Acculturation and smoking in North Americans of Chinese ancestry: A systematic review

Carolyn C. Gotay, PhD,¹ Michelle S. Reid, MPH,¹ Marliese Y. Dawson, BA,¹ Shouzheng Wang, MD²

ABSTRACT

OBJECTIVES: Many North American immigrants come from China. Given the critical impact of tobacco use on health, it is important to understand rates and correlates of smoking in this population. This systematic review addressed the question: based on current research, what is the association between acculturation and smoking behaviours in Chinese immigrants to North America?

METHODS: The search was conducted in PubMed, Medline, Web of Science, and Academic Search Complete for papers published from 2005 to 2014. Data were extracted from Canadian and American studies for population characteristics, study design, measures of smoking and acculturation, and findings regarding smoking rates and associations between smoking and acculturation.

SYNTHESIS: The literature search identified 147 articles, and 14 met inclusion criteria. Three studies were based on Canadian samples and the remaining 11 were from the United States. Of the 14 papers, 3 reported findings for youth and 11 for adults. Among adults, daily smoking rates were consistently much higher in men than women; for men, rates varied from 9% to 30%. Language use and time in North America were the most common indicators of acculturation. Almost all studies found a relationship between acculturation and smoking, such that more acculturated men smoke less and more acculturated women smoke more.

CONCLUSION: The findings suggest that the association between acculturation and smoking is gender-specific. This correlation is found in youth and adults and in both Canada and the US. Increased acculturation has a protective effect on smoking for Chinese North American men, but a harmful effect for women. Tobacco control interventions need to develop targeted strategies appropriate to these different populations.

KEY WORDS: Smoking; acculturation; Asian continental ancestry group

La traduction du résumé se trouve à la fin de l'article.

Can J Public Health 2015;106(5):e333–e340
doi: 10.17269/CJPH.106.4762

According to the World Health Organization, tobacco use is the leading cause of preventable death in the world, and “up to half of the world’s more than 1 billion smokers will die prematurely of a tobacco-related disease”.¹ In fact, more than one in ten deaths from heart disease and 70% of deaths from lung, tracheal and bronchus cancers are attributable to cancer.² Smoking is associated with many other diseases, including other cancers, stroke and chronic respiratory conditions.³

Smoking rates vary markedly internationally. For women, rates range from 1% (in Saudi Arabia) to 50% (in Nauru), and for men, rates go from a low of 8% (in Ethiopia) to 71% (in Kiribati). Rates in North America are intermediate, with 17% and 25% of women and 24% and 33% of men smoking in Canada and the United States respectively.⁴

Individuals who emigrate from other parts of the world to North America often face many challenges in adjusting to their new homes, including differences in modal behaviours such as the prevalence of smoking. Immigrants from China comprise an interesting subgroup, since they are the largest group of immigrants to Canada (making up almost 13% of new Canadians)⁵ and one of the largest groups in the US, accounting for 4.2% of new immigrants (after individuals from Mexico, India and the Philippines).⁶ Smoking rates in China are 2% for

women and 51% for men, both greatly different from North American rates.⁴

This paper reviews published literature on smoking rates in North Americans of Chinese origin, with an emphasis on understanding one of the most important factors affecting smoking in these individuals. Specifically, we focus on acculturation, which has been defined as “a complex, multidimensional process by which foreign born individuals adopt the values, customs, norms, attitudes, and behaviors of the mainstream culture”.⁷ Acculturation plays a crucial role in many health behaviours, including smoking, diet and exercise.^{8–10}

Leung¹¹ conducted a sophisticated analysis of smoking and acculturation in the US, which included data for individuals from 66 countries of origin. She identified important gender

Author Affiliations

1. Centre of Excellence in Cancer Prevention, School of Population and Public Health, University of British Columbia, Vancouver, BC
2. Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, People's Republic of China

Correspondence: Carolyn C. Gotay, PhD, Centre of Excellence in Cancer Prevention, School of Population and Public Health, University of British Columbia, Vancouver, BC V6T 1Z3, Tel: ☎604-827-4022, E-mail: carolyn.gotay@ubc.ca

Acknowledgements: Support for Dr. Wang's studentship was provided by the Mitacs Globalink program. Support for the work of the Centre of Excellence in Cancer Prevention is provided by the Canadian Cancer Society BC Yukon Division.

