Chapter 8

Community-Based HEALTH SERVICES and Diabetes

INSIDE
Highlights
Introduction
List of Exhibits
Exhibits and Findings
Discussion and Implications
Conclusions and Implications
Appendix 8.A – Research Methodology
References

AUTHORS
Anne-Marie Tynan
Jonathan T. Weyman
Jane Y. Polsky
Maria I. Creatore
Peter Gozdyra
Gillian L. Booth
Richard H. Glazier
HIGHLIGHTS

Issue

- Access to and regular use of health services is essential for the prevention, early diagnosis and optimal management of diabetes as well as the prevention of diabetes-related conditions.

- Diabetes is a leading cause of blindness, heart disease, stroke and kidney problems. Good diabetes care and management can prevent or delay the onset of these complications. Because diabetes can be complicated to manage, people with this disease require close follow-up by a multidisciplinary team of health care professionals, which may include their primary care provider, diabetes educators (nurse and dietitian) and a range of specialists (including an eye care specialist and endocrinologist), as needed. People with diabetes also play an essential role in their own self-care.

- The purpose of this chapter is to examine the distribution of and geographic access to health service providers in Peel who are involved in caring for people with diabetes. The spatial distribution and accessibility to family physicians/general practitioners, diabetes specialists (i.e., endocrinologists, ophthalmologists, optometrists) and diabetes education programs is the focus of this chapter.

Key Findings

- There was a fairly even distribution of family physicians/general practitioners (FPs/GPs) across Peel region with a higher concentration located in central Mississauga. FPs/GPs were also well distributed in relation to concentrations of adults aged 20+ with diabetes.

- In north and northeast Brampton and in many parts of Caledon, there were longer travel distances to the nearest location of an FP/GP than in the rest of Peel.

- There was good overall distribution of eye specialists (i.e., ophthalmologists and optometrists, and especially optometrists), but fewer endocrinologists, who were located almost exclusively near major hospitals in Peel. Many areas in Peel had travel distances of 5 km or more to the nearest endocrinologist and parts of west Brampton and most of Caledon had travel distances of 10 km or more.

- Diabetes education programs were offered at relatively few locations in Peel. Programs were scattered throughout Mississauga and Brampton and found in only one location in Caledon (in Bolton). Currently, few or no diabetes education programs are located in the rapidly developing, higher immigration and high diabetes area of north, northeast and east Brampton.

Implications

- Although geographic access to health services in Peel was fairly good, there are other aspects of health service access that was not captured in these analyses, but nevertheless are important facilitators of overall population health. These include difficulties using services due to cultural and social factors, physicians who may be located nearby but are closed to accepting new patients, wait times to get an appointment and long distances to service providers without adequate forms of local public transportation.

- Given the growth in immigration and rising rates of diabetes in Peel, it is important that Public Health and municipal planners take into account the ethnocultural preferences of certain population sub-groups when determining the kinds of programs and health services that best suit community needs, including their accessibility.

- Diabetes education programs and other diabetes services play a critical role in the treatment of diabetes and its complications. The expansion of diabetes education programs and satellite centres should be based on population needs and be located in relatively underserved areas. Programs also need to deliver culturally appropriate services that address the needs of the population living in Peel.
INTRODUCTION

Health Services and Diabetes

Diabetes is one of the most commonly encountered conditions in primary practice accounting for nearly seven million visits to family physicians/general practitioners (FPs/GPs) each year in Ontario alone. Ontarians aged 20 and older with diabetes had a mean of 7.3 FP/GP visits per year. People with diabetes require access to good quality healthcare to help them navigate the often complicated pathway associated with managing their disease. Intensive management of risk factors associated with diabetes complications can reduce the rate of major complications such as heart attacks, stroke, amputation and death by up to 50%. Regular management, as well as continuity of care (defined as a continuous relationship between patients and their care providers sustained over time), is very important for achieving better outcomes for chronic diseases such as diabetes. Although the majority of diabetes patients are managed by primary care providers, access to specialists (e.g., endocrinologists and ophthalmologists) is necessary for more complex diabetes problems and patients with type 1 diabetes.

