

# Provider- and patient-related determinants of diabetes self-management among recent immigrants

## Implications for systemic change

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### Abstract

**Objective** To examine provider- and patient-related factors associated with diabetes self-management among recent immigrants.

**Design** Demographic and experiential data were collected using an international survey instrument and adapted to the Canadian context. The final questionnaire was pretested and translated into 4 languages: Mandarin, Tamil, Bengali, and Urdu.

**Setting** Toronto, Ont.

**Participants** A total of 130 recent immigrants with a self-reported diagnosis of type 2 diabetes mellitus who had resided in Canada for 10 years or less.

**Main outcome measures** Diabetes self-management practices (based on a composite of 5 diabetes self-management practices, and participants achieved a score for each adopted practice); and the quality of the provider-patient interaction (measured with a 5-point Likert-type scale that consisted of questions addressing participants' perceptions of discrimination and equitable care).

**Results** A total of 130 participants in this study were recent immigrants to Canada from 4 countries of origin—Sri Lanka, Bangladesh, Pakistan, and China. Two factors were significant in predicting diabetes self-management among recent immigrants: financial barriers, specifically, not having enough money to manage diabetes expenses ( $P = .0233$ ), and the quality of the provider-patient relationship ( $P = .0016$ ). Participants who did not have enough money to manage diabetes were 9% less likely to engage in self-management practices; and participants who rated the quality of their interactions with providers as poor were 16% less likely to engage in self-management practices.

#### EDITOR'S KEY POINTS

- Understanding the determinants associated with diabetes self-management among high-risk immigrant groups might reduce the burden of type 2 diabetes mellitus on the Canadian health care system.
- This study found that financial hardship and the perceived quality of the provider-patient interaction were statistically significant predictors of diabetes self-management among recent immigrants with type 2 diabetes mellitus. Financial barriers can limit patients' ability to self-manage their diabetes (eg, affect ability to buy medication and management supplies). The patient-provider interaction plays an important role in diabetes self-management, as recent immigrants' perceptions of unfair and discriminatory treatment by health care providers affects their adoption of diabetes self-management practices.

**Conclusion** Financial barriers can undermine effective diabetes self-management among recent immigrants. Ensuring that patients feel comfortable and respected and that they are treated in culturally sensitive ways is also critical to good diabetes self-management.

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# Déterminants reliés au médecin et au patient influençant la prise en charge autonome du diabète par des immigrants récents

## Implications pour des changements systémiques

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### Résumé

**Objectif** Examiner les facteurs liés au médecin et au patient qui ont une incidence sur la prise en charge par le patient de son diabète chez des immigrants récents.

**Conception** Des données démographiques et expérientielles ont été recueillies à l'aide d'un instrument de sondage international adapté au contexte canadien. Le questionnaire final a fait l'objet d'une mise à l'essai préalable, puis a été traduit en 4 langues : mandarin, tamoul, bengali et urdu.

**Contexte** Toronto, en Ontario.

**Participants** Au total, 130 immigrants récents ayant signalé eux-mêmes un diagnostic de diabète de type 2, qui résidaient au Canada depuis 10 ans ou moins.

**Principaux paramètres à l'étude** Les pratiques de prise en charge autonome du diabète (en se fondant sur un ensemble de 5 pratiques de prise en charge de son diabète, les participants ayant obtenu un score pour chaque pratique adoptée), de même que la qualité des interactions entre le médecin et le patient (mesurée selon une échelle de type Likert en 5 points dans la réponse à des questions sur les perceptions de discrimination et de soins équitables par les participants).

**Résultats** Les 130 participants à cette étude étaient des immigrants récents au Canada en provenance de 4 pays : Sri Lanka, Bangladesh, Pakistan et Chine. Deux facteurs étaient des prédicateurs significatifs de la prise en charge par des immigrants récents de leur diabète : les difficultés financières, plus précisément le fait de ne pas avoir assez d'argent pour les dépenses liées à la prise en charge du diabète ( $p = ,0233$ ), de même que la qualité de la relation entre le médecin et le patient ( $p = ,0016$ ). Les participants qui n'avaient pas assez d'argent pour prendre en charge leur diabète étaient 9% moins susceptibles d'adopter de telles pratiques. Les participants qui jugeaient mauvaise la qualité de leurs interactions avec les médecins étaient 16% moins enclins à adopter des pratiques de prise en charge de leur diabète.

**Conclusion** Les difficultés financières peuvent nuire à une prise en charge autonome efficace du diabète chez les immigrants récents. Il est aussi essentiel de faire en sorte que les patients se sentent à l'aise, respectés et traités de manière adaptée à leur culture pour favoriser une bonne prise en charge par le patient de son diabète.

