**Title**

External validation and comparison of four cardiovascular risk prediction models using data from an Australian population-based cohort study (AusDiab)

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**Background**

Clinicians need accurate and reliable tools to help them identify individuals who are at an increased risk of a cardiovascular (CVD) event. The performance of the 2013 American College of Cardiology/American Heart Association (ACC/AHA) Pooled Cohort Risk Equation for predicting atherosclerotic cardiovascular disease (ASCVD) events in Australian population has not been investigated.

**Aims**

We evaluated the performance (i.e. calibration and discrimination) of the ASCVD Pooled Cohort Risk Equation and compared it to the performance of three commonly used Framingham-based CVD risk prediction scores.

**Method**We included 4621 adults aged 35 to 74 years enrolled in the Australian Diabetes, Obesity and Lifestyle (AusDiab) study and followed up through November 2011 (with a median follow-up of 11.1 [10.7-11.6] years). We excluded participants who had previous CVD at baseline or with missing data necessary for risk score calculations. We applied the four CVD risk prediction scores (Anderson, D’Agostino, D’Agostino office-based, and ASCVD Pooled Cohort Risk). We calculated the predicted and observed adjudicated CVD risk at 10 years.

**Results**There were 193 adjudicated CV events during the follow up period. Discrimination and calibration statistics were better with ASCVD Pooled Cohort Risk compared to the three Framingham-based scores both in men and women. However, all four CVD risk models overestimate CV risk predominantly in participants with higher risk. In addition, using the ASCVD Pooled Cohort Risk with 7.5% risk threshold to identify high-risk individuals is associated with a net increase of 13.9% and 29.2% in women and men that would be identified as high-risk using Anderson Framingham with 20% risk threshold, whereas only 9% and 8.5% of those newly identified as high risk have actually experienced a CV event in 10 years respectively.

**Conclusion**

The new ACC/AHA CV risk score outperformed the other three Framingham-based CV risk scores in Australian contemporary population.

**References** (If applicable)