

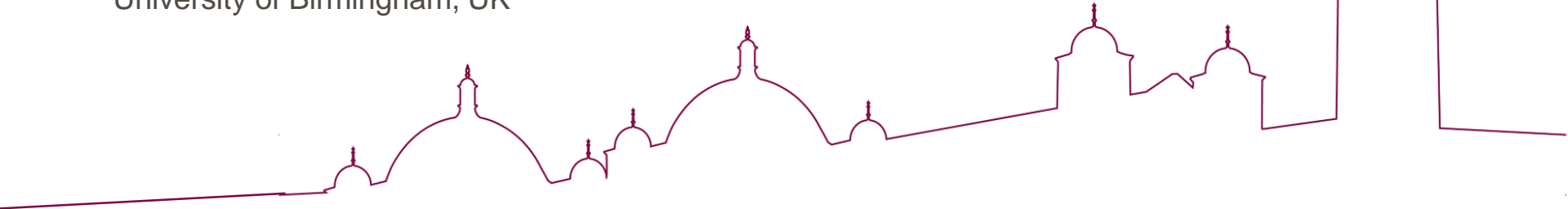
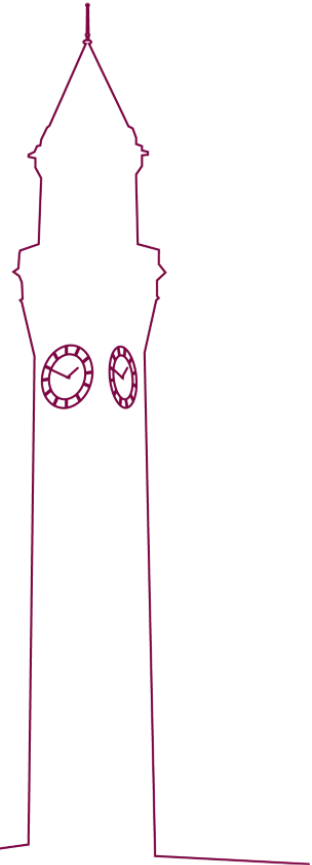


UNIVERSITY OF  
BIRMINGHAM

# Diabetes in the child: why do I need my eyes tested?

**Prof Tim Barrett**

School of Clinical and Experimental Medicine  
College of Medicine and Dentistry  
University of Birmingham, UK



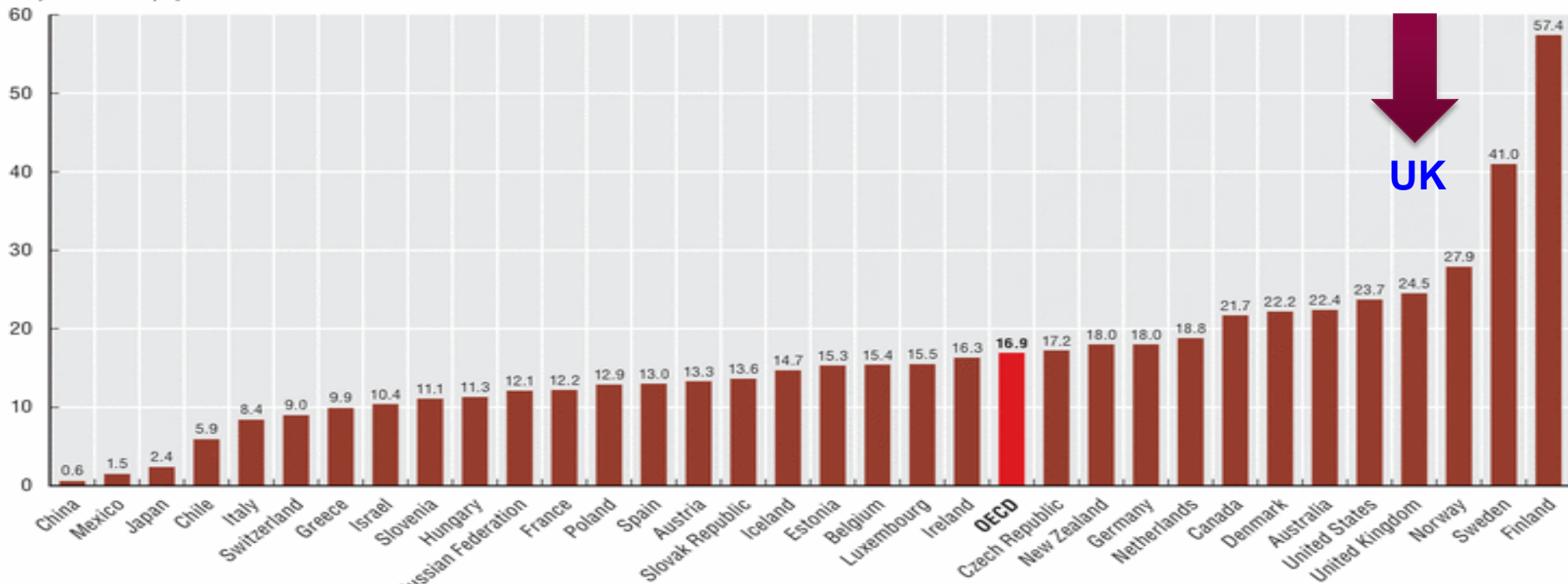
# Case: Ben

- Type 1 diabetes aged 20 months
- Premixed insulin
- Family struggles with compliance
- HbA1c persistently 9%
- Retinal screening aged 8yrs R1
- Greater family awareness
- HbA1c 7.8%
- Repeat retinal screening R0
- Now on pump