### POINTS DE REPÈRE DU RÉDACTEUR

- Une bonne compréhension des déterminants associés à la prise en charge par le patient de son diabète dans des groupes d'immigrants à risque élevé pourrait réduire le fardeau du diabète de type 2 qui pèse sur le système de santé canadien.
- Cette étude a révélé que les difficultés financières et les perceptions entourant la qualité des interactions entre médecins et patients étaient des prédicateurs statistiquement significatifs influençant la prise en charge par le patient de son diabète chez des immigrants récents souffrant de diabète de type 2. Les obstacles financiers peuvent limiter la capacité des patients de prendre en charge leur diabète (p. ex. capacité réduite d'acheter les médicaments et les fournitures médicales). L'interaction entre le médecin et le patient joue un rôle important dans la prise en charge autonome, puisqu'un traitement perçu par les immigrants récents comme étant injuste et discriminatoire nuirait à leur adoption des pratiques de prise en charge autonome de leur diabète.

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**D**iabetes affects 7.6% of the Canadian population, of which more than 90% constitutes type 2 diabetes mellitus (T2DM).<sup>1</sup> In addition to determinants of health such as low income, age, and obesity, immigrant status has been identified as a considerable risk factor for T2DM.<sup>1-5</sup> An Ontario study that looked at linked administrative health and immigration records found that recent immigrants experienced higher odds of developing T2DM compared with long-term residents of this province.<sup>5</sup> The increased risk of T2DM among recent immigrants is attributed to multiple and interconnected factors including genetic predisposition, low income, nutritional transition, acculturative stress, social isolation, limited physical activity, and health care services that are not linguistically and culturally sensitive.<sup>2-8</sup> Recent immigrants are also more likely to develop complications associated with T2DM such as atherosclerosis and renal failure.<sup>2</sup> Reducing the illness complications and the economic burden of T2DM requires effective self-management practices.<sup>9,10</sup> However, little is known about the determinants of self-management practices among recent Canadian immigrants. The objective of this study was to identify patient- and provider-related factors associated with T2DM self-management in this group.

### Diabetes self-management practices

Diabetes self-management practices include physical activity, smoking cessation, the consumption of a healthy diet, regular foot care, and glycemic checks.<sup>2,11-13</sup> Although glucose monitoring is currently under review, these core elements are recommended by Canadian and international clinical practice guidelines and there is sufficient evidence to suggest that self-management of diabetes is associated with clinical and economic benefits.<sup>9,10,14-18</sup>

The literature identifies many factors associated with the adoption of diabetes self-management practices,<sup>13,19</sup> both patient and provider related. The former include low income, limited social support, cultural differences in beliefs about illness causation and management, linguistic barriers, low levels of health literacy, and comorbidities such as depression that challenge the ability to perform diabetes self-care.<sup>13</sup> The latter includes provider knowledge and attitudes about diabetes, as well as perceptions of the quality of the interaction between a patient and his or her health care provider.<sup>20</sup>

The literature on the determinants of T2DM self-management practices among recent immigrant populations is very limited. Available studies, mostly qualitative, show that social support systems and access to information and services affect diabetes self-management practices among immigrant communities.<sup>21,22</sup> Given the high risk of T2DM among recent immigrants and the effectiveness of diabetes self-management, an understanding of the determinants associated with diabetes self-management among high-risk

immigrant groups might reduce the burden of T2DM on the Canadian health care system.

## METHODS

### Setting and sample frame

The study design was a cross-sectional survey of recent immigrants with T2DM living in the greater Toronto area in Ontario who had resided in Canada for 10 years or less and a comparison Canadian-born group with T2DM. This definition of *recent immigrants* has been used in other studies of Canadian immigrants.<sup>6-8</sup> In 2006, there were 465 815 recent immigrants in Toronto, accounting for 18.4% of the city's population. The top regions of origin for immigrants settling in Toronto between 2001 and 2006 were South Asia (26%) and East Asia (20%, most from China).<sup>23</sup> Toronto ranks higher than any other metropolitan area in North America in terms of immigrants as a percentage of the total population.<sup>24</sup>

The sample size and eligibility criteria for this study were pre-established by the Public Health Agency of Canada. The age range was predefined as adults aged between 35 and 65. The diagnosis of T2DM was based on self-report. Although there are hundreds of newcomer communities in Toronto, the recent immigrant communities included in this study were selected using 4 criteria: risk of developing T2DM after migration; current immigration trends; the presence of social, economic, and linguistic barriers to health care; and pre-existing relationships with the research team that would facilitate recruitment and optimize participation.

### Sampling procedure

With the absence of a sample frame or registry of all new immigrants with T2DM in Toronto from which to draw a representative sample, several techniques were used to recruit study participants. High-density immigrant neighbourhoods were identified by mapping 2006 census tracts in the greater Toronto area where more than 50% of the population spoke 1 of the 4 study languages. These areas were targeted for information campaigns, including posters in buildings, stores, and community centres. Immigrant-serving organizations, diabetes education centres, and community health centres were also used to recruit recent immigrant participants.

