Quality Standards

Type 1 Diabetes

Care for People of All Ages

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Health Quality Ontario
Let's make our health system healthier

Ontario

About This Quality Standard

The following quality standard addresses **care for people of any age with a diagnosis of type 1 diabetes.**

It applies to all settings, including hospital and acute care settings, correctional facilities, and community care, including primary care, specialist care, hospital outpatient clinics, home care, and long-term care.

What Is a Quality Standard?

Quality standards outline what high-quality care looks like for conditions or processes where there are large variations in how care is delivered, or where there are gaps between the care provided in Ontario and the care patients should receive. They:

- Help patients, families, and caregivers know what to ask for in their care
- Help health care professionals know what care they should be offering, based on evidence and expert consensus
- Help health care organizations measure, assess, and improve their performance in caring for patients

Quality standards are developed by Health Quality Ontario, in collaboration with health care professionals, patients, and caregivers across Ontario.

For more information, contact qualitystandards@hqontario.ca.

Values That Are the Foundation of This Quality Standard

This quality standard was created, and should be implemented, according to the Patient Declaration of Values for Ontario. This declaration “is a vision that articulates a path toward patient partnership across the health care system in Ontario. It describes a set of foundational principles that are considered from the perspective of Ontario patients, and serves as a guidance document for those involved in our health care system.”

These values are:

- Respect and dignity
- Empathy and compassion
- Accountability
- Transparency
- Equity and engagement

Health care professionals should acknowledge and work towards addressing the historical and present-day impacts of colonization in the context of the lives of Indigenous Peoples throughout Canada. This work involves being sensitive to the impacts of intergenerational and present-day traumas and the physical, mental, emotional, and social harms experienced by Indigenous people, families, and communities. This quality standard uses existing clinical practice guideline sources developed by groups that may not include culturally relevant care or acknowledge traditional Indigenous beliefs, practices, and models of care.

Quality Statements to Improve Care

These quality statements describe what high-quality care looks like for people with type 1 diabetes.

Quality Statement 1: Diabetes Self-Management Education and Support
People with type 1 diabetes and their family and caregivers are offered an individualized, structured self-management education and support program at diagnosis and on an ongoing basis.

Quality Statement 2: Access to an Interprofessional Care Team
People with type 1 diabetes have access to an interprofessional diabetes health care team with training in type 1 diabetes.

Quality Statement 3: Setting and Achieving Glycemic Targets
People with type 1 diabetes, in collaboration with their health care team, set individualized glycemic targets, including glycated hemoglobin (hemoglobin A1C) and other available measures of glycemia. All available data are used to assess whether individualized glycemic targets are achieved and to guide treatment decisions and self-management activities.

Quality Statement 4: Identifying and Assessing Mental Health Needs
People with type 1 diabetes are screened regularly for psychological distress and mental health disorders using recognized screening questions or validated screening tools. People who screen positive for a mental health disorder are assessed by a health care professional with expertise in mental health.

Statement 5: Transition From Pediatric to Adult Diabetes Care
People with type 1 diabetes experience planned, coordinated, and supported transitions from pediatric to adult diabetes care.

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Scope of This Quality Standard

This quality standard addresses care for people of any age with a diagnosis of type 1 diabetes. It applies to all settings, including hospital and acute care settings, correctional facilities, and community settings, including primary care, specialist care, hospital outpatient clinics, home care, and long-term care.

This quality standard does not include care for pregnant people with type 1 diabetes. For a quality standard that addresses care for people with type 1 or type 2 diabetes who become pregnant, or people diagnosed with gestational diabetes, please refer to the *Diabetes in Pregnancy* quality standard.

Why This Quality Standard Is Needed

Type 1 diabetes is a chronic, metabolic disease in which the pancreas produces little or no insulin. It usually develops in individuals younger than age 25 years.[1] Type 1 diabetes has been historically, and continues to be the most common type of diabetes in children and youth (although type 2 diabetes is increasingly being diagnosed in this population).[2] In 2015, an estimated 1.5 million Ontarians, or 10.2% of the provincial population, were living with diabetes (type 1 and type 2 combined).[3] Most health administrative data do not differentiate between type 1 and type 2 diabetes, but estimates suggest that 10% of cases are type 1 diabetes.[3] Type 1 diabetes is not preventable.

People with diabetes are at risk of developing serious, acute complications (e.g., severe hypoglycemia, ketoacidosis); long-term microvascular complications affecting the eyes, kidneys, and nerves; and cardiovascular disease.[4] Frequent monitoring of glucose levels, lifelong insulin administration via injection or an insulin pump to keep blood glucose levels in the target range, and a healthy, balanced diet and physical activity are essential for managing type 1 diabetes and reducing the risk of acute and chronic complications.[5]

Managing the condition and its complications has substantial personal and economic impacts on people with type 1 diabetes and their families and caregivers, and the economic burden to the Canadian health care system and society more broadly is considerable. In total, diabetes is estimated to cost Ontarians $6 billion each year.[3] People with diabetes and their families have identified challenges affording out-of-pocket costs for medications, equipment, devices, and supplies required to treat their diabetes.[6] Twenty-five percent of Canadians with diabetes report that these costs affect their adherence to their prescribed treatment regimens, which poses risks to their short- and long-term health.[7]

Compared with the general population, people with diabetes (type 1 or type 2) are more than three times more likely to be hospitalized with cardiovascular disease, 12 times more likely to be hospitalized with end-stage kidney disease, and nearly 20 times more likely to be hospitalized with nontraumatic lower-limb amputations.[8] The risk of blindness in people with diabetes is up to 25 times higher than in those without diabetes.[8] More than 30% of people with diabetes experience significant depressive symptoms,[10,11] and 11% of people with diabetes meet the diagnostic criteria for comorbid major depressive disorder—twice that of people without diabetes.[9] Among children with type 1 diabetes, acute complications, such as diabetic ketoacidosis and severe hypoglycemia, are the leading cause of hospital admissions and emergency department visits.[12] Further, young adults without medical follow-up during the transition from pediatric to adult diabetes services are more likely to experience hospitalization for diabetic ketoacidosis during this period.[13,14]

There are also regional variations across Ontario in the rates of hospitalizations and emergency department visits attributable to type 1 diabetes. In 2017/18, there were nearly 3 times as many hospitalizations in the North West region (71.4 per 100,000 individuals) than in the Mississauga Halton region (25.5 per 100,000 individuals) (Discharge Abstract Database, 2017/18). Also in 2017/18, the rate of emergency department visits per 100,000 people was 4.2 times higher in the South East region (274 per 100,000 individuals) than in the Mississauga Halton region (65 per 100,000 individuals) (National Ambulatory Care Reporting System, 2017/18). These varying rates of hospitalizations and emergency department visits may be linked to differences in the prevalence of type 1 diabetes across the regions and/or variations in care people with type 1 diabetes receive in the community.

