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BRIEF NOTE

The Health of Immigrants to New York City From Mainland China: Evidence From the New York Health Examination and Nutrition Survey

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Very little is known about the newest New Yorkers of Chinese heritage, the largest and fastest growing immigrant group in the city. This article compares measures of the health of immigrants to New York from Mainland China to the health of other New Yorkers of Asian heritage along with all other New Yorkers. We did so using the 1,999 subjects in the 2004 New York Health and Nutrition Examination Survey, controlling for age and gender. We found that New Yorkers born in Mainland China have a lower body mass index, a smaller waist circumference, a more sexually conservative lifestyle, highly favorable high-density lipoprotein profiles, and lower rates of herpes II infection. However, they also have higher blood levels of lead, cadmium, and mercury than either reference group. This article provides the first study of the health needs of New York's largest and most rapidly growing immigrant group.

KEYWORDS *emigrants, immigrants, Chinese Americans, Asian Americans, health status disparities, health status*

People of Chinese ancestry first began to arrive in New York in the late nineteenth and early twentieth century (Kwong, 2002; Takaki, 1989; Yung, 1995; Zhou, 2009). It is believed that New York served as a multicultural refuge, where it was possible for Chinese Americans to blend in and escape persecution. After the Immigration and Nationality Act of 1965, Chinese New Yorkers came of their own, eventually forming large communities in Manhattan, Queens, and Brooklyn (Logan, Zhang, & Alba, 2002; Zhou, 2009).

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Immigrants from China represent the largest and most rapidly growing immigrant group in the city (U.S. Census Bureau, 2010), but almost nothing is known about their health needs.

The vast majority of recently arrived Chinese New Yorkers have their origins in Fujian Province of China, and many are undocumented (Kwong, 2002; Zhou, 2009). In this article, we explore the social attributes, behavioral risk factors, and overall health of these newest New Yorkers using the New York City Health and Nutrition Examination Survey (NYC HANES).

METHODS

The 2004 NYC HANES includes a representative, weighted sample of participants residing within New York City who are age 20 and older (Thorpe et al., 2006). It was modeled after the National Health and Nutrition Examination Survey, and was conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS, 2011). After participants were selected, they were enrolled and examined at a health center in New York City where they were administered a comprehensive health interview, they were examined, and blood and laboratory values were obtained. The analytic sample included 1,999 participants. All subjects in the analytic sample were included.

Our study focuses on persons born in Mainland China ($n = 87$). Those born in Taiwan, Hong Kong, and Macau were excluded because these groups tend to be wealthier and to have lived for a longer time in New York City. Our two comparison groups include all New Yorkers not born in Mainland China ($n = 1,912$) and a subgroup of those New Yorkers identifying as Asians ($n = 173$). All analyses were conducted using Stata 11.0 (StataCorp College Station, TX) and were weighted to produce representative estimates of the New York City adult population. We examined differences in medical examination outcomes using linear regression models (for continuous data) or logistic models (for dichotomized data) adjusted for age and gender. Education produced relatively little effect in the models, and was not included as a covariate. We used two regression models to compare New Yorkers born in Mainland China to all New Yorkers and Asian New Yorkers, as these reference groups are not mutually exclusive. Length of time in New York was not available as a variable for foreign-born Chinese.

RESULTS

There were 87 subjects who were born in China, 173 Asian New Yorkers, and 1,912 other New Yorkers available for analysis. While the majority Asian

TABLE 1 Demographic Characteristics of Study Participants

Participant demographics	Born in mainland China	All other Asian race	All other New Yorkers
Descriptive characteristics	<i>n</i> = 87	<i>n</i> = 173	<i>n</i> = 1,912
Female (%)	49.3	57.8	54.0
Age (mean)	43.5	41.8	45.7
18–29 years (%)	19.7	19.8	19.8
30–49 years (%)	42.1	43.0	43
50+ years (%)	38.2	37.0	37.2
Socioeconomic characteristics			
Less than high school education (%)	50.4	20***	26.2***
High school education (%)	24.5	15.4	19.1
More than high school education (%)	25.1	64.6***	53.2***
Income above \$20,000 per year (%)	46.1	70.7**	69 ***
Anyone to help with financial support (%)	74.0	73.9	77.6
Access to healthcare			
Insured (%)	72.2	67.7	79.3
Has access to routine healthcare (%)	80.5	61.1**	75.2
Ever had colonoscopy/sigmoidoscopy (>50 years old) (%)	25.8	43.5	51.8*
Self-reported risk factors			
Sedentary lifestyle (%)	27.8	25.2	22.4
Drinks alcohol heavily (%)	14	25.2	31.2***
Self-reported health status			
Excellent (%)	6.4	8.3	9.7
Very good (%)	15.5	22.5	26.2
Good (%)	46.6	48.1	39.0
Fair (%)	29.8	16.8	21.8
Poor (%)	1.7	4.3	3.3

p* < .05. *p* < .01. ****p* < .001.

