

Family History of Cancer

Is It an Accurate Indicator of Cancer Risk in the Immigrant Population?

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BACKGROUND. Patients' self-reports of family history of cancer influence physician cancer screening recommendations. Little is known about rates of reporting a family history of cancer in the immigrant population.

METHODS. The study used a nationally representative probability sample of adults, 18 years of age and older, living in the United States (N = 5010) who had responded to the 2005 Health Information Trends Survey (HINTS). Likelihood of reporting a family history of cancer was examined as a function of nativity status (foreign-born vs US-born) and control variables.

RESULTS. Immigrants were approximately one-third as likely as nonimmigrants to report a family history of cancer (odds ratio [OR], 0.35; 95% confidence index [95% CI], 0.25–0.48) after controlling for sociodemographic and cancer knowledge variables.

CONCLUSIONS. When healthcare providers are assessing cancer risk and making screening recommendations, they should take into account that among foreign-born patients, and especially nonwhite foreign-born patients, self-reported family history of cancer (FHC) may misrepresent their cancer risk. Failure to account for low rates of reporting FHC among immigrants could inadvertently contribute to existing disparities in cancer screening and use of genetic testing by immigrants and ethnic minorities. *Cancer* 2008;112:399–406. © 2007 American Cancer Society.

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Guidelines recommend earlier and/or more frequent screening for individuals with a family history of breast, ovarian, colorectal, prostate, and skin (melanoma) cancers.¹ Consequently, self-reported family history of cancer (FHC) is associated with screening recommendations by providers^{2–4} and screening behavior.^{5–7} Furthermore, with advances in genetic medicine, patients' FHC is becoming increasingly consequential to the allocation of healthcare services, including genetic testing and prophylactic interventions offered to high-risk individuals. In short, a person's knowledge and reporting of FHC impacts access to cancer prevention and screening services.

There is considerable variability in the accuracy with which individuals report FHC. Under-reporting is far more common than over-reporting, with sensitivities ranging from less than 50% to as high as 98% depending on cancer site.⁸ The gold standard for evaluating the accuracy of family history reports has been to verify self-reports with tumor registries, hospital records, or personal contact with affected relatives. Studies that use this approach have typically been limited to small, convenience samples not well suited to exam-

ining population-level predictors such as sociodemographic characteristics.^{9-11,12,13} Consequently, little is known about the characteristics of subpopulations more or less likely to know their FHC.

One group known to face numerous barriers to healthcare, including low rates of cancer screening, is immigrants.¹⁴⁻¹⁶ More than 12% of the documented US population is foreign-born.¹⁷ To date, little is known about FHC reporting by immigrants living in the United States. To address this gap, we investigated the likelihood of reporting an FHC by immigrants and nonimmigrants in a nationally representative sample.

MATERIALS AND METHODS

Sample

Data for this study were obtained from the 2005 Health Information Trends Survey (HINTS). HINTS was conducted to survey patterns in health information seeking, cancer knowledge, and health behavior.¹⁸ The survey was administered to a nationally representative probability sample of 5586 households who had telephones. Response rates were 34.0% for the screener questionnaire and 61.2% for the full interview. Although not optimal, the response rates were consistent with those of other recent studies that have used random-digit dialing.¹⁹ After the initial telephone screening, the survey was conducted either via telephone or the Internet. Respondents elected to complete the survey in English or Spanish (5.3%). Respondents were excluded from the present study if they were missing data on any of the study variables; the final sample included 5010 (90.0%) respondents.

Variables

Respondents were classified according to whether they reported 1 or more family members with a history of cancer or no family members with a history of cancer. To ascertain family history of cancer, respondents were asked, "Have any of your family members ever had cancer?" The main independent variable was nativity, that is, whether a participant was born in the United States or in a foreign country. Two sets of explanatory variables were included in our analyses. First, we included sociodemographic variables found in previous research to be associated with differences in FHC reporting (race/ethnicity, sex, age, education).^{11,20-22} We included marital status, reasoning that unmarried individuals may interact less with family members than married individuals and, thus, be less knowledgeable of their family history of disease. We also included healthcare

coverage, as individuals with a regular source of care may be more aware of the importance of familial risk and more likely to seek information about their FHC. Respondents were asked to identify themselves as non-Hispanic white, non-Hispanic black, Hispanic, Asian, or Pacific Islander. For the sake of simplicity, respondents will hereafter be described as white, black, Hispanic, or Asian/Pacific Islander. Income was correlated with education (Spearman $r = 0.50$; $P < .001$). A sizeable proportion (14.1%) of the sample did not have a response for income; therefore, education rather than income was included in the analyses. Second, we included explanatory variables potentially associated with differences in a person's knowledge of family history or knowledge of the importance of family history as a risk factor for cancer (whether the participant had been diagnosed with cancer her/himself, whether the participant had ever sought out information about cancer, and whether the participant has family and friends with whom he/she talks about his/her health).