# Incidence estimates of type 1 diabetes, children aged 0-14 years, 2010

Cases per 100 000 population



UNIVERSITY OF  
BIRMINGHAM

MEDICAL AND  
DENTAL SCIENCES

(OECD iLibrary)

# The rising incidence of type 1 diabetes in England and Wales has plateaued by 2014

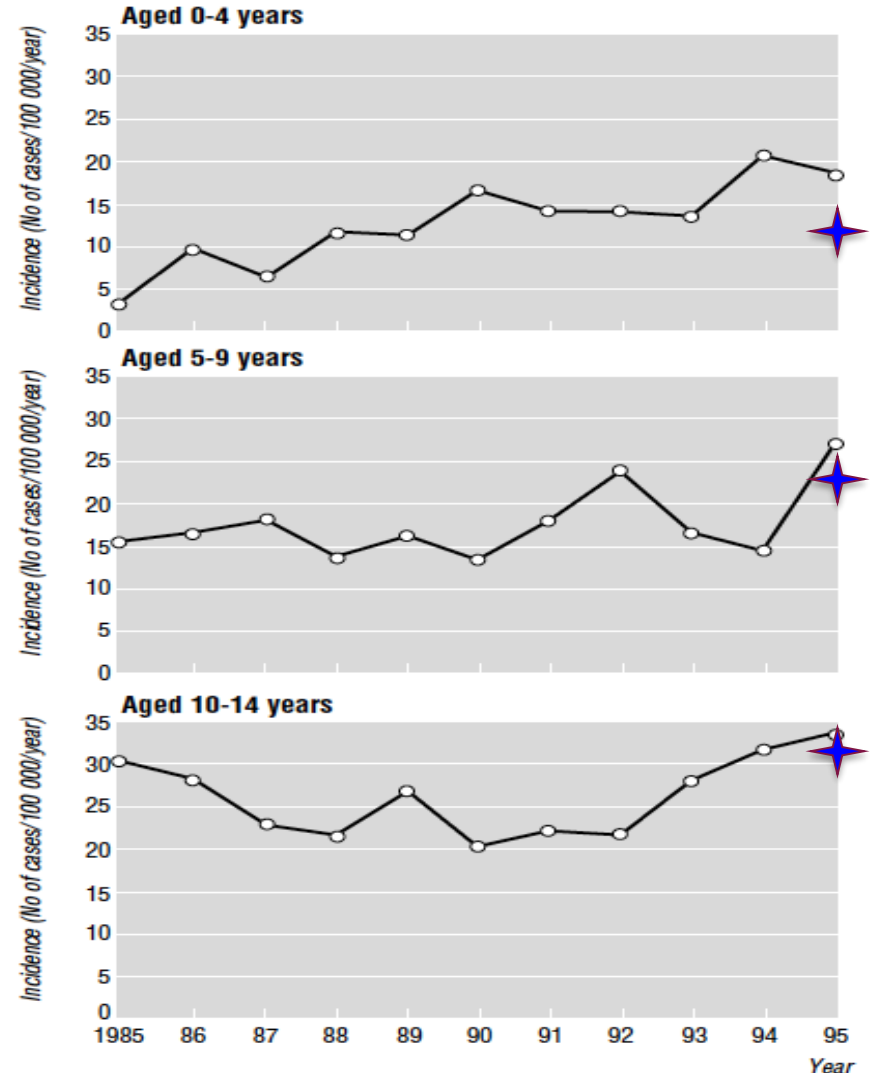
Age	Incidence/100,000/year
0-4yrs	12.1
5-9yrs	23.7
10-14yrs	31.1

(Gardner S et al BMJ 1997;315:713-7)  
 (National Paediatric Diabetes Audit 2013-14)



