



# Associations between race, discrimination and risk for chronic disease in a population-based sample from Canada



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## ABSTRACT

A major epidemiological finding emerging from studies using U.S. samples is that racial differences in experiences of discrimination are associated with racial differences in health. A newer area of research is exploring the population-level dynamics between race, discrimination, and health status in various societies. The objective of this study is to assess for the first time in a national sample from Canada: (a) racial differences in experiences of discrimination and, (b) the association between discrimination and chronic conditions and their major risk factors. Data were obtained from the 2013 Canadian Community Health Survey ( $n = 16,836$ ). Race was categorized as Aboriginal, Asian, Black, or White. Discrimination was measured using the Williams Everyday Discrimination Scale. Outcomes included having any chronic condition or major risk factors (obesity, hypertension, smoking, binge drinking, infrequent physical activity, and poor self-rated health). Crude and adjusted (for age, sex, immigrant status, socioeconomic) logistic regressions modeled the association between (a) race and discrimination and, (b) discrimination and each outcome. Results indicated that Blacks were most likely to experience discrimination, followed by Aboriginals. For example, Blacks were almost twice as likely (OR: 1.92, 95% CI: 1.19–3.11), and Aboriginals 75 percent more likely (OR: 1.75, 95% CI: 1.37–2.22) to report being treated with less courtesy or respect than others. Blacks were more than four times as likely (OR: 4.27, 95% CI: 2.23–8.19), and Aboriginals more than twice as likely (OR: 2.26, 95% CI: 1.66–3.08) to report being feared by others. Asians were not statistically different from Whites. With two exceptions (binge drinking and physical activity), discrimination was associated with chronic conditions and their risk factors (OR for any chronic condition: 1.78, 95% CI: 1.52–2.08). Initial results suggest that in Canada, experience of discrimination is a determinant of chronic disease and chronic disease risk factors, and Blacks and Aboriginals are far more exposed to experiences of discrimination.

## 1. Introduction

This paper examines population-level associations between race, discrimination, and risk for chronic disease in Canada. Racial inequalities in health are one of the major public health crises of our time (Williams and Mohammed, 2013; Phelan and Link, 2015). Public health theory suggests that, fundamentally, racial inequalities in health are in large part attributable to the culmination – the literal ‘embodiment’ – of racism (Williams and Mohammed, 2013; Phelan and Link, 2015; Krieger, 2005). This is because racism is a root mechanism that produces systematic racial differences in everyday living conditions and lived experiences that constitute the basis for health (Williams and

Mohammed, 2013; Phelan and Link, 2015; Jones, 2000). Most of the empirical evidence on the health effects of racism has focused on experiences of discrimination as a measure of racism. These studies initially centered on the United States using local or regional samples, and compared Blacks and Whites, but have expanded to other groups in the U.S. and to other high- and middle-income countries around the world that have stigmatized racial groups (Williams and Mohammed, 2009; Paradies et al., 2015). More recently, in efforts to move from establishing discrimination as a determinant of health, to assessing its population (public health) impact, several high-income countries (the United Kingdom, New Zealand and Canada) have incorporated questions about experiences of discrimination in major national health

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surveys. Such national survey data can provide initial, if not definitive, answers to pressing population questions about racial discrimination and its influence on health. What is the population burden of discrimination experienced by each race/ethnic group in these societies? What is the population-wide impact in these countries of experiences of discrimination on the major public health outcomes of our time, such as the chronic conditions that account for many of the major causes of morbidity and mortality? In the current study, we produce what we believe are the first Canadian national estimates to answer these questions.

For the past several decades, countless studies have documented the pervasiveness and persistence of racial inequalities in health, including chronic diseases and their risk factors, such as obesity, hypertension, and associated health behaviors. As evidence from the United States and elsewhere has shown, the most compromised racial groups vary by country and by the immigrant profile of each race ethnic group. But with few exceptions, non-Whites seem to suffer worse health status than Whites, particularly after accounting for immigrant profiles (Smith et al., 2000; Siddiqi et al., 2013a; Acevedo-Garcia et al., 2012; LaVeist and Lebrun, 2010). A recent paper from Canada found that, compared to Whites, Aboriginals and Blacks were at higher risk for several risk factors related to chronic disease, including hypertension, obesity, and smoking and drinking (Aboriginals only), though Asians were at lower risk for these conditions (Ramraj et al., 2016).