Data Analysis

All analyses were weighted to produce nationally representative estimates; however, it should be noted that because of small sample size, results for the Asian/Pacific Islander group may not be generalizable to the US population. Differences in the distribution of categorical explanatory variables by nativity status (US-born vs foreign-born) were assessed for statistical significance by chi-square tests, generating 2-sided P -values (Table 1). Differences in the continuous variable, age, were assessed for statistical significance by Student t test. For descriptive purposes, bivariate logistic regression analyses were conducted to assess associations between each of the independent variables and reporting family history of cancer. Next, we tested 3 nested multiple logistic regression models. Model 1 contained nativity status and race/ethnicity. Model 2 contained Model 1 variables and sociodemographic variables. Model 3 contained Model 2 variables and knowledge variables. The inclusion of explanatory variables was staged in this manner to assess the contribution of each category of variables to the association between nativity status and reporting an FHC. Finally, analyses were performed within the foreign-born group to determine whether several variables frequently used as indices of acculturation were associated with reporting an FHC (age at immigration, years in the United States, comfort with English).^{23,24} Another aspect of acculturation is integration into American institutions, including the healthcare system. Immi-

TABLE 1
Weighted Estimates of Characteristics of US-born and Foreign-born Respondents

Characteristics	No.*	% Total Sample (95% CI), N = 5010	% US-born (95% CI), n = 4468	% Foreign-born (95% CI), n = 542	P
Race					<.001
White	3987	72.9 (71.0–74.8)	82.0 (80.2–83.8)	16.9 (13.1–20.8)	
Black	424	10.5 (9.2–11.8)	11.4 (9.9–12.9)	5.0 (2.5–7.5)	
Hispanic	484	13.6 (12.1–15.1)	5.5 (4.4–6.6)	63.4 (5.8–6.9)	
Asian and Pacific Islander	115	3.0 (2.3–3.6)	1.1 (0.6–1.5)	14.7 (11.0–18.5)	
Mean age		45.3 (44.6–46.0)	46.1 (45.4–46.9)	40.4 (38.6–42.1)	<.001
% Female	3301	52.5 (50.4–54.5)	52.5 (50.3–54.6)	52.5 (46.7–58.3)	.99
Marital status					.08
% Married	2928	64.9 (62.9–66.9)	64.1 (62.0–66.2)	69.6 (63.9–75.3)	
% Previously married	1398	15.4 (14.2–16.6)	16.1 (14.9–17.4)	10.9 (7.9–14.0)	
% Never married	684	19.7 (17.7–21.7)	19.8 (17.7–21.9)	19.4 (13.9–25.0)	
Education					<.001
<High school	601	13.8 (12.3–15.2)	10.2 (8.9–11.5)	35.6 (30.1–41.2)	
High school	1360	30.1 (28.3–32.0)	31.3 (29.3–33.3)	22.9 (17.9–27.9)	
Some college	1434	31.8 (29.9–33.8)	33.8 (31.7–35.9)	19.5 (14.4–24.6)	
College	1615	24.3 (22.7–25.8)	24.7 (21.3–26.3)	21.9 (17.7–26.1)	
Has health care coverage	4422	83.6 (82.0–85.3)	88.0 (86.5–89.5)	56.7 (50.8–62.7)	<.001
Has family and friends to talk to about health	4166	80.1 (78.4–81.8)	80.3 (78.5–82.1)	78.7 (74.0–83.4)	.52
Has sought information about cancer in the past	2692	49.9 (47.9–51.9)	52.8 (50.6–54.9)	32.4 (27.4–37.5)	<.001
Has personal history of cancer	781	11.4 (10.3–12.4)	12.6 (11.4–13.7)	4.2 (2.4–6.0)	<.001
Has family history of cancer		71.9 (70.1–73.7)	76.7 (75.0–78.5)	42.3 (36.7–47.9)	<.001

* Unweighted numbers.

grants have low rates of healthcare coverage, which improve with length of time in the United States and a transition to US citizenship.²⁴ We tested whether, among immigrants, healthcare coverage was associated with likelihood of reporting an FHC. Analyses were performed using Stata 9.1 (StataCorp, College Station, Tex).

