

# Diabetes Quarterly

DIABETES EDUCATOR SECTION NEWSLETTER

AUTUMN 2003



## Guest Editorial

### *Hypoglycemia: Sweet and Lowdown*

By Jean-François Yale MD CSPQ

**D**rug-induced hypoglycemia, secondary to insulin injections or insulin secretagogues, is recognized as a major obstacle in achieving glycemic targets to prevent the development and progression of chronic complications due to diabetes, particularly in type 1 diabetes. As our therapeutic targets lower, it can be expected that hypoglycemia will become a greater problem in the years to come.

The clinical importance of hypoglycemia is related primarily to the occurrence of severe hypoglycemia, particularly when it is associated with hypoglycemia unawareness. With the risk of permanent cognitive damage in children, glycemic goals are less stringent in patients  $\leq 12$  years of age than in adults. While the evidence of cognitive damage in adults remains controversial, the occurrence of severe hypoglycemia is dangerous for people with diabetes (i.e. risk of injury through fall, driving accident) and often generates more fear than the chronic complications of diabetes. In this issue of *Diabetes Quarterly*, Jeffrey Johnson and colleagues describe the fear associated with hypoglycemia, and its marked reduction after a successful islet cell transplantation.

Dereck Hunt provides an excellent overview of hypoglycemia in the management of diabetes. Dr. Hunt reviews the definition of hypoglycemia, its symptoms and causes, as well as the various approaches to its prevention and treatment. It is now recommended that patients use oral agents that do not cause hypoglycemia before using insulin secretagogues. As well, new insulin analogues reduce the risk of hypoglycemia, particularly during the night. More information on current hypoglycemia recommendations

can be found in the 2001 *Canadian Diabetes Association Clinical Practice Guidelines for the Prevention and Management of Hypoglycemia in Diabetes* (<http://www.diabetes.ca/Files/CDAHypoglycemiaGuidelines.pdf>) (1).

It is now recognized that frequent mild hypoglycemic episodes can lead to the development of hypoglycemia unawareness, dramatically increasing the risk of severe hypoglycemia. Thus, it is essential not to consider mild hypoglycemic episodes as benign and to try to minimize their occurrence by appropriate preventive approaches. When hypoglycemia unawareness does develop, it can be reversed in most cases by careful avoidance of all hypoglycemic episodes by temporarily increasing blood glucose (BG) goals.

In this issue, Daniel Cox and colleagues provide a review of BG awareness training, an 8-session training program to help people with type 1 diabetes better anticipate, prevent, recognize and treat extreme BG events. Anna Brundage discusses various methods of detecting nocturnal hypoglycemia, including the use of the Continuous Blood Glucose Monitor.

The 2001 *Canadian Diabetes Association Clinical Practice Guidelines for the Prevention and Management of Hypoglycemia in Diabetes* (1) recommend that mild to moderate hypoglycemia be treated by the oral ingestion of 15 g of carbohydrate, preferably as glucose or sucrose tablets or solution. Glucose gel, on the other hand, is quite slow-acting and must be swallowed to significantly treat hypoglycemia. Presently, there is no evidence to support the practice of administering glucose gel buccally, since absorption through the mucosa is minimal. Severe hypoglycemia in an

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unconscious person in the home situation should be treated with 1 mg glucagon subcutaneously or intramuscularly. In children  $\leq 5$  years of age, a dose of 0.5 mg should be used.

Finally, Christine Richardson describes a mini-dose glucagon protocol for the prevention and treatment of mild to moderate hypoglycemia in the pediatric setting. This innovative protocol was well-received by patients and their families, who appreciated its efficacy and the low frequency of side effects.

Hypoglycemia associated with the treatment of diabetes is a direct consequence of the limitations of our therapeutic approaches. We hope that this complication, which may increase as a consequence of

more intensive management, will subsequently decrease as new technologies (i.e. continuous glucose monitoring with immediate feedback, closed-loop insulin pumps and islet cell transplantation) become available.

*Jean-François Yale is Professor of Medicine, McGill Nutrition and Food Science Centre, and Department of Medicine, McGill University, and Director of the Royal Victoria Hospital Metabolic Day Centre in Montreal, Quebec, Canada.*

#### Reference

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## Living with Diabetes: 10 Days in the Life of a Diabetes Patient

By Jody Luth, Brad Harvey

Dietetic Interns, Hamilton Health Sciences, Hamilton, Ontario, Canada

*As dietetic interns with healthy beta cells, Jody and Brad were interested in learning what diabetes patients cope with on a day-to-day basis. After voicing their curiosity, the diabetes nurse clinicians with whom they work insisted that they immerse themselves completely in the life of a diabetes patient by testing blood glucose (BG)*

*levels before and after each meal, counting carbohydrates, keeping a food diary and injecting ersatz insulin (saline) when needed. This is their 10-day diary as persons living with diabetes.*



**Jody (J):** The alarm clock signalled the first of my 10 days with diabetes and I could think of little else. As I stepped out of my morning shower, I realized I had to pay careful attention when drying my feet, something I had never done before. Just before sitting down for breakfast, I tested my BG only to realize it rendered a 7.7 mmol/L reading on the BG meter. I felt as if my world was crashing down around me. I set my watch to test my BG 2 hours later and awaited anxiously for the time to pass. With shaking hands, I tested myself a

second time. This time the meter read 5.2 mmol/L. Phew!

**Brad (B):** Day 2 began with voices screeching in my head, begging "please don't prick me again!" Taking out the lancet, I loaded the test strip and prepared myself for yet another finger prick with what feels like a 4-inch spike. This is only my eighth BG test and I am baffled at how a person with diabetes can perform BG tests day after day, year after year.

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## Diabetes Quarterly

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## From the Chair's Desk

By Joan Erickson RN BSN CDE

I am writing this article with mixed emotions as it is my last "From the Chair's Desk" message. I am filled with trepidation and some relief due to my upcoming availability of free time after October 18, 2003. My family, my garden and my coworkers are looking forward to this change. I must admit that I, too, am eagerly anticipating all those additional ski days this winter. Simultaneously, there is some sadness in knowing that this fulfilling experience will soon be over.

The last 2 years have been exhilarating, busy, stressful, tiring, challenging and, above all, very rewarding. I have met many passionate, dedicated volunteers within the Diabetes Educator Sector (DES) and the Canadian Diabetes Association (CDA). These volunteers have been amazing, demonstrating what dedication is really all about. I thank you from the bottom of my heart for all that you have taught me and for all that you have done and continue to do for those affected by diabetes.

My role as DES Chair would have been impossible to perform were it not for the support of key volunteers and staff. For this, I thank the DES National Executive members and the DES support staff for their tremendous support during my term. Each and every member carried out their responsibilities with incredible enthusiasm and expertise. The chair of any group is only as good as the whole group; the Executive members have made my term successful.

Special thanks must go to Donna Lillie, Vice President, Research & Professional Education, who has the incredible task of providing management support to the DES Chair—imagine having to start over again every 2 years! She has been a supportive listener and coach.

Serving as a Director and Vice Chair of the CDA National Board has provided me with a much broader view of the CDA as an organization and further demonstrated the need for a more global view of the issues related to diabetes. The CDA National Board members are very much like DES members: dedicated, passionate volunteers who are working towards

improving the lives of those affected by diabetes. What is more, I have learned more about the business world than I ever dreamed I would.

