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Innovation in transforming a large-scale scientific medical conference in China entirely online in response to COVID-19

At the time of writing, the coronavirus disease 2019 (COVID-19) pandemic has spread around the world, with >6.3 million confirmed cases and >380 000 deaths.¹ A growing number of scientific conference organizers are cancelling their medical meetings, and researchers are scrambling to find alternative ways to interact with collaborators. Recently, in China, a scientific conference on interventional cardiology was able to be held entirely online through high-quality 5G internet despite the large size of the conference. The logistical advantages achieved by this pioneering approach may be helpful for future scientific meetings including those not held during pandemics.

The China Cardiovascular Intervention Forum (CCIF)² is the first national meeting in the field of interventional cardiology and one of the largest scientific meetings in China. With the principle of popularization, standardization, and promotion of cardiovascular interventions, the CCIF has been held continuously for the last 22 years and was scheduled to take place in Wuhan in April 2020. However, as with most other scientific meetings, because of the spread of COVID-19, the organizers had to move the entire 23rd CCIF online with limited time to prepare.

On 9 March, the American College of Cardiology (ACC) announced the cancellation of their Scientific Session, which may be the first large cardiovascular conference impacted by the COVID-19 pandemic. ACC moved some of the lectures and posters online. By 3 April, this virtual meeting had been attended by >38 000 registered attendees across 157 countries, with >246 000 active sessions.

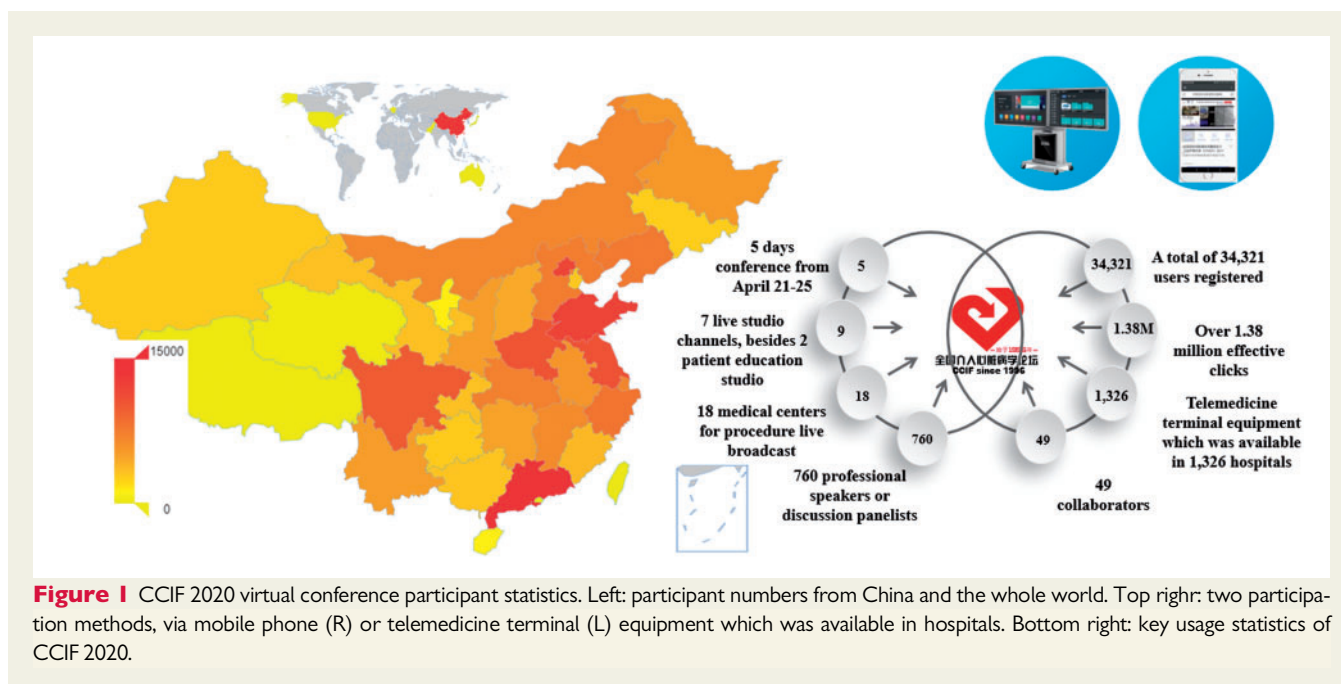
Inspired by the ACC, the CCIF moved online this year as a live virtual meeting. The entire conference was held online over 5 days, including all round-table discussions, live cases, academic lectures, joint sessions with

the World Association of Chinese Cardiologists (WACC), and live broadcasts of operations. To our knowledge this was the first entirely online meeting on such a scale. The contents included annual statistical reports on China's cardiovascular intervention procedures, keynote scientific sessions, continuous medical education, cardiology of patients with COVID-19 (as special events with colleagues in Wuhan), etc.