The consistency of findings has led to a substantial literature to investigate the mechanisms that produce an association between race and health. From this work, racism has been established as a ‘fundamental cause’ of health – it is the root cause of racial groups experiencing systematic differences in their everyday living conditions and lived experiences, and thus in their health status (Williams and Mohammed, 2013; Phelan and Link, 2015). In other words, racial health inequalities occur because disempowered racial minorities experience racism; racial health inequalities are pervasive because racism is pervasive (Phelan and Link, 2015).

There are two principal and related ways that racism manifests. Both mechanisms have health consequences because (a) both limit access to the resources that operate as necessary prerequisites for health, and, (b) both result in the accumulation of experiences of psychological and physiological stress that adversely impact the health of the mind and body, affect health behaviors, compromise access to health care, and influence a variety of other mechanisms related to health (Williams and Mohammed, 2013; Adler and Rehkopf, 2008; Williams, 1999; McEwen and Gianaros, 2010; Geronimus et al., 2006; Link and Phelan, 1995).

The first form of racism is a structural mechanism, in which the very organization of society – politics, policies, socio-cultural institutions – restricts opportunities for racial minorities, and provides privileges and advantages for Whites (Williams and Mohammed, 2013; Jones, 2000). There are countless relevant examples. Historical and contemporary institutional processes have created an ingrained pattern of racial segregation across neighborhoods in the United States (Massey and Denton, 1993). The implementation of President Roosevelt’s “New Deal” created opportunities to accumulate wealth, for example through home ownership, that were far more accessible to Whites compared to Blacks. Tropes abound worldwide in which “... ideas of Black inferiority and White superiority have historically embedded in multiple aspects of culture, and many images in contemporary population culture continue to devalue, marginalize, and subordinate non-White racial populations ... (Williams and Mohammed, 2013)” In Canada, there are historical and contemporary examples regarding the use of institutional mechanisms to disenfranchise and subjugate Aboriginals, Blacks, and Asians – from colonial stealing of lands and resources from Aboriginals and state-sanctioned slavery, to present-day police ‘carding’ practices that differentially target Black and Brown young men (Galabuzi, 2004).

The second form of racism is interpersonal discrimination, which is principally mediated by an encounter in which an individual’s words

and actions (or indifference) towards a non-White person are guided by their negative perceptions and feelings about non-White groups, irrespective of consciousness about the perceptions and feelings they harbor, or of intentionality (Williams and Mohammed, 2013; Jones, 2000). Research suggests that in the modern day context, interpersonal discrimination much less frequently occurs in striking and overt ways (notwithstanding, for example, recent important findings regarding racial inequalities in police shootings), rather it tends to manifest in subtler but routine, insidious acts – what have been termed micro-aggressions (Krieger et al., 2005; Sue, 2009). While such interpersonal encounters may occur between private citizens in mundane everyday situations, they also often occur in circumstances where the encounter is embedded within structural processes, such as job-hiring practices, in confrontations with police (that is, if one is fortunate enough not to be shot), and while accessing medical care. In such scenarios, interpersonal and structural aspects of racism are intimately connected (Williams and Mohammed, 2013; Bertrand and Mullainathan, 2004; Oreopoulos, 2009).

Thus, racism is ‘fundamental’ because it can initiate nearly every mechanism that is involved in determining whether we get sick or stay healthy. They limit employment and income. They shape access to public systems as services: education, health care, social welfare, and transportation. They create chronic stress that tax the physiological systems of the body, and stimulate stress-coping behaviors that are often precursors of chronic disease (e.g., poor eating habits, smoking). Intervening on any particular mechanism, without addressing racism, is unlikely to improve health and reduce health inequalities (Williams and Mohammed, 2013; Phelan and Link, 2015).

In public health, studies which explicitly state an empirical focus on understanding the association between racism and health have mainly measured racism through self-reported experiences of interpersonal discrimination. Most have used local and regional samples of Blacks and Whites in the United States, and have found experiences of discrimination to be associated with a range of the chronic conditions and related risk factors that account for major sources of morbidity and mortality. Studies of hypertension and allostatic load (a measure of stress-induced dysregulation across multiple physiological systems) suggest at least a small, significant association with experiences of discrimination. Findings for obesity and smoking are also fairly consistent, while alcohol consumption has produced somewhat mixed findings (Lewis et al., 2015; Gilbert and Zemore, 2016; Cunningham et al., 2013).