The DES leadership group and members have worked on several issues/events over the past 2 years. Some of these include:

- contributing to the self-directed learning manual *Building Competencies in Diabetes Education: Advancing Practice*;
- assisting with website changes, including the addition of online conference registration, policies and procedures and the bulletin board;
- organizing the annual Leadership Forum;
- initiating the *Being There* scholarships to allow recipients to attend the CDA/CSEM Professional Conference and Annual Meetings;
- developing a 5-year strategic plan and revising the mission statement;
- participating in the 2003 *Clinical Practice Guidelines* revision process;
- participating in the National Diabetes Strategy working groups;
- reviewing the National Review Program, and providing recommendations to simplify the review process;
- participating in the National Diabetes Strategy Forum;
- presenting a poster at the 2003 International Diabetes Federation Congress, highlighting the *Building Competencies in Diabetes Education: The Essentials* project;
- assisting with the CDA/CSEM Professional Conference and Annual Meetings program planning;
- developing the chapter handbook; and
- participating on the CDA advocacy *Report Card* working group.

Enormous effort and enthusiasm have gone into each of these activities. I thank all of the participants. You make me proud to have had the privilege of sitting as Chair of your organization.

The future will present many challenges and issues for DES. Some of these are related to the environment we live in: obesity, increased incidence and prevalence of

diabetes, increased need for effective prevention strategies, increased strain on healthcare funding and decreased availability of healthcare professionals, including diabetes educators.

There are also challenges related to past and current DES activities. For example:

- implementation of the strategic plan;
- assessing and implementing recommended changes to the National Review Program;
- dissemination and implementation of the 2003 *Clinical Practice Guidelines* to members and other healthcare professionals;
- participation in collaborative endeavours with other non-profit groups related to healthcare prevention strategies; and
- active participation and maintenance of a leadership role in the National Diabetes Strategy within the increased emphasis on chronic disease strategies.

Each year the challenges and issues facing the DES continue. It is for this reason we continue to grow and mature as an organization. Please join me in offering my best wishes and support to the future DES executive and leadership team as they steer us through the challenges of the coming years.

### Get Involved!

**D** *diabetes Quarterly* is seeking a writer for our Web Watch column. A regular feature of the newsletter, Web Watch provides a listing of web sites of interest and value to our readership. If you are interested in becoming a regular contributor to **your** newsletter, we would love to hear from you. Please contact Lisa Durante, Senior Editor, by telephone (416-363-0177, ext. 577) or e-mail ([lisa.durante@diabetes.ca](mailto:lisa.durante@diabetes.ca)).

# Hypoglycemia: A Brief Overview

By Derek Hunt MD MSc FRCPC

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**H**ypoglycemia, a reaction experienced all too often, is 1 of the first topics discussed during diabetes education classes. Fortunately, it is now receiving increasing attention from diabetes care organizations due to lower blood glucose (BG) goals, making hypoglycemia more likely, while advancing preventive practices.

## What is hypoglycemia?

Hypoglycemia occurs when BG levels fall below 4.0 mmol/L, which causes a wide range of symptoms. Symptoms can be either adrenergic (caused by higher levels of adrenaline in the body) or neuroglycopenic (where the brain lacks enough glucose to function properly). Adrenergic symptoms include tremors, sweating, palpitations, increased appetite and a sense of anxiety, while neuroglycopenic symptoms include confusion, speech or cognitive impairment, weakness, drowsiness or dizziness, and fatigue.

Hypoglycemia episodes can be described as either mild or severe. Mild reactions indicate that individuals are able to recover on their own, while severe episodes require the assistance of another individual to increase BG levels. In cases of severe hypoglycemia, neuroglycopenic symptoms can result in coma or seizure activity.

Although hypoglycemia often occurs during the day, it can also occur overnight. Known as nocturnal hypoglycemia, low BG levels during sleep may wake a person. However, there are times when an episode may disrupt the individual's sleep without fully waking them, resulting in a sense of tiredness or a feeling of unrest. When episodes of nocturnal hypoglycemia occur, fasting BG levels will be markedly elevated, a finding known as the Somogyi effect (named after the physician who first described the occurrence).

## Causes of hypoglycemia

Hypoglycemia is a result of altered BG levels, which are effected by such factors as dietary intake, exercise, oral hypoglycemic agents, insulin, infection, stress

and certain medications. As well, alcohol consumption can either reduce or increase BG levels. As a result, it is important to carefully balance all of these factors to maintain a healthy BG level.

Individuals who control their diabetes through lifestyle interventions generally do not experience hypoglycemia, as the pancreas stops releasing excessive insulin when BG levels suggest becoming too low. Also, those who are taking oral hypoglycemic agents—metformin (Glucophage), acarbose (Prandase), pioglitazone (Actos) and rosiglitazone (Avandia)—to control their BG levels may avoid hypoglycemic episodes since these products increase the risk of hypoglycemia only minimally. However, hypoglycemia is a concern with persons requiring either insulin, or an insulin secretagogue, such as glyburide (Diabeta), gliclazide (Diamicon) or repaglinide (GlucoNorm). Excessively high insulin levels in the body where BG levels are low can cause a hypoglycemic reaction.

## Preventing hypoglycemia

People with diabetes who require insulin may develop hypoglycemia for a variety of reasons. For instance, the mealtime insulin dosage may be too high for the carbohydrate content of the meal. Physical activity before or after a meal can also play a role in the body's sensitivity to insulin, whereby a smaller dosage is required to maintain appropriate BG levels. As well, the type of insulin used can play a role in the onset of a hypoglycemic reaction. Those using Toronto or regular insulin may require a small snack 2 to 3 hours after a meal to prevent low BG levels, while those using rapid-acting insulin products like lispro or aspart do not. For individuals with type 1 diabetes, rapid-acting insulin can effectively reduce the risk of nocturnal hypoglycemia.

An individual's insulin regime may also play a role in the occurrence of a hypoglycemic episode. Taking longer-acting insulin like NPH (also known as N) insulin at suppertime may lead to nocturnal hypoglycemia. To avoid such an occurrence,

altering the time of injection to bedtime may prove beneficial. As well, using insulin secretagogues such as glyburide can effectively control BG levels and is a frequent cause of hypoglycemia. To minimize the chances of this, patients should keep their meal plans and activity levels consistent.

## Treating an episode of hypoglycemia

Even if a patient is careful, there is still a risk of hypoglycemia. Therefore, it is important for each patient to know how to respond. Mild episodes of hypoglycemia can be corrected by consuming 15 g of carbohydrate, optimally in the form of glucose or sucrose tablets, or solution. If, after 15 minutes, BG levels remain <4.0 mmol/L another 15 g of glucose or sucrose is required. Individuals suffering a severe hypoglycemic reaction (those requiring assistance from another person) should receive a 20 g oral supplement. However, if the individual with diabetes has lost consciousness, emergency room assistance is required. As well, a dose of glucagon administered subcutaneously can be helpful. For this, diabetes educators should encourage their patients with type 1 diabetes to ensure a complete glucagon kit is within reach both at home and at work.

## The diabetes team

As with so many aspects of diabetes care, members of the diabetes healthcare team play a key role in helping patients minimize the risks of hypoglycemia. Educating patients to understand how their medications work and how they should be taken is critical.

