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Original article

On the basis of visa type: Insights into incorporation and health among foreign-born people in the United States

Alicia Dunajcik [a], Solveig Argeseanu Cunningham [a,b,*]

[a] Department of Epidemiology, Rollins School of Public Health, Emory University, Atlanta, GA, United States
[b] Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, GA, United States

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ABSTRACT

Foreign-born people have different patterns of health, and several psychosocial and contextual factors may contribute to these differences. Type of visa with which one resettles is an important consideration because it is linked both with the reason for initially migrating and with experiences after arriving in the U.S. This study examines the association between visa type and health in terms of self-rated health and diagnosed chronic conditions. Using the New Immigrant Survey (NIS), a nationally representative study of foreign-born people at the time of receiving legal permanent residence in the U.S., we used logistic regression models to estimate the odds of having chronic conditions and the odds of reporting fair or poor health. People who had refugee, asylum, parole and post-arrival legalization visa types had the highest prevalence of any chronic condition; they were also most likely to report being in fair or poor self-rated health, even after controlling for other characteristics. Conversely, people who had diversity visas had the highest self-rated health and the fewest chronic conditions. Overall, the type of visa a person holds is associated with health and chronic disease even years after resettlement.

1. Introduction

In the first two quarters of the 2022 fiscal year, 449,502 foreign-born individuals immigrated to the U.S. (U.S. Department of Homeland Security, 2022). These new immigrants joined over 44 million foreign-born people already residing in the U.S. (Batalova et al., 2020). Immigrants, or people who move to resettle in another country, experience lifestyles, diets, neighborhoods, and healthcare access different from native-born residents in their country of resettlement (Gordon-Larsen et al., 2003; Daniel et al., 2013). In the U.S., immigrants have been noted to have better health than native-born people, including in terms of cardiovascular diseases, overweight and obesity rates, and some cancers (Markides and Rote, 2019; Jasso et al., 2004; Argeseanu Cunningham et al., 2008; Kennedy et al., 2015; Singh et al., 2013a; Singh and Hiatt, 2006; Singh et al., 2013b). On the other hand, immigrants have often been noted to have poorer health than U.S.-born people for other conditions, including diabetes, infections, and occupational injuries (Argeseanu Cunningham et al., 2008; Singh et al., 2013b).

Immigrants are not a homogenous population. They arrive from different environments of origin and have differing upbringings, diets, ethnicities, and motivations for migrating. An important factor shaping people's experiences of migration and incorporation is the type of migration visa with which they initially resettle. Visa type is related with the circumstances migrants leave behind and their status and rights on arrival. For example, the conditions of migration and resettlement are typically different for highly educated people with specialized employment visas compared with refugees escaping war and deprivation. This study examines the association between visa types and health status at the time of obtaining permanent residence. This research is grounded in the proposition that health may be influenced both by the experiences that lead to migration under a particular visa type and by the experiences generated by the type of visa a person holds. We examine self-rated health, a well-documented indicator of overall wellbeing, and diagnosis of several chronic conditions: diabetes, high blood pressure, lung conditions, heart conditions and stroke, arthritis, and cancer.

2. Background

Millions of people pass through U.S. customs each year, for both

* Corresponding author at: Hubert Department of Global Health, Emory University; 1518 Clifton Road, Atlanta, GA 30322, United States
E-mail address: sargese@emory.edu (S.A. Cunningham).

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temporary and permanent migration. People who intend to resettle are designated by U.S. authorities as noncitizens permanently residing in the U.S. with Lawful Permanent Residence (LPR), more commonly known as a green card (U.S. Department of Homeland Security, 2016). Immigrating to the U.S. is a multi-step process that takes months to years to complete, depending on where the process is initiated and on the visa type one acquires (Customs and Immigration Services, 2020). While immigration visas grants the short-term status needed to relocate to the U.S., a green card provides permission to live and work permanently in the U.S. (U.S. Customs and Immigration Services, 2015). Neither visa holders nor green card holders are U.S. citizens and therefore they have limited access to some government assistance (U.S. Customs and Immigration Services, 2020a; Brooks et al., 2017).

2.1. Visa types and migration patterns

The types of visa a person is eligible for are determined by their family and social networks, their education and skills, and the circumstances of their migration. Some people are eligible for multiple visa types, in which case they can select one that permits fastest entry or is easiest to obtain. The major visa categories are family-sponsorship, employment, diversity, refugee/asylum/parole, and legalization.

Family-sponsored visas are available for people who are the spouse, child, sibling, or parent of a U.S. citizen who is taking on financial responsibility for them; spouses and unmarried children of legal permanent residents are also eligible (U.S. Department of State, 2020a). In our nationally representative sample, this is the largest visa category, including about 67% of visa holders (authors' calcualtions).

The second-largest category, with about 10% of visas, is employment. Employment visas are for people who are sponsored by an employer, meaning that the employer provides verification to the government of their intent to hire the person, as well as proof that they can compensate the person with a living wage, so that the immigrant is not reliant upon government assistance (U.S. Department of State, 2020a). Typically, employment immigrants have special skills, experiences, or education that are needed and insufficiently available in the U.S. These include persons with "extraordinary ability", outstanding professors, researchers and professionals holding an advanced degree, multinational managers, executives, investors, and specific skilled and unskilled workers. Immediate family members of people with employment visas are also granted permission to reside in the U.S. (U.S. Department of State, 2020a).

The diversity, or "lottery", visa type was created in 1990 to increase the number of immigrants from countries with low immigration to the U.S. (U.S. Department of Homeland Security, 2016), calculated based on immigration numbers for each country in the previous 5 years (U.S. Department of State, 2019). Any country with less than 50,000 immigrants yearly to the U.S. qualifies as "low admission" and is tentatively included (U.S. Department of State, 2019). The diversity visa grants immigration to 50,000 people annually via random selection among a pool of applicants worldwide who fill out free applications (U.S. Department of Homeland Security, 2016). In 2018, 23 million primary and derivative applications for the diversity visa were received (U.S. Department of State, 2020b).

