

Accuracy Of Cardiovascular Risk Stratification By Canadian Primary Care Physicians: Preliminary Results From The Primary Care Audit Of Global Risk Management (PARADIGM) Study

M. Gupta,^{1,2,3,4} M Kajil,¹ S Hirjikaka,¹ M. Tsigoulis,¹ G.B.J. Mancini,⁵ R. Nisenbaum,^{3,4} M Mamdani^{3,4} and S. Verma^{1,3,4}
¹Canadian Cardiovascular Research Network, Brampton, ON; ²McMaster University, Hamilton, ON; ³Keenan Research Centre in the Li Ka Shing Knowledge Institute of St. Michael's, Toronto, ON; ⁴University of Toronto, Toronto, ON; ⁵University of British Columbia, Vancouver, BC

BACKGROUND

Optimal clinical management requires proper CV risk stratification. Guidelines recommend the use of validated tools (eg. Framingham Risk Score (FRS)) but such tools are not widely adopted by primary care physicians (PCP). The PARADIGM study prospectively evaluated the methods and accuracy of CV risk stratification used by PCP in Canada.

PARADIGM OBJECTIVES

Primary objective

- To evaluate primary care physician behaviour towards global cardiovascular risk prediction in healthy individuals

Secondary objectives

- To evaluate the prevalence of classic and novel markers of risk
- To evaluate the feasibility of bedside carotid atherosclerosis assessment, and its correlation to biochemical risk markers and Framingham Risk Score (FRS)
- To disseminate best practices and new knowledge to key stakeholders in the primary prevention of cardiovascular disease

STUDY SETTING AND ENROLMENT

Primary care physician investigators from 105 sites prospectively enrolled 3015 healthy middle-aged adults undergoing cardiovascular risk assessment.

Inclusion Criteria

- Men ≥40y, women ≥50y
- Absence of known high FRS
- Non-diabetic
- Absence of lipid lowering treatment (current or past);
- No previous history of atherosclerosis (angina, TIA, myocardial infarction, stroke, peripheral arterial disease)
- Willingness to give informed consent

STUDY ALGORITHM

Visit 1

- Obtain Informed consent
- Collect demographics and CV risk factors
- Document concomitant medications
- Perform physical and laboratory measures

Visit 2 (within 60 days of Visit 1)

- Review results
- Determination of risk level and need for lipid lowering therapy
- CRF completed and faxed to CCRN

