

HEALTH PRACTITIONERS' PERSPECTIVES ON THE BARRIERS TO DIAGNOSIS AND TREATMENT OF DIABETES IN ABORIGINAL PEOPLE ON VANCOUVER ISLAND

Geoffrey McKee

Centre for Aboriginal Health Research, University of Victoria
Victoria, BC

Frank Clarke

Centre for Aboriginal Health Research, University of Victoria
Victoria, BC

Andrew Kmetc, PhD

Faculty of Human and Social Development, University of Victoria
Victoria, BC

Jeffrey Reading, PhD¹

Centre for Aboriginal Health Research, University of Victoria
Victoria, BC

1. Correspondence and reprint requests: Geoffrey McKee, Center for Aboriginal Health Research, Saunders Annex, Room 130C, PO Box 1700 STN CSC, University of Victoria, Victoria, BC, V8W 2Y2, Canada. Phone: (250) 818-3448 or (250) 472-5456; Fax: (250) 472-5450. Email: gmckee@uvic.ca

Acknowledgments: We would like to acknowledge the Vancouver Island Health Authority (VIHA), the Intertribal Health Authority (ITHA), and the Nuu-chah-nulth Tribal Council for their administrative assistance and the healthcare practitioners who took the time to participate in the survey. We would also like to thank those associated with the LE,NONET project at the University of Victoria for their support of Geoffrey McKee and Frank Clarke in facilitating their partnership with the Centre for Aboriginal Health Research. Financial support was provided by the LE,NONET Project at the University of Victoria and the Canadian Institutes of Health Research. Jeff Reading is funded through the Institute of Aboriginal Peoples Health.

ABSTRACT

The prevalence of diabetes mellitus among Aboriginal populations in Canada represents a health crisis. Researchers and Aboriginal patients have identified barriers to prompt diagnosis and treatment of diabetes in Aboriginal communities. These barriers include poverty, co-morbidities, cultural indifference, and lack of healthcare resources. This study discusses the barriers to care of Aboriginal people with diabetes from the perspective of healthcare providers on Vancouver Island. Nonstandardized surveys containing multiple-choice and open-ended questions were distributed to 33 healthcare providers on Vancouver Island who reported working with Aboriginal people with diabetes; 18 completed surveys were returned. Descriptive statistics were prepared for the multiple-choice section of the questionnaire. Open-ended questions were coded and organized into substantive categories to identify trends. Barriers identified by participants include access to transportation, educational material, traditional care and medicine, and diagnostic services. Suggestions for possible solutions to barriers were grouped into three categories: education, overcoming systemic barriers, and cultural relevance. While some specific barriers were emphasized by participants, the general trends were similar to those perceived by Aboriginal patients and researchers as reported in the literature. The postulated solutions emphasize regional disparity in healthcare resources and the need to respect Aboriginal worldviews in western medical practice.

Keywords: Diabetes mellitus; Aboriginal, North America; health personnel; rural communities; health services accessibility

INTRODUCTION

Type 2 diabetes, a condition characterized by insulin resistance and reduced insulin secretion that develops after birth, has become increasingly prevalent among Aboriginal populations in Canada (Harris et al., 1996; Young et al., 2000; Green et al., 2003; First Nations Information Governance Committee, 2004, 2005; Dannenbaum et al., 2008). The 2002/2003 Regional Health Survey reported over 19.7% of First Nations adults have been diagnosed with type 2 diabetes, compared with a rate of 4.5% in the general population (First Nations Information Governance Committee, 2005). In addition, type 2 diabetes typically affects adults; however, it is emerging in First Nations children as young as five years old, with girls five times more likely to be diagnosed than boys (First Nations Information Governance

Committee, 2005). Other studies suggest diabetes is more prevalent in the Métis population than the general Canadian population (Métis National Council, 2006); however, self-reported rates among Inuit populations appear lower (Young, 2003). These trends highlight the problem that type 2 diabetes poses and may continue to pose for the health of Aboriginal communities in Canada.