UNIVERSITY OF BIRMINGHAM

COLLEGE OF MEDICAL AND DENTAL SCIENCES



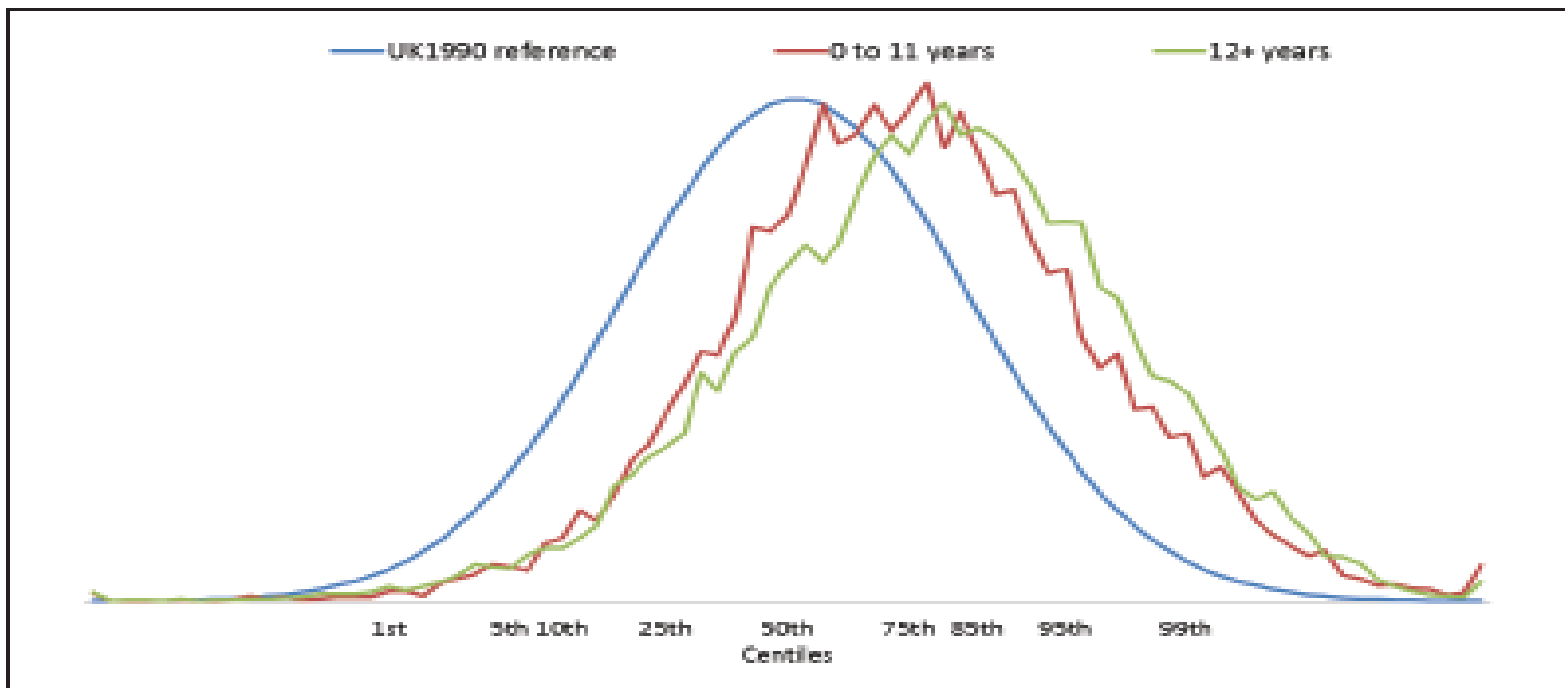
# Children and young people with diabetes

- 26,598 0 – 25 year olds
  - 95.3% T1DM (25,357) (185.7/100,000)
  - 1.9% T2DM (507) (3.75/100,000)
  - Monogenic diabetes (92)
  - Other specified (142)
  - Not specified (248)

	T1DM	T2DM
White	18,253 (72%)	185 (36.5%)
Mixed	637 (2.5%)	31 (6.1%)
Asian	1,233 (4.9%)	132 (26.0%)
Black	425 (1.7%)	28 (5.5%)
Other	359 (1.4%)	18 (3.6%)
Not stated	3,949 (15.6%)	97 (19.1%)
Unallocated ethnic group*	501 (2%)	16 (3.2%)

