



FINAL EVALUATION REPORT

The *SLICK* Project

Screening for *L*imb, *I*-Eye, Cardiovascular, and *K*idney
Complications of Diabetes
Using Mobile Diabetes Clinics

An Alberta First Nations Project

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Original Submission: November 17th, 2003
Revised Submission: February 28th, 2004



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BACKGROUND

Diabetes and its complications impose a significant burden on public health, especially among First Nations populations, in whom diabetes has reached epidemic proportions. Age-standardized prevalence rates of diabetes among First Nations men and women are now 3.6 and 5.3 times higher than among Canadian men and women respectively.¹ First Nations people with diabetes also experience complications more frequently than other groups. Estimates project a 10-fold increase in the rate of lower extremity amputations, 5 times the rate of blindness, a 10-fold increase in the rate of cardiovascular disease, and 10 times as many individuals starting kidney dialysis in this population by 2016.²

Socioeconomic costs of diabetes are significant, and are borne by individuals with diabetes, their families, communities, the health care system, and society in general. The cost of diabetes care for a status Indian has been shown to be higher than for a diabetic from the general population.³ The *SLICK* project was an intervention that aimed to reduce the burden of this public health disorder in Alberta First Nations communities.

PROJECT DESCRIPTION AND RATIONALE

SLICK (Screening for Limb, I-Eye, Cardiovascular, and Kidney complications of diabetes) was a University of Alberta - Alberta First Nations - Health Canada collaborative endeavour, coordinated by the Implementation Committee of the Aboriginal Diabetes Initiative. The project was designed to overcome barriers to access to a comprehensive, coordinated, and integrated screening program for limb, eye, cardiovascular, and kidney complications of diabetes. It involved the deployment of two mobile units equipped with advanced information and communications technologies (ICT) into all 44 Alberta First Nations communities, to facilitate implementation of the Canadian Diabetes Association (CDA) evidence-based clinical practice guidelines with respect to: screening, education, and community-based care. Through its activities, the project hoped to: increase awareness, improve diabetes services, increase identification of diabetes complications, empower clients to arrange appropriate follow-up care; and eventually attain the long-term outcomes of improving client health, decreasing diabetes complications, and reducing the socioeconomic cost associated with diabetes.



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EVALUATION STRATEGY

This evaluation assesses whether the *SLICK* project attained its goals. Administrative outcomes, clinical outcomes, satisfaction with diabetes services, knowledge of diabetes and diabetes services, and cost of care were evaluated quantitatively and qualitatively. Quantitative analyses were performed on data obtained from clinical exam findings and lab test results recorded in the *SLICK* Clinical Database, as well as information collected from the *SLICK* Surveys which asked questions regarding clinical outcomes, satisfaction, and knowledge. Cross-time comparisons between initial and final visits were made to evaluate the effectiveness of this program. Qualitative analyses were conducted through key informant interviews, review of program documentation, and correspondence with the *SLICK* team. An economic evaluation is also included in this report.

RESULTS

Administrative Outcomes

A total of 1,151 clients enrolled in the *SLICK* project attended the mobile clinics between December 5th, 2001 and July 22nd, 2003. Roughly one in four of these clients returned for a follow-up visit. Two-thirds of clients were female, as expected in a sample of the First Nations diabetes population, and the average age was 54 years. Socioeconomic determinants of health such as household size and education were similar to the general First Nations population in Canada.

One of the primary administrative successes of *SLICK* found through qualitative analyses was that primarily First Nations health professionals ran this “technologically innovative, community-based” program. However, in carrying out their roles, members of the *SLICK* team experienced heavy workloads, stress associated with timelines, fatigue, and interference with home life. This resulted in staff turnover, shortages, and illness. Responsibilities were often overwhelming, and sometimes vaguely defined. For example, nurses were required to transfer heavy equipment from the van to the community health center, though a ramp was later used to help facilitate this. Principal investigators had to assume the additional role of financial tracking because the role of financial officer had not been assigned. Issues arising from problems with internal communication between management and staff were also identified.

Clinical Outcomes

Quantitative analyses of data collected from initial visits to *SLICK* identified a clear need for improved control of diabetes and its complications in this population. Two-thirds of clients had suboptimal or inadequate metabolic control of their diabetes on presentation to the program. Diabetes complications and associated risk factors were also found to be prevalent. Cardiovascular disease and risk factors accounted for the greatest burden of illness among *SLICK* clients. About



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one-third of respondents reported heart problems. Almost all individuals were found to be overweight or obese with a tendency for central distribution of fat. Close to two-thirds had unfavourable lipid profiles, and inadequate blood pressure control was an issue for roughly half of clients. Kidney complications of diabetes were found in more than one-third of the population, about one third had foot abnormalities, and some degree of retinopathy was identified in one in four individuals. Though the majority of clients were female who were at an increased risk of diabetes and heart problems due to central obesity, significantly more males than females had high blood pressure readings, kidney problems, foot abnormalities, and retinopathy.

