

Trends in insulin therapy in 50,861 children and adolescents with type 1 diabetes from Austria and Germany between 2000 and 2014

B Bohn¹, S Wiegand², S Kummer³, U Menzel⁴, O Kordonouri⁵, C Böttcher⁶, E Fröhlich-Reiterer⁷, RW Holl¹ on behalf of the DPV initiative

¹University of Ulm, Institute of Epidemiology and Medical Biometry, ZIBMT, German Center for Diabetes Research (DZD), Ulm, Germany, ²University Charité Berlin, Department of Pediatrics, Berlin, Germany, ³University Children's Hospital, Duesseldorf, Department of General Pediatrics, Neonatology and Pediatric Cardiology, Duesseldorf, Germany, ⁴Altona Children's Hospital, Hamburg, Germany, ⁵Diabetes Center for Children and Adolescents, Children's Hospital AUF DER BULT, Hannover, Germany, ⁶Justus Liebig University, Division of Paediatric Endocrinology & Diabetology, Centre of Child and Adolescent Medicine, Giessen, Germany, ⁷Medical University Graz, Department of Pediatrics and Adolescent Medicine, Division of Endocrinology and Diabetes, Graz, Austria

Disclosure statement

The authors declare that they have no conflict of interest.

Conclusion

Insulin dosage and ratio of prandial to basal insulin both increased over the last 15 years. These findings might be explained by an increase in sedentary lifestyle or by changes in the quantity/quality of nutrition.

Background and Objective

Over the last two decades, treatment of type 1 diabetes became more intensified and changes in the type of insulin used were reported. We therefore hypothesized that there are also changes in insulin dosage and in the ratio of prandial to basal insulin. Our aim was to analyse potential trends in paediatric subjects with type 1 diabetes from Austria and Germany between 2000 and 2014.

Methods

- Diabetes-Patienten-Verlaufsdokumentation (DPV) database: Software for standardized, prospective documentation of diabetes care and outcome (www.d-p-v.eu) (Fig. 1).
- **50,861 subjects** (<20 years of age) with **type 1 diabetes** from 375 DPV centres.
- Regression models were applied for
 - insulin dosage/kg body weight per day in patients on intensified conventional insulin therapy (ICT),
 - insulin dosage/kg body weight per day in patients on insulin pumps (CSII),
 - ratio of prandial to basal insulin in patients on ICT.
- Sex- and age-specific analyses (0-5; 5-<10; 10-<15; 15-<20 years of age).
- Confounders: Sex, age, body mass index (BMI), and diabetes duration.
- P-values for trend were given (SAS 9.4).