Conflict of Interest: None to declare.

differences in smoking rates and concluded that “Most immigrant men are from countries with higher male smoking rates, and most immigrant women are from countries with lower female smoking rates. Therefore, the convergence in smoking rates is due to gender differences in smoking prevalence among immigrants” (p. 1426). Studies of immigrants in other countries have shown that smoking rates are highly variable depending on country of origin; for example, a study in the Netherlands found that smoking rates were almost double in Turkish compared to Moroccan men, with Surinamese men intermediate.¹² Canadian data indicate high variability in smoking rates among immigrants according to country of origin, with the greatest variation within the “Asian” group of countries.¹³ For this reason, it is particularly important to look at smoking rates in specific subgroups of immigrants.

Regarding smoking and acculturation in Chinese immigrants, our understanding is limited. While three high-quality systematic reviews in the area of acculturation and smoking behaviour have been reported,^{14–16} these reviews were limited to US populations, and two reviews^{14,16} considered “Asian Americans” as one group without distinguishing among Asian subpopulations, despite the considerable heterogeneity within this broad designation. Two reviews examined interactions between sex and acculturation in Asian adults and found a positive association between acculturation and smoking for women and an inverse association between acculturation and smoking for men^{14,16}; one review looked at Asian subgroups and found the same relationship for Chinese adults.¹⁵ One review included adolescent studies and reported a positive association between acculturation and smoking in Asian youth but did not examine gender differences.¹⁴

The purpose of this paper is to answer the question: based on current research, what is the association between acculturation and smoking behaviours in Chinese immigrants to North America? Despite proportionately more Chinese immigrants in Canada than in the US, studies based on Canadian populations have not been included in previous reviews. This paper also provides information about whether trends observed in older literature have been maintained over time, as smoking rates in the US and Canada have continued to decline. The proportion of Canadians who are current smokers has declined from 25% in 1999 to 19% in 2005 and 16% in 2012.¹⁷ In the US, current smoking rates have declined from 21% in 2005 to 18% in 2013.¹⁸ These rates illustrate that in recent years, cigarette use has declined across North America, and whether this affects rates in immigrants has not been established.

METHODS

The search was conducted in PubMed, Medline, Web of Science, and Academic Search Complete using the strategy: (smok* OR tobacco) AND (acculturat* OR immigra*) AND (Chinese OR Taiwanese OR Asian continental ancestry group [MESH term]) AND (North America* or America* or Canad*)." The search was limited to articles published in English from January 1, 2005 to August 1, 2014.

A total of 147 abstracts were initially identified. Based on review of abstracts and full papers, articles were retained for review if analyses reported at least one measure of acculturation and

reported findings for acculturation and smoking specifically in Chinese North Americans ($n = 14$). Articles were excluded if they did not: report analyses specific to Chinese North Americans ($n = 67$); focus on smoking ($n = 42$); and/or report an analysis of smoking and acculturation ($n = 17$). Review papers and abstracts and year 2005 papers appearing in the previously-mentioned reviews were also excluded. (See Figure 1.)

Data were extracted for population characteristics, study design, measures of smoking and acculturation, and findings regarding smoking rates and associations between smoking and acculturation. (See Table 1.^{19–32}) All papers were reviewed by one author (CG) and by one or more of the other authors, with coding disagreements resolved through discussion. Papers were reviewed against the STROBE Statement 22-item checklist for cross-sectional studies³³ to ensure they were adequately reported. This checklist includes six different areas (Title and Abstract, Introduction, Methods, Results, Discussion and Funding), each with multiple components that are required for appropriate reporting of the background, methods and findings³⁴ for this kind of research. A total of 22 key components were examined for the 14 included studies. Studies were scored as ‘complete’ if they reported all items in a section; ‘partially complete’ if they reported most of the items in a section; and ‘incomplete’ if they failed to report two or more items in the section. Five studies^{21,24,25,28,30} reported 20 or more items, eight,^{19,22,23,26,27,29,31,32} reported 17–19 items and one reported 15 items.²⁰ A complete table of the STROBE assessment is available upon request.