Similarly, patients should understand why they may have experienced a hypoglycemic episode in order to make appropriate adjustments to lifestyle or medication to avoid a repeat occurrence. Finally, it is important to keep patients abreast of new developments in diabetes care through ongoing education. By educating and supporting our patients who are at risk of hypoglycemia, they remain assured of their health and safety.

# Reduced Fear of Hypoglycemia With Successful Islet Transplantation

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Episodes of severe hypoglycemia, a common occurrence in patients with labile type 1 diabetes and hypoglycemia unawareness, can cause considerable fear and anxiety (1,2). These patients may find relief in islet transplantation with the Edmonton Protocol (3-5). A combination of a surgical procedure to transplant islets into the recipients' liver and a regimen of immunosuppressive medications to prevent rejection following transplantation, the Edmonton Protocol is now being replicated in type 1 diabetes patients around the world.

Hypoglycemia unawareness and extreme lability are the main indications for undergoing islet transplantation (4,5). Candidates for this procedure generally experience extreme swings in blood glucose (BG) levels and are at risk of episodes of severe hypoglycemia. As a result, these patients restrict their lifestyles and adopt certain behavioural practices to avoid the onset of hypoglycemia, such as not driving or eating before going to bed or entering a long meeting, to offset the occurrence of hypoglycemia (6). Simultaneously, making

such behavioural changes can induce a considerable level of anxiety in patients with type 1 diabetes (1,2).

With the clinical improvements and success rates of islet cell transplantation with the Edmonton Protocol, there is evidence of its clinical effectiveness in type 1 diabetes, relieving fear and anxiety in those experiencing problems with hypoglycemia unawareness or those with labile type 1 diabetes. However, the benefits of freeing or reducing insulin requirements for these patients must be weighed against the risks of the procedure and its resulting complications.

Physiologic measures have demonstrated that islet cell transplantation can effectively render patients with type 1 diabetes free of insulin requirements within the confines of chronic indefinite immunosuppression (5). To determine the potential impact of the procedure on the patients themselves, the Edmonton Protocol assessed the health-related quality of life (HRQL) changes, in particular those pertaining to hypoglycemia fear in pre- and post-transplant patients.

As of June 2003, the protocol has assessed self-reported HRQL in 35 patients who have received  $\geq 2$  transplants and 46 approved patients who are still on the waiting list. Of this population, each completed standardized questionnaires either in self-report format or orally over the telephone at various stages of the procedure: pre-transplant; 1 month after the first transplant; and various times after the second transplant (1 month, 3 months, 6 months, 12 months, 24 months and 36 months). For the purpose of this analysis, the Edmonton Protocol used only the last available HRQL assessment for post-transplant patients.

Each survey batch contained several standardized HRQL questionnaires, including the Hypoglycemia Fear Survey (HFS) and the Health Utilities Index (6-8). The HFS contains 23 questions that assess

the patient's concerns and worries of hypoglycemia and the behaviours he/she engages in to avoid low BG levels. The higher the score on this survey, the greater the fear of hypoglycemia. The Health Utilities Index, providing a weighted score from 0 to 1, contains numerous questions to gauge several aspects of health such as emotion or anxiety. (8).

Overall, the study was found to be successful, with patients who have undergone the procedure experiencing less fear of episodes of hypoglycemia compared to those who have not had the transplantation (Figure 1). Furthermore, it was found that as time passed, the quotients of fear and anxiety of hypoglycemia lessened. The correlation between HRQL scores and time passed since the procedure suggests that HRQL improves over time. While it is not completely clear what happens within the individual to indicate a change in HRQL scores, particularly over longer lapse periods, further studies will be performed to elaborate on these initial results.

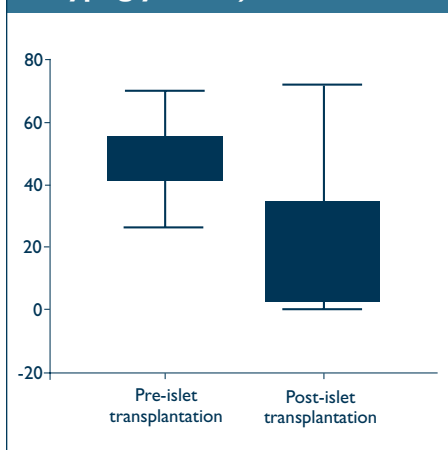
In a small number of participants, the transplantation was unsuccessful. While the small numbers do not allow for the formal testing of the differences in HFS scores, it appears that these individuals continue to show a great amount of hypoglycemia fear compared to those with a successful procedure. Their fears of hypoglycemia and anxiety levels were similar to those patients still on the waiting list, indicating the real success of islet cell transplantation.

## Conclusion

The results of the Edmonton Protocol demonstrate the benefits of islet cell transplantation on decreasing a patient's fear and anxiety of hypoglycemia. Individuals who have undergone a successful treatment, allowing for the successful removal of exogenous insulin or better control over BG, no longer worry about

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**Figure 1. Fear of hypoglycemia in pre- and post-islet transplant patients (higher scores indicate greater fear of hypoglycemia)**



# Mini-dose Glucagon for the Prevention and Treatment of Mild/Moderate Hypoglycemia in the Pediatric Setting

By Christine Richardson RN CDE

Division of Endocrinology and Metabolism, Children's Hospital of Eastern Ontario, Ottawa, Ontario, Canada

As healthcare providers, many of us have received a call from a distressed parent who is concerned that his/her child is nearing an episode of hypoglycemia. In the past, we advised parents to visit an emergency facility for the administration of intravenous glucose, but today there is a new approach to hypoglycemia management that is both safe and effective. This new treatment not only helps the patient, it also eases the anxiety and frustration felt by families when visiting the emergency room or when forcing an oral intake upon their child (which often causes vomiting or another visit to the emergency room). This new modality is the use of glucagon, which is administered subcutaneously via an insulin syringe in mini-doses.

Dr. Morey W. Haymond and colleagues at the Diabetes Care Center for Children and Adolescents, Texas Children's Hospital, Houston, Texas, United States, developed and tested this technique (1). Their study analyzed 33 episodes of impending or mild hypoglycemia in 28 children with type 1 diabetes. As the patient neared an episode, parents were instructed to administer mini-doses of glucagon subcutaneously using a standard U-100 insulin syringe and a dosing schedule based on the child's age. The treatment proved to be an effective means of managing children with impending hypoglycemia due to gastroenteritis or poor oral intake of carbohydrates, without the usual side effects of glucagon.

Based on this research, the Children's Hospital of Eastern Ontario (CHEO), Ottawa, Ontario, Canada, instituted a protocol using the guidelines developed and presented by the Texas Children's Hospital for treatment of children and adolescents with type 1 diabetes, and:

- impending hypoglycemia due to gastroenteritis and/or poor oral intake;
- impending hypoglycemia due to insulin error; or
- mild to moderate hypoglycemia (no

seizure, coma or confusion), and unable or unwilling to take oral carbohydrates.

Participants in this protocol were placed under the care of a diabetes physician or diabetes educator. When an episode neared, parents were instructed to reconstitute the glucagon and, using an insulin syringe, administer a prescribed mini-dose of glucagon subcutaneously (Table 1).

Since introducing this protocol 2 years ago, we have averted many emergency-

facility visits that would otherwise have been required. The use of glucagon in mini-doses, even repeated throughout the day, has not produced the common side effects (vomiting, nausea, headache) experienced with a full dose of glucagon (500 to 1000µg).