RESULTS

Univariate and Bivariate Analyses

Characteristics of the sample as a function of nativity are presented in Table 1. Hispanic and Asian/Pacific Islander respondents were more likely to be foreign-born than white or black respondents ($P < .001$). Foreign-born respondents were slightly younger, reported less income, and had less education than their US-born counterparts ($P_s < .001$). Compared with US-born respondents, foreign-born respondents were less likely to report having insurance, having sought information about cancer in the past, and having a personal history of cancer ($P_s < .001$). Table 2 presents the bivariate relations between each of the predictor variables and reporting an FHC. With the exception of personal history of cancer, all variables were significant bivariate predictors of reporting an FHC.

Multiple Logistic Regression Analyses

Predictors of reporting family history of cancer

Table 2 contains the odds ratios associated with each of the independent variables included in Models 1–3. Results for the final, adjusted model (Model 3) indicate that there were several independent predictors of reporting an FHC. Foreign-born respondents were almost a third as likely as US-born respondents to report an FHC (odds ratio [OR], 0.35; 95% confidence interval [CI], 0.25–0.48). Respondents who had been previously married but were now single or who had never been married had slightly lower odds of reporting an FHC than respondents who were married (OR, 0.79; 95% CI, 0.62–0.99 and OR, 0.72; 95% CI, 0.55–0.94, respectively). Female respondents had greater odds of reporting an FHC than male respondents (OR, 1.20; 95% CI, 1.00–1.45), and respondents with healthcare coverage had greater odds of reporting an FHC than those without healthcare coverage (OR, 1.47; 95% CI, 1.10–1.95). Respondents who reported having family and friends with whom to talk about their health had higher odds of reporting an FHC than people who did not report these relationships (OR, 1.27; 95% CI, 1.00–1.60). Finally, those who reported having sought information about cancer were more likely to report an FHC than people who had not sought cancer information (OR, 2.41; 95%

TABLE 2
Odds Ratios (OR) for Reporting Family History of Cancer

Characteristic*	Unadjusted OR (95% CI)	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Foreign-born	0.22 (0.17–0.28) [†]	0.32 (0.23–0.44) [†]	0.35 (0.25–0.49) [†]	0.35 (0.25–0.48) [†]
Race				
Black	0.69 (0.51–0.94) [‡]	0.72 (0.53–0.98) [‡]	0.79 (0.58–1.08)	0.82 (0.59–1.12)
Hispanic	0.27 (0.21–0.36) [§]	0.55 (0.39–0.76) [†]	0.63 (0.44–0.89) [‡]	0.71 (0.50–1.01)
Asian and Pacific Islander	0.32 (0.20–0.50) [†]	0.67 (0.39–1.13)	0.59 (0.34–1.01)	0.57 (0.33–0.98) [‡]
Age	1.01 (1.00–1.01) [§]	—	1.00 (0.99–1.00)	1.00 (0.99–1.00)
Female	1.35 (1.13–1.61) [§]	—	1.37 (1.14–1.64) [†]	1.20 (1.00–1.45) [‡]
Marital status				
Previously married	0.84 (0.68–1.04)	—	0.73 (0.58–0.91) [§]	0.79 (0.62–0.99) [‡]
Never married	0.67 (0.52–0.88) [§]	—	0.69 (0.53–0.91) [§]	0.72 (0.55–0.94) [‡]
Education				
High school	1.96 (1.48–2.60) [†]	—	1.23 (0.91–1.66)	1.10 (0.81–1.50)
Some college	2.29 (1.71–3.07) [†]	—	1.37 (1.00–1.87)	1.10 (0.80–1.52)
College	2.03 (1.54–2.67) [†]	—	1.14 (0.83–1.56)	0.85 (0.61–1.18)
Has health care coverage	2.51 (1.96–3.22) [†]	—	1.57 (1.19–2.08) [§]	1.47 (1.10–1.95) [§]
Family and friends to talk to about one's health	1.59 (1.28–1.99) [†]	—	—	1.27 (1.00–1.60) [‡]
Sought information about cancer in the past	1.65 (1.40–1.95) [†]	—	—	2.41 (1.99–2.92) [†]
Personal history of cancer	1.21 (0.96–1.45)	—	—	0.79 (0.61–1.02)

* The referent groups were white for race; married for marital status, and <high school for education.

[†] $P \leq .001$

[‡] $P \leq .05$

[§] $P \leq .01$

CI, 1.99–2.92). The only race/ethnic group that was significantly less likely to report an FHC than whites was Asian/Pacific Islander (OR, 0.57; 95% CI, 0.33–0.98).