New Yorkers and other New Yorkers are female, the majority of those born in China are male (Table 1). Those born in Mainland China are also less likely to have a high school education, tend to have a lower income, and tend to have somewhat higher access to routine health care. The one measure of social capital, self-reporting having someone who might lend financial support, was similar across all three groups.

Relative to all other New Yorkers, New Yorkers born in Mainland China were one third as likely to report having a high school education or higher (OR = 0.32; *p* < .001) or to have an income over \$20,000 (OR = 0.36; *p* < .01) adjusting for age and gender (Table 2). They were also one fifth as likely to have ever taken oral contraceptives (OR = 0.22; *p* < .001) and were nearly eight times as likely to have initiated intercourse after age 15 (OR = 7.89; *p* < .01). But they were twice as likely to report having had an influenza vaccination (OR = 1.95; *p* < .01). With respect to adjusted medical examination data (Table 3), those born in Mainland China rated 4.5 points

TABLE 2 Odds Ratios for Self-Report Health History Data for Immigrants to New York From Mainland China Relative to Other Asian New Yorkers and Other New Yorkers in General After Adjusting for age and Gender: 2004 New York City Health and Nutrition Examination Survey

Participant demographics	Asian New Yorkers OR (95% CI)	All New Yorkers OR (95% CI)
Socioeconomic characteristics		
High school education or higher	0.22*** (-2.14, -0.85)	0.32*** (-1.63, -0.67)
Income above \$20,000 per year	0.36** (-1.63, -0.42)	0.36*** (-1.52, -0.52)
Insured ^a	1.24 (-0.33, 0.77)	0.71 (-0.78, 0.098)
Access to routine healthcare ^b	2.43* (0.13, 1.64)	1.22 (-0.44, 0.84)
Mental health status		
Current depression diagnosis ^c	0.97 (-1.85, 1.78)	0.44 (-2.32, 0.67)
Lifetime depression diagnosis ^d	0.97 (-1.29, 1.22)	0.43 (-1.91, 0.24)
Experienced confusion or memory problems	0.69 (-1.56, 0.82)	0.87 (-1.18, 0.90)
Has more than five close friends	0.85 (-0.82, 0.49)	0.75 (-0.83, 0.27)
Sexual history		
Age at first sexual intercourse >15 years old	2.25 (-0.82, 2.45)	7.89** (0.69, 3.44)
Ever had same sex partner ^e	1.63 (-1.91, 2.89)	1.05 (-1.92, 2.03)
Ever taken birth control pill	0.55 (-1.50, 0.29)	0.22*** (-2.27, -0.73)
Vaccination history		
Received hepatitis B 3-dose series	0.77 (-0.90, 0.38)	1.02 (-0.60, 0.63)
Had flu shot past 12 months	2.06* (0.076, 1.37)	1.95** (0.21, 1.13)
Other		
Ever had colonoscopy (>50 years old)	0.50 (-1.94, 0.54)	0.40 (-1.95, 0.10)
Sedentary lifestyle ^f	1.15 (-0.50, 0.77)	1.21 (-0.23, 0.61)
Physical limitations to working	0.77 (-1.11, 0.58)	0.87 (-0.79, 0.51)
Self-reported excellent health status	0.64 (0.35, 1.17)	0.62* (-0.91, -0.056)

^aIncludes health insurance obtained through employment or purchased directly as well as government programs like Medicare, Medicaid, and military health care/VA that provide medical care or help pay medical bills. ^bParticipant has a regular place to go for healthcare. ^cCurrent diagnosis established during the interview using World Health Organization's Composite International Diagnostic Interview. ^dLifetime diagnosis based on doctor or other health care professional ever telling the participant that he/she is depressed. ^eParticipant has, at any point in his or her life, had a sexual partner of the same gender. ^fParticipant does not stand or walk about a lot during the day, carry or lift things very often, or climbs stairs or hills often.

* $p < .05$. ** $p < .01$. *** $p < .001$.

lower with respect to body mass index (BMI), a waist circumference that was 11cm smaller ($p < .001$), had a higher high-density lipoprotein (HDL, or "good" cholesterol) by 5mg/dl ($p < .001$), and were nearly one fifth as likely to have a positive herpes II test result relative to other New Yorkers ($p < .001$). On the other hand, they were more likely to have elevated blood lead levels, cadmium levels, and mercury levels.

TABLE 3 Differences in Medical Examination and Laboratory Data Between Immigrants to New York from Mainland China Relative to Other Asian New Yorkers and Other New Yorkers in General After Adjusting for Age and Gender: 2004 New York City Health and Nutrition Examination Survey

