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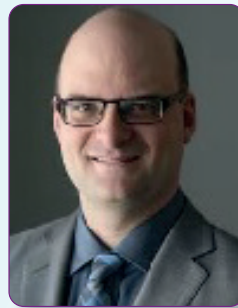
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**Use of a Statistical Adaptive Treatment Strategy Approach for Emulating Randomized Controlled Trials Using Observational Data: The Example of Blood Pressure Control Strategies for the Prevention of Cardiovascular Events Among Individuals with Hypertension at High Cardiovascular Risk**

Tianze Jiao, Robert W Platt, Antonios Douros, and Kristian B Filion.

Statistical approaches to adaptive treatment strategies (ATS) can be used to mimic the sequential decision-making inherently found in clinical practice. To illustrate the use of a statistical ATS approach, we emulated a target trial of different blood pressure (BP) control plans for the prevention of cardiovascular events among individuals with hypertension at high cardiovascular risk. This target trial was inspired by the Systolic Blood Pressure Intervention Trial (SPRINT).

We included 103,708 patients with hypertension and an QRISK3 estimated 10-year risk of cardiovascular disease  $\geq 20\%$  who initiated an antihypertensive drug between 1998 and 2018. Dynamic marginal structural models compared the effects of treating patients with intensive (target BP: 130/80 mmHg), standard (140/90 mmHg), and conservative (150/90 mmHg) BP control strategies. The adjusted hazard ratios (95% confidence intervals) for the intensive versus standard strategy were 0.96 (0.92, 1.00) for major adverse cardiovascular events and 0.93 (0.88, 0.97) for death from cardiovascular causes. For the conservative versus standard strategy, they were 1.06 (1.02, 1.10) and 1.08 (1.03, 1.13), respectively.

These results are largely compatible with SPRINT. ATS can be used to emulate randomized controlled trials (RCTs) of complex treatment strategies in an observational setting and represents an alternative approach for situations where RCTs are not feasible.