Based on evidence and clinical expert consensus, the five quality statements that make up this quality standard provide guidance on high-quality health care in priority areas for people in Ontario with type 1 diabetes.

How to Use This Quality Standard

Quality standards inform patients, clinicians, and organizations about what high-quality care looks like for health conditions or processes deemed a priority for quality improvement in Ontario. They are based on the best evidence.

Guidance on how to use quality standards and their associated resources are included below.

For People With Type 1 Diabetes

This quality standard consists of quality statements. These describe what high-quality care looks like for people with type 1 diabetes.

Within each quality statement, we’ve included information on what these statements mean for you.

In addition, you may want to download this accompanying patient guide on type 1 diabetes, to help you and your family have informed conversations with your health care providers. Inside, you will find questions you may want to ask as you work together to make a plan for your care.

For Clinicians and Organizations

The quality statements within this quality standard describe what high-quality care looks like for people with type 1 diabetes.

They are based on the best evidence and designed to help you know what to do to reduce gaps and variations in care.

Many clinicians and organizations are already providing high-quality evidence-based care. However, there may be elements of your care that can be improved. This quality standard can serve as a resource to help you prioritize and measure improvement efforts.

Tools and resources to support you in your quality improvement efforts accompany each quality standard. These resources include indicators and their definitions (Appendix 2) to help you assess the quality of care you are delivering, and identify gaps in care and areas for improvement. While it is not mandatory to use or collect data when using a quality standard to improve care, measurement is key to quality improvement.

There are also a number of resources online to help you, including:

- Our patient guide on type 1 diabetes, which you can share with patients and families to help them have conversations with you and their other health care providers. Please make the patient guide available where you provide care
- Our measurement resources, which include our data tables to help you identify gaps in care and inform your resource planning and improvement efforts; our measurement guide of technical specifications for the indicators in this standard; and our “case for improvement” slide deck to help you to share why this standard was created and the data behind it
- Our *Getting Started Guide*, which includes links to templates and tools to help you put quality standards into practice. This guide shows you how to plan for, implement, and sustain changes in your practice
- Quorum, an online community dedicated to improving the quality of care across Ontario. This is a place where health care providers can share information, inform, and support each other, and it includes tools and resources to help you implement the quality statements within each standard
- Quality Improvement Plans, which can help your organization outline how it will improve the quality of care provided to your patients, residents, or clients in the coming year

While you implement this quality standard, there may be times you find it challenging to provide the care outlined due to system-level barriers. Appendix 1 provides our recommendations to provincial partners to help remove these barriers so you can provide high-quality care. In the meantime, there are many actions you can take on your own, so please read the standard and act where you can.

How to Measure Overall Success

The Type 1 Diabetes Quality Standard Advisory Committee identified some overarching goals for this quality standard. These goals were mapped to indicators that can be used to monitor the progress being made to improve transitions from hospital to home in Ontario. Some indicators are provincially measurable, while some can be measured using only locally sourced data.

Collecting and using data associated with this quality standard is optional. However, data will help you assess the quality of care you are delivering and the effectiveness of your improvement efforts.

We realize this standard includes a lengthy list of indicators. We’ve given you this list so you don’t have to create your own quality improvement indicators. We recommend you identify areas to focus on in the quality standard and then use one or more of the associated indicators to guide and evaluate your quality improvement efforts.

See Appendix 2 for additional details on how to measure these indicators and our measurement guide for more information and support.

Indicators That Can Be Measured Using Provincial Data

- Percentage of people with type 1 diabetes who have had two or more hemoglobin A1C tests in the past 12 months
- Percentage of people with type 1 diabetes whose **most recent** hemoglobin A1C test fell within the following ranges:
  - In those 18 years of age and older:
    - ≤ 7.0%
    - 7.1 < 7.5%
    - 7.5 < 8.0%
    - 8.0 < 9.0%
    - ≥ 9.0%
  - In those younger than 18 years of age:
    - ≤ 7.5%
    - 7.6 < 8.0%
    - 8.0 < 9.0%
    - ≥ 9.0%
- Rate of complications among people with type 1 diabetes:
  - Stratify by:
    - Hyperglycemia
    - Hypoglycemia
    - Ketoacidosis
    - Neuropathy
    - Nephropathy
    - Retinopathy
    - Cardiovascular complications
    - Diabetes foot ulcers
    - Amputations (above-knee, below-knee)
    - Pancreatitis
- Percentage of people with type 1 diabetes with one or more urgent acute care visits for diabetes in the past year
  - Stratify by:
    - Emergency department visits
    - Hospitalizations
- Percentage of people with type 1 diabetes with one or more urgent acute care visits for a mental health disorder in the past year
  - Stratify by:
    - Emergency department visits
    - Nonelective hospitalizations
- Percentage of people who were hospitalized for type 1 diabetes who are readmitted to hospital:
  - Within 7 days of discharge
  - Within 30 days of discharge

Indicators That Can Be Measured Using Only Local Data

- Percentage of people with type 1 diabetes (and their family and caregivers, as appropriate) who report feeling confident managing their condition
- Percentage of people with type 1 diabetes who report that their interprofessional care team always or often involves them in decisions about their care

Quality Statements to Improve Care: The Details

Quality Statement 1: Diabetes Self-Management Education and Support

People with type 1 diabetes and their family and caregivers are offered an individualized, structured self-management education and support program at diagnosis and on an ongoing basis.

Definitions

Self-management education and support program: An interactive, ongoing process that aims to help people with type 1 diabetes and their families acquire the knowledge, confidence, and decision-making, problem-solving, and coping skills necessary for diabetes self-care practices and behaviours.[4,14,15] Programs should be timely, evidence-based, theory-driven, person-centred, and culturally relevant.[14] Providers should consider the social determinants of health and address the person's age and developmental needs, health beliefs, cultural needs, current knowledge, physical limitations, emotional concerns, family support, financial status, medical history, health literacy, numeracy, and other factors that influence their ability to meet the challenges of self-management.