### Survey development

Demographic and experiential data were collected using an adapted survey instrument developed by the International Centre for Migration Health and Development. Following extensive consultation with representatives of immigrant-serving organizations, diabetes education centres, and community health centres, the survey instrument was modified and adapted

to the Canadian context. The final questionnaire was pretested and translated into 4 languages: Mandarin, Tamil, Bengali, and Urdu. Ethics approval was obtained from the University of Toronto, Mount Sinai Hospital, and St Michael's Hospital in Toronto. Face-to-face interviews were conducted by trained researchers during a 9-month period in 2009 to 2010 using a computer-assisted personal interviewing methodology.<sup>25,26</sup> Study participants were able to complete interviews in their language of choice. Each interview lasted between 1 and 2 hours. The computer-assisted interview tool was created using SPSS data entry software.

### Study variables

The main outcome variable, diabetes self-management, was created based on a composite of 5 self-reported T2DM self-management practices: weekly self-monitoring of glucose (yes or no), weekly foot checks (yes or no), reduction in carbohydrate intake (yes or no), smoking status (yes or no), and regular physical activity (yes or no), as recommended in the 2008 Canadian Diabetes Association clinical practice guidelines.<sup>2</sup> Participants were scored on a scale of 0 to 5, with 1 point given for each of the practices that were adopted. The highest score an individual could receive was 5 and the lowest was 0. The aim of this composite variable was to be able to better categorize diabetes self-management practices based on more than 1 variable.

Demographic characteristics included age (continuous), marital status (married or not married), education (less than high school, high school or college, university or higher), sex (male or female), and employment (employed or unemployed). Two questions were used to assess financial barriers: "Have you ever been unable to manage your diabetes because you didn't have enough money?" (yes or no) and "Did not having costs covered by health card [Ontario Health Insurance Plan] or insurance make accessing health care difficult?" (yes or no).

The quality of the provider-patient interaction was assessed using a 5-point Likert-type scale developed and validated by the study team during previous qualitative work with racialized\*<sup>27</sup> immigrant community members. The scale consisted of the following 4 questions (responses included never, sometimes, often, very often, and always [1=never and 5=always]) addressing participants' experiences with health professionals in Canada: "Did you feel that you were treated fairly and equitably?" "Did you feel that you were treated with respect and dignity?" "Do you feel comfortable and accepted in

the health care setting?" and "Do you feel that health professionals understand and accept your cultural background?" Higher scores indicated a better quality of interaction with the provider.

Three variables were used to control for differences in the severity of T2DM that might influence self-management practices. Obesity was measured using body mass index and waist circumference measurements. It was dichotomized as not overweight or obese or overweight or obese. Diabetes-related comorbidity was assessed using the total number of health problems associated with diabetes that study participants identified from a list, for example, teeth problems, eye problems, leg problems, feet problems, heart problems, kidney problems. Comorbidity was categorized as no associated health problems, 1 health problem, or 2 or more health problems. Stress was assessed using a stress measure based on the Quebec Health Survey<sup>28</sup> and modified and validated by Noh and Kaspar.<sup>29</sup> The stress score reflects the mean response of 13 questions, phrased as "How often do you feel stress due to [factor]?" Stress-related factors included physical health, financial problems, housing problems, discrimination, and language barriers. Each response was scored on a scale of 1 to 5 (1=never stressed and 5=always stressed), and a mean index for stress was computed.

### Statistical analyses

Univariate logistic regression analysis was carried out to determine which variables should be included in the multivariate analysis using a cutoff *P* value of less than .2. Multivariate logistic regression using backward stepwise selection, removing variables that were not significant at the  $\alpha$  level of .05, was used to determine the best model. The final model included variables that were significant at the  $\alpha$  level of .05. The score test was used to assess the proportional assumption of odds between the levels of the outcome, which was accepted in our model as the final  $\alpha$  level was greater than .20. The Akaike information criterion, a measure of the relative quality of a statistical model, was used to assess errors in each of the more parsimonious models. Statistical analyses were conducted using SPSS, version 9.3, and SAS, version 9.2.

## RESULTS

Data were collected from 184 study participants with T2DM. Of these, 130 were recent immigrants (those who arrived in Canada within the past 10 years from the year this study was conducted) from Sri Lanka (*n*=30), Bangladesh (*n*=35), Pakistan (*n*=35), and China (*n*=30). Given the absence of a sampling frame, response rates could not be calculated. **Table 1** presents the descriptive statistics of the study population: 45.0% (58 of 130) of the

\*Unlike the term *visible minorities*, which Canada's Employment Equity Act defines as "non-Caucasian in race or non-white in colour,"<sup>27</sup> *racialized groups* is a term that clarifies that race is not an objective biologic fact, but rather a social and cultural construct that potentially exposes individuals to racism.

participants were male, 89.2% (116 of 130) were married, and the mean age of participants was 51.2 years. Only 34.0% of participants were employed; however, 52.0% had a university degree or higher. Financial barriers to diabetes self-management faced by recent immigrants included not having enough money to manage diabetes (30.8%) and not having insurance that covered the

costs of management expenses (48.5%). The mean score on the provider-patient interaction scale was 3.89; we found that of the participants, 60.8% often or always felt they were treated fairly and equitably, 59.2% often or always felt they were treated with respect and dignity, 58.5% felt comfortable and accepted in the health care setting, and 53.9% felt understood and accepted. In terms of diabetes severity, 19.7% of participants were overweight or obese, 65.4% had some comorbidity, and the mean stress score was 2.5. Overall, the data show that most participants followed at least 3 of the recommended diabetes self-management practices.

