




The 'new normality' in research? What message are we conveying our medical students?

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The impact of COVID-19 on medical education has been mainly viewed from the perspective of the imposed transition from face-to-face to online delivery of information and the enforced stopping of practical teaching in hospitals.¹⁻⁵ However, unfortunately, the deleterious effects of COVID-19 on how research findings are obtained, communicated and valued needs also careful consideration. Whilst teaching students that it is a genuinely exciting and unique time to be in medicine, as teachers of a subject entitled *'Introduction to Research'* to second-year medical students, we feel particularly worried about what the handling of the pandemic is transmitting our future physicians. Now, more than ever before, scholars need to reaffirm the importance on how research findings are obtained and communicated.

Undoubtedly, the continuing COVID-19 pandemic is a cause for deep concern. The urgent need for effective and safe COVID-19 treatments and vaccines is also out of any doubt. However, it seems that political and economic objectives may hold precedence. Nonetheless, in the name of 'beating the pandemic' not everything can be allowed.⁶⁻⁹ A 'new normality' in research that decreases the degree of

demand and rigour cannot be accepted. Vaccines to protect against SARS-CoV-2 have risen up the agenda of most policymakers and industries in most countries as the pandemic continues unabated and the pressure on healthcare systems is maintained. The Pfizer and BioNTech first announcement that their COVID-19 vaccine achieved over 90% efficacy in clinical trials was followed soon after by similar announcements of even better percentages by the Moderna and Sputnik V vaccines. Unfortunately, all the information was communicated only via press releases, meaning a lack of data and leaving multiple scientific uncertainties about how the vaccines work in specific individuals and, thus, may affect the pandemic's course. Peer-reviewed reliable feedback was also initially missing, and information is still needed on protection degree in people with diverse ages, important comorbidities such as obesity, longer-term safety and duration of protection.^{10,11} In addition, retractions in highly prestigious medical journals related to the clinical usefulness of some drugs to really combat COVID-19 have emphasized the need for robust, thoughtful study designs aimed at minimizing bias, adequacy of control groups as well as study outcomes and endpoints,

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data integrity and independent post hoc analyses together with more rigorous review processes.¹²⁻¹⁴ Governments and industry should avoid announcing critical science by press release. Such awkward communication channels leave science, media and stock markets vulnerable to potential manipulation. Clear, open and meticulous publication of the scientific basis is a fundamental requirement. Importantly, obviating science, whether by delaying publication or selectively picking favourable research represents a danger to public health, potentially causing deaths due to unsafe or ineffective interventions or via skipping of better treatment alternatives.

In these exceptional times, how can we safeguard science and, therefore, also medical education? A first step would be full disclosure of competing interests from governments, politicians, scientific advisers and appointees. A further step would be full transparency about decision making systems, processes and knowing who is accountable for what. Once transparency and accountability are established, expertise is possible without competing interests. Global agendas should not be driven by political and commercial objectives with worrying competing interests, including shareholdings in companies that manufacture diagnostic tests, treatments and vaccines. Politicians often claim to follow science, but that is a misleading statement. Science can only be trusted if it is available for scrutiny and free of political interference, if systems are transparent and not compromised by conflicts of interest. Politicians claim to support innovation, bring products to market at unprecedented speed and act only in the public interest to accelerate availability. Whilst these reasons are laudable, the protection of science from industry and political interests should be strongly pursued. A long-lasting scepticism about the connections between science and policy has been put forward to foster a coevolution of both during the pandemic.¹⁵ There is a need to explore the effectiveness of conflict-mitigating efforts during the current pandemic. Responsible scientific leadership as well as truthful and prudent public communications are essential.

Needless to say that the challenges for medical education are evident and formidable. It is up to us as teachers and physician-scientists to reinforce the highest values of our profession, remind our students of the passion and discipline required to determine advancements in medicine. It is important that we reflect on the current challenges to our profession and transmit that there is no alternative to truth. So as medical educators, we need to focus increasingly on the rigorous pathway of reason, guiding our students past the bombardment of misleading information and maintain a clear response. We teach our students that following the scientific method is key to the development and testing of hypotheses. Also that integrity and dedication as well as unbending perseverance not for personal gain but for the public good are essential. Scientific inquiry should not be quenched by potential setbacks, and we also need to acknowledge to students