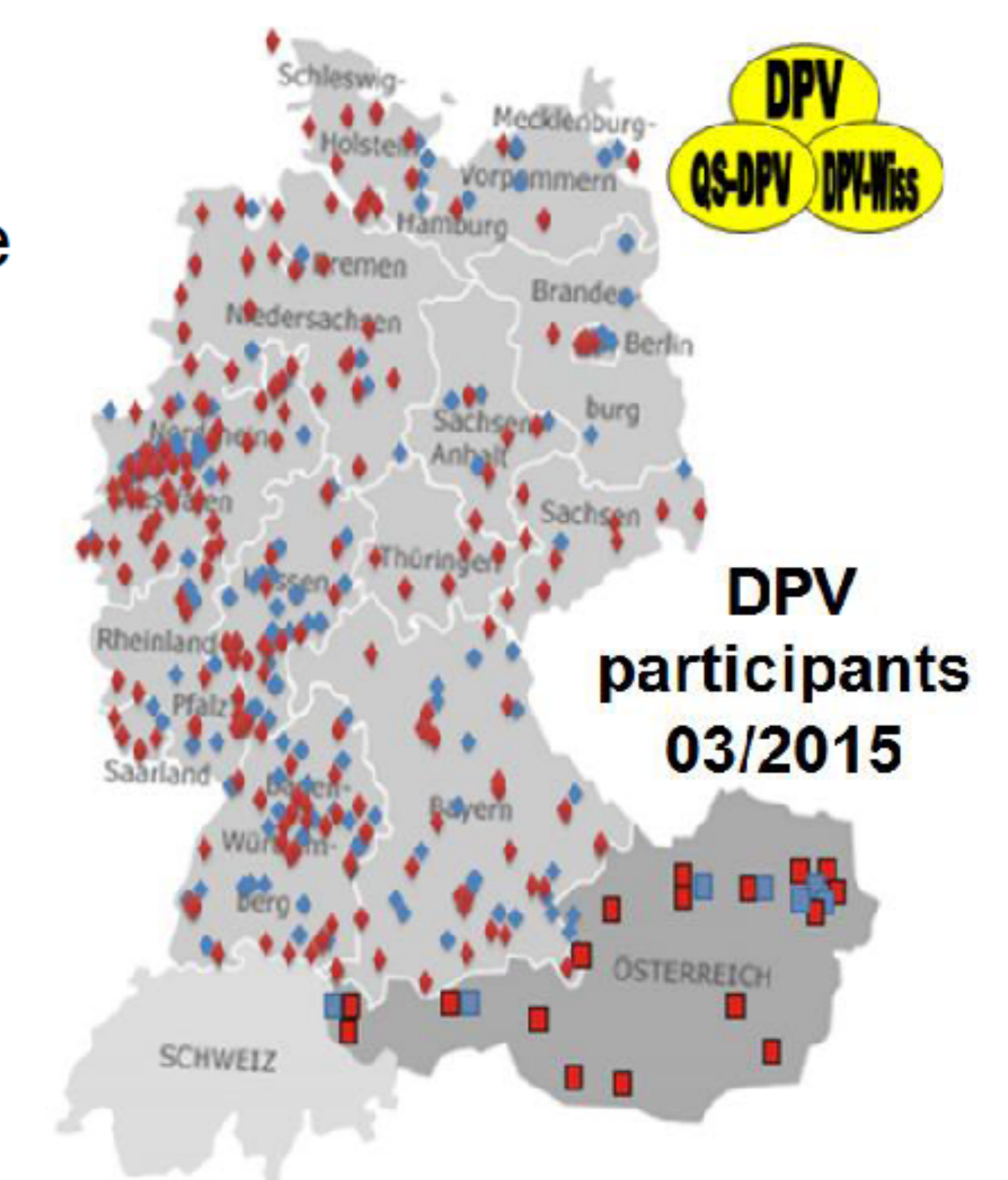


Fig. 1: DPV registry

Results – Description

Tab. 1: Demographic and clinical characteristics of the whole study population

n	50,861
male, %	52.4
age [years]	11.7 (8.1;14.5)
age at diabetes manifestation [years]	8.4 (4.8;11.6)
diabetes duration [years]	1.5 (1.2;3.5)
HbA _{1c} [%]	7.4 (6.7;8.4)
insulin dosage/kg body weight/day	0.76 (0.60;0.95)

Data are medians (Q1;Q3) unless otherwise indicated.

Results – Regression analysis

Increase in insulin dosage

ICT: from 0.88 IU/kg/day in 2000 to 0.94 IU/kg/day in 2014 ($p<0.0001$)
CSII: from 0.71 IU/kg/day in 2000 to 0.80 IU/kg/day in 2014 ($p<0.0001$) (Fig. 2).

Sex- and age-specific analyses revealed a significant increase in ICT and CSII in all subgroups (all $p<0.01$). Only in 5-10 year old subjects on CSII, insulin dosage decreased from 0.71 IU/kg/day in 2000 to 0.68 IU/kg/day in 2014 ($p<0.0001$).

Increase in ratio of prandial to basal insulin

The ratio of prandial to basal insulin in patients on ICT rose from 1.25 in 2000 to 1.37 in 2014 ($p=0.0056$) (Fig. 3).

An increase was also present in all subgroups. However, this trend was only significant in girls and in younger age-groups (0-5; 5-<10 years of age) ($p<0.0001$, respectively).