Education and support programs should include content on the following:

- Information on type 1 diabetes (what it is, its symptoms, and how it is diagnosed)
- Insulin therapy (aims, how it works, mode of delivery, and dosing)
- Glucose monitoring, including targets for glucose control (self-monitoring of blood glucose and glycated hemoglobin [hemoglobin A1C] levels, available monitoring devices, and interpreting and using results for decision-making)
- Effects of nutrition and physical activity on blood glucose levels and how to alter diabetes regimens (such as balancing insulin, food, and exercise)
- Managing intercurrent illness (e.g., planning for sick days, monitoring blood ketones)
- Preventing, detecting, and managing hypoglycemia, hyperglycemia, and ketosis
- Late complications of type 1 diabetes, including preventing and managing complications and the importance of regular assessment
- Dealing with the psychological aspects of living with diabetes
- Community supports and resources (these can be social, emotional, and financial, including available funding sources for any out-of-pocket health care costs)
- Diabetes device education, training, and support (regular evaluation of technique, results, and ability to interpret and respond to device-generated data)
- Lifestyle and life events (such as stress, holidays, travel, smoking, alcohol and recreational drug use, school, college, and employment)
- Diabetes and driving guidelines
- Sexual and reproductive health and contraception counselling (starting at puberty)
- Preconception counselling for people of reproductive age (see the *Diabetes in Pregnancy* quality standard)

Depending on how care services are organized and the person's needs and knowledge gaps, self-management education and support may be carried out by several members of the health care team. If necessary, the person with type 1 diabetes may be referred to other health care professionals (or programs) with expertise in type 1 diabetes. To best fit the person's needs and the immediacy of those needs, including local circumstances and resources, education may be delivered face-to-face (one-on-one or in small group settings), through telehealth technologies (e.g., telephone, web-based, or virtual), or through a combination of both.

Ongoing basis: A person with type 1 diabetes and their family and caregivers should receive diabetes self-management education and support at diagnosis and at regular intervals thereafter, depending on their needs, age, and developmental stage. This can occur at routine follow-up appointments, which are usually every 3 months in pediatric settings and every 6 months in adult settings, or sooner if complicating factors or individual needs arise and when transitions in care occur.[14]

Sources

American Diabetes Association, 2018[14] | Diabetes Canada, 2018[4] | National Institute for Health and Care Excellence, 2016,[1] 2016[16] | Scottish Intercollegiate Guidelines Network, 2017[17]

Rationale

Diabetes is a complex chronic condition and its dynamic nature requires people to make frequent and ongoing self-management decisions.

In addition to diabetes self-management education and support programs, people with type 1 diabetes and their family and caregivers (as appropriate) should have prompt and convenient access to diabetes-related advice (e.g., by telephone, text messaging, or email and in person) from their diabetes health care team between visits to manage urgent matters.

What This Quality Statement Means

For People with Type 1 Diabetes and Their Family and Caregivers

From the time of diagnosis, you and your family and caregivers should be offered education and support to help you learn about type 1 diabetes and ways to manage it effectively. Your needs are unique and change throughout your life, and the education and support you receive should address these needs and your involvement in your own care.

If you are a parent or caregiver of a child with type 1 diabetes, you will have a role in managing their diabetes. Education and support will be tailored to you and your needs during this time. As children grow up and become more independent, they will increasingly take over responsibility for their care and self-management, and education and supports should shift accordingly.

For Clinicians

Offer timely and ongoing evidence-based information, support, and advice starting at diagnosis to help people and their family and caregivers learn about type 1 diabetes and develop the knowledge and skills to manage their diabetes. Individualize content to meet their needs and adapt it as necessary for age, developmental stage, cultural factors, health literacy, and comorbidities. If you are not able to provide education on site, ensure that people have access to it elsewhere (e.g., through partnerships with local organizations, specialized clinic settings, or local pediatric or adult diabetes education programs).

For Health Services Planners

Ensure that appropriate time, processes, and resources are available for health care professionals to provide timely self-management education and support to people with type 1 diabetes and their family and caregivers. Ensure that people of all ages with type 1 diabetes and their family and caregivers have access to health care professionals trained in providing diabetes self-management education, including but not limited to certified diabetes educators. Monitor wait times for diabetes self-management education and support programs to ensure people have timely and equitable access.

Quality Indicators: How to Measure Improvement for This Statement

- Percentage of people with type 1 diabetes whose individualized, structured self-management education and support program has been reviewed by their interprofessional diabetes health care team within the last year
- Average wait time between when a person with type 1 diabetes and their family and caregivers (where appropriate) are referred to an individualized, structured self-management education and support program and their visit
- Percentage of people with type 1 diabetes (and their family and caregivers, as appropriate) who report feeling confident managing their condition

Measurement details for these indicators, as well as indicators to measure overarching goals for the entire quality standard, are presented in Appendix 2.

Quality Statement 2: Access to an Interprofessional Care Team

People with type 1 diabetes have access to an interprofessional diabetes health care team with training in type 1 diabetes.

Definition

Interprofessional diabetes health care team: The team consists of multiple providers from various disciplines with specific training in type 1 diabetes who work together to provide comprehensive and coordinated care. People with type 1 diabetes and their family members and caregivers are an integral part of the team and should participate in decisions about their own care. The team's composition should be tailored to the care and developmental needs of the individual and to the community in which they live. The team may include, but is not limited to, the following care providers: a child life specialist, chiropodist, diabetes educator (of any health care profession), dietitian, exercise physiologist, nurse, nurse practitioner, pharmacist, physician (e.g., endocrinologist, family physician, pediatrician, psychiatrist), psychologist, and social worker.

Sources

American Diabetes Association, 2018[14] | Diabetes Canada, 2018[4] | National Institute for Health and Care Excellence, 2016,[1] 2016[16]

Rationale

The needs of people with type 1 diabetes are dynamic and complex. Pediatric and adult interprofessional diabetes health care teams made up of providers with specific training in type 1 diabetes can effectively provide person-centred, high-quality diabetes care, education, and support for people with diabetes and their family and caregivers. This collaborative, coordinated care approach should begin at diagnosis.[1,4]

Models of delivering specialized interprofessional diabetes care can be adapted to the location and context where care is offered, and may be organized, staffed, and accessed in various ways to best fit local circumstances and resources. This could include the use of telehealth technologies (e.g., telephone, web-based, or virtual) or the integration of existing services in primary care and specialist care settings to improve access and reduce travel time for people with type 1 diabetes and their families.