Refugee, asylum, and parole visas make up the smallest proportions of visas. They are granted to people forced to leave their country due to war, disaster, or other devastating circumstances (Mossaad, 2019). Forced migrants may enter the U.S. as official refugees through a process facilitated by the United Nations High Commissioner for Refugees (UNHCR) , whereby the UNHCR identifies vulnerable people and the U. S. government selects which refugees to admit from this pool (United Nations High Commissioner for Refugees, 2020). All refugees entering the U.S. are paired with a nonprofit that will aid them in resettlement and provide some basic goods and services (United Nations High Commissioner for Refugees, 2020). Asylum seekers have been forced to leave their country of origin and are seeking refugee status, which is granted to people who cannot return to their country of origin due to safety concerns (Mossaad, 2019). Parole is granted to people who are otherwise inadmissible to the U.S. but demonstrate an urgent humanitarian reason why the public would benefit from their parole (U.S. Customs and Immigration Services, 2019). The legalization visa type is based on policies that grant immigration to people already residing in the U.S. as non-immigrants or undocumented immigrants for extended time periods.

In the early 2000s, when the only nationally representative dataset of immigrants, which we use here, was fielded, the U.S. received about 706,000 immigrants yearly (U.S. Department of Homeland Security, 2004). In 2003, 70% of all immigrants qualified for permanent residence through family sponsorship (U.S. Department of Homeland Security, 2004). The second largest immigrant group qualified through employment preferences, which accounted for 12% of all immigrants (U.S. Department of Homeland Security, 2004). In 2003, the U.S. specified that it would allow up to 70,000 refugee admissions, but only 28,000 entered (U.S. Department of Homeland Security, 2004). Notably, the number of refugees entering the U.S. began plummeting during this time period, with a 25-year low of 27,000 refugees entering the U.S. in 2001 (U.S. Department of Homeland Security, 2004; Chishti and Bergeron, 2011). This drop in refugee admissions is attributable to 9/11 and the restructuring of Immigration and Naturalization Services (INS) into the Department of Homeland Security. In 2005, Refugee Corps was formed to interview refugee applicants worldwide (Citizenship and Immigration Services, 2021). While refugee arrivals have increased since 2003, policy changes in 2017 led to a large drop in the number of refugees being admitted into the U.S. from UNHCR in 2018 (Connor and Manuel Krogstad, 2018).

2.2. . Migration and health

In most higher-income countries, including the U.S., Canada, and European countries, foreign-born people are in better health by many indicators than native-born people (Sanou et al., 2014). In the U.S., this advantage cannot be explained by healthcare, as immigrants have less access to healthcare, and health insurance than U.S. natives (Pitkin Derose et al., 2009).

Among immigrant and non-immigrant populations in the U.S., chronic diseases are the leading cause of morbidity (Raghupathi and Raghupathi, 2018): approximately 45% of all people living in the U.S. have at least one chronic condition (Raghupathi and Raghupathi, 2018). Diabetes is a very common chronic condition, often more common among foreign-born people in the U.S. than U.S. natives (Argeseanu Cunningham et al., 2008). High blood pressure is the most common chronic disease in the U.S. (Institute of Medicine (US) Committee on Public Health Priorities to Reduce and Control Hypertension, 2010) and immigrants less frequently have high blood pressure than U.S.-born people (Argeseanu Cunningham et al., 2008). Foreign-born people are generally less likely to suffer from a stroke or diagnosed heart disease than U.S. natives (Argeseanu Cunningham et al., 2008). There are numerous lung diseases of public health importance in the U.S., with asthma being the most common. A study based on the National Health Interview Survey found that U.S. adult immigrants have a lower prevalence of asthma than people born in the U.S. and that the prevalence of asthma rose as immigrants spent time in the U.S. (Iqbal et al., 2014).

A "healthy migrant effect" has been noted in the literature, and has been explained with two propositions: One set of explanations centers around the proposition that migrants tend to have better social support and health behaviors than native-born people (Akresh and Frank, 2008; Landale and Oropesa, 2001; Scribner and Dwyer, 1989). Another set of explanations focuses on selection factors, noting that people who are able to migrate are those who are in especially good health (Abraído--Lanza et al., 1999; Akresh and Frank, 2008; Jasso et al., 2005a; Palloni and Arias, 2004).

Visa type merits consideration in understanding migrant health. It

has been noted that refugees are often in poor health prior to migrating, which could impact their health even long after resettlement (Jasso et al., 2005a). One study noted that refugees, asylees, and parolees were the visa groups most likely to have declining health after migration (Akresh and Frank, 2008). A study of people first filing for a visa in New York City indicated that those with legalization status tended to report that they had had good health during childhood but poor health presently, while people with refugee status reported poor health both in childhood and at present (Jasso et al., 2005a). Another study found that refugees were in worse health than non-refugees at the time of permanent residence in terms of self-rated health, chronic conditions, and mobility limitations (Reed and Barbosa, 2017). One study found that people with family and diversity visas were less frequenlty overweight or obese than people with other visa types (Yeh et al., 2016).

3. Conceptual framework

We hypothesize that health may be influenced both by the experiences that lead to migration under a particular visa type and by the experiences generated by the type of visa a person holds. While a visa is merely a set of numbers on a passport, these numbers relate to the rights and status a person can access and their standing in society.

