

# Residents' Report of COVID-19 Associated Training Disruptions, Stressors, and Opportunities During the Pandemic—The Singapore Experience

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## ABSTRACT

**Background** The COVID-19 pandemic has disrupted residency training. Several studies have been performed to investigate the impact of the pandemic on residency training in Accreditation Council for Graduate Medical Education–International (ACGME-I)-accredited institutions. However, these were either limited to certain specialties or failed to consider possible opportunities from the pandemic.

**Objective** To determine the stressors on residents as well as the opportunities that arose from the COVID-19 pandemic across multiple specialties in Singapore.

**Methods** A cross-sectional survey among SingHealth residents was conducted between July and September 2020. The survey assessed the balance between service and training during hospital postings, the pandemic's influence on examination and teaching, the psychological impact of the pandemic, the level of burnout, and the effect on morale of residents during the pandemic.

**Results** The response rate was 27.1% (253 of 934). Out of the 253 residents, 136 (53.8%) felt stressed during the pandemic. Concerns about family's health and safety pertaining to potential COVID-19 infection, progression in training, and completion of examinations were the top 3 stressors. One-hundred and three residents (40.7%) had their training disrupted either by being placed in an interim posting not part of their residency requirements or being deployed to care for patients with COVID-19. Although administrative support and information for virtual teaching were sufficient, only 108 (42.7%) agreed it had the same value as face-to-face sessions. Despite the challenges, 179 (70.8%) thought that experiencing this crisis provided more meaning in their career.

**Conclusions** The COVID-19 pandemic has brought about challenges and learning opportunities for residents.

## Introduction

The COVID-19 pandemic has caused significant disruptions to learning environments in medical education and residency training. Social distancing measures and restrictions in cross-deployment reduced the mobility of health care staff and on-site learning opportunities.<sup>1,2</sup> Focus was also placed on service provision instead of training and education. Prior studies within single subspecialties showed that the fear of delayed graduation, infecting loved ones, lack of supervision when working in high-risk areas, loss of autonomy over working arrangements, fewer learning opportunities, and higher workload were possible stressors.<sup>3–5</sup>

Nonetheless, amid significant stressors, opportunities arose during the pandemic, such as having more

online learning content and asynchronous learning activities.<sup>6</sup> The pandemic also built resilience and improved residents' abilities to cope with stress.<sup>7</sup>

The COVID-19 pandemic has affected, and will continue to affect us, given its dynamic situation with new variants, new protocols, and new methods of teaching and learning. To supplement current studies that primarily investigated the negative effect of the COVID-19 pandemic on residents in single specialties, we aim to evaluate the challenges and opportunities across different specialties brought about by the pandemic. This is the first such study to be performed in an Accreditation Council for Graduate Medical Education–International (ACGME-I)-accredited institution.

## Methods

### Setting and Participants

A cross-sectional survey was conducted between July and September 2020 among residents in SingHealth

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*Editor's Note: The online version of this article contains further data and the survey used in the study.*

residency training programs. The survey coincided with the surge in community and migrant worker dormitory cases. Singapore has 3 sponsoring institutions accredited by ACGME-I and had 2278 residents in 2020, with SingHealth having the largest (934 of 2278, 41%) resident population.

### Survey Development

The survey was developed through an iterative review process by a committee that included the designated institutional official (DIO; T.H.K.), associate DIO (L.S.H.), program directors, and staff in the Centre for Resident and Faculty Development. It was coordinated by the SingHealth Graduate Medical Education Office.

The survey had 29 items and assessed for: (1) balance between service provision and training; (2) impact of the pandemic on examination and teaching; (3) psychological impact, level of burnout, and impact on morale; and (4) demographics (see online supplementary data). Response types were either dichotomous or were based on a 5-point Likert scale or required ranked responses.

### Participant Recruitment and Data Collection

Prospective participants were first invited via email on July 7, 2020 to complete the online survey. Subsequently, 6 reminders were sent 1 to 2 weeks apart from July 29 to October 9, 2020. Responses were collected anonymously.

