

## Health professions education in pandemics and epidemics: A proposed framework for educators

### Dear Editor,

The COVID-19 pandemic has disrupted healthcare systems and health professions education (HPE). There are few frameworks to help educators manage HPE before, during and after pandemics and epidemics. We developed a crisis management framework which draws from diverse theories to emphasise preparedness, leadership, stakeholder perceptions and organisational learning to provide guidance.<sup>1</sup> Bundy et al. define crisis management in 3 stages: before, during and after a crisis. This allows detailed response planning.<sup>1</sup> We adapted it to derive a framework for HPE in pandemics and epidemics (HPEPE). This framework is relevant as it reminds educators to not only focus on the present pandemic, but also the steps to take before and after the crisis to learn and prepare further for the future.

We performed a systematic literature review and identified 208 publications relevant to HPEPE. We distilled the key points, grouped them into 6 elements, reaffirmed representativeness, then mapped them back to the crisis management framework.<sup>1</sup> We describe 6 elements, comprising 6 Cs—curriculum, continuing professional development (CPD), communications, courage, communities and continuity—and demonstrate their relevance to HPEPE and crisis management stages. Table 1 illustrates how our proposed framework was applied during the COVID-19 pandemic in the Singapore context.

**Curriculum.** Swift curriculum adaptation is essential in HPEPE.<sup>2-4</sup> Hybrid models, combining remote and on-site teaching and training could be adopted. Similarly, to minimise risk of exposure, alternatives could be used for assessments, such as electronic proctoring for written examinations, or use of simulated patients and videoconferencing for clinical assessments. Virtual selection interviews and even graduation ceremonies could be conducted online. Investing in technology resources (high-speed Internet access, video-production facilities, videoconferencing software and learning management systems<sup>5</sup>) and upskilling faculty to thoughtfully use technology<sup>5</sup> are crucial for HPEPE. While technological innovations are welcome, educational principles should guide design and implementation,<sup>5</sup> with emphasis placed on programme evaluation. Context must be considered during implementation. Uptake of technology varies depending

on resource settings,<sup>3</sup> and increased technology use may exacerbate resource disparities between learners, regions or countries, leading to disenfranchised learners. Education systems should thus provide additional resources as appropriate.

During pandemics, important but less visible curriculum elements (including leadership skills, ethics, decision-making in uncertainty, resource management, adaptability and professionalism) may be opportunistically and authentically taught using case discussions, reflection and role modelling.<sup>6,7</sup> Post-pandemic, schools should re-examine the teaching and integration of public health, epidemiology and infection control preparedness<sup>6,7</sup> in their curricula during curricular review.

**CPD.** During pandemics, adapting CPD for healthcare professionals is vital for just-in-time learning and up-to-date practice as pandemic-related medical knowledge evolves rapidly.<sup>3</sup> Frontline healthcare professionals should educate themselves through trustworthy CPD resources and international resources (e.g. online resources by the US Centers for Disease Control and Prevention and the World Health Organization) for accessible and up-to-date information. Post-pandemic CPD might embrace a wider range of pandemic-related topics such as communications, technology-enhanced learning, disaster medicine, or psychological effects of the pandemic on individuals or societies.

**Communications.** Good communications applies equally to crisis management<sup>1</sup> and HPEPE. Communications is important in all stages of HPEPE, but particularly critical during the pandemic for internal and external stakeholders.<sup>6,8</sup> Two-way communications for internal stakeholders (learners, faculty and administrators) serve to provide information, receive feedback, offer reassurance and maintain morale; technology can extend the reach of these communications. Communications allow engagement, build trust and may mitigate the sense of isolation. For external stakeholders (healthcare institutions or government/regulatory bodies), communications allow for effective coordination of student/resident placements, planning of curricular changes and crafting of education-related policies. Before the next pandemic, planning for defined communications protocols and teams can be done.<sup>2</sup>

Table 1. Application of the framework for health professions education in pandemics and epidemics (HPEPE) at institutional and national levels during the COVID-19 pandemic

