Migration and Health above Age 50: Is There a Healthy Immigrant Effect and a Mediterranean Paradox in Europe?

Benedetta Pongiglione
London School of Hygiene and Tropical Medicine

Abstract

Two among the best known findings in the literature on migration and health are the 'healthy immigrant effect' and the 'Latino paradox'. Both phenomena have been based on studies set in the US or Canada, while the European scenario remains much less explored. This paper aims to shed further light on the validity of these findings in Europe. We used the propensity score matching to compare the health of migrants and non-migrants in 16 European countries. To assess whether Latino paradox has an equivalent in Europe, we identified a subgroup of migrants coming from Mediterranean countries and compared them with natives and non-Mediterranean immigrants. Results showed no substantial differences between migrants and natives. When disparities occurred, immigrants appeared relatively worse off than native-born individuals. Mediterranean immigrants suffered more from asthma and less from stroke, but there were no elements to confirm or controvert the 'Mediterranean paradox' hypothesis in Europe.

Keywords: health status, immigrants, Europe, older population

Introduction

Research on migration and health is split into studies comparing migrants' health to that of non-migrant counterpart in the origin country and studies considering migrants in relation to the host population living in the receiving country. It has been commonly found that when migrants arrive in the destination country, they are healthier than the native born population and over time their health status converges to the national average. This is almost the 'traditional' path for immigrants to the US and it is known in literature as 'Healthy Immigrant Effect' (HIE) (Sander, 2007). To explain the health advantage of immigrants upon their arrival, three competing reasons have been advanced in literature (Kennedy et al., 2006). These are health screening by receiving countries, healthier behaviour of immigrants in their home country before leaving and immigrant self-selection. The first explanation has not been found to be an important determinant of the Healthy Immigrant Effect (Uitenbroek and Verhoeff, 2002), while the relevance of the second depends on home country conditions compared to those of destination country and the age at migration (Kennedy et al., 2004). The 'self-selection' idea explains the healthy immigrant effect by assuming that migrants are both healthy and wealthy enough to be able to afford to migrate. Since migration requires physical and financial resources, the healthier people are more likely to migrate and once they have arrived in the recipient country they are healthier than the native born population. The explanation for the convergence occurring after migration is still controversial. The reasons for the worsening of immigrant health status are partially complementary to those for their better initial health conditions: immigrants are likely to change their former healthy behaviours and take up unhealthy lifestyles such as fat/high calorie diet and low physical activity when they settle in the host country (Newbold, 2005). At the same time immigrants are exposed to the same environmental factors affecting the native born population. This phenomenon is known as 'acculturation process' (see Jasso et al., 2004; McDonald and Kennedy, 2004). Migration itself might deteriorate health, subjecting immigrants to stress and having a negative psychological impact. Another determinant may be the barriers to access to the health care system because of language, cultural or legal constraints and a lack of information about the new health care system.

The best known consequence of HIE is the case of Latinos in the US. A special expression is used in the literature for this case: 'Hispanic Paradox'. The term Hispanic Paradox refers to the observation that, although they share similar economic positions, Latinos fair better by a number of health indicators than do comparable U.S. populations (including non-migrant Latinos), but this advantage decreases the longer the immigrants live in the US (Abraído-Lanza et al., 1999).

While the US scenario has been extensively researched, the European situation is less known. Studies on migrants' health are more recent and findings do not show a homogeneous situation. The health gap between natives and foreigners seems to change depending on immigrant origins and the recipient countries taken into account. Most research are usually set in a specific country (the receiving country) and migrants in that country are analysed and pooled together according to their place of origin. One of the few studies covering a number of European countries (Solé-Auro and Crimmins, 2008) did not find evidence of the healthy immigrant effect. On the other hand, although the European situation is very different from the US scenario, something similar to the Hispanic paradox has also been found in Europe. Migrants from Mediterranean countries seem to be the healthiest –in particular with respect to cardiovascular diseases- thanks to their diet, although they have lower socio-economic status (see Gadd et al., 2003; Martinez-Gonzales et al., 2010; Mitrou et al., 2007). Khlat and Darmon (2003) found Mediterranean migrants benefiting from remarkable mortality advantages compared to other migrants and native population. Germany and France, in particular, seem to make the case for a Mediterranean migrants' mortality paradox (Razum et al, 1998; Khlat and Courbage, 1996). The 'Albanian paradox', as defined by Gjonça and Bobak (1997), also emphasizes the positive impact on health deriving from having Mediterranean origins.