In addition to the effectiveness of the protocol, we assessed parental satisfaction by surveying the participants' families. The survey occurred between April and July 2002. Of the 216 respondents, 22 used

**Table 1. The mini-dose glucagon protocol for the prevention and treatment of mild/moderate hypoglycemia during episodes of gastroenteritis and/or poor oral intake in children and adolescents with type 1 diabetes**

<b>Purpose</b>	To prevent impending hypoglycemia or treat mild/moderate hypoglycemia in children and adolescents with type 1 diabetes and gastroenteritis and/or poor oral intake.
<b>Indications</b>	<ul style="list-style-type: none"> <li>• Impending hypoglycemia due to gastroenteritis and/or poor oral intake.</li> <li>• Impending hypoglycemia due to insulin error.</li> <li>• Mild to moderate hypoglycemia (i.e. no seizure, coma or confusion) and unable or unwilling to take oral carbohydrates.</li> </ul>
<b>Equipment</b>	<ul style="list-style-type: none"> <li>• Glucagon (1 mg/ml).</li> <li>• Insulin syringe.</li> <li>• BG meter and strips.</li> </ul>
<b>Protocol</b> (instructions given to parents)	<ol style="list-style-type: none"> <li>1. Reconstitute glucagon and draw into insulin syringe.</li> <li>2. Inject subcutaneously using an insulin syringe, basing dose on age:  <ul style="list-style-type: none"> <li>&lt;2 years: 2 units=20 µg;</li> <li>&gt;2 years: 1 unit/year of age (max. 15 units=150 µg).</li> </ul> </li> <li>3. Monitor BG every 30 minutes</li> <li>4. If no improvement in BG in 30 minutes (BG &gt;5 mmol/L), administer double the initial glucagon dose:  <ul style="list-style-type: none"> <li>&lt;2 years: 4 units=40 µg;</li> <li>&gt;2 years: 2 units/year of age (max 30 units=300 µg).</li> </ul> </li> <li>5. Repeat effective dose of glucagon every 60 minutes, as required, to maintain BG &gt;4.4 mmol/L</li> <li>6. Call 'Diabetes Doctor on Call' if child or adolescent experiences: <ul style="list-style-type: none"> <li>• seizure</li> <li>• loss of consciousness</li> <li>• failure to maintain BG &gt;4.4 mmol/L</li> <li>• vomited twice in 4 hours</li> </ul> </li> <li>7. Once reconstituted, glucagon is effective for 24 hours at room temperature.</li> </ol>

BG = blood glucose

glucagon and 9 had used the mini-dose protocol. The 9 protocol patients had a mean age of 10.5 years (4 to 17 years of age) and a mean blood glucose (BG) level at start of protocol of 2.9 mmol/L (1.9 to 4.0 mmol/L). The parents of the 9 patients were satisfied with the results. Furthermore, these parents reported that the protocol averted hospital visits as well as side effects. The physicians involved were also pleased with the results, crediting the use of mini-dose glucagon with preventing many emergency room visits.

Finding the protocol effective, diabetes nurse educators at CHEO now include the use of mini-dose glucagon during illness and for impending hypoglycemia into their regular teaching program. It is anticipated that, in time, diabetes educators at CHEO will inform all of their patients and their families about this alternate use for glucagon.

Presently, the use of the protocol is restricted, so parents must call their physician or nurse educator for dosing advice. By doing so, the diabetes healthcare provider can assess the situation (i.e. dehydration due to vomiting) and ensure mini-dose glucagon is indicated.

Prior to the protocol, healthcare providers felt limited in their capacity to help families manage an illness when BG levels continued to decrease and the child opposed oral carbohydrate intake. However, by using the mini-dose glucagon protocol both clinicians and parents can be confident in a tool that will manage the illness at home. To ensure continued safe use of the protocol, frequent telephone contact by the diabetes educator or physician is maintained to assess for potential problems such as dehydration.

Families, patients and the healthcare system benefit from the use of glucagon. For patients and their families, the treatment provides clients with a more effective solution for impending hypoglycemia; it reduces cost to parents of travelling to and waiting at the hospital, and prevents increased anxiety commonly associated with an emergency room visit. In addition to these benefits, glucagon use allows the healthcare system to improve service provided to patients and decrease costs due to fewer emergency room visits.

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*Islet Transplantation...continued from page 5*  
episodes of hypoglycemia, nor do they take precautions to avoid its occurrence. As a result, quality of life improves.

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*Dr. Johnson holds a Canada Research Chair in Diabetes Health Outcomes. Dr. Shapiro is a Clinical Investigator with Alberta Heritage Foundation for Medical Research and holds a Wyeth-Ayerst Canada/Canadian Institutes of Health Research Chair in Transplantation.*

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*10 Days...continued from page 2*

**J:** The licorice called out to me from the candy bowl, but I was forced to ignore its enticing sweetness. Although I am not on a strict meal plan, I am beginning to feel the frustration that comes with one.

**B:** Keeping a food diary, counting carbohydrates and subtracting fibre has become a tedious, torturous task. However, by writing down everything I eat, I do feel more accountable.

To gain the full experience of a person with diabetes, the nurse clinicians suggested we give ourselves insulin injections—something we were always curious about. After being trained on how to properly inject insulin, we were each handed a bag containing syringes and vials. We were then instructed to inject NPH at bedtime, as well as rapid-acting insulin anytime we ate more than the allotted 20 g of carbohydrates.

**J:** Living with diabetes was a lot more time consuming than I first anticipated. Testing BG, recording food intake, counting carbohydrates and injecting insulin all require a set routine. While at home, I was able to better conform to the routine, but going out proved difficult. For example, I spent an evening at a friend's home. I knew the invitation included dinner, but was unsure of what was to be served. Would I rudely decline the meal they prepared or inject myself numerous times throughout the evening as more food was presented? This is a question many people with diabetes must face on a regular basis.

Pretending to be persons with diabetes proved to be an incredible learning experience for both of us. It allowed us to fully appreciate our patients' way of life, and the time and effort they must put in every day to properly manage their diabetes. With the insight we gained, we definitely recommend that other healthcare professionals working with persons with diabetes undertake a similar experiment.

#### Submission Deadlines for Diabetes Quarterly

Winter 2003	November 10, 2003
Spring 2004	March 31, 2004
Summer 2004	June 30, 2004
Autumn 2004	September 30, 2004

# Nocturnal Hypoglycemia

By Anna Brundage RN BHSc(N) CDE

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The incidence of hypoglycemia is increasing as more individuals with diabetes attempt to meet the current guidelines for glycemic management. The Diabetes Control and Complications Trial (DCCT) reported a three-fold increase in severe hypoglycemia (described as an episode requiring assistance from another individual) in subjects undergoing intensive treatment vs. conventional treatment (1). As more individuals initiate intensive management of their diabetes, the incidence of hypoglycemia unawareness increases, which is 1 of the risk factors associated with severe hypoglycemia (2). Other risk factors include current A1c levels <6%, antecedent episodes of severe hypoglycemia, long duration of diabetes and autonomic neuropathy (3,4).

Severe hypoglycemic episodes occur mostly during the night when food intake and blood glucose (BG) monitoring is minimal (4,5). Furthermore, during sleep there is less ability to detect the symptoms of impending nocturnal hypoglycemia (6). For this, it is recommended that individuals with diabetes test their BG levels during the night, however, it may be impossible to do so during a hypoglycemic episode.

