

# Clinical Practice Consensus Guidelines ISPAD

A Rosenbloom et al  
Pediatric Diabetes 2009

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GLOBAL IDF/ISPAD GUIDELINE FOR  
**DIABETES** IN **CHILDHOOD**  
AND **ADOLESCENCE**



# Patients characteristics T2DM

- Europe/US                      obesity (>85% )
- Japan                              30% NON obese
- Asian Indian children 50% normal weight
- Taiwan                            50% normal weight

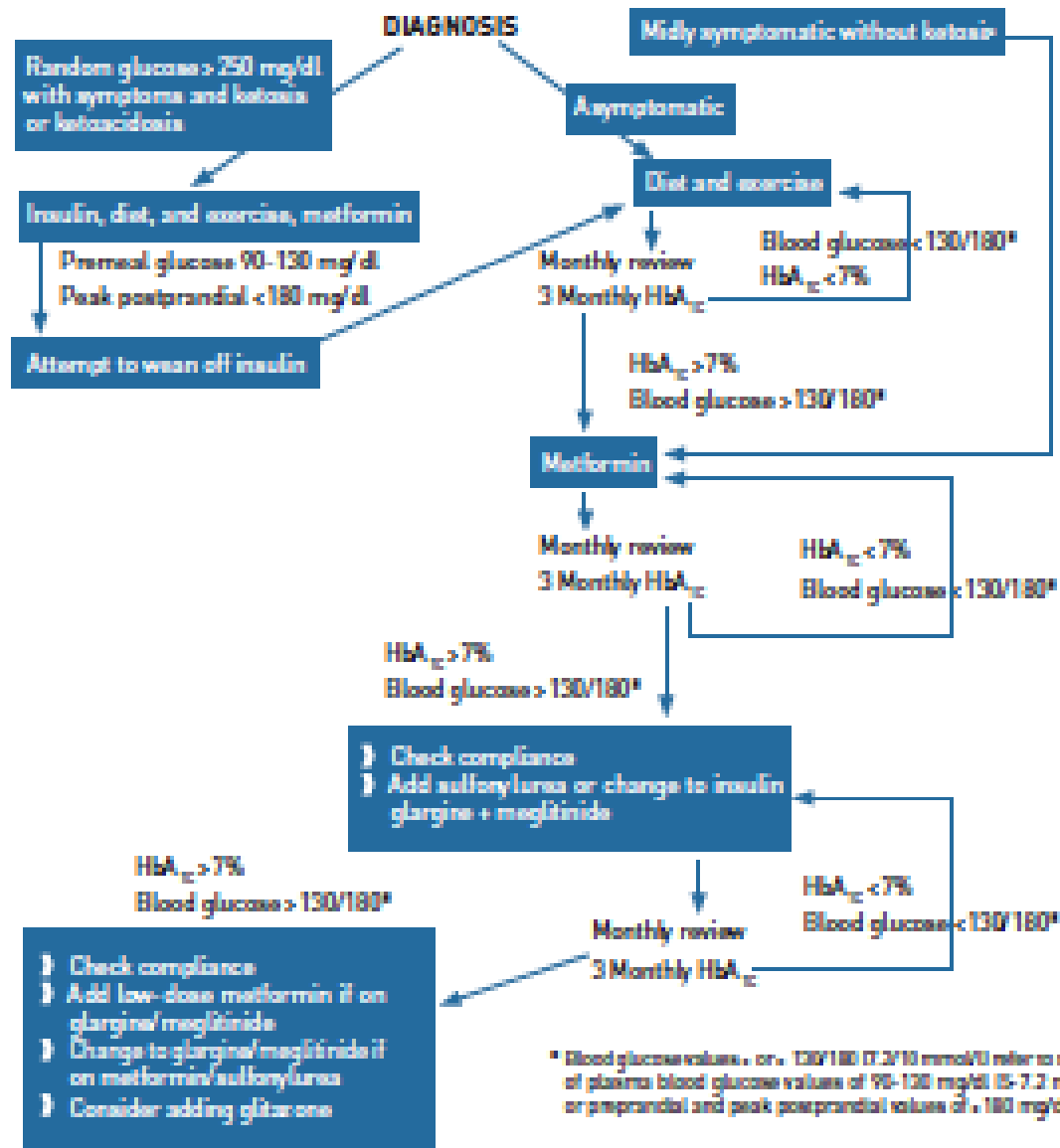
# IDF/ISPAD

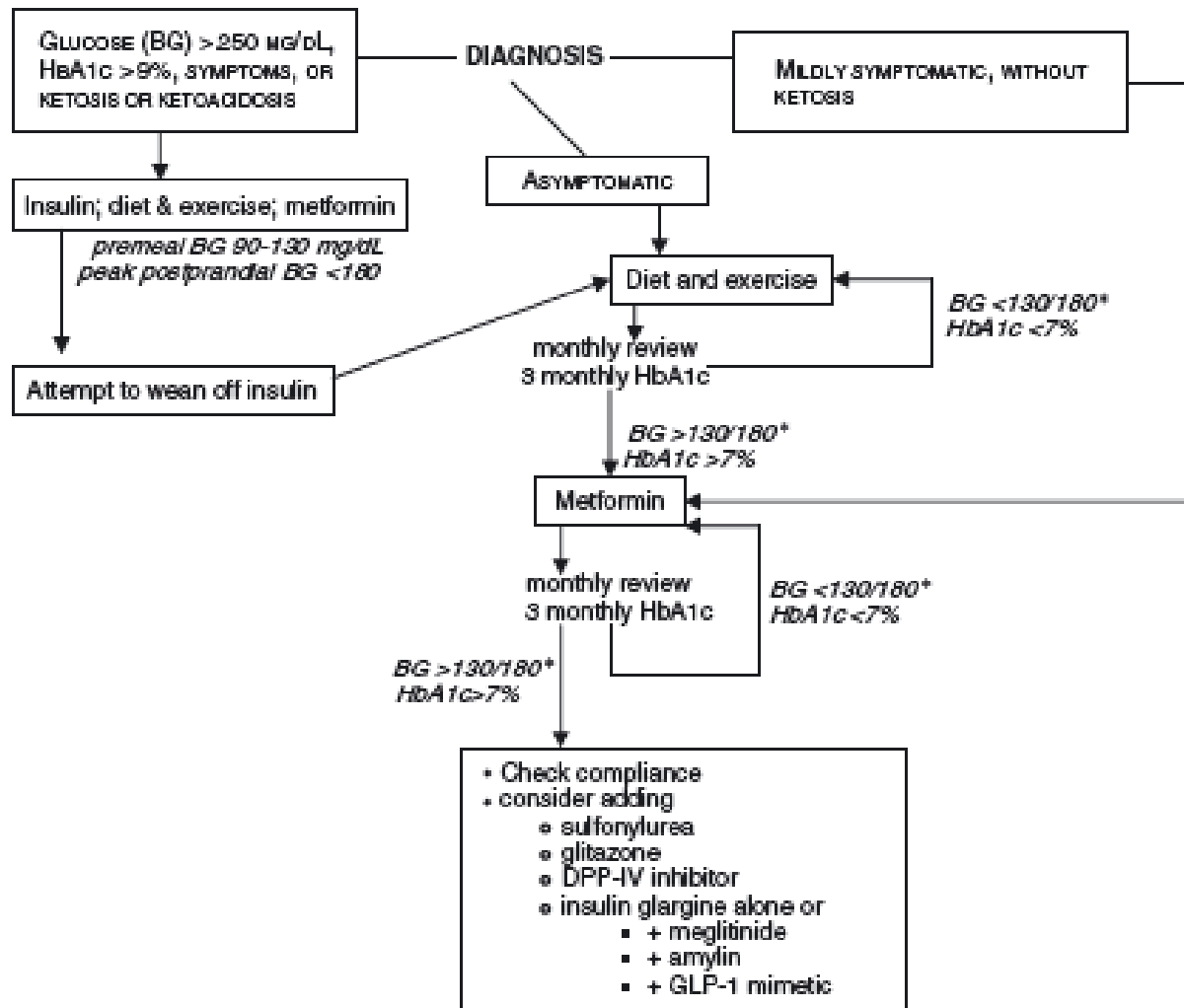
## Treatment recommendation 2011

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- Initial treatment : clinical symptoms dependent
  - insulin
  - lifestyle: diet-exercise
- Once metabolically ok (1-2 wks post diagnosis)
  - Start Metformin (250mg),
  - Progressive increase 2x/day till 2x 1000 mg
  - transition time for insulin weaning in 2-6w
- Glucose measurements (min) 2x/day

**Figure 1. Management of type 2 diabetes mellitus in children and adolescents**





\*blood glucose values < or >130/180 (7.2/10 mmol/L) refer to self-monitoring plasma BG values of 90-130 mg/dL (5-7.2 mmol/L) fasting or preprandial and peak postprandial values of <180 mg/dL (10 mmol/L).