In some senses, these studies have provided a ‘proof of concept,’ establishing experiences of discrimination as a determinant of health (and thus of racial health inequalities). At this juncture however, it is critical to move towards establishing the broader public health impact of discrimination – how are experiences of discrimination distributed in the population, and what is the population-level influence of experiences of discrimination on health?

While the United States has led the research on experiences of discrimination and health, many population-health oriented studies of experiences of discrimination are also coming from peer nations. In this regard, the United Kingdom and New Zealand has been at the forefront of the science (Smith et al., 2000; Wallace et al., 2016; Harris et al., 2006). More recently, Canada’s major national health survey, the Canadian Community Health Survey (CCHS), conducted a special one-time supplement to examine experiences of discrimination. More generally, Canada has a rich tradition regarding scholarship on discrimination. Scholars such as Kenneth Dion have been at the forefront of exploring discrimination from the perspective of individuals on the receiving end – its myriad consequences (Dion, 2002). In the present study, we use this supplement to investigate in a national sample of Canadians the extent of (a) racial differences in experiences of discrimination and (b) the association between discrimination and chronic conditions and their major risk factors.

2. Methods

Data were obtained from those aged 18 years and over who participated in the rapid response component of the 2013 cycle of the CCHS, which focused on questions related to experiences of discrimination. Listwise deletion was used to drop the 2.7 percent of respondents with missing data, resulting in a total sample size of 16,836. The CCHS offers a national sample of Canadians that is representative by region, age, and household composition. The sampling strategy does not explicitly attend to race, though the CCHS offers the largest national health data for multiple racial groups.

Race was derived from two questions in the CCHS. The first question asked: “You may belong to one more racial or cultural groups on the following list (check up to four that apply): White, South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.), Chinese, Black, Filipino, Latin American, Arab, Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.), West Asian (e.g., Iranian, Afghan, etc.), Korean, Japanese, and other. The second question asked: “Are you an Aboriginal person, that is, First Nations, Métis or Inuk (Inuit)? First Nations includes Status and Non-Status Indians.” Respondents whom reported only one category were included in the analysis. Those who reported multiple racial categories were omitted due to small sample size (due to Statistics Canada restrictions, we are unable to report the precise sample size). Respondents were grouped as: White, Aboriginal, Black, or Asian (if they reported being South Asian, Chinese, Filipino, Arab, Southeast Asian, West Asian, Korean, or Japanese). Small cell sizes also prevented the independent analysis of some groups (e.g., Latin Americans or subgroups of Asians), among whom further heterogeneity may be possible. In small samples, Noh and colleagues have explored perceived discrimination and mental health among various Asian-Canadian groups (Noh et al., 1999).

For the sake of comparison to the Canadian government's officially recognized racial category of ‘visible minority,’ which refers to people whom are “persons, other than Aboriginal persons, who are non-Caucasian in race or non-White in colour,” we also created a same-named variable in which Blacks and Asians were collapsed.

Experiences of Discrimination were measured through dichotomizing responses to items from an abbreviated version of the validated Williams Everyday Discrimination Scale (Krieger et al., 2005; Sternthal et al., 2011). This scale, which has been validated against the original Williams Scale and produced a Chronbach's Alpha of 0.77 (Krieger et al., 2005; Sternthal et al., 2011; Williams et al., 1997; Taylor et al., 2004), asks respondents to report on a Likert scale how often: they are treated with less courtesy or respect than other people, they receive poorer service than other people at restaurants or stores, people act as if they think you are not smart, and people act as if they are afraid of you. Experiences of discrimination were coded as ‘frequent discrimination’ (a few times a year, a few times a month, or at least once a week) versus ‘infrequent discrimination’ (< once a year/never). Due to sample size constraints that prevented looking at the separate association between each scale item and health outcomes, an additional derived summary variable was created, which dichotomized those who reported “frequent discrimination” in response to at least one of the above scale items and those who did not.

