The healthy immigrant effect: results of a meta-analysis on self-rated general health

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Over 200 million people in the world are involved in international migration today (MPI, 2015). Seeking for well-being or by forced displacement, international migrants are increasingly a subject of global interest according to human rights, economic and political challenges related to their adaptation in the host country. As far as immigrants may contribute to labour force and Gross Domestic Product, they also represent a burden for host countries as they have specific needs for various social services including those of health care. Several studies have shown that immigrants have poorer health than the natives of the host country. Specifically, at least initially, upon their arrival, immigrants are healthier than the native-born population. This foreign-born health advantage, also known as the “healthy migrant effect”, is well documented in Europe, the USA, Canada (Bollini & Siem 1995; Cunningham, Ruben & Narayan 2008; Ng et al., 2005; Lou & Beaujot, 2005) and Oceania (Australia and New Zealand). Over time, as immigrants adjust to their new homeland, this health advantage wanes, resulting in a convergence of health statuses for both immigrants and natives, or even in worse health for immigrants. This does not seem universal1 as reveal narrative and systematic literature reviews’ findings on the subject. However, reviews are favourable to the idea that such a trend appears on specific indicators such as self-perceived general health, mental health (except postpartum depression) and mortality (Vang & al, 2015; De Maio, 2010). To help quantify both the initial health advantage and the degree of loss that follows, our goal here is to achieve a quantitative synthesis of the health gap between immigrants and natives from the results of the literature on the subject in the World2. The interest of this research is to produce this synthetic indicator that will compare the health of immigrants with that of the natives and check if the length of residence works against long-term immigrants on the perception of their general health. Our contribution will include an empirical test on the size and direction of the effect of the immigrants status on general health self-perceived (through a meta-analysis).

Method

Studies were identified between May and October 2014 through electronic databases searches using PubMed, Medline, Embase, Global Health, SOC Index, JSTOR, and Clinical Key. We included original research articles published either in English or in French between 1980 and 2014. The keywords used are ‘healthy immigrant effect’, ‘migrant health’, and ‘immigration and health’. We chose quantitative-based studies (using data from large sample or population-representative surveys at the national level, vital statistics or censuses) which compare the health of immigrants and natives of the host country. Over 400 articles met these criteria and focus on different health outcomes such as mental health, mortality, chronic diseases, disabilities and functional limitations, risk behaviours and self-perceived general health. Our communication will be based on the 523 articles that analyzed the self-perceived general health outcome.

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1 It is expressed differently depending on the health indicator and stage of life.
2 We focus in the world regions cited above in the paragraph.
3 Due to a failure to present the results adequately, the data from some studies could not be retrieved. Estimates of 33 articles have been included in the meta-analysis.
Regarding the data extraction (Borestein & al, 2011; Sterne, 2009; Higgins & Green, 2008), the selected variables are study characteristics: the composition by age, sex, ethnicity and length of residence and the host country. The main bivariate relationship is linking immigration status to the self-perceived general health. The authors of the articles have generally expressed this relationship by the estimator of the odds ratio (OR). Due to their nature, the odds ratios cannot be added up or aggregated directly in their original scale and generate a measure that makes sense. To perform the aggregation, odds ratio values reported in each article were transformed to logarithmic scale (LogOR) and the aggregate value was transformed back to the odds ratio scale. When the effects are reported in the articles in other scales than the odds ratio or the natural logarithm of odds ratio, the transformations were made using basic formulas of each estimator (odds ratio, frequencies, mean) and the corresponding measurement precision (standard error, confidence interval, standard deviations). In most cases, we calculated effect sizes from the frequencies of data in matrixes of self-perceived general health by nativity status (immigrant or native). Where frequency data were not reported, we used the pre calculated effects of immigrant status on the self-perceived general poor health. Note that in the database, odds ratio values lower than 1.00 indicate better self-perceived general health of immigrants relative to natives while values greater than 1.00 indicate a poorer overall health of immigrants. For comparability purposes, we have chosen to retain the estimated effects with a minimum of control variables in the multivariate models (some effects controlling for age and / or sex were included however). The data by subgroups were extracted where available (including by age group, gender, generational status, length of residence and ethnicity). Data analysis was made with a random effects model for aggregating effects collected in the articles due to the presence of heterogeneity. The random effects model assumes that the aggregated results should be valid beyond the sample used by each study and are based both on participant characteristics and on research design. Unlike fixed-effects models, random effects models account for these variations between studies that are "authorized" to have an effect on the value of the results reported in the study (Borestein & al 2011; Sterne, 2009).