On average, immigrants were younger in age than nonimmigrants (mean = 40.39 years vs 46.14 years). It is possible that an association between younger age and lower FHC reporting can explain the effect of nativity on FHC reporting. The effect of nativity on FHC reporting did vary as a function of age [$F(1, 5009) = 4.24$] ($P = .04$). However, use of a mean split to divide the sample into a younger (≤ 45 years) and an older (>45 years) group then refitting the adjusted model to the 2 groups revealed that foreign-born respondents in either group were less likely than their US-born counterparts to report an FHC. Compared with younger US-born respondents, the adjusted odds of younger foreign-born respondents reporting an FHC was 0.25 (95% CI, 0.17–0.36). The odds of older foreign-born respondents reporting an FHC compared with older US-born respondents was 0.33 (95% CI, 0.23–0.48).

Do control variables account for the effect of nativity on reporting family history of cancer?

The nativity effect was attenuated by sociodemographic factors but not by knowledge factors. With the addition of race/ethnicity (Model 1), the differ-

ence in odds, compared with US-born individuals, of foreign-born individuals reporting an FHC was attenuated by 45.3%. When the remaining sociodemographic variables were added (Model 2), the odds of foreign-born individuals reporting an FHC, compared with US-born individuals, were attenuated by an additional 9.5%. The addition of variables potentially associated with knowledge of FHC or the importance of FHC as a risk factor (Model 3) resulted in no change in the odds ratio associated with nativity.

Race/Ethnicity

Previous research has demonstrated lower FHC reporting among blacks, Hispanics, and Asians compared with whites.²⁰ A critical question is whether race/ethnicity remains an independent predictor after statistically controlling for other sociodemographic variables and, in particular, after controlling for nativity. With the addition of nativity, the odds of blacks and Hispanics reporting an FHC were still significantly lower compared with whites, although the odds were much attenuated. The differences in the odds of blacks, Hispanics, and Asians/Pacific Islanders reporting an FHC compared with whites were diminished by 4.1%, 100.2%, and 112.2%, respectively. In the final model (Model 3), the only race/ethnic group less likely to report an FHC than whites was Asian/Pacific Islander (OR, 0.57; 95% CI, 0.33–0.98).

Are nativity effects found in all race/ethnic groups?

We were interested in whether the effect of nativity on reporting an FHC could be found in each race/ethnic group. The interaction between race and nativity status was marginally significant after accounting for all Model 3 independent variables, $f(3, 5007) = 2.22$; $P = .08$. Follow-up analyses revealed that the adjusted effect of being foreign-born on family history of cancer reporting was significant for all categories of race/ethnicity. Odds ratios for the 4 groups by race were as follows: white = 0.58 (95% CI, 0.35–0.96), black = 0.14 (95% CI, 0.04–0.47), Hispanic = 0.26 (95% CI, 0.14–0.47), and Asian/Pacific Islander = 0.10 (95% CI, 0.02–0.40). It should be noted, however, that results for blacks and Asians/Pacific Islanders are based on extremely small samples (as few as 28 respondents) and should be interpreted with caution.

Acculturation and reporting family history of cancer

We were also interested in whether, among foreign-born respondents, indices of acculturation (age at immigration, years in the US, self-reported comfort with English, and insurance coverage) accounted for variability in FHC reporting. Neither age at immigration nor years in the United States was a significant predictor of FHC reporting ($P_s = .15-.52$). Comfort with English was a significant bivariate predictor of FHC reporting (OR, 1.34; 95% CI, 1.10–1.62); however, when sociodemographic and knowledge-related variables were added to the model, comfort with English no longer predicted likelihood of FHC reporting (OR, 1.20; 95% CI, 0.93–1.54). Healthcare coverage was not a significant predictor of FHC reporting by foreign-born respondents (OR, 1.48; 95% CI, 0.91–2.39).

