

# Optimizing Blood Glucose Control in Long Term Care Homes

Canada, as a nation, is getting older. Furthermore, the prevalence of diabetes increases with age, affecting 15 to 20 per cent of Canadians over 75 years of age. According to some researchers, the intersection of these two trends may cause diabetes in the aged adult to be the most important epidemic of the 21st century.

In 2001, the biggest census to census increase in median age in Canada in a century was recorded. Between 1991 and 2001, the population aged 80 years and over soared 41 per cent. It is expected to increase an additional 43 per cent from 2001 to 2011. As the population over 80 years of age increases, so does the proportion of frail elderly residents living in long term care homes. And so does the prevalence of diabetes.

Diabetes in the elderly is not only costly, accounting for 25 per cent of the Medicare budget in the USA, but is also the cause of serious morbidity and mortality from both macrovascular and microvascular complications.

## Diabetes in long term care

Among long term care residents with diabetes, 90 per cent are reported to have evidence of coronary artery disease, stroke and/or peripheral vascular disease. Diabetes is the leading cause of blindness, non-traumatic amputation and end-stage kidney failure. Moreover, for the elderly in a long term care setting, hyperglycemia can increase the risk of urinary tract infection, falls, skin ulcers and weight loss. It also impairs cognitive function and wound



Photo: The Steering Committee at Tendercare Living Centre

healing. In addition, dementia—a common diagnosis within residential care—is increasingly linked to diabetes as a risk factor.

## Building a safety net

The day to day management of this chronic health condition is both dynamic and unpredictable. Caring for residents with diabetes is a high-burden task exemplified by the need to perform frequent capillary blood glucose (BG) testing followed by medication adjustments. With the limited resources available in long term care homes, facilities must put systems in place to carefully balance the needs of these residents with the enormous work demanded of staff.

Because most long term care home residents with diabetes require medications—especially insulin—to control their BG levels, the complexity and acuity of their care further escalates during sickness. The follow-

ing sections, although not exhaustive, identify some of the key components essential to optimizing BG control and thus enhancing the safety of residents with diabetes.

## Establish individualized targets for glycemic control

Treatment goals must be tailored to each resident, with consideration of individual risk factors.

### Recommendations

1. Achieve the glycemic targets recommended in Canadian Diabetes Association 2008 Clinical Practice Guidelines<sup>1</sup> (Table 1) only if this can be done safely.
2. Pre-meal (pre-prandial) BG levels above 10 mmol/L or post-meal (post-prandial) BG levels above 14 mmol/L can result in significant symptomatology—primarily unnecessary fatigue and frequent infection

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Table 1: Recommended targets for glycemic control.<sup>1</sup>

	Hemoglobin A1C (%)	Fasting plasma glucose or pre-prandial plasma glucose (mmol/L)	Two-hour post-prandial plasma glucose (mmol/L)
Type 1 and 2 diabetes	<7	4–7	5–10

tions—and thus should be avoided. Hyperglycemia exceeding these thresholds should be managed by prompt adjustment and/or modification of medications.

### **Perform capillary blood glucose monitoring**

Done regularly using a properly calibrated meter, capillary BG monitoring (CBGM) provides information that is essential to timely treatment modification.

#### *Recommendations*

1. Establish a schedule of CBGM for residents receiving diabetes medications, especially insulin.
2. Avoid using multiple brands of BG meters at one facility.
3. Make the instructional manual available to explain how to use the BG meter.
4. Adopt appropriate infection-control measures to avoid the transmission of blood-borne pathogens.
5. Develop protocols to calibrate BG meters with a control solution.

6. Develop protocols to perform laboratory-meter comparisons to validate the accuracy of CBGM results.

### **Management of hypoglycemia (blood glucose <4 mmol/L)**

Hypoglycemia must be managed effectively and efficiently to ensure resident safety.

#### *Recommendations*

1. Develop a treatment protocol that includes the threshold level of BG at which to initiate treatment, treatment options, an algorithm of care, how and when to use glucagon and procedures to notify the physician.
2. Centralize treatment supplies, including glucagon, and facilitate access within the long term care home.

### **Administration of insulin**

Insulin is a high-alert medication. Its absorption may vary by as much as 25 per cent from day to day in a single person and by up to 50 per cent between different people.

Variability can be minimized by consistency in injection technique; injection site selection and rotation; and adequate resuspension of cloudy insulin.

#### *Recommendations*

1. Develop a diagram to facilitate the selection of injection sites and explain site rotation to staff.
2. Provide education to raise staff awareness regarding the action profile of insulin, the proper technique for resuspension of cloudy insulin and priming of injection needles.

### **Other laboratory monitoring**

CBGM helps to establish a pattern of daily BG levels, but it does not offer an assessment of glycemic management over extended periods of time. In addition, the accuracy of CBGM results may be compromised by some health conditions.

#### *Recommendations*

1. Assess glycosylated hemoglobin (A1C) levels approximately every three to four months.

2. Perform a complete blood count regularly, including hemoglobin, hematocrit, fasting plasma glucose and serum creatinine levels. Monitor renal function and liver enzymes accordingly.

### Management on sick days

BG levels become more unstable during sickness, coupled with poor oral intake. The adjustment of diabetes medications must be guided by frequent CBGM. In addition, adequate carbohydrate and fluid replacements are essential to prevent dehydration and the development of a hyperglycemic hyperosmolar non-ketotic state.

#### Recommendations

1. Develop a protocol to include CBGM and ketone testing during periods of sickness.
2. Establish a procedure to notify the physician of sickness and define thresholds for emergency hospital admission.
3. Develop a list of alternate food choices for carbohydrate and fluid replacement.

4. Develop a log to track residents' oral intake.

### Safety of system

For optimal effect and to avoid hypoglycemia, diabetes medications must be given in accordance with meal times. CBGM results should be recorded on a form to facilitate the easy application of pattern management for the purpose of adjusting diabetes medications. Any knowledge deficits in health care providers must be addressed and monitored to enhance quality of care.

#### Recommendations

1. Develop a schedule to optimize the administration of diabetes medications in accordance with meals. (This is best done in collaboration with the pharmacy.)
2. Develop appropriate documentation to record CBGM results.
3. Provide education to meet the learning needs of staff and physicians.
4. Conduct systematic chart audits on quality of care and report findings to the

- long term care home's management team.
5. Develop a maintenance program to sustain changes and provide support to staff.

### Embark on the journey of change

A multi-disciplinary steering committee is essential for identifying deficiencies, planning strategies and implementing changes. The success of a program is highly dependent on the collaboration of all stakeholders throughout the process. **LTC**

#### Reference

1. Canadian Diabetes Association. 2008 Clinical Practice Guidelines. *Can J Diabetes* 2008;32(Suppl. 1) S1-201.

*This article is intended as an educational resource for health care providers working in long term care. Each long term care home is unique and changes must be made in consultation with the home's advisory committee and physicians.*