Refugees and asylum seekers often experience distressing events prior to migration, such as victimization and living in temporary facilities; therefore, they are expected to have worse health than other immigrants (Mossaad, 2019). For non-humanitarian visa groups, immigrating may be a form of privilege rather than a response to devastation. Generally, people applying for employment, family, diversity, and legalization visas must demonstrate financial means to survive in the U.S. without government assistance (U.S. Department of State, 2020c). People with employment status generally have to further demonstrate excellence in skills or training, entailing that they may be the most highly selected group. People with family-sponsored visas may be less healthy than other migrants (Akresh and Frank, 2008), as they are not selected on their own skills, but rather the financial wellbeing of their relatives. Diversity visa holders may also have relatively little selection, as they were awarded a visa through a lottery process; on the other hand, some health and know-how is needed to navigate the visa lottery application process.

Hypothesized relationships between visa type, social circumstances, and health are shown in Fig. 1. This figure depicts pre-migration experiences that may impact the type of visa for which a person is eligible in resettling in the U.S. Country of nationality is important because the U.S. has differing opportunities for visas available to people from different countries. Education and accompanying degrees, and job skills and occupation, can make people eligible for employment visas. Family composition, marriage, and spouses' nationality or visa can make one eligible for the visa type of their spouse or eligible for family sponsorship. Urban residence in the country of origin often provides social connections and access to resources and therefore can facilitate access to information and opportunities to seek specific visas. Timing of arrival to the U.S. is relevant because different migration policies and visa options have been available in specific years to migrants arriving to the U.S. Figure 1 also depicts that visa type may lead to different experiences of resettlement in the U.S. Depending on their initial visa type, migrants may have experienced different occupational opportunities, access to health care and other resources, and mandatory health screenings; visa type also relates to ability to co-reside with family members and access employment; these experiences are intertwined with health, stress, and well-being post-arrival.

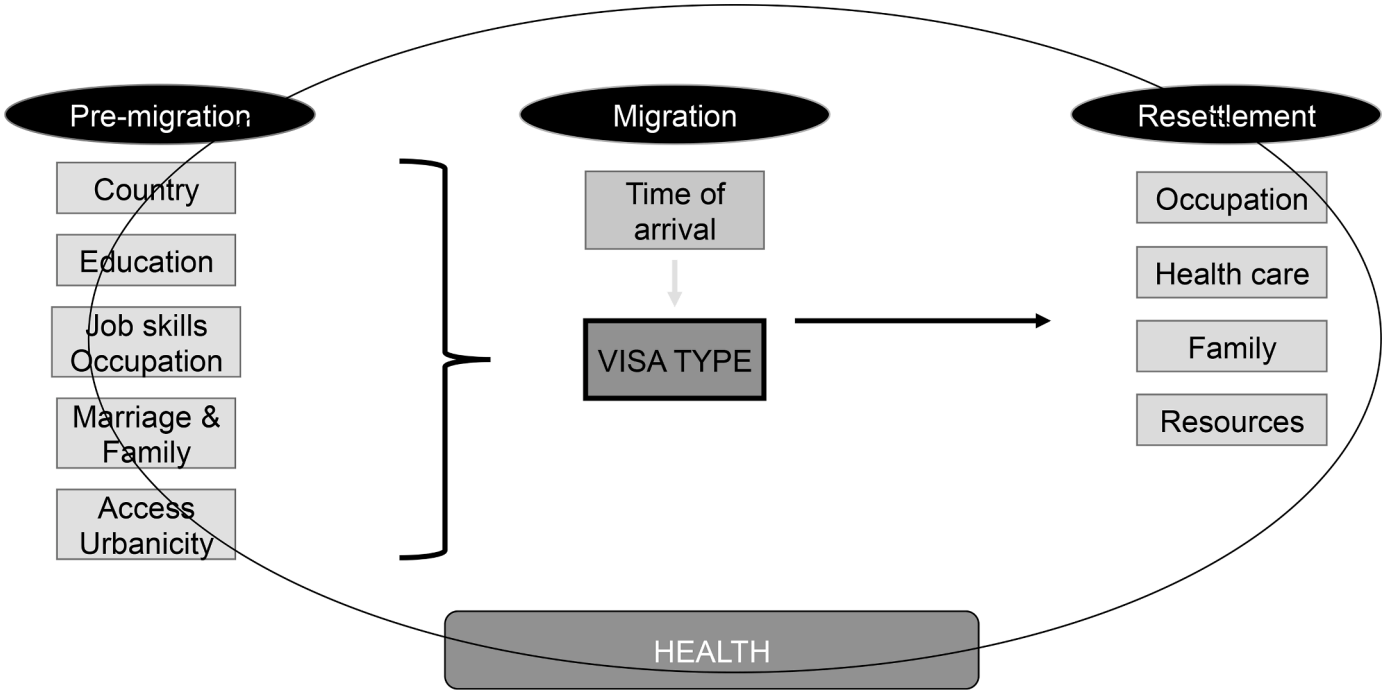

Fig. 1. Visa type entails different experiences of migration and resettlement[a].
[a]Pre-migration experiences: Country = country of origin, Education = years of school and accompanying degrees, Job skills/Occupation = job(s) and on the job training, Marriage/Family status = spouse and one's relationship to a U.S. citizen, Access/Urbanicity = international connections, urban residence, and information on visa opportunities.
Migration experiences: Time of Arrival = the year one first arrived in the U.S.
Resettlement experiences: Occupation = job(s) and training, Health care = access to facilities and insurance, Family = family members providing social/financial support, Resources = social programs available to certain people or a community.

4. Materials and methods

4.1. Data source

The New Immigrant Survey (NIS) is nationally representative of immigrants who obtained legal permanent residence in the U.S. between May and November 2003. The study sampled 12,500 adult immigrants aged 18 and older at the time of gaining permanent residence; it includes both immigrants who arrived in the U.S. upon obtaining an immigrant visa and immigrants who lived in the U.S. prior to obtaining an immigrant visa. Names, visa types, and contact information were obtained from the U.S. Immigration and Naturalization Services (INS), which is now known as U.S. Citizenship and Immigration Services (USCIS). Interviews were conducted via telephone or in-person in the language of each respondent's choice in 2003–2004 with 8,573 (68.6%) of those sampled. This study is a secondary data analysis using the publicly-use, anonymized dataset available for research at nis.princeton.edu.