DISCUSSION

Foreign-born respondents were less likely to report an FHC than individuals born in the United States. Even after controlling for race/ethnicity, several other sociodemographic variables, and cancer knowledge-related variables, foreign-born respondents were about one-third as likely to report an FHC as US-born respondents. In addition, the present study is, to our knowledge, the first to examine nativity in conjunction with race/ethnicity. Previous studies with adequate power to examine race-related differences in reporting FHC by individuals residing in the United States have not examined nativity.^{20,21} Pinsky and colleagues found that blacks were more likely to under-report FHC than whites and that Hispanics

and Asians reported less familial cancer than whites.²⁰ Ramsey et al. also found that blacks reported lower rates of FHC than whites, although the opposite would be expected given cancer incidence rates for the 2 groups.²¹ Results of the present study were consistent with this previous research in that we found that blacks and Hispanics were less likely to report an FHC than whites; however, both effects were reduced considerably after accounting for nativity, and both effects were rendered nonsignificant after accounting for additional sociodemographic variables. In the present study, only Asians/Pacific Islanders were less likely to report an FHC than whites after adjusting for covariates. These findings are important in that they indicate that nativity may explain some of the differences in FHC reporting previously attributed to race/ethnicity. Results of the present study also indicate that nativity effects generalize across whites, Hispanics, blacks, and Asians/Pacific Islanders; however, further research using larger samples of foreign-born Asians, Pacific Islanders, and blacks is needed to corroborate these results.

Of note, having a personal history of cancer did not predict likelihood of reporting an FHC. Epidemiologists have expressed concern that recall bias affects the accuracy of reporting family history of disease and is a function, in part, of respondents' personal experience with the disease.²⁵ In addition, persons with a personal history of cancer would presumably be more motivated to seek information about family history of the disease and, therefore, become more knowledgeable about their FHC compared with individuals without a personal history of cancer. Whereas Chang and colleagues found that sensitivities were higher for individuals with a personal history of cancer than controls, other researches have not.^{11,12,26} In the present study, a personal history of cancer was not associated with the likelihood of reporting an FHC. In contrast, a history of cancer information-seeking was positively associated with reporting an FHC. Although many individuals undoubtedly sought cancer information in response to a family member's cancer diagnosis,²⁷ others may have been motivated to collect information about their personal FHC after seeking cancer information and learning of familial cancer risk.

Foreign-born respondents were less likely to report an FHC than US-born respondents. Why would this be the case? The variables included in the adjusted model contributed little to the explanation of this effect. Factors that should be related to knowledge of family history of cancer (eg, talking with family and friends about one's health, personal

history of cancer) did not attenuate the effect of nativity on FHC reporting, and the inclusion of socio-demographic variables made only a small impact on reducing the size of the nativity effect. One exception was race/ethnicity. The effect of nativity was somewhat attenuated by race/ethnicity, mainly because white immigrants were more likely to report an FHC than nonwhite immigrants.

It is possible that as immigrants become more acculturated, they also are more likely to report an FHC. This hypothesis was not supported by our analyses. Among immigrants, none of the indices of acculturation (English-language comfort, age at immigration, years in the US, and healthcare coverage) were independently associated with reporting an FHC. These results suggest that a low rate of FHC reporting probably persists even as immigrants become more integrated into American culture, including the American medical system. This leaves 2 likely possibilities. 1) Most of the variability in FHC reporting is because of phenomena associated with immigrants' countries of origin. 2) Immigrants continue to face barriers to knowing their FHC once they are living in the United States.

Much of the difference between the likelihood of reporting an FHC by foreign-born respondents compared with US-born respondents may be because of low cancer incidence rates in immigrants' countries of origin²⁷ as well as lower cancer rates among foreign-born than US-born residents of the United States.²⁸ Cancer incidence rates vary considerably by country and disease site; however, the United States has some of the highest cancer incidence rates in the world. With exceptions, including cancers linked to bacterial and viral infections (eg, cervical, liver, and stomach cancers), cancer incidence rates in the United States are often more than double those found in many developing countries.^{27,29} Lower incidence rates of cancer outside of the United States are thought to be attributable to younger age structures in these countries, behavioral and environmental exposures,³⁰ and a pattern of underdiagnosing and under-reporting cancers in under-resourced countries.³¹ To the extent that cancers are undiagnosed, foreign-born respondents will under-report their FHC. In countries where exposures to behavioral or environmental risks, such as cigarette smoking, have been lower historically, cancers that develop as the result of gene-environment interactions^{32,33} should be less common. Low exposure to environmental and behavioral risk and shorter life expectancy could obscure a genetic propensity for cancer that will express itself after families are established in the United States and are exposed to the

same risk factors as US-born individuals. In this case, measures of FHC will fail to represent some immigrants' true risk for the disease.