REGIONAL DISPARITIES

Although extensive data has been collected regarding the national prevalence of diabetes, there remain significant regional disparities. The extent of type 2 diabetes in First Nations populations in British Columbia remains below the national average of 19.7% (First Nations Information Governance Committee, 2005), with an approximate rate of 6% (Johnson et al., 2002; British Columbia Provincial Health Officer, 2005; Kaur et al., 2004). While the provincial average may be an underrepresentation of First Nations individuals with diabetes, definitive causes for the disparity are unknown. This is an area of research that requires further exploration. According to the 2004 *Provincial Health Officer's Annual Report*, the age-standardized prevalence of diabetes among status Indians within the Vancouver Island Health Authority (VIHA) was 6.2% (British Columbia Provincial Health Officer, 2005). These regional variations highlight the diverse environmental and cultural factors associated with diabetes care in Aboriginal communities across Canada. For example, qualitative studies on the experiences of First Nations individuals with diabetes in British Columbia have identified cultural barriers to healthcare access unique to each rural community, such as the mode of understanding illness within a traditional worldview (Grams et al., 1996; Barton et al., 2005). It is essential to identify regional healthcare barriers to inform community-based policy change.

COMPLICATIONS

The rate of developing complications from diabetes is relatively high among Aboriginal people with diabetes. In the 2002/2003 Regional Health Survey, 88.7% of people with diabetes reported adverse complications directly related to their condition (First Nations Information Governance Committee, 2005). Since the likelihood of developing diabetic complications increases with increasing duration of illness, the decreasing age at onset of type 2 diabetes among First Nations may signify rising rates of complications in the long term (Young et al., 2000). Avoidance of diabetic complications is as-

sociated with tight glycemic control and effective preventative and primary health care (Klein et al., 1996; Gaster and Hirsch, 1998; LeRoith and Rayfield, 2007). Increased rates of co-morbidities such as retinopathy, nephropathy, and neuropathy suggest barriers regarding access to primary and secondary care for patients with diabetes (Martens et al., 2007; Ross et al., 2007; Dannenbaum et al., 2008). For example, the DREAM 3 study identified the need to increase ambulatory care resources in First Nations communities to minimize the risk of progression to end-stage renal failure (Tobe et al., 2006). Other studies have also characterized inequities, such as poor access to healthcare services and financial constraints, leading to increased risk of developing complications in Aboriginal populations (Martens et al., 2007; McIntyre et al., 2007).

STUDY OBJECTIVES

Current research has identified numerous barriers to diagnosis and treatment of diabetes as perceived by Aboriginal patients and indirectly by statistical inference, including lack of access to medical practitioners and educational resources, low socioeconomic status, cultural indifference, and co-morbidities such as mental health disorders (Rowley, 1999; Young et al., 2000; Ralph-Campbell et al., 2006; Marrone, 2007). Although this data provides substantial insight into barriers from the patients' and researchers' perspectives, there is a gap in research from the perspective of care providers. This preliminary study identifies direct barriers to effective care as perceived by health care professionals on Vancouver Island. In addition to adding a new dimension to the literature, this will allow a comparison of perceived barriers between those receiving treatment and care with those providing services.

This study also inquired into healthcare practitioners' visions of solutions to the disparity in care on Vancouver Island. The threat of diabetes mellitus is recognized nationally, resulting in the initiation of various regional prevention and treatment programs specific to Aboriginal populations. Many of these programs focus on overcoming barriers described by longitudinal studies and other literature (Ho et al., 2006; Kaler et al., 2006). For example, the BRAID, SLICK, and MDSi projects were initiated in Alberta to meet the need for increased screening programs to provide early detection for both diabetes mellitus and associated complications (Kaler et al., 2006). The SLICK project resulted in increased detection of diabetes and fewer diabetic complications within participating communities (Health

Canada, 2005; Virani et al., 2006). While some of these programs have demonstrated success, there is still significant regional diagnostic and treatment disparity (Kaur et al., 2004; Horn et al., 2007). The proposed solutions and perspectives of participants in this study can help inform community-based policy change and lower the burden of illness, while making efficient use of limited resources and informing future research in this area.