### Statistical Analysis

Categorical variables were expressed as percentages. To quantify the importance of the stressors, each stressor was scored from 1 (least important) to 9 (most important). Stressors not ranked were scored zero. Weighted scores were obtained by multiplying the number of responses with the score. Statistical analyses were conducted using SPSS 20 (SPSS Inc, Chicago, IL). A *P* value of  $<.05$  was considered statistically significant.

### Ethical Approval and Consent

This study has been approved by SingHealth Centralised Institutional Review Board (reference: 2020/2942) with waiver of consent.

### Results

We received 253 valid responses from a target population of 934 residents (27.1%). Most were female, aged 31 to 35 years and from internal medicine (online supplementary data), similar to the profile of

the entire residency cohort (online supplementary data).

TABLE 1 reports the prevalence and triggers of stress by specialty. Weighted scores of each stressor are displayed in the online supplementary data. One hundred and thirty-six (53.8%) respondents either strongly agreed or agreed that they felt stressed during the pandemic. Among all respondents, the top 3 stressors (regardless of the pandemic) and most aggravated during the pandemic were concerns about family's health and safety, progression in training, and completion of examinations (online supplementary data).

TABLE 2 shows the impact of the pandemic on residency training and perception of new norms. Among the respondents, 40.7% (103 of 253) were either placed in an interim posting not part of their residency requirements or deployed to care for patients infected with COVID-19. However, 57.1% (144 of 253) to 74.3% (188 of 253) of residents deployed to community COVID-19 treatment facilities felt that they had adequate supervision and learning opportunities on resource management, communication, and ethics and professionalism in patient care. Despite challenges, 70.8% (179 of 253) thought that this crisis provided more meaning in their careers. For teaching, only 42.7% (108 of 253) acknowledged that teaching via videoconferencing had the same value as face-to-face teaching sessions.

### Discussion

To our knowledge, this study is the first to identify possible stressors and opportunities during the COVID-19 pandemic in residents across different specialties in an ACGME-I-accredited institution. The main findings of our study are: (1) most participants were stressed during the height of the pandemic; (2) the top 3 causes of stress were due to concerns about family's health and safety, progression in training, and completion of examinations; (3) the use of virtual teaching methods might not have the same value as face-to-face or simulation training; and (4) despite the challenges, a substantial proportion of residents thought that the pandemic provided more meaning in their careers.

Over 50% of participants felt stressed during the pandemic, which corroborates and supplements existing literature.<sup>8-10</sup> Their concerns about family's health and safety, progression in training, and completion of examinations as the top 3 stressors were similar to those in prior studies.<sup>3,9,11,12</sup> Unsurprisingly, residents were afraid of contracting the virus at work and infecting their family members.<sup>9,13-15</sup> A systematic review showed that reduction of training opportunities was the most common problem faced by residents,<sup>11</sup> which affected their residency progression, especially

