A journey like no other: anatomy 2020!

Article  (Accepted Version)


This version is available from Sussex Research Online: http://sro.sussex.ac.uk/id/eprint/99728/

This document is made available in accordance with publisher policies and may differ from the published version or from the version of record. If you wish to cite this item you are advised to consult the publisher's version. Please see the URL above for details on accessing the published version.

Copyright and reuse:
Sussex Research Online is a digital repository of the research output of the University.

Copyright and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable, the material made available in SRO has been checked for eligibility before being made available.

Copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.
A journey like no other: Anatomy 2020!

Claire F. Smith1, Wojciech Pawlina2,*

1Department of Medical Education, Brighton and Sussex Medical School, University of Sussex, Brighton, United Kingdom

2Department of Clinical Anatomy, Mayo Clinic College of Medicine and Science, Mayo Clinic, Rochester, Minnesota

Running title: Covid-19 and Anatomy 2020

*Correspondence to: Dr. Wojciech Pawlina, Department of Clinical Anatomy, Mayo Clinic College of Medicine and Science, Mayo Clinic, 200 First Street SW, Rochester, MN 55905. USA. E-mail: pawlina.wojciech@mayo.edu

Keywords: Gross anatomy education, medical education, covid-19 pandemics, medical students, leadership, digital skills, body donation, resilience, mental health
As 2020 is over, it seems fitting to start this editorial by reflecting on what can only be described as a seismic shift in how anatomy educators and students learning anatomy have been affected by the global Covid-19 pandemic. As the pandemic spread across the world, it has imposed social, educational and physical changes on all of us at a pace and scale like no other event in this century (Ferrel and Ryan, 2020; Torda, 2020). Approximately 107 countries rapidly implemented closures of their educational institutions globally impacting over 1.38 billion learners (Li and Lalani, 2020; Sahu, 2020; Viner et al., 2000a, b). Schools and universities were forced to rapidly move their education activities online (Bao, 2020; Mukhtar et al., 2020). The evidence for the effectiveness of school closures and social distancing implemented by governments was based almost entirely on the past influenza models, where viral transmission was driven by non-compliance of children to infection control practices (Jackson et al., 2014; Rashid et al., 2015; Bin Nafisah et al., 2018; Viner et al., 2000b). However, since the transmission pattern of Covid-19 appears to be different (Mehta et al., 2020) it is still unclear whether school and university closures are effective in coronavirus outbreaks (Viner et al., 2000b). Epidemiological studies from China indicated that social distancing alone could be sufficient to control COVID-19, whereas proactive closures of schools cannot interrupt viral transmission on their own (Zhang et al., 2020). Systematic reviews and meta-analysis from a large number of observational studies support practice of physical distancing and the use of face masks that are associated with large reduction in risk of Covid19 infection (Chu et al., 2020).

Teaching of the foundational sciences, and in particular laboratory-based courses were affected by school closures. For anatomy this meant the closure of most anatomy teaching facilities in medical schools and anatomy units/departments in universities (Brassett et al.,
The result was anatomists had to rapidly then change provision to be on-line (Evans et al., 2020; Longhurst et al., 2020; Pather et al., 2020). However, at the same time many medical faculty, staff and students involved in anatomy education had to return to front line of medical and clinical patient care workforce. Creating additional pressure on non-clinical anatomists to develop and use new virtual approaches to continue delivery of anatomy curricula. Anatomists also had to create action plans that enabled the gradual return to limited dissection classes or experiences when it was safe to do so (Bond and Franchi, 2020; Brassett et al., 2020; Cheng et al., 2021; Ross et al., 2020).