Occasional mild to moderate hypoglycemic incidents cause unpleasant symptoms and are inevitable with current therapies where optimal glycemic management is the goal. Severe episodes, however, may cause life-threatening conditions; 2 to 4% of deaths in persons with type 1 diabetes <50 years of age are thought to be due to hypoglycemia (6,7).

A study was undertaken recently to monitor abnormal cardiac repolarization during clinical episodes of hypoglycemia (8). Subjects were observed overnight with a continuous glucose monitoring system (CGMS) to record the duration of the incident, while an electrocardiogram (EKG) documented cardiac arrhythmia during periods of hypoglycemia. Results of the study showed spontaneous nocturnal hypoglycemia in adults with type 1 diabetes to be associated with the lengthening of the QT interval. Researchers found these

results to be consistent with the hypothesis that hypoglycemia-induced arrhythmia may cause sudden overnight death in young people with type 1 diabetes (8).

In several studies, the use of CGMS has shown the frequency of hypoglycemic episodes to be greater than previously thought. Hypoglycemia is also a significant problem for children and adolescents as well as persons with type 2 diabetes who have been using insulin for many years (6,9,10). At times, the individual is not aware that a hypoglycemic episode has taken place (6).

Diabetes educators must properly educate and counsel their patients to practice preventive measures for severe hypoglycemia. At the Tri-hospital Diabetes Education Centre (TRIDEC) in Toronto, Ontario, CGMS was initiated in 2000. The CGMS glucose sensor is a microelectrode inserted into the subcutaneous tissue, usually in the abdominal area, and is worn for 3 days. Interstitial glucose levels are recorded at 5-minute intervals to generate graphs of interstitial glucose levels.

Although clinical decisions cannot be made based on CGMS results (evidence suggests the sensors may either overestimate the fall of BG or the recovery time), the graphs can show trends in BG levels and the accompanying records may indicate precipitating factors for hypoglycemia (11). By providing invaluable information, the graphs can be used to assist patients in better self-management to decrease the risk of hypoglycemia. However, the CGMS program is labour-intensive as it requires 2 to 3 hours per patient and is costly (TRIDEC charges patients \$75 for sensor and supply costs).

When CGMS is not available, nocturnal hypoglycemia should be documented by monitoring BG at peak times of insulins used and after strenuous physical activity. If monitoring is also not possible, healthcare professionals must rely on the signs and symptoms of nocturnal hypoglycemia.

Hypoglycemia can have severe consequences. For this, diabetes educators must be cognizant of the risk factors for severe

hypoglycemia and be able to identify possible nocturnal hypoglycemia. Optimal diabetes management is essential for the prevention of long-term complications; however, every effort must be made to minimize the incidence of severe hypoglycemia.

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# Blood Glucose Awareness Training: What is It? What Can It Do for Me? Where is It?

Daniel Cox<sup>1</sup> PhD, Linda Gonder-Frederick<sup>1</sup> PhD, Lee Ritterband<sup>1</sup> PhD, John Zrebiec<sup>2</sup> MSW, William Clarke<sup>1</sup> PhD

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We keep our homes at a comfortable temperature with the aid of a furnace and an air conditioner, which are controlled by a thermostat that gauges the indoor temperature and determines which system is required to cool or warm the house. Engineers call this process a “negative feedback loop.” Similarly, the body maintains blood glucose (BG) levels in the normal range: carbohydrate raises BG levels, while insulin lowers them. Unfortunately, people with diabetes do not have a fully functional ‘thermostat’ that determines when, how much and what kinds of food and insulin are needed.

Diabetes management has come a long way over the past 20 years. Previously, diabetes patients relied on urine sticks to measure their BG. Today, BG meters provide quick readings and require minimal amounts of blood to provide accurate measurements. However, there are limitations: they report only current BG levels without taking into account where you have been or where you are going, they do not give instructions on what to do next, and they can be costly, sometimes painful and occasionally inconvenient. Continuous glucose monitoring systems (CGMS) hold some promise, but their future application may have limitations as well (due to expense and impracticality).

In addition to these high-tech ‘thermostats,’ people with diabetes rely on their experienced symptoms to reflect high and low BG levels. Using internal cues to determine if BG levels are too high or too low can be advantageous as they are readily available, at no cost to the individual. However, there are disadvantages, since some cues may go unrecognized or misinterpreted.

Individuals with diabetes experience physical symptoms as a consequence of either high or low BG levels. Low BG causes the body to release adrenaline, resulting in increased heart rate and sweating (neurogenic symptoms). Additionally, low BG levels deprive the brain of much-needed fuel, resulting in slowed thinking, poor coordination and difficulty concentrating

(neuroglycopenic symptoms). When BG levels rise above normal, the body tries to compensate by releasing sugar in our fluids. As a result, the need to urinate increases, while salivation and mucus production decrease. However, symptoms of extreme BG differ from person to person.

## Blood Glucose Awareness Training

Blood Glucose Awareness Training (BGAT) is an 8-session training program that has evolved over the past 15 years. Its goal is to help individuals with type 1 diabetes better anticipate, prevent, recognize and treat extreme BG events. Potential beneficiaries of BGAT include individuals who:

- have frequent hyperglycemia or high BG levels;
- experience periods of diabetic ketoacidosis;
- have a fear of hypoglycemia;
- have impaired hypoglycemia awareness;
- will pursue intensive insulin therapy;
- experience periodic severe hypoglycemia; or
- have had driving accidents due to hypoglycemia.

BGAT is a group training program whereby 6 to 8 adults with type 1 diabetes study the chapters of the BGAT manual, which are then discussed at the 8 meetings. The chapters are as follows:

- Chapter 1 focusses on keeping a BG diary and interpreting BG estimates. Over the course of the training program, participants improve their accuracy of estimating current BG levels and predicting where their BG levels are heading.
- Chapter 2 explores insulin kinetics, which allows participants to better anticipate when their insulin will be more or less active and how this can influence their personal BG level.
- Chapter 3 discusses carbohydrate counting to help individuals better anticipate when and by how much their BG is likely to rise.
- Chapter 4 helps individuals become more aware of their physical activity levels. Participants learn to decipher

the best time to perform physical exercise and how to balance exercise, food and insulin.

Chapters 2 to 4 help participants to better anticipate increases or decreases in their BG levels. By successfully accomplishing this, individuals can avoid extreme BG episodes.

- Chapter 5 instructs participants to identify their personal best neurogenic symptoms, and to determine when these internal cues are more or less likely to occur.
- Chapter 6 focusses on neuroglycopenic symptoms, specifically when to treat such symptoms as cues of hypoglycemia and how these symptoms can interfere with both detection and treatment of low BG levels.
- Chapter 7 examines how extreme BG levels can influence mood and, as a result, affect relationships with family and friends. Awareness of these mood swings can help people with diabetes better manage them and use them as cues of extreme BG levels.

The material discussed in chapters 5 to 7 teaches participants to detect extreme BG levels on the basis of internal cues.

- Chapter 8 provides a summary focussing on what actions individuals with diabetes must take to protect the gains they have achieved by participating in BGAT.

BGAT is a useful and beneficial diabetes education and behaviour change program. It leads to the reduction of high and low BG levels, greater awareness of extreme BG levels and significant reductions of the consequences of such episodes (diabetic ketoacidosis, severe hypoglycemia, driving mishaps due to hypoglycemia). To date, BGAT has been translated into Dutch, German and Japanese.