Fig. 1. Treatment decision tree for type 2 diabetes in children and adolescents.

# Conclusion ISPAD IDF-ISPAD

- Diagnostic criteria
- Treatment regimens
  - insulin , metformin, D/E → and ???
- Complication screening in both : high priority
- ISPAD GUIDELINES : revision 2013

# Type 2 diabetes: Prevalence and Management in Europe



**Professor David Dunger**  
**Professor Tim Barrett**  
**Professor Reinhard Holl**

**EnprEMA meeting**  
**European Medicines**  
**Agency, London 25<sup>th</sup>**  
**February 2013**



# European Diabetes Registers

- EuroDIAB Existing diabetes registers
- EnprEMA Survey
- German Diabetes Register
- UK JUMP Study

# EnprEMA type 2 diabetes register survey

<b>FRANCE</b>	<b>Jean-Jacques Robert</b>	No existing T2D register but plans to establish a Register with the support of the association Aide aux Jeunes Diabetiques
<b>POLAND</b>	<b>Przemyslaw Jarosz-Chobot</b>	No existing T2D register. Numbers of patients likely to be very low
<b>ITALY</b>	<b>Francesco Chiarelli</b>	Network established to collect robust data on T2D in children
<b>UK</b>	<b>Timothy Barrett</b>	National study of subjects with T2D funded by the MRC has characterised 192 out of an estimated 240 in the UK.
<b>DENMARK</b>	<b>Henrik Mortensen</b>	All diabetic subjects are registered in the Danish Registry for Childhood and Adolescent Diabetes. 27 subjects have been identified nationally
<b>GERMANY</b>	<b>Reinhard Holl Olaf Hiort</b>	DPV initiative provides an excellent national register of all paediatric diabetes patients including 860 type 2 patients. Population well characterised and potentially available for data exchange and collaborative studies
<b>SPAIN</b>	<b>Lourdes Ibanez</b>	4-5 centres doing clinical trials. Investigate possible networks through Spanish Paediatric society.
<b>SLOVENIA</b>	<b>Tadej Battelino</b>	A national T2D registry for the paediatric age group (0-end of 18y) – not many patients; also impaired glucose tolerance registry (more patients, screened with an OGTT obese children with BMI SDS more

# EnprEMA type 2 diabetes register survey

<b>LUXEMBOURG</b>	<b>Carine de Beaufort</b>	Currently seeing 2-4 cases aged under 18 years at CB's clinic. More statistics to follow.
<b>AUSTRIA</b>	<b>Thomas Pieber</b>	Paediatricians ( Austrian Diabetes Incidence Study Group) have a prospective registry for all types of DM including T2 DM since 1999 for the age group < 18 years. The majority of the paediatric diabetes centres participate in DPV.
<b>FINLAND</b>	<b>Mikael Knip</b>	Finland has a national register for all cases with diabetes diagnosed in pediatric units in. That register started in 2002 and currently they have 5419 registered patients, out of whom 37 (0.7%) have been diagnosed with type 2 diabetes. The number of patients with T2D varies from one to six per year.

