

Investigating the dynamics of migration and health in Australia: A Longitudinal study

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Does healthy immigrant effect vary between immigrant subgroups in Australia: A longitudinal investigation?

Background:

Immigrant health and their access to and use of health care services is a key policy issue in Australia which has one of the highest proportions of immigrant population in the world: an estimated 24% of the total population of 4.96 million people is born overseas, and net overseas migration is the major contribution to population growth in Australia (Australian Bureau of Statistics 2007; Australian Bureau of Statistics 2008). Immigrants play a major role in satisfying the Australian demand for labour. As such, good health is essential in guaranteeing their continuing social and economic contribution to the nation and in maximising the benefit of immigration program. Moreover, in a country where one person in five is born overseas, the national health profile and consequent cost to the health system is significantly determined by the health and health service utilisation of its immigrants.

It is therefore surprising that comparatively little attention has been paid to immigrant health and health care utilisation both domestically and internationally. This may be due, in part, to the complexities of the relationships involved, but also results from a lack of reliable data linking health outcomes to migration status, and the background and experiences of migrants. Immigrants were either excluded from most health research conducted in Western societies or were too few, both in number and as a proportion of study samples, to yield reliable estimates of their health status and health needs (Friis, Yngue et al. 1998). Much of the recent international literature on immigrant health has focused on identifying the presence and possible magnitude of a “healthy immigrant effect”. Typically these studies used cross-sectional data or a series of cross-sectional data which only provide a snapshot in time of differences in the outcome between migrants and non-migrants. Not only does this ignore time, which is valuable as an indicator of integration, but also potential biases from between-individual (and other endogenous) effects.

Aims:

Using multiple rounds of panel data from the Household Income and Labour Dynamics in Australia (HILDA), this study determines the existence and temporal dynamics of the healthy immigrant effect. The key question is to identify whether differences in the various health outcomes (as measured by SF-36 with subscales mental health, general health, physical functioning; and psychological stress (K-10)) exist between the native –born (NB) and foreign-born (FB) and among the different migrant groups and if there is a difference, whether it remains over time adjusting for various covariates. Specifically this study addresses the following specific questions:

- Do immigrants have a health advantage relative to the NB? If existent, is this relative health advantage (between FB and NB) different for different migrant subgroups (e.g. English speaking countries, Asians and “other countries”)?
- If FB have a health advantage, does it decline as duration of residence increases and for all FB groups? If yes, what factors contribute to the changes in health status?

Methods:

Data

The Household, Income and Labour Dynamics in Australia (HILDA) is a longitudinal survey of Australian people occupying private dwellings. The survey provides longitudinal data on the lives of Australians, with a particular attention paid to household formation, health, income and work. The Survey was commenced in 2001 with a large national probability sample of 7682 households with at least one eligible person aged 15 years and above. All the members of these households aged 15 years and over form the basis of the panel to be interviewed in all the subsequent waves. One of the salient features of HILDA is that the sample was gradually extended to include all those persons from these households resulting from changes in the age and compositional changes of the original households, interviewed in wave 1. In wave 1 a total of 19,914 individuals are interviewed. Of these, 3,556 were FB, with 1,525 from the main ES countries (10.9% of the total sample), and 2,031 (14.5% of the sample) born in non-English-speaking countries (Headey and Warren 2008). Both the longitudinal and cross-sectional weights were provided with the data to make inferences about the population.

Variables and measures: Two health measures are used in this study: SF-36 (which can have three subscales-mental health, general health and physical functioning), and Kessler 10 (psychological stress). The SF-36 is comprised of 36 questions that fall into eight health domains: general health perceptions (GH - 5 items), physical functioning (PF - 10), role limitations due to physical functioning (RP - 4), bodily pain (BP - 2), general mental health (MH - 5), role limitations due to emotional problems (RE - 3), vitality (VT - 4), and social functioning (SF - 2). Each is scored from 0 (worst score) to 100 (best score). A score of 100 in the PF, RP, BP, SF, RE, GH, VT, and MH domains indicate an absence of problems in those areas. The maximum score on these scales indicates not just the absence of disability, but also the presence of a positive health state. For example, a score of 100 in physical functioning indicates an ability to perform all activities without limitations due to health; whereas a score of 100 in mental health indicates an ability to function without personal or emotional problems. A score of 100 in the mental health domain indicates that the respondent feels peaceful and happy and is calm all the time. The SF-36 also yields two psychometrically-based physical and mental health summary measures the Physical Component Summary (PCS) and the Mental Component Summary (MCS).