An examination of utilization of health services prior to *SLICK* also provided justification for the program's activities. At their initial visit, one in ten clients did not have a main diabetes health care provider, and of those who did, one in five did not visit with this provider in the previous year. On the other hand, forty percent of individuals had been hospitalized overnight, and almost half had visited emergency rooms. Diabetes appeared to be the presenting problem for most of these visits. Prior to receiving screening services through *SLICK*, screening practices were poor in this population. Slightly more than half the clients reportedly did not meet clinical practice guidelines for monitoring metabolic control. Four out of five did not have their feet examined annually, four in ten did not have their eyes examined at recommended intervals, one-third failed to meet guidelines for kidney disease screening, but about three-quarters had their cholesterol level measured as recommended.

Cross-time comparisons over the course of the project provide support for the effectiveness of *SLICK* in achieving some of its anticipated outcomes. For example, the project appeared to increase identification of complications in the population. *SLICK* screening activities identified complications in a greater proportion of people than reported having a previous diagnosis, especially in terms of: kidney problems (33-48% vs. 16%), high cholesterol (64% vs. 36%) and foot problems (30-39% vs. 25%). There is also evidence of progress toward decreasing complications of diabetes. For the most part, clinical exam findings and lab test results improved over the course of the project. There was a significant reduction in body weight among clients. Metabolic control, cardiovascular risk factors, foot risk, and protein leakage from kidneys among females all showed signs of improvement. There were improvements in utilization of health services as well. Doctor visits increased, suggesting that clients may have been empowered to arrange follow-up and treatment. Visits to the emergency room decreased significantly, and hospitalizations also decreased, suggesting the project is on the road to obtaining its long-term goal of decreasing the socio-economic cost of diabetes.

Interviews with key informants suggest that anecdotally, clients became more interested in their health outcomes, and felt empowered especially with respect to weight control and nutrition. In



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addition, providers felt that complications were identified in individuals who would not have otherwise accessed health care services, and that referrals for follow-up care increased. Suggestions for additional activities included: primary diabetes prevention interventions, and formal nutrition counselling and foot care.

Satisfaction with Diabetes Services

Overall, most respondents to the *SLICK* survey were satisfied with the quality of diabetes care received in the conventional system. However, there was room for improvement. Between 38% and 45% of respondents rated the quality of diabetes care received in the year prior to *SLICK* as poor or fair. Only one in five felt the quality of care was very good to excellent. Individuals were most satisfied with how health care providers informed them about the state of their diabetes, and least satisfied with providers keeping them informed about the next steps in their care. Cross-time comparisons reveal that the level of satisfaction with the quality of care increased after the implementation of this program. Therefore, it appears that the *SLICK* project is making inroads in improving services.

Qualitative research explored satisfaction with various aspects of the program. Members of the *SLICK* team were happy with the goals of the project, and were satisfied with the progress made toward achieving many of these goals. For example, providers felt that perceptions toward health care improved, and that communities embraced the program as their own. *SLICK* provided “unprecedented access to screening services”, visited each community in Alberta at least once, and was made accessible even to individuals with undiagnosed diabetes. However, waiting times were often long due to the length of time spent with each client, new clients were sometimes unable to access services during follow-up visits, and many communities were not even seen for follow-up visits as originally planned. Several reasons for inefficiencies in quantity of care delivered were identified. Targets for number of clients seen during this program were not met due, in part, to: scheduling conflicts (including cancellations by communities due to events such as funerals), inefficient scheduling of clients into clinics, staff shortages, malfunctioning equipment (e.g., Cholestech LDX machine, retinal camera), equipment shortages in the field (e.g., camera bulbs), and misplacement of equipment (e.g., laptop). In addition, too much nursing time was said to be spent setting up and re-loading equipment, and not enough time was available to conduct health promotion activities.

Overall, providers were satisfied with the high technical quality of care provided, and clients were noted to appreciate seeing visual retinal images during their visit and receiving test results right away. Technology used to capture digital retinal images included the Zeiss 450 Fundus Camera and the Kodak Professional DCS 760 Digital Camera. While this equipment was found to be easy to set up, damage occurred due to improper handling and maintenance. The camera bulb burned out



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periodically, and spares were not available in the field. While hand-delivery of CDs containing the images to the Tele-Ophthalmology Unit in Edmonton maintained privacy, it was found to be inefficient. Point-of-care machines (Cholestech LDX and Bayer DCA 2000) to test blood and urine were user-friendly. However, in the initial stages of the program, readings for both the Cholestech LDX and tonometry pens (to measure eye pressure) were consistently high. The validity of the tests was subsequently maintained through a Quality Assurance contract with a reference lab. Various problems were noted with respect to the database software and data entry. Privacy was protected through password-protected access to client data, and obtaining client consent prior to sharing of information with providers.

