RUSH UNIVERSITY

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Do the New Pooled Cohort Equations Agree with Reynold's Risk Score for Women?

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Introduction

Since the inception of the Framingham Heart Study, risk stratification has continued to evolve, with efforts to further classify women at risk for future cardiovascular events to allow for better targeted preventive therapy. In 2007, the Reynolds Risk Score (RRS) was introduced to provide an algorithm that was inclusive of novel risk factors and biomarkers. The guidelines recommended that women with a 10-year RRS ≥10% should be treated with statins.

In November 2013, the ACC and AHA published a new set of guidelines developed from community-based Pooled Cohort Equations to focus on the assessment of hard atherosclerotic and cardiovascular disease (ASCVD) risk events. The 2013 ACC/AHA blood cholesterol treatment guidelines lowered the statin threshold to an ASCVD risk ≥7.5%. We compared the new ASCVD risk score and the RRS Model A and B 10-year risk estimation to assess agreement between treatment thresholds.

Methods

- Data from 660 female patients, aged 40 to 79 years, from 2006-2014 at the Rush and Emory University Heart Centers for Women were evaluated.
- Baseline characteristics and biomarkers were collected, including total, LDL and HDL cholesterol levels, apolipoprotein B (ApoB), lipoprotein(a) [Lp(a)], hs-CRP, and HbA1c.
- Patient history of diabetes, smoking status, family history, hypertension, and hypertension treatment were recorded. HDL was substituted for ApoA in the RRS.
- Agreement between the RRS and ASCVD risk score was evaluated using Bland-Altman analysis, McNemar's and Chi-square tests.

Figures

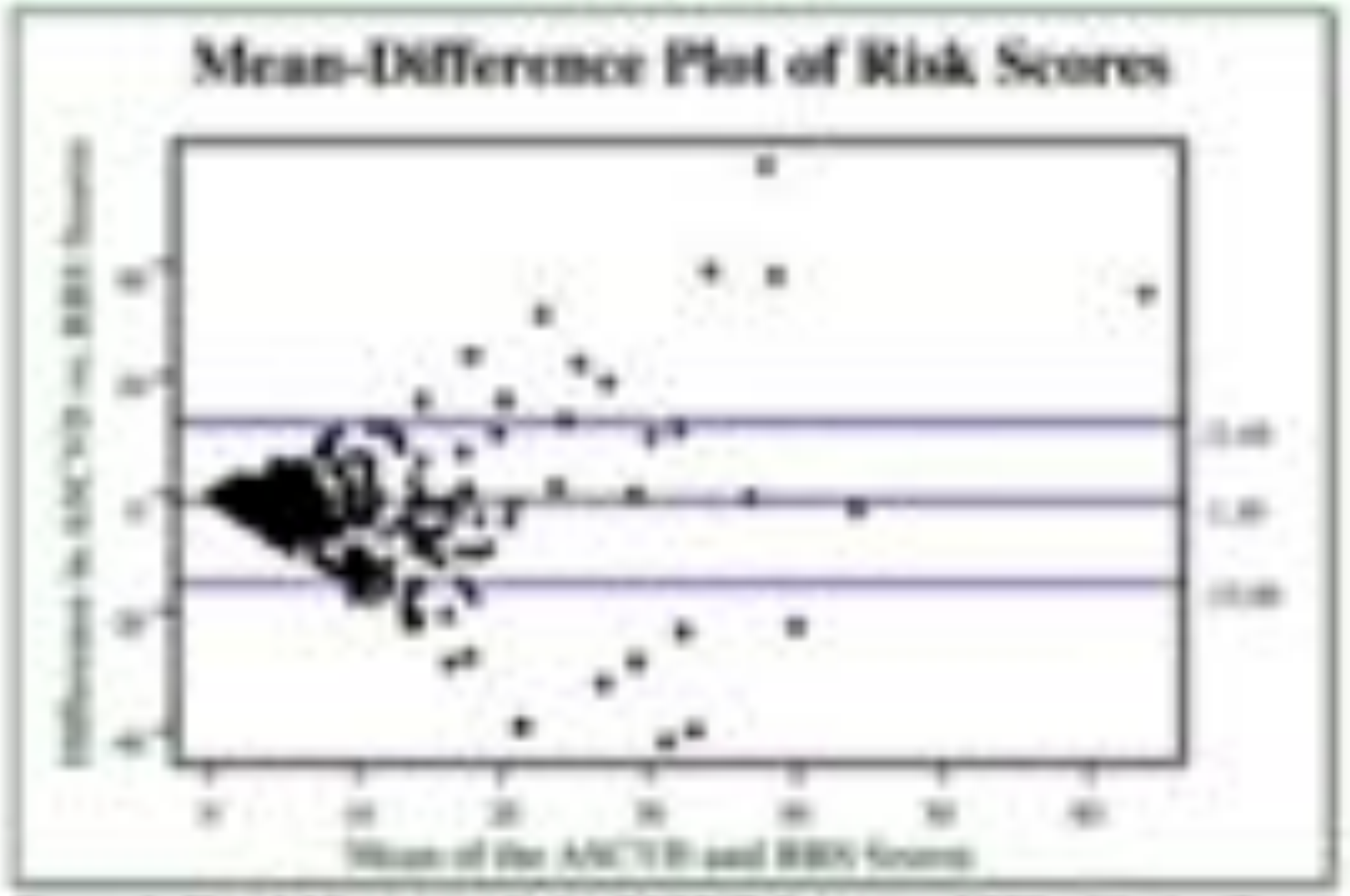

Figure 1: Bland Altman analysis of ASCVD Scores and RRS with significant agreement at low-risk levels; r=0.58.
y=-1.94+ -0.04x; p=0.28; Bias= -1.26; Limits of Agreement: 12.48, -11.0

