Population mixing and childhood leukaemia

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In their recent study of childhood leukaemia (CL) in Switzerland, Lupatsch et al. [1] imply that they have tested my population mixing (PM) hypothesis concerning an infective aetiology for CL [2]. This is misleading, since this hypothesis concerns *marked rural* PM, as I have always stressed, and their study does not address such PM. They also state that, apart from one of case-control type, all previous studies have been ecological; this is incorrect, since that of Kinlen and Balkwill [3] was a cohort study. In general, epidemics do not show a linear dose-response relation with the contact level between susceptible and infected individuals, but begin when this reaches some critical level, specific for the agent involved [4]. The examples of marked rural PM that my colleagues and I have studied have been specific and clearly identifiable [2], and those associated with CL excesses usually involved influxes much greater in size than the rural communities they affected. The meta-analysis [2] to which Lupatsch et al. [1] refer included the most recent examples in the UK, of Seascale (18-fold excess of CL) and in the USA, of Fallon (26-fold) which followed influxes in size equivalent to about 10 and 27 times, respectively, that of the rural communities in question.

By comparison, the rural PM investigated in Switzerland appears relatively minor: median and maximum population growth in rural municipalities during 1985–1990 was 6 and 124 %, respectively, and during 1995–2000 was 10 and 78 %, respectively [1]. Though the range of growth for the

upper rural quintile in their analysis is not presented, these maxima suggest that the population growth in their study is limited. From the first study [5], limited rural PM has not usually been associated with an excess of CL, implying that the level of contact between infected and susceptible individuals was insufficient to trigger an epidemic of the underlying infection and a consequent excess of its rare response, CL. No marked rural PM in the Swiss study is mentioned during the period studied [1], despite the authors' themselves referring to previously reported excesses being associated with "extreme PM...in rural but not urban areas". It seems unlikely that even a single example occurred and in these circumstances, the PM hypothesis can hardly be claimed to have been tested.

Compliance with ethical standards

Conflict of interest The author declares he has no conflict of interest.

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