

# Insulin Calculating

## A Tool That Helps Prevent Errors

D. Trecroci  
April 2005

“Errors in calculation of insulin dosage by adolescents occur frequently,” write U.C. Davis researchers in a recent study. “Consistent use of an insulin dosage calculation device may help to improve metabolic control in adolescents using multiple daily injections (MDI) or continuous subcutaneous insulin infusion pumps (CSII).”

The researchers evaluated the impact of an insulin dosage calculation device (IDC) on metabolic control, treatment satisfaction, regimen adherence and quality of life in adolescents using MDI or an insulin pump.

The IDC was used in 83 adolescents.

Patients received training on dosage calculation using either the IDC or conventional methods, and they performed sample calculations.

“We observed a higher frequency of errors with conventional calculations than with the IDC,” write the researchers. “At six months, there was a trend toward improved A1C in the IDC group overall and a significant improvement in the subset who used the IDC consistently.”

—*Journal of Pediatric Endocrinology and Metabolism*, December 2004

---

**Nicole Glaser, MD, is an assistant professor of pediatrics at the University of California, Davis School of Medicine and was a lead researcher for the study.**

*Why is this study important to type 1 kids and their parents?*



Many adolescents are responsible for their own diabetes care. Often, they find dosage calculations to be time-consuming and cumbersome, and sometimes they resort to estimating dosages rather than calculating them precisely. This study confirms that errors in calculating insulin dosages occur frequently in adolescents using MDI or CSII, and that a simple, inexpensive device can help to improve control, likely by decreasing dosage errors. Although more recent models of insulin pumps have bolus calculation “wizards” built into the software, this is not available to patients who use MDI, making the devices perhaps most useful for those patients.

***What is an IDC, and can it be used in a clinical setting?***

The IDC is a simple, inexpensive device that calculates insulin dosages by combining the patient’s insulin to carbohydrate ratio with the correction scale for blood glucose. The device is circular and made of two layers of laminated cardboard. To use it, the patient turns the upper disc in relation to the lower disc, and the correct insulin dosage appears in a clear window.

All of our patients use the IDC at home. We give it to them at the clinic, and then we explain how it is used at the clinic session (usually with a teaching session on carbohydrate counting). They then carry it with them, usually in their glucose meter case, and use it to calculate dosages for all meals.

The devices will be called “InsuCalc” and should be available by summer of 2005. They can easily be used in any clinical setting (adult as well as pediatric), and are ideally given to patients by a physician, CDE or dietitian. Learning to use the device requires about three to five minutes of instruction.

More information about the InsuCalc will be available soon at [www.InsuCalc.com](http://www.InsuCalc.com), and healthcare providers will be able to place orders directly from the site.

***Can you speculate why you observed a higher frequency of errors with conventional calculations than with the IDC?***

There are so many steps to the calculations that I think it is easy to make errors. After determining the carbohydrate content of the meal, patients have to multiply by the ratio of insulin to carbohydrate, then add units according to the correction scale. Some ratios of insulin to carbs are very easy to use, such as 1 unit for every 10 grams, but others involve more difficult calculations, such as 1 unit per 7.5 grams. In our study, we asked the teens to calculate the dosages using whatever means they normally would use, and since most don’t use electronic calculators, many made mistakes.