The goal of this research is to assess the validity and the scope of the Healthy Immigrant Effect in Europe comparing elderly migrants with their native counterpart, and to investigate whether the Latino Paradox applies to Mediterranean migrants in Europe as to Hispanic migrants in the US. By setting the analysis at European level, the main contribution of this work is to depart from a country-based approach to embrace a European-wide approach.

Methods

Data

The data used in this study are drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE). We use the fourth wave of SHARE that took place in 2010 in sixteen countries[1]. SHARE provides micro data on health, socio-economic status and social and family networks of individuals aged 50 or over. The SHARE database is particularly useful in that it provides information on both health and socio-economic variables. A large variety of health variables and demographic data, data on household income, assets and employment are available for a large number of countries. The main feature of SHARE is that its target is limited to a certain age (50+).

[1] Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, Czech Republic, Poland, Hungary, Portugal, Slovenia, Estonia.

For our aims, this implies not including the most recent immigrant flow and dealing -in most cases- with long standing immigrants, in a scenario where North-Western European countries are the receiving countries and South-Eastern European countries are the sending countries.

Measures

MIGRANT STATUS: The demographic survey module asks respondents whether they were born in the country where the survey takes place. If their answer was "no", they were asked to specify in which country they were born. Those answering "no" were defined to be immigrants. Migrants represent 11% of the sample. Those coming from Mediterranean countries[2] represent 2% of the sample and 16.6% of migrants.

HEALTH: We used several measures of health. We selected a number of diagnosed health conditions including heart attack, hypertension, cholesterol, stroke, diabetes, lung diseases, asthma, arthritis, and cancer, measured through the answer to the question "Has a doctor ever told you that you had any of the following conditions?". To measure problems with functioning and disability we used two indicators: difficulty performing at least one of the activities of daily living (ADLs) and difficulty with at least one of instrumental activities of daily living (IADLs). Finally, we included a self-assessed measured of health ranging from excellent to poor, distinguishing poor health in case of 'fair' or 'poor' answer and good health for 'excellent', 'very good' and 'good' self-evaluation.

Table 1 shows the prevalence for each health indicator by immigrant status. Migrants -consisting of all immigrants, regardless of their origins- presented the highest percentages with regard to all measures. Particularly, they suffered more than natives from heart attack (+3.6%) and arthritis (+5%) and rated their health poor more frequently (+9.2%); the percentage of them having difficulty in ADLs and IADLs was around 2.5 points higher than natives and they were diagnosed with hypertension more frequently (43% versus 40.6% of non-immigrants). They also were affected more than non-migrants by all the remaining diseases, although the health gap in these cases was smaller. On the other hand, Mediterranean migrants presented the lowest prevalence rates for all indicators but asthma as compared with natives. Particularly low was their prevalence of hypertension (34.5% versus 40.6% of natives), stroke (2.7% versus 4.5%), arthritis (21.7% versus 24%), and the proportion of Mediterranean migrants perceiving their health as poor (38% versus 42%).

2 Albania, Bosnia and Herzegovina, Croatia, Cyprus, Greece, Italy, Montenegro, Portugal, Serbia, Slovenia, Spain, Turkey, Macedonia, The former Socialist Federal Republic, Kosovo.

