



Training/Practice

Training in Cardiovascular Medicine and Research

The Transformation of Cardiology Training in Response to the COVID-19 Pandemic: Enhancing Current and Future Standards to Deliver Optimal Patient Care

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ABSTRACT

The COVID-19 pandemic has had an unprecedented impact on cardiology training. Novel opportunities have been identified in several domains: patient exposure, procedural experience, didactic education, research and development, advocacy and well-being, and career advancement. Lessons learned from COVID-19 should be used to further improve fellowship training such as, for example, through the development of a competency-based training and evaluation system. Multimodality teaching that incorporates telelearning provides creative solutions for trainee and continuing medical education. Fellow-initiated research should be supported and nurtured. Enhanced attention to trainee well-being and burnout is particularly important. The emerging cardiologists of the future and the way they are trained will be shaped by the COVID-19 challenge of our generation.

RÉSUMÉ

La pandémie de COVID-19 a eu un impact sans précédent sur la formation en cardiologie. De nouvelles opportunités ont été identifiées portant sur différents éléments : exposition des patients, expérimentation des procédures, enseignement didactique, recherche et développement, défense des intérêts et bien-être, et avancement professionnel. Les enseignements tirés de la COVID-19 devraient être utilisés pour améliorer encore la formation des résidents avec, par exemple, la mise en place d'un système de formation et d'évaluation basé sur les compétences. L'enseignement multimodal qui intègre le téléapprentissage offre des solutions créatives pour la formation médicale continue des stagiaires. La recherche initiée par les résidents devrait être soutenue et encouragée. Il est particulièrement important d'accorder une plus grande attention au bien-être et à l'état d'épuisement professionnel des stagiaires. Les cardiologues émergents de demain et les méthodes de formation seront façonnés par le défi de notre génération que constitue la COVID-19.

The coronavirus disease 2019 (COVID-19) pandemic and its resurgence is causing unparalleled disruption to cardiology training, even as the international community awaits

safety and efficacy outcomes of mass vaccination. Novel adaptations have been identified in several domains, including patient exposure, procedural experience, didactic education, research and development, advocacy and well-being, and career advancement (Fig. 1). Several aspects have been addressed by training bodies, including the Canadian Cardiovascular Society (CCS) Trainee Committee.¹ We highlight factors required to sustain excellence, preserve wellness, and innovate in crisis through this unprecedented challenge.

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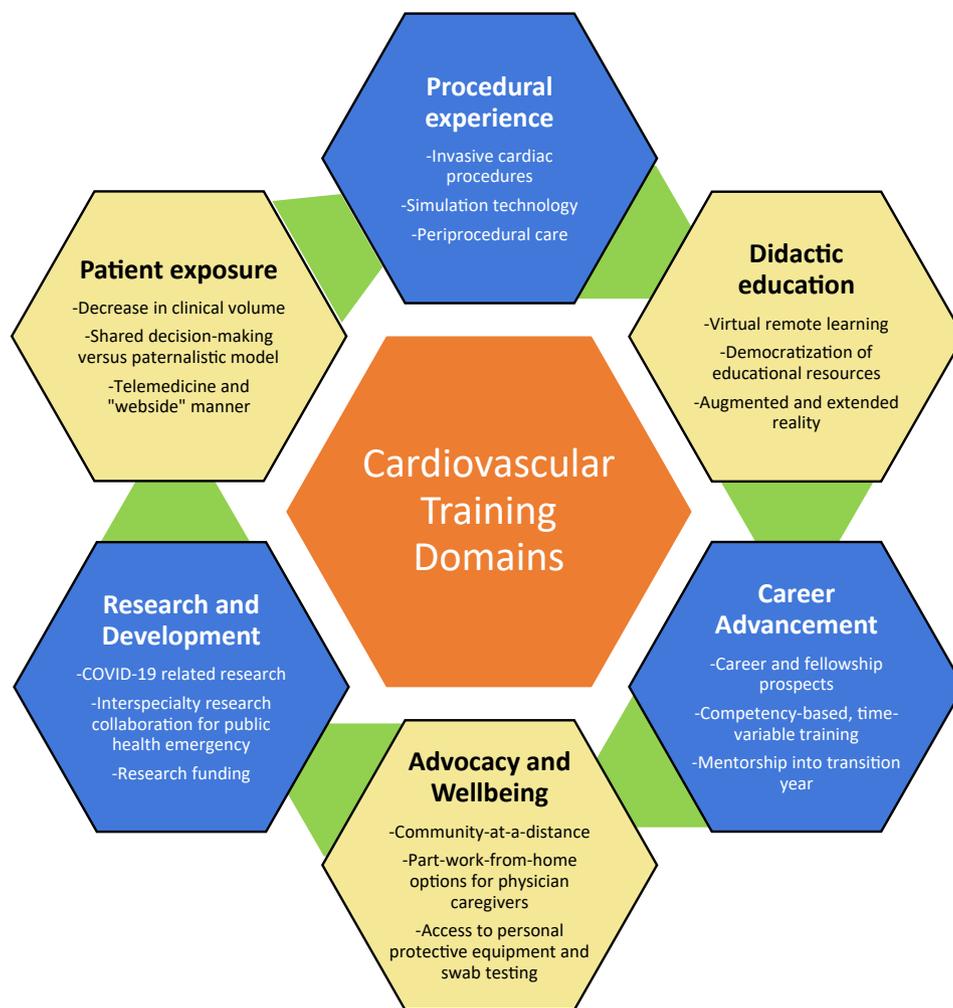


