Commentary: Mediterranean paradoxes continue to provoke

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In this issue of the International Journal of Epidemiology Jamrozik and colleagues ask whether the ‘Mediterranean paradox’ confers protection against abdominal aortic aneurisms (AAA) in addition to its traditionally cited protection against ischaemic heart disease. They seek answers to this question not in populations still living in the Mediterranean but in those who have migrated to Australia.

The authors conducted a trial of ultrasound screening for AAA in Perth, Western Australia. Of the 12,203 screened men, 1,163 had been born in the Mediterranean region, 333 in Scotland, 258 in the Netherlands and 2,801 elsewhere in northern Europe. The ‘Mediterranean’ subjects were, on average, about 5 cm shorter than the other birthplace groups. The diameter of the aorta was related to height, so the authors sought to control confounding from this source by multiplying the diameter (in mm) by 100 and then dividing by the subject’s height. The use of this form of height adjustment is not explicitly defended. Without adjustment for height, fewer of those born in the Mediterranean had large aortas—their 95th centile was 28.8 mm compared to 32.2 mm for the study population as a whole. Using the chosen height-adjusted index, 2.9% of the Mediterranean-born exceeded a specified 95th centile value (based on the distribution among the Australian-born) compared to 4.7% of the total. When comparisons were made using a 99th centile value, the ‘Mediterranean’ advantage, relative to the Australian-born, was no longer apparent. Throughout, prevalences of enlarged aortas tended to be higher in those born in the Netherlands and Scotland. Given that precision was relatively lower for the prevalences of those exceeding the 99th centile value and that between-group differences at this level could also be subject to variation in the proportions excluded for having ‘known or treated AAA’, most information probably resides in the comparisons based on the 95th centile values. The authors are perhaps over-interpreting their data when they judge that any Mediterranean paradox in relation to aortic aneurism ‘if it exists at all ... is more modest than that for coronary disease’. Their evidence might equally be summarized as suggestive but inconclusive.

The ‘Mediterranean’ subjects in their study population have mostly lived in Australia for over three decades—as have the migrants from northern Europe with whom they are compared. The preservation among such migrants of a ‘Mediterranean advantage’ in relation to vascular risk is widely appreciated in Australia but little noticed outside. Inadequate reporting in international journals may have contributed to the widespread perception that migrant studies of vascular disease generally reveal the predicted convergences to host rates and thus confirm current aetiological hypotheses.

Mortality from all vascular causes in people migrating from Greece and Italy to Australia was last reported for the late 1980s, using data derived from country of birth entries on death certificates and census returns. (Mortality attributable to ischaemic heart disease is less generally available for these groups; it is also more vulnerable, in vital statistical sources, to variations in classificatory practices.) At that time vascular mortality in the migrants was substantially lower than in both their countries of origin and among the Australian-born (the standardized mortality ratios for Greek and Italian migrants relative to the Australian born for ages 15–74 years in 1987–1989 were: 62 and 67, respectively, for males and 55 and 55 for females). There was no evidence of any convergence towards host rates with longer residence in Australia. Selective migration of healthier people is always a possible explanation for low mortality in migrants. Lower mortality in the first years following migration is evident for a number of birthplace groups in the Australian migrant data but effects of this kind are not more apparent among those born in southern Europe and they do not explain a sustained mortality advantage.

The potential contribution of conventional risk factors to this Mediterranean migrant advantage in Australia has been explored by Bennett. He pooled data from national risk factor surveys conducted in metropolitan Australia in 1980, 1983 and 1989. Among those born in the Mediterranean region, blood cholesterol concentrations were very similar to those in the Australian-born; smoking was higher in males, but lower in females and blood pressures were slightly lower. Taken as a whole, the established risk factors offered little explanation for the marked and persistent protection enjoyed by those born in Greece and Italy. If the Mediterranean migrants to Australia are being protected by their diet, pathways operating via blood lipid levels are implausible candidates. This is consistent with observations from the Seven Countries Study where Mediterranean cohorts enjoyed a two- to three-fold advantage over northern Europeans at given blood cholesterol concentrations (controlling for smoking and blood pressure).

Migrant mortality rates in Australia have not been stationary but rather have been falling just as fast as host rates, so maintaining a constant proportional advantage. Temporal changes like this argue against a dominant role for genes, independent of environment. This leaves the way open for speculating that protective elements of Mediterranean food cultures were not all left behind at the time of migration. On the contrary, some of them may have found new expression in an environment where preferred foods, such as salad vegetables, became available year round from shops—in contrast to the seasonality of traditional supplies, which in rural areas were largely domestic.
The national risk factor survey in 1983 included a 24-hour dietary recall with the following reported daily intakes for respondents born, respectively, in southern Europe, Australia and the UK (expressed in g/d): tomato and tomato products—36.5, 27.0, 22.5; leafy greens—39.5, 14.5, 13.5; citrus fruit—82.0, 51.5, 51.5; apples and pears—82.0, 71.0, 68.5.7

The substantial consumption gradients for these fruit and vegetable categories leave room here for yet to be specified protective constituents of plant foods, with antioxidant and possibly other properties, as the causes of the corresponding gradients in vascular risk. Such thinking would be consistent with Ferro-Luzzi’s detailed explorations of the possible sources of protection from Southern Italian diets.8,9

It is of related interest that in France, Italy and Spain, the baleful march of ‘Macdonaldization’ has yet to achieve its widely anticipated triumph over the Mediterranean advantage.10 Over the decade to the mid-1990s, France and Italy exceeded or equaled EU average declines of around 30% in vascular mortality at ages under 65.11 The slightly poorer performance of Spanish males (who showed a 26% decline in mortality from vascular causes compared to a 40% decline in Spanish females) finds ready explanation in the increasing aetiological force of tobacco smoking in this population—lung cancer in Spanish males under 65 rose by 19% over the decade, compared to an EU-wide decline of 14%. Estimated trends in ‘vascular mortality not attributable to smoking’ over the two decades to the early 1990s show Spanish males to be out-performing northern countries.12 The interesting exception to these broad trends has been Greece where the decline in vascular mortality rates has lagged markedly. In the 1970s Greece’s low levels of vascular mortality were the envy of all; now Greece is being overtaken even by Finland. In a small cohort study on elderly rural Greeks the only component of the diet significantly related to survival was dairy products (adversely) but an overall score based on splits at the median for eight characteristics was strongly predictive.13 This study offers no direct clues as to why Greeks who stayed in Greece—but not those who migrated to Australia—have lagged behind in reducing risks of vascular death.

The Mediterranean paradox continues to provoke. If protection against vascular disease in these populations is coming, in large measure, from protective factors in plant foods, then this protective influence needs to be specified in a way that makes it consistent with observed trends in food intakes and vascular risk in both non-migrant and migrant populations of Mediterranean origin. The advantage enjoyed by most such populations has increased with affluence, despite often adverse trends in conventional risk factors. It is unlikely that the ‘in season’ availability of putatively protective foods has been much enhanced by affluence, but the year round consistency of intake of such foods could have been.14 ‘Annualized’ measures of such exposures may be deceptive.

References