If we look back over the history of higher education, in a period of a few months, Covid-19 has dramatically changed world-wide education with the massive rise in e-learning approaches and remote teaching. There have been few times in history where major educational advances have been triggered as the result of world events. Perhaps, the last being the changes after World War II with direct focus on subjects and redefining the “modern” university system as part of a collection of educational services under one roof (Goldin and Ktaz, 1999; Ludmerer, 2005). This was accompanied by a substantial increase in the number of new higher educational institutions (Goldin and Ktaz, 1999). The founding of the internet was another significant event that has changed educational practices with online techniques gradually infiltrating the higher education arena in recent decades (Hillstrom, 2015).

There are a number of themes that have emerged for anatomists while they have been adapting their practices during the pandemic: leadership, digital skills, body donation,
resilience, and mental health (Evans et al., 2020; Longhurst et al., 2020; Pather et al., 2020; Ravi, 2020).

**Leadership**

Anatomists are often the part of the first course or module in a medical curriculum and this has not only put anatomists right at the forefront of responding to the changing educational landscape, but also in the forefront of making decisions and setting a standard for other areas of medical and allied health care education. Some of these decisions would have been unthinkable in their speed and consequences in previous years. The amount of “process” required for change has always been a barrier in education. Anatomists have had to be leaders using skills more aligned with crisis management instead of educators. Anatomists because of their other roles in curriculum management and institutional leadership have had to assist in the creation of socially distanced campuses (Parkin and Brown, 2020) and have had to work out enhanced health and safety standards and practices for their anatomy laboratories.

**Digital Skills**

Under the theme digital skills there are a range of issues that anatomists have faced. One of the barriers to digital innovation has been perception and at times reluctance to move completely into digital modes of delivery. Before Covid-19 there were on-line programs however, some teachers had never taught virtually and had to quickly upskill to adapt to Zoom, Microsoft Teams or other videoconferencing platforms (Longhurst et al., 2020; Pather et al., 2020). This left many instructors feeling vulnerable and exhausted. The tried and trusted techniques of large group lectures, or small group dissection sessions felt light
years away. For many it was like going back to the first scary lecture they gave. Students have also had to upskill even though generation Z students are commonly referred to as being digitally literate, however students also faced a learning curve as their learning experiences and expectations were changed. This caused uncertainty for some students, as like the teachers, tried and tested methods of learning were often no longer viable options. Digital connectivity was an issue for many and the infrastructure in many countries was not designed for the volume of traffic of multiple learners using videoconferencing platforms at the same time (Cecilio-Fernandes et al., 2020). Hence, some teachers and students may have found that the digital experience was less than ideal. It was beneficial that a part of the anatomy community had engaged in the use of digital technology for education prior to Covid-19 with modalities such as virtual and augmented reality. These modalities along with the artificial intelligence that is being developed for adaptive learning may remove any remaining barriers and will become essential drivers of the transformative change of the future of medical education (Fellner et al., 2017; Goh and Sandars, 2020).

**Body Donation**

Body donation during Covid-19 has been affected across the globe (Ravi, 2020; Singal et al., 2020) and this has led to shortages of cadavers where teaching is occurring in-person and for advanced surgical training. The longer-term impact of Covid-19 on anatomy departments is not yet understood but it may have a negative influence on both medical education and the students' future careers for several years to come (Cuschieri and Agius, 2020; Franchi, 2020). As we evaluate success and student performance in anatomy courses over the last year, most educators are surprised by the unexpected success of virtual anatomy education especially in traditional anatomy programs that usually teach with body donors. These
successes, mostly based on students’ evaluations, may have inadvertently proven to medical school administrators that anatomy can be taught successfully without presence of cadavers. For example, the shift to remote lectures was well received by the students at the University of Malta and they urged the university administration to make it the norm (Cuschieri and Agius, 2020). Anatomists have gone above and beyond in 2020 to ensure successful student learning so it is possible that evaluation data may be reflective of an online experience that is not replicable under “normal” situations. Educators need to go back through the evidence of what anatomy laboratories offer in terms of applied practical learning, spatial ability, nontraditional discipline-independent skills (Evans and Pawlina, 2020), humanity and ethical practice (Jones, 2020), and also to look at the core aim of the learning, meaning what will students be doing with this knowledge and how will they apply it?