**TABLE 1**  
Proportion of Residents Who Were Stressed During the COVID-19 Pandemic and Weighted Scores of Stressors

| Residency Program                      | Stressed During the COVID-19 Pandemic <sup>a</sup> , n (%) | Weighted Scores of Stressors <sup>b</sup> |                            |                |                                           |                 |                    |                         |                            |                                        |
|----------------------------------------|------------------------------------------------------------|-------------------------------------------|----------------------------|----------------|-------------------------------------------|-----------------|--------------------|-------------------------|----------------------------|----------------------------------------|
|                                        |                                                            | Patient-Related                           | Relationships at Workplace | Family's Needs | Concerns About Family's Health and Safety | Personal Health | Lack of Sleep/Rest | Progression in Training | Completion of Examinations | Lack of Safety in Training Environment |
| Diagnostic radiology                   | 10 (83.3)                                                  | 49                                        | 35                         | 53             | 78 <sup>c</sup>                           | 64              | 68                 | 79                      | 75                         | 29                                     |
| Obstetrics and gynecology              | 11 (68.8)                                                  | 71                                        | 61                         | 85             | 128                                       | 93              | 73                 | 81                      | 71                         | 41                                     |
| Pathology                              | 9 (64.3)                                                   | 40                                        | 65                         | 78             | 75                                        | 47              | 54                 | 79                      | 70                         | 20                                     |
| Medical oncology                       | 3 (60.0)                                                   | 29                                        | 25                         | 23             | 35                                        | 13              | 16                 | 34                      | 29                         | 10                                     |
| Emergency medicine                     | 10 (58.8)                                                  | 55                                        | 63                         | 91             | 106                                       | 87              | 98                 | 93                      | 77                         | 54                                     |
| Anesthesiology                         | 10 (55.6)                                                  | 84                                        | 42                         | 72             | 108                                       | 92              | 76                 | 95                      | 107                        | 67                                     |
| Internal medicine                      | 46 (54.8)                                                  | 470                                       | 328                        | 335            | 412                                       | 277             | 400                | 467                     | 433                        | 155                                    |
| Pediatrics                             | 14 (53.8)                                                  | 130                                       | 105                        | 123            | 156                                       | 109             | 131                | 117                     | 116                        | 70                                     |
| Cardiology                             | 3 (50.0)                                                   | 27                                        | 38                         | 37             | 31                                        | 22              | 26                 | 34                      | 29                         | 9                                      |
| Orthopaedic, plastic, and hand surgery | 5 (50.0)                                                   | 50                                        | 42                         | 49             | 62                                        | 35              | 32                 | 52                      | 50                         | 35                                     |
| General surgery                        | 5 (47.6)                                                   | 53                                        | 45                         | 58             | 69                                        | 29              | 43                 | 68                      | 60                         | 24                                     |
| Family medicine                        | 8 (34.8)                                                   | 110                                       | 100                        | 85             | 134                                       | 102             | 105                | 139                     | 99                         | 47                                     |
| Neurology                              | 2 (28.6)                                                   | 39                                        | 41                         | 43             | 45                                        | 30              | 16                 | 30                      | 23                         | 15                                     |
| Ophthalmology                          | 0 (0)                                                      | 13                                        | 17                         | 24             | 25                                        | 22              | 14                 | 28                      | 18                         | 8                                      |
| Total                                  | 136 (53.8)                                                 | 1220                                      | 1007                       | 1156           | 1464                                      | 1022            | 1152               | 1396                    | 1257                       | 584                                    |

<sup>a</sup> Respondents who selected "agree" and "strongly agree" to "I feel stressed during this period of pandemic."

<sup>b</sup> Stressors were ranked using a Likert scale ranging in response to the question "Rank in order, which factor will give rise to stress for you." Most important stressors were scored 9 and least important stressors scored 1. Stressors not ranked were scored zero. Weighted scores were obtained by multiplying the number of responses with the score.

<sup>c</sup> Bolded and italicized scores refer to the highest weighted scores of stressors in each residency program.