It is possible that immigrants have fewer opportunities to learn about their FHC than nonimmigrants, which also may result in FHC under-reporting. For one, being separated from extended, or even immediate family members, should lead to fewer opportunities to exchange information on health and illness with their relatives. It is also possible that there are cultural norms and beliefs that are more common among immigrants than nonimmigrants that inhibit, or have inhibited, family communication about one's own and relatives' cancer diagnoses. Although there is considerable diversity within ethnic and cultural groups, and there is evidence of cancer guilt, stigma, and taboo in most cultures,³⁴ some cultural norms and beliefs may be particularly powerful barriers to open communication on the topic of cancer. The belief that cancer is a punishment has been documented in several cultural groups including Chinese immigrants,³⁵ Arabs,³⁶ and African Americans.³⁷ It has been noted that among South Asians, for example, cancer may tarnish or bring shame on a family.³⁸ Also, outside of North America, it is relatively more common to find a preference for not disclosing cancer diagnosis and prognosis information to patients themselves.³⁹ This secrecy may inhibit open communication about cancer among family members.

A third possibility is that medical encounters experienced by immigrants and their families may have placed little emphasis on knowing and reporting a family history of illness, resulting in less communication about family history of disease between relatives. Medical care in under-resourced countries is less likely to emphasize familial cancer risk than in countries with ample healthcare resources. For example, recent guidelines on breast cancer screening for under-resourced countries make no mention of inquiring into a patient's family history of breast cancer.⁴⁰ Even in the United States, nonwhite women were found less likely than white women to have had a documented family breast cancer history assessment during a visit to a primary care physician.⁴¹ In part because of these patterns in healthcare, immigrants may be less knowledgeable about familial cancer risk than nonimmigrants. Consistent with this idea, Honda found that when compared with nonimmigrants, immigrants were less aware of genetic testing for cancer risk.⁴² Lack of knowledge of family history as a risk factor for cancer has been associated with less communication on cancer diagnoses between family members.⁴³

Limitations and Future Directions

Although this study provides novel information on FHC reporting by immigrants, it has several limitations. First, given the wording of the item used to assess FHC, persons were not restricted from reporting cancers in nonbiological relatives. It is presumed that after controlling for sociodemographic variables such as marital status, at the aggregate level, the likelihood of reports of cancer among all family members should be highly correlated with reports of cancer among biological relatives. Previous research has used similarly phrased items to assess family history of cancer.⁴⁴ Second, the gold standard for estimating accuracy in reporting FHC has been to compare personal reports of family history to records from cancer registries.^{9,11} Another interesting strategy has been to compare reports of family history prevalence and expected cancer incidence rates from Surveillance, Epidemiology, and End Results (SEER) data to identify sociodemographic groups for which these are discrepant.²⁰ An attempt to use either method to study FHC among immigrants would present sizeable challenges. Many immigrants' family members will live or have died abroad, making it nearly impossible to verify cancer status. Although we did not have information on immigrants' countries of origin, future studies should collect information on place of residence for family members so that studies can compare reported and expected rates of family history of cancer. This effort would be further enhanced by collecting information that could help explain discrepancies between reported and actual family history such as access to and utilization of healthcare by relatives, frequency of contact with relatives, and cultural and family norms concerning appropriate communication about cancer. Unfortunately, estimating the expected prevalence of cancers for family members living in immigrants' countries of origin will not be possible for some immigrant groups, as reliable cancer prevalence data are not available for all countries.⁴⁵

Conclusion

The main implication of this study is that FHC may not be as accurate for indicating risk for foreign-born patients as it is for US-born patients. When healthcare providers are assessing cancer risk and making screening recommendations, they should take into account that it may be possible for immigrants to have inherited a genetic disposition for cancer but not to have an FHC, either because their relatives died of other causes before developing cancer or because their relatives were protected against developing cancer by low exposure to environmental and

behavioral risk factors. In addition, because of underdiagnosis in countries of origin, lack of awareness of familial risk, and communication barriers in families, foreign-born patients, especially nonwhite immigrants, may not be aware of their true FHC. Failing to take these possibilities into account could result in systematically providing less secondary cancer prevention to immigrants. This could inadvertently contribute to existing disparities in cancer screening and in the use of genetic tests by immigrants and ethnic minorities.^{14,46}