SF-36 also includes information on self-Rated Health (SRH). This SRH varies between 1 (poor health) and 5 (excellent health). Those reported fair or poor health were considered as reporting 'poor health', and others who reported good or very good or excellent were considered as reporting as 'good health', in this study.

In waves 7 and 9, HILDA collected information on the psychological distress levels of individuals by administering K-10 questionnaire. The Kessler-10 consists of ten questions about non-specific psychological distress and seeks to measure the level of current anxiety and depressive symptoms based on questions about negative emotional states a person may have experienced in the four weeks prior to interview (Kessler, Andrews, Colpe, Hiripi, Mroczek, Normand et al., 2002; Kessler, Barker, Colpe, Epstein, Gfroerer, & Hiripi, 2003). For each item there is a five-level response scale based on the amount of time the respondent reports experiencing the particular problem. Generally, each item is scored from 1 for 'none of the time' to 5 for 'all of the time'. Scores for the ten items are then summed, yielding a minimum possible score of 10 and a maximum possible score of 50, with low scores indicating low levels of psychological distress and high scores indicating high levels of psychological distress.

The main exposure/explanatory variable will be nativity status, i.e., FB or NB. FB is further sub grouped into Asia, English Speaking (ES) countries, and "other countries". Duration of residence is used as a proxy measure to investigate how exposure to the social, cultural and physical environment of the host population might be associated with the health of migrant population. In addition, age, sex, marital status, education, employment status, household income, region of residence, time, health behaviour (drinking, smoking) are used as controls in all multivariate analyses as they are associated with both migration and health.

We used random effects linear regression models to understand the joint effect of immigrant status and the duration of residence in Australia on various health aspects such as PH (with PCS as the dependant variable in the regression model), MEH (with MCS being the dependant variable in the regression model) and PSD (with PSD as the dependent variable in the regression model). Random effects logistic regression models were used to understand the role of immigrant status and the length of stay in Australia on SRH. SRH status which takes values 0 (representing 'poor health') and 1 (representing 'good health') was the dependant variable in the logistic regression. Probability of being in good health, given the various covariates, has been modelled in the logistic regression.

Before the regression analysis, basic characteristics of all the FB and the NB respondents were provided and trends in mean levels of PH, MEH and PSD were studied. We also studied trends in proportion of people reported 'poor health', across all the waves of HILDA.

Results and conclusions

Table 1 shows socio-economic and demographic characteristics of all these FB and NB Australians, in wave 1. Trends in PH, MEH, PSD and proportion reporting poor health (proportion reporting poor/fair SRH) are shown in Figures 1(A), 1(B), 1(C) and 1(D) respectively, by immigrant status. Figures 1(E), 1(F), 1(G) and 1(H), on the other hand, shows trends in the above mentioned health aspects by cohort of arrival of FB groups.

In general, the PH, MEH and SRH levels are better for FB groups who arrived Australia after 1991 and are found decreasing with their duration of stay in Australia (Figures 1(E), 1(F) and 1(H)). This indicated the existence of “healthy immigrant effect”. Results show a clear declining trend in PH and increasing trend in the proportion of people reporting poor health, over different waves of HILDA. On the other hand, MEH levels are relatively stable over different waves, with the exception of FB people from “other countries”. On the whole, the levels of PH, MEH, PSD and SRH are poorer for FB people, in comparison to the NB people. However, the health of FB groups vary considerably from one another and some of the FB groups have clear health advantage over the NB people, with respect to various health outcomes. For instance, the PH of Asians is better than the NB Australians. Apart from that, there is no clear sign of decline in physical health among Asians while the decline is clearly pronounced in the NB Australians. However, the differentials observed in levels and trends of health outcomes found in these figures may also be due to the influence of other confounders that have association with immigrant status, length of stay in Australia and various health outcomes. Hence, we ran random effect logistic regression models.