4.2. Data preparation and selected variables

Visa type was pre-coded into five groups: family-sponsored, employment preferences, diversity, refugee/asylee/parolee, and legalization. The research team that developed the New Immigrant Survey created survey weights to account for study design and non-response patterns, so that the data are representative of people who became legal permanent residents in 2003 (NIS sample weights, 2003). The weights correct for sampling error and non-response error.

We examined self-rated health and presence of diagnosed chronic conditions. NIS asked respondents to rate their overall health as excellent, very good, good, fair, or poor. Respondents were also asked whether they had ever been diagnosed by a doctor with each of the following conditions: high blood pressure, diabetes, cancer/tumor, chronic lung diseases (not including asthma), asthma, heart problems, stroke, and arthritis or rheumatism. Responses are dichotomous (yes/no). We combined asthma and chronic lung diseases into a single lung diseases variable, and stroke and heart problems were combined into a single circulatory condition variable. An all-encompassing chronic condition variable was created to indicate if a person had at least one of the conditions.

Control variables were education, employment, sex, marital status, health insurance coverage, smoking , geographic region of origin, region of residence in the U.S., age, and time spent in the U.S. Education was based on the number of years of school and is used as a linear variable. Years in the U.S. measured the time between the year the person first came to the U.S. and the year of survey and is used as a linear variable. Region of birth is split into four regions: Europe and Central Asia; North America [Canada, Haiti, Guadeloupe]; Latin America and the Caribbean; Africa and the Middle East; and East Asia, South Asia, the Pacific, and Oceania. These categories were created by the NIS team and are available in the public-use dataset to maintain respondent anonymity and were grouped to avoid small group sizes and reflect geographic proximity (Jasso et al., 2000; Jasso et al., 2005b). We condensed employment into the following categories: employed; seeking work; unemployed due to being laid off, disabled or on leave; homemaker; other circumstances. Region of residence in the U.S. was based on a pre-populated variable in the public-use dataset and indicates where one's green card was sent: West, Midwest, South, and Northeast. Sex is categorized as male and female. Health insurance was dichotomized, with yes including insurance from outside of the U.S., self-insurance, employer-provided insurance, and Medicare or Medicaid. Marital status was categorized as married or living with a partner; single and never married; and divorced or widowed. Age in years was a linear variable calculated by subtracting year of birth from year of survey. An age-squared variable was included to test for non-linear relationships. Respondents were asked if they were ever smokers with responses of yes/no.

4.3. Analysis

We used NIS survey weights for all analyses. We used listwise deletion for missing values (601), resulting in an analytic sample of 7,972.

After examination of each variable using descriptive methods, pairwise correlation tests between all variables were used to assess collinearity. No evidence of collinearity, using a correlation matrix and correlation coefficient of 0.7, was detected and all variables were retained in analysis.

To assess self-rated health, we converted the 5-item likert scale to a dichotomous variable where good, very good, or excellent health was compared to fair or poor health. The self-rated health variable was converted to a dichotomous variable because the number of people in each visa type who rated their health as fair or poor was small and might have contributed to micronumerosity if left in an ordinal multinomial model. Logistic regression was conducted with dichotomized self-rated health. For chronic conditions, logistic regression models were used with dichotomous variables indicating whether the person had been diagnosed with each condition. We also used logistic regression models with a dichotomous variable indicating whether the person had been diagnosed with any of the chronic conditions.

5. Results

Foreign-born people at the time of legal permanent residence in the U.S. were on average 38.41 years old and had been in the U.S. for 5.76 years on average. Over one-third reported that they were in excellent health (34.7%), and most others were in very good (28.7%) or good (27.3%) health (Table 1). Still, almost one in five (19.6%) had at least one chronic condition. High blood pressure was the most commonly reported condition (9.5%), followed by arthritis/rheumatism (4.4%), diabetes (3.8%), and chronic lung diseases (3.4%).

The most common (66.9%) visa type was family-sponsored visa, followed by employment (9.9%), legalization (8.2%), diversity (8.1%), and refugee, asylum, and parole (6.8%) visas. Those with employment visas most frequently had health insurance, likely due to employment-provided benefit. They most frequently originated from Asia and the Pacific and had the highest level of education (16.2 years on average). Diversity visa holders were least frequently insured and most frequently were unemployed and seeking work (29.2%). They were the youngest (mean age 33.2 years) and the most recently arrived in the U.S., with an average of 1.4 years spent in the U.S. Refugees, asylees, and parolees were the oldest immigrants (mean age 40.3 years). Legalization immigrants almost exclusively originated from Latin America and the Caribbean (97.5%) and had spent the most time in the U.S. (15.4 years).

Diversity and employment immigrants most frequently reported excellent and very good health, while people with refugee and legalization visas most frequently reported fair and poor health (see Table 1). Diversity visa holders had the lowest prevalence of diagnosed conditions (8.6%), followed by employment visa holders (15.2%). Legalization and refugee visa holders had the highest prevalence of diagnosed conditions (24.2% and 28.9%, respectively). Fig. 2 shows the prevalence of at least one health condition and self-reported overall health of foreign-born people at the point of receiving legal permanent residence.

Table 2 shows associations between self-rated health and visa type, controlling for other characteristics. Compared with family-sponsored immigrants, diversity immigrants had half the odds of fair or poor self-rated health (odds ratio (OR) = 0.50, $p = .005$); refugees, asylees, and parolees had almost 3 times higher odds of fair or poor health (OR = 2.74, $p < .001$); legalization immigrants had almost twice the odds of fair or poor health (OR = 1.94, $p < .001$). Odds of fair or poor self-rated health were similar for employment-based and family-sponsored immigrants (OR = 0.82, $p = .317$).