Diabetes care depends on the daily commitment of the person with diabetes to self-management practices, preferably with the support of an integrated diabetes healthcare team. The diabetes healthcare team should be multi- and inter-disciplinary. It should establish and sustain a communication network among the health and community systems needed in the long-term care of the person with diabetes. Members of the core team should include a family physician/general practitioner and/or a specialist, and diabetes educators (e.g., nurse and dietitian). The person with diabetes and his or her family should also be central members of the team. Family support has been shown to benefit the person with diabetes. The membership of the team may also include numerous other personnel (e.g., pharmacist). Individuals with diabetes often have multiple chronic conditions making diabetes management more challenging. Diabetes treatment is often complex and can be expensive, making it one of the most burdensome and costliest chronic diseases of our time. As a result of the complexity of the disease, it is essential that high-quality health services be provided to assist patients and their families dealing with the many facets of diabetes prevention and care.

Family Physicians/General Practitioners (FPs/GPs)

When Ontarians have a new health problem they usually visit their family physician/general practitioner (FP/GP) first. FPs/GPs contribute to the delivery of most health services in Ontario, including diabetes diagnosis, treatment and management. In Ontario, a large proportion of diabetes management is shouldered by FPs/GPs, with three-quarters of the population receiving diabetes care from their FP/GP only. In fact, FPs/GPs identify diabetes as one of the most common chronic diseases managed in primary health care. Ontarians living with diabetes visit a physician twice as often as members of the general population.

FP/GPs also screen patients who may be at risk for developing diabetes. The Canadian Diabetes Association (CDA) Clinical Practice Guidelines recommend routine screening for diabetes every three years for all adults aged 40 years and older. Earlier and more frequent screening is warranted in specific high-risk groups, including individuals of Asian, African, Hispanic and Aboriginal descent. Screening also identifies individuals with pre-diabetes, which refers to higher than normal levels of blood glucose, but not yet high enough to be diagnosed as type 2 diabetes. Although not everyone with pre-diabetes will develop type 2 diabetes, many will.

It is important to identify pre-diabetes, because the progression to diabetes can be prevented or delayed by lifestyle changes involving dietary improvements, increased physical activity and modest weight loss (5%–7% of body weight), as well as taking certain medications. Furthermore, research has shown that some long-term complications associated with diabe-
tes – such as coronary heart disease (CHD) and nerve damage – may begin during pre-diabetes.\textsuperscript{20} Screening in primary care can detect people whose estimated cardiovascular disease (CVD) risk is high and potentially modifiable.\textsuperscript{21}

Regular diabetes care is important due to the large number of routine screening tests and adjustments to treatment regimens required to optimize the control of diabetes and associated risk factors.\textsuperscript{3} The long-term complications of diabetes can be delayed or prevented through specific interventions, such as tight control of blood sugar levels, cholesterol and blood pressure levels.\textsuperscript{4} Good glycemic (glucose) control is associated with the prevention or delay of diabetes complications including diabetic eye disease, kidney disease and neuropathy.\textsuperscript{17}

Regular diabetes management is critical. Patients with diabetes who failed to see a primary care physician during the previous year had a two-fold higher risk of being hospitalized or being seen in an emergency department for uncontrolled diabetes (blood sugar too high or too low).\textsuperscript{22} In contrast, patients who had a regular provider and visited a physician more frequently had fewer of these episodes.\textsuperscript{22} It has also been shown that persons with diabetes who saw their FP/GP at least three times a year were one-third less likely to require a diabetes-related amputation over the next five years compared with those with fewer annual visits.\textsuperscript{23}

For patients with diabetes, having an ongoing relationship with the same health care provider not only facilitates continuity of care, but provides an opportunity to learn more about the long-term management of the disease. A regular primary care provider conducts important routine screenings that can identify and subsequently help modify and manage the risk factors for diabetes-related comorbidities (concurrent conditions). They also provide the ongoing support and care that patients with diabetes need to help them not only with the day-to-day management of their disease, but to direct them to other resources and care as required.\textsuperscript{5, 24} Primary care providers also integrate diabetes care with preventive health care, provide lifestyle counselling, provide care for other acute and chronic conditions, and coordinate care among various specialists, teams and institutions.
**DIABETES SPECIALISTS**

**Endocrinologists**
Referral to an endocrinologist is one of a number of measures available to primary care providers to aid patients who are not meeting therapeutic targets. Most endocrinologists provide specialized care for diabetes and have expertise in managing complex diabetes regimens. However, other types of physicians, including specialists in general internal medicine, may also specialize in diabetes management. Endocrinologists may work in either hospital or community-based settings, often in close proximity to centres offering diabetes education programs. Although many patients with diabetes will not need specialist care in order to achieve treatment targets, specialized health care provided by endocrinologists should be available to those who do.