What This Quality Statement Means

For People With Type 1 Diabetes

You should have access to a health care team with expertise in type 1 diabetes care. Depending on your needs and the resources available in your community, your team may include doctors, nurses, a social worker, a pharmacist, and others. Your team can answer your questions about how to manage diabetes, and work with you to adjust your food plan, activity levels, and medications. You and your family should be included as important members of your health care team. This means your questions, concerns, observations, and goals are discussed and incorporated into your care plan, and you are supported to play an active role in your own care.

For Clinicians
Ensure that people have access to an interprofessional diabetes care team with training in type 1 diabetes. Involve people and their families in decisions about their care. Work collaboratively and partner with the person and their family in all aspects of daily care, care planning, health promotion, and wellness to ensure shared decision-making and engagement.

For Health Services Planners
Ensure systems, processes, and resources are in place so that people of all ages with type 1 diabetes have timely access to an interprofessional diabetes health care team that is trained in type 1 diabetes. Teams should comprise providers and roles that meet the needs of the population served.

Quality Indicator: How to Measure Improvement for This Statement

- Local availability of adult and pediatric interprofessional diabetes health care teams with training in type 1 diabetes

Measurement details for this indicator, as well as indicators to measure overarching goals for the entire quality standard, are presented in Appendix 2.

Quality Statement 3: Setting and Achieving Glycemic Targets

People with type 1 diabetes, in collaboration with their health care team, set individualized glycemic targets, including glycated hemoglobin (hemoglobin A1C) and other available measures of glycemia. All available data are used to assess whether individualized glycemic targets are achieved and to guide treatment decisions and self-management activities.

Definitions

Glycated hemoglobin (hemoglobin A1C): A measure of average blood glucose levels over the previous 3 months,[18] and has strong predictive value for diabetes complications.[4] Current clinical practice guidelines provide consensus-based guidance recommending target hemoglobin A1C values of less than or equal to 7.5%[4,14] for children and adolescents (younger than 18 years of age) and of less than or equal to 7%[4,14] for adults. However, they also agree that targets should be tailored to each person with diabetes and that aiming for a particular hemoglobin A1C value should not be accompanied by problematic hypoglycemia or other adverse effects of treatment (e.g., polypharmacy). Hemoglobin A1C targets should take into consideration an individual's daily activities, age, duration of diabetes, comorbidities, frailty, likelihood of complications, and history of hypoglycemia.[1,4] In adults with diabetes with multiple comorbidities, advanced complications, limited life expectancy, or frailty, it may be reasonable to have less stringent hemoglobin A1C targets.[4,14] Targets should be decided in collaboration with the person and their family and caregivers (where appropriate), reflecting the person's preferences, needs, and values.[14]

Other available measures of glycemia: Any self-monitoring glucose device a person might use. These may include a blood glucose meter (using fingerstick blood glucose measurements), with or without continuous glucose monitoring or flash glucose monitoring.[4]

All self-monitoring glucose devices provide glucose values. Continuous glucose monitoring and flash glucose monitoring devices provide additional information, including[19,20]:

- Percentage of time in target glucose range
- Percentage of time in hypoglycemia range
- Percentage of time in hyperglycemia range
- Glycemic variability

Sources

American Diabetes Association, 2018[14] | Diabetes Canada, 2018[4] | National Institute for Health and Care Excellence, 2016,[1] 2016[16]

Rationale

Achieving optimal glycemic targets is fundamental to diabetes management and reduces both the risk and progression of diabetes-related complications in people with diabetes.[4] However, achieving optimal glycemic targets, while avoiding hypoglycemia, can be challenging and requires individualized insulin regimens.[19] Maintaining an optimal range between high and low blood sugars is a delicate balance. Chronic sustained hyperglycemia damages blood vessels and nerves, leading to complications that include blindness and kidney failure as well as high rates of heart disease. At the same time, hypoglycemia has its own potential risks and harms and is a key barrier to achieving desired glycemic targets.[19,20]

Each measure of glycemia has benefits and limitations; therefore, use of all available measures of glycemia—hemoglobin A1C, in conjunction with regular home glucose monitoring (using accurate fingerstick blood glucose measurements, with or without continuous glucose monitoring or flash glucose monitoring)—provides important information to assess glycemic status and optimize diabetes management.[1,18]

If glycemic targets are not achieved, care teams should collaborate with the person with type 1 diabetes to consider a stepwise approach to improve glycemia, with an individualized focus on the following[1,16,18]:

- Adjusting insulin doses
- Identifying and addressing individual and family factors that potentially affect achieving the glycemic target (such as psychosocial and mental health needs, knowledge gaps, family conflict, limited support, and financial barriers)
- Assessing the psychological effect of goal setting on the person
- Incorporating available and appropriate technology to reduce episodes of hyperglycemia and hypoglycemia and improve time spent in the target glucose range

The person's specific needs and goals should inform considerations of technology use. Device options—including appropriateness, potential benefits and risks, clinical response, and any out-of-pocket costs—should be discussed with the person and their family. Device-specific education, training, and support, both initially and at regular intervals thereafter, is essential for successful implementation and ongoing use (see quality statement 1).[20]

What This Quality Statement Means

For People With Type 1 Diabetes

Work with your diabetes health care team to determine your target hemoglobin A1C value and target glucose range (before meals and after meals). Try to keep your glucose level as close to your target range as possible. This will help to delay or prevent complications of diabetes. You should be offered treatment and support to help you reach and stay at your targets.

Checking your glucose level with a glucose meter (also known as self-monitoring of blood glucose) or using a flash glucose monitor or continuous glucose monitor will:

- Determine if you have a high or low blood glucose level at a given time
- Show how your health behaviours and insulin affect your blood glucose levels
- Help you and your diabetes health care team make health behaviour and insulin changes that will improve your glucose levels

For Clinicians

Work with people with type 1 diabetes to determine their individualized hemoglobin A1C target and support them to reach and stay at their target. Consider the hemoglobin A1C value in conjunction with all available measures of glycemia when assessing whether a person's individualized glycemic targets are achieved and when adjusting therapy. Work with people who have not achieved their glycemic target, using a stepwise approach to improve glycemic control. Assess their individual needs and access appropriate resources to meet those needs, such as self-management education, additional support, and technology. Diabetes devices can be cost prohibitive, a common barrier to use. Engage in discussions with people and their families about the availability and appropriateness of new diabetes devices, as well as any out-of-pocket costs (when known) for diabetes devices and supplies (or any diabetes-related health care costs). Assist with reviewing other funding sources (e.g., through private insurance, when available, or through a government program such as the Ontario Disability Support Program, Ontario Works, or the Ontario Drug Benefit Program).