The items in the Introduction, Discussion and Funding sections were well reported in virtually all studies. Table 2 summarizes STROBE sections that were not consistently reported across

Figure 1. Literature search flow chart

Table 1. Studies included in this review

First author (year)	Location	Sample size;* age; sex	Design	Acculturation assessment	Smoking status assessment	Smoking rates	Results for acculturation and smoking
Adolescent studies							
Asbridge (2005) ²⁰	Toronto	<i>n</i> ≥ 100; 13–19 yrs; 50% F ¹	Self-administered survey	Years in Canada “Active cultural retention” (language at home, cultural event attendance, liking for ethnic music)	Smoking during past year (self-report)	20% smoked in last year	Chinese youth had lower smoking rates than other groups in this study, but acculturation measures did not explain these findings. Gender differences not explored.
Kaplan (2008) ²⁵	California	<i>n</i> = 632; 12–17 yrs; 49.6% F	Prospective cohort, assessed at baseline, year 1, year 2. Study-specific survey based on questions from the California Tobacco Survey, the Youth Risk Behavior Surveillance System & the Health Behavior Questionnaire, telephone survey	Birthplace Language Acculturation Scale (language used as child, read in, usually spoken at home and usually spoken with friends; higher score = higher level of acculturation)	Baseline classification: Non-smokers/non-susceptibles (never tried smoking and would definitely not in following 12 months); Non-smokers/ susceptible (never tried but would definitely yes, probably yes or probably not smoke in next year); Experimenters/smokers (tried, smoked within past 30 days or smoked >100 cigarettes in lifetime) (self-report)	Experimenters/smokers: 7.8% at baseline, 12.8% at 1 year, 15.5% at 2 years	US-born Chinese adolescents were more likely to report smoking at the 3 rd assessment than foreign-born Chinese. Gender differences not explored.
Weiss (2006) ³¹	Los Angeles County	<i>n</i> = 402; Grades 8–9; 45.5% F	Self-administered questionnaire	Short Acculturation Scale for Hispanics (Language use, media, ethnic social relations)	Lifetime smoking (“even a puff”) Past 30-day smoking (smoking on at least 1 day) (self-report)	M: Lifetime, 19.3%; past 30 days, 5.1% F: Lifetime, 19.1%; past 30 days, 4.9%	Acculturation not a predictor of smoking for Chinese youth. Gender differences not explored.
Adult studies							
An (2008) ¹⁹	California	<i>n</i> = 2491; ≥18 yrs; 43.8% F	California Health Interview Surveys, phone interview	Language at home Generation Years in US	Lifetime non-smoker (smoked <100 cigarettes in life); former, current smoker (at least some days in past month) (self-report)	14.6% M, 3.8% F current smoker	M: Higher smoking with non-English-speaking and shorter time in the US. F: More smoking with second generation and above and longer time in the US.
Cantrell (2008) ²¹	New York City	<i>n</i> = 2537; 18–64 yrs; 38% F	Questions adapted from national surveys, In-person and telephone survey	Language at home OR Reads English newspapers most or every day	Smoked ≥100 cigarettes in life; current smoking vs. not In smokers <15/day or ≥15/day (self-report)	30.3% M, 2.2% F current smoker	M: Higher smoking rates in those considered not acculturated. F: No analysis included as sample of female smokers was too small.
Chiu (2012) ²²	Ontario	<i>n</i> = 3038; ≥12 yrs; 51.6% F	National Population Health Survey, Canadian Community Health Survey, interviewer-collected	Years in Canada	Current smoker (self-report)	<15 years: 15.6% M, 2.6% F; ≥15 years: 12.9% M, 4.3% F	M: Lower smoking with longer time in Canada. F: Higher smoking with longer time in Canada.
Hislop (2008) ²³	Vancouver	<i>n</i> = 504; 20–64 yrs; 57% F	In-person survey	English fluency Years in North America (NA)	Current smoker (smoked ≥100 cigarettes in lifetime and smoked within last 30 days); former smoker (self-report)	20% M, 1% F current smoker	M: higher smoking with less English fluency, and <10 years in NA. F: No analysis included as sample of female smokers was too small.