We analyzed several outcomes related to chronic disease and associated risk factors. Chronic conditions were dichotomized as having any of the following: asthma, arthritis, back problems, migraine headaches, chronic obstructive pulmonary disease, diabetes, heart disease, cancer, intestinal or stomach ulcer, stroke, urinary incontinence, bowel disorder, scoliosis, or Alzheimer's disease. Risk factors were also dichotomized and included: obesity (self-reported BMI > 30 kg/m<sup>2</sup>), hypertension (doctor diagnosis of hypertension), smoking (non-smoker versus current or former smoker), binge drinking (non-drinker or regular drinker versus occasional binge drinker), and physical activity (regular or occasional versus infrequent). We also examined self-rated health (dichotomized as fair or poor versus good, very good, or

**Table 1**  
Descriptive characteristics (weighted proportions) of the study population: 2013 Canadian Community Health Survey Rapid Response Module.<sup>a</sup>

	White	Aboriginal	Black	Asian	Visible Minority
	n = 14,853	n = 804	n = 214	n = 965	n = 1179
<b>Age</b>					
18-25	11.1	24.9	20.8	21.6	21.5
26-35	16.1	23.2	21.5	23.7	23.3
36-45	15.0	15.9	22.6	22.6	22.6
46-55	19.9	12.6	13.3	16.4	16.0
56-65	18.1	15.4	14.1	8.2	9.1
65+	19.8	8.0	7.7	7.5	7.6
<b>Sex</b>					
Male	49.4	48.8	49.4	45.9	46.4
Female	50.6	51.2	50.6	54.1	53.6
<b>Immigrant Status</b>					
No	87.9	99.5	25.5	16.7	18.0
Yes	12.1	0.5	74.5	83.3	82.0
<b>Income</b>					
> \$75000	47.6	35.9	33.0	43.3	41.8
\$50000-\$74999	20.7	19.2	20.4	22.8	22.4
\$25000-\$49999	20.9	25.1	26.1	21.3	22.0
< \$25000	10.8	19.8	20.5	12.7	13.8
<b>Education</b>					
Postsecondary	61.4	44.9	55.5	64.5	63.2
Secondary	25.8	31.5	33.9	27.2	28.1
Less than secondary	12.8	23.6	10.7	8.3	8.6
<b>Any Chronic Condition</b>					
No	32.9	18.5	40.8	41.7	41.6
Yes	67.1	81.5	59.2	58.3	58.4
<b>Obesity</b>					
No	78.7	73.3	84.3	92.2	91.1
Yes	21.3	26.7	15.7	7.8	8.9
<b>Hypertension</b>					
No	79.7	82.2	80.6	85.3	84.6
Yes	20.3	17.8	19.4	14.7	15.4
<b>Self-Rated Health</b>					
Good	89.0	82.7	92.9	93.0	92.9
Poor	11.0	17.3	7.1	7.0	7.1
<b>Smoking</b>					
Non-smoker	32.6	23.9	67.6	70.1	69.7
Current or former smoker	67.4	76.1	32.4	29.9	30.3
<b>Drinking</b>					
Non-drinker or regular drinker	53.7	39.8	79.7	79.8	79.8
Binge drinker	46.3	60.2	20.3	20.2	20.2
<b>Physical Activity</b>					
Frequent	47.0	46.5	53.3	43.8	45.2
Infrequent	53.0	53.5	46.7	56.2	54.8
<b>Less Courtesy</b>					
Less than once a year	81.2	66.9	61.5	75.3	73.3
More than once a year	18.8	33.1	38.5	24.7	26.7
<b>Poorer Service</b>					
Less than once a year	90.3	83.1	71.2	82.6	81.0
More than once a year	9.7	16.9	28.8	17.4	19.0
<b>Treated as Not Smart</b>					
Less than once a year	88.0	74.4	74.4	85.7	84.1
More than once a year	12.0	25.6	25.6	14.3	15.9
<b>Feared by Others</b>					
Less than once a year	91.5	79.9	75.8	93.4	90.9
More than once a year	8.5	20.1	24.2	6.6	9.1
<b>Any Discrimination</b>					

(continued on next page)

Table 1 (continued)

	White	Aboriginal	Black	Asian	Visible Minority
	n = 14,853	n = 804	n = 214	n = 965	n = 1179
Less than once a year	69.4	51.6	47.8	64.5	62.1
More than once a year	30.6	48.4	52.2	35.5	37.9

<sup>a</sup> Weighted Proportions.

excellent).