Figure 1. The 6 transformational domains of cardiovascular training in COVID-19.

Frontline Fellows

Cardiology fellows were often the first to be recruited in pandemic responses owing to their dual expertise in internal medicine and critical care, as well as availability of reallocated time from cancelled elective procedures. Subsequently, this enabled interspecialty learning and contribution of cardiology-specific skillsets.

The unmet training needs of emerging cardiologists in acute cardiovascular training were highlighted in a pre-COVID-19 survey across 39 countries by the Association of Acute Cardiovascular Care (ACVC) and European Society of Cardiology (ESC), revealing that most doctors found invasive procedures challenging and that their confidence in managing acutely ill patients was poor.² Thus, COVID-19 has forced trainees to a trial by fire, having to master intensive care medicine-specific skills such as airway management, nutrition and supportive measures, and end-of-life conversations. Emerging cardiovascular complications of COVID-19 such as acute myocardial injury and thromboembolism, require cardiology trainees to apply existing knowledge and adapt to COVID-19-specific situations. Although with risk of personal harm, managing the sickest COVID-19 patients has conferred unique training opportunities.

Procedural Experience

Invasive cardiac procedures have become the cornerstone of precise diagnostics and cardiac treatment. However, the ACVC survey reported that opportunities for simulation-based procedural training (SBPT) were limited.² Although the majority of respondents found SBPT beneficial, fewer than 20% had this opportunity. As recently described,³ with its endorsement as an educational tool by the American College of Cardiology (ACC) and ESC, SBPT could form a greater core in the curriculum. There is added benefit of enabling physical distancing outside clinical duties. Simulations can supplement actual patient encounters as cardiovascular procedures decrease in volume, within a competency-based (versus volume-based) model of assessment.

Virtually Engaged

Cardiology conferences have reverted to videoconferencing in response to physical distancing mandates. Many lectures are now delivered as digital experiences, facilitating attendance and providing high-quality educational opportunities. Resourceful programs can experiment with new ways to use mixed reality digital solutions to enhance fellow education going forward.³

Another survey was conducted of fellows-in-training (FITs) across the United States on the impact of COVID-19 on training.⁴ While most FITs (62%) were not participating in physical clinics, 66% were providing telemedicine care, and 74% felt that additional training in this would be beneficial.⁴ Both ACC and CCS have provided guidance statements on optimal provision of telemedicine care. In turn, expanding flexibility for deployment, including options of less-than-full-time training and working from home, will enhance capability to recruit and retain physician caregivers and enable workforce diversification, as women often carry the bulk of these responsibilities.

Patient Exposure

Non-COVID-19 patients with nonurgent medical issues have been steered away from physical visits. Consequently, FITs have seen reduced numbers of cardiac patients, with decreased opportunities for detailed clinical assessments, analysis of cardiac tests, and performance of cardiac procedures.

Adding to existing complexity, physicians encounter the stress experienced by patients whose cardiac procedures are delayed. In contrast to shared decision making, cardiologists are frequently serving more paternalistic roles with limited treatment choices. Astute level of engagement is required to remotely counsel patients on decision making rationale and holistically supporting patients through this period.

In response to these various clinical conundrums, clinical care systems have significantly expanded their telemedicine capabilities and converted in-person clinical visits to virtual visits for services ranging from chronic disease follow-up to acute care triaging. Although video visits offer improvement over audio-only discussions and e-mail correspondence, conversation flow is stunted and the “human touch” of in-person interactions is removed. Thus, there is a learning curve for clinicians to master the optimal use of video-based communication in developing a “webside manner.” Telemedicine visits can also provide opportunities for feedback and self-assessment.