# TYPE 2 DIABETES DATA in THE SWEET WEBSITE 2013

## Metabolic outcome - type 2 diabetes

Number of centres:	12
Number of patients (overall):	57
Number of visits (overall):	118
Data status:	2013-01-13, 13:52:09 CET

## Demographic characteristics

Number of centres:	14
Number of patients (overall):	7.487
Number of visits (overall):	92.090
Data status:	2013-01-13, 13:49:02 CET

### Select Centre

All centres ▼ from 2012 ▼ 06 ▼ 12 months into the past

HbA1c (type 2 diabetes)	Number of patients	Median	< 7.0% percentage and number of patients	7.0% - 7.5% percentage and number of patients	7.5% - 9.0% percentage and number of patients	> 9.0% percentage and number of patients	Patients with at least 4 measurements
<b>all patients</b>	57	6,42	59,65% (34)	10,53% (6)	12,28% (7)	17,54% (10)	15,09%
<b>&lt; 1 year since diabetes manifestation</b>	6	6,29	83,33% (5)	0,00% (0)	16,67% (1)	0,00% (0)	11,11%
<b>&gt; 1 year since diabetes manifestation</b>	43	6,80	53,49% (23)	13,95% (6)	13,95% (6)	18,60% (8)	13,33%
<b>age 0 - &lt;6</b>	1	6,20	100,00% (1)	0,00% (0)	0,00% (0)	0,00% (0)	0,00%
<b>age 6 - &lt;12</b>	1	8,90	0,00% (0)	0,00% (0)	100,00% (1)	0,00% (0)	100,00%
<b>age 12 - &lt;18</b>	39	6,20	64,10% (25)	10,26% (4)	10,26% (4)	15,38% (6)	13,89%
<b>age &gt;= 18</b>	16	7,45	50,00% (8)	12,50% (2)	12,50% (2)	25,00% (4)	6,25%

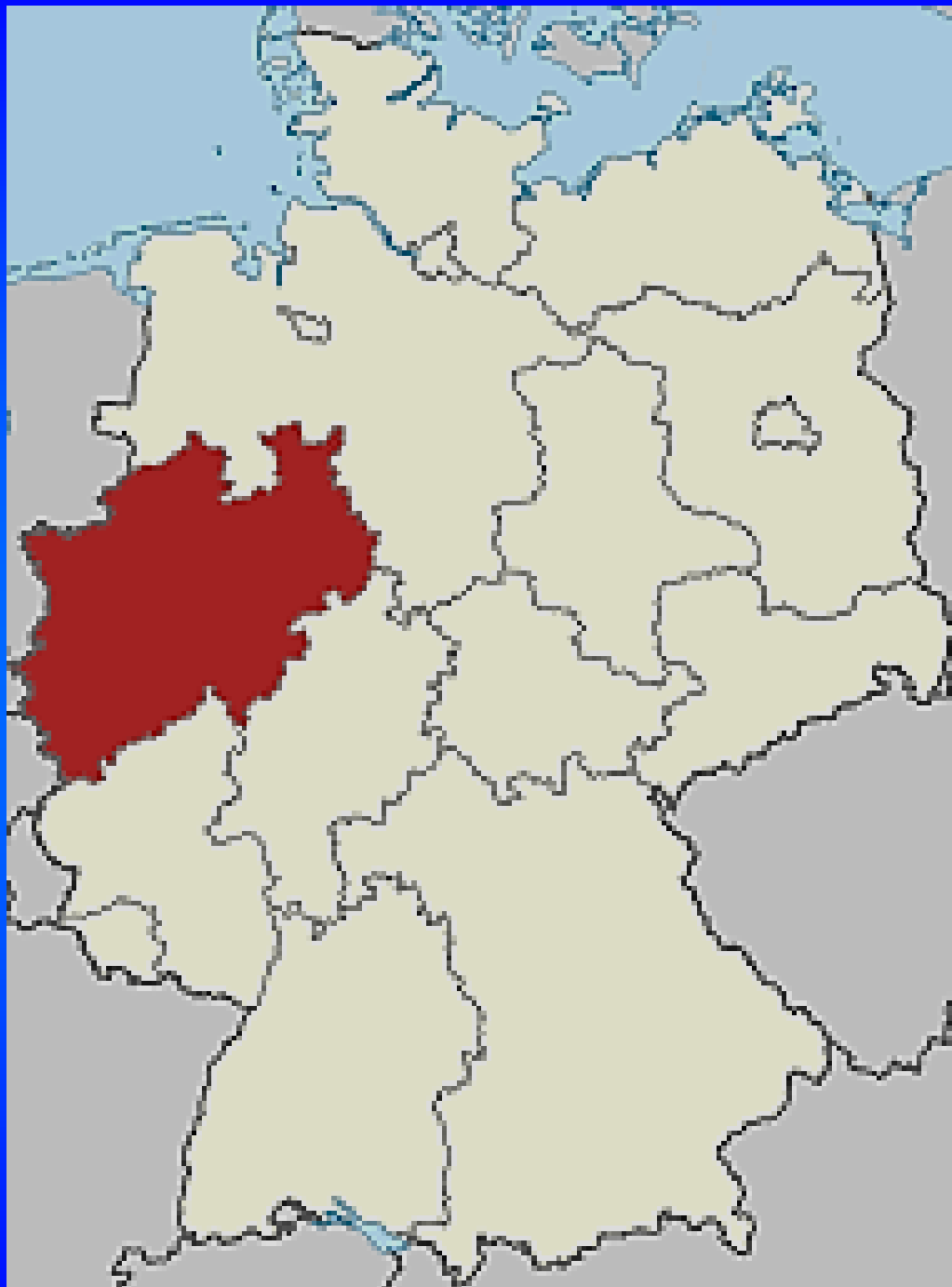
# Type-2-Diabetes in Adolescents – German Data