**Ophthalmologists and optometrists**
Eye problems are a common complication of diabetes that can lead to serious loss of vision or blindness. Fortunately, vision loss associated with diabetes may be averted through prevention strategies, early detection and treatment. Access to an ophthalmologist or optometrist with experience in detecting diabetic eye disease (retinopathy) is essential for preventing vision loss. The Canadian Diabetes Association (CDA) Clinical Practice Guidelines recommend that all patients with diabetes undergo regular screening and evaluation for diabetic retinopathy by an expert professional (i.e., ophthalmologist or optometrist). To do so, a dilated eye examination should be performed at the time of diabetes diagnosis (for those with type 2 diabetes) and annually (in all patients with diabetes). In Ontario, routine retinal screening and other essential eye services for people with diabetes are covered by the Ontario Health Insurance Program (OHIP).

**Diabetes education programs**
Education is essential in the treatment of diabetes and people with diabetes are encouraged to take an active role in the day-to-day management of their own health care (self-management). These skills can be learned from professionals such as nurses, registered dietitians and trained diabetes educators located within a community- or hospital-based diabetes education program, or a primary care practice setting (e.g., Family Health Team). Other important diabetes professionals may include a social worker, psychologist, foot care specialist (podiatrist or chiropodist), pharmacist or physiotherapist. Diabetes education programs commonly offer group as well as individual counselling to patients on strategies to maintain a healthy diet, undertake regular physical activity, control blood sugar levels and reduce the risk of complications, including how to recognize hypoglycemic (low blood sugar) reactions and treat them appropriately. Most programs also provide advanced training on how to self-administer insulin and adjust its dose. Effectively educating people living with diabetes to better manage their condition can lead to improved glucose control and may reduce their likelihood of developing diabetes complications. Thus, individuals with diabetes play a key role in managing their disease and improving their own quality of life.

**Geographic access to health services**
Geographic access to primary care is an important facilitator of overall population health. While having good geographic access is not always sufficient for people to access the health care they need, it is an essential prerequisite for care. For example, geographic proximity to a family doctor may not necessarily mean that doctor is taking on new patients. Additionally, language, social, cultural and transportation issues can also act as barriers to care despite geographic proximity to a healthcare provider.

In this chapter, the geographic distribution of diabetes care providers in Peel is examined. The services provided by family physicians/general practitioners (FPs/GPs), specialists (e.g., endocrinologists, ophthalmologists/optometrists) and diabetes education programs are studied. In addition, geographic access to services (represented by travel time to diabetes care providers and diabetes education programs) is explored in relation to the prevalence of diabetes in Peel.
LIST OF EXHIBITS

Exhibit 8.1  Locations of family physicians/general practitioners (FPs/GPs) [2009] and distribution of adults aged 20+ with diabetes [2007], by census tract [2006], in residential areas [2009], in Peel region

Exhibit 8.2  Locations of diabetes specialists (endocrinologists, ophthalmologists and optometrists) [2011] and distribution of adults aged 20+ with diabetes [2007], by census tract [2006], in residential areas [2009], in Peel region

Exhibit 8.3  Locations of diabetes education programs [2011] in Peel region

Exhibit 8.4  Locations of diabetes education programs [2011] and distribution of adults aged 20+ with diabetes [2007], by census tract, in residential areas [2009], in Peel region

Exhibit 8.5  Modelled travel distance along the road network [2009] to the nearest location of a family physician/general practitioner (FP/GP) [2009], in Peel region

Exhibit 8.6  Modelled travel distance along the road network [2009] to the nearest location of an endocrinologist [2011], in Peel region

Exhibit 8.7  Modelled travel distance along the road network [2009] to the nearest location of an ophthalmologist or optometrist [2011], in Peel region

Exhibit 8.8  Modelled travel distance along the road network [2009] to the nearest location of a diabetes education program [2011], in Peel region

Exhibit 8.9  Spatial relationship between the average road network distance to the nearest family physician/general practitioner (FP/GP) [2009] and age- and sex-standardized diabetes prevalence rate-ratios* [2007], by census tract [2006], in Peel region

Exhibit 8.10  Spatial relationship between the average road network distance to the nearest endocrinologist [2011] and age- and sex-standardized diabetes prevalence rate-ratios* [2007], by census tract [2006], in Peel region