Central Site

- FRS calculated centrally

DATA MANAGEMENT

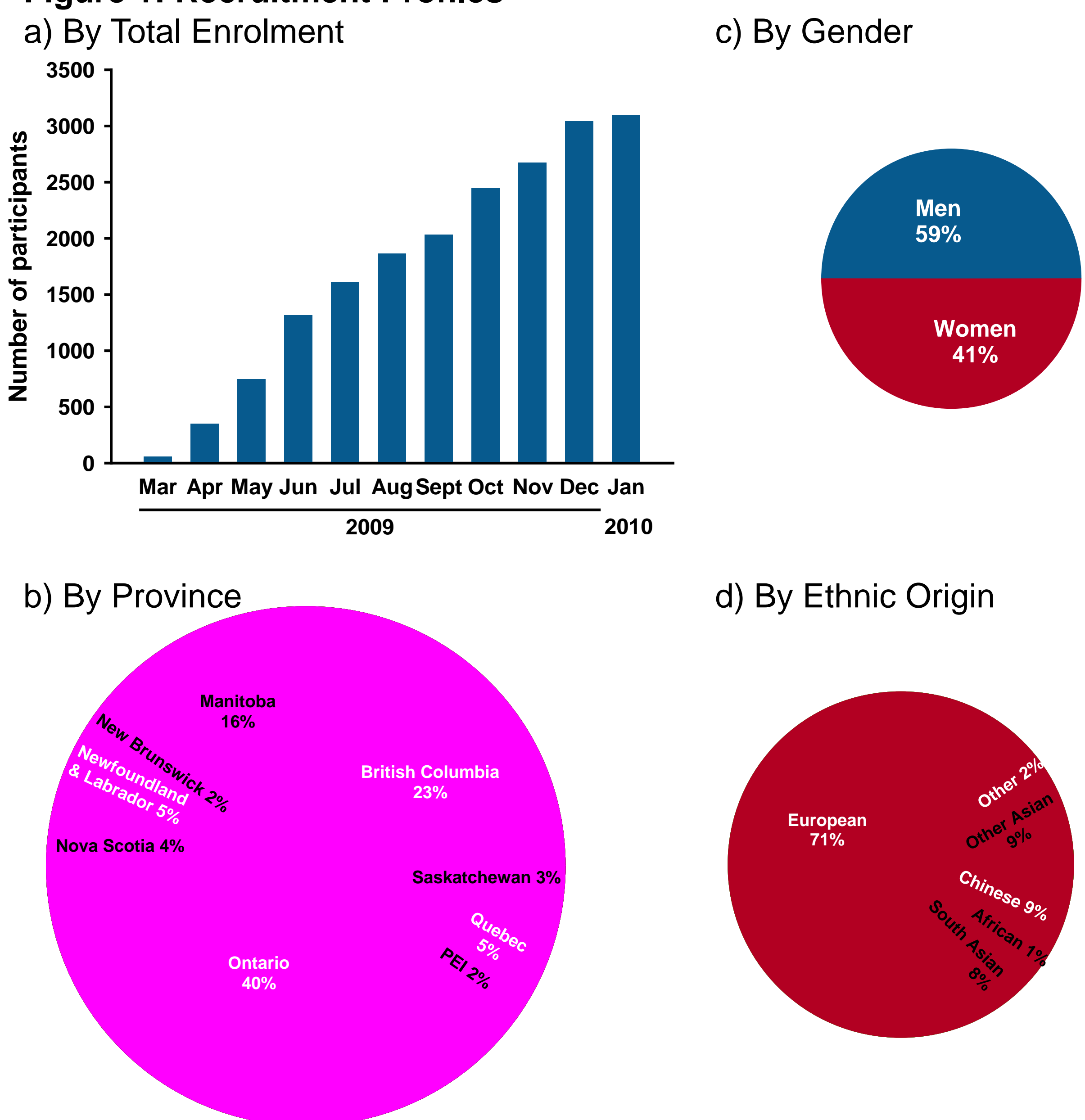
Centrally calculated Framingham risk scores were estimated using the sex-specific equations provided in D'Agostino et al. Circulation (2008) 117(6):743-53. Risk scores were categorized as Low (<10%), Intermediate (10-20%) and High (>20%). Concordance between the centrally calculated risk category and the physician risk assessment were evaluated using the kappa statistic and 95% confidence interval and estimated percent agreement (Low/Low, Intermediate/Intermediate, High/High). Chi-square tests were used to compare percent agreement and kappa statistics.

Agreement between investigator and central determination of risk is expressed in 2 ways: percent agreement, and kappa statistic:

<0	less than chance agreement
0.01-0.20	slight agreement
0.21-0.40	fair agreement
0.41-0.60	moderate agreement
0.61-0.80	substantial agreement
0.81-0.99	almost perfect agreement

RESULTS

Figure 1: Recruitment Profiles



Tables 1 and 2. Clinical Characteristics and Cardiovascular Medications at Baseline

Variable	Median (SD) or %
Age (years)	56.3 (8.4)
Male	58.8
European origin	69.6
Hypertension	30.4
Treated Hypertension	26.6
Past/Current Smoker	34.7
Family Hx CVD (1st degree relative <60)	24.3
Systolic BP (mm Hg)	126.6 (14.0)
Diastolic BP (mm Hg)	78.5 (9.1)
BMI (kg/m ²)	27.8 (5.3)
Waist Circumference (cm)	94.8 (13.6)
Has optimized lifestyle behaviors	55.1

Medication Class	n (%)
Angiotensin Converting Enzyme Inhibitors	327 (10.9)
Angiotensin Receptor Blocker	333 (11.0)
Beta Blocker	120 (4.0)
Calcium Channel Blocker	166 (5.5)
Diuretic	444 (14.7)
Aspirin	406 (13.5)

Table 3. Baseline Laboratory Results

Medication Class	Median (SD)	
	mmol/L	mg/dL
Total Cholesterol	5.6 (1.0)	217 (39)
LDL Cholesterol	3.6 (0.8)	139 (31)
HDL Cholesterol	1.4 (0.4)	54 (16)
Triglycerides	1.6 (1.0)	142 (89)
hsCRP (mg/L)	2.6 (3.2)	
Fasting Blood Glucose	5.4 (0.7)	97 (13)
A1C (%)	5.7 (0.5)	
Creatinine	0.08 (0.02)	0.91 (0.18)
eGFR (mL/min/1.73m ²)	77.4 (16.0)	
Urine MACR (mg/mmolL)	1.6 (4.8)	

