



# COVID-19: A Reminder for Medical Curriculum Review

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**Abstract:** Medical schools must ensure that their curricula evolve in response to changes in clinical practice and the needs of future doctors. Undergraduate medical programs should be better equipped to anticipate and plan for changes in future clinical practice and learning needs of the students. The COVID-19 outbreak and the recent epidemics of new and emerging infections have brought into sharp focus the importance of subjects, such as infectious diseases, infection control, public health, occupational health and virology in medical school curricula. A review of the medical curriculum at PAPRSB Institute of Health Sciences revealed that the time allotted for teaching these subjects is much less than that allotted for teaching non-communicable diseases and other subjects. The changing health paradigm requires medical teaching to be continuously redefined and updated. Given the reduced amount of teaching time allotted for subjects, such as infectious diseases, infection control, public health, occupational health and virology, it might be timely to review and recalibrate the teaching hours of these subjects in all the medical curricula, to better prepare our doctors facing the challenges of future epidemics and pandemics.

**Keywords:** pandemic, infectious diseases, curriculum revision

## Introduction

Due to the exponential increase in medical knowledge, technical innovations, scientific advances and changing patterns of disease demographics, the medical curriculum is constantly evolving and needs regular review and updating. Medical schools must ensure that curricula evolve in response to changes in clinical practice and the needs of future doctors.<sup>1</sup> It has also been proposed that undergraduate medical programs be better equipped to anticipate and plan for changes in future clinical practice and learning needs of the students.<sup>1</sup>

The epidemics and pandemics of emerging or re-emerging infectious disease, on average have appeared every decade but recently, the frequency between epidemics and pandemics seems to be shorter as evident with Severe Acute Respiratory Syndrome (SARS) in 2003, Influenza A H1N5 (bird flu) in 2007, H1N1 (swine flu) in 2009, Middle East Respiratory Syndrome (MERS) in 2012, Ebola in 2014,<sup>2</sup> Zika in 2016 and now in 2020, we are in the midst of COVID-19 pandemic.<sup>3</sup> The COVID-19 outbreak and the recent epidemics of new and emerging infections have brought into sharp focus the importance of subjects such as infectious diseases, infection control, public health, occupational health and virology in medical school curricula.

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## Curriculum Overview in PAPRSB Institute of Health Sciences

The Pengiran Anak Puteri Rashidah Sa'adatun Bolkiah (PAPRSB) Institute of Health Sciences at Universiti Brunei Darussalam (UBD) offers a three-year Bachelor of Health Sciences (Medicine) program. It is a fully integrated course which covers four main curricular areas: health sciences, our community, patient care, and personal and professional development, with clinical experience from the start of the program. After this first phase at UBD, the students are transferred to one of the partner medical schools (PMS) for the second phase of the program to complete the undergraduate Medicine program. Currently, the PMS are in the United Kingdom, Ireland, Australia and Hong Kong.<sup>4</sup>

Formal curriculum mapping at PAPRSB Institute of Health Sciences was initiated during the first few months of 2009 and is an active process as the program continues to evolve in line with best practice in medical education content and delivery. The subjects taught in PAPRSB Institute of Health Sciences are in-line with the module content throughout the six semesters (three years) which cover Chemistry of life, Body structure and function, Cardiovascular and Respiratory, Blood and Endocrine, Gastrointestinal and Renal, Musculoskeletal and Skin, Brain and Behavior, Life cycle and Genitourinary medicine.<sup>3</sup> As it is a fully integrated course, the students have exposure to clinical postings and patients from year one to year three. Like other undergraduate medical institutions, curriculum changes in PAPRSB Institute of Health Sciences have been done throughout the years, mainly consisting of syllabus or content modifications.

A general needs assessment of the undergraduate medical students on the teaching of subjects related to pandemics was undertaken in PAPRSB Institute of Health Sciences. The authors used a less resource-intensive source of data by reviewing the current curriculum documents of PAPRSB Institute of Health Sciences. We identified the titles, time allotted for the teaching sessions, learning objectives, designs, mode of delivery and assessments of all the teaching sessions related to the topics of epidemic and pandemic (infectious diseases, infection control, public health, occupational health and virology). Our review of the curriculum revealed that over the 3-year program in UBD, the time allotted for teaching infectious diseases, infection control, public health, occupational health and virology is much less than that allotted for teaching non-communicable diseases

and other subjects. The total time allotted for teaching infectious disease is 69 hours (4.6% of the total teaching time), infection control is 9 hours (0.6%), public health is 14 hours (0.9%), occupational health is 3 hours (0.2%), and virology is 10 hours (0.7%), whereas the time allotted for teaching non-communicable disease is 372 hours (24.6%) and for all other subjects is 1033 hours (68.4%), over the 3 years of the undergraduate course (Table 1).