Table 1. Prevalence rates of health outcomes by immigrant status

	Natives	Migrants	Mediterranean Migrants
Poor health	41.8	50.9	38.0
Heart attack	14.2	17.8	12.4
Hypertension	40.6	43.0	34.5
Cholesterol	23.8	24.2	23.2
Stroke	4.5	6.1	2.7
Diabetes	12.7	13.6	13.3
Lung disease	6.7	8.6	5.8
Asthma	0.7	1.0	2.6
Arthritis	24.0	29.0	21.7
Cancer	5.8	6.5	5.3
ADL	11.7	14.2	10.4
IADL	18.2	20.5	17.8

CONTROLS: The covariates included in the model were the following: age; gender; marital status distinguished into those living with partner or spouse and those living as single; number of children; household size; years of education; total income received by all household members during the last month; housing conditions in terms of ownership; employment status divided into retired, employed; and other and country of residence. We also included some behavioural or lifestyle factors which are body mass index, measured as the individual's body mass divided by the square of their height; smoking habit, distinguishing never, past and current smokers; and physical activity, defining inactive those who practice activities requiring moderate energy less than once a week. We chose not to include alcohol use, due to the well documented nonlinear association between alcohol use and various health outcomes (San Jose et al., 1999).

The characteristics of the observations are shown in Table 2. Overall, immigrants did not differ significantly from native-born population. The total income perceived by all household members was lower for migrants, 33% of them were in the first quantile as compared with 21% of natives; a smaller proportion of migrants owned their house (71.2% versus 75.2% of non-immigrants). 31 percent of migrants were high educated compared to 27 percent of natives; immigrants lived alone more frequently (33.6% versus 31.2% of non-migrants). When we compared Mediterranean migrants to natives differences were substantial. A larger proportion of Mediterranean migrants were men (52.6%), they were younger and, probably due to this, a smaller percentage was retired (51% of Mediterranean immigrants compared to 58% of natives); immigrants form Mediterranean countries were much less educated, having in 53.7% of cases less than 8 years of education, but they perceived a higher monthly total income; and owned their house less

frequently than natives (64.2% versus 72.5%). The number of children and the household size were almost the same across the different migration-based groups. Generally, Mediterranean migrants presented significant differences with natives, while the migrant group, consisting of all immigrants, appeared relatively similar to non-migrants.

Table 2. Selected socio-demographic characteristics of study sample

	Natives (%)	Migrants (%)	Mediterranean Migrants (%)
Sample size	31,956 (89)	3,963 (11)	656 (2)
Sex			
Male	44.7	42.8	52.6
Female	55.3	57.3	47.4
Age			
50-64	49.7	47.0	59.0
65-74	29.4	30.6	25.6
75-84	16.9	18.7	12.5
85+	4.0	3.8	2.9
Marital Status			
Living alone	31.2	33.6	25.3
Living with partner	68.8	66.4	74.7
Years of school			
0-8	35.0	34.8	53.7
9-12	37.9	34.4	30.3
13+	27.1	30.8	16.0
Income			
1st quantile	21.2	33.4	8.1
2nd quantile	20.9	17.1	21.3
3rd quantile	19.8	16.1	29.0
4th quantile	18.0	15.1	18.0
5th quantile	20.2	18.3	23.6
Owner (yes)	75.2	71.2	64.2
Employment status			
Retired	57.8	59.1	51.1
Employed	27.0	26.1	28.4
Other	15.3	14.8	20.6
Bmi	27.1	27.4	27.6
Number of children	2.1	2.1	2.2
Household size	2.1	2.1	2.2
Smoking			
Never	41.7	43.9	39.9
Ex-smoker	39.1	35.5	36.1
Currently	19.2	20.6	23.9
Physical activity			
Inactive	18.8	19.5	18.5