Exhibit 8.11  Spatial relationship between the average road network distance to the nearest eye specialist (ophthalmologist or optometrist) [2011] and age- and sex-standardized diabetes prevalence rate-ratios* [2007], by census tract [2006], in Peel region

Exhibit 8.12  Spatial relationship between the average road network distance to the nearest diabetes (DM) education program [2011] and age- and sex-standardized diabetes prevalence rate-ratios* [2007], by census tract [2006], in Peel region
Findings:

- There was a fairly even distribution of family physicians/general practitioners (FPs/GPs) throughout Peel region. In central Mississauga there was a higher concentration of FPs/GPs, possibly due to the higher population density in this area (see Exhibits 1.9 and 1.10).

- There was a small pocket in central Brampton with fewer FPs/GPs as well as fewer FPs/GPs located in the newly developing areas of north, east and northwest Brampton.

Exhibit 8.1. Locations of family physicians/general practitioners (FPs/GPs) [2009] and distribution of adults aged 20+ with diabetes [2007], by census tract [2006], in residential areas [2009], in Peel region
Findings:

- There was a clustering of diabetes specialists in and around Mississauga City Centre and along major roads in Brampton. Specialists were generally located near hospitals in Peel region (see Exhibit 8.3).

- Eye services were well distributed in Mississauga with the exception of south and southeast Mississauga. There were also fewer eye services in parts of north, northwest and southeast Brampton and in Caledon (with the exception of Bolton).

- Endocrinologists were not as well distributed as eye services. Almost all endocrinologists in Peel were located near major hospitals in Brampton and Mississauga (see Exhibit 8.3).
Findings:

• Diabetes education programs were scattered throughout Mississauga and Brampton. There was one program located in Caledon (in Bolton). Diabetes education programs were located on-site at hospitals, community health centres and family health teams. Satellite programs were located at other sites in Peel.

• There were no diabetes education programs located in the rapidly developing areas of east and northeast Brampton.

Note: This map shows the locations of on-site and satellite diabetes education programs/services offered by family health teams (FHTs), community health centres (CHCs) or hospitals in Peel. Diabetes education programs/services offered through individual or other family physician/general practitioner (FP/GP) practices are not shown on this map.
Exhibit 8.4. Locations of diabetes education programs [2011] and distribution of adults aged 20+ with diabetes [2007], by census tract [2006], in residential areas [2009], of Peel region

Findings:

• Few, if any, diabetes education programs were located in some areas that had relatively high concentrations of adults with diabetes. These areas include parts of east, northeast and northwest Brampton, and south and northwest Mississauga.

Note: This map shows the locations of on-site and satellite diabetes education programs/services offered by family health teams (FHTs), community health centres (CHCs) or hospitals in Peel. Diabetes education programs/services offered through individual or other family physician/general practitioner (FP/GP) practices are not shown on this map.
Findings:

- In many areas of Mississauga, Brampton and a few areas in Caledon, there was a relatively short travel distance of 3,000 metres or less to the nearest family physician/general practitioner (FP/GP).

- Many areas of Caledon had distances of more than 5,000 metres to the nearest FP/GP, as did small pockets of northeast, east and west Brampton.

- Overall, road distances to the location of the nearest FP/GP were relatively short across Peel region.
Many areas in Peel had road network travel distances of more than 5,000 metres to the nearest endocrinologist. Parts of west Brampton and most of Caledon had travel distances of more than 10,000 metres.

Areas with shorter travel distances (3,000 metres or less) to the nearest endocrinologist were found in central Brampton and central and west Mississauga.

Exhibit 8.6. Modelled travel distance along the road network [2009] to the nearest location of an endocrinologist [2011], in Peel region
Road network travel distances to the nearest eye specialist were relatively short (3,000 metres or less) throughout much of Mississauga, in central Brampton and in east Caledon (Bolton).

There were longer travel distances (more than 5,000 metres) to an ophthalmologist or optometrist throughout west and northeast Brampton, and most of Caledon (with the exception of Bolton and Caledon Village).

Findings:

- Road network travel distances to the nearest eye specialist were relatively short (3,000 metres or less) throughout much of Mississauga, in central Brampton and in east Caledon (Bolton).

- There were longer travel distances (more than 5,000 metres) to an ophthalmologist or optometrist throughout west and northeast Brampton, and most of Caledon (with the exception of Bolton and Caledon Village).
Road network travel distances to the nearest diabetes education program were relatively short (3,000 metres or less) in east, central, west and northeast Mississauga, central and north Brampton and east Caledon (Bolton).

