



Health and well-being of movers in rural and urban areas – A grid-based analysis of northern Finland birth cohort 1966

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ABSTRACT

We examined the association of health and well-being with moving using a detailed geographical scale. 7845 men and women born in northern Finland in 1966 were surveyed by postal questionnaire in 1997 and linked to 1 km² geographical grids based on each subject's home address in 1997–2000. Population density was used to classify each grid as rural (1–100 inhabitants/km²) or urban (>100 inhabitants/km²) type. Moving was treated as a three-class response variate (not moved; moved to different type of grid; moved to similar type of grid). Moving was regressed on five explanatory factors (life satisfaction, self-reported health, lifetime morbidity, activity-limiting illness and use of health services), adjusting for factors potentially associated with health and moving (gender, marital status, having children, housing tenure, education, employment status and previous move). The results were expressed as odds ratios (OR) and their 95% confidence intervals (CI). Moves from rural to urban grids were associated with dissatisfaction with current life (adjusted OR 2.01; 95% CI 1.26–3.22) and having somatic (OR 1.66; 1.07–2.59) or psychiatric (OR 2.37; 1.21–4.63) morbidities, the corresponding ORs for moves from rural to other rural grids being 1.71 (0.98–2.98), 1.63 (0.95–2.78) and 2.09 (0.93–4.70), respectively. Among urban dwellers, only the frequent use of health services (≥ 21 times/year) was associated with moving, the adjusted ORs being 1.65 (1.05–2.57) for moves from urban to rural grids and 1.30 (1.03–1.64) for urban to other urban grids. We conclude that dissatisfaction with life and history of diseases and injuries, especially psychiatric morbidity, may increase the propensity to move from rural to urbanised environments, while availability of health services may contribute to moves within urban areas and also to moves from urban areas to the countryside, where high-level health services enable a good quality of life for those attracted by the pastoral environment.

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Introduction

People's health and well-being may affect the propensity to move in complicated ways. Thus good health can either increase or decrease the likelihood of moving, and moving itself and starting life in a new place may have an impact on a person's health. Many studies have associated good health with the readiness to move, especially long distances (e.g. Bentham, 1988; Boyle, Norman, & Rees, 2002; Lu, 2008; Norman, Boyle, & Rees, 2005). In turn, some studies have observed that people in poor health, notably

older people, are the ones who move (e.g. Bentham, 1988; Larson, Bell, & Young, 2004; Lu, 2008; Verheij, van de Mheen, de Bakker, Groenewegen, & Mackenbach, 1998).

Migration is said to be directly health selective when due to health reasons. People with poor health may move because they wish to get away from health-hazardous areas or to be closer to health services or unofficial care from relatives (Bentham, 1988; Larson et al., 2004; Lu, 2008). Poor health may also adversely affect a person's livelihood and his/her ability to live in a certain place (Moorin, Holman, Garfield, & Brameld, 2006; van Lenthe, Martikainen, & Mackenbach, 2007). Indirectly health-selective migration occurs when health-related factors such as socioeconomic status are associated with moving (e.g. Curtis, Setia, & Quesnel-Vallee, 2009; Martikainen, Sipilä, Blomgren, & van Lenthe, 2008). Moving has been associated with a variety of

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factors depending on the context and age of the population concerned. In Finland, those who move most often are women, aged 31–60 years, have a family, are highly educated and belong to the category of upper clerical employees (Heikkilä, Rintala, Airio, & Kainulainen, 2003). In other health-migration studies, factors such as age, employment status, marital status, family type, household income and previous migration are important factors related to moving (e.g. Lu, 2008; Verheij et al., 1998). Better health among people with a high level of education and socioeconomic status is likely to be a factor in their greater propensity to move (e.g. Bentham, 1988).

Place characteristics can either push or pull migrants depending on what amenities they wish to use and how able they are to use them (Walters, 2000). Poor accessibility to social, health and public services was one motive to move among people who lived in sparsely populated country districts of Finland and were contemplating moving (Heikkilä et al., 2003). Along with place-related push and pull factors, personal and health characteristics of movers may interfere with moving. People moving from less- to more-affluent areas may be healthier, while those moving from more- to less-affluent areas are less healthy than those who do not move (Martikainen et al., 2008; Norman et al., 2005; van Lenthe et al., 2007). This may point to health-based selection among movers (Curtis et al., 2009). In Finland, self-reported health is poorer, long-term illness more prevalent and age-adjusted mortality higher in rural than in urban areas (e.g. Karvonen & Kauppinen, 2008; Lankila et al., 2012; Näyhä & Hassi, 1999). Directly and indirectly health-selective residential mobility may underlie these health differences. Movement of healthy, highly educated people to urban areas may promote or maintain good health and well-being in urban areas (Karvonen & Kauppinen, 2008). Similarly, if people with poor health move to rural areas seeking healthier residential environments or more affordable housing, for example, this would result in increased prevalence of poor health in rural areas and decreased prevalence in urban areas. Conversely, movement of people who need specialist medical care or other services to urban areas could increase poor health in urban areas. Persons with poor health may also become entrapped to certain areas e.g. due to lacking financial resources or because they feel too sick to move (e.g. Cox, Boyle, Davey, & Morris, 2007; Lu, 2008; Mooring et al., 2006; Riva, Curtis, & Norman, 2011). Thus, even if there would be a desire to move, it is not always met by an actual move.