Analysis

The small size of the immigrants' sample prevented a significant analysis of their health compared to that of non-migrants, all the more so if they were divided into subgroups according to their origin. Under the circumstances, we decided to use propensity score matching in order to make migrants and non-migrants comparable although the immigrant group was definitely smaller. We considered migrants as the treated group and non-migrants as the control group. The propensity score is defined as the probability of being assigned to the treatment group given a set of observed covariates:

$$p(X) = P(w = 1|X)$$

where X is the set of covariates and w is treatment assignment. We estimated propensity score using a logit model. Propensity score has a key property. It is a balancing score which is defined by Rosenbaum and Rubin (1983) as a function of the observed covariates so that the conditional distribution of the covariates given the propensity score is the same for treated and control units.

$$X \perp w|p(X)$$

At each value of the propensity score the distribution of the covariates should be the same in the treated and control groups. Once selected the covariates to estimate the propensity score, the propensity score matching was finally performed using the multiple nearest-neighbour approach with replacement (Caliendo and Kopeinig, 2005). We thereby matched one treated to the three controls closest to the treated according to the propensity score. We used the Stata command `psmatch2` (Leuven and Sianesi, 2003).

Results

Figure 1 shows the propensity score histogram by treatment status; in figure 1a the treated group is represented by immigrant group and in figure 1b by Mediterranean immigrants. The propensity score was estimated using variables listed in table 2 and controlling for country of residence. The propensity score's range was larger when the treated group was represented by all immigrants, due to the larger sample size. In both cases, in each class of the propensity score there were a certain number of treated individuals as there were non-treated individuals. Therefore, common support seemed to be respected.