**Resilience and Mental Health**

Anatomists should all take pride in how they have coped in the pandemic. For most it has meant hundreds of extra hours preparing teaching while simultaneously juggling different professional and personal responsibilities such as caring for children while schools were closed. Global education leaders (Soon and Prabhakaran, 2016; Parkin, 2020) have explained how building resilience in the work force in universities is paramount to the longer term success of higher education. As the work force has been under extreme pressure, coupled by funding cuts and staff shortages due to Covid-19 this has placed extra pressure on teaching faculty. One of the values in the strategic plan for University of Sussex in the United Kingdom, is kindness (University of Sussex, 2018) and this has been a value that has had such importance in 2020. Kindness takes many forms, from staff recognizing
that they need to be kind to themselves, acknowledging they are doing their best in very
difficult times, but also kindness from students to staff, where students accept that staff are
working within limited time and resources and re-setting the expectations of students
during this time.

It is not surprising that mental health organizations across the globe have reported a rise in
mental health issues during 2020 (Ma et al., 2020; Sahu, 2020). Past research on epidemics
or other traumatic events indicate that such events can lead to increased levels of anxiety,
depression and sedentary time as well as a willingness to engage in social isolation (Cao et
al., 2020; Huckins et al., 2020; Rajkumar, 2020). During Covid-19 medical students in
anatomy courses experienced increasing anxiety as pandemic gradually affected their
physical, emotional, and mental well-being (Chandratre, 2020; Cuschieri and Agius, 2020).
The imposed social distancing regulations, lack of on-campus learning and absence of peer
support systems may have contributed to negative effects on mental health that are
represented by higher rates of depression, suicidal ideation, and stigmatization around
depression (Chandratre, 2020). Together with the mental health of faculty and staff, all
levels of the education sector must take responsibility for supporting mental health and for
implementing effective strategies to support professional well-being.

It has been a pleasure to read many of the adaptations that anatomists have brought
forward to Anatomical Sciences Education over the past twelve months. As we are transition
to the next phase, it is clear that there are some aspects of anatomy education that will be
very hard to replace. These include learning in dissection laboratory environment with peers
and near-peer teachers, the teamwork, professionalism, role modelling, and mentoring by
anatomy faculty that traditionally has occurred in the physical space of the anatomy laboratory. It is important to also consider the informal learning and social interaction opportunities that occur on campus and how these can or cannot be recreated virtually. However, online teaching has benefits that students openly embrace, such as convenience, flexibility, and enhanced interaction through chat functions (Torda, 2020).

We must now look forward and reset to some of the questions as educators we all ask. How do students learn? What types of teaching and resources assist in students learning anatomy? What impacts in a positive or negative way on students learning? We must all re-look at such questions with a fresh set of eyes as the theories we once knew might not be suitable going forward. We know little about how a high-flex/blended/dual mode/hybrid learning approach really works out for anatomy, and hence we must ensure that in designing educational studies we are looking at ethics, materials and methods that are truly aligned to the environment and questions we are asking now. It is only with such robust studies that we will be able to form a true understanding of the benefits and shortcomings of the methods we have been forced to employ over the past twelve months during the Covid-19 pandemic. Many of these changes will make us better educators, better collaborators, better innovators and will have impact on the future of medical graduates entering healthcare workforce (Torda, 2020).

As we settle into the “new normal” we can take heart (pun intended) that a positive attribute of the anatomy community has been its strength and support that has been seen through different societies, activities, and social media. Never before has anatomy been so international and so without barriers.
Claire F. Smith, B.Sc., P.G.C.E., Ph.D.,

Brighton and Sussex Medical School,
University of Sussex,
Brighton, United Kingdom.

Wojciech Pawlina, M.D., F.A.A.A.*

Mayo Clinic College of Medicine and
Science,
Mayo Clinic,
Rochester, Minnesota