Table 2 shows results of regression analysis for PH and MEH, and Table 3 shows regression results analysis for PSD and SRH. These regression results confirm the existence of healthy immigrant effect. However, the healthy immigrant effect varied according to the measure of health and immigrant group under consideration (Table 2 and Table 3). For example, controlling for all other confounding factor, the mean level of PH for people from Asians, ES speaking countries and from “other countries”, with less than 10 years of duration in Australia is 22.3, 16.3 and 11.1 points respectively above the PH level of NB Australians. And all these differences are statistically significant, except the difference in physical health levels of FB people from “other countries”. While the PH level of all FB groups declines with increase in the duration of residence but it still remains above the NB Australians except for people from “other countries”. For example, the PH level of people from Asians and ES speaking countries with 11-20 years of duration of residence in Australia is 2.8 and 15.4 points respectively above the level of NB Australians, while the level of PH for people from “other countries” with 11-20 years of duration of stay in Australia is 4.5 points lower than NB Australians. However, all these difference are statistically insignificant except for people from ES speaking countries. Further reduction in health is observed for all FB groups who lived in Australia for more than 20 years with only statistically different for people from ES speaking countries. In short, people from Asia start being the healthiest but declining health rapidly and then health decline slowdowns

while people from ES speaking countries sustaining their health relatively longer period and then their health levels drop rapidly. The PH of FB people from “other countries” drop continuously and more rapidly than the remaining FB groups.

FB people from Asia and “other countries” with less than 10 years of stay in Australia have slightly MEH advantage over NB Australians, although the advantage is not statistically significant. The MEH levels of people from “other countries” with 11-20 years and with more than 21 years of stay in Australia are lesser to MEH levels of NB Australians by 22 points and 15 points respectively and these differences are statistically highly significant. The level of MEH for Asians is also found to be declining with increase in their duration of residence in Australia. However, the MEH levels Asians with 11-20 years and more than 21 years are not statistically different from the NB Australians. The MEH of FB people from ES countries has also changed with their duration of stay in Australia. But, the changes are not statistically significant.

Interestingly, psychological distress levels decreases for people from ES countries and increases for Asians and for people from “other countries”, as their duration of stay increases in Australia. While decrease in PSD for people from ES countries is statistically insignificant, but the increase in PSD for Asians and “other countries” is statistically significant. Unlike PH and MEH, even the Asians and people from “other countries” with less than 10 years stay in Australia have more PSD than the NB Australians, although they are statistically not different from the PSD level of NB Australians. Asians and people from “other countries” with 11-20 years of stay in Australia are having 1.3 and 2.0 points of additional PSD levels respectively than the NB Australians and these differences are statistically significant.

Analysis of self-rated health also showed differential ‘healthy immigrant effect’. For example, the odds of reporting good health is 1.8 times more likely for Asians with less than 10 years of stay in Australia, in comparison to the odds of reporting good health by the NB Australians. And the difference is statistically significant. However, the self-reported health of Asians is at the same level as of NB Australians after more than 21 years of stay in Australia. The odds of reporting good health by FB people from ES countries is not statistically different from the NB ones, irrespective of their duration of residence in Australia. The odds of reporting good health changed from 2.1 to 0.65 in between FB people from “other countries” whose duration of stay is less than 10 years and more than 21 years respectively, in comparison to the odds of reporting good health by the NB Australians. And both these differences are statistically significant.