	Other Asian New Yorkers (95% CI)	All New Yorkers (95% CI)
Average body mass index (kg/m ²)	-2.2*** (-3.3, -1.2)	-4.5*** (-5.7, -3.2)
Average waist circumference (cm)	-5.7*** (-8.3, -3.2)	-11.0*** (-13.8, -8.1)
Average plasma glucose (mg/dL) ^a	-5.7 (-14.8, 3.2)	0.6 (-6.1, 7.4)
Average glycohemoglobin (%) ^b	-0.22 (-0.48, 0.00)	0.03 (-0.17, 0.23)
Total cholesterol (mg/dL) ^c	3.1 (-8.0, 14.3)	7 (-1.8, 15.8)
High density lipoprotein cholesterol (mg/dl) ^c	6.5** (2.4, 10.6)	5.0** (1.4, 8.5)
Low density lipoprotein cholesterol (mg/dl) ^c	-5.6 (-17.3, 6.4)	-2.5 (-11.8, 7.0)
Triglycerides (mg/dl) ^c	-7.1 (-33.9, 18.4)	4.7 (-15.8, 25.1)
Average systolic blood pressure (mm Hg)	-2 (-5.5, 1.7)	-2.1 (-5.2, 1.0)
Average diastolic blood pressure (mm Hg)	0.56 (-2.1, 3.4)	0.62 (-1.7, 3.0)
Cotinine (ng/mL) ^d	1.3 (-24.3, 27.2)	-8 (-31.5, 16.0)
Lead (ug/dL) ^e	0.44 (-0.02, 0.86)	0.81*** (0.41, 1.20)
Cadmium (ug/L) ^e	0.60*** (0.39, 0.80)	0.69*** (0.55, 0.83)
Mercury, total (ug/L) ^e	5.3*** (3.7, 6.8)	6.6*** (5.7, 7.5)
Odds ratio (reference is Born in Mainland China)		
Herpes I diagnosis ^f	5.64** (0.61, 2.85)	5.85*** (0.80, 2.73)
Herpes II diagnosis ^f	0.42 (-1.93, 0.19)	0.22*** (-2.31, -0.71)

^aPlasma glucose concentration was measured using an enzymatic reaction. ^bHbA1C was measured on whole blood with an ion-exchange high-performance liquid chromatography (HPLC) method. ^cFasting levels. Serum cholesterol and triglycerides were measured enzymatically using commercial reagents. ^dSerum cotinine levels were measured using an isotope dilution, liquid chromatography, tandem mass spectrometry method. ^eTested using inductively coupled plasma mass spectroscopy (ICP-MS). ^fSerum samples were analyzed for antibodies to HSV-1 and HSV-2 using type-specific immunodot assays.

* $p < .05$. ** $p < .01$. *** $p < .001$.

CONCLUSIONS

New Yorkers who were born in Mainland China have a more favorable mental, cardiac, and reproductive health profile than other New Yorkers, but higher exposures to heavy metals. The diet among Chinese New Yorkers is heavy in vegetables and seafood, which may both explain the lower cardiac risk profile and the higher exposure to mercury (Newman & Linke, 1982; Porterfield, 1951). Cadmium and lead can persist in the body for decades, and may reflect exposures within China (Centers for Disease Control and Prevention, n.d.). However, recent exposures to lead could occur via traditional medicines that contain lead (Ernst, 2002). While lead tends to be sequestered in the bones, on average, those with significant early life lead exposures could plausibly have higher average blood lead levels due to leeching.

Relative to other New Yorkers, those born in China appear to be sexually conservative. They are much less likely to report an early age of intercourse

or to use birth control pills. This self-report data is supported by laboratory measures of herpes II (most often genital), with prevalence that is one fifth of the average New Yorker.

These differences are not likely attributable to less access to health care, as those born in China had comparable or better access to health care than other New Yorkers. This is likely attributable to the extensive outreach provided to Chinatown communities and the presence of clinics that provide free or subsidized care, such as the Charles B. Wang Health Center.

At present, there are no other medical examination studies of Chinese groups within the United States with which to compare New York's Chinese immigrant population. Studies from within Mainland China suggest that urban dwellers in China share more in common with native-born New Yorkers with respect to health risks than they do to Chinese immigrants to New York City (Fang, Chen, & Rizzo, 2009; Hannum, 2002; Ho et al., 2010; Liu, Hsiao, & Eggleston, 1999; Wang & Zhou, 2010; Weng et al., 2007; Wu, 2006).

The primary limitation of the NYC HANES data lies in the self-report portion of the medical interview. Cross-cultural differences in norms or perceived stigma can plausibly skew results in either direction. In addition, sample sizes were too small to detect anything less than a moderate effect size for some measures. Finally, we did not have an adequate measure of acculturation available to us. This variable would have allowed us to present the reader with a sense of how different levels of exposure to the United States might influence health. However, the majority of Chinese immigrants arrived to New York City within the past 10 years and reside in enclaves in Manhattan's Chinatown, Brooklyn's Sunset Park Chinatown, and Queen's Elmhurst and Flushing neighborhoods (U.S. Bureau of the Census, 2010).

The superior health status of lower-income immigrant groups has been hypothesized to be related to social cohesion (Franzini, Ribble, & Keddie, 2001). The target population in this sample had similar numbers of friends or people in their social network who could lend financial support, a finding congruent with a previous report (Osypuk, Diez Roux, Hadley, & Kandula, 2009). Rather, good health markers (e.g., highly favorable cholesterol profiles) in the face of poverty and low educational attainment may well be explained by a favorable behavioral risk profile. While there is cause for concern regarding heavy metal exposure, the future looks bright for New Yorkers who were born in Mainland China.

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