**TABLE 2**  
Impact of the COVID-19 Pandemic on Residency Training and Perception of New Norms

| Area                           | Statement                                                                                  | Agree <sup>a</sup> ,<br>n (%) | Neutral,<br>n (%) | Disagree <sup>b</sup> ,<br>n (%) |
|--------------------------------|--------------------------------------------------------------------------------------------|-------------------------------|-------------------|----------------------------------|
| Training and service provision | Deployed for duties in community COVID-19 facilities                                       | 35 (13.8)                     | N/A               | 218 (86.2)                       |
|                                | There was adequate supervision while serving in COVID-19 facilities <sup>c</sup>           | 26 (74.3)                     | 8 (22.9)          | 1 (2.9)                          |
|                                | Deployment allowed for learning of resource management <sup>c</sup>                        | 22 (62.9)                     | 8 (22.9)          | 5 (14.3)                         |
|                                | Deployment allowed for learning of interpersonal and communication skills <sup>c</sup>     | 22 (62.9)                     | 9 (25.7)          | 4 (11.4)                         |
|                                | Deployment allowed for learning of ethics and professionalism <sup>c</sup>                 | 20 (57.1)                     | 10 (28.6)         | 5 (14.3)                         |
|                                | Deployment allowed for learning of technologies and electronic resources <sup>c</sup>      | 16 (45.7)                     | 14 (40.0)         | 5 (14.3)                         |
|                                | Support was provided to ensure that training progression was not delayed                   | 180 (71.1)                    | 50 (19.8)         | 23 (9.1)                         |
|                                | The opportunity to experience this health care crisis provided more meaning in my career   | 179 (70.8)                    | 53 (20.9)         | 21 (8.3)                         |
|                                | Training was well-supported during the COVID-19 pandemic                                   | 170 (67.2)                    | 54 (21.3)         | 29 (11.5)                        |
|                                | Workload was more than usual                                                               | 117 (46.2)                    | 94 (37.2)         | 42 (16.6)                        |
| Teaching and examination       | Faculty supervision was reduced during the COVID-19 pandemic                               | 81 (32.0)                     | 71 (28.1)         | 101 (39.9)                       |
|                                | Did an interim posting outside of their originally planned posting                         | 68 (26.9)                     | N/A               | 185 (73.1)                       |
|                                | Communication of information regarding training was efficient                              | 189 (74.7)                    | 44 (17.4)         | 20 (7.9)                         |
|                                | There was sufficient administrative support when usual teaching methods had to be modified | 188 (74.3)                    | 48 (19.0)         | 17 (6.7)                         |
|                                | The postponement/cancellation of examinations added anxiety                                | 145 (57.3)                    | 85 (33.6)         | 23 (9.1)                         |
|                                | Teaching via video conferencing had the same value as face-to-face teaching                | 108 (42.7)                    | 52 (20.6)         | 93 (36.8)                        |
|                                | Simulation training can be carried out solely using video conferencing                     | 22 (8.7)                      | 57 (22.5)         | 174 (68.8)                       |

<sup>a</sup> Respondents who selected "agree" and "strongly agree."

<sup>b</sup> Respondents who selected "disagree" and "strongly disagree."

<sup>c</sup> Percentages reflected were based on the 35 respondents who were deployed for duties in community COVID-19 facilities.

for procedural-based specialties.<sup>12,16</sup> Fortunately, lack of safety in the training environment was not a major stressor, contrary to previous studies,<sup>11</sup> possibly due to established infection control measures.<sup>4,17,18</sup> More than 50% of respondents disagreed that virtual teaching methods had similar value as face-to-face teaching or simulation training. Blended teaching approaches could be used, with the mode of delivery tailored to learning objectives.<sup>19</sup>

Despite these concerns, the pandemic also presented opportunities, such as honing skills in resource management and communication while addressing ethics and professionalism in patient care. Also, 70.8% of respondents felt that the pandemic provided more meaning to their careers. Realising the importance of medical professionals during the crisis might have built their professional identity and intrinsic motivation.<sup>4,20</sup>

This study has several limitations. First, the response rate was low (27.1%), though similar to prior studies,<sup>5,21-23</sup> which increased the risk of nonresponse bias where nonrespondents could either be overwhelmed and apathetic, or unaffected. Given the cross-sectional study design, we could not observe changes over time, such as during the emergence of the Delta and Omicron variants that caused a surge in COVID-19 cases.<sup>24-26</sup> Additionally, a single question with a Likert scale scoring was used to measure stress levels, without additional items or comparator instruments to evaluate its validity. However, this was an expedient method to meet the exigencies of the pandemic.

## Conclusions

Over 50% of residents felt stressed during the COVID-19 pandemic. The main stressors include concerns about family's health and safety, progression in training, and completion of examinations. Knowledge of these stressors will be useful when planning for interventions and support programs that meet residents' needs. Importantly, residents thought that the pandemic added meaning to their careers and provided learning opportunities.

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