Knowledge

Analyses related to knowledge provide evidence for the need for education activities conducted by this project. It was found that attendance at formal diabetes education programs significantly increases self-reported level of understanding of diabetes. Initially, respondents knew half as much about appropriate screening practices as they did about complications of diabetes. After exposure to *SLICK* activities, subjective assessment of knowledge increased significantly. Objective assessments of knowledge of complications and appropriate screening practices increased as well.

Indeed, qualitative analyses found that providers felt awareness of diabetes, its complications, and screening practices increased among clients. Providers themselves also felt more knowledgeable about diabetes after their involvement with *SLICK*.

Cost of Diabetes Care

The total operational cost of the *SLICK* project was found to be \$734.34 per client visit. This figure was calculated from direct costs including laboratory and clinical exam equipment and materials, personnel, travel (including costs associated with *SLICK* vans and staff), communication, stationery and supplies, and implementation costs (data management, quality assurance, evaluation). A direct comparison of the diabetes screening services provided by this intervention compared to the conventional health care system, using only those costs that can be directly compared (i.e., materials and personnel associated with laboratory testing and clinical exam, as well as travel associated with *SLICK* vs. travel costs for clients in the conventional system) revealed that the *SLICK* model of care was more cost effective than the conventional system (\$356.71 vs. \$504.89). Further evaluation is necessary to include long-term cost savings due to anticipated outcomes such as reductions in the number of clients on dialysis, indirect cost savings such as client time saved, and unaccounted for costs such as visits to physicians for follow-up care.



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CONCLUSIONS

Quantitative analyses support the need for diabetes control programs in this population, and provide evidence for the short-term effectiveness of the *SLICK* project. However, given the limitations of this investigation (e.g., small follow-up sample size) we cannot say for certain that all of these cross-time trends are statistically relevant (and not simply the result of random variation) or due to the *SLICK* program (without comparing against a control group). We can conclude, however, that most of the cross-time changes are consistently positive, regardless of whether we examine clinical outcomes, satisfaction with diabetes services, or knowledge about diabetes.

Qualitative analyses describe many successful aspects of this project, and identify areas for improvement. Suggestions for the future of this project include:

Centralized Project Management and Control Centre

Human Resources Infrastructure

- ✦ Clearly defined roles and responsibilities
- ✦ Team-building exercises, staff and community appreciation
- ✦ Open communication and input between different levels (e.g., regular debriefings between management and staff)
- ✦ Compensatory “rest days” for *SLICK* staff after travel

Administrative Infrastructure

- ✦ Designated individuals for data entry, financial tracking
- ✦ Scheduling—ensure schedules adhered to
- ✦ Team members based at central sites within Treaties to reduce travel time between visits.

Training

- ✦ Mandatory orientation and evaluation period for staff
- ✦ Ongoing technical training, continuing medical education
- ✦ Photography supervisor in the field
- ✦ Ongoing feedback on performance

Equipment

- ✦ Regular maintenance program with spare set of equipment
- ✦ Inventory/tracking system
- ✦ Fixed carrying compartments in van to avoid damage



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- ✦ Ongoing upgrades to equipment
- ✦ Clear identification of ownership of equipment with respect to partners in the project

Resources

- ✦ Increased funding for sustainability
- ✦ Increased number of vans and staff

Integration with health care system and community

- ✦ Collaboration with community providers to ensure appropriate follow-up and “buy-in”; set policy with respect to role of *SLICK* in follow-up
- ✦ Engage community leaders, Chiefs, Elders

This evaluation finds that despite the overwhelming task of implementing this program, the *SLICK* team and its partners have made remarkable progress toward achieving the short-term and long-term goals of this project. Further evaluation will provide additional evidence for the long-term effectiveness of this initiative.

¹ National Steering Committee for the First Nations and Inuit Regional Health Survey. *Final report*. 1999.

² Green, C. & Al. (1997). *Projecting future diabetes prevalence in Manitoba First Nations*. 4th International Conference on Diabetes and Aboriginal People, San Diego.

³ Jacobs, P. Cost of diabetes in the status Indian population in Manitoba, 1995/96. Draft document prepared for the Medical Services Branch, Health Canada. Manitoba, 1998.