

Factors influencing Type 1 diabetes control in children – a detailed local analysis of an NPDA dataset

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BACKGROUND

National Paediatric Diabetes Audit (NPDA) provides comparative data for local paediatric diabetes units (PDUs) on key care processes and overall HbA1c. More detailed analysis on other variables affecting HbA1c is undertaken at a national level, but not at an individual PDU level.

OBJECTIVE

To determine the factors influencing glycaemic control (HbA1c levels) in young children and adolescents with Type 1 Diabetes Mellitus (T1DM)

METHODS

Retrospective analysis of the local data collected for the NPDA 2014-15 in a medium sized PDU. Data was analysed using the SPSS statistical package.

RESULTS

Baseline characteristics

- 181 patients (97 boys and 84 girls)
- Age : 12.2 ± 4.1 years (mean \pm SD), (range 3.1-20.0)
- T1DM accounts for 96% (n=174) of cases.
- Non-T1DM patients: T2DM(1), Cystic Fibrosis Related Diabetes(3), monogenic form of diabetes(1) and other specified diabetes(2)
- Ethnicity: White(52%), Black(15%), Asian(8%), Other(17%), Mixed(2%), and Not stated(6%)
- Average HbA1c: 8.6% [70.7 ± 19.4 mmol/mol].
- HbA1c level below 7.5% (58 mmol/mol)- 26.5%(Fig1)