Travel distances to the nearest diabetes education program were slightly longer (more than 5,000 metres) in parts of south, north and northeast Mississauga, and east, northeast, west and southwest Brampton, and throughout most of Caledon.

Exhibit 8.8. Modelled travel distance along the road network [2009] to the nearest location of a diabetes education program [2011], in Peel region
Findings:

• There were relatively short to medium travel distances (5,000 metres or less) to the nearest family physician/general practitioner (FP/GP) (compared to the rest of Peel) in areas such as north, northeast, east and northwest Brampton, and northeast Mississauga where diabetes rates were high (at least 20% higher than the GTA).

• Portions of southwest Brampton and south Mississauga had lower diabetes rates and short travel distances to the nearest FP/GP (2,000 metres or less). Most of Caledon had low diabetes rates but relatively long distances (more than 5,000 metres) to the nearest FP/GP.

*Rate-ratio calculated as:
census tract rate for pop. aged 20+  
GTA rate for pop. aged 20+  
Overall Greater Toronto Area (GTA) diabetes rate: 9.0%
Findings:

• The vast majority of high diabetes areas in Peel (with diabetes rates at least 20% higher than the GTA average rate of 9.0%) had average road network distances between 3,001 to 10,000 metres to the nearest endocrinologist. These areas were located in north, east, northwest and southwest Brampton, and north, north-central and northeast Mississauga.

• Areas in south Mississauga with lower diabetes rates (at least 20% lower than the GTA average) had average road network travel distances of 10,000 metres or less to the nearest endocrinologist.
Findings:

- Many high diabetes census tracts (those having diabetes rates at least 20% higher than the GTA average) had travel distances of 3,000 metres or less to the nearest eye specialist.

- Low diabetes areas (with rates at least 20% lower than the GTA average) in Mississauga and Brampton also had travel distances of 3,000 metres or less to the nearest eye specialist.

Exhibit 8.11. Spatial relationship between the average road network distance to the nearest eye specialist (ophthalmologist or optometrist) [2011] and age- and sex-standardized diabetes prevalence rate-ratios* [2007], by census tract [2006], in Peel region.
Findings:

- High diabetes census tracts (with diabetes rates at least 20% higher than the GTA average) located in northeast and southwest Brampton, and north and north-central Mississauga had average road network travel distances of 5,000 metres or less to the nearest diabetes education program.

- Some high diabetes census tracts located in north and central Brampton, and northeast and central Mississauga had shorter travel distances (5,000 metres or less) to the nearest diabetes education program.
In this chapter, the locations of and geographic access to family doctors, medical specialists and diabetes education programs in relation to diabetes prevalence in Peel is reviewed.

Health services in general were well distributed throughout Peel. Family physicians and general practitioners (FPs/GPs) were particularly well-distributed throughout the region. There was a higher concentration of FPs/GPs in central Mississauga, which may be due to the higher population density in this area. There were fewer FPs/GPs located in the rapidly developing areas of north and east Brampton, but road network travel distances to FPs/GPs were generally short (3,000 metres or less) throughout Peel, including areas with higher diabetes rates. Compared to the rest of Peel, Caledon had the longest travel distances (more than 5,000 metres) to the nearest FP/GP. Given the rural make-up of Caledon, it is not surprising that travel distances would be slightly longer. However, it is unlikely that residents of Caledon would consider a distance of 5,000 metres (or more) to visit an FP/GP as a long trip especially given the rural setting.

Overall, there was a relatively even distribution of and good geographic accessibility to FPs/GPs, which is a positive finding given the key role that FPs/GPs play in the prevention, treatment and care for people with diabetes. This is particularly important in Peel where diabetes rates are high thus necessitating greater need for primary care.

It is important to note that although geographic access to FPs/GPs in Peel was quite good, there are other aspects of access that also play a key role in overall population health that could not be measured. Such aspects included whether or not physicians were open or closed to new patients, the provision of language-specific services and cultural sensitivity to the health care needs of certain immigrant groups.

Medical specialists – endocrinologists, ophthalmologists, optometrists

The majority of endocrinologists, ophthalmologists and optometrists were located in Mississauga (near the City Centre) and along major roads and near hospitals in Peel.