METHODOLOGY

Ethical approval for this study was obtained from the Joint UVic/VIHA Research Ethics subcommittee prior to the commencement of the study.

SURVEY PARTICIPANTS

The population sample was limited to individual healthcare practitioners actively practising on Vancouver Island. A telephone contact list for care providers was developed from existing lists of healthcare practitioners on the Nuu-chah-nulth, Inter Tribal Health Authority, and VIHA websites. Contact information for potential participants not associated with the Nuu-chah-nulth, Inter Tribal Health Authority, or VIHA was retrieved from the *Guide to Aboriginal Organizations and Services in British Columbia 2005/2006*, released by the Ministry of Aboriginal Relations (Ministry of Aboriginal Relations and Reconciliation, 2005). Healthcare practitioners were defined as physicians, nurses, community workers, and other volunteers who routinely interacted with Aboriginal clients diagnosed with diabetes. The study was not restricted to care providers of Aboriginal ancestry.

SURVEY

The survey² was developed using barriers to care identified in the literature based either on statistical analysis by researchers or as directly perceived by Aboriginal populations (Rowley, 1999; Young et al., 2000; First Nations Information Governance Committee, 2005; Ralph-Campbell et al., 2006). The surveys were mailed to 33 participants after undergoing pilot testing for completion time and comprehensibility. The survey consisted of 26 multiple-choice questions with options for open-ended responses and two purely open-ended questions. These questions were further divided into four subsections: *Setting*, *Practitioner*, *Barriers*, and *Possible Solutions to Removal of Barriers*. Because of the study's focus on the barriers to care, the *Barriers* category was further subdivided into five subsections: *Geographical*,

2. Survey available by contacting gmckee@uvic.ca

Cultural, Financial, Educational, and Systemic. The two open-ended questions were included in the *Possible Solutions to the Removal of Barriers* section and provided an opportunity for the participants to provide their opinions on solutions to reduce or eliminate the barriers to prompt diagnosis and treatment of Aboriginal people with diabetes. This was important for comprehensive and useful recommendations for future research and policy. To maximize the degree of participation, follow-up emails and telephone calls were made to all 33 participants.

ANALYSIS

Eighteen completed surveys were received by mail. Due to the small sample size, complex quantitative statistical analysis was not performed. Instead, qualitative analytical techniques identified themes in the data and basic descriptive statistics identified emerging themes in the multiple-choice answers. For the open-ended questions, responses were coded and clustered into organizational categories (Maxwell, 2005). Recurring themes were then identified in each category and end substantive categories were developed, to determine emergent themes. Where possible, barriers inferred by postulated solutions were triangulated with data collected from the multiple-choice section to maximize validity.

RESULTS/DISCUSSION

PROFILE OF PARTICIPANTS

Participants were recruited from multiple Vancouver Island communities, half of which were identified as rural. Analysis of employment locations revealed that 9 out of 18 participants reported working at community health centres, 3 at band offices, 2 at hospitals, and 4 at other locations. All participants reported employment in a practice that focused on Aboriginal health and/or wellbeing. Professionally, 11 participants identified themselves as nurses, 3 as community health representatives, 2 as health support workers, and 2 as other health professionals. It was noted that 15 out of 18 participants reported being over 40 years of age, while 12 reported practising for more than 11 years. On average, participants reported seeing approximately 20 patients weekly, and on average 6 out of 20 were diabetic. Of those diabetic, approximately 5 out of 6 were of Aboriginal ancestry. Their daily interactions with Aboriginal people with diabetes and the substantial variation in both profession and location of practice allows a broad examination of

perceived barriers to diagnosis and treatment of Aboriginal people with diabetes

BARRIERS TO TREATMENT AND DIAGNOSIS

Although participants identified various barriers to treatment and diagnosis, descriptive statistical analysis of the multiple-choice data revealed inequities between Aboriginal and non-Aboriginal populations within each of the 5 categories: *Geographical, Cultural, Financial, Educational and Systemic*.