Covariates included age, sex (male or female), immigrant status (foreign born or not), household income (< \$25000 \$25000-\$49999, \$50000-\$74999, or > \$75000), and education level (less than secondary, secondary, or postsecondary).

Data modeling proceeded in several steps. First, we calculated the weighted proportion of each racial category in each outcome, discrimination, and covariate category (Table 1) - Statistics Canada regulations did not permit us to release the raw sample sizes. Next, we analyzed the odds of experiencing each type of discrimination for each racial group compared to Whites (Table 2). We ran three models: (1) a crude model that entered only race, (2) an adjusted model that added demographic characteristics (age, age (Phelan and Link, 2015), gender, and immigrant status) and (3) a third model that added socioeconomic factors (income and education). Finally, we analyzed the association between discrimination and each health outcome (Table 3). We again ran three models: (1) a crude model that entered only discrimination, (2) an adjusted model that additionally entered demographic characteristics (age, age-squared, gender, and immigrant status), and (3) a model that further adjusted for socioeconomics (income, education). Unfortunately, due to sample size constraints, we were unable to analyze racial differences separately amongst immigrants and non-immigrants. All models incorporated appropriate survey weights, as

Table 2

Racial inequalities in experiences of discrimination: 2013 Canadian community health survey rapid response module.

	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
<b>Treated with less courtesy or respect than others.</b>			
White (ref.)			
Aboriginal	2.13 (1.68–2.71)	1.82 (1.43–2.31)	1.75 (1.37–2.22)
Black	2.70 (1.76–4.14)	2.01 (1.25–3.24)	1.92 (1.19–3.11)
Asian	1.41 (1.13–1.77)	0.99 (0.74–1.32)	0.99 (0.74–1.32)
Visible Minority	1.57 (1.28–1.92)	1.14 (0.87–1.48)	1.12 (0.86–1.47)
<b>Received poorer service than others.</b>			
White (ref.)			
Aboriginal	1.90 (1.38–2.63)	1.66 (1.20–2.28)	1.65 (1.19–2.27)
Black	3.78 (2.26–6.30)	2.85 (1.63–5.02)	2.85 (1.62–5.01)
Asian	1.96 (1.51–2.56)	1.42 (0.97–2.09)	1.42 (0.97–2.09)
Visible Minority	2.20 (1.73–2.79)	1.64 (1.15–2.33)	1.63 (1.15–2.32)
<b>Treated as being not smart.</b>			
White (ref.)			
Aboriginal	2.53 (1.99–3.23)	2.01 (1.56–2.60)	1.85 (1.42–2.41)
Black	2.54 (1.56–4.11)	1.97 (1.13–3.44)	1.84 (1.04–3.25)
Asian	1.23 (0.94–1.60)	0.91 (0.63–1.31)	0.91 (0.62–1.31)
Visible Minority	1.40 (1.10–1.77)	1.06 (0.76–1.47)	1.04 (0.74–1.46)
<b>Feared by others.</b>			
White (ref.)			
Aboriginal	2.71 (2.01–3.66)	2.25 (1.66–3.06)	2.26 (1.66–3.08)
Black	3.43 (1.91–6.14)	5.25 (2.20–8.20)	4.27 (2.23–8.19)
Asian	0.75 (0.53–1.08)	0.91 (0.55–1.50)	0.91 (0.55–1.51)
Visible Minority	1.08 (0.78–1.49)	1.34 (0.86–2.10)	1.34 (0.86–2.11)

Model 1: Race.

Model 2: Race, Age, Age (Phelan and Link, 2015), Gender, Immigrant Status.

Model 3: Race, Age, Age<sup>2</sup>, Gender, Immigrant Status, Income, Education.

Table 3

Estimates for the association between discrimination and health: 2013 Canadian community health survey rapid response module.

	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Any Chronic Condition	1.68 (1.46–1.94)	1.79 (1.54–2.09)	1.78 (1.52–2.08)
Obesity	1.19 (1.04–1.36)	1.30 (1.13–1.50)	1.27 (1.10–1.47)
Hypertension	0.66 (0.57–0.77)	1.21 (1.01–1.44)	1.20 (1.00–1.43)
Poor Self-Rated Health	1.34 (1.14–1.58)	1.94 (1.62–2.31)	1.90 (1.58–2.29)
Smoking	1.09 (0.97–1.23)	1.31 (1.16–1.49)	1.30 (1.14–1.47)
Binge drinking	1.42 (1.28–1.58)	1.06 (0.94–1.19)	1.08 (0.96–1.22)
Infrequent physical activity	1.04 (0.93–1.17)	1.05 (0.93–1.18)	1.04 (0.92–1.17)

Model 1: Discrimination.

