

# **Protocol: Developments in medical education in response to the COVID-19 pandemic: A BEME scoping review**

## Review Team

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## Background

The novel coronavirus disease (Covid-19) is a highly contagious disease that was first reported in Wuhan, Hubei Province, China in December 2019. Within weeks of the emergence of the disease, it had spread to several countries and the World Health Organization (WHO) declared the outbreak as a Public Health Emergency of International Concern in January 2020 and as a pandemic in March 2020 (Bedford J et al. 2020). According to the dashboard of the Center for Systems Science and Engineering at Johns Hopkins University, Baltimore, USA (Dong E, 2020) the disease has been reported in 188 countries, affected over 35,000,000 people worldwide and caused over 1,000,000 deaths globally as of October 1, 2020.

Covid-19 is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2), previously known as the 2019 novel coronavirus (2019-nCoV). SARS-Cov-2 is a novel member of coronaviruses which are a large class of highly diverse, enveloped, positive-sense, single-stranded RNA viruses (He F, et al. 2020). The impact globally on medical education has already been felt with huge numbers of campuses on lockdown (Ahmed H, et al. 2020) with new requirements for physical distancing and personal protective equipment (PPE) for clinical encounters. This has meant teaching and assessments have had to occur in very different ways.

A number of educational developments or interventions have been deployed in response to COVID-19. This author group previously conducted a rapid systematic review of such developments (Gordon, et al. 2020). We anticipate that many developments in education brought about by Covid-19 will likely persist beyond the pandemic. It is therefore crucial as a community to examine and understand the strengths and weaknesses of approaches and innovations. Developments identified in the first review included pivoting to online education delivery, replacing traditional workplace-based learning with virtual learning or telehealth, adapting assessment processes, and addressing learner support, mental health, and wellbeing.

Our initial review analyzed published articles between December 1<sup>st</sup>, 2019 - May 24<sup>th</sup>, 2020. A pilot search conducted in September revealed that a substantial number of new developments had been reported in the intervening time period. Multiple publications in our initial review indicated that outcome data and additional details would be reported in the future, warranting an update review. Indeed, our pilot search showed that more studies with outcomes data were now available. Furthermore, there were additional studies in areas identified as gaps in our prior review, namely, well-being, assessment, and interviewing for medical school and residency.

The team initially produced a revised protocol and planned to complete a similar systematic review to the previous publication, updating the synthesis. Pilot searching revealed there was a substantial increase in the volume of published literature in the months since the previous review. Additionally, there was noted to be a divergence of scope, scale, methodology and outcomes of these reviews which presented a significant challenge to the review team and the wider educational community. The methodology was revised to consider just reviews with evaluation of outcomes, but this still left a wide ranging evidence base that did not appear to clearly converge in any one area or suggest key areas of focus for smaller systematic reviews.

The team therefore revised the goals of this project to map and chart the rapidly expanding literature.

Therefore, the aim of this systematic review is to conduct a scoping review of reports on educational developments in response to the COVID-19 pandemic within medical education.

### Review Questions

- To examine the extent, range and nature of medical education COVID-19 research activity
- To determine areas of focus for undertaking full systematic reviews in the future
- To summarize and disseminate current research findings of the rapidly expanding evidence base
- To identify gaps in the existing literature for future research

### **Methods**

This protocol has been guided by our previously published framework (Gordon 2020), BEME guidance and the model for scoping reviews described by Arksey and O'Malley (2005). The review team have decided to align with the overarching requirements in the STORIES statement (Gordon 2014) as there is no clear framework for reporting scoping reviews in the field. However, amendments to meet the goals of the Arksey and O'Malley (2005) guidance have been made.

The five stages of a scoping review were followed.

- Stage 1: identifying the research question (as above)
- Stage 2: identifying relevant studies
- Stage 3: study selection
- Stage 4: charting the data
- Stage 5: collating, summarizing and reporting the results

### **Stage 2: Identifying relevant studies**

#### Search Terms

(covid-19[tw] OR COVID19[tw] OR COVID-19[nm] OR SARS-CoV-2[tw] OR SARS-CoV2[tw] OR severe acute respiratory syndrome coronavirus 2[nm] OR severe acute respiratory syndrome coronavirus 2[tw] OR 2019-nCoV[tw] OR 2019nCoV[tw] OR coronavirus[tw] OR coronavirus[mh] OR pandemic[tw]) AND ("Internship and Residency"[Mesh] OR "Students, Medical"[Mesh] OR "Education, Medical"[Mesh] OR "Schools, Medical"[Mesh] OR Intern[tiab] OR interns[tiab] OR "House officer"[tw] OR "house officers"[tw] OR Resident[ti] OR residents[ti] OR residency[ti] OR "medical education"[tw] OR fellow[tiab] OR fellows[tiab] OR "junior doctor"[tw] OR "junior doctors"[tw] OR "post-graduate"[tw] OR postgraduate[tw] OR "foundation year"[tw] OR "foundation program"[tw] OR "medical student"[tw] OR "medical students"[tw] OR "Curriculum"[mesh] OR curricul\*[tiab] OR "medical school"[tw] OR "medical schools"[tw] OR "medical training"[tw] OR "undergraduate"[tw] OR "graduate"[tw] OR Learn\*[tw] OR

training[tw] OR trainer[tw] OR trainee\*[tw] OR instructor\*[tw] OR instructional[tw] OR educat\*[tw] OR classroom\*[tw] OR simulat\*[tw] OR virtual[tw] OR ZOOM[tw]) AND ("2020/05/01"[Date - Publication] : "3000"[Date - Publication])

### Search Dates

May 1, 2020 – September 09, 2020 for PubMed, January 1, 2020 – September 19, 2020 for other databases (as delineating by month isn't possible).