Geographical

The geographical dispersion of Aboriginal communities on Vancouver Island was described as a barrier to treatment and diagnosis. In particular, the inability of diabetic patients to arrange transportation was a substantial barrier to prompt diagnosis and treatment. An example specific to coastal communities, such as those on Vancouver Island and other islands, was access to ferry services to larger communities with more extensive health services. One participant commented on the lack of ferry access at night and the financial cost as inhibiting patients from accessing effective care.

Geographical barriers were also identified by the Regional Health Survey, which reported a higher prevalence of diabetes among adults living in isolated communities than nonisolated communities; however, specific details of access to transportation were not addressed (First Nations Information Governance Committee, 2005). In other studies, rural location was linked to poor access to healthcare services (Chan et al., 2006) and the distance of a community from specialists was associated with increased mortality rates resulting from diabetic complications (Tonelli et al., 2007). While isolation has been acknowledged as a substantial barrier to care, the lack of information on access to transportation in the literature and substantial concerns raised by participants suggests that further exploration is required.

Cultural

The majority of participants reported that difficulties accessing traditional care and medicine were a result of significant cultural barriers to diagnosis and treatment. These parallel inferences made from the literature and indicate the importance of traditional practices for both Aboriginal patients and healthcare providers.

Studies indicate that traditional methods of healing are considered important and effective by Aboriginal people (Waldram et al., 2000). One study of urban Aboriginal people with diabetes found that 62% of participants

thought Aboriginal people had traditional methods for treating diabetes, while 33% believed that traditional medicine could alleviate their condition (WalDRAM et al., 2000). First Nations participants in a study conducted in Bella Coola, British Columbia, indicated that traditional methods were commonly used in concert with western medicine (Barton et al., 2005). They cited coordinating traditional practices such as consuming traditional foods, medicines, and participating in healing circles with western practices such as medical checkups, health education, and monitored treatment. Interest in traditional practices was also acknowledged in a qualitative study of Haida individuals with diabetes (Grams et al., 1996). The Regional Health Survey, however, suggests that only 12.9% of surveyed Aboriginal people with diabetes use traditional medicines and 6.0% see a traditional healer or take part in traditional healing ceremonies (First Nations Information Governance Committee, 2005). The relatively high rate of interest and low rate of practice suggests substantial barriers regarding access to traditional medicine and care. Difficulties accessing traditional care and medicine are not comprehensively explored in the literature; however, this inference correlates with participants' responses in the present study.

Educational

Educational barriers to diagnosis and treatment are important from the perspective of healthcare providers. In particular, two-thirds of participants indicated that patients may have inadequate access to online information. This signifies the perceived importance of the Internet as a medical information resource from the perspective of healthcare providers. The importance may be emphasized due to a lack of other educational resources in isolated Aboriginal communities.

The Regional Health Survey indicates a lack of participation in diabetes education: only 4 out of 10 Aboriginal people with diabetes currently attend a diabetes clinic or utilize educational resources (First Nations Information Governance Committee, 2005). For those not attending an education program, 50.9% did not consider themselves requiring diabetes education (First Nations Information Governance Committee, 2005). Studies indicate many Aboriginal people with diabetes consider current educational programs incomplete and difficult to understand (Ho et al., 2006). The issues surrounding effective education programs for Aboriginal people with diabetes may be attributed to a lack of cultural relevance in current initiatives. Given that participants emphasized inadequate access to online information, the

Internet may also be viewed as a resource that could provide more relevant information to Aboriginal individuals.

Financial

In the present study, participants strongly indicated financial constraints as a barrier to care; this included the aforementioned transportation costs required to overcome geographical barriers. The comparison between participant response and the literature suggests socioeconomic factors should be addressed in community health policy to overcome this financial barrier.

Although the Canadian public healthcare system theoretically covers essential healthcare costs, studies indicate those with lower socioeconomic status show lower healthcare access (Marrone, 2007). Other studies report lower income diabetic patients experience increased acute hospital visits, inferring lower use of ambulatory services (Booth and Hux, 2003). In general, the average income of Aboriginal people in Canada is substantially lower than the general population (Reading et al., 2007). This suggests, in agreement with findings in this study, the financial burden of accessing healthcare services poses a substantial barrier for Aboriginal people with diabetes.