For Health Services Planners
Ensure that systems, processes, and resources are in place so that people with diabetes and health care professionals can determine hemoglobin A1C in conjunction with all available measures of glycemia, assess achievement of individualized glycemic targets, and use this information to inform treatment changes. Ensure that systems are in place for health care professionals (teams) to offer people with type 1 diabetes a stepwise approach to improving glycemic control if this has not yet been achieved. Prioritize equitable access to resources necessary to meet their identified needs, such as self-management education, additional support, and diabetes technologies.

Quality Indicators: How to Measure Improvement for This Statement

- Percentage of people with type 1 diabetes (and their family and caregivers as appropriate) who report feeling involved in determining their individualized hemoglobin A1C target and target glucose range
- Percentage of people with type 1 diabetes who have a documented A1C target and target glucose range
- Percentage of people with type 1 diabetes whose most recent hemoglobin A1C test was within their individualized target range
- Percentage of people with type 1 diabetes whose most recent hemoglobin A1C test fell within the following ranges:
    - 18 years of age and older:
        - ≤ 7.0%
        - 7.1 < 7.5%
        - 7.5 < 8.0%
        - 8.0 < 9.0%
        - ≥ 9.0%
    - Younger than 18 years of age:
        - ≤ 7.5%
        - 7.6 < 8.0%
        - 8.0 < 9.0%
        - ≥ 9.0%

Measurement details for these indicators, as well as indicators to measure overarching goals for the entire quality standard, are presented in Appendix 2.

Quality Statement 4: Identifying and Assessing Mental Health Needs

People with type 1 diabetes are screened for psychological distress and mental health disorders on a regular basis using recognized screening questions or validated screening tools. People who screen positive for a mental health disorder are assessed by a health care professional with expertise in mental health.

Definitions

Screened: Screening for signs of psychological distress and symptoms of common mental health disorders provides a mechanism for early identification of people in need of further assessment, care planning, and initiation of treatment and supports (where appropriate). Screening can be performed by any trained member of the health care team using validated, age-appropriate screening tools or recognized screening questions.

Regular basis: Evidence on the optimal timing and frequency of screening is inconsistent. The Type 1 Diabetes Quality Standard Advisory Committee agrees that, ideally, people should be screened for the presence of psychological distress and symptoms of common mental health disorders during the following times:

- At the initial visit
- On a periodic basis (at least annually)
- As clinically indicated or due to self-reported need, not achieving treatment goals, or persistently poor metabolic control (e.g., high hemoglobin A1C levels or recurrent diabetic ketoacidosis)
- When there is a significant change in a person’s condition, treatment, or life circumstance

Psychological distress: Examples of psychological distress include diabetes distress and fear of hypoglycemia. Diabetes distress is a form of emotional distress resulting from living with diabetes and the demands of daily self-management.[23] Symptoms of diabetes distress may present similarly to major depressive disorder but lack the severity to meet the criteria in the *Diagnostic and Statistical Manual of Mental Disorders,* 5th edition.[23] Diabetes distress is associated with poorer glycemic control and decreased self-management.[14,24]

If psychological distress is identified, the person should be referred for diabetes self-management education and support (see quality statement 1) to address the areas of diabetes self-care that are most relevant to them. If a person continues to experience distress or their self-care remains impaired after tailored diabetes education, the health care professional should connect or refer their patient, with their permission, to a mental health professional.

Mental health disorder: Examples of common comorbid mental health disorders in people with diabetes include major depressive disorder, anxiety disorders, eating disorders and disordered eating behaviours, and stress-related disorders.

Recognized screening questions: Examples are presented below. Answering yes to any of these questions is considered a positive screen and requires assessment of symptom severity using a validated screening tool.

Screening questions for anxiety[25]:

- During the past 4 weeks, have you been bothered by feeling worried, tense, or anxious most of the time?
- Are you frequently tense, irritable, and having trouble sleeping?

Screening questions for depression[26]:

- In the last month, have you been bothered by little interest or pleasure in doing things?
- In the last month, have you been feeling down, depressed, or hopeless?

Validated screening tools: Examples include:

- **Anxiety symptoms—**Generalized Anxiety Disorder 7-item (GAD-7) scale; Revised Children's Anxiety and Depression Scale (RCADS); Multidimensional Anxiety Scale for Children (MASC); Geriatric Anxiety Inventory (GAI)
- **Depressive symptoms**—Patient Health Questionnaire (PHQ-9); Quick Inventory of Depressive Symptomatology (Self-Rated) (QIDS-SR); Beck Depression Inventory (BDI-I or BDI-II); Zung Self-Rating Depression Scale; Center for Epidemiologic Studies Depression Scale (CES-D)
- **Diabetes-related emotional distress**—Diabetes Distress Scale (DDS-2, DDS-17); Problem Areas in Diabetes (PAID-5, PAID-20) Scale
- **Disordered eating and eating disorders**—Diabetes Eating Problem Survey (Revised) (DEPS-R); modified Sick-Control-One-Fat-Food (mSCOFF) tool; modified Eating Disorder Inventory (mEDI)

Screen positive: A person screens positive for diabetes distress or symptoms of a specific mental health disorder if they have a certain number of positive responses to questions on a validated tool. Each screening tool has its own recommended cut-off score for a positive screen. Further evaluation is necessary for people who screen positive.

Health care professional with expertise in mental health: A health care professional with training in mental health and/or psychosocial issues can be a psychologist, psychiatrist, social worker, primary care provider (family physician or nurse practitioner), or occupational therapist. This person should preferably also have an understanding of type 1 diabetes. This clinician may be a member of the health care team or be enlisted by referral. A person should be referred to another mental health provider whenever their condition or care needs exceed their current provider's scope of practice or expertise.