	Institutional level activities and outcomes	National level activities and outcomes
<b>Curriculum</b>	<ol style="list-style-type: none"> <li>1. Creation of new neurology e-lecture series for students from 3 medical schools, blueprinted to national curriculum</li> <li>2. Use of teleconferencing (Zoom) for neurology residents for:               <ol style="list-style-type: none"> <li>a. Teaching</li> <li>b. Assessments: case-based discussions and assessments of entrustment in entrusted professional activities</li> </ol> </li> <li>3. Survey of neurology residents to assess impact of COVID-19 pandemic on their teaching, training and supervision</li> <li>4. Upgrading of Internet routers, purchase of software licences and laptops for digital education</li> </ol>	<ol style="list-style-type: none"> <li>1. Several Ministry of Health advisories were issued on training for all health professions that provided guidance for curriculum, especially in learning and assessment (formative or summative), aiming to balance workforce competency, student safety and sustainability</li> <li>2. Advisory from Ministry of Health covering principles and conduct of summative examinations during COVID-19</li> <li>3. Review of coverage of infection control in curriculum of all health professions (medical, nursing, allied health)</li> <li>4. Modified objective structured clinical examination (OSCE) for Singapore neurology exit examination, which was conducted in accordance to advisories above</li> </ol>
<b>Continuing professional development (CPD)</b>	<p>(Creation of national level CPD resources)</p> <ol style="list-style-type: none"> <li>1. Frequent communications to faculty by institute's Education Director during COVID-19 pandemic (initially sent weekly, later monthly) covering education-related issues relevant to the pandemic</li> <li>2. Meetings by Programme Directors with neurology and neurosurgery residents to update residents, address concerns and co-create solutions</li> <li>3. Care packages given to all staff, with signed note from institutional Medical Director</li> </ol>	<ol style="list-style-type: none"> <li>1. Creation of national level CPD resources:               <ol style="list-style-type: none"> <li>a. Ministry of Health (<a href="https://www.moh.gov.sg/covid-19/faqs">https://www.moh.gov.sg/covid-19/faqs</a>)</li> <li>b. Saw Swee Hock School of Public Health, National University of Singapore (<a href="https://sph.nus.edu.sg/covid-19/webcasts/">https://sph.nus.edu.sg/covid-19/webcasts/</a>)</li> <li>c. Academy of Medicine, Singapore (<a href="https://www.ams.edu.sg/policy-advocacy/covid-19-resource-page">https://www.ams.edu.sg/policy-advocacy/covid-19-resource-page</a>)</li> </ol> </li> </ol>
<b>Communications</b>	<ol style="list-style-type: none"> <li>1. Regular communications by Ministry of Health with multiple stakeholders:               <ol style="list-style-type: none"> <li>a. Medical, nursing, allied health schools' leadership</li> <li>b. Students from schools above</li> <li>c. Postgraduate training programmes and Designated Institutional Officers Policies adjusted based on stakeholder feedback</li> </ol> </li> <li>2. Message from Health Minister to all healthcare workers in Singapore (<a href="https://www.moh.gov.sg/hpp/all-healthcare-professionals/news/NewsArticleDetails/minister-s-message-to-healthcare-workers">https://www.moh.gov.sg/hpp/all-healthcare-professionals/news/NewsArticleDetails/minister-s-message-to-healthcare-workers</a>)</li> </ol>	<ol style="list-style-type: none"> <li>1. Regular communications by Ministry of Health with multiple stakeholders:               <ol style="list-style-type: none"> <li>a. Medical, nursing, allied health schools' leadership</li> <li>b. Students from schools above</li> <li>c. Postgraduate training programmes and Designated Institutional Officers Policies adjusted based on stakeholder feedback</li> </ol> </li> <li>2. Message from Health Minister to all healthcare workers in Singapore (<a href="https://www.moh.gov.sg/hpp/all-healthcare-professionals/news/NewsArticleDetails/minister-s-message-to-healthcare-workers">https://www.moh.gov.sg/hpp/all-healthcare-professionals/news/NewsArticleDetails/minister-s-message-to-healthcare-workers</a>)</li> </ol>
<b>Courage</b>	<ol style="list-style-type: none"> <li>1. Healthcare staff volunteered for patient care in COVID-19 wards and community care facilities</li> <li>2. Faculty trialed new educational methods, such as Zoom-based teaching and assessments, and Zoom-based team-based learning</li> </ol>	<ol style="list-style-type: none"> <li>1. Ministry of Health made difficult but necessary decisions, balancing safety with learning to:               <ol style="list-style-type: none"> <li>a. Allow students back to clinical areas for focused clinical learning with appropriate precautions</li> <li>b. Continue summative examinations with precautions, and allow newly graduated doctors to start work earlier</li> <li>c. Set boundaries and reject calls from some faculty asking for students to be posted to areas with higher risk of COVID-19 infection to ensure student safety</li> </ol> </li> <li>2. Postgraduate clinical examinations reviewed by Ministry of Health and conducted using teleconferencing and other safe-distancing precautions</li> </ol>
<b>Communities</b>	<ol style="list-style-type: none"> <li>1. Staff support hotline</li> <li>2. Continuation of existing faculty development programme, "Fireside Chat", using Zoom teleconferencing to build community of practice</li> <li>3. Academic conference in October 2020 on medical humanities during COVID-19 pandemic</li> </ol>	<ol style="list-style-type: none"> <li>1. Faculty development webinar on technology-enhanced learning held via Zoom in April 2020 by the Academy of Medicine, Singapore, bringing health professions education community together</li> <li>2. Singapore government's initiative to highlight voices from Singaporeans speaking about the pandemic (<a href="https://www.singaporetogether.gov.sg/reflect/stories">https://www.singaporetogether.gov.sg/reflect/stories</a>)</li> </ol>
<b>Continuity</b>	<ol style="list-style-type: none"> <li>1. Continuation of funding support for conferences (both scientific and educational)</li> <li>2. Ongoing revision of institutional continuity plan, including educational aspects</li> <li>3. Ongoing revision of neurology residency curriculum and structure to be more pandemic-resilient</li> </ol>	<ol style="list-style-type: none"> <li>1. Ministry of Health's existing standards for medical schools revised to include need for education continuity</li> <li>2. Archiving documents and decisions made during the pandemic by government</li> <li>3. Plans for post-pandemic review and planning a whole-of-government response to the next pandemic</li> </ol>

