Title

South Asian-White health inequalities in Canada: Intersections with gender and immigrant status

Abbreviated Title

South Asian-White health inequalities in Canada

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Keywords

Canada; South Asian; White; racial health inequalities; gender; immigration; socioeconomic status; health behaviours; body-mass index

Abstract

Objectives: We apply intersectionality theory to health inequalities in Canada by investigating whether South Asian-White health inequalities are conditioned by gender and immigrant status in a synergistic way.

Design: Our dataset comprised 10 cycles (2001-2013) of the Canadian Community Health Survey. Using binary logistic regression modeling, we examined South Asian-White inequalities in self-rated health, diabetes, hypertension and asthma before and after controlling for potentially explanatory factors. Models were calculated separately in subsamples of native-born women, native-born men, immigrant women and immigrant men.

Results: South Asian immigrants had higher odds of fair/poor self-rated health, diabetes and hypertension than White immigrants. Native-born South Asian men had higher odds of fair/poor self-rated health than native-born White men and native-born South Asian women had lower odds of hypertension than native-born White women. Education, household income, smoking, physical activity and body mass index did little to explain these associations. The three-way interaction between racial identity, gender and immigrant status approached statistical significance for hypertension but not for self-rated health and asthma.

Conclusion: Our findings provide modest support for the principle that combinations of identities derived from race, gender and nationality constitute *sui generis* categories in the manifestation of health outcomes.

Introduction

Intersectionality theory contends that macro-level forms of inequality such as racism, sexism and nationalism are mutually constituted (Collins 1993; Hankivsky 2011; Viruell-Fuentes et al. 2012; Gazard et al. 2014). One consequence of the entanglement of these domains of inequality at the macro levels of modern societies is that the complex social identities manifested at the intersection of racial identity, gender and immigrant status, such as immigrant White man or native-born South Asian woman, are often associated with unique experiences in everyday life. This means that the health effects of racial identity, gender and immigrant status in regression-based modelling should not be treated as distinct phenomena which can be examined separately or controlled one for another. Rather, intersectionality theory indicates that the unique experiences which may accrue to complex social identities should be accommodated in the form of statistical interactions between racial identity, gender and immigrant status in regression models on health. Inspired by intersectionality theory, we apply regression modelling to data from the Canadian Community Health Survey (CCHS) to determine whether South Asian-White health inequalities intersect with gender and immigration in Canada.

Various studies have documented poorer health for South Asian Canadians compared to White Canadians (e.g., Anand et al. 2000; Gupta et al. 2002; Vissandjee et al. 2004; Veenstra 2009; Chiu et al. 2010; Liu et al. 2010; Kim et al. 2013; Omariba 2015). As far as we know, no previous study has examined the health consequences of intersections between South Asian versus White identity and gender and immigration. This may be because the samples of native-born South Asian men and women in nationally representative survey data from the CCHS and the National Population Health Survey are typically too small for this purpose. We address this problem by analyzing combined data from ten cycles of the CCHS in order to document the nature and extent

of South Asian-White inequalities in self-rated health, diabetes, hypertension and asthma in subsamples comprised of native-born women, native-born men, immigrant women and immigrant men. The unprecedented size of our nationally representative sample allows us to test the intersectional proposition that gender identity and immigrant status are entwined with racial identity in the production of South Asian-White health inequalities in Canada.

Methods

The CCHS is a cross-sectional survey that collects information related to health status, health care utilization and health determinants for the Canadian population. Statistics Canada conducted the CCHS in 2001, 2003 and 2005 and annually from 2007 onwards. The target population for these cross-sectional surveys was all persons 12 years of age and older residing in Canada, excluding individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Armed Forces and residents of some remote regions. One person was chosen randomly from each household to complete the survey. Response rates for the surveys ranged from a high of 84.7% in 2001 to a low of 66.7% in 2013.