## BGAT online

There are 2 major barriers to the effective use of BGAT. First, the program requires a significant amount of time, effort and commitment on the participant’s part.

*Continued on page 10*

*Blood Glucose...continued from page 9*

Consequently, it is not appropriate for all diabetes patients but, rather, only those interested in better managing their diabetes and who are willing and able to make an 8-week commitment to participate in and follow through with the required readings and practice exercises.

A second drawback is availability, since it is not readily accessible to all individuals with type 1 diabetes. To resolve this problem, a grant from the American Diabetes Association provided funding to post BGAT online. BGAT-home (<http://www.bgat-home.com>) is an informative, engaging and useful tool. Available on an evaluation basis only, BGAT-home requires participants to complete several questionnaires before and after use.

To use BGAT-home, participants must have access to a computer, printer and internet connection, and participants must measure their BG levels with a meter 2 to 4 times per day. Finally, time is needed: each unit takes 1 hour to complete, and time throughout the day is required to practice the exercises at the end of each chapter.

Individuals without internet access at home or those uncomfortable using the internet can still benefit from BGAT-home by using public library computers, or asking friends and family members to assist them with the program. As well, type 1 diabetes patients can work with their diabetes educator or other individuals with type 1 diabetes to complete the program together.

#### **Acknowledgement**

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## Web Watch

### *Hypoglycemia Information With a Click of Your Mouse*

Maureen Thornton RN CDE

If you are looking for resources and information on hypoglycemia, hypoglycemia unawareness and various studies associated with nocturnal hypoglycemia prevention, then take a look at these websites, which can be very useful in your practice.

<http://www.diabetes.ca/Files/CDAHypoglycemiaGuidelines.pdf>

For diabetes educators in Canada, the authoritative resource on hypoglycemia management is the 2001 Canadian Diabetes Association Clinical Practice Guidelines for the Prevention and Management in Hypoglycemia in Diabetes, which is available here in PDF format.

<http://www.advancefornurses.com/common/editorial/editorial.aspx?CC=3883>

An article that discusses hypoglycemia unawareness and explains how hypoglycemia occurs in those with and without diabetes,

the causes for the reaction, the treatments required and the severe complications if treatment is not administered correctly and in time.

[http://www.eatright.org/Public/GovernmentAffairs/92\\_adap1099.cfm](http://www.eatright.org/Public/GovernmentAffairs/92_adap1099.cfm)

This article written by the American Dietetic Association was first published in the *Journal of American Dietetic Association*, but can now be found at this website address. Within the article, entitled "Functional Foods," the authors discuss the benefits various functional foods can provide, including the control of blood glucose overnight and treating nocturnal hypoglycemia.

<http://www.bbdc.org/pdf/Chapter12.pdf>

From Banting and Best Diabetes Centre comes this excellent, 5-page article explaining hypoglycemia and its various treatments.

<http://care.diabetesjournals.org/cgi/content/full/24/11/1858>

A study by the National Institutes of Health in the US, entitled "Limitations of Conventional Methods of Self-monitoring of Blood Glucose," can be found at this address. Discussing the weakness of at-home self monitoring, the study focusses on a 3-day span of continuous glucose sensing in pediatric patients with type 1 diabetes.

The Editorial Board of *Diabetes Quarterly* wishes to express its appreciation to Maureen Thornton for contributing her invaluable expertise to Web Watch over the last 2 years. Web Watch has become a popular and informative website reference for readers, thanks to Maureen's initiative, commitment and dedication. We wish her the best in her future endeavours.

# The Way I See It

## My Living and Learning Experience with Type 1 Diabetes

The author of this column is a diabetes educator, pharmacist and type 1 diabetes patient who wishes to remain anonymous.

Thirty years ago, I was diagnosed with type 1 diabetes. I was at work when my father gave me the news and told me I had to go to the hospital immediately. So, off I went, upset by everything that was happening to me at that moment. My day was being disrupted with changes that were beyond my control. As I think back over the years, it was a good thing I had no idea how that day would affect the rest of my life.

As we all know, diabetes is a chronic, progressive disease forcing an individual to face many challenges. It never takes a vacation. How one interprets the challenges will vary depending on what they have been taught, their support network, their lifestyle, their income and their expectations of how to live with the condition.

Many advances have occurred over the past 30 years—both in knowledge and diabetes tools. The results of the Diabetes Control and Complications Trial (DCCT) and the United Kingdom Prospective Diabetes Study (UKPDS) have changed the landscape of diabetes management (1,2). In response to these landmark studies, the Canadian Diabetes Association (CDA) now considers intensive glycemic control a standard of care (3). However, strict glycemic control increases the chance of hypoglycemia, creating yet another dilemma for those affected by diabetes (1,2).

Where do we find the true definition of hypoglycemia? Does such a definition really exist? Do we check a dictionary or do we ask our patients? In an attempt to answer this, I checked 2 medical dictionaries<sup>†</sup>, with each providing a slightly different definition, yet similar underlying meanings. However, if you were to ask a patient with diabetes to define hypoglycemia, there may be numerous answers, each correct for that individual. For me, hypoglycemia is a serious adverse event of intensive diabetes management,

which requires extensive education, monitoring, problem-solving and understanding. Just as hyperglycemia is a fact of life in diabetes patients, so is hypoglycemia. Along with the expected symptoms (i.e. tremor, sweating, hunger and perhaps loss of consciousness), hypoglycemia can create fear, embarrassment, loss of self-confidence and humiliation, as well as decreased overall happiness (4).

In recognition of the seriousness of hypoglycemia, the CDA has published evidence-based recommendations for the prevention and management of hypoglycemia (5). A strong message is being sent to all diabetes educators and patients to take the time to listen and learn about hypoglycemia management.

As educators, it is important for us to “establish a covenantal relationship with our patients, 1 where both the patient and healthcare provider voluntarily agree to institute a course of action aimed at achieving a commonly agreed outcome” (6). We must be nonjudgemental, caring and understanding. Although most of us do not suffer our patient’s hypoglycemic symptoms or their frustrations, we can offer support, information and inspiration for success (7). Diabetes surrounds the individual 24 hours a day and is capable of imposing fatigue on patients and their families. Thus, the education and wise words we provide as educators are far more meaningful than criticism. It is our responsibility to help patients find the best way for them, not us, to live well with diabetes.

As patients, we should make an attempt to become responsible for our self-care. We must realize that it will be us, and not the healthcare professional, who will suffer the consequences of long-term diabetes mismanagement (either hyperglycemia or hypoglycemia). We must learn as much as we can and seek advice to solve our problems. As well, patients must feel comfortable in knowing that the knowledge being provided is current and within the realms of practice guidelines and reality.

Diabetes is a lifelong journey with no simple solution. However, by setting a

course and allowing for changes in direction as deemed appropriate, educators and patients can make this journey together.

As for me, I take every opportunity to educate people about diabetes. I believe that healthcare professionals, as well as healthcare institutions, governments and diabetes organizations must become more proactive in sending the message to the Canadian population that diabetes is not just one disease, but a multitude of diseases that affect the quality of life for families.

As I travel this journey with my family, healthcare team, friends and colleagues (who have always been 100% supportive), I feel lucky that I have the opportunity to continue to learn and live with diabetes each day. Living life to the fullest and making diabetes management a part of that life provides a challenge, but it is certainly not insurmountable.

