The 'healthy migrant effect'—not merely a fallacy of inaccurate denominator figures

From OLIVER RAZUM, HAJO ZEEB and SABINE ROHRMANN

Sir—Ringbäck Weitoft *et al*.[1] present intriguing evidence indicating that the lower mortality among immigrants compared to the host population in register studies could largely be explained by inaccurate denominator figures. Their findings suggest that immigrants to Sweden, particularly those from Turkey and Southern Europe, frequently remain registered on the national population registry even after returning to their home countries. Thus, an inflated denominator basis would lead to an underestimate of their mortality rate.

In Germany, too, the age-adjusted mortality among the 2 million Turkish residents is markedly lower than that of Germans, according to register studies.[2] To assess whether this could be due to tbe bias reported by Ringbäck Weitoft *et al*. we analysed the mortality experience of immigrants in the German Socio-Economic Panel (SOEP). In the SOEP, a representative sample of households is followed up annually. Between 1984 and 1997, 23 769 individuals (25% of them immigrants) had spent a median of 8 years on the panel; 1310 deaths (6.3% among immigrants) were reported. We compared the mortality of immigrants from Turkey and Southern Europe, most of them former guest workers and their family members, to that of Germans in a Poisson regression model.[3] Forward-stepwise estimation led to the selection of the variables sex, time period (1991–1997 versus 1984–1990), and age in 10-year bands as a continuous and a quadratic term. No significant interactions of relevance were found.

Table 1 shows crude mortality rates and adjusted relative risk estimates of immigrants from Turkey and Southern Europe versus German panel members. Immigrants have a significantly lower mortality risk than Germans even after age adjustment. So far, there is no evidence of a secular increase in their mortality.

Our findings demonstrate that in Germany, the comparatively low mortality among immigrants is not explained by over-registration alone. In the SOEP where inaccuracies in the denominator figures can be ruled out, immigrants experience a mortality advantage almost similar in size to that in register studies. Cohort studies in other countries found mortality rates among immigrants that were up to 36% lower in men and 44% lower in women, compared to the host population.[4] Kliewer,[5] in a review, found mortality advantages of a lower magnitude but lasting 20 years and more. This healthy migrant effect is assumed to be due to (self-) selection at the time of immigration. It is also visible in studies of self-reported morbidity where it diminishes with time of residence in the host country.[6] Yet the presence of a healthy migrant effect is not an indication of equity in health, as can be seen e.g. from the higher maternal mortality among women of non-German nationality in Germany.[7]

With migration on the rise world-wide, epidemiological studies will increasingly include immigrants in the study population. The healthy migrant effect thus becomes a potential effect modifier that needs to be properly understood and quantified. Future research should identify factors determining the size and possible attenuation with time of the mortality advantage among immigrants. Besides, a numerator bias, e.g. due to a selective re-migration of critically ill individuals to their home countries, should be ruled out.

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Table 1 Mortality risk of immigrants versus Germans by sex, period and age group in the German Socio-Economic Panel, 1984–1997

	Immigrants from Turkey and Southern Europe [Germans] ⩾15 years	Immigrants from Turkey and Southern Europe [Germans] 15–64 years
No. of individuals in panel	3851 [18 624]	3833 [16 710]
Median No. of years in panel	8 [8]	8 [7]
Total person-years contributed	30 612 [141 875]	30 063 [121 903]
Number of deaths	67 [1212]	59 [335]
Crude mortality rate per 1000 person-years (95% CI)	2.19 [1.72–2.78] [8.54 (8.08–9.04)]	1.97 [1.52–2.53] [2.75 (2.47–3.06)]
Adjusted relative risk estimates[a]		
Immigrants vs. Germans (95% CI)	0.63 (0.49–0.82)	0.68 (0.52–0.90)
Sex: Females vs. males (95% CI)	0.60 (0.54–0.67)	0.58 (0.47–0.71)
Period: 1991–1997 vs. 1984–1990 (95% CI)	0.77 (0.69–0.86)	0.80 (0.66–0.97)

[a] Poisson modelling; all variables and age included simultaneously in one model.

Department of Tropical Hygiene and Public Health, Heidelberg University. Im Neuenheimer Feld 324, 69120 Heidelberg, Germany. e-mail: oliver.razum@urz.uni-heidelberg.de

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