Findings from the univariate analysis are presented in **Table 2**. The variables that met inclusion criteria were age, sex, employment, highest level of education, financial barriers, quality of provider-patient interaction, stress, and comorbidity.

**Tables 3 and 4** present findings from the initial and final multivariate analyses. In the final multivariate analysis, only 2 factors were significant in predicting diabetes self-management: the financial barrier of not having enough money to manage diabetes ( $P = .0233$ ) and the quality of the provider-patient relationship ( $P = .0016$ ) (**Table 4**). Participants who did not have enough money to manage diabetes were 9% less likely to engage in self-management practices and study participants who rated the quality of their interactions with providers as poor were 16% less likely to engage in self-management practices.

## DISCUSSION

Financial hardship and the perceived quality of the provider-patient interaction were statistically significant predictors

**Table 1. Descriptive statistics of the study population of recent immigrants:  $N = 130$ .**

CHARACTERISTICS	VALUE
Mean age, y	51.2
Male sex, %	45.0
Married marital status, %	89.2
Employment, %	
• Employed full time or part time	34.0
• Unemployed, looking for work	18.0
• Unemployed, not looking for work	48.0
Highest level of education, %	
• Less than high school	33.3
• High school or college	14.7
• University or higher	52.0
Financial barriers, %	
• Not enough money to manage diabetes	30.8
• Costs of diabetes management not covered by insurance	48.5
Mean score on the quality of provider-patient interaction scale	3.89
Quality of provider-patient interaction, %	
• 1 (Worst)	2.7
• 2	19.4
• 3	22.5
• 4	25.2
• 5 (Best)	30.2
Overweight or obese, %	19.7
Diabetes comorbidity, %	
• No additional problems	34.6
• 1 problem	20.0
• $\geq 2$ problems	45.4
Mean stress score	2.5
Total diabetes self-management practices followed, %	
• 1 practice	2.3
• 2 practices	9.2
• 3 practices	23.1
• 4 practices	35.4
• All practices	30.0
Mean diabetes self-management score	3.8

**Table 2. Univariate predictors of diabetes self-management**

VARIABLE	PVALUE
Age	.0770
Sex	.0826
Marital status	.3464
Employment	.1627
Highest level of education	.0028
Financial barriers	
• Not enough money to manage diabetes	.0493
• Costs of diabetes management not covered by insurance	.3167
Quality of provider-patient interaction	.0026
Stress (mean)	.0602
Obesity	.5114
Comorbidity	.1328

**Table 3. Initial multivariate model for associations with diabetes self-management**

VARIABLE	P VALUE
Age	.0709
Sex	.1153
Highest level of education	.7737
Employment	.8440
Financial barriers	
• Not enough money to manage diabetes	.0096
• Costs of diabetes management not covered by insurance	.3899
Quality of provider-patient interaction	.0004
Stress	.1890
Comorbidity	.8505

**Table 4. Final multivariate model for associations with diabetes self-management**

VARIABLE	P VALUE	ODDS RATIO (95% CI)
Financial barrier		
• Not enough money to manage diabetes	.0233	1.086 (1.032-1.142)
Quality of provider-patient interaction	.0016	1.161 (1.034-1.307)

of diabetes self-management among recent immigrants with T2DM in Toronto. The fact that financial barriers impede self-management practices is well documented in the literature.<sup>29-33</sup> Financial barriers can limit patients' ability to self-manage their diabetes in several ways: reducing the amount of time they have for physical activity; affecting their access to healthy food; prohibiting them from buying medication and management supplies; and contributing to a stressful psychosocial environment associated with the adoption of unhealthy behaviour. Approximately 57% of Canadians with T2DM report that the cost of medications, devices, and supplies prevents them from following prescribed self-management practices.<sup>34</sup> Financial hardship as a barrier to self-management is of particular concern for recent immigrants in Canada living with increasing rates of low income. Although immigrant and Canadian-born population groups experienced similar rates of low income in 1980, by 2005, immigrants were 1.6 times more likely than those of the Canadian-born population to be in low-income categories.<sup>35</sup> For very recent immigrants (who arrived in Canada 5 years previously or earlier), the rate of low income in 2005 was 2.7 times higher than it was for those who were Canadian born.<sup>35</sup>

Our finding that the perceived quality of the patient-provider interaction plays an important role in diabetes self-management is also consistent with previous research. Enhancing patient-provider communication

and shared decision making have been shown to result in greater patient satisfaction, adherence to treatment plans, and improved health outcomes, such as higher self-reported health status, emotional health, symptom relief, and physiologic measures of disease control; however, the causal mechanism for these results remains unclear.<sup>36,37</sup> Our measure of patient-provider interaction incorporated an underresearched aspect of this relationship: the perception of discrimination and inequitable care, which appears to be an important determinant of the adoption of healthy diabetes self-management practices. A small but growing body of research is documenting how and why perceptions of discrimination and the lack of linguistically and culturally sensitive care constitute systemic barriers to health care in general<sup>26,38-40</sup> and participation in health-enhancing behaviour.<sup>40</sup> For example, US studies found that perceived discrimination among African-American patients is associated with communication barriers, perceptions of disrespect, and adverse health outcomes such as lower rates of blood glucose (hemoglobin A<sub>1c</sub> levels) testing,<sup>38,41</sup> foot examinations, and blood pressure testing, and cognitive decline.<sup>41-43</sup> These findings carry strong relevance, as recent immigrants and racialized groups (two-thirds of whom are foreign born) are disproportionately more likely than other groups are to experience discrimination and unfair treatment in health care settings.<sup>44-47</sup>