Table 2 also shows similar patterns with respect to the odds of having any chronic condition. Compared with family-sponsored immigrants, diversity immigrants had 35% lower odds of having any chronic

Table 1
Characteristics of foreign-born people at the time of gaining Legal Permanent Residence in the U.S., by visa type.[a,b]

Variables	All New Immigrants (n = 7972)	Family Sponsored (n = 3838)	Employment Preferences (n = 1620)	Diversity (n = 1353)	Refugee/Asylee/ Parolee (n = 534)	Legalization (n = 627)
Self-Rated Health Status						
Excellent	34.70%	33.15%	42.35%	47.03%	29.98%	29.70%
Very Good	28.65%	29.16%	32.58%	30.77%	24.93%	20.49%
Good	27.28%	28.43%	21.95%	20.42%	28.30%	30.30%
Fair	7.97%	7.91%	2.96%	1.64%	11.47%	17.92%
Poor	1.40%	1.35%	0.15%	0.14%	5.33%	1.58%
Diabetes						
Yes	3.76%	3.86%	2.29%	1.38%	5.52%	5.60%
No	96.24%	96.14%	97.71%	98.62%	94.48%	94.40%
High Blood Pressure						
Yes	9.50%	10.10%	6.32%	3.74%	13.83%	10.55%
No	90.50%	89.90%	93.68%	96.26%	86.17%	89.45%
Chronic Lung Diseases						
Yes	3.36%	3.06%	3.94%	1.66%	4.41%	5.91%
No	96.64%	96.94%	96.06%	98.34%	95.59%	94.09%
Stroke or Heart Problem						
Yes	2.05%	2.16%	0.47%	0.46%	5.01%	2.23%
No	97.95%	97.84%	99.53%	99.54%	94.99%	97.77%
Arthritis/Rheumatism						
Yes	4.40%	4.73%	2.28%	1.33%	8.21%	4.16%
No	95.60%	95.27%	97.72%	98.67%	91.79%	95.84%
Employment Status						
Employed	55.76%	48.44%	74.73%	55.38%	74.12%	77.44%
Unemployed, Seeking Work	16.17%	18.13%	6.61%	29.20%	7.69%	6.01%
Unemployed, Laidoff/Disabled/Retired	4.95%	5.96%	0.94%	0.98%	7.27%	3.56%
Unemployed, Homemaker	16.39%	19.67%	12.68%	6.71%	7.61%	10.98%
Other	6.73%	7.79%	5.05%	7.72%	3.30%	2.00%
Health Insurance Coverage						
Covered	42.07%	39.33%	71.21%	22.22%	53.14%	39.25%
Not Covered	57.93%	60.67%	28.79%	77.78%	46.86%	60.75%
Country of Origin						
Latin America	43.77%	48.32%	12.70%	4.23%	27.40%	97.53%
Africa and Middle East	11.05%	8.18%	5.65%	40.12%	24.62%	0.92%
Europe, Central Asia, America (Canada, Haiti, Guadeloupe)	15.45%	11.54%	17.06%	43.26%	36.09%	0.62%
East Asia, South Asia, Pacific, and Oceania	29.73%	31.96%	64.59%	12.39%	11.89%	0.93%
Years of Education	12.25 (0.06)	11.78 (0.08)	16.17 (0.11)	14.53 (0.11)	12.43 (0.20)	8.85 (0.18)
Age in Years	38.41 (0.17))	39.10 (0.24)	36.75 (0.23)	33.22 (0.29)	40.25 (0.52)	38.41 (0.41)
Years in U.S.	5.76 (0.09)	5.00 (0.12)	6.26 (0.15)	1.40 (0.10)	6.10 (0.20)	15.38 (0.20)

New Immigrant Survey, 2003.

[a] Study excluded those with missing variables. Results are survey-adjusted. Weighted study population comprised of 66.88% family preferences, 10.00% employment, 8.11% diversity, 6.84% refugee/asylee/parolee, and 8.17% legalization.

[b] Categorical variables displayed as frequency percentage, linear variables displayed as Mean (Standard Error).

conditions (OR = 0.65, p = .004). Again, refugees, asylees, and parolees, as well as legalized immigrants, had much higher odds: OR = 1.81 for refugees, asylees, and parolees and OR = 1.58 for legalization immigrants (p = .001). Odds of having a chronic condition were similar for employment-based and family-sponsored visa holders (OR = 1.05, p = .651).

Controlling for other characteristics, women were slightly more likely to report fair or poor health than men and were more likely to report a chronic health condition (Table 2). People living on the West coast of the U.S. rated their health most poorly and those living on the East Coast . The odds of fair and poor health increased with age, as expected, but additionally with time spent in the U.S. The odds of fair or poor health were inversely associated with years of education. Compared with employed people, those who were not employed had higher odds of being in poor or fair health and of having at least one chronic condition. Those who were uninsured were less likely to have a diagnosed condition, though this may be because they are undiagnosed due to lack of access to care.

Table 3 shows estimates for each of the five chronic conditions: diabetes, high blood pressure, lung conditions, stroke/heart conditions, and arthritis/rheumatism, to understand whether certain conditions were more prevalent in certain visa groups. Compared with people with family sponsored visas, those with employment visas had lower odds of having heart conditions or stroke; in fact, they had the lowest odds of these conditions among all visa types. There were no significant differences in the risk of each condition between diversity visa holders and family sponsored visa holders. On the other hand, refugee, asylum, and parole visa holders were at significantly highest odds of diabetes (OR = 1.86 compared with family sponsorship), high blood pressure (OR = 1.68), and arthritis and rheumatism (OR = 1.89). Legalization visa holders had highest odds of lung diseases and stroke conditions and had significantly higher odds than family sponsored immigrants for stroke, heart conditions (OR = 2.72) and lung conditions (OR = 2.11).

