

EACPR and AHA statement empowers health care professional to use Clinical Cardiopulmonary Exercise Testing

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The European Association for Cardiovascular Prevention and Rehabilitation (EACPR), a registered branch of the European Society of Cardiology (ESC), and the American Heart Association (AHA) have today issued a joint [scientific statement](#) that sets out to produce easy-to-follow guidance on Clinical Cardiopulmonary Exercise (CPX) testing based on current scientific evidence. The document, which has been published simultaneously online in the *European Heart Journal* and *Circulation*, is intended to stimulate greater uptake of clinically warranted CPX assessments and potentially open the way for the initiation of multi-centre international trials utilising the technology.

"The ultimate goal of the statement is to both increase awareness of the value of CPX and the number of [healthcare professionals](#) feeling able to undertake clinically meaningful CPX interpretations. For each indication we've paired the information down to an easily digestible one page report," says Marco Guazzi, M.D., The European co-chair of the writing group.

The statement, which is viewed as a major step-forward, represents the first joint statement produced by the EACPR and AHA. "The purpose of producing joint recommendations is to deliver an internationally consistent statement that will prevent confusion with respect to the most relevant information gained from a CPX for a given patient. Providing universal reporting recommendations may also facilitate international

multicentre trials using CPX as a study endpoint when appropriate," explains Ross Arena, M.D., the American co-chair of the writing group.

CPX, which is recognised as the gold standard [aerobic exercise](#) testing assessment, merges traditional exercise testing procedures (ECG, [blood pressure](#), perceived exertion etcetera) with analysis of ventilatory expired gases including information such as oxygen consumption, carbon dioxide production and minute ventilation (the volume of gas produced over the time period of a minute).

"CPX provides a much better idea of the underlying pathophysiology than routine exercise testing and allows better targeting of treatments," says Guazzi, a cardiologist from the University of Milano, Italy.

CPX also gives an indication of what is occurring at the cellular level in the muscles. "It can provide both valuable diagnostic information and also prognostic information about the likely outcome for individual patients," says Arena, a professor at the University of New Mexico Health Sciences Centre in Albuquerque, New Mexico, U.S.A. Taking the example of heart failure, he says, information derived from CPX testing can be used to gauge the urgency of transplantation.

While clinical use of CPX is firmly established in patients with systolic heart failure and unexplained exertional dyspnoea, emerging evidence now strongly suggests CPX has "clinical utility" in patients with suspected/ confirmed pulmonary arterial hypertension or secondary pulmonary hypertension, pulmonary disease, hypertrophic cardiomyopathy, suspected myocardial ischemia, and suspected mitochondrial myopathy. But undermining the use of the technology have been the difficulties experienced by health care professionals in the interpretation of the data. This, says Arena, has been caused by the fact that many current CPX software packages generate "an overwhelming abundance of data" that is difficult to decipher. "While some centres

have appropriately trained health professionals who can interpret the data and produce succinct reports, in many places interpretation is left to the health care professional who orders the test. If they haven't been trained interpretation can be a daunting task," says Arena.

The EACPR and AHA have gained the "distinct impression" that the confusion around interpretation is leading to suboptimal utilisation of this valuable technology. "We strongly feel that if the tests were easier to interpret this would lead to increased utilization of the technology," says Guazzi.

The joint statement sets out to empower clinicians to take control and undertake their own interpretations. First, the document reviews the body of original research in CPX and justifies which variables should be assessed for each given indication. Next a colour coded one page reporting sheet has been devised for each indication, giving a range of readings graded green, yellow, orange or red. Responses in the green zone indicate a normal response for a given variable, while responses in the yellow, orange and red zones indicate progressively greater abnormalities.

In addition to heart failure and unexplained exertional dyspnoea, tables are provided for suspected or confirmed hypertrophic cardiomyopathy, suspected or confirmed pulmonary arterial hypertension/ secondary pulmonary hypertension, chronic obstructive lung disease or interstitial lung disease, suspected myocardial ischemia and suspected mitochondrial myopathy.

The authors have also devised a "universal CPX reporting form" that outlines the information that needs to be collected according to the specific conditions. "In the past labs haven't performed or recorded the tests in the same way. For example some use peak un-averaged values of [oxygen consumption](#), while others use average values, and others the last

30 second average values. Getting all centres to report the information in the same way opens the way for multicentre trials using CPX data in a consistent way," explains Guazzi.

One such study that could be undertaken would be a large scale prospective studies for each condition that links patients' CPX scores to their outcomes.

"Looking to the future I really hope that the companies who produce the computer soft ware programmes analysing the reading will embrace our recommendations and use it to produce information that's even easier for clinicians to interpret," says Arena.

Provided by European Society of Cardiology

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