Eye services were generally well distributed throughout the region, but endocrinologists were not as well distributed. There were very few locations of endocrinologists outside the major hospitals in Mississauga and Brampton. Not surprisingly, the longest travel distances (more than 10 km) to an endocrinologist were in Caledon. While the trend for endocrinologists to locate in high-density areas near hospitals is unlikely to change in the short-term, there is movement toward endocrinologists working in non-hospital (community) settings. This provides future opportunities for new specialty practices to open in high-need areas. However, it is not unusual to travel longer distances to a specialist regardless of where one lives. Specialist referrals are often based on a number of factors including the nature of or familiarity with the specialist and not necessarily on proximity to the referring physician or patients’ own location.

Diabetes education programs

Diabetes education programs were scattered throughout Mississauga and Brampton. There was one diabetes education program in Caledon (in Bolton).

While some locations in Brampton and Mississauga did not have a diabetes education program, travel distances to the nearest program were 5,000 metres or less in many parts of Mississauga and Brampton, and in Bolton (within Caledon). Slightly longer distances (more than 5,000 metres) to diabetes education programs were found in high-diabetes areas in northeast and southwest Brampton, and north and north-central Mississauga. Conversely, some high-diabetes census tracts located in north and central Brampton, and northeast and central Mississauga had average distances 5,000 metres or less to the nearest diabetes education program.
LIMITATION OF THESE ANALYSES

A couple of limitations of these analyses deserve mention. The physical locations and distribution of family physicians/general practitioners (FPs/GPs) throughout Peel region is shown. However, no assessment to determine if the FPs/GPs at these locations were actually accepting new patients was conducted. As previously discussed in this chapter, access does not only refer to proximity but also to whether an individual provider is accepting new patients.

Secondly, it is important to note that only the locations of on-site and satellite diabetes education programs/services offered by family health teams (FHTs), community health centres (CHCs) or hospitals in Peel was included. Neither diabetes education programs/services offered through individual or other FP/GP practices, nor satellite services offered less than once a week were analyzed.

CONCLUSIONS AND IMPLICATIONS

Peel is home to rapid new development and large recent immigrant and visible minority populations, particularly individuals of South Asian heritage (see Chapter 4 for a definition of visible minority used in this atlas). These groups have considerably higher rates of diabetes compared with other ethnic groups. This relationship was most evident in the high-diabetes areas in west, central and northeast Mississauga, as well as east, central-west, north and northeast Brampton – areas that are home to a high concentration of visible minorities and recent immigrants (see Chapter 4 for more information about ethnicity and immigration in relation to diabetes in Peel region). These demographic trends suggest the need to develop effective programs to prevent diabetes and to target immigrants of all age groups in rapidly expanding areas of Peel. Because there may be a high proportion of residents who may not speak English in areas with high rates of diabetes, there is also a need to provide language-specific health services in these areas.

The importance of culturally-specific services is perhaps one of the most important issues in health service provision in Peel. Traditional diabetes care systems designed for mainstream populations are often of limited relevance to culturally-diverse populations. Such systems commonly emphasize reducing behavioural risk factors and the benefits of self-care behaviours, but ignore the social, cultural, economic and physical environments in which lifestyle practices are shaped and constrained. There is growing evidence to show that diabetes prevention and management strategies that offer group support and services provided by a multidisciplinary/community-based team with an understanding of the cultural and socio-economic realities of the target ethnic group are associated with improved clinical outcomes and reduced ethnic disparities.

Policy-makers must prepare for the rising burden of diabetes on healthcare resources by ensuring that primary prevention strategies are in place. Although diabetes can be prevented through lifestyle changes aimed at increasing activity and improving diet, providing these interventions on an individual basis may not always be feasible. Effective prevention strategies must: identify high-risk populations and their modifiable risk factors; optimize urban planning and resource availability to address the “diabetogenic” environment (i.e., an environment where people have easy access to high fat, high calorie foods); and implement public education campaigns to promote healthier lifestyles.

Newly developing areas in Peel region may be ideal locations for implementing population-based prevention strategies. Northeast and east Brampton, in particular, are areas with a large influx of new residents and more growth planned for the future (see Chapter 1). Future plans should focus on the provision of community-based health care prevention and management programs aimed at high-risk groups in these areas. Programs should be developed and deliv-
ered in partnership with target communities and should reflect local ethnocultural representation. Other factors also play a role in whether patients use diabetes education services. Fewer than half of the primary care physicians surveyed in Peel (and Halton) region followed the Canadian Diabetes Association (CDA) recommendation to refer patients to diabetes self-management education programs. Common reasons for not referring were patients’ unwillingness to attend, lack of evening/weekend appointments, language barriers, long referral waiting lists and inconvenient location for patients. The addition of diabetes educators on-site in family physician/general practitioner (FP/GP) offices might enhance FP/GP referrals and uptake in patient participation.