6. Discussion

This study examined health among foreign-born people resettled in the U.S. according to type of migration visa. Visa type is an important consideration because it often reflects reasons for migration and affects post-migration opportunities such as employment, health insurance, and family networks. We found that self-rated health and diagnosed chronic conditions differed by visa type, even after controlling for age, time in

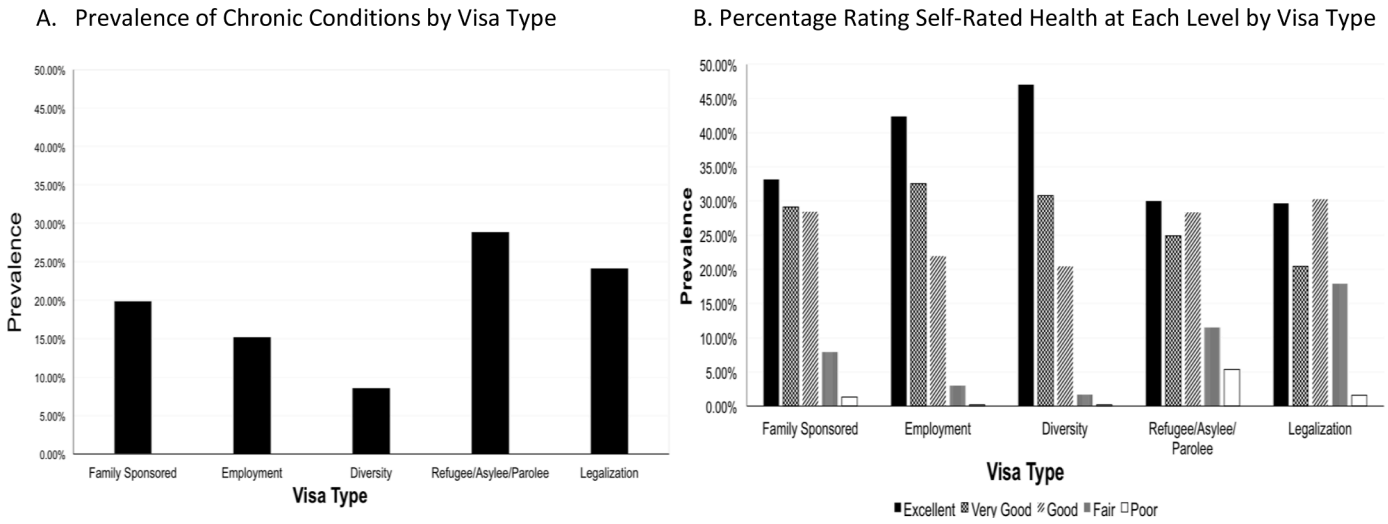

Fig. 2. Prevalence of at least one health condition and self-assessed overall health of foreign-born people at the point of receiving Legal Permanent Residence in the U.S.
A. Prevalence of Chronic Conditions by Visa Type B. Percentage Rating Self-Rated Health at Each Level by Visa Type.
Data Source: New Immigrant Survey, 2003

Table 2
Odds of fair or poor self-rated health and of having a chronic condition among foreign-born people at the time of gaining Legal Permanent Residence in the U.S.

	Self-Rated Health[a]				Any Chronic Conditions[b]			
Covariate	Odds Ratio	95% Confidence Interval		Sig[c]	Odds Ratio	95% Confidence Interval		Sig[c]
Visa Type (ref = Family Sponsored)								
Employment Preferences	0.82	0.55	1.22		1.05	0.84	1.31	
Diversity	0.50	0.31	0.81	**	0.65	0.49	0.87	***
Refugee/Asylee/Parolee	2.74	2.01	3.75	+	1.81	1.41	2.33	+
Legalization	1.94	1.42	2.65	+	1.58	1.21	2.06	***
Employment Status (ref = Employed)								
Unemployed, Seeking Work	1.02	0.75	1.39		1.24	1.00	1.53	*
Unemployed, Laid off/Leave/Disabled/Retired	3.11	2.15	4.49	+	1.83	1.35	2.50	+
Unemployed, Homemaker	1.15	0.86	1.54		1.60	1.28	2.00	+
Other	2.03	1.42	2.91	+	1.43	1.05	1.93	*
Sex (ref = Male)								
Female	1.37	1.10	1.71	**	1.34	1.14	1.58	***
Marital Status (ref = Married/Living with Partner)								
Separated/Divorced/Widowed	0.81	0.61	1.08		1.04	0.83	1.32	
Not married	1.04	0.77	1.39		1.31	1.06	1.61	*
Health Insurance Coverage (ref = Covered)								
Not Covered	0.94	0.76	1.15		0.71	0.61	0.83	+
Smoking Status (ref = Never Smoked)								
Smoker (ever)	1.22	0.97	1.53		1.45	1.22	1.72	+
Region of Origin (ref = Europe, Central Asia, America [Canada, Haiti, Guadeloupe])								
Latin America	0.99	0.70	1.39		1.01	0.78	1.31	
Africa and Middle East	0.67	0.42	1.06		1.04	0.78	1.39	
East Asia, South Asia, the Pacific, and Oceania	0.79	0.56	1.12		0.80	0.63	1.02	
U.S. Place of Residence (ref = West)								
South	0.91	0.70	1.18		0.79	0.65	0.96	*
East	0.61	0.48	0.78	+	0.78	0.65	0.93	**
Midwest	0.74	0.52	1.07		1.07	0.84	1.36	
Education (years)	0.90	0.88	0.92	+	1.01	0.99	1.02	
Age (years)	1.04	1.00	1.08		1.06	1.03	1.10	***
Age Squared (years^2)	1.00	1.00	1.00		1.00	1.00	1.00	
Time in U.S. (years since first arrival)	1.01	1.00	1.03	*	1.00	0.99	1.01	

n = 7972 New Immigrant Survey, 2003; results are from two survey-adjusted logistic regression models.