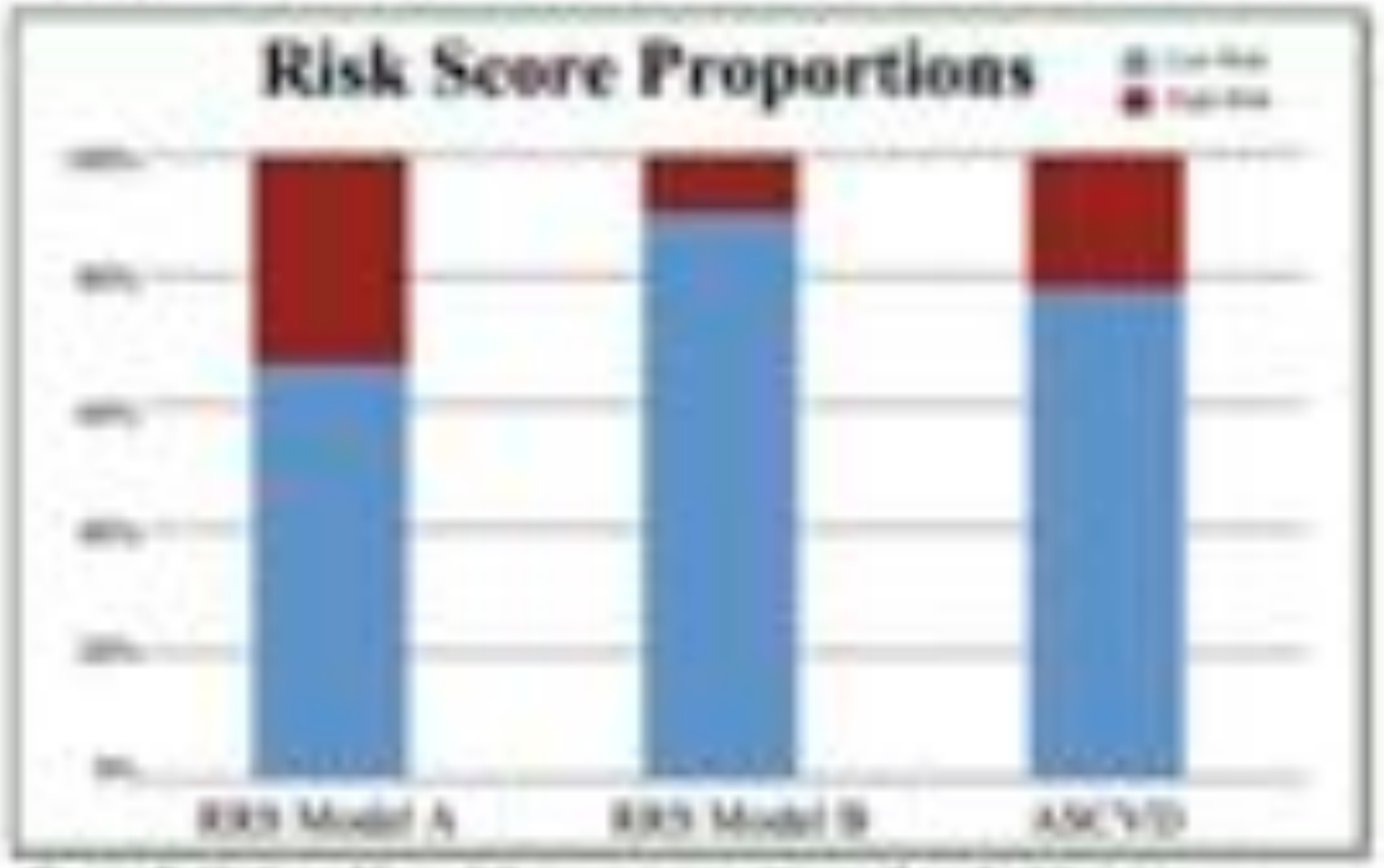

Figure 2: High and low risk score proportions of each risk score.

Risk Score Features

Risk Score	Target CV Events	Variables
RRS Men: 50-80 Women: 45-80	MI, death from Coronary Heart Disease, Stroke, and Coronary Revascularization	Age, sex, total cholesterol, HDL, systolic BP, hs-CRP, diabetes status, HbA1c, Apo B100, ApoA-1, Lp(a), family history of premature MI, smoking status
ASCVD Women: 40-79	MI, death from Coronary Heart Disease, Stroke.	Age, sex, total cholesterol, HDL, systolic BP, diabetes status, smoking status, ethnicity, and anti-HTN treatment

Results

- RRS-A and ASCVD risk have a highly significant agreement using the Bland Altman analysis at low-risk levels, but agreement diminished with increased risk. **See Figure 1.**
- In ASCVD low-risk patients, 14.8% and 1.5% were reclassified into RRS-A and RRS-B high-risk respectively; while 3.2% of RRS-A and 13.5% of RRS-B low-risk patients were reclassified into ASCVD high-risk. (Chi-square Test, McNemar's Test, p<0.001). **See Figure 2.**

Discussion

- Discrepancies in scoring result from Lp(a), hs-CRP, diabetes status, and family history inclusion in the RRS, while ethnicity and hypertension treatment are included in the ASCVD risk score.
- While ASCVD high-risk scores may identify patient populations that benefit from pharmacologic intervention, patients categorized as low-risk by ASCVD risk score but intermediate to high-risk by RRS may also benefit from aggressive risk factor modification.
- We must explore additional opportunities to better risk stratify our patients and identify those with elevated or discordant Lp(a) so that appropriate management and counseling can take place.

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