Figure 1. Propensity Score histogram by treatment status

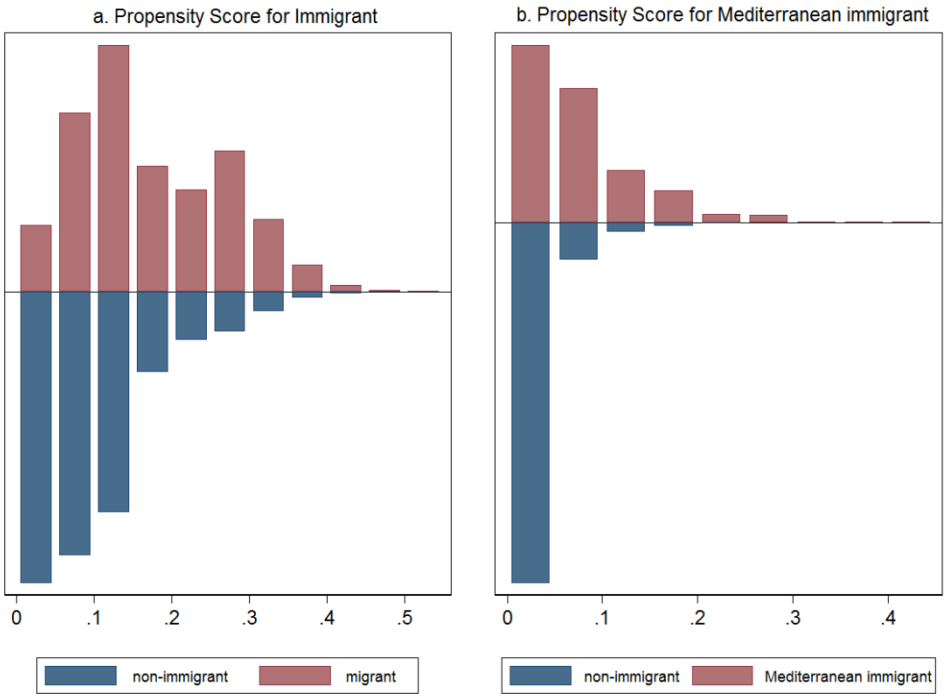

Table 3 presents the results of propensity score matching, for the treated group 'immigrant'. The first result is that most of the coefficients are not significant. The t-statistics is larger than 1.96 (significance at 5 percent level) in four cases (poor perceived health, diabetes, lung disease and arthritis). For all these outcomes, migrants appeared to have a poorer health than their native counterpart, in particular they were 2% more likely than non-migrants to suffer from diabetes, and more likely to suffer from lung disease and arthritis (1.1% and 5.2% respectively); and the proportion of migrants perceiving their health poor was 2.2 points higher than natives. As for the other outcomes, there was no evidence of advantages or disadvantages in health deriving from being an immigrant; therefore it was not possible to affirm whether migrants' health differed significantly from non-migrants' health. However, where results were significant, migrants resulted disadvantaged compared with native-born population.

In table 4 the treated group is represented by 'Mediterranean migrant'. In this case even less results are significant; only stroke and asthma present a t-statistics larger than 1.96 (1.96 and 3.3 respectively). These two outcomes reveal two opposite results. After matching, the percentage of Mediterranean migrants likely to be affected by asthma was 2.1% higher than that of natives, but they appeared to be hit by stroke less frequently than their non-migrant counterpart (-1.6%). In all the other cases coefficients were not significant, and then there was no evidence supporting Mediterranean migrants being neither more nor less healthy than non-migrants.

Table 3. Average Treatment Effect on Treated
-Immigrant-

Health outcome	Treated	Controls	Difference	S.E.	T-stat
Poor health	0.5087	0.4865	**0.0222**	0.0100	**2.21**
Heart attack	0.1777	0.1694	**0.0083**	0.0076	1.09
Hypertension	0.4304	0.4235	**0.0069**	0.0099	0.7
Cholesterol	0.2418	0.2272	**0.0147**	0.0086	1.71
Stroke	0.0609	0.0522	**0.0087**	0.0046	1.87
Diabetes	0.1355	0.1152	**0.0202**	0.0067	**3.02**
Lung disease	0.0859	0.0744	**0.0115**	0.0055	**2.1**
Asthma	0.0099	0.0066	**0.0033**	0.0019	1.72
Arthritis	0.2904	0.2386	**0.0517**	0.0089	**5.8**
Cancer	0.0647	0.0615	**0.0032**	0.0049	0.65
ADL	0.1415	0.1380	**0.0035**	0.0069	0.51
IADL	0.2044	0.1975	**0.0070**	0.0080	0.87

Table 4. Average Treatment Effect on Treated
-Mediterranean Immigrant-

Health outcome	Treated	Controls	Difference	S.E.	T-stat
Poor health	0.3796	0.3704	**0.0091**	0.0226	0.4
Heart attack	0.1235	0.1291	**-0.0056**	0.0154	-0.36
Hypertension	0.3445	0.3831	**-0.0386**	0.0223	-1.73
Cholesterol	0.2317	0.2373	**-0.0056**	0.0197	-0.28
Stroke	0.0274	0.0437	**-0.0163**	0.0083	**-1.96**
Diabetes	0.1326	0.1280	**0.0046**	0.0157	0.29
Lung disease	0.0579	0.0762	**-0.0183**	0.0114	-1.61
Asthma	0.0259	0.0046	**0.0213**	0.0065	**3.3**
Arthritis	0.2165	0.1992	**0.0173**	0.0191	0.9
Cancer	0.0534	0.0478	**0.0056**	0.0103	0.54
ADL	0.1037	0.1235	**-0.0198**	0.0145	-1.36
IADL	0.1784	0.1834	**-0.0051**	0.0179	-0.28

Discussion and Future Analyses

The findings of this work confirmed the mixed patterns of immigrant health in Europe. The comparison between immigrants and non-immigrants led to the conclusion that their health did not differ significantly, although there were some differences depending on the health outcome considered. The origin country of immigrants also seemed to play a minor role in determining migrants' health condition compared with that of native-born population.

When migrants were considered all together without distinguishing their origin country, their health did not differ from that of non-migrants. They were more likely than non-migrants to

suffer from diabetes, lung disease and arthritis, and to perceive poor their health, but with regard to the other diseases and problems in functioning and disability they were as affected as non-migrants.