Systemic

The majority of participants emphasized there is inadequate access to regular diagnostic services, including screening for diabetes mellitus and complications, in Aboriginal communities. This correlates with the lack of screening and diagnostic resources reported in the Regional Health Survey (First Nations Information Governance Committee, 2005). One study in northern Alberta reported the screening activities for Aboriginal patients were 44-79% of that recommended in the CDA Clinical Practice Guidelines (Ralph-Campbell et al., 2006). In reference to screening capacity for complications, Kaur reports the proportion of on-reserve Aboriginal people with diabetes in British Columbia that participated in annual retinal screens was only 33%, which was likely due to a lack of healthcare services within communities (Kaur et al., 2004). The reported lack of diagnostic resources appears to be a substantial barrier, both from the perspective of healthcare professionals and across the literature.

POSSIBLE SOLUTIONS TO BARRIERS

Analysis of the responses obtained from the open-ended questions revealed three themes regarding possible solutions to barriers. These themes were: *education, overcoming systemic barriers, and cultural relevance.*

Education

Perhaps the strongest consensus among participants was the need to overcome educational barriers. The main educational theme emerging from the data regarded prevention programs targeting youth, children, and young families. It was suggested that diabetes and healthy living programs be implemented in schools to counter diabetes at an early age. Another participant suggested routine diabetes workshops to increase awareness and nurture trusting relationships between healthcare providers and community members.

The need for increased educational programs is identified in the Regional Health Survey (First Nations Information Governance Committee, 2005). It suggests implementation of community-wide education and prevention activities, and nutritional and physical education programs in schools. This is in agreement with the solutions postulated by the participants in the present study, thus confirming the importance of educational programs in preventing development of diabetes mellitus and further complications.

Overcoming Systemic Barriers

The majority of participants emphasized increasing the number of screening programs as a solution to screening barriers. In particular, participants suggested routine screening programs for high-risk communities. Some participants identified successful existing programs. For example, one participant commented on the provision of screening tests at community-held health fairs and events. Another indicated that VIHA staff comes to the community once a month to provide screening tests. One notable suggestion identified the need for awareness and relationships with the community to increase the rate of participation in screening programs.

These solutions correlate with existing programs initiated to meet the need for high-risk screening in Aboriginal populations. Regional screening programs have successfully been instigated in northern Alberta, southern Quebec, and eastern British Columbia (Macaulay et al., 1997; Daniel et al., 1999; Kaler et al., 2006). The proposed solutions also meet the suggestions in the Regional Health Survey regarding implementation of community-wide screening programs for at-risk youth and adults (First Nations Information Governance Committee, 2005).

The second systemic theme that emerged from the data was the need for increased health resources within Aboriginal communities. Participants indicated the need to increase the number of nurses, dieticians, and other

healthcare providers within communities. Other resource gaps, such as glycosylated hemoglobin (A1C) screening equipment, were cited.

The need for increased resources is also expressed in the current literature. Minore suggests that high nursing turnover in rural Aboriginal communities results in exacerbation of illness and reduction in quality health services (Minore et al., 2005). The Regional Health Survey suggests personnel, including home care givers, be trained to provide diabetes education and screening (First Nations Information Governance Committee, 2005). The results of the present study are complementary to this literature in suggesting additional resources on the front line of Aboriginal diabetic care.

Cultural Relevancy

The third theme explored cultural relevancy in the prevention, diagnosis, and treatment of diabetes in Aboriginal communities. Participants suggested increased education of healthcare providers regarding "cultural competency." According to participants, this includes understanding of the "spiritual" and "emotional" aspects of healing and "current stresses [and] situations of Aboriginal communities." Other suggestions included implementation of local teachings into education and promotion of healthy living by Elders and tribal leaders. One participant summarized the importance of this approach: "Treatment that works for First Nations People.... For the people by the people."