Sources

American Diabetes Association, 2018[14] | Diabetes Canada, 2018[4] | National Institute for Health and Care Excellence, 2016,[1] 2016[16] | Scottish Intercollegiate Guidelines Network, 2017[17]

Rationale

Depression, anxiety, eating disorders (such as bulimia), disordered eating behaviours (such as diabulimia), and psychological distress are more common in people with type 1 diabetes than in the general population.[10,11,24-26] In diabulimia, a dangerous disordered eating behaviour unique to people with type 1 diabetes, individuals deliberately reduce or omit insulin to achieve weight loss, which can lead to hyperglycemia and glycosuria (i.e., the excretion of glucose into the urine).[4,28] It is most common during adolescence and young adulthood, particularity among women.[10,11,24-26]

The demands of diabetes management, risk of complications, and worries of hypoglycemia can place emotional stress on people with type 1 diabetes. This might precipitate or exacerbate psychological challenges present for other reasons. Additionally, these stresses might interfere with a person's ability to manage their diabetes.[1]

The mental health comorbidities of diabetes are associated with poorer glycemic control, decreased participation in diabetes self-management activities (e.g., physical activity, healthy eating, taking diabetes medications), increased functional impairment, increased risk of medical complications associated with diabetes, a decreased quality of life, and increased health care costs.[1,10,11,15,24,25,27]

Screening does not provide a diagnosis of a mental health disorder; however, it identifies symptoms, quantifies severity in a time-limited setting, and indicates who may need further assessment and treatment. It is important to consider the applicability of validated tools for appropriate assessment for specific populations (e.g., taking into account age and developmental stage, language, cultural relevance, and cognitive ability). For children and adolescents, screening questions should include developmentally appropriate language and be based on the criteria in the *Diagnostic and Statistical Manual of Mental Disorders,* 5th edition.

For detailed quality statements related to the identification, diagnosis, and treatment of major depression, anxiety disorders (including generalized anxiety disorder, specific phobias, social anxiety disorder, and panic disorder), and obsessive-compulsive disorder, please refer to Health Quality Ontario's quality standards *Major Depression*, *Anxiety Disorders*, and *Obsessive-Compulsive Disorder*.

What This Quality Statement Means

For People With Type 1 Diabetes

Managing diabetes is demanding, and it can impact your emotional well-being and quality of life. It is normal to sometimes feel burnt out or tired of managing your diabetes. Maintaining your mental and emotional health is important to help you take care of yourself and your diabetes. Your health care professional should ask about your mental health and how diabetes is impacting you, and offer you treatment and support if you need it.

For Clinicians

Be alert to the possibility of mental health concerns and psychological distress in people with type 1 diabetes. Use recognized screening questions or validated screening tools (when available) to identify people who might benefit from further comprehensive assessment and appropriate treatment. Collaborate with individuals to determine the most effective next steps based on the severity of their symptoms and their individual needs and preferences.

For Health Services Planners

Ensure clinicians receive training in the recognition, identification, and provision of information and counselling on psychological distress and mental health disorders for people with type 1 diabetes. Ensure that clinicians have the knowledge and resources to refer people to a mental health professional (as required). Access to and waitlists for publicly funded mental health professionals and services vary across the province and are a common barrier to care. Systems, processes, and resources need to be in place so that people with type 1 diabetes who require a consultation with a mental health professional can be appropriately triaged and have timely access.

Quality Indicators: How to Measure Improvement for This Statement

- Percentage of people with type 1 diabetes who were screened for psychological distress and mental health disorders within the past year
- Average wait time from when a person with type 1 diabetes screens positive for a mental health disorder and when they have a first visit with a health care professional with expertise in mental health
- Percentage of people with type 1 diabetes with one or more urgent acute care visits for a mental health disorder in the past year

Measurement details for these indicators, as well as indicators to measure overarching goals for the entire quality standard, are presented in Appendix 2.

Quality Statement 5: Transition From Pediatric to Adult Diabetes Care

People with type 1 diabetes experience planned, coordinated, and supported transitions from pediatric to adult diabetes care.

Definition

Planned transitions: An established set of actions designed to ensure effective coordination and continuity of health care as people with diabetes move from pediatric to adult diabetes care and services.

Young adults with diabetes, their families, pediatric diabetes care providers, primary care providers, and adult diabetes care providers all have important roles to play in the shared responsibility of patient care before, during, and after the transfer of care.[30] To facilitate effective transitions from pediatric to adult diabetes services, transition planning should do the following[14,16,30-33]:

- Address the person’s physical, developmental, psychosocial, mental health, education, lifestyle, cultural, and financial needs
- Begin in early adolescence or at least 1 year before the transfer to adult health care providers
- Involve regular transition readiness assessments to identify individual goals and needs, discussing these with youths and their families and working together to develop an action plan that includes self-management skills and education (see quality statement 1)
- Take a multidisciplinary, coordinated approach between pediatric and adult diabetes providers
- Allow sufficient time for people with diabetes to familiarize themselves with the practicalities of moving from pediatric to adult services

Sources

American Diabetes Association, 2018[14] | Diabetes Canada, 2018[4] | National Institute for Health and Care Excellence, 2016[16] | Scottish Intercollegiate Guidelines Network, 2017[17]

Rationale

Poor transitions from pediatric to adult diabetes care put young adults at risk for disengagement with the health care system and poor diabetes-related outcomes. This transition often occurs at a time when they are experiencing significant physical, developmental, psychological, and social change.[4] This time is further complicated for young adults with type 1 diabetes who are also increasingly assuming responsibility for their diabetes care from their parents.[34]

Young adults are at high risk for diabetes complications due to a decline in self-management behaviours, suboptimal glycemic control, and a loss of follow-up care.[13,32-34] Those who lack medical follow-up during the transition period are at higher risk of adverse outcomes in early adulthood, including diabetic ketoacidosis and death.[13,14,33] Receiving support through the transition period results in improved clinic attendance and glycemic control, a decreased loss of follow-up care, and fewer diabetes-related complications.[35,36]

What This Quality Statement Means

For People With Type 1 Diabetes

If you are diagnosed with diabetes as a child or a teenager, at a certain age (usually 18 years) you will leave your pediatric diabetes team for an adult diabetes clinic. When you are preparing to move to adult care, your care team should start working with you early to ensure a smooth transition. They will try to understand whether there are things you still need to learn about your diabetes, and how prepared you are to move into adult care.

For Clinicians

Ensure that people transferring from pediatric to adult services experience well-prepared, coordinated, and seamless transitions. This includes starting transition planning early; providing individualized, age-appropriate, and developmentally appropriate care; facilitating communication with the person with type 1 diabetes and between teams; and taking care of other related processes.