Continued

Table 1. Continued

First author (year)	Location	Sample size;* age; sex	Design	Acculturation assessment	Smoking status assessment	Smoking rates	Results for acculturation and smoking
Hu (2007) ²⁴	Texas	<i>n</i> = 1054; ≥19 yrs; 38% F	Questions from Behavioral Risk Factor Surveillance System, completed by mail or phone	Years in US	Current smoker (smoked ≥100 cigarettes in lifetime and within last 30 days); ever-smoker (at least part of a cigarette); former smoker (self-report)	M: current, 14.7%; ever, 66.8% F: current, 4.8%; ever, 24.5%	M: lower smoking rate the longer in the US (<5 years were 3× more likely to smoke ≥15 years). F: No analysis included as sample of female smokers was too small.
Li (2012) ²⁶	USA	<i>n</i> = 284; All M	National Latino and Asian American Study, personal or phone interview	English fluency Years in US	Current smoker (self-report)	16.2% M current smoker	Trend toward longer time in US and lower smoking.
Li (2013) ²⁷	New York City	<i>n</i> = 2246; ≥18 yrs; 51.8% F	REACH Survey, self-administered or phone or interview	Language at home Birthplace	Current smoker (smoked ≥100 cigarettes in lifetime and currently smoke every day or some days) (self-report)	17.7% M, 3.6% F current smoker	F: Not included in study. M: Higher smoking in foreign-born.
Parikh (2009) ²⁸	New York City	<i>n</i> = 517; 55–75 yrs; 42% F	NYC Chinese Health Survey, in-person interview	Years in US English use	Current smoker (smoked ≥100 cigarettes in lifetime and currently smoke every day or some days) (self-report)	23.6% M, 1% F current smoker	F: Lower smoking in foreign-born, higher smoking in English-speaking at home. M: None.
Sussman (2011) ²⁹	New York City	<i>n</i> = 215; 18–90 yrs; 1 st generation immigrants; 64% F	Questionnaire based on validated scales Self-administered in group setting	Created a Chinese Acculturation Index: Language competence, identity, behavioural	Smokers (current and former smokers) (self-report)	9% M, 7% F current smoker	F: No analysis included as sample of female smokers was too small.
Taylor (2007) ³⁰	Seattle	<i>n</i> = 395; 20–64 yrs; 53% F	In-person survey	Years in US Birthplace	Current smoker (smoked ≥100 cigarettes in lifetime and smoked in past 30 days); former smoker (self-report)	M: Current, 21%; former, 33% F: Current, 1%; former, 0	M: Earlier age at immigration = lower odds of smoking.
Wong (2009) ³²	San Francisco Bay Area	<i>n</i> = 460; ≥18 yrs; 8.6% F All smokers with a medical condition	In-person interview Recruited from inpatient or outpatient medical setting	Acculturation scale: Years in US Language at home English fluency (Total score 0–5 for 3 items)	Average daily cigarette use Nicotine dependence (self-report)	Cigs/day = 4.4 inpatients, 11.9 outpatients	F: More acculturated = higher odds of smoking. Current smokers were more likely to have been born in China than non-smokers. Gender differences not explored. More cigarettes with higher acculturation. Acculturation was not significant, controlling for inpatient/outpatient status entered into analysis. Gender differences not explored.

* In studies that included more than one group, number shown refers to number of Chinese participants, unless otherwise noted.

† Exact numbers were not provided. Percent female is based on entire sample, not only Chinese.

Table 2. STROBE Statement checklist

STROBE item	Description (relevant component of item)	% of studies reporting item as		
		Fully reported	Partially reported	Incomplete
9	Bias (Describe any efforts to address potential sources of bias)	7.1%	7.1%	85.7%
10	Study size (Explain how the study size was arrived at)	7.1%	0%	92.8%
12	Statistical methods (Explain how missing data were addressed)	57.1%	14.3%	28.6%
13	Participants (Report numbers of individuals at each stage of study—e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed)	28.6%	7.1%	64.3%
16	Main results (Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision [e.g., 95% confidence interval]. Make clear which confounders were adjusted for and why they were included)	35.7%	64.3%	0%

studies. The primary reason for ‘incomplete’ ratings was that most studies were secondary analyses of survey data, and full information about how participants were identified and accrued, justification of sample size, and how missing data were handled were not specified. The STROBE criteria also stipulate providing unadjusted estimates, and a number of studies only reported adjusted figures; these studies were rated as ‘incomplete’ as well.

SYNTHESIS

Fourteen studies met eligibility criteria. Three studies were reported on Canadian samples,^{20,22,23} with the others conducted in various regions of the US. Three studies were in adolescents or young adults^{20,25,31} and the others were based on adults. Three studies included primarily men,^{21,26,32} including one based on smokers with a medical condition.³²

Study methods

Most studies collected data as part of a larger survey in person, by telephone, or through self-report. It should be noted that a number of reports included additional immigrant or ethnic groups, but only data for Chinese North Americans are reviewed here. Thirteen reports were based on cross-sectional data. One study included baseline assessment with follow-up data.²⁵

Acculturation assessment

Language use was a common indicator of acculturation and was used in many studies. The specific questions varied and included language used at home,¹⁹ the frequency of reading English newspapers,²¹ and English proficiency.¹⁹ One study²⁵ developed a “language acculturation scale” including a number of items.