[a] Self-rated health status measured on scale where 1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor, converted to 1 = fair/poor, 0 = excellent/very good/good;.

[b] Diagnosed conditions of diabetes, high blood pressure, cancer, lung conditions, heart conditions, stroke, and arthritis included. Indicates if respondent has at least one condition.

[c] sig. represents level of significance where *$p < .05$, **$p < .01$,***$p < .005$,+$p < .001$.

Table 3
Odds of having at least one chronic condition among foreign-born people at the time of gaining Legal Permanent Residence in the U.S.

Covariate	Diabetes Odds Ratio[a]	95% Confidence Interval		High Blood Pressure Odds Ratio[a]	95% Confidence Interval		Lung Conditions Odds Ratio[a]	95% Confidence Interval		Stroke/Heart Conditions Odds Ratio[a]	95% Confidence Interval		Arthritis Odds Ratio[a]	95% Confidence Interval	
Visa Type (ref= Family Sponsored)															
Employment Preferences	1.16	0.72	1.86	1.06	0.78	1.44	1.11	0.72	1.70	0.35*	0.14	0.83	0.85	0.53	1.36
Diversity	0.98	0.53	1.79	0.72	0.47	1.10	0.58	0.32	1.03	0.39	0.12	1.24	0.62	0.32	1.19
Refugee/Asylee/Parolee	1.86*	1.14	3.02	1.68***	1.19	2.39	1.37	0.81	2.29	2.68***	1.51	4.75	1.89***	1.25	2.86
Legalization	1.45	0.90	2.35	1.52*	1.06	2.17	2.11***	1.32	3.39	2.72**	1.30	5.66	1.13	0.67	1.93
Employment Status (ref = Employed)															
Unemployed, Seeking Work	1.44	0.92	2.25	1.19	0.88	1.60	0.84	0.54	1.31	2.14*	1.18	3.88	0.98	0.64	1.49
Unemployed, Laid off/Leave/Disabled/ Retired	2.46+	1.56	3.87	1.80***	1.27	2.55	1.21	0.61	2.41	1.79	0.99	3.21	1.10	0.67	1.79
Unemployed, Homemaker	2.27+	1.48	3.47	1.75+	1.33	2.32	1.39	0.88	2.18	1.29	0.72	2.30	1.06	0.69	1.62
Other	2.48***	1.43	4.28	1.83***	1.23	2.71	0.71	0.36	1.41	1.62	0.79	3.33	1.13	0.65	1.95
Sex (ref= Male)															
Female	0.84	0.61	1.17	1.05	0.85	1.30	1.46*	1.05	2.02	1.17	0.79	1.75	1.96+	1.44	2.68
Marital Status (ref = Married/ Living with Partner)															
Separated/Divorced/ Widowed	0.99	0.69	1.41	0.92	0.70	1.19	1.36	0.78	2.39	1.11	0.71	1.75	1.34	0.98	1.83
Not married	1.04	0.66	1.65	0.94	0.69	1.29	1.88+	1.32	2.68	1.01	0.49	2.08	1.77**	1.15	2.70
Health Insurance Coverage (ref= Covered)															
Not Covered	0.72*	0.53	0.96	0.89	0.73	1.09	0.61***	0.44	0.83	0.54***	0.36	0.80	0.74*	0.56	0.99
Smoking Status (ref= Never Smoked)															
Smoker (ever)	0.94	0.66	1.33	1.25*	1.01	1.56	1.84+	1.31	2.59	1.30	0.87	1.93	1.53**	1.11	2.09
Geographic Region of Origin (ref=Europe, Central Asia, America [Canada, Haiti, Guadeloupe])															
Latin America	3.00+	1.77	5.11	0.95	0.67	1.34	0.85	0.51	1.41	0.52	0.27	1.00	0.56*	0.34	0.91
Africa and Middle East	3.07+	1.67	5.65	0.76	0.51	1.13	0.89	0.49	1.63	0.59	0.29	1.21	0.75	0.45	1.24
East Asia, South Asia, the Pacific, and Oceania	1.89*	1.09	3.26	0.73	0.53	1.01	0.89	0.55	1.44	0.69	0.39	1.22	0.66	0.43	1.01
U.S. Place of Residence (ref = West)															
South	0.78	0.54	1.12	0.93	0.72	1.20	0.97	0.67	1.40	0.84	0.50	1.40	0.88	0.61	1.28
East	0.72*	0.52	1.00	1.12	0.89	1.41	0.77	0.53	1.11	0.70	0.44	1.10	0.79	0.57	1.09
Midwest	0.88	0.55	1.42	1.08	0.78	1.51	0.90	0.55	1.48	1.48	0.79	2.76	1.13	0.72	1.80
Education (years)	0.99	0.96	1.01	1.00	0.98	1.02	1.04*	1.00	1.08	1.01	0.97	1.05	0.97*	0.94	1.00
Age (years)	1.21+	1.13	1.29	1.16+	1.11	1.21	0.95*	0.90	1.00	1.06	0.98	1.15	1.18	1.11	1.25
Age Squared (years^2)	1.00+	1.00	1.00	1.00***	1.00	1.00	1.00*	1.00	1.00	1.00	1.00	1.00	1.00***	1.00	1.00
Time in U.S. (years since first arrived)	1.01	0.99	1.02	1.00	0.99	1.01	1.01	0.99	1.03	0.99	0.97	1.01	1.01	1.00	1.03

$n = 7972$, New Immigrant Survey, 2003; results are from two survey-adjusted logistic regression models.
[a] Level of significance indicated beside odds ratio, where $*p < .05$, $**p < .01$,$***p < .005$,$+p < .001$.

the U.S., education, region of birth, region of residence in the U.S. smoking status, health insurance, marital status, sex, and employment status.