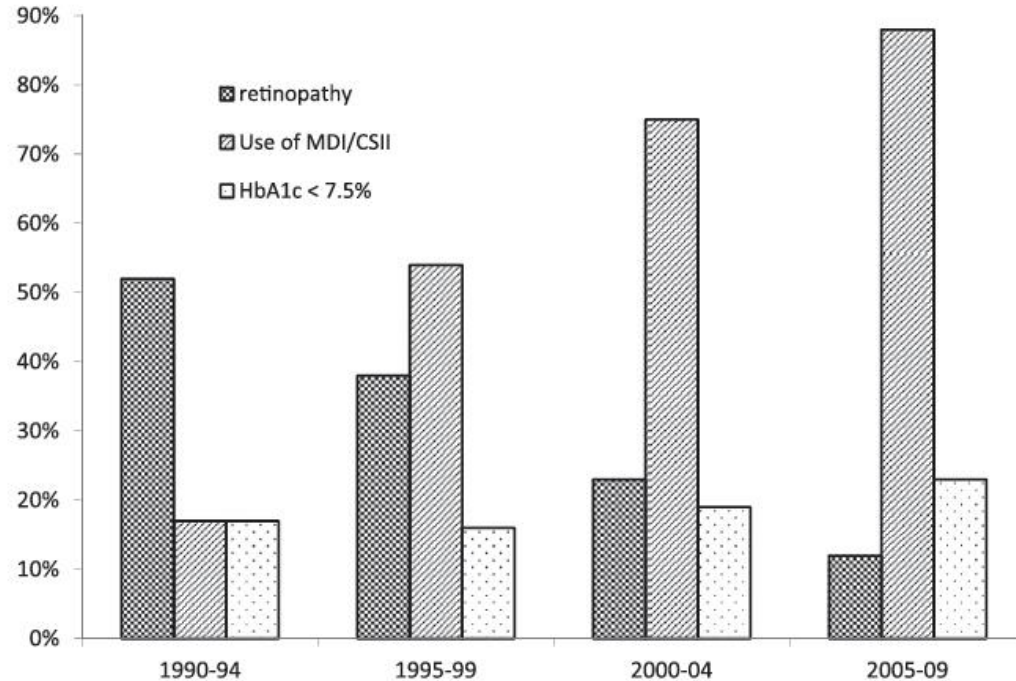


# Children are fatter: distribution of body mass index of children with Type 1 diabetes, 2013/14

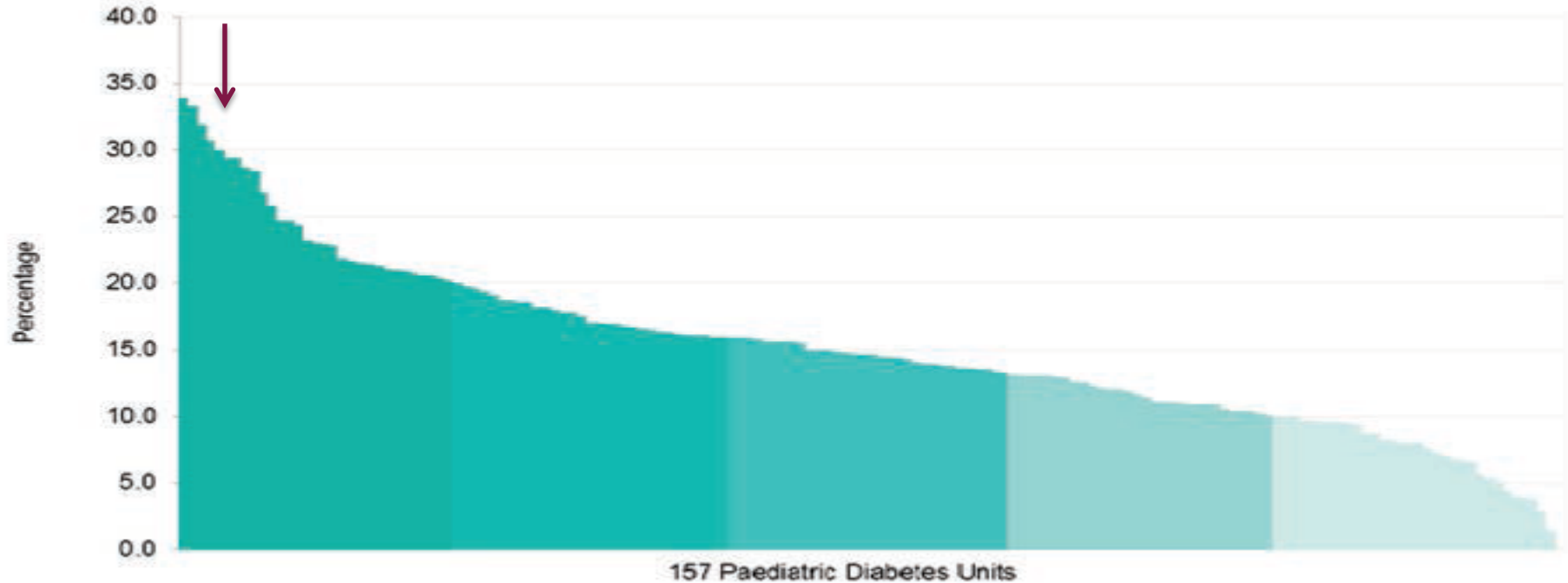


# Declining retinopathy with better treatment

1604 12-20yr olds  
T1DM



# Percentage of children achieving HbA1c less than 58mmol/mol/7.5% by unit



UNIVERSITY OF  
BIRMINGHAM

COLLEGE OF  
MEDICAL AND  
DENTAL SCIENCES

(CMO Annual Report 2012)



# Changes in insulin regimes 2001-2014

Regime	UK 2001	Germany 2001	UK 2013/14
CSII	0.3%	5%	16.1%
4 injections/day	7.7%	65%	54.8%
3 injections/day	4.3%	20%	3.7%
1-2 injections/day	87.7%	10%	7.1%



# Natural history of retinopathy in children and young people with type 1 diabetes

- To describe prevalence of retinopathy in children with T1DM
- To describe natural history of retinopathy



# Methods

- Retrospective study
- Diabetes clinic Birmingham Children's Hospital
- All children eligible for screening between 1<sup>st</sup> Jan – 31<sup>st</sup> Dec 2008
  - Children 12yrs and over; or diabetes duration 5 yrs or more
- Eligible patients identified from local “Twinkle” database (Hicom)
- Data collected on glycaemic control
- Follow-up data collected for 2009, 2010



