There are estimated to be more than 500 million people living with cardiovascular disease across the world, a number that is rising inexorably, as lifestyles change, and people live longer. The most common conditions are coronary artery disease, peripheral vascular disease, and stroke, from which survival is improving over time. In contrast to this demand, access to health care resources varies enormously across the world, with many systems struggling to maintain standards in the face of rising costs. This means that there are often major differences in availability in key resources such as staff, equipment, medicines, and beds, of which the most important and often the most expensive is the workforce. Shortage of appropriately trained staff is a constant source of stress for those managing healthcare in both the developed and developing worlds. There is thus a contradiction in cardiovascular care between rising demand and the need to make the most of the skilled staff available. It is in this space that artificial intelligence is beginning to make a big impact. Machine learning can enhance care from first attendance in the clinic, from early diagnosis of coronary artery disease using automated risk-prediction models based on patient history to more accurate examination using artificial-intelligence-enabled stethoscopes. (1) Beyond diagnosis and improving clinical examination, there lie a panoply of artificial-intelligence algorithms that have improved accuracy in analysis of the electrocardiogram, echocardiogram, and cardiovascular magnetic resonance imaging, which play a critical role in diagnosis and correct management of cardiovascular disease. (2) Finally, machine learning has a critical role in drug selection, optimising adherence and treating according to target, which will in time deliver real improvements in morbidity and mortality from all cardiovascular diseases. (3) Using artificial intelligence will deliver better care to patients within a shorter time and with better outcomes, making heath care staff more efficient and more effective. These changes have the potential to reduce some of the inequalities present in health care delivery across the world.

References

1. Kay E, Agarwal A. DropConnected neural networks trained on time-frequency and inter-beat features for classifying heart sounds. Physiol Mea 2017;38:1645-57.
2. Davies RH, Augusto JB, Bhuva A, et al. Precision measurement of cardiac structure and function in cardiovascular magnetic resonance using machine learning. J Cardiovasc Magn Reson 2022;24:16.
3. Błaziak M, Urban S, Wietrzyk W, et al. An Artificial Intelligence Approach to Guiding the Management of Heart Failure Patients Using Predictive Models: A Systematic Review. Biomedicines 2022;10:2188.

Richard P Steeds, MD
Queen Elizabeth Hospital & Institute of Cardiovascular Sciences,
University of Birmingham,
Birmingham, UK