Racial identity was assessed by asking whether respondents regard themselves as South Asian, White, some other identity (i.e., Aboriginal, Arab, Black, Chinese, Japanese, Korean, Latin American, Southeast Asian or West Asian) or some combination of identities. We confined our analyses to respondents who reported South Asian identity only or White identity only. *Immigration status* distinguishes respondents born in Canada from recent immigrants (immigrated to Canada less than 10 years ago), midterm immigrants (10 to 19 years ago) and long-term immigrants (20 or more years ago). *Marital status* distinguishes between married or common-law,

divorced or separated, widowed and never married. *Educational attainment* distinguishes between less than high school diploma, high school diploma or G.E.D., community college or trade school, and bachelor's degree or higher. *Household income*, expressed in population deciles, depicts each respondent's household income relative to a low-income cut-off that accounts for household size and the population size of the respondent's community of residence. *Smoking status* distinguishes between never smoked, formerly smoked, smokes occasionally and smokes daily. A *physical activity index* characterizes overall activity levels as active (average daily energy expenditure of more than 3 kilocalories per kilogram of body weight), moderately active (1.5 to 3 kilocalories) or inactive (less than 1.5 kilocalories) based on a set of questions pertaining to various leisure activities. *Body-mass index (BMI)* is calculated from self-reported height and weight. *Self-rated health* is dichotomized to distinguish fair or poor health from excellent, very good or good health. Other indicators assess the presence of *diabetes*, *hypertension* and *asthma* diagnosed by a health professional.

<Tables 1 and 2 about here>

We combined data from all ten cycles of the CCHS that occurred between 2001 and 2013. Exclusion of cases without valid information for racial/cultural identity, gender or immigrant status and of all respondents younger than 25 produced a sample of 430 native-born and 3,989 immigrant South Asian women, 299,501 native-born and 35,776 immigrant White women, 428 native-born and 3,850 immigrant South Asian men and 241,536 native-born and 28,937 immigrant White men. Socio-demographic and health-related characteristics of the sample are described in Tables 1 and 2, respectively. Table 1 indicates that the South Asian respondents were much younger, on average, than the White respondents. Almost nine in ten White respondents but only one in ten

South Asian respondents were born in Canada and proportionately more South Asian respondents were married and lived in urban settings.

Tables 1 and 2 present descriptive statistics for the independent and dependent variables examined in this study and the extent of missing data for them. BMI was not calculated for pregnant women. To accommodate missing values in our regression models, we adopted the imputed data for household income provided by Statistics Canada for the 2005-2013 cycles, utilized missing data categories for household income in 2001 and 2003 and for the other independent variables, and applied list-wise deletion to the dependent variables. To account for the complex sampling design, we applied the master weight and 500 bootstrap replicate weights provided by Statistics Canada to our models. All statistical analyses were conducted in Stata 13. The study was ethically approved by the Behavioural Research Board at the University of British Columbia.

Results

For each dependent variable, we produced three binary logistic regression models separately for native-born women, native-born men, immigrant women and immigrant men (Table 3), although insufficiently large numbers of native-born South Asian women and men reporting diabetes (fewer than 20 in both samples) prevented us from constructing models for diabetes in the native-born samples. With self-reported racial identity as the primary independent variable of interest, the first model in each set of three controls for survey year, age in years and the square of age. This model serves to establish an association between racial identity and health that controls for these potential confounders. Predicted probabilities were also derived from the first model using the *margins*

(*atmeans*) command in Stata (Table 4). The second model in each set additionally controls for education and household income, enabling us to determine the degree to which socioeconomic status explains any previously established associations. The third model in each set additionally controls for smoking, physical activity and BMI. Lastly, tests of significance for three-way interactions between racial identity, gender, and immigrant status were obtained from hierarchically well-ordered logistic regression models (not shown). These separately predicted each health variable except diabetes, were implemented in the full sample, and controlled for survey year, age in years and square of age.

<Tables 3 and 4 about here>

One health outcome, hypertension, was conditioned by both gender and immigration in a synergistic way. Specifically, South Asians were less likely than Whites to report hypertension among native-born women (OR=0.50, 95% CI=0.31-0.85), no more and no less likely than Whites to report hypertension among native-born men (OR=0.97, 95% CI=0.49-1.93) and more likely than Whites to report hypertension among immigrant women (OR=1.45, 95% CI=1.23-1.72) and immigrant men (OR=1.28, 95% CI=1.09-1.51). The three-way multiplicative term in the corresponding interaction model was marginally significant ($p = 0.09$). The predicted probabilities of Table 4 show that native-born South Asian women were least likely to report hypertension (7.0%) and immigrant South Asian women and men were most likely to do so (19.7% and 20.8%, respectively). In other words, immigrant South Asian women and men were at elevated risks of hypertension while native-born South Asian women were at inordinately low risk of hypertension. Socioeconomic status, health-related practices and BMI had little role in explaining these inequalities.