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German Diabetes Center, Epidemiology  
Düsseldorf



Reinhard Holl, MD  
DPV coordinator / pediatric  
endocrinologist / diabetologist,  
University of Ulm, Germany



**Pediatric  
Diabetes  
Incidence  
registry  
Northrhine-  
Westfalia**

# Summary of Data based on Incidence Registry from Northrhine-Westfalia

The number of type-2-DM-patients 5-19 years in Germany is still low.

No increase between 2002 and 2010

Estimated new cases per year in Germany:  
130 – 160 (1.0-1.3 per 100.000 )

Estimated total number of pediatric type-2 patients in Germany:  
580 – 780 (6.0-6.5 per 100.000 )

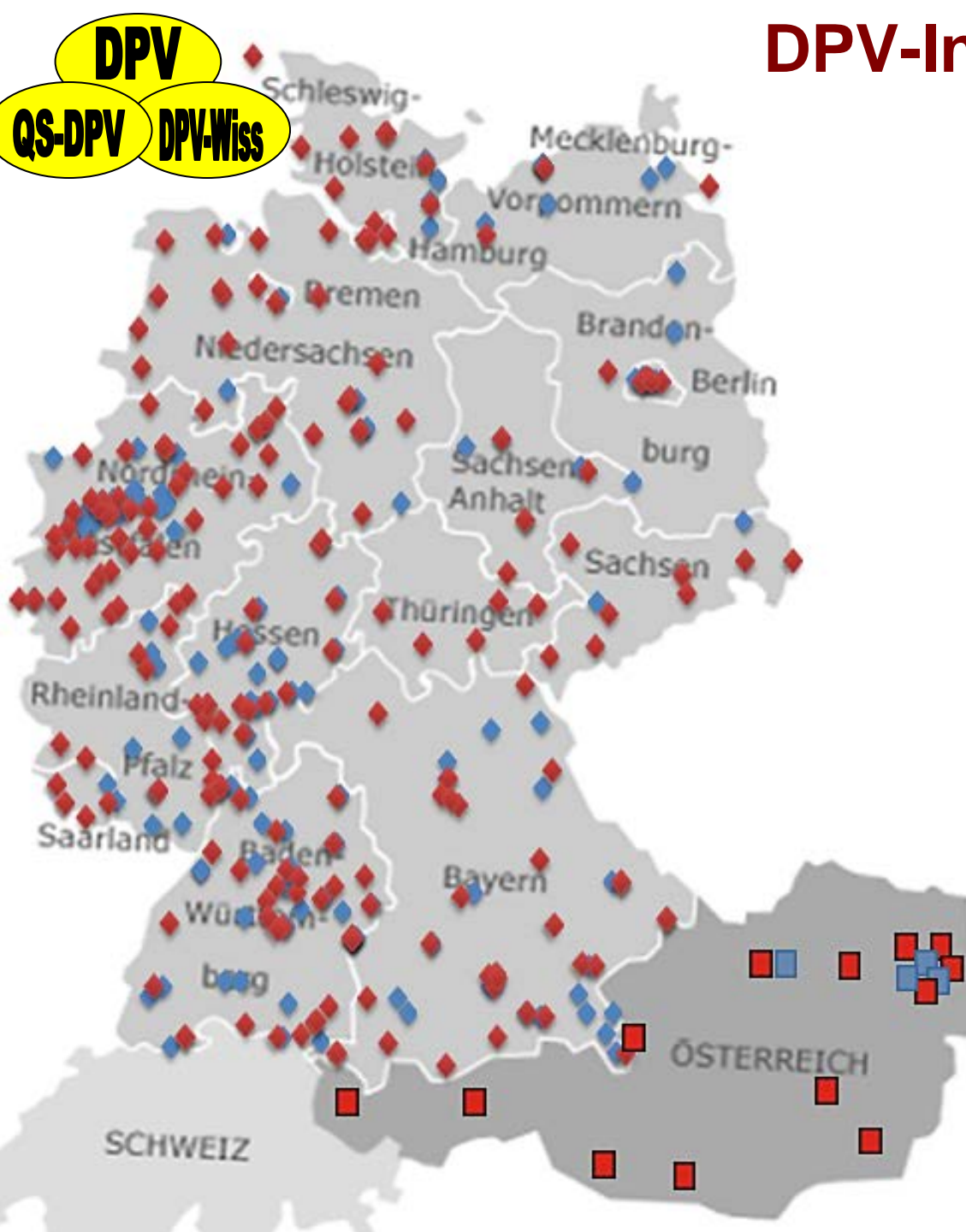
## Other population-based data from Germany:

### Type-2-diabetes in children and adolescents in Baden-Württemberg

- 56 patients identified
- prevalence: 2,3 per 100.000 (age 0-20 y.)
- mean age at onset: 15.8 years
- extrapolated for Germany: 390 cases



# DPV-Initiative 1995 – 2011



**Patient visits:** 2 432 466  
outpatient: 2 116 426  
inpatient: 316 040

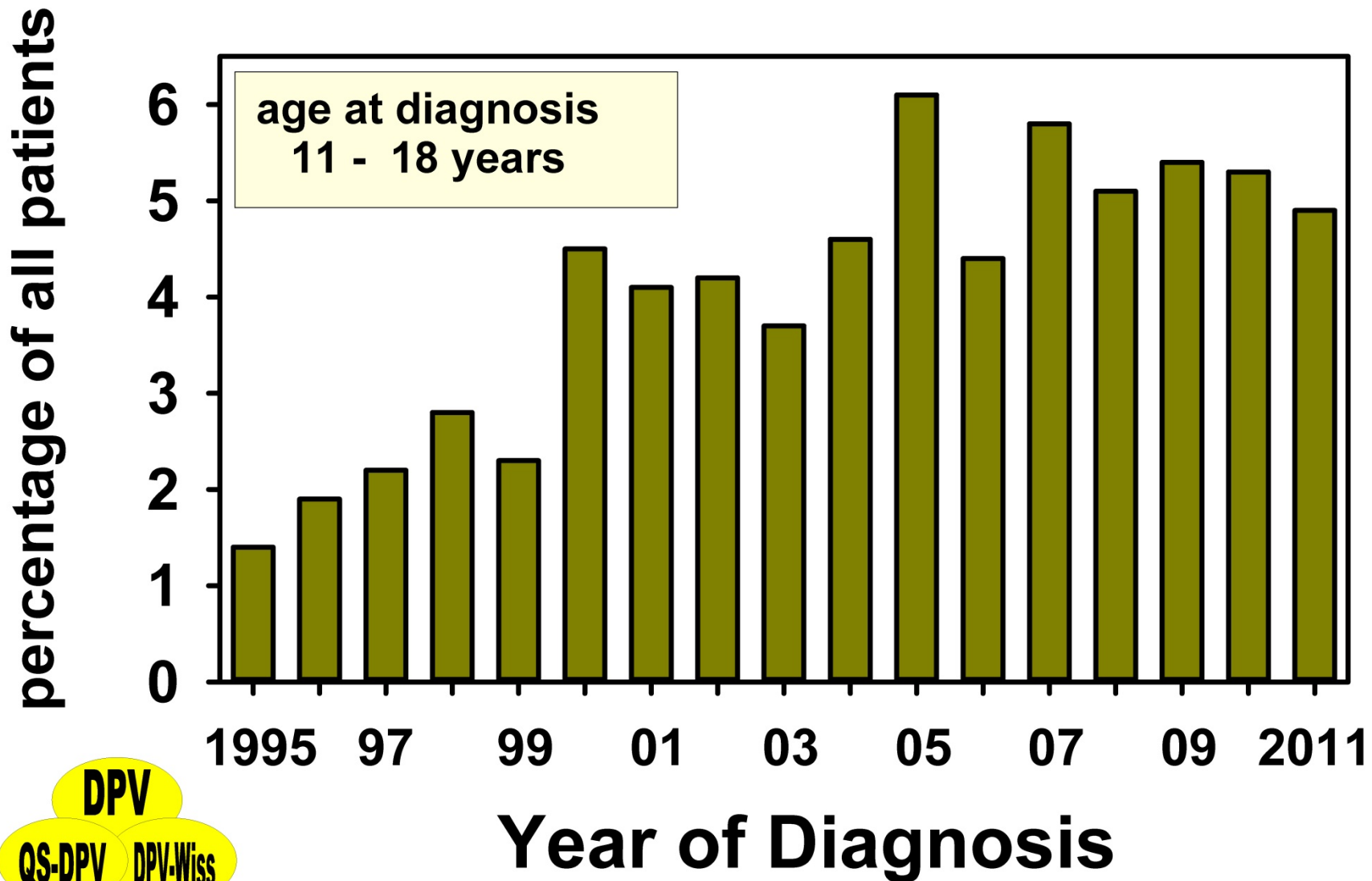
**Patients:** 272 657  
pre-DM: 1 761  
type-1-DM: 78 551  
type-2-DM: 172 856  
type-3-DM: 10 019  
gest.-DM: 9 470