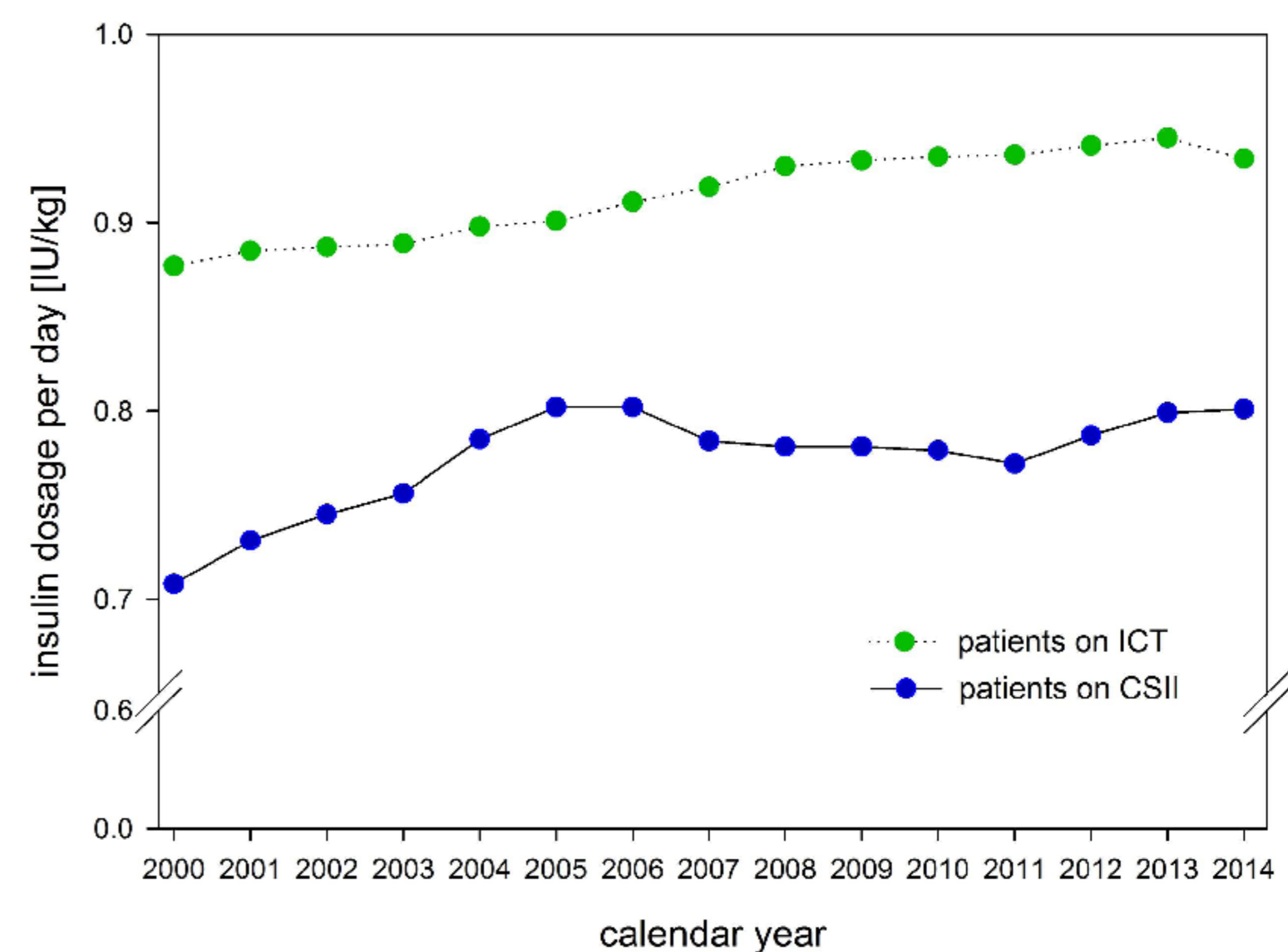


Fig. 2: Insulin dosage/kg body weight per day in all patients on ICT, or CSII, stratified by calendar year. Data are adjusted for sex, age, BMI, and diabetes duration.