Table 1: Unweighted wave 1 characteristics (per cent with a particular characteristic) of present study respondents

Factor	Category	Country of birth				
		Australia	FB			All FB
			ES	Asia	others	
Sex	Male	45.07	49.33	41.28	47.01	46.97
	Female	54.93	50.67	58.72	52.99	53.03
Age group	15-24	13.37	3.79	12.50	5.58	6.13
	25-54	62.45	61.66	73.26	53.19	61.50
	55+ years	24.18	34.55	14.24	41.24	32.37
State	New South Wales	29.73	28.57	40.70	25.50	30.15
	Victoria	24.54	18.32	31.98	32.27	25.35
	Queensland	21.85	20.63	6.98	12.55	15.38
	South Australia	9.80	10.50	3.49	13.35	9.91
	Western Australia	8.66	16.24	10.76	12.55	13.99
	Tasmania	3.38	2.56	0.87	1.00	1.74
	Northern Territory Australian Capital Territory	0.55 1.48	0.85 2.32	2.03 3.20	0.40 2.39	0.96 2.52
Level of education	<=12 years of schooling	52.32	43.47	45.64	51.79	46.43
	Bachelor or diploma	40.38	45.30	41.86	39.24	42.76
	Graduation and above	7.30	11.23	12.50	8.96	10.81
Type of Place of residence	Major Urban	56.41	69.48	87.21	78.88	75.98
	Other Urban	25.63	15.87	9.59	11.16	13.15
	Rural Balance	17.96	14.65	3.20	9.96	10.87
Marital status*	Married	65.68	75.70	74.71	74.10	75.02
	Separated/Widowed	13.31	14.04	9.30	16.53	13.81
	Never married	21.02	10.26	15.99	9.36	11.17
Type of employment	Full time employ	44.37	45.79	40.12	34.86	41.32
	Part time employ	21.10	17.34	18.90	15.74	17.18
	Un employed	3.16	2.44	4.36	3.78	3.24
	Not in labour force	31.37	34.43	36.63	45.62	38.26
How well can speak English	Proficient	98.10	98.17	28.20	46.22	68.05
	Good	1.90	1.83	60.47	47.81	27.81
	Not good	0.00	0.00	11.34	5.98	4.14
Year of arrival to Australia	Not known		5.25	7.27	6.57	6.07
	<1960		16.61	4.07	34.26	19.34
	1961-1980		46.52	18.31	29.08	35.44
	1981-1990		20.76	30.81	15.14	21.14
	>= 1991		10.87	39.53	14.94	18.02
Household income	<=20,000	14.69	13.80	13.08	24.50	16.88
	(20,000-40,000]	20.21	21.37	23.84	20.72	21.68
	(40,000-60,000]	19.47	18.32	21.51	18.53	19.04
	>60,000	45.64	46.52	41.57	36.26	42.40
Total sample size (un weighted)		5795	819	344	502	1665
Total sample size (weighted)		5553	782	522	623	1907