**Age at onset**  
< 18 y.: 63 716  
> 18 y.: 207 180

**Participating centers:** 370

**pediatric  
internal medicine**

# Type-2-Diabetes in Pediatrics



DPV

QS-DPV

DPV-Wiss

# **Pediatric type-2-patients (0-20 years) available in DPV Database**

**Cumulative 1995 to 2012**

**1432 patients**

**38 % males, 62 % females**

**14.5 years age at onset**

**32.3 kg/m<sup>2</sup> BMI**

**+2.4 BMI-SDS**

**33 % migration**

**background**

**As of January 1st, 2012**

**517 patients**

**We are sorry for not being able to join  
this EnprEMA meeting today,**

**But we are both happy to cooperate with  
the initiative in the future**

**Joachim Rosenbauer  
Reinhard Holl**



Homepage: <http://www.d-p-v.eu>

## Funding of DPV-Initiative





# JUMP



## TYPE 2 DIABETES IN CHILDHOOD: BUILDING A PLATFORM FOR INTERVENTIONS TO PREVENT THE PROGRESSION TO CARDIOVASCULAR DISEASE

Gray Z<sup>1</sup>, Ilsley E<sup>2</sup>, Cotter C<sup>1</sup>, Ford A<sup>3</sup>, Turner K<sup>4</sup>, Heywood J<sup>4</sup>, Barnett A<sup>2</sup>, Dunger D<sup>4</sup>, Hamilton-Shield J<sup>5</sup>, Wales J<sup>6</sup>, Barrett T<sup>2</sup>.