When immigrants coming from Mediterranean countries were considered apart, their health did not seem to differ from natives' health. Using a more focused lens, Mediterranean migrants resulted more affected by asthma but less struck by stroke. However, these findings did not allow us to confirm or to controvert the hypothesis of a 'Healthy Mediterranean effects'.

The fact that the health of migrants, regardless of their origin, did not differ significantly from non-migrants' health can largely be explained by the fact that in this sample most of migrants were long-standing migrants, where the average time to arrival was about 43 years. This also may explain the lack of significant differences in health between Mediterranean migrants and native born population. The fact that the former had been living in their recipient country for a long time may have reduced the positive role, in terms of lifestyle (diet, physical activity, environment, etc...), played by their origins in determining their health status. This would be in line with the second part of the HIE theory stating that migrants' health converges over time to non-migrants health and therefore these slight differences would be the consequences of the acculturation process (Jasso et.al., 2004).

Our findings are consistent with those from Sole-Aurò and Crimmins (2008). The authors found little evidence of the 'healthy immigrant effect' in Europe at age 50 and over and, where differences in health between migrants and non-migrants were observed, the former were generally found to have worse health. On the other hand, our results contrast with the literature supporting the 'Mediterranean paradox', in that we did not find evidence of Mediterranean immigrants being healthier than natives. This could be explained by the fact that most of the studies on Mediterranean immigrants did not refer just to migrants aged 50 and over -who are more likely to be long-standing migrants- but included immigrants of any age.

The primary limitation of this study lies in the fact that immigrants were observed at one point in time and therefore it was not possible to know their health at the time of their arrival and how it has varied over time. However, SHARE is a longitudinal survey covering a period of about 10 years. Therefore, although it is not possible to know precisely migrants' health at the time of immigration, there is still some potential for tracking their health over time and see whether it changes and converges to native-born population's level the longer the immigrants live in the recipient country.

References

Abraído-Lanza, A.F., Dohrenwend, B.P., Ng-Mak, D.S., and Turner, J.B. (1999) The Latino mortality paradox: A test of the "salmon bias" and healthy migrant hypotheses. *American Journal of Public Health,* 89, 1543-1548.

Balarajan R. (1991) Ethnic differences in mortality from ischaemic heart disease and cerebrovascular disease in England and Wales. *BMJ;*302:5604.

Becker S. and Ichino A. (2002) Estimation of average treatment effects based on Propensity Scores. *The Stata Journal,* Vol.2, 4, 358-377.

Caliendo, M., and S. Kopeinig. (2005) Some Practical Guidance for the Implementation of Propensity-score matching. Iza Discussion Paper 1588. Institute for the Study of Labor (IZA).

Card D. (2007) How Immigration Affects U.S. Cities. CReAM Discussion Paper, no. 11/07.

Choi, S. (2012). Testing healthy immigrant effects among late life immigrants in the United States:
Using multiple indicators. Journal of Aging Health, 24, 475–506.

Courbage Y, Khlat M. (1996) Mortality and causes of death of Moroccans in France, 1979–91. *Population: An English Selection,* Vol. 8, pp. 59-94.

Franzini L, Ribble JC and Keddie AM (2001), "Understanding the Hispanic paradox", Ethnicity and Disease 11 (3): 496–518, *PMID* 11572416.

Gadd, M.; Johansson, S.E.; Sundquist, J. and Wändell, P. (2003) Morbidity in cardiovascular disease in immigrants in Sweden. *Journal of Internal Medicine* 254: 236-243.

Gadd, M., Johansoon, S.E., Sundquist, J. and Wändell, P. (2006) Are the differences in all-cause and coronary heart disease mortality between immigrants in Sweden and in their country of birth? A follow-up study of total populations *BMC Public Health* 6:102.