The suggested solutions to cultural barriers echo those of the Regional Health Survey which emphasize the importance of community level strategies that include local customs and history (First Nations Information Governance Committee, 2005). Culturally appropriate prevention programs have been implemented successfully in various communities across Canada. For example, the Sandy Lake school-based diabetes prevention program incorporates traditional teaching techniques into nutritional education (Saksvig et al., 2005). The ADWP program initiated in Alberta also has successfully integrated western healthcare practices into an Aboriginal healing model (Toth et al., 2005). While some strategies are successful, the participant responses suggest there is substantial disparity in culturally relevant programs among Aboriginal communities on Vancouver Island.

Limitations

Although this study was directed towards the provision of health services for Aboriginal patients, no distinction was made to differentiate barriers

for First Nations, Métis, or Inuit people with diabetes. The net sample size for this study was very small and thus no definite quantitative conclusions could be reached. The true geographic extent of study participation by respondents could not be identified as this was an anonymous survey. It should also be noted that the lack of physicians among respondents limited the extent of healthcare practitioners involved. To fully construct an accurate depiction of healthcare practitioners' perspectives, all professions within the field must be included within the sample population. In future studies, this may be accomplished by utilizing other methods of surveying participants, including in-person or telephone interviews or online surveys. However, this study gives important information to build on and these limitations can be addressed in future studies to develop the areas not identified or explained through this data.

CONCLUSION

The present study looks at barriers to diabetic treatment and prevention services for Aboriginal people perceived by healthcare providers on Vancouver Island and suggests community-based solutions. While the sample size of the study was limited, it does provide a basis for planning more extensive research into the barriers to care for Aboriginal people with diabetes.

An understanding of the barriers to prompt diagnosis and treatment is critical given the increasing prevalence of diabetes among Aboriginal populations. This study identified disparities related to access to transportation, educational material, traditional care and medicine, and diagnostic services. The general trends identified from the perspective of healthcare practitioners in this study are in agreement with previous literature identifying barriers from the perspective of Aboriginal patients and researchers. Further investigation of healthcare disparities will provide a foundation for future policy changes to stem the tide of this growing health issue in Aboriginal communities.

REFERENCES

- Barton, S.S., Anderson, N., and Thommasen, H.V. (2005). The diabetes experiences of Aboriginal people living in a rural Canadian community. *Australian Journal of Rural Health* 13(4), 242–246.
- Booth, G.L. and Hux, J.E. (2003). Relationship between avoidable hospitalizations for diabetes mellitus and income level. *Archives of Internal Medicine* 163(1), 101–106.

- British Columbia Provincial Health Officer. (2005). *Impact of Diabetes on the Health and Wellbeing of People in British Columbia: Provincial Health Officer's Annual Report 2004*. Victoria, BC: Ministry of Health.
- Chan, L., Hart, L.G., and Goodman, D.C. (2006). Geographic access to health care for rural Medicare beneficiaries. *Journal of Rural Health* 22(2), 140–146.
- Daniel, M., Green, L.W., Marion, S.A., Gamble, D., Herbert, C.P., Hertzman, C., and Sheps, S.B. (1999). Effectiveness of community-directed diabetes prevention and control in a rural Aboriginal population in British Columbia, Canada. *Social Sciences & Medicine* 48, 815–832.
- Dannenbaum, D., Kuzmina, E., Lejeune, P., Torrie, J., and Gangbe, M. (2008). Prevalence of diabetes and diabetes-related complications in First Nations communities in northern Quebec (Eeyou Istchee), Canada. *Canadian Journal of Diabetes* 32(1), 46–52.
- First Nations Information Governance Committee (2004). *First Nations and Inuit Regional Health Surveys, 1997: A Synthesis of the National and Regional Reports*. Ottawa, ON: National Aboriginal Health Organization.
- (2005). *First Nations Regional Longitudinal Health Survey (RHS) 2002/2003*. Ottawa, ON: National Aboriginal Health Organization.
- Gaster, B. and Hirsch, I.B. (1998). The effects of improved glycemic control on complications in type 2 diabetes. *Archives of Internal Medicine* 158(2), 134–140.
- Grams, G.D., Herbert, C., Heffernan, C., Clama, B., Wilson, M.A., Grzybowski, S., and Brown, D. (1996). Haida perspectives on living with non-insulin-dependent diabetes. *Canadian Medical Association Journal* 155, 1563–1568.
- Green, C., Hoppa, R.D., Young, T.K., and Blanchard, T.F. (2003). Geographic analysis of diabetes prevalence in an urban area. *Social Sciences & Medicine* 57, 551–560.
- Harris, S.B., Perkins, B.A., and Whalen-Brough, E. (1996). Non-insulin-dependent diabetes mellitus among First Nations children. New entity among First Nations people of north western Ontario. *Canadian Family Physician* 42, 869–876.
- Health Canada (2005). *The Alberta First Nations Project to Screen For Limbs, Eyes, Cardiovascular and Kidney Complications of Diabetes Using Mobile Clinics (SLICK)*. Canada Health Infostructure Partnerships Program (CHIPP). Retrieved April 18, 2009 from <http://www.hc-sc.gc.ca/hcs-sss/pubs/chipp-ppics/2004-slick/synopsis/index-eng.php>.
- Ho, L.S., Gittelsohn, J., Harris, S.B., and Ford, E. (2006). Development of an integrated diabetes prevention program with First Nations in Canada. *Health Promotion International* 21(2), 88–97.