Model 2: Discrimination, Age, Age (Phelan and Link, 2015), Gender, Immigrant Status.

Model 3: Discrimination, Age, Age<sup>2</sup>, Gender, Immigrant Status, Income, Education.

suggested by Statistics Canada.

### 3. Results

#### 3.1. Descriptive statistics (Table 1)

Since Canada does not routinely report data by racial group, it is difficult to compare the CCHS sample to the population with as much precision as might be possible in the United States. For example, there does not appear to be any direct reporting on the proportion of ‘Whites’ in Canada, though this can be approximated by assuming ‘Whites’ are those that do not report being visible minority, nor Aboriginal. With that caveat, compared to the 2011 National Household Survey (the closest year to our data for which national comparative statistics are available), Whites formed a greater proportion of our sample than their share of the Canadian population (88% versus 78.3%). The same was true for Aboriginals, who were 4.7 percent of the CCHS sample, but comprise only 2.6 percent of the 2011 population, and South Asians, who made up 5.7 percent of our sample, but represent 4.8 percent of the population. By contrast, Blacks made up only 1.3 percent of our sample, but represented 2.5 percent of the 2011 population.

Whites in our sample tended to be older than other racial groups. Whites were 6–7 times less likely to be immigrants (12.1 percent of Whites reported being immigrants compared to 74.5 percent of Blacks and 83.3 percent of Asians). Both Whites and Asians were nearly half as likely as Blacks and Aboriginals to be in the lowest income quintile (10.8% and 12.7% compared to 20.5% and 19.8% respectively). Whites and Asians were also more likely than Blacks to be in the highest income quintile. Proportions in the middle quintiles were somewhat more evenly distributed. Educational statistics somewhat belied the income distribution. For example, Whites demonstrated a greater proportion of those with less than secondary schooling than Blacks (12.8% versus 10.7%), though Blacks were more concentrated in the secondary schooling category, while Whites were primarily located in the post-secondary schooling category.

Blacks had the highest proportion of reports of experiencing any form of discrimination (52.2%), followed by Aboriginals (48.4%), Asians, (35.5%) and Whites (30.6%). Blacks consistently had the highest proportions of experiencing each type of discrimination, though in most cases, Aboriginals were not far behind. In that sense, the biggest divide appeared to be between Blacks and Aboriginals, and Whites and Asians, the latter two of whom reported far less discrimination. For some measures, such as being feared by others, Blacks (24.2%) and Aboriginals (20.1%) reported three or more times as much discrimination as Whites (8.5%) and Asians (6.6%). The proportion of Blacks that reported receiving poor service was more than three times that of Whites (28.8% versus 9.7%). When compared to Whites, double the proportion of Blacks reported being treated with less courtesy, and

along with Aboriginals, to be treated as not smart.

Aboriginals had the highest proportion of having a chronic condition (81.5%), while other racial groups were more clustered (between 59.2% (Blacks) and 67.1% (Whites)). Approximately 17% of aboriginals reported poor self-rated health, compared to only 7.1% of Blacks and 7.0% of Asians. Overall, Whites and Aboriginals had the worst risk-factor profiles. Obesity was highest among Aboriginals (26.7%) and Whites (21.3%). Blacks had approximately two-thirds (15.7%) and Asians approximately one-third 7.8% the proportion of individuals reporting being obese. Aboriginals also had the highest proportion of individuals who smoked (76.1%), though a high proportion of Whites were also smokers (67.4%). The proportion of Black and Asian smokers was found to be less than half that of these groups. Aboriginals also had the highest proportions of binge drinking (60.2%). Just over two-thirds as many Whites were binge drinkers (46.3%), and Blacks and Asians had only one-third as many binge drinkers (20.3% and 20.2%, respectively). Proportions of hypertension were much more clustered, ranging from 20.3 percent among Whites, to 14.7 percent among Asians. The same was true for infrequent physical activity, which ranged from 56.2 percent among Asians to 46.7 percent among Blacks.