We hypothesized that those with refugee, asylee, and parolee visa types would have the worst health. We found that those with refugee, asylee, and parolee visa type were indeed in the worst health at the time of gaining legal permanent residence: they had the highest prevalence of any chronic condition and were most likely to report being in fair or poor self-rated health, even after controlling for age, employment, health insurance, and other characteristics. This finding is consistent with their designation of vulnerability (United Nations High Commissioner for Refugees, 2020). These groups are frequently exposed to trauma before arriving in the U.S. (Betancourt et al., 2017), and these experiences may negatively impact health.

We also found that those who gained permanent residence with legalization from other visa types after residing in the U.S. commonly reported fair or poor health; they also were most likely to have diagnosed chronic conditions compared with other immigrants. Because legalization visa holders resided in the U.S. as undocumented residents or non-immigrant aliens, often for years, it is possible that they were unable to access health care and may have lived in difficult conditions. People who are not legal permanent residents do not qualify for Medicare or Medicaid, even for emergency use (Brooks et al., 2017). Furthermore, non-permanent residents are often not authorized to work in the U.S. or have restrictions on where and for how long they can work (U.S. Customs and Immigration Services, 2020b). As a result, many legalization visa holders have limited job mobility and are unable to obtain a fair salary before gaining permanent residence (Enchautegui, 2013). In addition, many may experience difficult circumstances and lack of access to healthcare before entering the U.S. This group and those with refugee, asylee and parolees status most commonly had chronic conditions; they also likely had low access to health and therefore are more likely to not be diagnosed. Thus, it is possible that their health is even worse than documented in this study.

Diversity immigrants were in the best health: they were most likely to have high self-rated health and had the lowest prevalence of chronic

conditions. To qualify for the diversity visa type, one must have at least a high school diploma and two years of work experience in a profession that requires at least two years of training (U.S. Department of State, 2019). Diversity visa holders must additionally have financial means to travel and to live in the U.S. prior to being granted permanent resident status (U.S. Department of State, 2019). The health advantages of diversity visa holders were robust to controlling for education and employment status in the US; still, other characteristics that may explain their good health were not available, such as professional prestige or socioeconomic status before migration.

Women had worse self-rated health and a higher odds of chronic conditions, and their odds of arthritis was the highest of all individual conditions. The worse rating of health by women is consistent with other studies, as is the higher rate of arthritis (Boerma et al., 2016). Overall, immigrants living on the East Coast had significantly better health than those living in other census regions in the U.S., even after accounting for country of origin and socioeconomic status, while the West coast had the lowest self-rated health.

We note some strengths and limitations of this study. The New Immigrant Survey was conducted in 2003 and several changes in immigration have occurred since. Still, the prevalence of chronic disease has increased during this time, and the social and political challenges faced by immigrants also have been exacerbated. Many of the immigrants resettling in the U.S. in or near 2003 are still residing in the U.S. and their health contributes to the health of the U.S. population. The analysis accounts for some of the characteristics that changed for more recent migrant cohorts, such as countries of origin. If these characteristics are indeed thoroughly accounted for, associations of health and visa would still be present, even if the population of migrants has changed. For example, people who arrived on refugee visas in the late 1990s may be from different countries than those arriving on refugee visas today, but, even when adjusting for education, region of origin, and other characteristics, these findings suggest that refugees will still have a higher prevalence of chronic conditions than immigrants with other visa types.

The New Immigrant Survey had a response rate of 69% and post-stratification survey weights were created to adjust for these. Because sampled participants were contacted using information from green card applications, it is possible that some people could not be contacted due to moving to a new residence. Still, the New Immigrant Survey is the only study that is nationally representative of foreign-born people permanently residing in the U.S. It is the only study that has information about visa type and is large enough to allow for analyses of visa type and health: other U.S. studies, even when they include immigrants, do not include visa information.

Another limitation is that information on chronic conditions was self-reported. Some behavioral variables, like smoking, may not provide sufficeint detail to examine their roles.

Prior studies have reported differences in individuals' health across countries (National Research Council and Committee on Population, 2004), we account for some of this heterogeneity in immigrant health by controlling for region of birth. We are able to account for region but not country since our dataset included participants from over 100 countries. While we may be combining people with different experiences, we are able to somewhat disentangle visa type from country of residence.

Differences in health across visa type may originate from pre-migration exposures, such as exposure to war and socioeconomic circumstances, from experiences of reaching the U.S., such as safety and duration of travel routes and stop-overs, and from experiences after arrival, such as access to jobs, to health care, and feelings of inclusion or discrimination. We could not determine whether differences in health are attributed to experiences prior to migration, during migration, or after resettlement in the U.S.

The findings only pertain to foreign-born adults who were granted LPR. Foreign-born people without LPR likely have different health from the study population described here, and this study cannot provide information about their health; nor are we able to compare our study population to the U.S.-born people.

7. Conclusion

This research has highlighted how visa type is associated with overall health and chronic disease among foreign-born people resettled in the U. S. Differences by race, ethnicity, and country of origin have been well documented already, but we have now shown that visa type is additionally important and additionally relates to disparities in health. Refugees, asylum seekers, and people who have been living in the U.S. undocumented and later gained legalized status were at higher risk of poor health and of chronic diseases than other foreign-born people. It will be important to understand whether elevated risks of chronic conditions originate from stress and low access to resources after arrival in the U.S., or whether they are linked with conditions prior to migration. Disparities in immigrant health can be understood as contributing to the already substantial societal disparities in health and health care costs among native-born people; immigrant disparities must be understood and addressed to improve health in the U.S.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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