Figure 1: Observed trends in health by country of birth and year of arrival

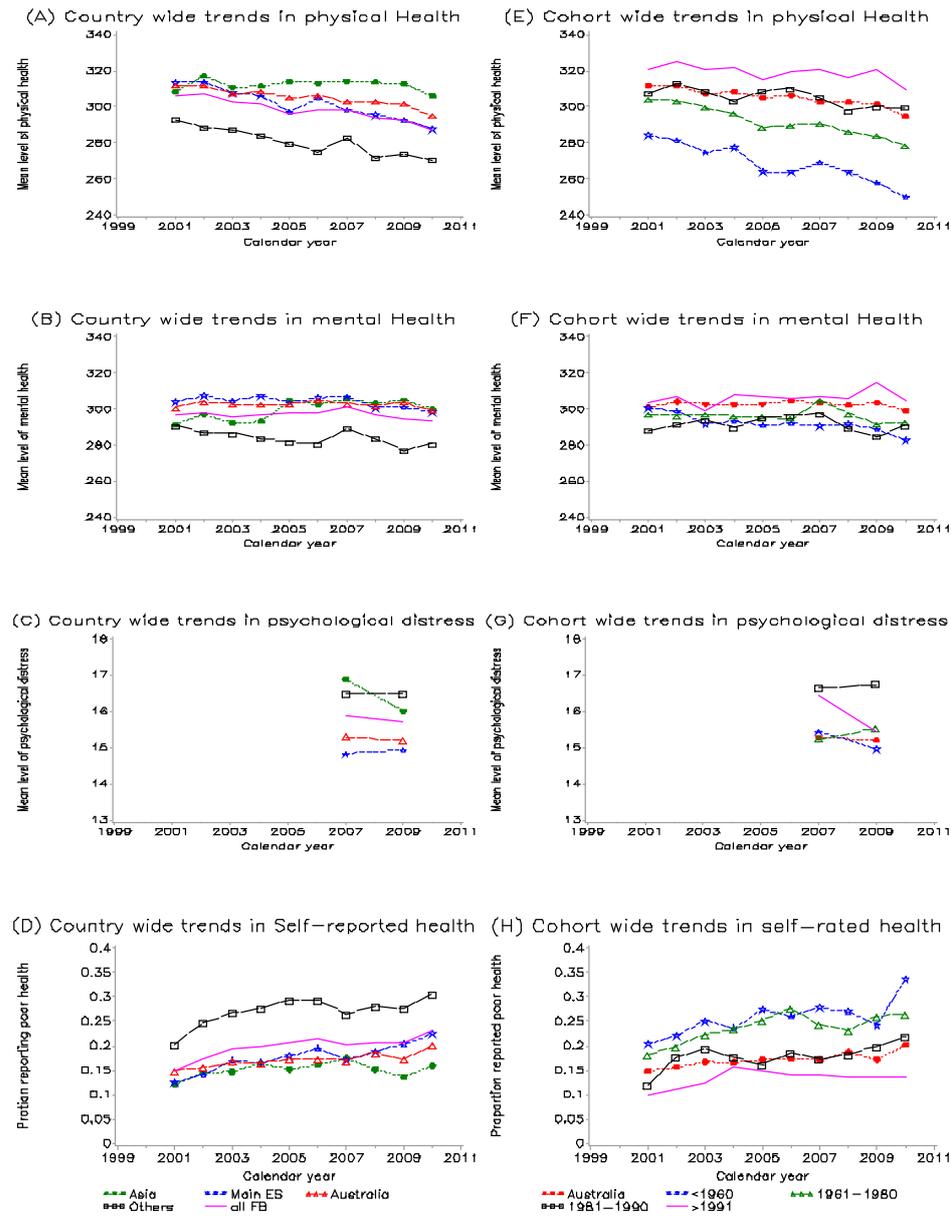


Table 2: Effect various factors on physical and mental health

Factor	Categories (if any)	PH estimate	PH std error	PH significance	MEH estimate	MEH std error	MEH significance
	Intercept	304.78	5.5141	<.0001	299.38	5.3415	<.0001
Country of birth and duration of residence in Australia	ES countries < 10 years	16.3213	7.5204	0.0300	1.7213	6.4643	0.7900
	ES countries 11 to 20	15.3903	5.6697	0.0066	4.4849	4.8707	0.3572
	ES countries > 20	-8.3783	3.1448	0.0077	-0.01568	2.7052	0.9954
	Asia <10	22.3017	6.7931	0.0010	7.9101	5.8890	0.1792
	Asia 11 to 20	2.8225	6.3967	0.6590	-4.1982	5.5348	0.4482
	Asia >20	-5.5282	7.8552	0.4816	-12.0444	6.7669	0.0751
	Other countries <10	11.7185	8.8097	0.1835	0.7578	7.6037	0.9206
	Other countries 11 to 20	-4.5466	7.7890	0.5594	-21.7650	6.7206	0.0012
	Other countries > 20	-24.0465	4.0996	<.0001	-15.7836	3.5469	<.0001
	Australia	0	.	.	0	.	.
Sex	Female	-3.6149	1.6470	0.0282	-7.8698	1.4212	<.0001
	Male	0	.	.	0	.	.
Age group	15-24 years	9.6993	1.6889	<.0001	-4.5714	1.6724	0.0063
	25-54 years	11.2008	0.9518	<.0001	-3.4535	0.9316	0.0002
	55+ years	0	.	.	0	.	.
State	Australian Capital Territory	-0.5985	4.1050	0.8841	-0.1256	3.8946	0.9743
	New South Wales	-3.9533	2.4367	0.1047	-4.3215	2.2137	0.0509
	Northern Territory	0.4853	4.8442	0.9202	-8.4757	4.7148	0.0722
	Queensland	-4.2181	2.4978	0.0913	-4.4381	2.2784	0.0514
	South Australia	-5.5686	3.0504	0.0679	-4.9282	2.7555	0.0737