### 3.2. Regression modeling: experiences of discrimination (Table 2)

Overall, findings of crude models suggested that Blacks were at highest odds of experiencing each form of discrimination, followed by Aboriginals, then Asians.

In fully adjusted models, the effect sizes declined, but only for Asians did they become non-significant. Adjusted models suggest that Blacks and Aboriginals both experienced nearly twice the odds of Whites of being treated with less courtesy or respect than others (Black OR 1.92 [1.19–3.11], Aboriginal OR 1.75 [1.37–2.22]). A similar pattern across racial groups also emerged for experiences of being treated as not smart. Blacks were nearly three times at greater odds than Whites to receive poorer service than others (OR 2.85 [1.62–5.01]), and Aboriginals at sixty-five percent higher odds. The odds of experiencing being feared by others were more than four times higher for Blacks when compared to Whites (OR 4.23 [2.07–8.19]), and Aboriginals over twice as high. Results for visible minorities fell between Black and Asian estimates.

### 3.3. Regression modeling: association between discrimination and health (Table 3)

Results suggest that for many, but not all outcomes, discrimination is associated with chronic conditions and their related risk factors. In crude models, reporting frequent discrimination was associated with sixty eight percent higher odds of having a chronic condition (OR 1.68 [1.46–1.94]). Experiencing frequent discrimination was also associated with higher odds of obesity, binge drinking, and poor self-rated health. Discrimination was not associated with smoking or infrequent physical activity, and was associated with lower likelihood of hypertension. In most cases, adjusting for demographic characteristics strengthened the association between experiences of discrimination and health. In the case of hypertension, the direction of the association changed (OR 1.21 [1.01–1.44]). The association with binge drinking and physical inactivity was non-significant in these models. The addition of socio-economics had little influence on these estimates.

## 4. Discussion

In the first known national Canadian estimates of the associations between race, experiences of discrimination, and chronic conditions and their risk factors, our study produced several important findings.

First, racial minorities in Canada differed significantly in their experiences of discrimination. While Blacks were the most likely to experience discrimination, followed by Aboriginals, Asians were not

statistically different than Whites. Given both global historical and contemporary societal conditions for Blacks and Aboriginals – from slavery and colonization, to state-sanctioned segregation, to their on-going legacies – and more favourable economic contexts of many (but certainly not all) Asian immigrants, this finding is perhaps unsurprising (Galabuzi, 2004; Adelson, 2005). Indeed, prior research from the United States suggests that, after Whites, Asians are the least likely to report everyday experiences of discrimination – sometimes Asians report even fewer instances than Whites (Association AP, 2016).

Moreover, this finding suggests that the ‘visible minority’ category officially recognized by the Canadian government, underestimates discrimination for Blacks, and overestimates discrimination for Asians. Put differently, the ‘visible minority’ category aggregates non-Whites to the extent that it conflates in one category groups whose experiences are often worse than those of Whites, with those whose experiences are better or no different than those of Whites. Our finding thus provides an important basis for replacing the ‘visible minority’ category with finer racial groupings that better reflect the social categories that are most salient in Canada.

Second, after controlling for demographic and socioeconomic covariates, in a Canadian population, experiencing frequent discrimination was associated with nearly twice the odds of having a chronic condition, and with an increase in odds of major risk factors for chronic conditions that ranged from twenty to 98 percent.

Finally, though discrimination is associated with health in Canada, the most compromised health status is not consistently observed in the groups experiencing the most discrimination. On the one hand, Aboriginals experienced high levels of discrimination, and in many cases, suffered the most ill-health. On the other hand, Blacks experienced the highest levels of discrimination, but with the important exception of hypertension, were the healthiest or second healthiest group. The major caveat is that, it is unclear how representative of racial differences in health status the 2013 cycle of CCHS may be, since there were notable inconsistencies from the most comprehensive analysis of racial disparities in health in Canada, a 2000–2010 pooled study of CCHS by Ramraj et al. (2016). These additional cycles were unavailable to us because only the 2013 cycle contained data on experiences of discrimination (Ramraj et al., 2016).