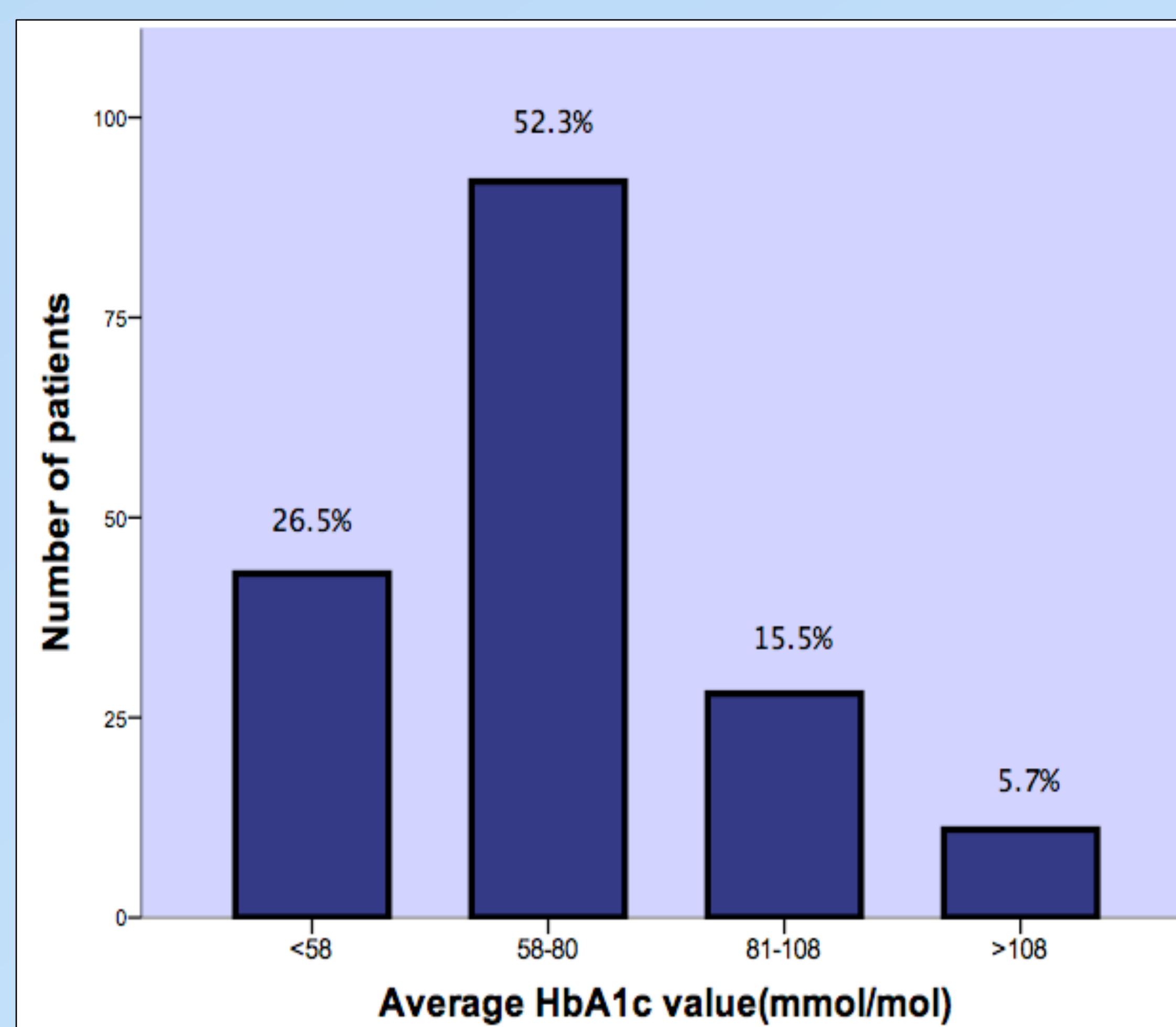


Figure 1: Average HbA1c values

Age and HbA1C

- There was a linear relationship between age and HbA1c ($r=0.106$). (Fig 2)
- Adolescents in particular had poorer glycaemic control; the mean HbA1c is 17.6 mmol/mol higher for those aged 15 to 19 years compared to those aged 0 to 4 years ($p<0.0001$).