### Limitations

A few limitations to this study must be noted. The study sample was small and non-randomized and we were unable to examine areas of vulnerability within the recent immigrant group such as immigration status (ie, refugee) and age at arrival. Larger-scale studies are needed to validate our results. The results are based on self-reporting, which is prone to bias. Some variables associated with diabetes self-management, such as social support and access to information, were not available in the survey instrument. Some questions were developed specifically for this study and not validated in previous research (eg, Do you have insurance?). The lack of an association between insurance and self-management in this study requires further investigation given the growing recognition and support of universal pharmacare in Canada. The findings might only reflect the experiences of recent immigrants from racialized backgrounds with a first language other than English. A Canadian-born comparison group was not included in our analysis. Because the study only encompassed immigrants from 4 linguistic groups, our results are not generalizable to the whole recent immigrant population; however, it is worth noting that immigrants are among the high-risk groups.

The statistically significant association between perceived quality of patient-provider relationship and

diabetes self-management is timely given the recent introduction of the Excellent Care for All Act and the Health Equity Impact Assessment tool by the Ontario Ministry of Health and Long-Term Care, which mandates health care institutions to establish quality improvement committees to review and improve quality of care to improve patient experience with attention to equity.<sup>48</sup> Training healthcare providers in diversity and cross-cultural sensitivity is crucial in ensuring respectful, culturally sensitive, and equitable care. Increasing the diversity of health care staff and working in partnership with immigrant community leaders and outreach workers are also proven system-level solutions that might contribute to improved T2DM compliance and outcomes among recent immigrants.<sup>49-55</sup>

## Conclusion

Even in a health care system where there is universal coverage, financial barriers can prevent people from effectively managing T2DM. For example, Canada lacks a publicly funded drug coverage program. The effective self-management of T2DM is not only about having accessible health care services or health care providers prescribing healthy diabetes self-management practices.<sup>56</sup> Our results indicate that financial barriers and perceived experiences of unfair and discriminatory treatment by health care providers can undermine effective diabetes self-management in a recent immigrant population. Additional research is necessary to confirm whether similar associations exist in nonrecent and Canadian-born groups. Structural impediments can be overcome by putting health equity into routine practice within primary health care settings. Solutions might include the following: greater collaboration across health and social sectors on tangible client interventions and political advocacy to overcome financial barriers to health care—similar to the “poverty tool”<sup>†</sup> developed by Bloch et al<sup>57,58</sup>; and tailored training on nondiscriminatory and newcomer-friendly models of provider-patient interaction. 

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### Contributors

**Dr Hyman**, the primary investigator for this project, conceptualized the research question, oversaw the data collection and analysis, and wrote the first draft of this manuscript. **Dr Shakya**, the co-primary investigator for this project, conceptualized the research question, oversaw the data collection and

analysis, and contributed to the first draft of this manuscript. **Drs Gucciardi and Vissandjée** were co-investigators who contributed to the design of the study and reviewed the final manuscript. **Mr Jembere** conducted the data analysis.

