Derivation and Internal Validation of a Disease-specific Cardiovascular Risk Prediction Model for Patients with Psoriasis and Psoriatic Arthritis

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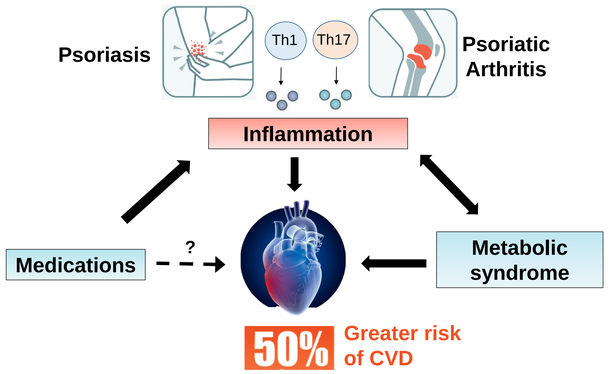
Background

- Cardiovascular disease (CVD) risk in patients with psoriatic disease (PsD) may be underestimated by conventional scoring systems.



Objective

❖ To develop and internally validate a 5-year disease-specific cardiovascular risk prediction model for patients with psoriatic disease

Methods (1)

- **Design**: Longitudinal, prospective cohort study.
- **Population**: Patients with psoriatic disease in Ontario, Canada, enrolled in IPART.
- **Exclusions**: Patients with a history of a CVD event prior to clinic entry.
- **Outcome**: Incident fatal and non-fatal CVD events.
- **Analysis**: Using time-varying covariates, we fit models to predict CVD events within a 5-year period.
- **Model evaluation**:
  - ➢ A base prediction model included traditional CVD risk factors.
  - ➢ An expanded model, controlled for the specific class of medication used, included the base model and PsD-related factors.
- **Model performance**: Assessed using measures of discrimination and calibration, and sensitivity and specificity.

Methods (2)

- The following traditional CVD risk factors and psoriatic disease-related variables were assessed at each study visit:

Traditional CVD Risk Factors	Demographic & PsD-related Risk Factors
1. Age	1. Race
2. Sex	2. Number of clinically damaged joints
3. Smoking status	3. Number of dactylitic digits
4. Diabetes	4. Number of tender entheseal sites
5. Systolic blood pressure	5. Number of tender and swollen joints
6. Body Mass Index	6. Psoriasis severity, by Psoriasis Area and Severity Index (PASI)
7. Total cholesterol	7. Physical function, by HAQ (Health Assessment Questionnaire)
8. Triglycerides	8. ESR (Erythrocyte Sedimentation Rate)
9. Use of anti-hypertensive medications	
10. Use of lipid-lowering medications	

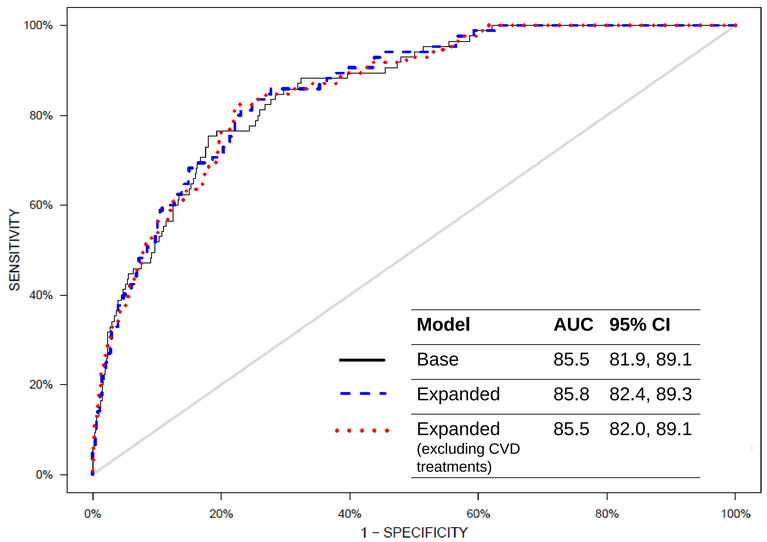
Results

1,336 patients
92% with PsA
47% female
Mean follow-up: 6.8 years

85 incident CVD events

1 **Model Discrimination:**
- Discriminative ability of the **base model** (with traditional CVD risk factors alone) was excellent, with an area under the curve (AUC) of 85.5.
- The **expanded model**, controlled for the strongest medication (use of daily NSAIDs, csDMARDs or biologics) used at each visit, did not select any of the disease-related risk factors and did not improve risk discrimination compared to the base model.

Figure 1. Area under the receiver operating characteristic curve (AUC) for the different 5-year risk prediction models.

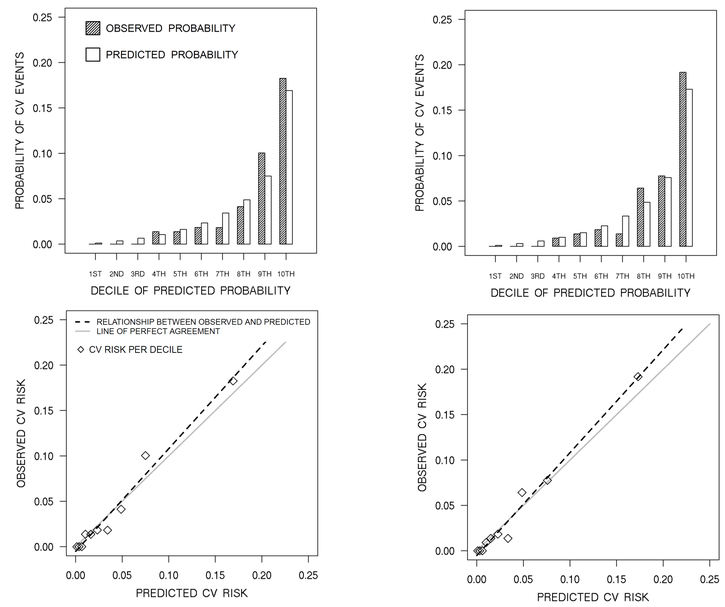


Results

2 **Model Calibration:** All models were well calibrated and appeared to be an accurate estimate of the observed number of cardiovascular events.

Figure 2A. Base model (traditional CVD risk factors)

Figure 2B. Expanded model



3 **Sensitivity and specificity** of the cut-off values (5% and 10%) for CVD risk across both models were similar. When considering the total number of events: (**1**) Up to 53% of events occurred in patients classified as low to intermediate risk (<10%). (**2**) Up to 25% of events occurred in patients classified as low risk (<5%).

	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Base model				
>5%	77	78	12	99
>10%	47	92	19	98
Expanded model				
>5%	75	78	12	99
>10%	49	92	20	98

NPV, negative predictive value; PPV, positive predictive value

Conclusion

❖ A 5-year prediction model that includes traditional cardiovascular risk factors alone is accurate in predicting cardiovascular risk in patients with psoriatic disease, showing excellent discrimination and calibration.

Acknowledgements

- This study was supported by Canadian Institutes of Health Research, Women's College Research Institute, National Psoriasis Foundation, Arthritis Society, and the Krembil Foundation.