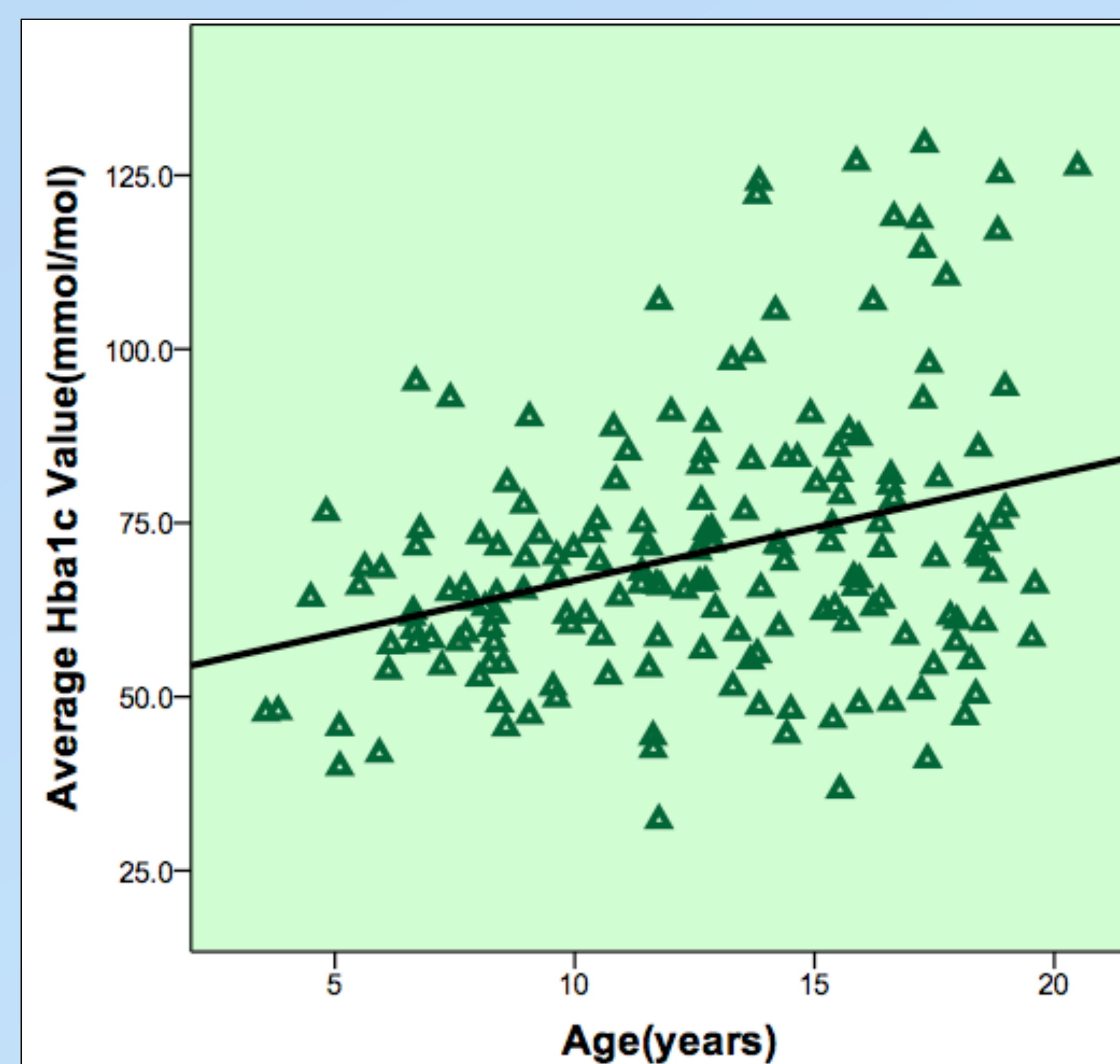


Figure 2: Relationship between age and average HbA1c

Ethnicity and HbA1C

- The average HbA1c for the Black population is (82.1 ± 21.5), significantly higher than and that for White population (69.7 ± 19.5) ($p=0.048$).
- This difference between the ethnic groups is more marked than the national data. (Fig3)

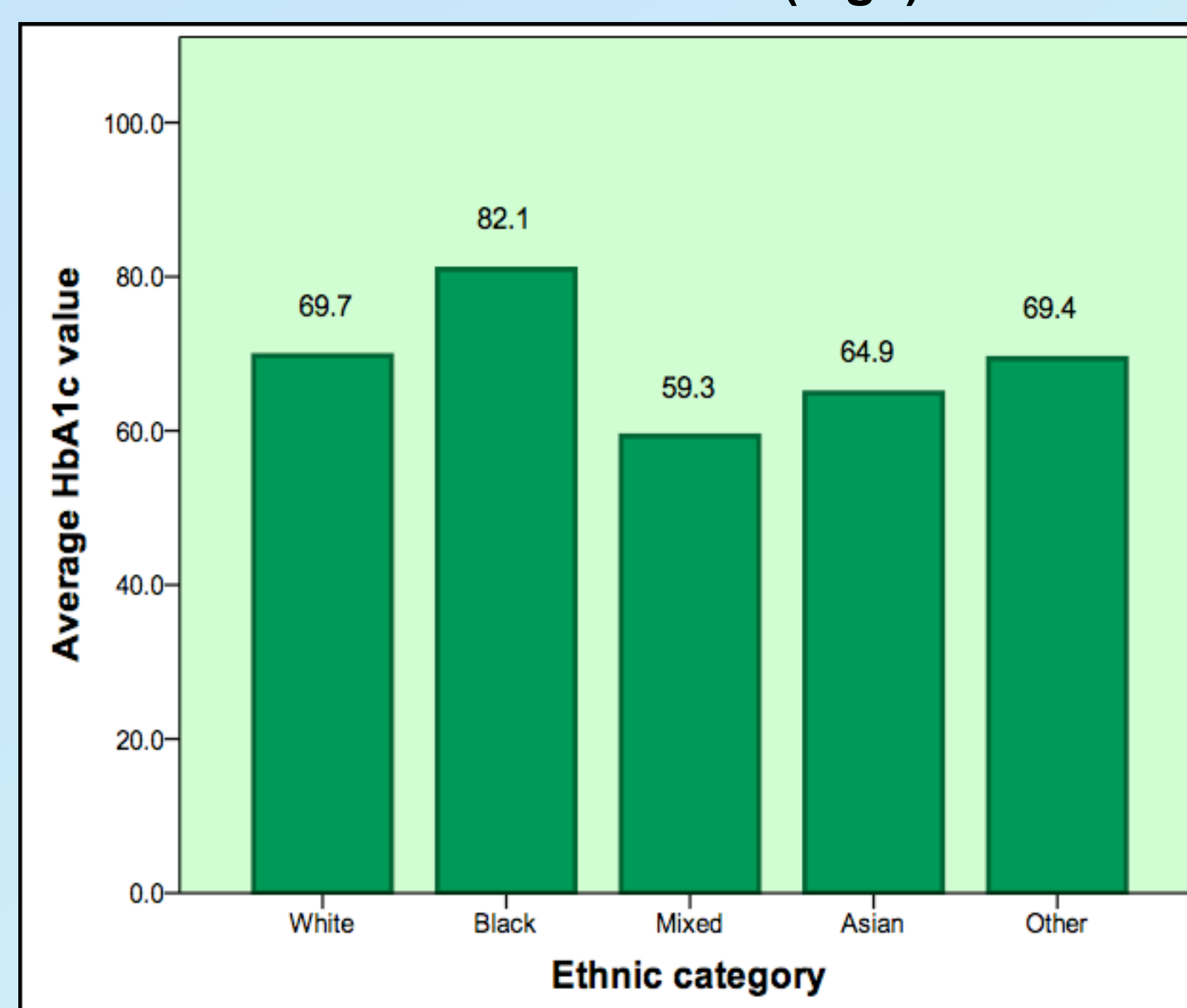


Figure 3: Ethnic categories and average HbA1c

Duration of diabetes and HbA1C

- The mean HbA1c was significantly higher for those who had T1DM for >5 years (74.5 ± 19.6) compared to those with a duration <5 years (67.0 ± 18.5) ($p = 0.01$). (Fig4)