Fig. 2. Investigator Methods of CV Risk Determination

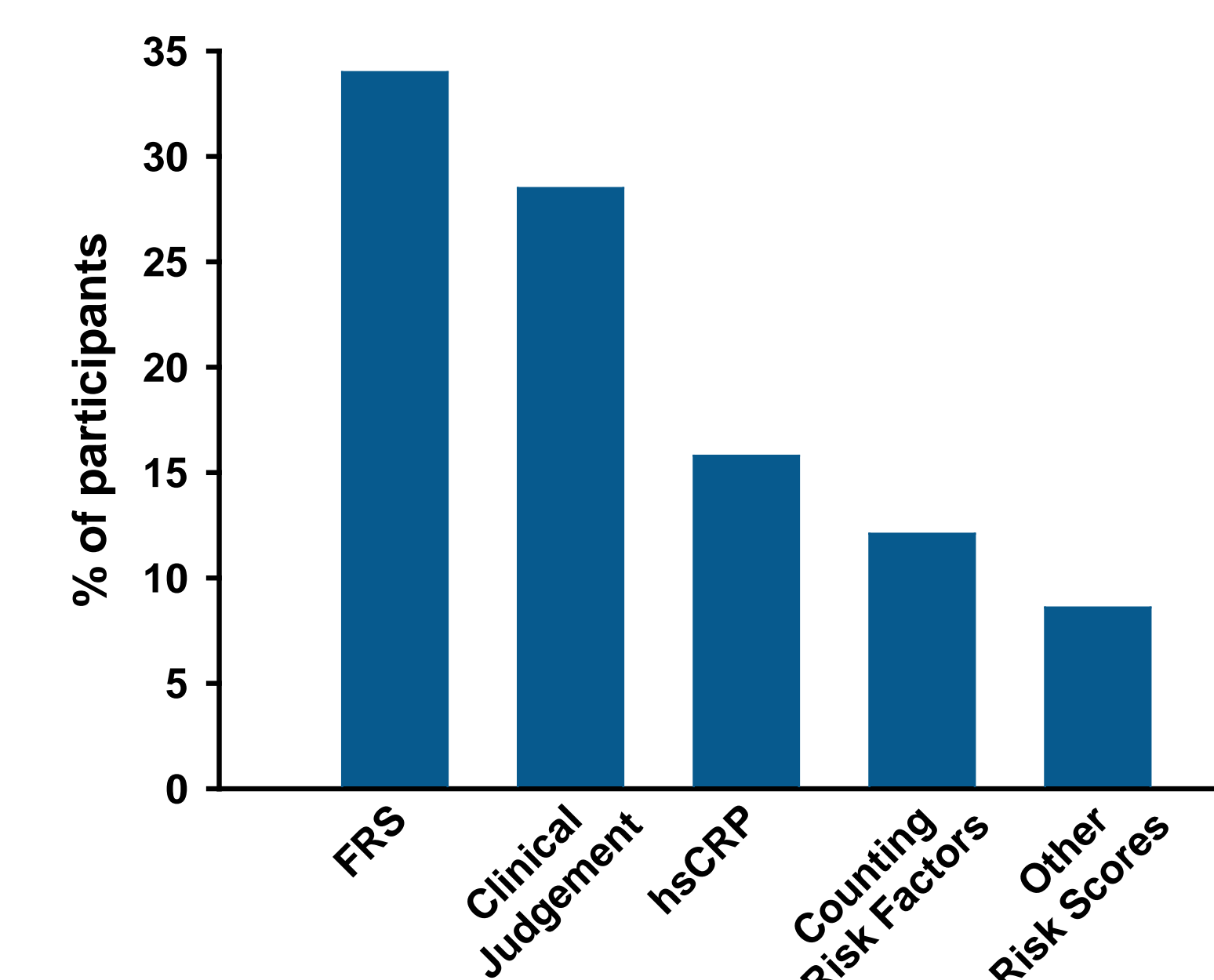


Fig. 3. A) Investigator vs Central Risk Stratification and B) Overall Agreement Rates for Risk Stratification

