

# Research findings

## *Defining the relationship between carbohydrate and the dose of insulin*

Age Range: 12 to 30 years

### ▶ WHAT WAS THE AIM?

Currently people with diabetes work out how much insulin to give for meals based on how much carbohydrate they plan to eat and their insulin to carbohydrate ratio. This ratio assumes that as carbohydrate amounts increase so does the insulin dose. This is based on a linear relationship but studies suggest that the relationship might not be linear and that a different ratio might decrease the risk of “hypos” and improve blood glucose levels after eating.

The aim of this study was to gain a better understanding of the relationship between the carbohydrate amount and the insulin needed to keep blood glucose levels in target range after a meal.

### ▶ HOW DID WE DO IT?

Thirty-one young people with type 1 diabetes aged 12-27 years ate four breakfasts of different amounts of carbohydrates - 20, 50, 100 and 150 grams. The percentage of carbohydrate, fat, protein and fiber were maintained across the meals.

The meal insulin doses were calculated using the carbohydrate amount and the young person's insulin carbohydrate ratio. Participants wore continuous glucose monitoring systems to monitor blood glucose levels for up to 5 hours after the meals.

### ▶ WHAT DID WE FIND?

The 20g carbohydrate meal had the most predictable response to standard therapy and the time in target range was greater than the other meals. The hypoglycemia rate was highest in the 100g and 50g meals compared to the 20g and 150g carbohydrate meals.

The largest meal had a lower insulin requirement in the 2 hours after the meal and a second rise later that continued through the 5 hour period. Our full results were published here:

<https://onlinelibrary.wiley.com/doi/10.1111/dme.14675>

### ▶ WHAT DOES THIS MEAN IN PRACTICE?

A non-linear relationship between insulin requirement and carbohydrate was observed with higher carbohydrate meals. Findings suggest that large meals containing 150g of carbohydrate or more may require a higher insulin dose and the use of dual wave bolusing to maintain levels in target range.

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