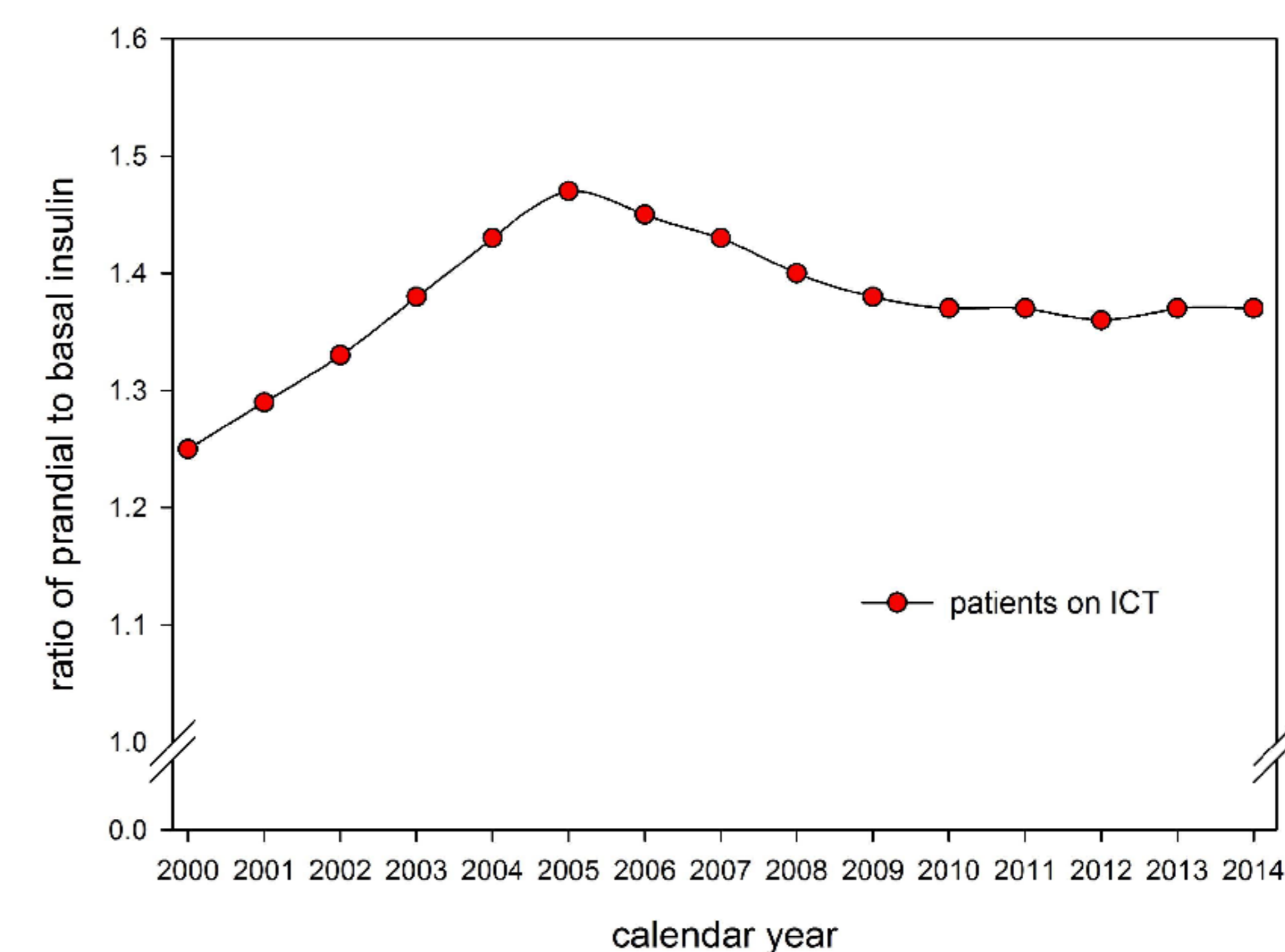


Fig. 3: Ratio of prandial to basal insulin in all patients on ICT, stratified by calendar year. Data are adjusted for sex, age, BMI, and diabetes duration.



Contact
 Barbara Bohn, M.Sc. Public Health Nutrition
 Institute of Epidemiology and Medical Biometry, ZIBMT, University of Ulm, Germany
 Phone: +49 (0)731 / 5025353, Email: barbara.bohn@uni-ulm.de