### Competing interests

None declared

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### References

- Canadian Diabetes Association. *Diabetes: Canada at the tipping point*. Toronto, ON: Canadian Diabetes Association. Available from: [www.diabetes.ca/CDA/media/documents/publications-and-newsletters/advocacy-reports/canada-at-the-tipping-point-english.pdf](http://www.diabetes.ca/CDA/media/documents/publications-and-newsletters/advocacy-reports/canada-at-the-tipping-point-english.pdf). Accessed 2017 Jan 19.
- Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2008 clinical practice guidelines for the prevention and management of diabetes in Canada. *Can J Diabetes* 2008;32:S1-S201.
- Public Health Agency of Canada [website]. *Diabetes in Canada. Facts and figures from a public health perspective*. Ottawa, ON: Public Health Agency of Canada; 2012. Available from: [www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/index-eng.php](http://www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/index-eng.php). Accessed 2017 Jan 19.
- Veenstra G. Racialized identity and health in Canada: results from a nationally representative survey. *Soc Sci Med* 2009;69(4):538-42. Epub 2009 Jun 25.
- Creatore MI, Moineddin R, Booth G, Booth G, Manuel DH, DesMeules M, et al. Age- and sex-related prevalence of diabetes mellitus among immigrants to Ontario, Canada. *CMAJ* 2010;182(8):781-9. Epub 2010 Apr 19.
- Hyman I, Jackson B. The healthy immigrant effect: a temporary phenomenon? In: Health Canada. *Migrant health*. Ottawa, ON: Health Canada; 2010. Available from: [www.hc-sc.gc.ca/sr-sr/pubs/hpr-rpms/bull/2010-health-sante-migr/index-eng.php](http://www.hc-sc.gc.ca/sr-sr/pubs/hpr-rpms/bull/2010-health-sante-migr/index-eng.php). Accessed 2017 Jan 19.
- Vissandjée B, Desmeules M, Cao Z, Abdool S, Kazanjian A. Integrating ethnicity and migration as determinants of Canadian women's health. *BMC Womens Health* 2004;4(Suppl 1):S32.
- Chen J, Ng E, Wilkins R. The health of Canada's immigrants in 1994-95. *Health Rep* 1996;7(4):33-45, 37-50.
- Garrett DG, Bluml BM. Patient self-management program for diabetes: first-year clinical, humanistic, and economic outcomes. *J Am Pharm Assoc* 2005;45(2):130-7.
- Sidorov J, Shull R, Tomcavage J, Girolami S, Lawton N, Harris R. Does diabetes disease management save money and improve outcomes? A report of simultaneous short-term savings and quality improvement associated with a health maintenance organization-sponsored disease management program among patients fulfilling health employer data and information set criteria. *Diabetes Care* 2005;28(4):684-9.
- Centers of Disease Control and Prevention. Strategies for reducing morbidity and mortality from diabetes through health-care system interventions and diabetes self-management education in community settings. A report on recommendations of the Task Force on Community Preventive Services. *MMWR Recomm Rep* 2001;50(RR-16):1-15.
- Lorig KR, Sobel DS, Stewart AL, Brown BW Jr, Bandura A, Ritter P, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Med Care* 1999;37(1):5-14.
- Chodosh J, Morton SC, Mojica W, Maglione M, Suttrop MJ, Hilton L, et al. Meta-analysis: chronic disease self-management programs for older adults. *Ann Intern Med* 2005;143(6):427-38.
- Michigan Quality Improvement Consortium. *Management of diabetes mellitus*. Southfield, MI: Michigan Quality Improvement Consortium; 2013. Available from: [www.mqic.org/pdf/mqic\\_management\\_of\\_diabetes\\_mellitus\\_cpg.pdf](http://www.mqic.org/pdf/mqic_management_of_diabetes_mellitus_cpg.pdf). Accessed 2017 Jan 19.
- National Collaborating Centre for Chronic Conditions. *Type 2 diabetes. The management of type 2 diabetes*. London, UK: National Institute for Health and Clinical Excellence; 2009. Available from: [www.nice.org.uk/guidance/ta203/resources/nice-recommends-liraglutide-for-type-2-diabetes-mellitus4](http://www.nice.org.uk/guidance/ta203/resources/nice-recommends-liraglutide-for-type-2-diabetes-mellitus4). Accessed 2017 Jan 19.
- Scottish Intercollegiate Guidelines Network. *Management of diabetes. A national clinical guideline*. Edinburgh, Scot: Scottish Intercollegiate Guidelines Network; 2010. Available from: [www.sign.ac.uk/pdf/sign116.pdf](http://www.sign.ac.uk/pdf/sign116.pdf). Accessed 2017 Jan 19.
- American Association of Diabetes Educators. *Guidelines for the practice of diabetes education*. Chicago, IL: American Association of Diabetes Educators; 2010.
- Haas L, Maryniuk M, Beck J, Cox CE, Duker P, Edwards L, et al. National standards for diabetes self-management education and support. *Diabetes Care* 2013;36(Suppl 1):S100-8.
- Peyrot M, Rubin RR, Lauritzen T, Snoek FJ, Matthews DR, Skovlund SE. Psychosocial problems and barriers to improved diabetes management: results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) study. *Diabet Med* 2015;22(10):1379-85.
- Nam S, Chesla C, Stotts NA, Kroon L, Janson SL. Barriers to diabetes management: patient and provider factors. *Diabetes Res Clin Pract* 2011;93(1):1-9. Epub 2011 Mar 5.

<sup>†</sup>The Ontario College of Family Physicians framework outlined in *Poverty: A Clinical Tool for Primary Care in Ontario* suggests a simple, 3-step approach to address poverty: screen, adjust risk, and intervene.<sup>57</sup>