Compared to 2013, from 2000 to 2010, fewer Whites (9.2% versus 11.0%) and Aboriginals (16.2% versus 17.3%) had poor self-rated health, while the proportion was larger for Blacks (16.2% versus 17.3%). The proportions of obesity were higher across all racial groups, ranging from 8.4 percent among Asians to 38.7 percent among Aboriginals. While in 2013, 67.4 percent of Whites, 32.4 percent of Aboriginals, 76.1 percent of Blacks, and 29.9 percent of Asians were smokers, these proportions were 46.9 percent, 58.8 percent, and 19.1 percent, respectively in the older sample. In 2013, 20.3 percent of Whites reported having hypertension, but from 2000 to 2010, this proportion was only 11.9 percent. For Aboriginals (17.8% versus 29.0%) and Blacks (19.4% versus 28.2%), hypertension rates were much higher in the older sample. Asians had similar proportions in both samples. Drinking was assessed differently in the two samples, and physical activity and overall proportion of chronic conditions were not assessed in the previous study. For example, the proportion of White binge drinkers was 12.6 percent, and of Aboriginal binge drinkers was 16.8 percent. The proportion of hypertension was highest amongst Blacks (14.6%). Other studies with fewer cycles of CCHS also demonstrated distinctions with our health findings, through similar to our study, showed elevated risk for hypertension in Blacks compared to Whites (Veenstra, 2009, 2012; Veenstra and Patterson, 2015, 2016; Patterson and Veenstra, 2016).

In the case of measuring any chronic condition, this issue is further compounded by discordance between self-report in the CCHS and administrative health records that has been reported elsewhere (Muggah et al., 2013).

Several possible explanations for our findings should be considered

and further investigated. First, our results may be a function of small sample sizes for Blacks and Asians. Though the CCHS contains the largest sample of Blacks and Asians in a national Canadian health survey, the survey does not explicitly sample by race, and sample sizes for these groups were still quite small. As Canada begins to invest in collecting data to enable analysis of race and racism, our study suggests that it is important to attend to sample size adequacy and representativeness.

Second, immigrant status may influence both levels of reported discrimination and health status. While our sample size was too small to permit us to formally test differences in reported discrimination by immigrant status, it appeared descriptively that, for Whites, there was no difference, while for Blacks and Asians, immigrants reported less discrimination than their native-born counterparts.

In prior Canadian and U.S. data, immigrants of all races seem to initially have better health than their native-born counterparts, but their health worsens with increasing length of stay and generation status (Williams, 2012). Moreover, immigrants who migrate are often a healthier group of individuals than the societies from which they come, thus inducing a selection effect (Acevedo-Garcia et al., 2012). While our analyses of health outcomes controlled for immigrant status, the Canadian context presents an additional complication in understanding the effects of immigrant status: with the exception of Aboriginals, many racial minorities in Canada arrived relatively recently (non-European immigration largely began in the mid 1960s), so, even non-immigrant racial minorities in Canada are largely only one or two generations from arrival (Siddiqi et al., 2013a; Ramraj et al., 2016; Siddiqi and Nguyen, 2010).

Finally, it is also possible that our results represent a genuine phenomenon: that, despite experiencing high levels of discrimination, other societal conditions essentially act as buffers, and thus prevent discrimination from translating into worsened health risk factors. In other words, it is possible that the economic and social security otherwise produced by Canadian institutions, policies, and socio-cultural environment buffer the effects of interpersonal discrimination (Siddiqi et al., 2013a, 2013b; Siddiqi and Nguyen, 2010; Siddiqi and Hertzman, 2007). For instance, prior research has suggested that lower levels of income inequality, a stronger social safety net, and more generous social spending may account for documented higher levels of population health, and lower socioeconomic inequalities in health, in Canada compared to the United States (Siddiqi et al., 2013a, 2013b; Siddiqi and Nguyen, 2010; Siddiqi and Hertzman, 2007; Zuberi, 2006; Banting and Kymlicka, 2003).

Our study suggests important future considerations. Countries such as Canada, that have lagged behind the United States in systematically collecting data on race, and assuring adequate sample sizes of various racial groups, should actively seek to improve survey data in this regard. More generally, the study of racial discrimination should be considered in the context of a population-level phenomenon, and thus more studies that provide results from national and other systematic samples should include information on discrimination. Lastly, the hypothesis that our study yielded – that the health effects of interpersonal discrimination may be buffered (or exacerbated) by other aspects of societal context – should be pursued by further research.

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