	TAS	-15.5790	4.0372	0.0001	-6.8972	3.7178	0.0636
	Victoria	-1.1999	2.5444	0.6372	-1.4594	2.3010	0.5259
	Western Australia	0	.	.	0	.	.
Level of education	<=12 years of schooling	-12.9470	2.0443	<.0001	-6.5755	1.9169	0.0006
	Bachelor or diploma	-5.1405	1.8925	0.0066	-2.9881	1.7909	0.0952
	Graduation and above	0	.	.	0	.	.
Current marital status	Married	-3.0876	1.2244	0.0117	8.1691	1.2089	<.0001
	Separated/widowed	-7.0772	1.6137	<.0001	-6.2563	1.5810	<.0001
	Never married	0	.	.	0	.	.
Current employment status	Full time employ	10.4096	0.6469	<.0001	6.7100	0.6547	<.0001
	Part time employ	9.2098	0.6979	<.0001	7.2158	0.7083	<.0001
	Un employed	1.2551	1.5266	0.4110	-7.6271	1.5548	<.0001
	Not in labour force	0	.	.	0	.	.
How well can speak English	Proficient	13.2174	4.2796	0.0020	8.7092	4.2422	0.0401
	Good	10.4132	4.0569	0.0103	7.3852	4.0268	0.0667
	Not good	0	.	.	0	.	.
Household income level	<=20,000	-7.7014	1.0081	<.0001	-7.1359	1.0138	<.0001
	(20,000-40,000]	-5.8203	0.7795	<.0001	-5.2918	0.7858	<.0001
	(40,000-60,000]	-3.6534	0.6601	<.0001	-3.0974	0.6698	<.0001
	>60,000	0	.	.	0	.	.
Drink alcohol	Never drink	-13.1598	1.3805	<.0001	-9.0558	1.3631	<.0001
	Left drink	-14.6519	1.1714	<.0001	-10.6626	1.1779	<.0001
	<= 2 times a week	-0.6915	0.5441	0.2037	-0.2181	0.5498	0.6916
	>= 3 times a week	0	.	.	0	.	.
Smoke	Never smoke	5.6599	1.2373	<.0001	10.1518	1.1888	<.0001
	Left smoking	-0.1984	0.9538	0.8353	5.5650	0.9506	<.0001
	Smoke	0	.	.	0	.	.
Time	Time	-2.1226	0.07281	<.0001	-0.6794	0.07370	<.0001