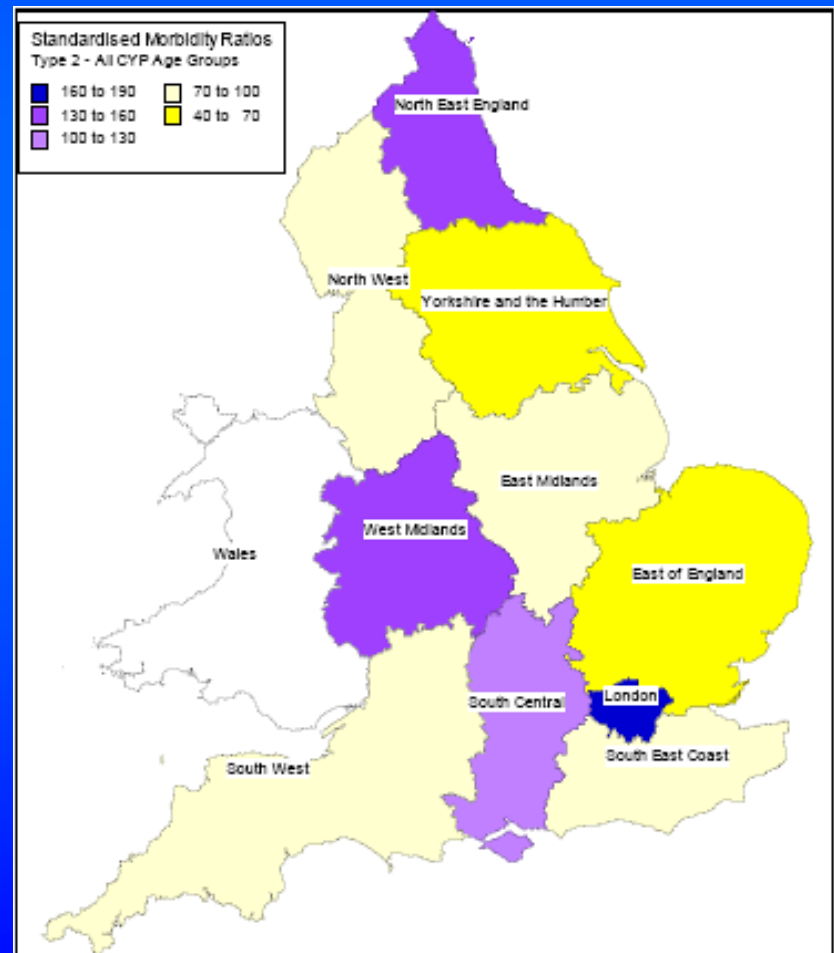
<sup>1</sup>Birmingham Children's Hospital NHS Foundation Trust, <sup>2</sup>University of Birmingham, <sup>3</sup>Sheffield Children's Hospital NHS Foundation Trust, <sup>4</sup>University of Cambridge, <sup>5</sup>University of Bristol, <sup>6</sup>University of Sheffield

# Introduction

- Type 2 diabetes reported in children since 1979
- First UK reports 2000
- USA SEARCH, TODAY studies
- Little phenotypic data on UK patients
- UK ethnic minority population from Pakistan, India, Bangladesh, West Indies

RCPCH/DUK 'snapshot' 2009  
328 'paediatrician diagnoses'

Vs ~23,000 Type 1 diabetes



# UK childhood T2DM

- UK paediatric type 2 diabetes cohort
  - Characterized by anthropometry, biomarkers, and co-morbidities
  - Other diagnoses (type 1, monogenic) excluded
    - Autoantibody testing University of Bristol
    - Monogenic diabetes testing University of Exeter
  - Chart natural history, co-morbidities
  - Characterise insulin secretory reserve, resistance
  - Cohort for recruitment to clinical trials



# Results

- Notified of 256 children with paediatrician diagnosis
- Recruited to end Jan 2013: 175
- Exclusions: 7 secondary diabetes
- Exclusions: 17 pancreatic autoimmunity
- Results showing data for first 156 patients
- M:F ratio 1 : 2.39
- Ethnic origin: 42% white UK, 15% black, 33% S. Asian, 9.0% other, 1% unknown
- Median age at diagnosis 13.4 yrs (range 7.9-17.5)
- 66% osmotic symptoms at presentation, 23% asymptomatic, 4% DKA
- Median diabetes duration 3.25 yrs

# Treatment:

- Diet / lifestyle only 8%
- Metformin only 55%
- Metformin and insulin 32%
  
- UK practice to add insulin:
  - At diagnosis if osmotic symptoms, then wean off
  - if HbA1c persistently greater than 7.5% despite maximal tolerated dose metformin
- Other agents: small numbers only

# Conclusions

- T2DM still ~1% of childhood diabetes in UK
- White UK children older at diagnosis than non-white children, more obese
- Trend to ethnic differences in fasting C-peptide, BMI-SDS at diagnosis.
- African-Caribbean UK children have poorer metabolic control, signs of cardiovascular dysfunction compared to White UK and South Asian children.



# Acknowledgements

Medicines for Children Research Network nurses

Diabetes research network

Local Principle Investigators round UK

Diabetes UK

