



Published on *British Columbia Drug and Poison Information Centre (BC DPIC)* (<http://www.dpic.org>)

[Home](#) > [Printer-friendly PDF](#) > [Printer-friendly PDF](#)

Insulin Dosing Errors Common at Bedtime

Access:

professional

Article type:

drug information

Canadian Patient Safety Week begins on October 28th with the theme *Medications Can Be Confusing*. At the same time November marks Diabetes Awareness Month. At the BC Drug & Poison Information Centre (DPIC) we thought these two occasions would be a good time to draw attention to a common, yet poorly understood medication safety issue in diabetics.

Over the past number of years, DPIC has noticed an increasing number of calls from diabetics who have made errors in their insulin administration. The feeling among staff was that consultations about insulin errors were most common during the bedtime hours with the patient having administered the wrong type of insulin. In order to get a better handle on the scope and scale of the problem we recently completed a chart review and data analysis for the period January 1, 2012 to June 30, 2013 (see Table 1 for summary).

During this 18-month period DPIC received 360 consultations about insulin dosing errors. As expected the nature of the calls varied but there were clear trends. Of the 360 calls, 215 (59.7%) came in during the late evening period (8pm to 4 am). Over 65% of the evening calls (143, 39.7% of total) involved the unintentional administration of rapid or short-acting insulin, usually a consequence of individuals taking their rapid insulin instead of their intended bedtime dose of long-acting insulin. Most of the consultation requests came from patients themselves with the majority (80.8%) being handled from home. Careful monitoring of blood glucose, administration of food to offset hypoglycaemia, and follow-up by poison specialists resulted in good outcomes for all cases. Most cases required more than one follow-up and there were no fatalities.

A recently published analysis of unintentional insulin overdoses in the United States showed similar trends.¹ In their analysis of data from 3 poison centres over a 22 month period, Beuhler, et al found 642 cases, the majority involving short acting insulin administered at the "evening" dose. A longer term retrospective analysis of US poison center data from 2000-

2009 found 3819 insulin exposures at 9 regional poison centers covering 4 states.² Again, the trend was unintentional therapeutic errors in the later evening hours. During the 10 year period of the study they observed a 28% mean annual increase in errors. In both studies the majority of patients were safely managed at home under the supervision of poison specialists.

There may be a number of factors responsible for the increasing number of insulin errors - first being that there are simply more diabetics in our population. Currently it is estimated that 2.4 million Canadians suffer from diabetes - a 230% increase from 1998 estimates - and this number is expected to grow to 3.7 million by 2019.³ The most successful protocols for management of type 1 diabetes rely on basal-bolus regimens.³ This involves bolus doses of short-acting insulin just prior to meals with the basal component supplied by a relatively large dose of long-acting insulin usually administered at bedtime. Increasingly these insulin regimens are being used in type 2 diabetics who account for the majority of patients. There is some suggestion that errors are more common in the evening because this the only time of day when a different type of insulin is used. Furthermore, many diabetics have vision problems and the packaging for the different types of insulin often appears similar.

In summary, modern pharmacologic management of diabetes increasingly relies on multiple daily injections of insulin. This is a challenge for some diabetics and errors are bound to occur. A frequent problem is unintentional bedtime administration of short-acting insulin instead of the intended long-acting formulation. While there is a potential for significant hypoglycemia most patients do well at home with careful observation and precluding measures. As patient care providers and experts in medication management pharmacists are well positioned to help patients avoid errors and improve patient safety.

Table 1. Summary of insulin dosing errors reported to DPIC

	Number	%
Total calls	360	100.0
Unintentional/therapeutic error	342	95.0
Calls received between 8pm and 4 am	215	59.7
Rapid/short instead of long-acting (after 8pm)	143	39.7
Calls managed from patients' home	291	80.8

> 1 follow-up call	263	73.0
--------------------	-----	------

References:

1. Beuhler MC, Spiller HA, Aleguas A. Demographics and outcome of unintentional insulin overdoses by three poison centers. Clin Toxicol. 2013; Aug 22 [Epub ahead of print].
2. Spiller HA, Borys DJ, Ryan ML, Sawyer TS, Wilson BL. Unintentional therapeutic errors involving insulin in the ambulatory setting reported to poison centers. Ann Pharmacother. 2011;45:17-22.
3. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2013 clinical practice guidelines for the prevention and management of diabetes in Canada. Can J Diabetes 2013;37(suppl 1):S1-S212.

Written by Rob Gair, BSc(Pharm) and Monica Durigon, MSc.

A version of this document was published in BCPhA's The Tablet. 2013; 22(5): 10-11.

Keywords: insulin glargine
insulin detemir
insulin aspart
insulin analogues
medication errors

We are grateful to all the First Nations who have cared for and nurtured the lands and waters around us for all time, including the xʷmʷkʷyʷm (Musqueam), Skʷwxʷwʷmesh Uʷxwumixw (Squamish Nation), and sʷlʷilwʷtaʷ (Tsleil-Waututh Nation) on whose unceded and ancestral territory our centre is located.

© 2024 BC Drug and Poison Information Centre

All material found on the BC Drug and Poison Information Centre (DPIC) website is provided for informational purposes only. It is *not* meant to replace the expert advice of a healthcare professional such as a physician, pharmacist, nurse or qualified poison specialist. Use of this site is governed and restricted by specific terms of use. Please review the **full terms and conditions** below prior to using the DPIC website. In the event of a poisoning emergency, call your local poison control centre immediately. Portions of this web site are intended for healthcare professionals. Interpretation and application of information may require more detailed explanation than contained herein, particularly regarding any clinical information that is found in or linked to this site. Patients are advised to consult their health care provider regarding diagnosis and treatment, and for assistance in interpreting these materials and applying them in individual cases.

Terms and Conditions

Source URL (retrieved on 2025-09-05 17:58): <http://www.dpic.org/article/professional/insulin-dosing-errors-common-bedtime>