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# LETTERS

UPDATED VERSION OF QRISK2

## Being sanguine about study design and multiple imputation

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Using The Health Improvement Network (THIN) database, Collins and Altman validate QRISK2-2011 versus the National Institute for Health and Clinical Excellence's Framingham Equation (NFE) for predicting 10 year risk of cardiovascular disease.[1]

The QRISK2-2011 web calculator replaces missing data via multiple imputation predictor algorithms. Would I want my risk assessed on imputed data or prefer my GP to determine which data to obtain? The net benefit of QRISK2-2011 was two more cases identified per 1000 women versus no model. Performance for men was better.

The only THIN covariate recorded substantially better in 2012 was smoking, not body mass index (BMI; 29.5% missing for men) or ratio of total cholesterol to high density lipoprotein-cholesterol (78% missing).

Townsend deprivation score features as main effect and interacting with age in QRISK2, but not in NFE. Why was the presence of the Townsend score (10% missing) made a design priority when imputation is tolerated for BMI, which also features in interactions?

Collins and Altman complained that NFE had not been UK calibrated, but their fig 2 (for men by age group) shows that a generalised 5% reduction in NFE risk prediction calibrates it "nicely" and without QRISK2's overprediction at the high end of predicted risk scores.

QRISK2-2011 makes the strong assumption that, conditional on measured risk factors, missing risk factors can effectively be imputed at random using data from "otherwise similar patients."

My doctor can see me and decide whether to measure my BMI. Clinical acumen and patients' compliance determine test decisions. Why not pit imputation's performance against clinical acumen by randomising between strategy 1 (obtain missing data) and strategy 2 (doctor decides for whom, and which, data to obtain). Actual and imputed values, as well as costs, can be compared and insight gleaned about whom to test further, and for what.

Statisticians should put strong assumptions to experimental challenge, as others do.

Competing interests: None declared.

1 Collins GS, Altman DG. Predicting the 10 year risk of cardiovascular disease in the United Kingdom: independent and external validation of an updated version of QRISK2. *BMJ* 2012;344:e4181. (21 June.)

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