### Search Strategy

- Databases will include Pubmed, Embase, CINAHL and PsychINFO
- MedEd Publish will be manually searched
- We decided to include the same databases as the original search for simplicity / clarity in PRISMA reporting.
- Titles and abstracts of all papers will be reviewed independently by two authors against the below inclusion and exclusion criteria. Inter-rater reliability will be calculated using Cohen's Kappa. Full texts will be reviewed against the inclusion and exclusion criteria by two authors. Disputes at any stage will be resolved through discussion, including a third author where necessary, until consensus is reached.
- A pilot search identified several interventions of interest that had been executed but not yet evaluated due to insufficient time prior to publication

### **Stage 3: Study Selection**

#### Inclusion criteria:

- Studies describing developments in medical education explicitly deployed in response to COVID-19.
- Studies in undergraduate, graduate or continuing medical education.
- Studies with medical students, residents, fellows, or physicians.
- Studies in any language.
- Studies that consider Kirkpatrick's outcomes (Level 1: Reaction, Level 2: Learning, Level 3: Behavioural Change, Level 4: Organisational Performance) OR other outcomes (e.g., quality improvement).

#### Exclusion criteria:

- Opinion pieces, commentaries, editorials, perspectives, calls for change, needs assessments and other studies where no actual development had been deployed.
- Studies that describe the development as a minor part of a larger package of planned measures.
- Studies that only have other healthcare professionals (i.e. other than medics)
- Studies that were included in our previous systematic review from December 1<sup>st</sup>, 2019 – May 24<sup>th</sup>, 2020

## **Stage 4: Charting the data**

This highlights key items to be extracted and considered amongst primary studies within a high-quality systematic review in medical education. Data will be extracted into a shared Microsoft Excel file.

Key items included will be:

- Paper identifiers (author(s), month of publication)
- Context
  - Geographic origin of development, local COVID-19 specific details
  - Participants / learner type and number, level of medical education (e.g. undergraduate medical education (UME), graduate medical education (GME), continuing medical education (CME) or mixed)
  - Setting / institution responsible for educational delivery (e.g., university, academic hospital)
  - Context where development experienced by the learner (e.g., classroom, online, hospital, community clinic)
  - Medical specialty if applicable
- Description of intervention
  - Primary focus of the development
  - Stated purpose of deployment (What problem was addressed?)
  - Brief summary of development
  - Further description of development with any links to materials
  - Theoretical models or conceptual frameworks described
  - Resources (details of cost / time / other resources)
- Intervention outcome(s) (Kirkpatrick outcome level or similar)
  - Level 1 participant reaction
  - Level 2a changes in attitudes; Level 2b changes in knowledge or skills
  - Level 3 behavioral change
  - Level 4a change in organizational practise; Level 4b change in clinical outcomes
  - Other outcomes (QI, policy change, checklist development, other impact)
- Summary or results
  - Lessons learnt
  - Key points from discussion
  - Summary of conclusion
  - What future research is indicated

Extraction will be completed by two authors independently, and discrepancies resolved by involving a third through discussion until a full consensus can be reached.

## **Stage 5: collating, summarizing and reporting the results**

This section is where the protocol deviates from the previous review by the team and from BEME review and is heavily guided by the framework for scoping reviews (2005) to allow the research questions to be addressed.

Unlike a standard BEME systematic review which may require researchers to read and review a large number of studies, with only a small percentage included in the final report, the scoping review seeks to present an overview of all material reviewed and consequently issues of how best to present this potentially large body of material are critical (Arskey 2005).

Again, unlike a BEME systematic review or our previous rapid review (Gordon 2020), the scoping study does not 'synthesize' evidence, assess quality or to aggregate findings from different studies.

The results will be charted in the following ways.

Firstly, by defining and categorizing the context and form of development. We will produce tables and charts mapping: the geographic distribution of studies, level of medical education, setting / institutions responsible for educational delivery, medical specialties, focus of the developments, and theoretical frameworks.

Having 'charted' information from studies, we will present a narrative account of findings. This will consider the extent and range of developments included in the review and outcomes assessed.

The literature will then be organized and categorized considering these key dimensions to identify key areas of convergence and divergence. In areas of convergence, key themes of the current literature and research findings will be narratively summarized. This will also allow the areas in greatest need for future systematic reviews to be highlighted. Finally, areas where there is a paucity of research will be identified and highlighted to guide future researchers.

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