Neither self-rated health nor asthma was conditioned by gender and immigration in a synergistic way ($p > 0.10$ for the three-way multiplicative term in both interaction models). We did find, however, that South Asians were more likely than Whites to report fair/poor self-rated health among native-born men (OR=2.02, 95% CI=1.13-3.61), immigrant women (OR=1.46, 95% CI=1.25-1.72) and immigrant men (OR=1.30, 95% CI=1.07-1.57). In the native-born samples these associations actually strengthened upon controlling for socioeconomic status, health-related practices and BMI, suggesting elevated risk of fair/poor self-rated health for native-born South Asian women as well (OR=2.01, 95% CI=1.17-3.46). Among immigrants, South Asians were much more likely than Whites to report diabetes (for women: OR=3.03, 95% CI=2.49-3.68; for men: OR=2.96, 95% CI=2.44-3.58), risks that were not explained by socioeconomic status, health-related practices or BMI. There was little compelling evidence for South Asian-White inequalities in asthma prior to controlling for potentially explanatory factors.

Discussion

In our Canadian study, South Asian-White inequalities in hypertension were conditioned by the intersection of gender and immigration. Specifically, the immigrant South Asian women and men in our sample were highly likely to report hypertension whereas the native-born South Asian women in the sample were inordinately unlikely to do so. It may be that native-born South Asian women have devised especially effective solutions to experiences of discrimination and marginalization in Canadian society. Sundar (2008) depicts young South Asian Canadians as leveraging their status as 'brown' in surprisingly flexible ways when navigating different social circumstances, perhaps reflective of the intersectional proposition that there are unique advantages

and disadvantages accruing to a given complex social identity (Purdie-Vaughn and Eibach, 2008). It could also be that native-born South Asian women report inordinately low levels of hypertension because they more aggressively pursue Canadian cultural ideals, including ideals pertaining to fitness and health, perhaps as a reaction to pressure from their families to conform to traditional and gender performative roles (Sundar 2008; Rajiva 2013). Suppositions such as these require empirical confirmation, however.

The South Asian immigrants in our sample experienced elevated risks of fair/poor self-rated health, hypertension and diabetes and the native-born South Asians were at relatively high risk of fair/poor self-rated health. Potential explanations for these health inequalities include the pathogenic stresses of perceived discrimination (Moghaddam et al. 2002), racial profiling of South Asian immigrants in the job market, including but not limited to the devaluation of their educational credentials (Giri 1998; Oreopoulos 2011; Esses, Dietz and Bhardwaj 2006), resultant downward career mobility upon entry into Canada (Basran and Li, 1998), differential treatment within the Canadian education (Samuel and Burney 2009; Ruck and Wortley 2002) and health care (Johnson et al. 2004) systems, and other exclusionary practices that target South Asians in Canada. Notably, education and income explained some of the risk of fair/poor self-rated health for immigrant South Asians but not for any of the other health inequalities identified in our study. Cultural factors, such as language barriers when interacting with health care practitioners (Ens et al. 2013; Crawford et al. 2015), resistance to Western prescriptions for diet and exercise (Patel et al. 2012) and the stress of assimilating into a new culture (Samuel 2009), may also be relevant here. Nevertheless physical activity, smoking and BMI explained none of the elevated risks of ill health for South Asians identified in our study. Finally, South Asian-White inequalities in hypertension and diabetes among immigrants may also reflect the fact that the most common

sending nations of South Asian Canadians (India and Pakistan) and White Canadians (European nations and the United States) have different prevalence rates of these chronic conditions which likely affects their prevalence among emigrants from these places (Kearney et al. 2005; Whiting et al. 2011).