Preliminary Results

The aggregation of the data included in the meta-analysis covered a sample of 1174980 participants with about 10% of immigrants. The first result of aggregation (Figure 1) indicates an odds ratio of 5.78 showing a health disadvantage of immigrants compared to natives (lnOR = 1.755; p <0.001; 95% CI = lnOR [1.621; 1.890]). The effects within studies vary from lnOR = 0.13 to lnOR = 20.99 with a great degree of heterogeneity between studies (I² = 100%; P <0.001; t² = 0.25), suggesting that there is a systematic variability between the size of the reported effects that was not taken into account. This variability may also explain the fact that aggregate result reflects a disadvantage of immigrants respective to their health (because most of the included studies are transversal in their data collection and do not take into account the dynamic and longitudinal aspect of the evolution of the health of immigrants) as well as the existence of important differences in the characteristics of included studies (composition by age, sex, length of residence, publication status). To check these two aspects and to assess their contribution to the heterogeneity between studies, we conducted a subgroup analysis of gender (5 articles), age (4 articles), and length of residence (4 articles). Taking

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4 A fixed effects model, not presented here, shows a strong heterogeneity between studies, which could be expected due to the high variability among immigrants in the world on the one hand, and between host countries on the other hand.
into account the age and sex (Figures 2 and 3) also shows the respective synthetic effects of 1.48 (95% CI = 1.223; 1.281) and 1.50 (95% CI = 1.240; 1.824) highlighting the health disadvantage of immigrants. While results for young adults are rather mixed, the results are more consistent in 50 years and older. The forest plot for gender subgroup analysis shows that the disadvantage is more pronounced among immigrant women than immigrant men. Finally, the analysis by subgroups of length of residence rather shows a result contrary to the general trend with an odds ratio of 0.66 (95% CI = 0.36; 1.20), indicating a trend toward better health of immigrants compared to natives when taking into account the duration of residence. The forest plot of the subsample of studies reporting effects by subgroup of length of residence (Figure 3) shows that the health advantage is particularly observable among recent immigrants (less than 10 years), but that immigrants may report a poor self-perceived health the first years after arrival (which could be due to stress of the installation). Immigrants who have longer residence duration (over 10 years) are the ones who tend to report lower levels of health compared to natives. Although the results for this variable are not generalizable beyond the studies included in this meta-analysis, they tend to corroborate the existence the healthy immigrant effect. We should also emphasize that these three forest plots of subgroup analysis, show an effect of the study-level characteristics on the estimated coefficients: between studies, the coefficients tend to rank similarly in the same age group, sex or duration of residence. Our future analysis will include additional tests to better assess the effect of study characteristics and composition of samples within each study on the meta-analytic average effect (ie the synthetic odds ratio) of all studies included in this meta-analysis. Rather than subgroup analysis, this study-level analysis may lead to more precise results because all studies will be analyzed simultaneously getting the sample size higher. We will also include specific additional analyzes meta-analysis such as analysis of publication bias to verify whether the studies are published in respect to the degree of significance of their results.

References
http://www.migrationpolicy.org/topics/international-data.
Figure 1: Forest plot for overall effect of migration status on self-rated poor health, (unaccount for subgroup variation)

It was considered that articles included different studies when reporting comparison between immigrants and natives of several host countries. For example the article Siddiqi et al (2012) compares immigrants to Canada and Canadians born on one hand and immigrants to the US with US-born on the other hand.
Figure 2: Forest plot of effect of migration status on poor self-reported health by age
Figure 3: Forest plot of effect of migration status on poor self-reported health by sex
Figure 4: Forest plot of effect of migration status on poor self-reported health by duration of residence