REFERENCES

- Zoorob R, Anderson R, Cefalu C, Sidani M. Cancer screening guidelines. *Am Fam Physician*. 2001;63:1101-1112. Comment in: *Am Fam Physician*. 2001;63:1039-1040, 1042.
- Schroy PC 3rd, Barrison AE, Ling BS, Wilson S, Geller AC. Family history and colorectal cancer screening: a survey of physician knowledge and practice patterns. *Am J Gastroenterol*. 2002;97:1031-1036.
- Tudiver F, Guibert R, Haggerty J, et al. What influences family physicians' cancer screening decisions when practice guidelines are unclear or conflicting? *J Fam Pract*. 2002;51:760.
- Love RR, Brown RL, Davis JE, Baumann LJ, Fontana SA, Sanner LA. Frequency and determinants of screening for breast cancer in primary care group practice. *Arch Intern Med*. 1993;153:2113-2117.
- McCaul KD, Branstetter AD, Schroeder DM, Glasgow RE. What is the relationship between breast cancer risk and mammography screening? A meta-analytic review. *Health Psychol*. 1996;15:423-429.
- Cormier L, Reid K, Kwan L, Litwin MS. Screening behavior in brothers and sons of men with prostate cancer. *J Urol*. 2003;169:1715-1719.
- Thrasher JE, Cummings KM, Michalek AM, Mahoney MC, Moysich KB, Piller DM. Colorectal cancer screening among individuals with and without a family history. *J Public Health Manag Pract*. 2002;8:1-9.
- Murff HJ, Spigel DR, Syngal S. Does this patient have a family history of cancer? An evidence-based analysis of the accuracy of family cancer history. *JAMA*. 2004;292:1480-1489.
- Anton-Culver H, Kurosaki T, Taylor TH, Gildea M, Brunner D, Bringman D. Validation of family history of breast cancer and identification of the BRCA1 and other syndromes using a population-based cancer registry. *Genet Epidemiol*. 1996;13:193-205.
- Ziogas A, Anton-Culver H. Validation of family history data in cancer family registries. *Am J Prev Med*. 2003;24:190-198.
- Chang ET, Smedby KE, Hjalgrim H, Glimelius B, Adami HO. Reliability of self-reported family history of cancer in a large case-control study of lymphoma. *J Natl Cancer Inst*. 2006;98:61-68.
- Kerber RA, Slattery ML. Comparison of self-reported and database-linked family history of cancer data in a case-control study. *Am J Epidemiol*. 1997;146:244-248.
- King TM, Tong L, Pack RJ, Spencer C, Amos CI. Accuracy of family history of cancer as reported by men with prostate cancer. *Urology*. 2002;59:546-550.