Our study has several notable limitations. First, even after combining all available cycles of the CCHS the samples of native-born South Asian women and men were still rather small, limiting our ability to identify weak but statistically significant associations in the native-born samples. In the case of diabetes in particular we could not calculate models for native-born respondents at all. Second, we do not distinguish between second and third or higher generation since immigration which means that we are unable to rule out the confounding influence of intergenerational cultural dynamics among native-born South Asians and Whites. Third, we do not consider occupation, an aspect of socioeconomic status that is affected by institutionalized racism. Future research on this subject should consider merging future cycles of the CCHS into this dataset so as to produce still larger sample sizes of native-born South Asians, consider a more finely graded measure of immigrant generation and incorporate indicators of occupation and nation/region of origin into their analyses.

In summary, we identified relatively high risks of fair/poor self-rated health, diabetes and hypertension for immigrant South Asian women and men, a relatively high risk of fair/poor self-rated health for native-born South Asian men and a relatively low risk of hypertension for native-born South Asian women. We found little evidence for South Asian-White inequalities in asthma. In regards to the primary goal of our study, the existence of a three-way interaction between South Asian-White identity, gender and immigrant status predicting self-reported hypertension provides modest support for the intersectional principle that combinations of social identities derived from

race, gender and nationality represent *sui generis* categories in the manifestation of health outcomes.

Main Messages

1. The three-way interaction between race, gender and immigrant status on hypertension approached statistical significance. In particular, South Asian immigrants were more likely than White immigrants to report hypertension but native-born South Asian women were less likely than native-born White women to do so. This supports the intersectional principle that combinations of identities derived from race, gender and nationality are *sui generis* categories in regards to health.
2. South Asian immigrants had higher odds of fair/poor self-rated health, diabetes and hypertension than White immigrants and native-born South Asian men had higher odds of fair/poor self-rated health than native-born White men.

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Table 1. Socio-demographic and health behavior characteristics of the sample

	<i>WOMEN</i>		<i>White</i>		<i>MEN</i>		<i>White</i>	
	<i>South Asian</i>				<i>South Asian</i>			
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Age								
25-34	1,461	33.1%	50,821	15.2%	1,147	26.8%	42,030	15.5%
35-44	1,227	27.8%	54,227	16.2%	1,322	30.9%	50,854	18.8%
45-54	615	13.9%	59,151	17.6%	653	15.3%	51,590	19.1%
55-64	576	13.0%	66,358	19.8%	560	13.1%	54,573	20.2%
65+	540	12.2%	104,720	31.2%	596	13.9%	71,426	26.4%
Immigration status								
Canadian by birth	430	9.7%	299,501	89.3%	428	10.0%	241,536	89.3%
Immigrated 0-10 years ago	1,398	31.6%	2,946	0.9%	1,287	30.1%	2,540	0.9%
Immigrated 10-20 years ago	1,106	25.0%	3,009	0.9%	1,013	23.7%	2,447	0.9%
Immigrated 20+ years ago	1,485	33.6%	29,821	8.9%	1,550	36.2%	23,950	8.9%
Marital status								
Married/ Common-law	3,347	75.7%	189,074	56.4%	3,292	77.0%	176,857	65.4%
Single/ Never married	473	10.7%	42,529	12.7%	689	16.1%	49,668	18.4%
Divorced/ Separated	290	6.6%	42,223	12.6%	209	4.9%	30,167	11.2%
Widowed	309	7.0%	61,451	18.3%	88	2.1%	13,781	5.1%
Urban/rural residence								
Urban	4,272	96.7%	244,037	72.8%	4,114	96.2%	189,593	70.1%
Rural	147	3.3%	91,240	27.2%	164	3.8%	80,880	29.9%
Educational attainment								
Less than H.S. Diploma	705	16.0%	75,737	22.6%	458	10.7%	61,113	22.6%
H.S. Diploma	729	16.5%	59,958	17.9%	607	14.2%	42,960	15.9%
Some college / trade school	1,189	26.9%	140,174	41.8%	1,197	28.0%	116,270	43.0%
Bachelor and above	1,750	39.6%	56,259	16.8%	1,960	45.8%	47,079	17.4%
Not stated	46	1.0%	3,149	0.9%	56	1.3%	3,051	1.1%
Household income decile								
1 (lowest incomes)	697	15.8%	30,638	9.1%	517	12.1%	15,855	5.9%
2	630	14.3%	42,021	12.5%	577	13.5%	21,125	7.8%
3	572	12.9%	35,455	10.6%	502	11.7%	23,573	8.7%
4	448	10.1%	32,926	9.8%	451	10.5%	24,488	9.1%
5	422	9.5%	31,256	9.3%	399	9.3%	25,306	9.4%
6	366	8.3%	31,220	9.3%	361	8.4%	27,001	10.0%
7	336	7.6%	28,661	8.5%	324	7.6%	26,580	9.8%
8	270	6.1%	28,608	8.5%	325	7.6%	28,634	10.6%
9	246	5.6%	29,594	8.8%	322	7.5%	31,620	11.7%
10 (highest incomes)	258	5.8%	28,457	8.5%	352	8.2%	34,999	12.9%
Not applicable	35	0.8%	4,023	1.2%	55	1.3%	4,026	1.5%
Not stated	139	3.1%	12,418	3.7%	93	2.2%	7,266	2.7%