- Horn, O.K., Bruegl, A., Jacobs-Whyte, H., Paradis, G., Ing, A., and Macaulay, A.C. (2007). Incidence and prevalence of Type 2 diabetes in the First Nation community of Kahnawá:ke, Quebec, Canada, 1986–2003. *Canadian Journal of Public Health* 98, 438–442.
- Johnson, S., Martin, D., and Sarin, C. (2002). Diabetes mellitus in the First Nations population of British Columbia, Canada. Part 3. Prevalence of diagnosed cases. *International Journal of Circumpolar Health* 61(3), 260–264.
- Kaler, S.S., King, M., and Toth, E.L. (2006). The BRAID study design: Believing we can reduce the Aboriginal incidence of diabetes. *Pimatisiwin* 4(1), 96–104.
- Kaur, H., Maberley, D., Chang, A., and Hay, D. (2004). The current status of diabetes care, diabetic retinopathy screening and eye-care in British Columbia's First Nations Communities. *International Journal of Circumpolar Health* 63(3), 277–285.
- Klein, R., Klein, B.E., and Moss, S.E. (1996). Relation of glycemic control to diabetic microvascular complications in diabetes mellitus. *Annals of Internal Medicine* 124(1 Pt 2), 90–96.
- LeRoith, D. and Rayfield, E.J. (2007). The benefits of tight glycemic control in type 2 diabetes mellitus. *Clinical Cornerstone* 8 (Supplement 7), 19–29.
- Macaulay, A.C., Paradis, G., Potvin, L., Cross, E.J., Saad-Haddad, C., McComber, A., Desrosiers, S., Kirby, R., Montour, L.T., Lamping, D.L., Leduc, N., and Rivard, M. (1997). The Kahnawake Schools Diabetes Prevention Project: intervention, evaluation, and baseline results of a diabetes primary prevention program with a Native community in Canada. *Preventive Medicine* 26, 779–790.
- Marrone, S. (2007). Understanding barriers to health care: A review of disparities in health care services among indigenous populations. *International Journal of Circumpolar Health* 66(3), 188–198.
- Martens, P.J., Martin, B., O'Neil, J.D., and MacKinnon, M. (2007). Diabetes and adverse outcomes in a First Nations population: Associations with health-care access, and socioeconomic and geographical factors. *Canadian Journal of Diabetes* 31(3), 223–232.
- Maxwell, J.A. (2005). *Qualitative Research Design: An Interactive Approach*. Thousand Oaks, CA: Sage Publications, Inc.
- McIntyre, I., Boughen, C., Trepman, E., and Embil, J.M. (2007). Foot and ankle problems of Aboriginal and non-Aboriginal diabetic patients with end-stage renal disease. *Foot & Ankle International* 28, 674–686.