Other indicators of acculturation were used as well. Years of living in North America was measured in most but not all^{20,25,27,29,31} studies. Duration of stay was classified in different ways: immigrants who spent ≥ 15 years in North America vs. those who spent < 15 years^{19,22}; and ≥ 10 years vs. less.^{23,30} Other studies used three or more categories of duration.

Information about country of birth was also assessed in a number of studies, although some only included foreign-born Chinese North Americans^{23,28–30} and one used “generational status,” with “first generation” defined as being born in China.¹⁹

Several studies included scales that assessed multidimensional aspects of acculturation: specifically, the “Active Cultural Retention” measure,²⁰ which includes measures of language use at home, attendance at cultural events, and liking ethnic music; the Short Acculturation Scale for Hispanics, which incorporates assessment of language use, media, and ethnic social relations and has been shown to be applicable in Chinese populations³¹; the Language, Identity and Behavior Acculturation Scale, which Sussman et al.²⁹ modified to make appropriate for Chinese populations; and an Acculturation Scale,³² which yields a total score based on years in the US, language at home, and English fluency.

Smoking assessment

While all studies used respondent self-report to indicate smoking status, specific questions varied, including ever-smoker,^{19,21,24} current smoker,²² amount smoked,²¹ susceptibility to smoke,²⁵ and nicotine dependence.³²

RESULTS

Smoking prevalence

Most studies reported rates separately for men and women and found much higher rates in men. Current smoking rates for adult men ranged from 9%²⁹ to 30%²¹; interestingly, both of these studies were based in New York City. For women, current smoking rates ranged from 1%^{23,28} to 7%.²⁹ Studies in adolescents and young adults found overall rates for current smoking of 5% for both girls and boys in grades 8–9,³¹ 8% in adolescents aged 12–17,²⁵ and 20% smoking during the past year in students aged 13–19.²⁰

Acculturation and smoking behaviour

Adults

Of the 11 studies, only 1 found no relationship between at least one acculturation measure and smoking.²⁸ The remaining 10 studies identified significant relationships, all in the same direction: men who were more acculturated smoked less and women who were more acculturated smoked more than their respective countrymen and countrywomen who were less acculturated. The nature of this relationship was the same and was found across various diverse ways of measuring acculturation and smoking, and using different statistical analytics and modeling.

Five of the eight studies that used some aspect of language use or proficiency as an indicator of acculturation found a relationship^{19,21,23,27,32} and three did not,^{25,26,28} such that more use of English language was linked with less smoking for men

and more for women (although only one study¹⁷ had sufficient numbers for an analysis of women).

Six^{19,22–24,30,32} of the eight studies that analyzed duration of stay in North America found at least one relationship between acculturation and smoking, such that longer stays were associated with less smoking for men^{19,22–24} and more for women^{19,22}; two²⁸ found no significant relationship. This finding was consistent across studies that categorized duration of stay in North America into different intervals: e.g., >10^{23,30} or >15 years.^{19,22,24,28,30,32}

Both studies that distinguished between foreign- and North American-born found a relationship with smoking behaviour,^{19,27} such that men born in China smoked more²⁷ and women born in China smoked less.^{19,27}

Of the studies that used multidimensional acculturation scales,^{20,29,31,32} two studies, both in adolescents, did not find a relationship between scale scores and acculturation.^{20,31} Among adults, one study found that the acculturation scale was associated with smoking for females, with more smoking among more acculturated women, but in men, the only significant factor that predicted smoking was earlier age at immigration.²⁹ The other adult study found that higher acculturation was associated with more smoking, but gender differences were not examined.³²

Adolescents

The three studies in youth had different findings: Asbridge et al.²⁰ found that acculturation was not related to smoking, whereas Kaplan²⁵ reported country of origin was related to smoking, with US-born youth being more likely to report smoking compared to foreign-born youth. Neither the Asbridge nor the Kaplan study looked at males and females separately, and Weiss³¹ only looked at males and females separately for Asian-American youth overall, grouping males and females together for the analysis of Chinese-American youth.