21. Huang Y. *Self-management of type 2 diabetes among Mainland Chinese immigrants in Canada: a qualitative study* [master's thesis]. Guelph, ON: University of Guelph; 2013. Available from: [https://atrium.lib.uoguelph.ca/xmlui/bitstream/handle/10214/6430/Huang\\_Youyou\\_201304\\_Msc.pdf?sequence=5&isAllowed=y](https://atrium.lib.uoguelph.ca/xmlui/bitstream/handle/10214/6430/Huang_Youyou_201304_Msc.pdf?sequence=5&isAllowed=y). Accessed 2017 Jan 19.
22. Chesla C, Chun KM, Kwan CM. Cultural and family challenges to managing type 2 diabetes in immigrant Chinese communities. *Diabetes Care* 2009;32(10):1812-6. Epub 2009 Jul 23.
23. Khandor E, Koch A. *The global city: newcomer health in Toronto*. Toronto, ON: Toronto Public Health, Access Alliance Multicultural Health and Community Services; 2010. Available from: [www.toronto.ca/legdocs/mmis/2011/hl/bgrd/backgroundfile-42361.pdf](http://www.toronto.ca/legdocs/mmis/2011/hl/bgrd/backgroundfile-42361.pdf). Accessed 2017 Jan 19.
24. Statistics Canada [website]. *Census snapshot—immigration in Canada: a portrait of the foreign-born population, 2006 census*. Ottawa, ON: Statistics Canada; 2008. Available from: [www.statcan.gc.ca/pub/11-008-x/2008001/article/10556-eng.htm](http://www.statcan.gc.ca/pub/11-008-x/2008001/article/10556-eng.htm). Accessed 2017 Jan 19.
25. Randolph JJ, Virnes M, Jormanainen I, Eronen PJ. The effects of a computer-assisted interview tool on data quality. *J Educ Technol Soc* 2006;9(3):195-205.
26. Hallfors D, Khatapoush S, Kadushin C, Watson K, Saxe L. A comparison of paper vs computer-assisted self-interview for school alcohol, tobacco, and other drug surveys. *Eval Program Plann* 2000;23(2):149-55.
27. Minister of Justice. *Employment Equity Act*. Ottawa, ON: Government of Canada; 2016. Available from: <http://laws.justice.gc.ca/PDF/E-5.401.pdf>. Accessed 2017 Jan 19.
28. Paykel ES, Myers JK, Dienelt MN, Klerman GL, Lindenthal JJ, Pepper MP. Life events and depression. A controlled study. *Arch Gen Psychiatry* 1969;21(6):753-60.
29. Noh S, Kaspar V. Perceived discrimination and depression: moderating effects of coping, acculturation, and ethnic support. *Am J Public Health* 2003;93(2):232-8.
30. Onwudike NC, Mullins CD, Winston RA, Shaya FT, Pradel FG, Laird A, et al. Barriers to self-management of diabetes: a qualitative study among low-income minority diabetics. *Ethn Dis* 2011;21(1):27-32.
31. Raphael D, Anstice S, Raine K, McGannon KR, Rizvi SK, Yu VL. The social determinants of the incidence and management of type 2 diabetes mellitus: are we prepared to rethink our questions and redirect our research activities. *Leadersh Health Serv* 2003;16(3):10-20.
32. Peyrot M, Rubin RR, Lauritzen T, Snoek FJ, Matthews DR, Skovlund SE. Psychosocial problems and barriers to improved diabetes management: results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabet Med* 2005;22(10):1379-85.
33. Simmons D, Peng A, Cecil A, Gatland B. The personal costs of diabetes: a significant barrier to care in South Auckland. *N Z Med J* 1999;112(1097):383-5.
34. PSL Research. *Report on survey of Canadians with type 2 diabetes*. Montreal, QC: PSL Research; 2007.
35. Picot G, Lou Y, Hou F. *Immigrant low-income rates: the role of market income and government transfers*. Catalogue no. 75-001-X. Ottawa, ON: Statistics Canada; 2009. Available from: [www.statcan.gc.ca/pub/75-001-x/2009112/pdf/11055-eng.pdf](http://www.statcan.gc.ca/pub/75-001-x/2009112/pdf/11055-eng.pdf). Accessed 2017 Jan 19.
36. Heisler M, Bouknight RR, Hayward RA, Smith DM, Kerr EA. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *J Gen Intern Med* 2002;17(4):243-52.
37. Heisler M, Cole I, Weir D, Kerr EA, Hayward RA. Does physician communication influence older patients' diabetes self-management and glycemic control? Results from the Health and Retirement Study (HRS). *J Gerontol A Biol Sci Med Sci* 2007;62(12):1435-42.
38. Zgibor JC, Simmons D. Barriers to blood glucose monitoring in a multiethnic community. *Diabetes Care* 2002;25(10):1772-7.
39. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. *J Behav Med* 2009;32(1):20-47. Epub 2008 Nov 22.
40. Pascoe EA, Smart Richman L. Perceived discrimination and health: a meta-analytic review. *Psychol Bull* 2009;135(4):531-54.
41. Ryan AM, Gee GC, Griffith D. The effects of perceived discrimination on diabetes management. *J Health Care Poor Underserved* 2008;19(1):149-63.
42. Hausmann LR, Hannon MJ, Kresevic DM, Hanusa BH, Kwok CK, Ibrahim SA. Impact of perceived discrimination in healthcare on patient-provider communication. *Med Care* 2011;49(7):626-33.