Few studies have elucidated how health and well-being are related to moving on a detailed geographical scale, especially taking into account the urban-rural dimension (Larson et al., 2004; Riva et al., 2011; Verheij et al., 1998). Our study attempts to add knowledge to how people's health is related to the migration process between rural and urban areas. Health differences may put people in unequal positions regarding the areas in which they can manage living and where it is worthwhile to move (e.g. Cox et al., 2007; Mooring et al., 2006; van Lenthe et al., 2007). In our study we concentrate only on the actual moves, not the desire to move.

Geo-referenced data of 1-square-kilometre grids have been used to show how self-reported health varies depending on the residential area type (Lankila et al., 2012). The present paper focuses on the associations of five health and well-being characteristics with moving between 1-square-kilometre geographical grid cells, separately in urban and rural areas. The data comes from a large population-based cohort of all persons born in northern Finland in 1966. As the effects of health and well-being on moving may differ depending on the type of area, we distinguish between area types on the urban–rural scale. The allocation of areas to rural and urban types was based on population density in the grid cell in

which the person resided at the start of the study and to which he/she moved during the next three years.

Because health is a multidimensional concept and different health indicators are differently associated with moving (e.g. Larson et al., 2004; Lu, 2008), we used five indicators of health, which all measure health at a somewhat different angle and were obtained by a postal questionnaire prior to the move. (1) *Satisfaction with life* measures health along with other factors related to well-being (e.g. Koivumaa-Honkanen, 1998; Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008). We suspect that in many cases urban environments may offer more opportunities for improving young adults' life satisfaction (e.g. opportunities for employment, schooling and social relationships) (Martikainen, 2006), than rural environments. This might incline especially rural dwellers who are unsatisfied to move. Persons' perception of current health status was measured by (2) *self-reported health*. The rationale for using this measure was that sick people are less likely to move, because moving requires strength (Lu, 2008; Verheij et al., 1998). (3) *Lifetime morbidity* is a composite measure of current and past diagnosed medical conditions; those suffering from psychiatric illness being separated from those having only somatic illness. A history of health problems may encourage moving from service-lacking areas to urban areas where the needed services are more accessible and coping with health problems easier (Larson et al., 2004). (4) *Activity-limiting illness* may indicate how well a person can cope in his/her living environment. We thought managing with impairment might be difficult, especially in the rural environment. Activity-limiting illness may also compromise employment prospects, thereby reducing the attractiveness of urban environments (e.g. Mooring et al., 2006). Limiting illness has been previously associated with short-distance moves (e.g. Norman & Boyle, 2005). (5) *The use of health care services* was also elicited because people needing many health services are more likely to move to urban areas with more access to those services (e.g. Bentham, 1988; Larson et al., 2004).

Study population

The Northern Finland Birth Cohort 1966 (NFBC) consists of all 12,231 births (12,058 live births) in 1966 in the two northernmost provinces in Finland (Lapland and Oulu). The cohort has been followed since birth, the latest survey being conducted in 1997 when the subjects were 31 years of age. Data from various national registers have also been collected (NFBC website, 2012; Rantakallio, 1988; Sorri & Järvelin, 1998).

The present study comprised all members of the NFBC 1966, still alive and living in Finland in 1997. Of the 11,637 living cohort members, 10,685 lived in Finland and 856 abroad, and for 96 the place of residence remained unknown. In 1997, a postal questionnaire was sent to all 11,541 cohort members whose address was known, and 8767 (76%) returned it. The cohort members living in Finland received their questionnaire in Finnish, or in Swedish if requested. Seventy-five subjects did not give permission to use their data and were excluded.

Of the remaining 8692 subjects, the coordinates of home address on 31 December 1997 were obtained from the Finnish Population Register Center and 8217 were available. Based on these coordinates, each cohort member was attached to the 1-square-kilometre grid cell (see Statistics Finland, 2012) in which he/she resided using ArcGIS. The home-address coordinates were also obtained for the period 1 January 1998 to 31 December 2000, and the subjects who had moved during that period (only the first change in the coordinates was taken into account) were also linked to their new residential grid. Each individual's place of residence in the relevant year was linked to population density in that year,

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