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Effect of Risk Factor Control on Simulated Coronary Heart Disease Events

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Wong et al¹ recently published a report using the UK Prospective Diabetes Study risk engine² to estimate the 10-year probability of coronary heart disease (CHD) events for US adults with type 2 diabetes if they were treated under 3 different levels of risk factor control intensity (all to goal, nominal control, and aggressive control). The risk factors included smoking, glycated hemoglobin (HbA1c), systolic blood pressure (SBP), total cholesterol (TC), and high-density lipoprotein cholesterol. They found that the aggressive control scenario led to the largest number of preventable CHD events. Interestingly, they also found that compared with controlling other risk factors, controlling TC had the largest impact on preventable CHD events (13.66% in the all to goal, 17.53% in nominal, and 35.05% in the aggressive treatment scenario), regardless of the control scenario.

We would be interested in understanding how individualized glycemic goals (e.g., HbA1c <8%) would affect the rates of preventable CHD events. Individualized goals have been endorsed by the American Diabetes Association for patients with advanced age, long diabetes duration, diabetes-related complications, and comorbidity since at least 2002³ and are more recently being promoted by the American Diabetes Association and the European Association for the Study of Diabetes.⁴ Our previous work has found that a higher individualized HbA1c goal may be appropriate for about 70% of US adults with diabetes.⁵

Additionally, we would like to express concern that the investigators' definition for risk level control in the nominal and aggressive control scenarios may have led to unrealistic results. For example, the nominal control scenario included a 10% relative reduction in SBP. Since the mean SBP was 129 mm Hg, a 10% reduction would lead to a mean SBP level of 116 mm Hg. This average SBP level could be considered potentially harmful since a SBP level <130 mm Hg has been associated with a 40% increased risk for serious adverse events.⁶ Similarly, the 50% reduction in TC for the aggressive control scenario seems not clinically feasible, that is, a mean TC of 2.3 mmol/L (88 mg/dl) in men or 2.45 mmol/L (96 mg/dl) in women. Clinically informed lower limits for SBP and TC may significantly change the magnitude of preventable CHD events for the nominal and aggressive treatment scenarios.

We are also concerned that the definitions for risk reduction favored TC lowering as the optimal strategy for preventing CHD events. The percentage reduction for TC was substantially larger than the reduction for HbA1c, SBP, and high-density lipoprotein cholesterol (nominal control, 25% vs 1%, 10%, and 10%, respectively; aggressive control, 50% vs 2%, 20%, and 20%, respectively). We would appreciate more explanation as to why these particular percentages were chosen for each risk factor level in the different control scenarios.

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