Table 1. Continued

	<i>WOMEN</i>		<i>White</i>		<i>MEN</i>		<i>White</i>	
	<i>South Asian</i>				<i>South Asian</i>			
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Physical activity								
Active	667	15.1%	69,419	20.7%	901	21.1%	66,450	24.6%
Moderate	924	20.9%	84,193	25.1%	937	21.9%	65,427	24.2%
Inactive	2,617	59.2%	177,084	52.8%	2,285	53.4%	128,036	47.3%
Not stated	211	4.8%	4,581	1.4%	155	3.6%	10,560	3.9%
Smoking status								
Daily	102	2.3%	58,288	17.4%	412	9.6%	58,006	21.4%
Occasional	49	1.1%	11,871	3.5%	231	5.4%	10,851	4.0%
Former	360	8.1%	146,576	43.7%	1,152	26.9%	140,870	52.1%
Never	3,906	88.4%	117,900	35.2%	2,482	58.0%	60,092	22.2%
Not stated	2	0.0%	642	0.2%	1	0.0%	654	0.2%
Body mass index								
Underweight	201	4.5%	9,076	2.7%	66	1.5%	1,853	0.7%
Healthy	2,261	51.2%	147,748	44.1%	2,139	50.0%	91,009	33.6%
Overweight	1,186	26.8%	97,380	29.0%	1,603	37.5%	114,922	42.5%
Obese	407	9.2%	61,664	18.4%	376	8.8%	56,348	20.8%
Not applicable	154	3.5%	4,614	1.4%				
Unknown	210	4.8%	14,795	4.4%	94	2.2%	6,341	2.3%
Total	4,419	100%	335,277	100%	4,278	100.0%	270,473	100.0%

Table 2. Reported prevalence of health conditions in the sample

	<i>WOMEN</i>		<i>White</i>		<i>MEN</i>		<i>White</i>	
	<i>South Asian</i>				<i>South Asian</i>			
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Fair or poor self-rated health								
No	3,792	85.8%	282,753	84.3%	3,837	89.7%	228,030	84.3%
Yes	622	14.1%	52,139	15.6%	439	10.3%	42,117	15.6%
Not stated	5	0.1%	385	0.1%	2	0.0%	326	0.1%
Diabetes								
No	4,027	91.1%	310,132	92.5%	3,778	88.3%	246,032	91.0%
Yes	389	8.8%	24,862	7.4%	499	11.7%	24,204	8.9%
Not stated	3	0.1%	283	0.1%	1	0.0%	237	0.1%
Hypertension								
No	3,727	84.3%	247,416	73.8%	3,559	83.2%	208,167	77.0%
Yes	689	15.6%	87,327	26.0%	717	16.8%	61,405	22.7%
Not stated	3	0.1%	534	0.2%	2	0.0%	901	0.3%
Asthma								
No	4,146	93.8%	303,361	90.5%	4,056	94.8%	252,991	93.5%
Yes	271	6.1%	31,659	9.4%	220	5.1%	17,278	6.4%
Not stated	2	0.0%	257	0.1%	2	0.0%	204	0.1%
Total	4,419	100.0%	335,277	100.0%	4,278	100.0%	270,473	100.0%