To address the burden of diabetes, Ontario launched a comprehensive diabetes strategy that builds on internationally accepted best practices and the growing body of evidence supporting the organization of health care around chronic disease management. The strategy includes efforts to prevent diabetes onset, improve access to information and educational materials that promote diabetes self-management, enhance access to comprehensive, team-based care for people with diabetes, and support the optimal management of diabetes in clinical practice through the development of a province-wide diabetes registry.

The availability of and access to high quality health care services are important factors in the prevention and management of diabetes. Primary care providers play key roles in helping patients cope with the day-to-day management of the disease, which may be complicated and overwhelming for many. Other services, such as medical specialists and diabetes education programs, are also essential to reduce the current and future burden of diabetes. However, providing additional health services will not fully solve the issue of overall access. Future plans to extend key diabetes-related health services in Peel should include consideration of how to overcome additional barriers to access besides geographic location. These include language and cultural differences, the current policy that imposes a three-month wait for Ontario Health Insurance Plan (OHIP) for new immigrants, the lack of a convenient, fast and well-connected public transportation system, and sensitivity to services that may be difficult to comply with or may be inappropriate in light of local residents’ values and beliefs.

APPENDIX 8.A – RESEARCH METHODOLOGY

Data Sources

Locations of Family Physicians/General Practitioners, Specialists and Diabetes Education Programs

• The locations of family physicians/general practitioners (FP/GP) presented in this chapter were received from the Corporate Provider Database (CPDB; 2009/10) housed at the Institute for Clinical Evaluative Sciences (ICES).
• The locations of diabetes specialists – endocrinologists, ophthalmologists, and optometrists – were received from the Institute for Clinical Evaluative Sciences (ICES; 2011).

• The locations of diabetes education programs were received from two sources: Diabetes Regional Coordination Centres (2011) and Peel Public Health (2011).

Diabetes Prevalence
• Age- and sex-standardized diabetes prevalence rates per 100 people were calculated using the Ontario Diabetes Database (ODD) and other administrative data sources held at the Institute for Clinical Evaluative Sciences (ICES) (see Appendix 2.A for a more detailed description).

ANALYSIS
The distribution of and geographic accessibility to family physicians/general practitioners (FPs/GPs), endocrinologists, ophthalmologists and optometrists, diabetes education programs and associated satellite locations across Peel region was examined.

• The distribution of these resources was examined by using symbols to depict their locations throughout Peel (e.g., locations of FPs/GPs across the region). This method provided an opportunity to determine where services were located and whether certain services existed in specific neighbourhoods. Dot density mapping was used to depict concentrations of adults aged 20 or older with diabetes across Peel. On these maps, one dot represented 100 adults 20 or older with diabetes. Dots were placed at random locations within residential areas of census tracts, based on the number of adults aged 20 years or older with diabetes that lived in a given census tract. This allowed for the comparison of the distribution of diabetes-related health services in Peel region with spatial concentrations of adults aged 20 years or older with diabetes.

• Access or accessibility, as shown on the accessibility maps, was measured as the shortest distance along the street network to the nearest resource location (e.g., FP/GP) from each point in a 150-metre grid of starting points located across Peel region. That is, the distance along the network of streets and highways from each starting point to the nearest location of each type of health service was measured.

• The spatial relationship between these accessibility measures and rates of diabetes prevalence that were either much higher (20% or more) or much lower (20% or less) than the GTA average diabetes rate of 9% was evaluated. For each Peel census tract, the diabetes rate was divided by the overall GTA rate in order to calculate a rate-ratio. Census tracts with diabetes rates that were meaningfully higher than in the GTA as a whole (rate-ratio of ≥1.2) were depicted in shades of red, while tracts with rates much lower than in the GTA (rate-ratio of ≤0.80) were depicted in shades of blue. All census tracts whose rates did not differ substantially from the GTA rate (rate-ratio between 0.81 and 1.19) were depicted using a single grey colour.


36. Raphael D, Anstic S, Raine K, et al. 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.