## Discussion

Infectious diseases pose a major threat to mankind's survival, health, wellbeing, prosperity, social stability and security. They account for 41% of global disease and are responsible for millions of deaths each year worldwide.<sup>5</sup> The frequent occurrence of emerging infectious diseases has pushed microbial threats and public health more into the forefront. There are concerns that undergraduate medical doctors are not adequately prepared for these wide-ranging infectious disease and public health responsibilities.<sup>6</sup> In times of pandemic, medical students may be called upon to actively volunteer in hospitals and communities to provide medical and health assistance, as well as guidance to the public. The students are willing to work but they may feel underprepared in times of pandemic. Mortelmans et al in their survey of medical students reported that during the H5N1 pandemic 70% of the students reacted positively towards the idea of being involved in patient care during the pandemic. However, they also found that only 18.9% of the students estimated themselves to be sufficiently educated on the pandemic, and 91% were convinced that care for patients during pandemics should be incorporated into their regular curriculum.<sup>7</sup>

Of the 3-year program in PAPRSB Institute of Health Sciences, only 7% of the teaching and learning time is allotted to the subjects of infectious disease, infection control, public health, occupational health and virology. While it is important to consider the amount of teaching and learning time allotted in the curriculum, it is also crucial to include and to increase the dimension of specific key topics in these subjects. Melber et al reported that some key topics of emerging importance, such as antimicrobial stewardship, the microbiome, infection control, global health and emerging infectious diseases were not emphasized in more than one-third of medical schools in the US.<sup>8</sup>

Although the data supporting our argument are limited to our own institution, reports from various countries have also raised similar concerns about undergraduate medical teaching and the future doctors' preparedness to face the

**Table 1** Teaching Hours for Subjects in PAPRSB Institute of Health Sciences, UBD in Year 1 to Year 3

Subject	Teaching Hours in Year 1	Teaching Hours in Year 2	Teaching Hours in Year 3	Total Hours
Infectious diseases	24	19	26	69 (4.6%)
Infection control	2	0	7	9 (0.6%)
Public health	11	1	2	14 (0.9%)
Occupational health	1	2	0	3 (0.2%)
Virology	1	9	0	10 (0.7%)
Non-communicable diseases	54	167	151	372 (24.6%)
All other subjects	364	339	330	1033 (68.4%)
Total				1510 (100%)

challenges of emerging and re-emerging infectious disease and pandemics.<sup>9–12</sup> Reports from the US have found that public health teaching was often perceived as peripheral in university medical programs<sup>9</sup> and concluded that additional education and training in public health in US medical schools was needed.<sup>10</sup> In the UK, many medical schools have faced difficulties with reduced time in teaching emerging infections and public health, and this was often compounded by deteriorating staffing level.<sup>11</sup> A survey also found that the lack of curriculum time was one of the reasons for the difficulties faced by educators in teaching public health in Canadian medical schools.<sup>12</sup>

We propose to undertake a formal targeted needs assessment at PAPRSB Institute of Health Sciences to assess the training and educational needs of the undergraduate medical students on pandemic, and to align their needs with the medical curriculum. Formal needs assessment will identify other important topics such as crisis management, disaster response, disaster ethics and management skills that are important in ‘pandemic preparedness’ which should also be included in the medical curriculum. As the total time allocated to the whole medical curriculum is finite, increasing the time allotment to subjects on pandemic would have to involve the consideration of reduction of time allotted to some of the other subjects.

## Conclusion

The changing health paradigm requires medical teaching to be continuously redefined and updated. Given the reduced amount of teaching time allotment for subjects such as infectious diseases, infection control, public health, occupational health and virology, it might be timely to review and recalibrate the teaching hours of these subjects in all the medical curricula. Curricular review should be perpetually responsive to change,<sup>13</sup> increasing the teaching time allocated for subjects on emerging and re-emerging infectious disease pandemics will ensure that

undergraduate medical curricula are better equipped to anticipate and plan for changes in clinical practice.

## Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed on the journal to which the article will be submitted; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

## Disclosure

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