Table 3. Odds ratios from weighted logistic regression models estimating risk of self-reported health conditions for South Asian (versus White) Canadians with 95% confidence intervals based on bootstrapped variance estimation

	<i>NATIVE-BORN WOMEN</i>			<i>NATIVE-BORN MEN</i>		
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
F/P SR health	1.50 (0.88-2.55)	1.60 (0.94-2.74)	2.01 (1.17-3.46)	2.02 (1.13-3.61)	2.27 (1.23-4.19)	2.69 (1.45-5.00)
Diabetes	----	----	----	----	----	----
Hypertension	0.51 (0.31-0.85)	0.54 (0.32-0.91)	0.62 (0.36-1.07)	0.97 (0.49-1.93)	1.00 (0.50-2.00)	1.11 (0.55-2.25)
Asthma	1.13 (0.63-2.03)	1.11 (0.62-1.99)	1.22 (0.68-2.18)	1.46 (0.90-2.38)	1.44 (0.88-2.35)	1.44 (0.89-2.35)
	<i>IMMIGRANT WOMEN</i>			<i>IMMIGRANT MEN</i>		
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
F/P SR health	1.46 (1.25-1.72)	1.22 (1.03-1.45)	1.18 (0.98-1.41)	1.30 (1.07-1.57)	1.08 (0.89-1.32)	1.27 (1.03-1.56)
Diabetes	3.03 (2.49-3.68)	2.73 (2.24-3.34)	2.99 (2.40-3.71)	2.96 (2.44-3.58)	2.79 (2.31-3.39)	3.52 (2.86-4.33)
Hypertension	1.45 (1.23-1.72)	1.36 (1.14-1.61)	1.39 (1.16-1.66)	1.28 (1.09-1.51)	1.31 (1.11-1.54)	1.56 (1.31-1.85)
Asthma	1.22 (0.97-1.55)	1.20 (0.95-1.51)	1.37 (1.07-1.76)	1.00 (0.76-1.31)	0.92 (0.69-1.23)	0.99 (0.71-1.38)

Note: For each dependent variable, Model 1 controls for survey year, age and age squared. Model 2 additionally controls for educational attainment and household income. Model 3 additionally controls for physical activity, smoking status and body-mass index. Sample sizes ranged from 299,469 to 299,699 for models on native-born women, 241,161 to 241,783 for models on native-born men, 39,690 to 39,738 for models on immigrant women and 32,687 to 32,762 for models on immigrant men.

Table 4. Predicted probabilities derived from weighted logistic regression models estimating risk of self-reported health conditions for South Asian and White Canadians

	<i>NATIVE-BORN WOMEN</i>		<i>NATIVE-BORN MEN</i>	
	<i>South Asian</i>	<i>White</i>	<i>South Asian</i>	<i>White</i>
F/P SR health	15.6%	10.9%	19.4%	10.6%
Diabetes	----	----	----	----
Hypertension	7.0%	12.9%	13.9%	14.3%
Asthma	11.0%	9.9%	9.4%	6.6%
	<i>IMMIGRANT WOMEN</i>		<i>IMMIGRANT MEN</i>	
	<i>South Asian</i>	<i>White</i>	<i>South Asian</i>	<i>White</i>
F/P SR health	17.3%	12.5%	12.9%	10.3%
Diabetes	11.3%	4.0%	13.4%	5.0%
Hypertension	19.7%	14.4%	20.8%	16.9%
Asthma	7.2%	5.9%	4.0%	4.0%

Note: Each model controls for survey year, age and age squared. Predicted probabilities were calculated using the *margins (atmeans)* command in Stata 14. Sample sizes ranged from 299,469 to 299,699 for models on native-born women, 241,161 to 241,783 for models on native-born men, 39,690 to 39,738 for models on immigrant women and 32,687 to 32,762 for models on immigrant men.