For Health Services Planners

Ensure that systems, processes, and resources are in place to facilitate communication and collaboration between pediatric and adult diabetes providers for safe and effective transitions from pediatric to adult diabetes care. Work collaboratively with pediatric and adult diabetes services (programs) and people with lived experience and their families to develop a transition policy that meets the needs of all people with type 1 diabetes transitioning to adult diabetes services, particularly those who are socially disadvantaged or have barriers to accessing care.

Quality Indicators: How to Measure Improvement for This Statement

- Percentage of people with type 1 diabetes who have completed a transition readiness assessment in collaboration with their pediatric interprofessional care team to identify their goals and needs before transitioning to adult care
- Percentage of people with type 1 diabetes referred to an adult interprofessional care team who present for their initial visit within 6 months of their last visit with their pediatric interprofessional health care team
- Percentage of people with type 1 diabetes, between the ages of 19 and 25 years, with two or more visits in the past year with an adult diabetes care team

Measurement details for these indicators, as well as indicators to measure overarching goals for the entire quality standard, are presented in Appendix 2.

Emerging Practice Statement: Use of Time in Range (Time in Target Glucose, Time in Hypoglycemia, and Time in Hyperglycemia Ranges) as a Measure of Diabetes Outcomes

What Is an Emerging Practice Statement?

An emerging practice statement describes an area for quality improvement that has been prioritized by the advisory committee but for which there is insufficient or inconsistent evidence in the guidelines used in the development of the quality statements. An emerging practice statement acknowledges that there is a need for evidence-based guidance to be developed in an area, but the evidence base in this area is still emerging.

Rationale

At this time, we cannot provide guidance on the use of other measures of diabetes outcomes apart from hemoglobin A1C for people with type 1 diabetes because of insufficient evidence in the guidelines used to develop the quality statements. While there is a growing body of literature showing the effectiveness of time in range as a key metric of diabetes control for people with diabetes who use a continuous glucose monitor or flash glucose monitor, further evidence is needed before a quality statement can be made. The advisory committee suggests this is important area to be considered in future work.

Appendix 1: How the Health Care System Can Support Implementation

To come

Appendix 2: Measurement to Support Improvement

The Type 1 Diabetes Quality Standard Advisory Committee identified some overarching goals for this quality standard. These goals were mapped to indicators that can be used to monitor the progress being made to improve transitions from hospital to home in Ontario. Some indicators are provincially measurable, while some can be measured using only locally sourced data.

Collecting and using data associated with this quality standard is optional. However, data will help you assess the quality of care you are delivering and the effectiveness of your quality improvement efforts.

We realize this standard includes a lengthy list of indicators. We've given you this list so you don't have to create your own quality improvement indicators. We recommend you identify areas to focus on in the quality standard and then use one or more of the associated indicators to guide and evaluate your quality improvement efforts.

To assess equitable delivery of care, you can stratify locally measured indicators by patient socioeconomic and demographic characteristics, such as age, education, gender, income, language, and sex.

Our measurement guide for transitions between hospital and home provides more information and concrete steps on how to incorporate measurement into your planning and quality improvement work.

How to Measure Overall Success

Indicators That Can Be Measured Using Provincial Data

Percentage of people with type 1 diabetes who have had two or more hemoglobin A1C tests in the past 12 months

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who have had two or more hemoglobin A1C tests in the past 12 months
- Data sources: Ontario Diabetes Database (ODD), RPDB (Registered Persons Database), Ontario Drug Benefit Claims (ODB), Discharge Abstract Database (DAD)], Ontario Drug Benefit Claims (ODB)

Percentage of people with type 1 diabetes whose **most recent** hemoglobin A1C test fell within the following ranges:

- In those 18 years of age and older:
    - ≤ 7.0%
    - 7.1 < 7.5%
    - 7.5 < 8.0%
    - 8.0 < 9.0%
    - ≥ 9.0%
- In those younger than 18 years of age:
    - ≤ 7.5%
    - 7.6 < 8.0%

  - 8.0 < 9.0%
  - ≥ 9.0%
- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator whose most recent hemoglobin A1C test fell within the ranges listed above
- Data source: Ontario Laboratories Information Systems (OLIS)

Rate of complications among people with type 1 diabetes:

- Stratify by:
  - Hyperglycemia
  - Hypoglycemia
  - Ketoacidosis
  - Neuropathy
  - Nephropathy
  - Retinopathy
  - Cardiovascular complications
  - Diabetes foot ulcers
  - Amputations (above-knee, below-knee)
  - Pancreatitis
- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who had a complication
- Data sources: DAD, National Ambulatory Care Reporting System (NACRS), ODD, Ontario Health Insurance Plan (OHIP)

Percentage of people with type 1 diabetes with one or more urgent acute care visits for diabetes in the past year

- Stratify by:
  - Emergency department visits
  - Nonelective hospitalizations
- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who had one or more urgent acute care visits for diabetes in the past year
- Note: potential stratifications are (1) unplanned emergency department visits for diabetes (main diagnosis or any problem) and (2) nonelective hospitalizations for diabetes (main diagnosis or any problem)
- Data sources: DAD, NACRS, ODD

Percentage of people with type 1 diabetes with one or more urgent acute care visits for a mental health disorder in the past year

- Stratify by:
  - Emergency department visits
  - Nonelective hospitalizations
- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who had an urgent acute care visit for a mental health disorder in the past year
- Data sources: DAD, NACRS, ODD

Percentage of people who were hospitalized for type 1 diabetes who are readmitted to hospital:

- Within 7 days of discharge
- Within 30 days of discharge

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who are re-admitted to hospital within 7 days or 30 days of discharge following an index hospital admission or emergency department visit for a type 2 diabetes specific reason
- Data Source: DAD, NACRS

Indicators That Can Be Measured Using Only Local Data

Percentage of people with type 1 diabetes (and their family and caregivers, as appropriate) who report feeling confident managing their condition

- Denominator: total number of people with type 1 diabetes (and their family and caregivers, as appropriate)
- Numerator: number of people in the denominator who report feeling confident managing their condition
- Data source: local data collection

Percentage of people with type 1 diabetes who report that their interprofessional care team always or often involves them in decisions about their care

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who report that their interprofessional care team always or often involves them in decisions about their care
- Data source: local data collection

Quality Statement 1: Diabetes Self-Management Education and Support

Percentage of people with type 1 diabetes whose individualized, structured self-management education and support program has been reviewed by their interprofessional diabetes health care team within the last year

