

# Collaboration is a Valuable International/ Interdisciplinary Directive for Electrophysiology Progress: NOvel & Tangible Important Lessons Learned COVID-EP: NOT ILL



## *Digital health lessons learned from the COVID experience can improve arrhythmic outcomes*

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*In a crisis, be aware of the danger—but recognize the opportunity.*

**John Fitzgerald Kennedy**

*The future doesn't belong to the lighthearted. It belongs to the brave.*

**Ronald Wilson Reagan**

### The Opportunity

Calamities of war, famine, and infection often take prominence when historians rank events that increase mortality rates. For example, smallpox, a devastating disease with a 30% mortality rate, destroyed many civilizations and killed approximately 300 to 500 million people worldwide in the 20th century, resulting in an annualized mortality rate of at least 3 to 5 million until its eradication in 1978.<sup>1</sup> However devastating COVID-19 seems at present, we have to look at this pandemic in perspective. The annualized worldwide COVID-19 mortality, based on the most recently reported 6-month death total of approximately 300,000 persons, is substantially less than the annual death rate from smallpox,<sup>2</sup> approximates the annual United States cardiovascular mor-

tality rate,<sup>3</sup> and represents only about 3.5% of the annual global cardiac mortality of 17 million.<sup>4</sup> Accordingly, classifying sudden cardiac death, which accounts for approximately one-half of all cardiovascular deaths,<sup>5</sup> and atrial fibrillation (AF), which accounts for approximately one-quarter of all cardiovascular deaths and is associated with substantial morbidity,<sup>6</sup> as two “chronic” arrhythmic crises at least similar in scope and severity to COVID-19 seems reasonable. However, neither at present is considered as constituting a public health crisis with anywhere near the same degree of importance as the current coronavirus epidemic. Accordingly, the widespread prevalence of these and other important conditions such as diabetes, obesity, and cancer should encourage us to rethink our medical priorities for the future. We must realize that the long-term health implications, which result from failing to focus on “noncrisis” problems, are likely greater than those associated with this pandemic. Accordingly, the need to establish collaborative, multidisciplinary efforts, such as those being coordinated by the Alliance for Advancing Bioelectronic Medicine,<sup>7</sup> to accelerate digital cooperation across specialties with the goal of creating a singular message and a unified electronic vision, will be necessary if our efforts to limit the negative clinical impact of arrhythmic disease is to be successful.

Policy actions, such as social distancing and isolation, have retarded the spread of COVID-19 and recommended the use of digital methods of care delivery, which were technically available before the pandemic but were used much less frequently

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for a variety of reasons. Many of these digital endeavors have been built on a foundation that was pioneered by and has characterized the field of cardiac electrophysiology since its embryonic days. Accordingly, as a specialty, we should pause; contemplate and consider how we—as individuals, as institutions, and as the leading global arrhythmia societies—might apply and adapt some of the potentially vast digital approaches, adopted to fight the COVID pandemic, to transform educational efforts; augment clinical programs; expand patient access; catalyze research and ultimately improve patient outcomes. By learning from our collective experience and collaborating with both industry colleagues and policymakers, we can implement and optimize digital technologies to build a global roadmap. Although these approaches are not specific to cardiac electrophysiology and will vary to some extent across the globe based on local circumstances, the creation of a broad-based and robust portfolio will allow us to expand innovation in arrhythmia care delivery worldwide.

## Education

The cancellation of multiple scientific sessions by “shelter in place” orders has accelerated the movement toward web-based educational alternatives. To fill the gaps that have manifested as a result of these cancellations, many of the educational modalities that characterize these meetings (e.g., presentations of new research, didactic sessions, procedural case presentations, clinical case discussions, expert panel discussions, and networking) have been reconfigured to facilitate presentation on digital web-based platforms. Going forward, in order to maximize our educational offerings and maintain our role as the leading sources of quality arrhythmia educational material, the major arrhythmia societies will need to determine how to balance the presentation of educational material using both in-person meetings and web-based modalities, such that there is value to attending conventions as “can’t miss,” energizing, interactive face-to-face events, as well as embracing enthusiastically new alternative, web-based learning methods that can provide longitudinal educational materials throughout the year.