43. Crowe M, Sartori A, Clay OJ, Wadley VG, Andel R, Wang HX, et al. Diabetes and cognitive decline: investigating the potential influence of factors related to health disparities. *J Aging Health* 2010;22(3):292-306. Epub 2010 Jan 26.
44. Toronto Public Health. *Racialization and health inequities in Toronto*. Toronto, ON: Toronto Public Health; 2013. Available from: [www.toronto.ca/legdocs/mmis/2013/hl/bgrd/backgroundfile-62904.pdf](http://www.toronto.ca/legdocs/mmis/2013/hl/bgrd/backgroundfile-62904.pdf). Accessed 2017 Jan 19.
45. Patychuk D. *Health equity and racialized groups: a literature review*. Toronto, ON: Health Equity Council and Health Nexus; 2011. Available from: [http://en.healthnexus.ca/sites/en.healthnexus.ca/files/resources/healthequityracializedgrps\\_literature\\_review.pdf](http://en.healthnexus.ca/sites/en.healthnexus.ca/files/resources/healthequityracializedgrps_literature_review.pdf). Accessed 2017 Jan 19.
46. Nangia P. *Discrimination experienced by landed immigrants in Canada*. RCIS working papers 2013/7. Toronto, ON: Ryerson Centre for Immigration and Settlement; 2013. Available from: [www.ryerson.ca/content/dam/rcis/documents/RCIS\\_WP\\_Parveen\\_Nangia\\_No\\_2013\\_7.pdf](http://www.ryerson.ca/content/dam/rcis/documents/RCIS_WP_Parveen_Nangia_No_2013_7.pdf). Accessed 2017 Jan 19.
47. Statistics Canada. *Ethnic diversity survey: portrait of a multicultural society*. Catalogue no. 89-593-XIE. Ottawa, ON: Statistics Canada; 2003. Available from: <http://publications.gc.ca/Collection/Statcan/89-593-X/89-593-XIE2003001.pdf>. Accessed 2017 Jan 19.
48. Ontario Ministry of Health and Long-Term Care [website]. *About the Excellent Care for All Act*. Toronto, ON: Ontario Ministry of Health and Long-Term Care; 2015. Available from: [www.health.gov.on.ca/en/pro/programs/ecfa/legislation/act.aspx](http://www.health.gov.on.ca/en/pro/programs/ecfa/legislation/act.aspx). Accessed 2017 Jan 19.
49. Cooper-Patrick L, Gallo JJ, Gonzales JJ, Vu HT, Powe NR, Nelson C, et al. Race, gender, and partnership in the patient-physician relationship. *JAMA* 1999;282(6):583-9.
50. Etowa JB, Foster S, Vukic A, Wittstock L, Youden S. Recruitment and retention of minority students: diversity in nursing education. *Int J Nurs Educ Scholarsh* 2005;2(1):13. Epub 2005 Jun 23.
51. Pearson A, Srivastava R, Craig D, Tucker D, Grinspun D, Bajnok I, et al. Systematic review on embracing cultural diversity for developing and sustaining a healthy work environment in healthcare. *Int J Evid-Based Healthc* 2007;5(1):54-91.
52. Peek ME, Ferguson M, Bergeron N, Maltby D, Chin MH. Integrated community-healthcare diabetes interventions to reduce disparities. *Curr Diab Rep* 2014;14(3):467.
53. Spencer MS, Rosland AM, Kieffer EC, Sinco BR, Valerio M, Palmisano G, et al. Effectiveness of a community health worker intervention among African American and Latino adults with type 2 diabetes: a randomized controlled trial. *Am J Public Health* 2011;101(12):2253-60. Epub 2011 Jun 16.
54. Sullivan Commission on Diversity in the Healthcare Workforce. *Missing persons: minorities in the health professions*. Washington, DC: Sullivan Commission on Diversity in the Healthcare Workforce. Available from: [www.aacn.nche.edu/media-relations/SullivanReport.pdf](http://www.aacn.nche.edu/media-relations/SullivanReport.pdf). Accessed 2017 Jan 19.
55. Traylor A, Schmittiel JA, Uratsu CS, Mangione CM, Subramanian U. Adherence to cardiovascular disease medications: does patient-provider race/ethnicity and language concordance matter? *J Gen Intern Med* 2010;25(11):1172-7. Epub 2010 Jun 23.
56. Canadian Diabetes Association. *A healthier Canada, a healthier economy. Recommendations by the Canadian Diabetes Association for the 2012 federal budget. Brief to the House of Commons Standing Committee on Finance*. Toronto, ON: Canadian Diabetes Association; 2011. Available from: [www.diabetes.ca/CDA/media/documents/about/cda-recommendations-for-2012-federal-budget-english.pdf](http://www.diabetes.ca/CDA/media/documents/about/cda-recommendations-for-2012-federal-budget-english.pdf). Accessed 2017 Jan 19.
57. Bloch G. *Poverty: a clinical tool for primary care in Ontario*. Toronto, ON: Ontario College of Family Physicians; 2013. Available from: <http://ocfp.on.ca/docs/default-source/cme/poverty-and-medicine-march-2013.pdf>. Accessed 2017 Jan 19.
58. Bloch G, Etches V, Gardner C, Pellizzari R, Rachlis M, Scott F, et al. Strategies for physicians to mitigate the health effects of poverty. *Ont Med Rev* 2008;75:45-9.

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