# Results (1)

329

Children with T1DM

\*p<0.001

189

Eligible for screening

149

Attended screening

119 screen neg

30 screen pos

20%

14yrs (7-18yrs)

14.5yrs (9-18yrs)

Median age (range)

8.7% (7.1-13.1)\*

9.1% (7.1-14)

Median HbA1c (range)

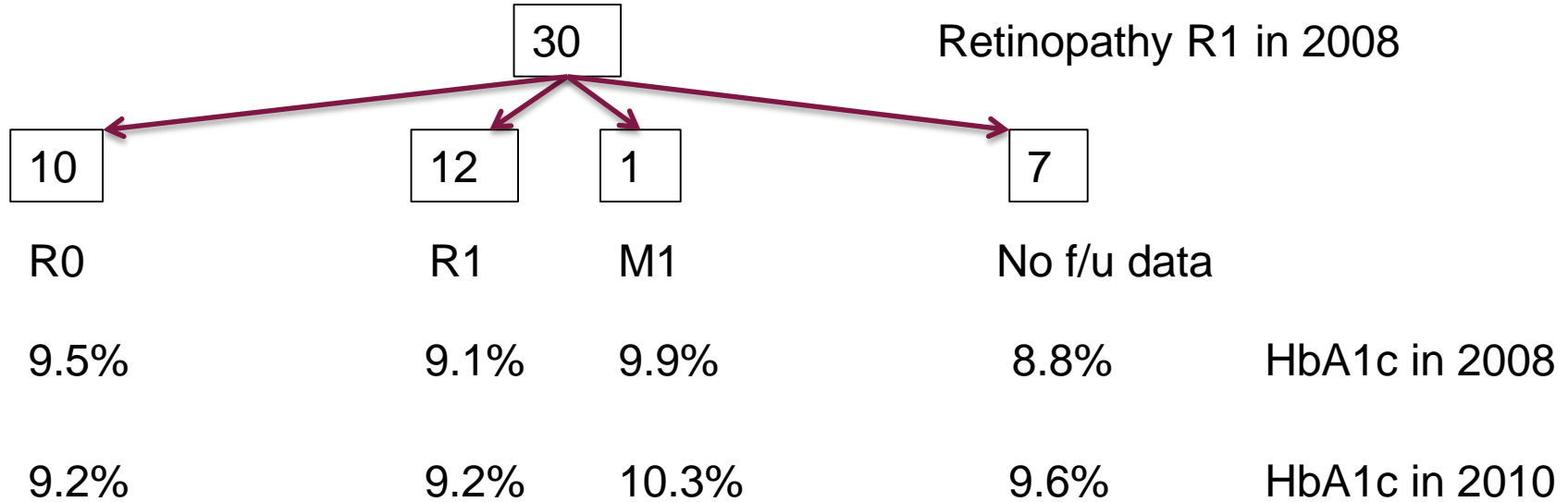
5.0yrs (0.2-12.5yrs)\*

7.7yrs (0.6-13.7yrs)

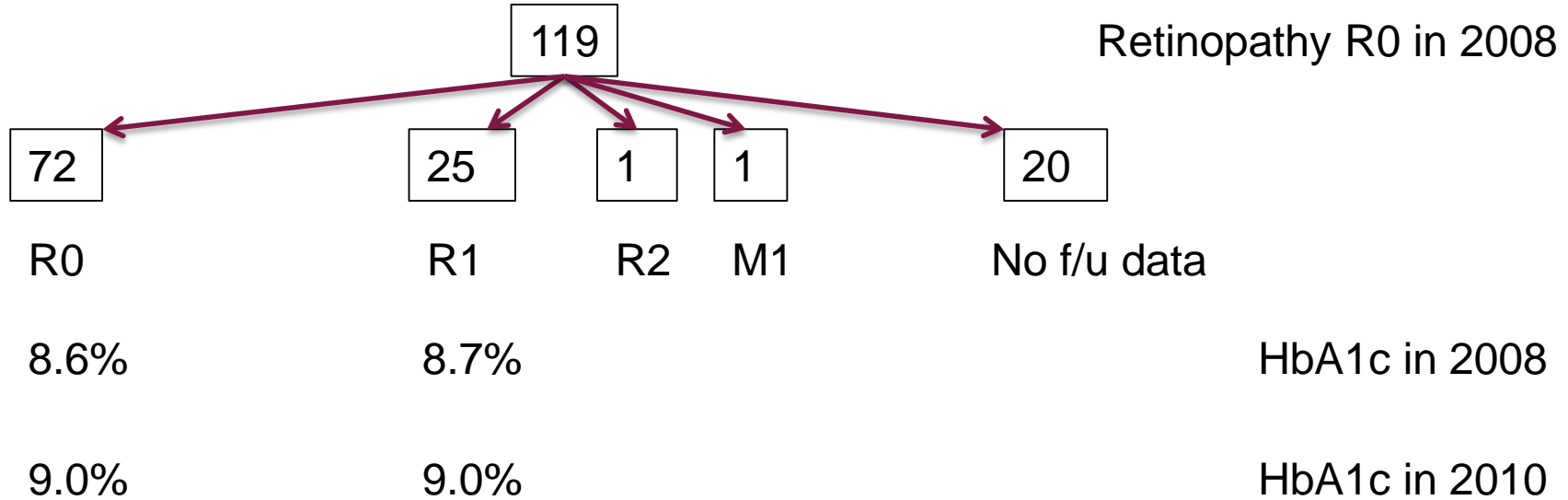
Median duration of diabetes  
yrs (range)