To create true value, our digital educational efforts should extend beyond our traditional educational approaches. Just as standard media outlets reconfigured their processes during this pandemic to connect experts around the globe in real time from their homes to inform viewers everywhere about COVID-19–related issues, we similarly must adapt. The potential opportunities are myriad. Web-based simulation training models can be used to teach and hone procedural skills; digital educational material can be made available to clinicians in remote and understaffed areas; and physicians can be connected electronically with experts at large, sophisticated centers for consultation on complex and challenging cases. These are just some examples of how digital technologies can be used to augment our collective global knowledge and enhance the quality of arrhythmia care everywhere.

## Clinical care

Providing excellent clinical care is the goal of all physicians, irrespective of their specialty. The COVID-19 pandemic has brought forward several approaches that, although extremely important, have historically remained relatively dormant. First, the establishment of clinician-led cross-specialty teams (e.g., infectious disease, critical care, pulmonary medicine, anesthesia, emergency medicine, hospitalist medicine, and administration) has been instrumental in improving patient outcomes during this pandemic. Second, the quarantine requirement has transitioned the telehealth option from existing as a narrowly defined and infrequently used tactic to becoming a mainstream way of delivering care. Third, aggressive work by scientists to synthesize new diagnostic and therapeutic options, while still developmentally embryonic, has much potential to accelerate solutions for operative clinical problems. We must learn from the ways in which these 3 scenarios are unfolding and modify our portfolios to improve arrhythmic care delivery at the 3 levels at which they operate.

### *Prevention*

Cross-societal and cross-specialty print, web-based, and app-driven approaches, which communicate effectively to patients on their own terms about the importance of lifestyle and risk factor modification, are needed. Supplementing these educational platforms with positive feedback programs using telehealth-based approaches, if done correctly, could empower patients and yield significant clinical benefits. Digital technologies also can be used to monitor patients and dynamically stratify risk, which until now has been an elusive goal, so that resource allocation can be improved.

### *Diagnosis*

The massive scale-back of office visits and elective procedures has markedly accelerated the use of applications, wearable devices, remote monitoring, and telehealth approaches to assess a variety of arrhythmic problems. The establishment of unique applications (e.g., remote assessment of the QTc interval in patients prescribed hydroxychloroquine, using consumer devices that were not previously approved for this purpose, mobile health interventions such as the TeleCheck-AF program adopted at the Maastricht Medical University Centre to support AF televisits<sup>8</sup>) asks us to think “out of the box” and fill the arrhythmia toolbox with new and promising technology. By making remote monitoring and telehealth mainstream, we should be able to improve disease surveillance and receive earlier notification of important signals that might require intervention.

### *Treatment*

The scientific community has mounted an aggressive and accelerated search for COVID-19 vaccines and treatments, resulting in the use of novel methods to overcome traditional developmental processes and regulatory hurdles that frequently delay such advances. What would happen if the

aggressive developmental and regulatory approaches being exercised to solve the COVID-19 problem could be applied similarly to overcome existing, cumbersome regulatory barriers, which make the approval of new arrhythmia therapies very costly and time-consuming, without compromising safety? By supplementing this fast-track approach with effective and robust postapproval digital surveillance methods to determine long-term safety and efficacy, we potentially could facilitate a therapeutic development paradigm shift.

## Research

Advances in the field of cardiac electrophysiology have been based on a strong research foundation that has evolved over time. Initial research studies based on small patient series were replaced by large clinical trials and recently complemented by publications accessing large databases. In an attempt to limit untoward clinical outcomes, the published research data on treatment options to address COVID-19 infections have been quite discrepant. For example, in studies assessing the role of chloroquine and hydroxychloroquine in treating patients with COVID-19, some studies have shown benefit<sup>9</sup> whereas others have not.<sup>10</sup> Most but not all of these studies failed to provide important information about the on-treatment QTc, which is of concern given the potential of these drugs to prolong the QT interval and result in serious life-threatening arrhythmias, especially when combined with other drugs as was done in selected patients.

The use of information obtained from large, digitally derived databases has many benefits (e.g., large sample size, broad and diverse population inclusion, shorter analysis timeframes, lower cost, etc.) compared to typical research approaches. However, they have inherent limitations (e.g., inclusion of nonrepresentative populations, participant and investigator selection biases, variation in adherence to protocols or treatment plans, limitations in follow-up, lack of information about the importance of unrecognized confounding variables, concerns about the quality of data and the statistical accuracy, etc.). However, these concerns should not limit electrophysiologists but instead should embolden us to find ways to gather this information and use it either to inform decision-making or more commonly to raise hypothesis-generating questions that can be answered by well-designed trials. For example, a study assessing the role of wearable digital technology enrolled over 400,000 participants in only 8 months.<sup>11</sup> This approach demonstrates how a pragmatic, digitally based research design program can provide a foundation for large-scale clinical investigation that previously was unattainable.