Key Message

1. The deleterious effects of COVID-19 on how research findings are obtained, communicated and valued needs also careful consideration.
2. Now, more than ever before, scholars need to reaffirm the importance on how research findings are obtained and communicated.
3. A 'new normality' in research that decreases the degree of demand and rigour cannot be accepted.
4. Discoveries require curiosity but also a passion for scientific analysis, thorough methodology, full transparency and time for reflection, a wane appeasement in the current pandemic.
5. Showcasing the key elements needed for a robust and strong research amidst the COVID-19 pandemic can help students to realize the true challenges of striking the right alignment between rigour, urgency to save lives and methodological shortcuts due to the huge epidemiological pressure.

that advances in science can be nonlinear, tedious and slow. Discoveries require curiosity but also a passion for scientific analysis, thorough methodology, full transparency and time for reflection, a wane appeasement in the current pandemic circumstances. Given the often elusive and provisional nature of scientific truth, it is important to emphasize that our research knowledge is vastly incomplete and that current concepts represent only a temporary step for better understanding, continually requiring questioning, critical analysis and further testing. Whilst encouraging students to question acquired information and pursue new evidence, we need to foster their critical thinking, as well as their desire to obtain accurate and reliable data. The relevance of our field is now frequently challenged by uncritical acceptance of tweets or social media messages. Exaggerated information, confusion with data or even wrong ideas can easily spread via social media so that students can develop an increasing distrust with the erosion of confidence that it entails.

In our view, it is particularly preoccupying that prevailing media control a pseudoscientific narrative that often relies on unknown or incomplete data on which then Governments base action. What is the point in teaching our medical students about the scientific method, the need of thorough experimental designs, which ensure reproducible, reliable, rigorous and robust data, if it is getting the norm that research that skips peer review and critical evaluation gets huge media coverage and credibility? How can we as teachers pass on to our students science's relevant role in driving advances in

understanding, diagnosing, preventing and curing of diseases based on sound analysis? How can we instil in them the life-long appreciation for the importance of hypothesis testing, peer review, critical thinking and profound research analysis? Should we favour populism at the expense of research integrity before our students? Should we better recommend them to engage or enrol in marketing courses to write press releases instead of in solid research methodology subjects? The student's grounding in knowledge and science is crucial to provide a solid medical education. Imperilment of science by endowed interests transmits an ill education to medical students at the same time as resulting in immeasurable harms to patients and society at large.

Several other lessons can be drawn from the COVID-19 pandemic to improve clinical research as well as medical education.¹⁶ The lack of an integrated coordination between research and care embodies a relevant challenge. This includes the structure of the clinical research system as well as the interface between clinical research and clinical care. In this context, some clinicians may view the logistical challenges associated with carrying out research studies as distracting and against their priorities and the tasks that clinical care requires. In parallel to the lack of research prioritization, the poor coordination with limited incentives for research collaboration has also to be identified among the main challenges. Showcasing the key elements needed for a robust and strong research amidst the COVID-19 pandemic can help students to realize the true challenges of striking the right alignment between rigour, urgency to save lives and methodological shortcuts due to the huge epidemiological pressure. Design thinking exercises with medical students can be carried out to unveil these circumstances as well as to try to find innovative ways to tackle them.¹⁷ Team-based learning aimed at elaborating a research project proposal addressing a specific aspect of COVID-19 can help students realize the difficulties of applying sound methodology in a real-world setting at the same time as stimulating their curiosity and creativity. Longitudinal qualitative research can also help to understand dynamic experiences to move forward. As medical educators, we can transmit our students that both transformational and transactional leadership paradigms are needed to be effective.¹⁸ By providing full and clear information, confidence and support, we can open their minds, contribute to develop the students' ability to embrace complexity, illuminate new opportunities for growth and skilfully navigate with courage the new challenges posed by the pandemic.

In our daily lives as physicians, we aim to create a culture of continuous improvement. However, we must use evidence-based approaches. Scientists should be conscious of the impact their studies may have on designing healthcare policies worldwide. Therefore, a call to keep research quality standards unchanged worldwide is needed. High evidence standards together with judgement in publishing COVID-19-related

studies are equally relevant.¹⁹ Exaggeration and overreaction may seriously damage medical education in addition to the reputation of science, public health, media and policymakers.²⁰ It may foster disbelief that will endanger the chances of an appropriately strong and sustained COVID-19 response. Our patients, in particular, but also our students and society at large deserve better.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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