14. Goel MS, Wee CC, McCarthy EP, Davis RB, Ngo-Metzger Q, Phillips RS. Racial and ethnic disparities in cancer screening: the importance of foreign birth as a barrier to care. *J Gen Intern Med.* 2003;18:1028–1035.
15. Carrasquillo O, Pati S. The role of health insurance on Pap smear and mammography utilization by immigrants living in the United States. *Prev Med.* 2004;39:943–950.
16. Echeverria SE, Carrasquillo O. The roles of citizenship status, acculturation, and health insurance in breast and cervical cancer screening among immigrant women. *Med Care.* 2006;44:788–792.
17. Larsen LJ. The foreign-born population in the United States: 2003. Current Population Reports, P20–551. Washington, DC: U.S. Census Bureau; 2004.
18. Davis T, Park I, Covell J, Rizzo J, Cantor D. Health Information National Trends Survey (HINTS) 2005, Final Report. Available at: <http://hints.cancer.gov/docs/HINTS2005Final-Report-0523.pdf>
19. Curtin R, Presser S, Singer E. Changes in telephone survey nonresponse over the past quarter century. *Public Opin Q.* 2005;69:87–98.
20. Pinsky PE, Kramer BS, Reding D, Buys S; PLCO Project Team. Reported family history of cancer in the prostate, lung, colorectal, and ovarian cancer screening trial. *Am J Epidemiol.* 2003;157:792–799.
21. Ramsey SD, Yoon P, Moonesinghe R, Khoury MJ. Population-based study of the prevalence of family history of cancer: implications for cancer screening and prevention. *Genet Med.* 2006;8:571–575.
22. Glanz K, Grove J, Le Marchand L, Gotay C. Underreporting of family history of colon cancer: correlates and implications. *Cancer Epidemiol Biomarkers Prev.* 1999;8:635–639.
23. Amaro H, de la Torre A. Public health needs and scientific opportunities in research on Latinas. *Am J Public Health.* 2002;92:525–529.
24. Schwartz SJ, Pantin H, Sullivan S. Nativity and years in the receiving culture as markers of acculturation in ethnic enclaves. *J Cross Cult Psychol.* 2006;37:345–353.
25. Rothman KJ, Greenland S, eds. *Modern Epidemiology.* Philadelphia: Lippincott Williams & Wilkins; 1998.
26. Mitchell RJ, Brewster D, Campbell H, et al. Accuracy of reporting of family history of colorectal cancer. *Gut.* 2004; 53:291–295.
27. Ward JA, Baum S, Ter Maat J, Thomsen CA, Maibach EW. The value and impact of the Cancer Information Service telephone service. Part 4. *J Health Commun.* 1998;3 suppl:50–70.
28. Herrinton LJ, Stanford JL, Schwartz SM, Weiss NS. Ovarian cancer incidence among Asian migrants to the United States and their descendants. *J Natl Cancer Inst.* 1994;86: 1336–1339.
29. Kamangar F, Dores GM, Anderson WF. Patterns of cancer incidence, mortality, and prevalence across five continents: defining priorities to reduce cancer disparities in different geographic regions of the world. *J Clin Oncol.* 2006;24: 2137–2150.
30. Jones LA, Chilton JA, Hajek RA, Iammarino NK, Laufman L. Between and within: international perspectives on cancer and health disparities. *J Clin Oncol.* 2006;24:2204–2208. Comment in: *J Clin Oncol.* 2007;25:1300–1301.
31. Rastogi T, Hildesheim A, Sinha R. Opportunities for cancer epidemiology in developing countries. *Nat Rev Cancer.* 2004;4:909–917.
32. Huang M, Dinney CP, Lin X, Lin J, Grossman HB, Wu X. High-order interactions among genetic variants in DNA base excision repair pathway genes and smoking in bladder cancer susceptibility. *Cancer Epidemiol Biomarkers Prev.* 2007;16:84–91.
33. Zhou W, Liu G, Miller DP, et al. Polymorphisms in the DNA repair genes XRCC1 and ERCC2, smoking, and lung cancer risk. *Cancer Epidemiol Biomarkers Prev.* 2003;12: 359–365.
34. Elkan R, Avis M, Cox K, et al. The reported views and experiences of cancer service users from minority ethnic groups: a critical review of the literature. *Eur J Cancer Care (Engl).* 2007;16:109–121.
35. Wong-Kim E, Sun A, DeMattos MC. Assessing cancer beliefs in a Chinese immigrant community. *Cancer Control.* 2003;10(5 suppl):22–28.
36. Azaiza F, Cohen M. Between traditional and modern perceptions of breast and cervical cancer screenings: a qualitative study of Arab women in Israel. *Psychooncology.* Published Online: 12 Mar 2007; DOI: 10.1002/pon.1180
37. Matthews AK, Sellergren SA, Manfredi C, Williams M. Factors influencing medical information seeking among African American cancer patients. *J Health Commun.* 2002;7: 205–219.
38. Bottorff JL, Johnson JL, Bhagat R, et al. Beliefs related to breast health practices: the perceptions of South Asian women living in Canada. *Soc Sci Med.* 1998;47:2075–2085.
39. Mystakidou K, Parpa E, Tsilila E, Katsouda E, Vlahos L. Cancer information disclosure in different cultural contexts. *Support Care Cancer.* 2004;12:147–154. Comment in: *Support Care Cancer.* 2004;12:143–146.
40. Anderson BO, Shyyan R, Eniu A, et al. Breast cancer in limited-resource countries: an overview of the Breast Health Global Initiative 2005 guidelines. *Breast J.* 2006;12suppl 1:S3–S15.
41. Murff HJ, Byrne D, Haas JS, Puopolo AL, Brennan TA. Race and family history assessment for breast cancer. *J Gen Intern Med.* 2005;20:75–80.
42. Honda K. Who gets the information about genetic testing for cancer risk? The role of race/ethnicity, immigration status, and primary care clinicians. *Clin Genet.* 2003;64:131–136.
43. Schroy PC 3rd, Lal SK, Wilson S, Heeren T, Farraye FA. Deficiencies in knowledge and familial risk communication among colorectal adenoma patients. *J Clin Gastroenterol.* 2005;39:298–302.
44. Ford JS, Coups EJ, Hay JL. Knowledge of colon cancer screening in a national probability sample in the United States. *J Health Commun.* 2006;11suppl 1:19–35.
45. Parkin DM, Whelan SL, Ferlay J, Storm H. *Cancer Incidence in Five Continents, Volume VIII.* Lyon, France: International Agency for Research on Cancer; 2005.
46. Armstrong K, Micco E, Carney A, Stopfer J, Putt M. Racial differences in the use of BRCA1/2 testing among women with a family history of breast or ovarian cancer. *JAMA.* 2005;293:1729–1736. Comments in: *JAMA.* 2005;293:1783–1785. *JAMA.* 2005;294:677; author reply 677–678.