# Results (2): 2 year follow-up of R1



# Results (2): 2 year follow-up of R0



# Conclusions

- Prevalence of R1 retinopathy in 2008 was 20%
- National prevalence in children in 2013/14 was 14%
- Risk factors: higher HbA1c, duration of diabetes
- 2 year follow-up: 1/3 resolved, 1/3 remained stable



# Prevalence of retinopathy in younger children

- Is the current starting age of 12 yrs suitable for diabetic retinopathy screening?
- Should diabetes duration be taken into account to determine age to start screening?



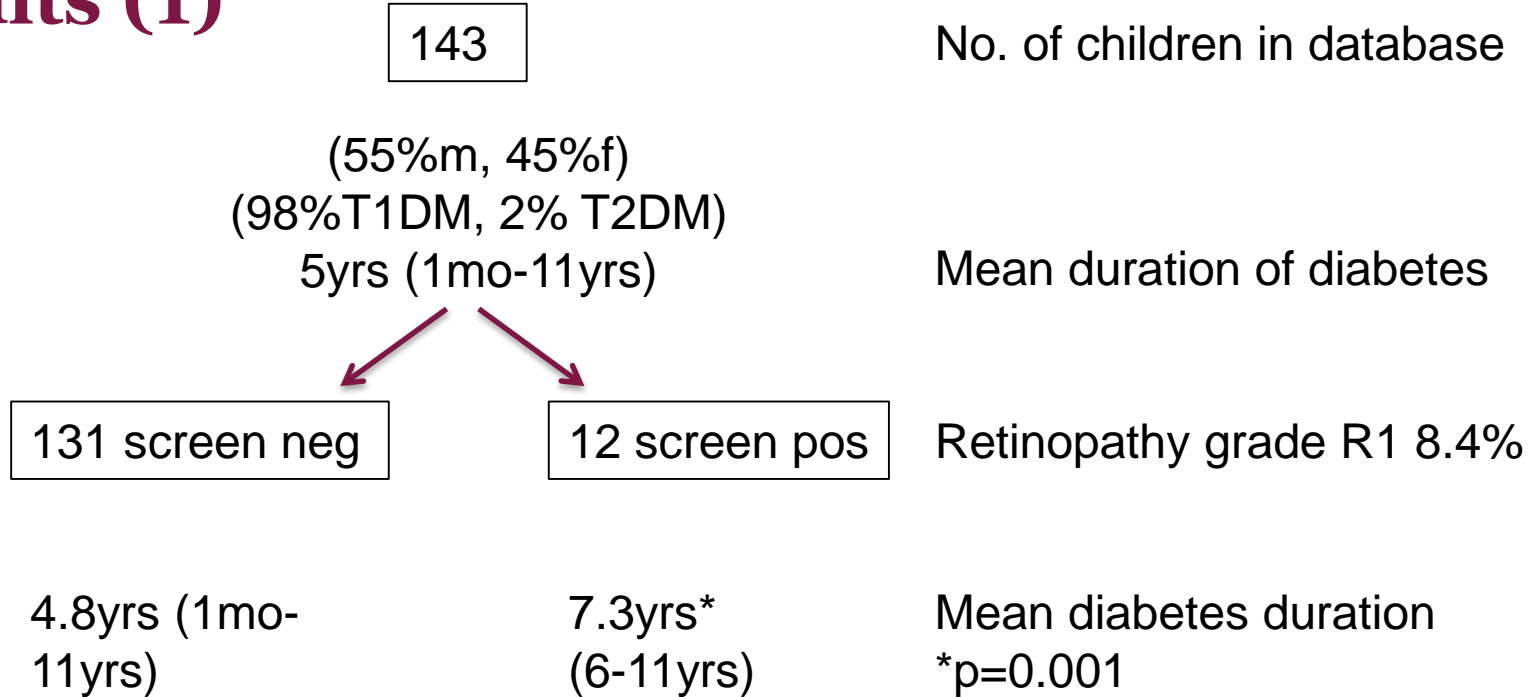


# Methods

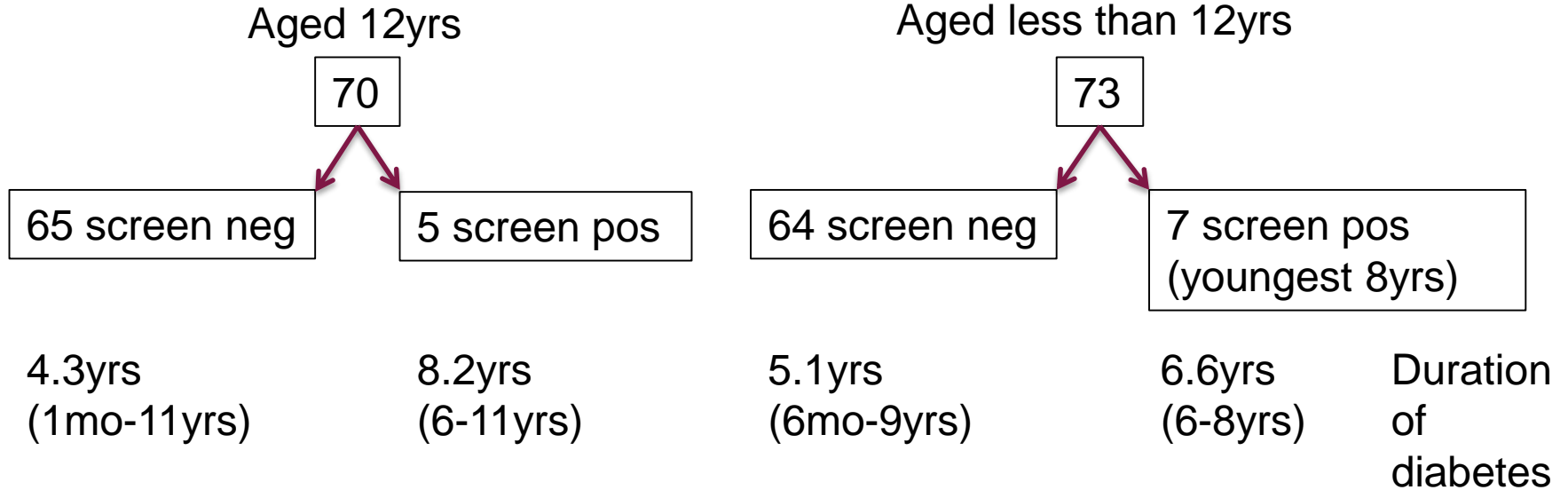
- Retrospective analysis
- Children 12yrs or less, Birmingham, Solihull and Black Country Eye Screening Programme
- 1<sup>st</sup> Jan 2003 – 31<sup>st</sup> Dec 2011
- Optometrists and screeners in community/hospital centres
- Digital fundus camera, 2 x 45° images, dilated pupils
  - macula centred, optic disc centred
- Grading by English national grading definitions
- Accessed electronic hospital records