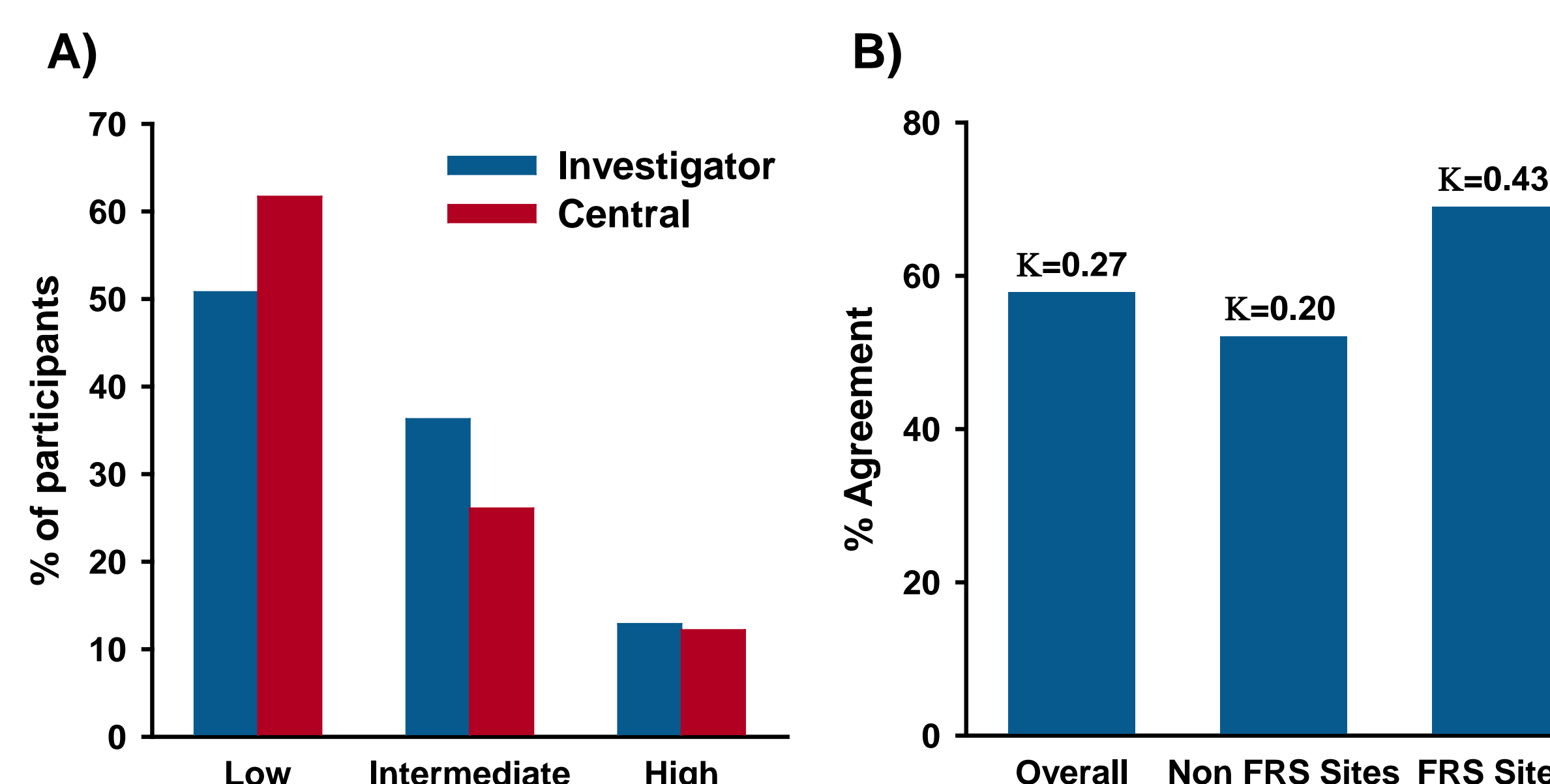
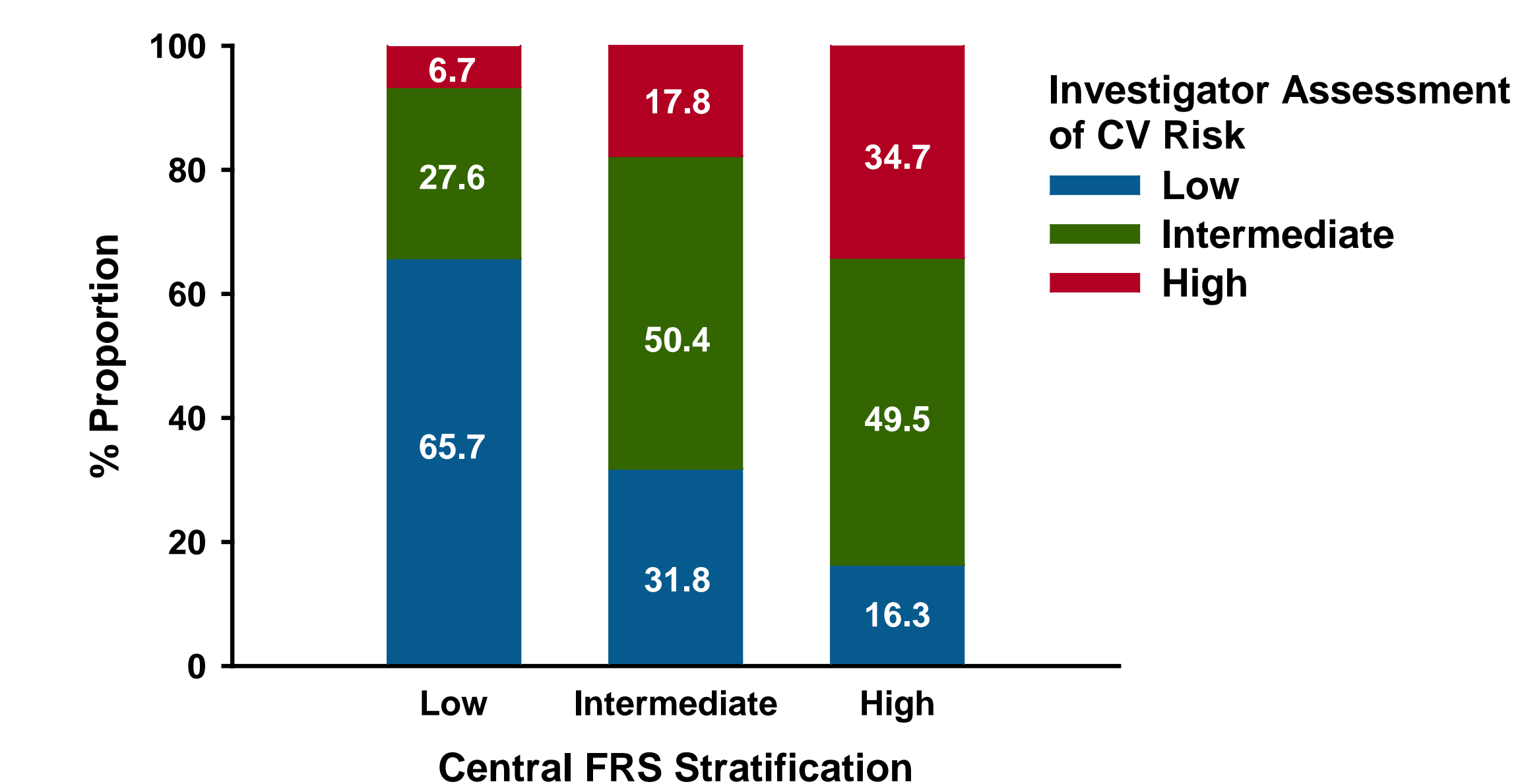