None of the adolescent studies reported on duration of stay in North America, and one study found that country of origin was related to smoking, with more smoking in US-born youth.²⁵

Other correlates of smoking behaviour

While all adult studies examined associations between smoking behaviour and demographic and socio-economic variables in their analyses, findings were inconsistent. Two studies did not provide Chinese-specific data and are not included here.^{19,27} Two studies found an inverse relationship between education and smoking rates for men,^{24,28} and one also found a positive relationship between education and smoking for women.²⁴ Four other studies, however, failed to find any significant association between education and smoking behaviour.^{23,26,30,32} One study reported that women with household incomes between \$20,001–\$50,000 had significantly higher smoking rates than women with lower and higher household incomes,²⁴ while two other studies did not find any significant relationship between household income and smoking behaviour.^{26,28} One study found a significant positive relationship between employment and smoking behaviour,³² while two other studies did not find it to be significant.^{21,28} One study found that being married was associated with lower smoking rates,²⁸ but two did not find a

relationship between marital status and smoking.^{26,32} One study examined age at immigration and found that for men, a younger age at immigration was associated with lower smoking rates.²⁹

CONCLUSION

This paper reviewed recent literature on acculturation and smoking behaviours in Chinese immigrants in Canada and the US. While only 3 of the 14 papers were based on Canadian samples, to our knowledge, this is the first time that Canadian data have been included in such reviews. Consistent findings were seen in Canadian and US studies.

Smoking prevalence in Chinese North-American men ranged from 9% to 30%. Rates for women were much lower but still varied widely. Adolescent rates were low in two studies but high (20%) in another.²⁰ This wide range of smoking prevalence estimates may stem from differences in study location, methodology, and participant characteristics (e.g., age, education, employment).

While acculturation was measured in multiple ways, its relationship with smoking was consistent: higher acculturation was linked with less smoking in men and more smoking in women. This relationship held for women in California (higher smoking with longer time in the US),¹⁹ Ontario (higher smoking with longer time in Canada), and New York City (lower smoking in foreign-born, higher smoking in those who speak English at home). California men smoked more when they did not speak English at home and had lived for a shorter time in the US,¹⁹ Ontario men smoked less with a longer residence in Canada,²² and Vancouver men smoked more when they had less English fluency and less time in Canada.²³ Results were stronger in some studies than in others,²⁶ but the pattern was clear. In this review, we did not find that different measures of acculturation yielded different outcomes, nor that smoking varied consistently according to other socio-demographic correlates.

Some limitations should be noted. We only searched published studies, but it is likely that additional data are available in the grey literature, such as government reports, that could be reviewed in the future. All data were based on self-reports and are subject to social desirability bias. As individuals become more acculturated to North American customs, they likely also become more aware that smoking is not a socially-acceptable behaviour, and they may be less likely to admit they smoke. Validation of smoking self-reports with biological correlates would be worthwhile.³⁴

Acculturation is a complex construct that can be measured in different ways, ranging from simple demographics to multi-subscale questionnaires. While nuanced assessments are often important, in this set of studies, simple questions about language use and time in North America appeared to be sensitive enough to detect differences in smoking patterns. While these studies included a fairly broad coverage across North America, 8 of 14 studies were conducted either in New York City or California. More diverse samples are needed before broad generalizations about Chinese in North America can be drawn. An additional limitation of the adolescent studies included here is that two^{20,25} did not provide a gender breakdown. More detailed current data are needed in this important age group.

However, given the findings and their consistency with previous reports, some implications for future research and programs can be drawn. Regarding research, it is clearly crucial to conduct analyses separately for Chinese men and women, both adults and youth. The impact of acculturation has opposite effects on smoking behaviours that would be obscured in analyses that combine both genders. Acculturation is an important correlate explaining considerable variance in smoking outcomes and is recommended for inclusion in research on smoking in immigrant populations. The studies reviewed here imply that more is not necessarily better when it comes to acculturation assessment, and straightforward queries about language use and time in the new country may be sufficient. It would be helpful if research studies reported data specific to population group, rather than, or in addition to, collapsing across, e.g., “Asians”. There were many other studies we initially identified that include Chinese respondents but did not report Chinese-specific data. While, theoretically, “Asian immigrants” may be a useful construct, this descriptor is not useful in understanding the distinct characteristics of any one group.