# Results (1)



# Results (2)

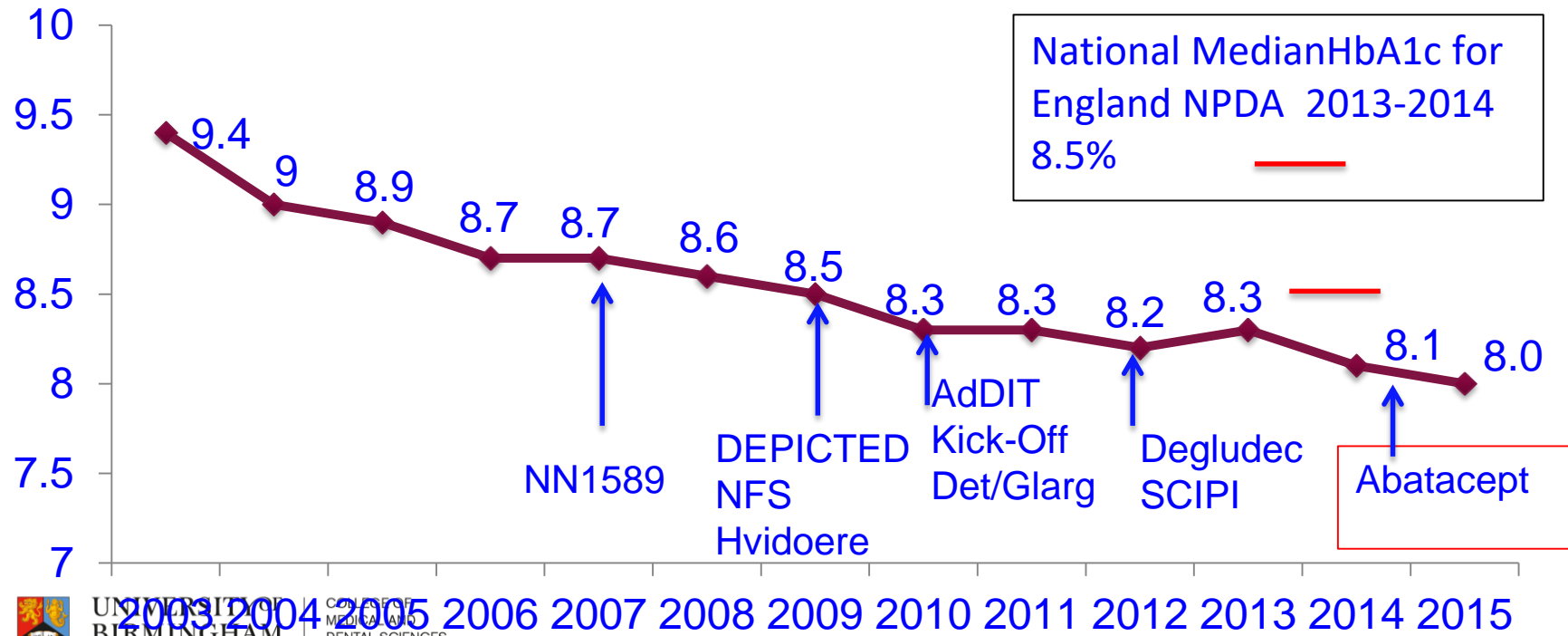


# Conclusions

- Retinopathy present in 8.4% diabetic children under 12 years
- Background retinopathy R1 only
- Related to duration of diabetes
- All affected children identified if screened from 6 years duration of diabetes



# Progress in glycaemic control 2003-2015



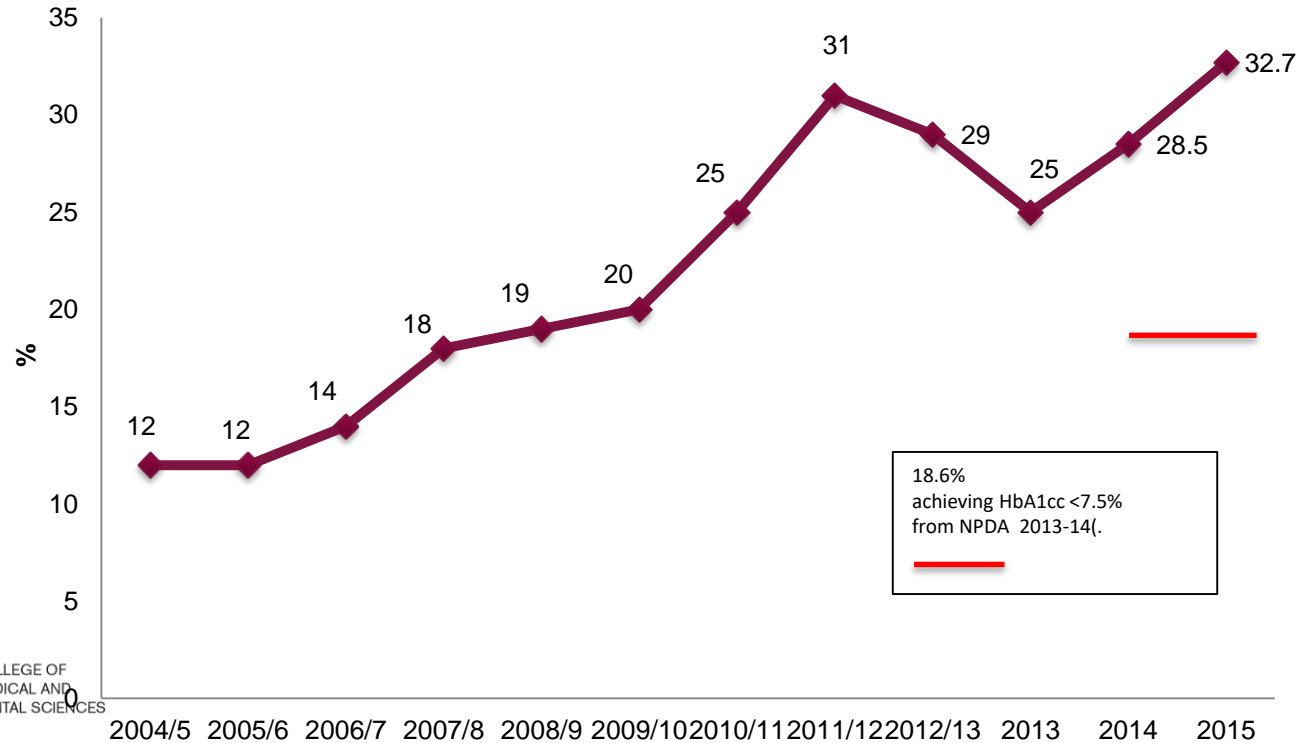
# Change in funding: Best Practice Tariff

- Introduced in 2011/12
- Paid to paediatric diabetes units on completion of:
  - Structured education programme
  - Minimum 4 clinic appts per year plus telephone contacts
  - 24 hour telephone helpline
  - Participation in National Paediatric Diabetes Audit
  - Must have a high HbA1c policy
  - Achieving screening targets



# Local diabetes audit

## Percentage achieving HbA1c <58mmol/mol



# Conclusions

- Prevalence of retinopathy decreasing with more intensive treatment
- Retinopathy present in 8.4% diabetic children under 12 years
- Risk factors: higher HbA1c, duration of diabetes
- 2 year follow-up: 1/3 resolved, 1/3 remained stable
- All affected children identified if screened from 6 years duration of diabetes





# Thankyou!



UNIVERSITY OF  
BIRMINGHAM

COLLEGE OF  
MEDICAL AND  
DENTAL SCIENCES



UNIVERSITY OF  
BIRMINGHAM