- Métis National Council (2006). *Preliminary Assessment of Diabetes Programs for Métis Peoples*. Ottawa, ON: Métis National Council.
- Ministry of Aboriginal Relations and Reconciliation (2005). *A Guide to Aboriginal Organizations and Services in British Columbia 2005/2006*. Victoria, BC: Ministry of Aboriginal Relations and Reconciliation.
- Minore, B., Boone, M., Katt, M., Kinch, P., Birch, S., and Mushquash, C. (2005). The effects of nursing turnover on continuity of care in isolated First Nation communities. *Canadian Journal of Nursing Research* 37(1), 86–100.
- Ralph-Campbell, K., Pohar, S.L., Guirguis, L.M., and Toth, E.L. (2006). Aboriginal participation in the DOVE study. *Canadian Journal of Public Health* 97(4), 305–309.
- Reading, J., Kmetc, A., and Gideon, V. (2007). *First Nations Wholistic Policy and Planning Model: Discussion Paper for the World Health Organization Commission on Social Determinants of Health., Assembly of First Nations*. Victoria, B.C.: Centre for Aboriginal Health Research.
- Ross, S.A., McKenna, A., Mozejko, S., and Fick, G.H. (2007). Diabetic retinopathy in native and nonnative Canadians. *Experimental Diabetes Research* 2007, 76271.
- Rowley, C. (1999). Factors influencing patient adherence in diabetes. Retrieved May 2008 from <http://www.calgaryhealthregion.ca/clin/adultpsy/papers/diabetes.pdf>.
- Saksvig, B.I., Gittelsohn, J., Harris, S.B., Hanley, A.J., Valente, T.W., and Zinman, B. (2005). A pilot school-based healthy eating and physical activity intervention improves diet, food knowledge, and self-efficacy for native Canadian children. *Journal of Nutrition* 135, 2392–2398.
- Tobe, S.W., Pylypchuk, G., Wentworth, J., Kiss, A., Szalai, J.P., Perkins, N., Hartman, S., Ironstand, L., and Hoppe, J. (2006). Effect of nurse-directed hypertension treatment among First Nations people with existing hypertension and diabetes mellitus: the Diabetes Risk Evaluation and Microalbuminuria (DREAM 3) randomized controlled trial. *Canadian Medical Association Journal* 174, 1267–1271.
- Tonelli, M., Manns, B., Culleton, B., Klarenbach, S., Hemmelgarn, B., Wiebe, N., and Gill, J.S. (2007). Association between proximity to the attending nephrologist and mortality among patients receiving hemodialysis. *Canadian Medical Association Journal* 177, 1039-1044.
- Toth, E., Cardinal, K., Moyah, D., and Ralph-Campbell, K. (2005). Perspectives in practice: Partnerships to address the diabetes epidemic in Aboriginal communities in Alberta. *Canadian Journal of Diabetes Care* 29(4), 415-419.

Virani, S., Strong, D., Tennant, M., Greve, M., Young, H., Shade, S., Kanji, M., Toth, E., and the Implementation Committee of the Aboriginal Diabetes Initiative. (2006). Rationale and implementation of the SLICK project. *Canadian Journal of Public Health* 97(3), 241-247.

Waldram, J.B., Whiting, J., Kornder, N., and Habbick, B. (2000). Cultural understandings and the use of traditional medicine among urban Aboriginal people with diabetes in Saskatoon, Canada. *Canadian Journal of Diabetes Care* 24(2), 31-38.

Young, T.K. (2003). Contributions to chronic disease prevention and control: Studies among the Kivalliq Inuit since 1990. *International Journal of Circumpolar Health* 62(4), 323-330.

Young, T.K., Reading, J., Elias, B., and O'Neil, J.D. (2000). Type 2 diabetes mellitus in Canada's first nations: Status of an epidemic in progress. *Canadian Medical Association Journal* 163(5), 561-566.