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<sup>†</sup> Dorlands Illustrated Medical Dictionary, 29th edition (2000), page 863; Taber's Cyclopedic Medical Dictionary, 19th edition (2001), page 999.

# National Nutrition Committee Update

By Eleeta Armit RD CDE

DES Representative, National Nutrition Committee

A summary of recent activities of the National Nutrition Committee (NNC) was presented at the Diabetes Educator Sector (DES) Leadership Forum in Toronto on May 30, 2003. A copy of the presentation is available at the Canadian Diabetes Association (CDA) website ([http://www.diabetes.ca/Section\\_Professionals/nutriguide.asp](http://www.diabetes.ca/Section_Professionals/nutriguide.asp)).

The presentation provided an update on the CDA/CSEM Professional Conference and Annual Meetings, as well as some activities of the Good Health Eating Guide (GHEG) working group. The GHEG working group is a collaboration of experienced diabetes educators from across the country with different fields of expertise to examine all aspects of the CDA's meal planning system and how to make it more compatible with those used by Diabète Québec (DQ) and the American Diabetes Association (ADA).

The annual conference will include 3 NNC-sponsored events:

- A pre-conference workshop, facilitated by Heather Komar and Cindy Sass, will focus on community-based diabetes education.
- The NNC's symposium will discuss 3 topics—*Healthy Eating is in Store for You™*; a GHEG revision update; and a lively discussion between Tom Wolever and Rhonda Bell on fructose in the diet of people with diabetes.
- A workshop on carbohydrate counting will be led by Barbara Allan and Kathryn Arcudi.

The GHEG group meets monthly by teleconference. Consultant Joanne Preece completed the business plan, and outlined areas of concern and the plan of action to carry out this project. The NNC and CDA senior management approved the plan.

The committee has reviewed the new meal planning resources from DQ and ADA. This past summer, nutritional database experts met with several committee members to prepare draft guidelines for choice food values using the Canadian Nutrient Database where possible. The draft will be presented at the symposium in Ottawa.

The July 2003 DES mailing contained a copy of the proposed recommendations for changes to the GHEG. They include:

- All carbohydrate groups be based on 15 g of available carbohydrate.
- Protein, fats and oils be revised to be consistent with nutrition guidelines. Heart-healthy choices be highlighted and other choices recognized.
- The Glycemic Index be incorporated into the food groups.
- Highlight high-fibre food choices within each group.
- Include more multicultural and ethnic food choices.
- Incorporate practicality of portions and ease of use for the patient.
- Add contemporary food choices to coincide with use in the real world.
- Recommendations be harmonized with other systems, i.e. DQ, ADA and Canada's Food Guide to Healthy Eating.

Though a long list, all items within each food group must be assessed to these criteria. In addition, other recommendations for the tool include:

- flexibility of use (for the professional) built into the tool;
- inexpensive;
- easy to use as a reference;
- avoid brand names, since products may change; and
- include informative references on dining out.

A final recommendation made for the GHEG included the removal of the CDA's Food Choice Values and Symbols (FCVS). Although initially designed to assist people in reading and using food labels, many consumers and educators did not find them to be helpful. As well, many people with diabetes believed them to be a CDA product endorsement (the symbols were never intended to be used this way).

Carbohydrate counting is growing in popularity as a meal planning method. As well, the CDA and Dietitians of Canada (DC) have launched *Healthy Eating is in Store for You™*. This detailed, consumer-education program will help consumers

better understand Health Canada's new mandatory labelling system and provide them with label reading skills that can be used instead of the FCVS.

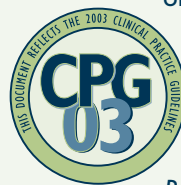
Work on a draft of the GHEG teaching tool and associated supporting materials will begin this fall. A pilot testing of some of the draft materials will occur in the spring of 2004. A launch at the 2004 CDA Professional Conference is tentatively planned.

There is ample opportunity for educators to comment and participate in the review of this teaching tool. If you would like to contribute to this project or require further information, please contact Sharon Zeiler, Senior Manager, Nutrition Initiatives and Strategies, via e-mail ([zeiler@diabetes.ca](mailto:zeiler@diabetes.ca)).

## Changes are Afoot!

The Canadian Diabetes Association's 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada will be launched at the CDA/CSEM Professional Conference and Annual Meetings in October 2003 and published in *Canadian Journal of Diabetes* in December 2003. The new guidelines will result in some changes to our suite of consumer and professional literature. Revisions to these materials are currently underway and should be completed by January 2004.

Until then, please be conservative in the quantities of material you order from the CDA, to prevent the accumulation of out-of-date literature. All revised materials will bear the *Clinical Practice Guidelines* marker (pictured here). Thank you for your cooperation in making the transition to the new *Clinical Practice Guidelines* as smooth as possible.



# Resource Review

## *The How To of Patient Education: A Guide and Workbook*

By Marilyn McInnes RN BA MEd CDE

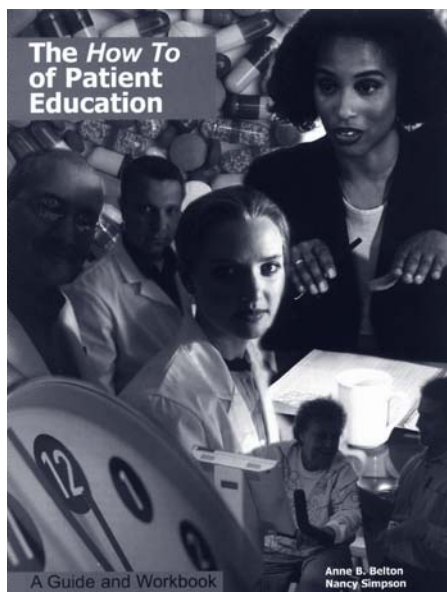
Nurse Clinician, Henderson Site of Hamilton Health Sciences, Diabetes & Clinical Faculty, McMaster University, Hamilton, Ontario, Canada

Effective healthcare education assists patients in acquiring and applying learned skills and attitudes to achieve optimal quality of life (1). Yet, there is a vast difference between teaching and learning. It takes knowledge and experience to develop the expertise to become a successful patient educator. Although healthcare professionals are expected to educate patients, many have not had formal instruction in the art of teaching and learning, leaving them to feel neither competent nor confident to teach their patients.

Anne B. Belton and Nancy Simpson collaborated to produce *The How To of Patient Education: A Guide and Workbook*, a resource that assists healthcare providers to acquire and refine their patient education skills. Each of the book's 6 modules develops information based on the principles of teaching and learning: Knowles Principles of Androgeny (adult education); the Prochaska Stages of Change Theory; Patient Empowerment; the Health Belief Model; and the Social Learning Theory. The workbook differentiates between teaching and learning, and emphasizes the need to guide—not lead—patients through the learning process. As well, it stresses the importance of becoming an empathetic listener, allowing patients to take charge of their learning.

The workbook teaches educators to better assess learning needs in both group and individual situations, and discusses formative and summative methods of evaluating learning. Furthermore, this education tool teaches readers how to develop and evaluate learning resources to meet individual patient needs. The importance and legal aspects of documenting patient teaching/learning is also examined. A summary at the end of each section involves review activities to reinforce the topics discussed. Key concepts, definitions and points of interest are highlighted in shaded areas throughout the book.