A number of interesting hypotheses were not addressed, such as whether the gender-specific impact of acculturation varies between age cohorts. In addition, the link between lower socio-economic status (SES) and higher smoking which has been found consistently in tobacco research³⁵ was not consistently seen here. Unfortunately, SES was not assessed in all studies, and there may have been insufficient data or variability in SES to detect a relationship. We recommend that future studies measure SES. With more research in this area, formal meta-analysis may be possible to provide a more refined estimate of the magnitude of the relationship between acculturation and smoking. Despite these limitations, the STROBE analysis showed that most reports were full and complete.

These results are consistent with the previous earlier reviews, and with other literature drawing from migrants from other countries, and in different parts of the world. That this result has been confirmed in current studies and Canadian data speaks to the robustness of this finding. Nierkens and colleagues¹² invoke a stage theory³⁶ to explain the changing smoking rates in immigrants as a function of socio-economics, gender, and the stage of the smoking epidemic (i.e., the degree to which smoking is a high-status, valued aspect of society) in both the country of origin and country of immigration. These authors conclude that “to stop the future smoking epidemic in immigrant populations, prevention programmes need to be particularly tailored to males in lower socio-economic groups and to females in higher socio-economic groups” (p. 390). Our suggestions are the same, except that the findings here were based on acculturation rather than SES. This model may be a useful heuristic to explain and predict changes in smoking behaviour in immigrants around the world.

Extending these conclusions to program development and implementation, the data imply that programs for new immigrants, such as English as a Second Language (ESL) classes, could be important vehicles for providing smoking prevention and cessation education. For men, ensuring that they are integrated into the customs and practices of their new homes could contribute to reducing smoking rates and other positive benefits. Men who immigrate when they are older may need

particular support to give up smoking if this is an entrenched part of their lifestyle. Women may benefit from tailored counseling to help them find other, healthier ways to become comfortable in their new countries rather than taking up smoking like their North American colleagues.

As North America continues to become increasingly ethnically and culturally diverse, it is crucial to understand how to enhance the health and well-being of these newcomers. Lower smoking rates benefit not only the immigrants and their families, but also the society as a whole.

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Received: August 28, 2014

Accepted: March 29, 2015

RÉSUMÉ

OBJECTIFS : De nombreux immigrants nord-américains viennent de la Chine. Vu l'impact crucial du tabagisme sur la santé, il est important de connaître les taux de tabagisme et leurs corrélats dans cette population. Notre revue systématique tente de répondre à la question suivante : D'après les études actuelles, quelle est l'association entre l'acculturation et l'usage du tabac chez les immigrants chinois en Amérique du Nord?

MÉTHODE : Nous avons interrogé les articles publiés entre 2005 et 2014 dans PubMed, Medline, Web of Science et Academic Search Complete. Nous en avons extrait les données d'études canadiennes et américaines sur les caractéristiques de la population, les protocoles d'étude, les indicateurs du tabagisme et de l'acculturation, et les constatations portant sur les taux de tabagisme et les associations entre le tabagisme et l'acculturation.

SYNTHÈSE : La recherche bibliographique a identifié 147 articles, dont 14 répondaient à nos critères d'inclusion. Trois études se fondaient sur des échantillons canadiens, et les 11 études restantes provenaient des États-Unis. Sur ces 14 articles, 3 présentaient des constatations axées sur les jeunes et 11, des constatations axées sur les adultes. Chez les adultes, les taux de tabagisme quotidiens étaient systématiquement plus élevés chez les hommes que chez les femmes; chez les hommes, les taux variaient entre 9 % et 30 %. La langue utilisée et le temps passé en Amérique du Nord étaient les indicateurs les plus courants de l'acculturation. Presque toutes les études ont observé une relation entre l'acculturation et le tabagisme : les hommes plus acculturés fument moins, et les femmes plus acculturées fument davantage.

CONCLUSION : L'association entre l'acculturation et le tabagisme est sexospécifique. Cette corrélation est observée chez les jeunes et les adultes, tant au Canada qu'aux États-Unis. L'acculturation accrue a un effet protecteur sur le tabagisme chez les hommes nord-américains d'origine chinoise, mais elle a un effet nocif chez les femmes. Les mesures de lutte antitabac doivent élaborer des stratégies ciblées en fonction de ces différentes populations.

MOTS CLÉS : tabagisme; acculturation; population d'origine asiatique continentale