## Quality/value

The rising cost of health care delivery, exacerbated by the COVID-19 medical exigencies in conjunction with the attendant global economic turndown, necessitates the cultivation of new ways to deliver quality health care at a lower price. The use of data analytics, which has allowed us to follow the worldwide progression of COVID-19 infections and accompanying outcomes, could be adapted to permit

effective data mining of electronic health records (EHRs) for arrhythmia information.

Modification of digital COVID-19 surveillance approaches and their application to arrhythmic health care problems, such as sudden cardiac arrest, might allow us to identify high-risk populations in need of better or alternative preventive and therapeutic approaches. Similarly, risk-adjusted electronic data capture could be applied to identify and reward centers providing guideline-driven care and achieving better outcomes. Although this effort clearly would require substantial governmental support, engagement of health care providers, and partnership with EHR vendors, who would have thought 6 months ago that similar collaborations could be produced across national borders to address this pandemic?

## Use of social media

Arrhythmia clinicians, scientists, institutions, and societies have used a variety of social media modalities in limited fashions. However, there is no large, worldwide, coordinated social media effort to increase public awareness about common, and in some cases life-threatening, arrhythmic diseases. In comparison, other diseases associated with lower mortality rates have benefited from such grass roots efforts. The Susan G. Komen Foundation, with its focus on breast cancer, has enlisted both individual and corporate sponsors in successful campaigns to augment public awareness about an important clinical problem. During the COVID-19 pandemic, traditional and nontraditional media outlets have engaged affected celebrity patients (e.g., Tom Hanks), governmental authorities (e.g., Boris Johnson), content experts, and common citizens in a variety of approaches to impart important messages. Available publications provide guidance on how to leverage social media to advance cardiovascular outcomes.<sup>12</sup> The field of electrophysiology could learn from this digitally based media experience and ramp up social media efforts in a coordinated and collaborative manner to increase public awareness with the goals of improving preventive efforts, increasing screening, and ensuring that guideline-driven therapeutic options are pursued more aggressively to decrease death and suffering from heart rhythm disorders.

## Summary

The suffering and death that have resulted from the COVID-19 pandemic constitute a true human catastrophe. However, as we always do when faced with seemingly unsurmountable obstacles, the medical community steps up and works collaboratively to mitigate the impact. Successful innovative approaches during this pandemic have manifested in a variety of arenas with digital initiatives playing a prominent role. If we hope to apply successfully the lessons that we can learn from the application of digital health innovations during the COVID-19 crisis and realize the goal of generating a foundation on which we can accelerate progress in eradicating arrhythmic suffering and death, several steps are mandatory.

First, we must examine how these digital approaches have been applied to address current problems, assessing both failures and successes. Second, we must review the digital status underlying our existing educational programs, care delivery processes, quality improvement portfolios, and research efforts. We then can determine which elements we should retain because they still have relevance; which items we should eradicate because they have reached the end of their applicable lifecycles; which components we should modify or build on to generate innovative approaches; and which initiatives we should start *de novo*. Third, we must put in place mechanisms to measure the impact of those digital innovation processes pursued to ensure that they add value.

Aggressive approaches aiming to engender sustained progress do not take place in a vacuum. They will require leadership across geographies, specialties, and societies. They also will require commitment from all of the relevant stakeholders, including patients, clinicians, scientists, administrators, regulators, payers, and industry colleagues. As cardiac electrophysiologists, we must examine how the world has coordinated efforts to defeat this infectious enemy. We then must apply and transform the digital tools available to us so that we can minimize suffering and death from arrhythmic disorders and expand reach to areas where health care delivery currently is limited. As noted in the quotations that frame this editorial commentary, electrophysiologists are not a “lighthearted” bunch, nor are we afraid of “danger.” We recognize the “opportunity” that has been given to us. As dedicated, forward-thinking individuals, we must be “brave” and coordinate our efforts. If we do, we will succeed.

As present, former, and future leaders of the largest arrhythmia societies, we are committed to working with patients, clinicians, scientists, corporate entities, media outlets, and global leaders everywhere to further this goal.

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