HealthManagement
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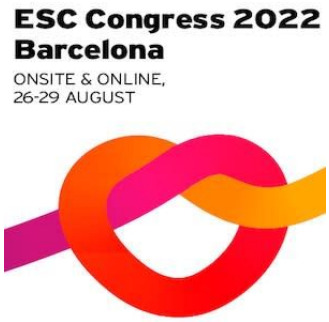
#ESCCongress: AI Algorithm for Prevention of Cardiovascular Disease



Late-breaking research presented at the ESC Congress shows that an artificial intelligence (AI) algorithm accurately estimates the risk of heart disease caused by cumulative exposure to cholesterol and blood pressure levels and the benefits of lowering both, thus providing the information needed to make individual treatment decisions.

Atherosclerotic cardiovascular disease is a chronic progressive disease that usually begins early in life and progresses over time. Clinical trials have demonstrated that lowering low-density lipoproteins (LDL) and systolic blood pressure (SBP) reduces the risk of atherosclerotic cardiovascular events. Lifelong exposure to lower LDL and SBP can reduce the risk of cardiovascular events compared to reductions observed from lowering LDL and SBP later in life. However, the optimal timing, duration and intensity of LDL and SBP lowering to prevent cardiovascular disease remain unclear.

The Causal-AI study is the first to show how to embed the causal effects of LDL cholesterol and SBP into AI algorithms. These algorithms can help inform decisions for individual patients on the optimal timing, intensity and duration of LDL and SBP lowering to prevent atherosclerotic cardiovascular events.

The study had two objectives. The first was to evaluate whether current risk scores accurately estimate the baseline risk of cardiovascular events caused by LDL and SBP and the benefit of lowering LDL and SBP beginning at any age and extending for any duration. The second objective was to evaluate whether adding the causal effects of LDL and SBP in the AI algorithm more accurately estimates cardiovascular risk and benefit.

The accuracy of the Joint British Societies' (JBS3) algorithm was evaluated, both alone and after adding Causal AI effects of LDL and SBP in 445,771 participants in the UK Biobank to assess how well these algorithms estimated lifetime risk and benefit; and in 48,315 participants in LDL and SBP lowering trials, to assess how well these algorithms estimated the short-term benefit of lowering LDL, SBP or both.

The primary outcome of the study was major coronary events (MCE), defined as the first occurrence of a fatal or nonfatal myocardial infarction or coronary revascularisation. The secondary outcome was major cardiovascular events (MCVE), defined as the first occurrence of a major coronary event or nonfatal ischaemic stroke.

The study showed that the JBS3 algorithm underestimated the risk of MCE among persons with lifelong higher LDL, SBP or both; and overestimated risk among those with lifelong exposure to lower LDL, SBP or both. It also underestimated the benefit of maintaining lifelong lower LDL, SBP, or both on MCE, and the benefit of lowering LDL, SBP or both starting later in life. By contrast, including the causal effects of LDL and SBP, derived from the Causal AI algorithm, accurately estimated the risk of MCE at all ages among persons with both higher and lower lifetime exposure to LDL, SBP or both. The Causal AI algorithm also accurately estimated the benefit of maintaining lifelong lower LDL and SBP at all ages and the benefit of lowering LDL, SBP, or both starting later in life.

Source: ESC
Image Credit: ESC

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