Table 4. Summary of Actual Agreement by Risk Category

Site Risk Level	Central Risk Level			Total	Central Agreement with Site
	Low	Intermediate	High		
Low	1221	250	60	1531	79.8%
Intermediate	514	397	182	1093	36.3%
High	124	140	126	390	32.3%
Total	1859	787	368		

Site Agreement with Central	Low	Intermediate	High	Overall Agreement	Kappa
	65.7%	50.4%	34.2%	57.9%	0.27 (0.24, 0.30)

Figure 4. Summary of Actual Agreement by Risk Category



CONCLUSIONS

- The PARADIGM study found that in middle-aged Canadians felt to be at low to intermediate CV risk:
 - 1/3 have hypertension and 1/3 are current or former smokers
 - 1/5 to 1/4 report a significant family history of CVD
 - The majority are overweight or obese
 - 55% feel they are doing the best they can through lifestyle intervention alone
 - Mean LDL is 3.6 mmol/l and mean hsCRP is 2.6 mg/dl
- In this group of investigators:
 - 34% report using the FRS to determine CV risk
 - Overall level of agreement between physician and central risk determination was only fair
 - Agreement was moderate for sites using FRS, and only slight for sites using other methods of risk stratification
- Using centrally calculated FRS as the gold standard, physicians accurately identified:
 - 65.7% of low risk patients
 - 50.4% of intermediate risk patients
 - 34.2% of high risk patients
- Two thirds of high risk patients were classified at lower risk levels

IMPLICATIONS

- Risk stratification, the cornerstone of CV risk reduction in primary prevention, is suboptimally done by physicians and leads to considerable misclassification of individuals into lower or higher risk categories.
- A large number of high risk patients were misclassified into lower risk groups suggesting that widespread educational initiatives are urgently required.
- The noted discrepancies in reported FRS utilization and correlation between central and site risk categorization may be at play in any country using calculated risk as the determinant of an indication for statin therapy and intensity of lipid lowering.

CONFLICTS OF INTEREST

The authors report no conflicts of interest to disclose.

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