As shown in Figure 1, from 21 to 25 April, during a total of >50 h over 5 days, live transmissions in seven studio channels covered >100 scientific sessions, 40 procedures (including 29 coronary interventions, seven electro-physiology procedures, three left atrial appendage closures, and one transcatheter aortic valve replacement) from 35 catheter laboratories in 18 medical centres, and 760 speakers or discussion panellists. This demonstrated that remote meeting technologies could be used on a much larger scale than was realized in the past.

During the live streaming, participants could either connect through telemedicine terminal equipment, which was available in 1326 hospitals, or join the meeting using their own mobile phones, computers, or other smart tablet devices anytime anywhere. Participants were able to interact with speakers or panellists through a comment system resembling Twitter, and a total of 28 984 interactive comments were posted during the conference.

A total of 34 321 users registered for the CCIF conference. The data revealed 1.38 million effective clicks from mobile/computer terminals from 388 Chinese cities, covering all 34 provincial-level administrative regions, as well as 10 countries outside China, with a mean average continuous online learning duration of 64 min. Among all participants, >4000 were from rural county clinics, meeting the conference goal of popularizing intervention therapies to less developed areas.



Since the CCIF had been continuously held for 23 years, for many scientists the conference is a chance to share research, learn innovative skills, and meet future collaborators. However, feedback shows that the virtual online CCIF gave most of the participants equal or even better experiences compared with previous in-person meetings, because of the following features and advantages. (i) A minimum of 60% reduction in costs was achieved. (ii) The online conference was able to improve accessibility, cut down on researchers' carbon footprints, and reach a wider audience than a conventional meeting could. Furthermore, all the scientific contents are archived and can be replayed in the future, which is much better for continuous education purposes. (iii) The past conferences used to be held in big cities. Physicians from rural, low-income districts would previously not have had the time or resources to attend in person to learn the standard techniques and novel concepts presented. Because these rural doctors are better able to attend online, this should help narrow the gap between low-income districts and improve the imbalance of healthcare delivery. (iv) These logistic advantages also helped presenters and panelists. In previous conferences, many of the presenters might have had to cancel, but for CCIF 2020 the cancellation rate was <2%.

Since this was the first attempt at an entirely online meeting on such a large scale, the approach had several teething problems that had to

be addressed. Round-table discussions were more difficult to coordinate online, and more work is needed both in technology and in organization to make this a smoother experience.

As stated in the opening speech of CCIF, 'Because we have no other option, we have to experiment, to learn and to transform'. In conclusion, the 23rd CCIF has demonstrated the revolutionary benefits achievable by moving large scientific meetings online.

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Key words to be adopted for COVID-19 research

A return to simple, large, randomized trials

In 1984

An outstanding article was published by Salim Yusuf, one of the 'gurus' of clinical research.¹ The article set out the rules for cardiovascular research worldwide. A few years later, the trials for the treatment of acute myocardial infarction (MI) modified the treatment for this number one killer^{2,3} and were followed by studies that contributed to the great success of cardiology.

Today

And this is a 'gift' from COVID-19, the lessons learnt seem to have been lost. A multitude of small, often uncontrolled clinical trials have started or are on the way, based on enthusiasm, but we risk wasting human and economic resources.

Why such a pessimistic view?

Because doctors are not magicians! Any proposed treatments for COVID-19 cannot provide miraculous results, but rather small to

moderate favourable effects. Hopefully small pilot/exploratory studies can open the door to new avenues, but still, even today, the priority has to be to plan and conduct large, simple, randomized trials.

Why large?

With the little knowledge we have about this pandemic, we can expect only moderate treatment effects. To reliably demonstrate a moderate benefit, we need several thousands of patients. Let us take as an example MI. At the beginning of the 1980s, the in-hospital mortality rate was ~12–13%, and the effective treatments (thrombolysis and aspirin) reduced it by ~20%: from ~13% to 10%. Large trials with 12 000² and 17 000³ patients were necessary to provide reliable results which were useful to change, in a brief period of time, clinical practices all over the world. In absolute terms, a moderate relative reduction of mortality corresponds to a huge number of lives saved globally.

The context of COVID-19 is similar: a small relative moderate reduction of deaths will produce an enormous impact on the absolute number of people who can survive after a hospitalization for the COVID-19 infection. In addition, patients affected by COVID-19 are