Democratising Didactic Education

FITs have expressed interest in complementary educational resources such as virtual board reviews, echocardiography-interpretation tutorials, SBPT, and multicentre collaborative webinars.⁴ Within cardiology, UK-based trainees have engaged global experts for regular curriculum-based teaching webinars made accessible to all and which have been very well received.⁵ There is potential to further develop a global library of high-quality webinars on these topics that can be utilized by the international cardiology community. With the rise in innovative virtual learning solutions, medical educators will have to maximise their “tech-knowledge” to develop educational materials that facilitate learning.

Well-Being Support

The emotional toll inflicted on trainees caring for COVID-19 patients requires special attention as anxiety, helplessness, and exhaustion set in. While the Canadian health care system is looking to retain and increase staffing, uncertainties may

also persist about future employment opportunities for fellows in countries where hospitals freeze hiring and furlough staff.

In response, fellows have built virtual communities of support with the use of online group chats and social media. Fellowship programs are appropriately leading in protecting and advocating for trainees.¹ Regular updates on the current pandemic state, new diagnostic and therapeutic strategies for COVID-19, and implications of latest developments should be provided for fellows. Some programs offer hazard pay and financial support for child care or mental health services and have ensured adequate access to personal protective equipment, COVID-19 testing, and pandemic-related training. Balint groups for critical debriefing within training programs can also help trainees deal with accumulated grief and stress experienced through caring for deteriorating COVID-19 patients.

Research

COVID-19 has presented new research opportunities. While many cardiology protocols were placed on hold, fellow-initiated COVID-19-related projects have evolved. On the other hand, non-COVID-19-related research activities may feel less relevant as funding is diverted toward infectious diseases/vaccine research or is reduced due to lack of incoming funds. Depending on the country-specific health care setting, future job opportunities for current research fellows including within cardiology may be uncertain owing to bleak economic outlooks affecting funding agencies.

Solutions may lie in interspecialty research collaborations. Through the pandemic, the benefits of collaborative initiatives were demonstrated. Virtual town halls, led by scientists, epidemiologists, public health officials, health systems leaders, and clinicians, enabled physicians with diverse skill sets and specialty viewpoints to solve complex public health care issues together. The various disciplines in the research community could be viewed as interdependent parts of a larger stratospheric ecosystem whose preexisting discoveries have enabled a nimble and coordinated response to the demands posed by COVID-19, and continued maturity of research infrastructure as a whole is required to solve global scientific and medical challenges of the future.

Career Trajectories

Concerns regarding the economic impact of COVID-19 jeopardising future job prospects, with decreased networking opportunities and reduced procedural training, were raised by FITs.⁴ Two-thirds also voiced concerns about fulfilling curriculum requirements before graduation.⁴

In response, program leadership will need to reevaluate current assessment methods of readiness for independent practice. Competency-based time-variable training can be explored to enable programs to shorten time-bound rotations without lowering performance expectations. Formal mentorship programs to nurture FIT development in early independent practice will smooth this transition period. Graduating fellows may require a training extension through their transition year. Proactive consideration of educational adaptations and implementing rapid feedback cycles may help to accomplish the goals of improving FIT education and well-being during training and early independent practice.

Summary

The recent experiences described internationally remind us that training requires continuous evolution, nimbleness, and creativity, especially during these unprecedented times, if we are to succeed in maintaining the best patient care and an optimal training environment. There is now a unique opportunity to further develop competency-based training and evaluation systems. Mainstream multimodality teaching media that incorporate telelearning are likely here to stay. Fellow-initiated research should be supported and nurtured. Finally, enhanced attention to trainee well-being and burnout is crucial.

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References

1. Canadian Cardiovascular Society Trainee Committee: Cardiovascular training during the COVID-19 pandemic in Canada. Available at: <https://ccs.ca/app/uploads/2021/02/CCS-Trainee-Committee-COVID-19-Rapid-Response-Team-003-1.pdf>. Accessed February 5, 2021.
2. Czerwińska-Jelonkiewicz K, Montero S, Bañeras J. The voice of young cardiologists. *Eur Heart J* 2020;41:2723-5.
3. Chong JH, Ricci F, Petersen SE, Khanji MY. Cardiology training using technology [e-pub ahead of print]. *Eur Heart J*.
4. Rao P, Diamond J, Korjian S, et al. The impact of the COVID-19 pandemic on cardiovascular fellows-in-training. *J Am Coll Cardiol* 2020;76:871-5.
5. Cardiovascular News: COVID-19: education in the time of coronavirus. May 6, 2020. Available at: <https://cardiovascularnews.com/covid-19-education-in-the-time-of-coronavirus/>. Accessed February 5, 2021.