- Denominator: total number of people with type 1 diabetes who have received an individualized, structured self-management education and support program
- Numerator: number of people in the denominator whose education and support program has been reviewed by their interprofessional diabetes health care team within the last year
- Data source: local data collection

Average wait time between when a person with type 1 diabetes and their family and caregivers (where appropriate) are referred to an individualized, structured self-management education and support program and their visit

- Data source: local data collection

Percentage of people with type 1 diabetes (and their family and caregivers, as appropriate) who report feeling confident managing their condition

- Denominator: total number of people with type 1 diabetes (and their family and caregivers, as appropriate)

- Numerator: number of people in the denominator who report feeling confident managing their condition
- Data source: local data collection

Quality Statement 2: Access to an Interprofessional Care Team

Local availability of adult and pediatric interprofessional diabetes health care teams with training in type 1 diabetes

- Data source: local data collection

Quality Statement 3: Setting and Achieving Glycemic Targets

Percentage of people with type 1 diabetes (and their family and caregivers as appropriate) who report feeling involved in determining their individualized hemoglobin A1C target and target glucose range

- Denominator: total number of people with type 1 diabetes (and their family and caregivers as appropriate)
- Numerator: number of people in the denominator who report feeling involved in determining their individualized hemoglobin A1C target and target glucose range
- Data source: local data collection

Percentage of people with type 1 diabetes who have a documented A1C target and target glucose range

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who have a documented A1C target and target glucose range
- Data source: local data collection

Percentage of people with type 1 diabetes whose most recent hemoglobin A1C test was within their individualized target range

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator whose most recent hemoglobin A1C test was within their individualized target range
- Data source: local data collection

Percentage of people with type 1 diabetes whose most recent hemoglobin A1C test fell within the following ranges:

- 18 years of age and older:
  - ≤ 7.0%
  - 7.1 < 7.5%
  - 7.5 < 8.0%
  - 8.0 < 9.0%
  - ≥ 9.0%
- Younger than 18 years of age:
  - 7.5%
  - 7.6 < 8.0%
  - 8.0 < 9.0%
  - ≥ 9.0%
    - Denominator: total number of people with type 1 diabetes

- Numerator: number of people in the denominator whose most recent hemoglobin A1C test fell within the ranges listed above
- Data source: Ontario Laboratories Information Systems (OLIS)

Quality Statement 4: Identifying and Assessing Mental Health Needs

Percentage of people with type 1 diabetes who were screened for psychological distress and mental health disorders within the past year

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who were screened for psychological distress and mental health disorders within the past year
- Data source: local data collection

Average wait time from when a person with type 1 diabetes screens positive for a mental health disorder and when they have a first visit with a health care professional with expertise in mental health

- Data source: local data collection

Percentage of people with type 1 diabetes with one or more urgent acute care visits for a mental health disorder in the past year

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator with one or more urgent acute care visits for a mental health disorder in the past year
- Data sources: Discharge Abstract Database (DAD), National Ambulatory Care Reporting System (NACRS)

Quality Statement 5: Transition From Pediatric to Adult Diabetes Care

Percentage of people with type 1 diabetes who have completed a transition readiness assessment in collaboration with their pediatric interprofessional care team to identify their goals and needs before transitioning to adult care

- Denominator: total number of people with type 1 diabetes
- Numerator: number of people in the denominator who have completed a transition readiness assessment in collaboration with their pediatric interprofessional care team to identify their goals and needs before transitioning to adult care
- Data source: local data collection

Percentage of people with type 1 diabetes referred to an adult interprofessional care team who present for their initial visit within 6 months of their last visit with their pediatric interprofessional health care team

- Denominator: total number of people with type 1 diabetes referred to an adult interprofessional care team
- Numerator: number of people in the denominator who present for their initial visit within 6 months of their last visit with their pediatric interprofessional health care team
- Data source: local data collection

Percentage of people with type 1 diabetes, between the ages of 19 and 25 years, with two or more visits in the past year with an adult diabetes care team

- Denominator: total number of people with type 1 diabetes who are between the ages of 19 and 25 years

- Numerator: number of people in the denominator with two or more visits in the past year with an adult diabetes care team
- Data sources: local data collection (to identify the denominator and to identify visits to nonphysicians and by physicians who did not bill OHIP); OHIP Claims Database (to identify visits by physicians who billed OHIP)

Appendix 3: Glossary

Care providers: Health care professionals and people in unregulated professions, such as administrative staff, child life specialists, personal support workers, recreational staff, and spiritual care staff. Our choice to use “care provider” does not diminish or negate other terms that a person may prefer.

Caregiver: Family members, friends, community members, or supportive people not necessarily related to the person with diabetes. Other terms commonly used to describe this unpaid role include “care partner,” “informal caregiver,” “family caregiver,” “carer,” and “primary caregiver.”

Culturally appropriate care: Care that incorporates cultural or faith traditions, values, and beliefs; is delivered in the person’s preferred language; adapts culture-specific advice; and incorporates the person’s wishes to involve family or community members.[4]

Family: The people closest to a person in terms of knowledge, care, and affection, and may include biological family, family through marriage, or family of choice and friends. The person defines their family and who will be involved in their care.

Health care professionals: Regulated professionals, such as dietitians, nurses, nurse practitioners, occupational therapists, pharmacists, physicians, physiotherapists, psychologists, and social workers.

Type 1 diabetes: A condition of chronic hyperglycemia that occurs when the body is unable to produce insulin, a hormone that helps the body’s cells use glucose for energy.[4] This condition is usually caused by an autoimmune process, resulting in a loss of beta cells (insulin-producing cells) in the pancreas.[4] In type 1 diabetes, pancreatic islet antibodies are usually present and C-peptides are undetectable or low.[4]

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About Health Quality Ontario

Health Quality Ontario is the provincial lead on the quality of health care. We help nurses, doctors and other health care professionals working hard on the frontlines be more effective in what they do – by providing objective advice and data, and by supporting them and government in improving health care for the people of Ontario.

We focus on making health care more effective, efficient and affordable through a legislative mandate of:

- Reporting to the public, organizations, government and health care providers on how the health system is performing,
- Finding the best evidence of what works, and
- Translating this evidence into clinical standards; recommendations to health care professionals and funders; and tools that health care providers can easily put into practice to make improvements.

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Looking for more information?

Visit our website at **hqontario.ca** or contact us at **qualitystandards@hqontario.ca** if you have any questions or feedback about this guide.

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