European Heart Journal (2003) **24**, 1899–1900

Editorial

Global risk assessment for cardiovascular disease and astute clinical judgement

Charles H. Hennekens[a]*, Ralph B. D'Agostino[b]

[a] *University of Miami School of Medicine, Miami, USA*
[b] *Boston University, Boston, USA*

Received 22 August 2003; accepted 28 August 2003

See doi:10.1016/j.ehj.2003.09.002 for the article to which this editorial refers

In their thoughtful and provocative article 'Are the Framingham and PROCAM coronary heart disease risk functions applicable to different European populations? The PRIME Study', Drs Empana and colleagues astutely conclude that the answer is neither simple nor straightforward.[1] On the one hand, they conclude that the Framingham (from the United States) and PROCAM (from Germany) risk functions overestimated the absolute risk of coronary heart disease in middle aged men from Belfast (with moderate risk) and France (with low risk). On the other hand, and, of perhaps greater relevance, the Framingham and PROCAM risk functions were able to rank individuals according to their estimated absolute risk.

This latter conclusion assumes even greater relevance in light of the historical perspective that the Framingham Risk Score was promulgated primarily to aid clinicians in making therapeutic decisions by ranking patients according to their estimated absolute risk.[2] The score includes gender, age, cholesterol, high density lipoprotein cholesterol, blood pressure, diabetes and cigarette smoking. Several years later the National Cholesterol Education Program III guidelines sponsored by the US National Heart, Lung, and Blood Institute utilized the Framingham Risk Score to guide the treatment decisions for the management of lipids. Specifically, patients were trichotomized into 10-year absolute risks of equal to or greater than 20% (for which the low density lipoprotein (LDL) cholesterol goal is less than 100 mg/dl), 10 to 19% (for which the LDL goal is less than 130) and less than 10% (for which the LDL goal is less than 160).[3] Even within the US it was noted that Framingham is a population of predominantly middle-class whites so Hispanics or African-Americans, whose absolute risks are higher) may require more aggressive management at a given risk score. Further, neither obesity nor family history of premature coronary heart disease, both independent risk factors in most epidemiological studies, were included and should, nonetheless be considered by clinicians. Finally, the presence of multiple metabolic risks factors also needs to be considered by the clinician. Specifically, the presence of multiple metabolic risk factors appears to be more than additive. In the US, about one in four adults has metabolic syndrome, a constellation that includes obesity, dyslipidaemia, hypertension, and glucose intolerance.[4]

The authors also conclude that the Framingham and PROCAM scores overestimate risk in Belfast and France. In this regard it is interesting to note that the PRIME Study does not capture silent myocardial infarction and may underestimate angina, both of which were collected in a systematic fashion in Framingham. These issues may, at least in part, raise a debate about whether Framingham overestimates or PRIME underestimates risk. Nonetheless, it is not surprising that a risk function derived for a particular population will either overestimate or underestimate risk in other populations. One strategy that has been utilized is the recalibration of the Framingham risk function to Japanese-Americans and Hispanics in Puerto Rico.[5] More recently, this has been replicated for the Catalonia area of Spain.[6] Such recalibrations are relatively straightforward requiring only average risk factor levels and incidence rates, both of which are available from Belfast and France.

With respect to risk assessment, the authors conclude that the use of one single risk function is not an acceptable target and that the development of specific-population risk functions is necessary. This conclusion should be viewed in the context of cost and feasibility issues to design, conduct, analyse and interpret new prospective cohort studies for each population for which risk is to measured. This issue is further complicated by the reality that in many populations we are now well beyond the era where it is possible to collect the necessary natural history data.[7] Although life-saving therapeutic and preventive drugs are underutilized

* Correspondence to: Dr C. H. Hennekens, 4300 Alton Road, Suite 207A, Miami Beach, Florida 33140, USA. Tel: +1 561 393-8845; fax: +1 561 393-8845
E-mail address: PROFCHHMD@prodigy.net (C.H. Hennekens).

0195-668X/03/$ - see front matter
doi:10.1016/j.ehj.2003.08.012

despite the availability of national guidelines, health care providers are prescribing aspirin, statins, angiotensin-converting enzyme inhibitors, and beta-blockers which would confound the risk estimates. Thus, national policy-makers may have to weigh the relative utilities of existing functions based on valid prospective cohort study data that demonstrate good discrimination and are amenable to recalibration against new data collection with its inherent imperfections.

In the meanwhile, it also seems important to point out that even the availability of valid population-specific risk functions may be necessary but not sufficient for rational clinical decision making. Astute clinical judgment should consider the totality of evidence as well as the assessment of additional risk factors in the individual patient that may alter the threshold for initiating a therapeutic strategy. These considerations seem particularly important for statins, aspirin, angiotensin converting enzyme inhibitors, and beta-adrenergic blockers where the totality of evidence indicates the need for more widespread and appropriate utilization.

References

1. Empana JP, Ducimetiere P, Arveiler D et al. Are the Framingham and PROCAM coronary heart disease risk functions applicable to different European populations? The PRIME Study. *Eur Heart J* 2003;**24**:1903–11.
2. Wilson PWF, D'Agostino RB, Levy D et al. Prediction of coronary heart disease risk factor categories. *Circulation* 1998;**97**:1837–47.
3. Executive summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA 2001;285:2486–97.
4. Eidelman RS, Lamas GA, Hennekens CH. The new National Cholesterol Education Program guidelines: Clinical challenges for more widespread therapy of lipids to treat and prevent coronary heart disease. *Arch Int Med* 2002;**162**:2033–6.
5. D'Agostino RB, Grundy S, Sullivan LM et al. Validation of the Framingham coronary heart disease prediction scores: results of a multiple ethnic group investigation. *JAMA* 2001;**286**:180–7.
6. Marrugat J, D'Agostino R, Sullivan LM et al. An adaptation of the Framingham coronary heart disease risk function to European Mediterranean areas. *J Epidemiol Commun Health* 2003;**57**:634–8.
7. Hennekens CH. Clinical and research challenges in risk factors for cardiovascular diseases (The Geoffrey Rose Lecture at ESC). *Eur Heart J* 2000;**21**:1917–9.