Table 3: Effect various factors on psychological distress and self-rated health

Factor	Categories (if any)	PSD estimate	PSD std error	PSD significance	SRH estimate	SRH std error	SRH significance	Odds ratios
	Intercept	18.5056	0.7969	<.0001	1.9431	0.2826	<.0001	6.98045
Country of birth and duration of residence in Australia	ES countries < 10 years	0.5812	0.5746	0.3119	0.1736	0.2801	0.5353	1.18963
	ES countries 11 to 20	-0.2398	0.4291	0.5763	0.3508	0.2136	0.1005	1.42024
	ES countries > 20	-0.1773	0.2387	0.4577	-0.04299	0.1090	0.6932	0.95792
	Asia <10	0.3432	0.5597	0.5398	0.5978	0.2633	0.0232	1.81818
	Asia 11 to 20	1.2626	0.5204	0.0153	0.2153	0.2339	0.3574	1.24025
	Asia >20	1.2629	0.6136	0.0396	0.02878	0.2799	0.9181	1.02920
	Other countries <10	0.1858	0.6900	0.7877	0.7501	0.3461	0.0302	2.11729
	Other countries 11 to 20	2.0054	0.6079	0.0010	-0.3431	0.2705	0.2047	0.70955
	Other countries > 20	0.8073	0.3332	0.0154	-0.4737	0.1430	0.0009	0.62269
	Australia	0	.	.	0	.	.	1.00000
Sex	Female	0.4217	0.1313	0.0013	0.1832	0.05969	0.0022	1.20104
	Male	0	.	.	0	.	.	1.00000
Age group	15-24 years	1.5678	0.3020	<.0001	0.4977	0.1095	<.0001	1.64498
	25-54 years	1.6308	0.1410	<.0001	0.3414	0.05447	<.0001	1.40694
	55+ years	0	.	.	0	.	.	1.00000
State	Australian Capital Territory	0.05596	0.4677	0.9048	-0.3649	0.2146	0.0896	0.69428
	New South Wales	0.4604	0.2231	0.0391	-0.2230	0.1022	0.0295	0.80014
	Northern Territory	-0.5213	0.6532	0.4249	0.09441	0.3171	0.7660	1.09901
	Queensland	0.6702	0.2318	0.0038	-0.1908	0.1061	0.0725	0.82626
	South Australia	0.6601	0.2726	0.0155	-0.3589	0.1235	0.0038	0.69843
	TAS	0.5270	0.3904	0.1771	-0.6559	0.1693	0.0001	0.51898
	Victoria	0.3671	0.2279	0.1073	0.002738	0.1057	0.9793	1.00274
	Western Australia	0	.	.	0	.	.	1.00000
Level of education	<=12 years of schooling	0.1613	0.2135	0.4499	-0.6030	0.1041	<.0001	0.54716
	Bachelor or diploma	-0.05855	0.2045	0.7747	-0.3411	0.1017	0.0008	0.71100
	Graduation and above	0	.	.	0	.	.	1.00000
Current marital status	Married	-1.1312	0.1855	<.0001	0.04744	0.07478	0.5259	1.04859
	Separated/widowed	-0.3034	0.2257	0.1790	-0.09556	0.09048	0.2910	0.90886
	Never married	0	.	.	0	.	.	1.00000
Current employment status	Full time employ	-1.2963	0.1473	<.0001	0.5237	0.04684	<.0001	1.68819
	Part time employ	-0.9154	0.1475	<.0001	0.5112	0.05119	<.0001	1.66736
	Un employed	0.6435	0.3079	0.0367	-0.04664	0.09542	0.6250	0.95443
	Not in labour force	0	.	.	0	.	.	1.00000
How well can speak English	Proficient	-2.4773	0.6671	0.0002	0.7676	0.2242	0.0007	2.15470
	Good	-2.3489	0.6371	0.0002	0.5115	0.2094	0.0148	1.66774
	Not good	0	.	.	0	.	.	1.00000
Household income level	<=20,000	1.0418	0.1884	<.0001	-0.6302	0.06368	<.0001	0.53249
	(20,000-40,000]	0.8023	0.1482	<.0001	-0.4440	0.05145	<.0001	0.64146
	(40,000-60,000]	0.3795	0.1305	0.0037	-0.2350	0.04764	<.0001	0.79054
	>60,000	0	.	.	0	.	.	1.00000
Drink alcohol	Never drink	0.6868	0.2150	0.0014	-0.7811	0.07770	<.0001	0.45791
	Left drink	1.1876	0.2049	<.0001	-0.6818	0.07063	<.0001	0.50573
	<= 2 times a week	0.1079	0.1149	0.3478	-0.1636	0.03965	<.0001	0.84906
	>= 3 times a week	0	.	.	0	.	.	1.00000
Smoke	Never smoke	-1.8163	0.1600	<.0001	0.5450	0.06445	<.0001	1.72465
	Left smoking	-1.4789	0.1550	<.0001	0.2049	0.05811	0.0004	1.22739
	Smoke	0	.	.	0	.	.	1.00000
Time	Time	-0.02250	0.02983	0.4506	-0.07677	0.005228	<.0001	0.92610

Conclusion

Unlike many previous studies that examine healthy immigrant effect based on cross-sectional data ignoring period and cohort effect, our study using 10 waves of longitudinal data brings out the dynamic nature of the association between migration and health in the Australian setting. This study confirms the existence of healthy

immigrant effect. However, the healthy immigrant effect varied according to the measure of health and immigrant group under consideration.

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