**Courage.** This is important in all stages of a pandemic. Courageous behaviours take many forms and can be displayed by both individuals and organisations.<sup>7</sup> As individuals, faculty members become role models by courageously staying true to their ethical duty to provide care. Such behaviours reinforce professional values for junior learners and facilitate the formation of professional identity. In bravely embracing lifelong learning, faculty can learn new technology skills, while students/residents can adopt new roles and responsibilities by becoming peer teachers or preparing CPD updates.

As organisations, schools and training programmes need to restructure curricular components and make difficult curricular decisions during pandemics. Courageous leadership is needed to make necessary sacrifices. Schools may need to graduate students earlier to supplement the workforce.<sup>6</sup> This requires strong leadership to address student/parental concerns, while making the necessary curricular adaptations to ensure that critical competencies are achieved before graduation. Post-pandemic reviews are also important to courageously acknowledge failures and also celebrate successes. Key learning points should be documented.

**Communities.** During and after pandemics, our learners experience fear and isolation. Healthcare communities can provide much-needed emotional support to learners.<sup>7</sup> The educator community can also support learners using a variety of approaches to encourage self-care, constructivist growth and professional development.<sup>9</sup> Our learners, as fledgling members of a healthcare community of practice,<sup>4</sup> can assist in clinical care during pandemics. This facilitates acculturation into the community of practice via legitimate peripheral participation that forms their professional identity.

**Continuity.** The crisis management literature emphasises the utility of business continuity plans. As an example, higher education maintains analogous academic continuity plans that can be adopted and developed for HPE systems.<sup>8,10</sup> A coordinating taskforce should be formed once the crisis is recognised to ensure continuity of the education mission, which is contingent upon the first 5 elements in our framework. If additional resources are needed to support these preceding elements, organisations should acquire them as a demonstrated commitment to education continuity. Post-pandemic, the continuity plans should be refined after review, and can be also stress-tested and strengthened via simulation.

Our proposed HPEPE framework emphasises principles and critical influences. As it is new, it has yet to be successfully implemented in full throughout all stages of a pandemic. We also acknowledge that the framework has only been used in a healthcare system in Singapore. Therefore, context needs to be considered in implementation. Future studies on application of this framework will help with validation and refinement.

Epidemics and pandemics will undoubtedly recur. A framework will help educators manage these crises, and plan responses to current and future crises. In this way, HPE becomes an active enabler of learning and resilience for students, faculty, and the health and education systems.

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