Although it could have been more succinct, Module 1 establishes the foundation of the resource tool providing readers with a good rationale for patient education.



Roadblocks to patient teaching are discussed, as well as several methods to remove them.

Module 2 is an excellent overview of the methodology of developing and enhancing effective communication skills. This chapter concisely and clearly develops key points, in particular, the need to ask open-ended questions, use plain language and to be active, empathetic listeners.

Module 3 examines the various learning styles of adults. It explains the principles of adult education developed by Knowles and the Prochaska Stages of Change Theory. The reader is also introduced to Patient Empowerment, the Health Belief Model, and the Social Learning Theory. The inclusion of family and/or significant others in patient teaching is encouraged.

Module 4 provides a general review of the basic foundations of the teaching/learning process and explains the important distinction between the 2 concepts. It emphasizes the necessity of developing clear learning objectives that reflect the cognitive, affective and psychomotor domains of learning. As well, this section helps the reader develop learning plans to meet the needs of patients in individual and group situations by stressing the need

to assess, develop, implement and evaluate learning.

In Module 5, readers learn to develop and evaluate effective patient education resources, while the significance of readability and literacy is identified. Efficient use of various media such as overheads, computer programs and videotapes is discussed. This section also provides a checklist and guide for the development and assessment of printed resources.

Module 6 reinforces the legal requirements of documenting teaching/learning. It presents examples of clear and specific documentation and provides the reader with ideas to create patient learning records.

This workbook takes the educator through an excellent step-by-step process of understanding the principles of androgeny and applying them to adult patients. Although certain parts of the workbook are verbose and redundant, overall, this resource promotes self-directed learning and encourages the healthcare provider to become an effective adult patient educator. At the same time, this workbook presents a good review for the veteran teacher and would be especially helpful for the novice educator. It certainly should be recommended reading for all those planning to write the Certified Diabetes Educator's exam. After all, patient education is the cornerstone of diabetes care (2).

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### Fifth Annual Options for Diabetes Conference

**When:** Friday, April 16 to  
Saturday, April 17, 2004

**Where:** Holiday Inn, Kingston,  
Ontario, Canada

**Who should attend:** Healthcare professionals interested in increasing their knowledge about diabetes.

**For more information, contact:**  
Margaret Little at (613) 547-3438  
or [hartwork@kingston.net](mailto:hartwork@kingston.net), or  
Joan Ferguson at (416) 239-0551.

# Sowing the Seeds of Diabetes Education

By Susan Baca RN CDE

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I have always enjoyed visiting schools. During these visits, offered specifically at schools with children with type 1 diabetes, I explain diabetes, low blood glucose (BG), living a healthy lifestyle and how to be a buddy to their classmate with type 1 diabetes. And the *pièce de résistance*—poking the teacher's finger to test their BG level! With the increase in type 2 diabetes in children, schools are in need of prevention programs. During a recent visit, I took the opportunity to begin planting the "seeds of prevention" for type 2 diabetes.

A healthy lifestyle should be a goal shared by both children with type 1 diabetes and their classmates. To demonstrate living healthfully, 3 children (the child with type 1 diabetes and 2 classmates) are chosen to help me plant the seeds in a clay pot. Once the seeds are planted, the 3 work carefully to water the soil. The students are then given the responsibility to care for the potted seeds and ensure a healthy plant grows by following a careful routine. Referring to the guidelines printed on the seed packet, I explain the plant's needs: full sun and regular watering. These key words are written down on a sheet of paper, which is taped to a tongue depressor and inserted into the soil. The pot is then placed in an accessible area where the entire class can care for it and watch it grow and bloom.

My discussion with the class includes a brief overview of both type 1 and type 2 diabetes, which allows me to slip in the message of preventing type 2 diabetes—keep active, eat well and stay healthy. Following the discussion, I test the children's knowledge and understanding of diabetes by asking questions. Later, during an interactive exercise, the children are split into teams of 2 and use cardboard paddles with key words on them to answer questions. Some examples of questions and answers include:

**Q.** How would you describe a child with diabetes?

**A.** Just like me.

**Q.** What is healthy for all of us to do?

**A.** Keep active and eat well.



Plant the seeds of prevention: keep active, eat well and stay healthy.

**Q.** When a person with diabetes experiences low BG, how can you help?

**A.** Get the sugar and call an adult.

This game usually fosters much discussion amongst the students. Once I have finished my talk and thanked the class for participating, I ask the group why I visited. The first reason was evident at the start of the discussion—to talk about their classmate's diabetes. However, the second is more difficult, but they always figure it out: plant the seeds of prevention by keeping active, eating well and staying healthy.

Visits made during the winter months are modified slightly, because planting seeds and caring for plants becomes more difficult. During these sessions, I lead the class in planting a thought rather than a seed. I explain to the children that when they glance over at the pot during the day, I

want them to be reminded of the seeds of prevention—keep active, eat well and stay healthy.

Classroom visits are tremendously enjoyable and provide a great way to teach children about diabetes. Whether it is fall, winter or spring, diabetes educators should get out of the office and into the classroom. There is work to be done and seeds to sow.

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# Making Our Way in School

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In October 2001, the Dryden Diabetes Clinic (DDC), in Dryden, Ontario, initiated a clinic day in the local high school to accommodate its cluster of 7 students with type 1 diabetes and 1 student with type 2 diabetes. Since many students had difficulty attending sessions held at our centre due to after-school activities, part-time jobs and lack of transportation, we decided to bring the clinic to the students. With the help of the high school principal and guidance personnel, the initiative has been a success.

Dryden High School is a composite high school with a current enrollment of approximately 1000 students in North-western Ontario. The clinic, which is held every 2 months at the high school is intended to have a registered nurse and dietitian visit with the students. However, the DDC has been without a dietitian for the past year, leaving the nurse to assume both responsibilities. Prior to attending their first session, the students are

required to submit a signed parental consent form allowing for the sharing of information between the school and the DDC. Once enrolled, parents are invited to attend sessions with their child (none have done so yet), or request a written or verbal report of the meeting.

To ensure the clinic day runs smoothly in conjunction with school functions and student schedules, a teacher is assigned to act as liaison. The presiding teacher is responsible for reserving a meeting room and scheduling each student for a 45-minute session. Students can request specific times to coordinate with their course scheduling, while others who will miss class will be given a signed consent form to do so by DDC staff.

In addition to meeting with the students, the attending nurse conducts in-services on diabetes for school staff, increasing their knowledge and understanding of the complexities of the disease. Specifically, these sessions focus on treating acute

complications of diabetes as well as the safety concerns involving students with diabetes who participate in extracurricular activities. Also, several staff volunteers are trained on blood glucose (BG) monitoring and glucagon administration.

To properly care for students with diabetes in cases of emergency, the DDC staff ensures the necessary supplies (including 2 BG meters) are available. Single-use lancets are also available, as are glucagon kits for each student with type 1 diabetes.

The success of the venture has led to the initiation of a student support group that meets monthly. Other positive outcomes for the students with diabetes include:

- provision of regular follow-up and education;
- all students are on multiple daily dose injections and most count their carbohydrate intake using a CHO:insulin ratio;
- increase in BG monitoring; and
- enhanced knowledge and understanding of diabetes by school staff.

In-school programs such as the DDC at Dryden High School are successful endeavours that produce tremendous rewards for students with diabetes and their teachers. The students will be able to better control their diabetes, while their teachers can provide necessary treatment, if required.