Gjonça A. and Bobak M. (1997) Albanian paradox: another case of the protective effect of Mediterranean lifestyle?. *The Lancet,* 350 (9094). pp. 1815-1817. ISSN 0140-6736

Heinrich C., Maffioli A. and Vázquez G. (2010) Primer for Applying Propensity-Score Matching. *SPD Working Paper*

Jasso, G., D. Massey, M. Rosenzweig, and J. Smith (2004) Immigrant Health : Selectivity and Acculturation, Chapter 7 in Anderson, Bulatao and Cohen (eds) Critical Perspectives on Racial and Ethnic Differences in Health in Late Life, Committee on Population, National Research Council, Washington DC: *The National Academies Press.*

Kennedy S., McDonald J.T and Biddle N. (2006) The Healthy Immigrant Effect and Immigrant Selection: Evidence from Four Countries. *SEDAP Research Paper* #164.

Khlat M and Darmon N. (2003) Is there a Mediterranean migrants mortality paradox in Europe?. *Int J Epidemiol* 32:1115–18.

Kristiansen M, Mygind A, and Krasnik, A (2007) Health effects of migration. *Danish Medical Bulletin* 54:46-7.

Leuven, E., and Sianesi B. (2003) PSMATCH2: Stata Module to Perform Full Mahalanobis and Propensity-Score Matching, Common Support Graphing, and Covariate Imbalance Testing. Statistical Software Components S432001 Newton, MA, United States: Boston College Department of Economics.

Martìnez-Gonzòlez M.A., Garcia-Lopez M., Bes-Rastrollo M., Toledo E., Martinez- Lapiscina E.H., Delgado-Rodriguez M., Vazquez Z. and Beunza JJ. (2010) Mediterranean diet and the incidence of cardiovascular disease: A Spanish cohort. *Nutr Metab Cardiovasc Dis.* 21(4):237-44.

McDonald JT, Kennedy S. (2004) Insights into the "healthy immigrant effect": Health status and health service use of immigrants to Canada. *Social Science and Medicine* 59:1613-27.

Mitrou P.N., Kipnis V., Thiébaut A.C., Reedy J., Subar A.F., Wirfält E., Flood A., Mouw T., Hollenbeck A.R., Leitzmann M.F., Schatzkin A. (2007). Mediterranean dietary pattern and prediction of all-cause mortality in a US population: results from the NIH-AARP Diet and Health Study. *Arch Intern Med* 167 (22): 2461–8.

Newbold, B. K. (2005). Self-rated health within the Canadian immigrant population: Risk and the healthy immigrant effect. Social Science & Medicine, 60, 1359–1370.

Razum O, Zeeb H, Akgun HS, Yilmaz S. (1998) Low overall mortality of Turkish residents in Germany persists and extends into a second generation: merely a healthy migrant effect?. *Trop Med Int Health* 3:297–303.

Rubin, D. B. (1973). Matching to remove bias in observational studies. *Biometrics* 29, 159–184

San Jose B, Van de Mheen H, Van Oers JAM, Mackenbach JP, Garretsen HFL (1999) The U-shaped curve: Various health measures and alcohol drinking patterns. *J Stud Alcohol*, 60(6):725-731.

Sander M. (2007) Return migration and the healthy immigrant effect. DIW SOEPapers on Multidisciplinary Panel Data Research 60.

Solé-Auró, A. and Crimmins, E.M. (2008) Health of Immigrants in European Countries. *International Migration Review,* 42(4): 861-876.

Sundquist K, Li X. (2006) Coronary heart disease risk in first- and secondgeneration immigrant in Sweden: A follow-up study. *J Intern Med.*259:418-427.

Uitenbroek, Daan G., and Arnoud P. Verhoeff. (2002) Life Expectancy and Mortality Differences Between Migrant Groups Living in Amsterdam, the Netherlands. *Social Science & Medicine* 54(9): 1379-1388.