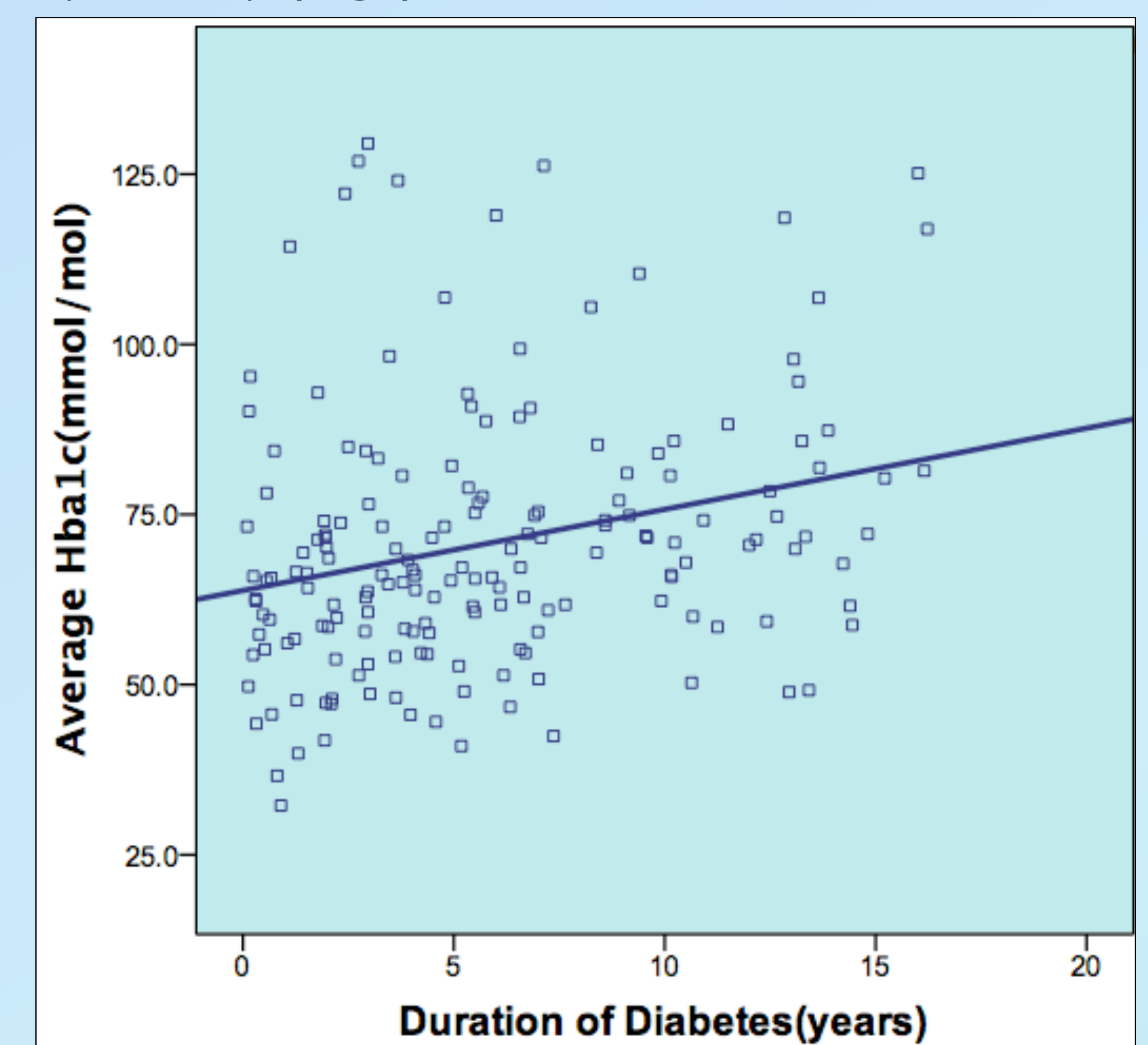


Figure 4: Relationship between duration of diabetes and average HbA1c

Insulin therapy and HbA1C

- Those on pump therapy (64.1 ± 12.9) had lower HbA1c levels than those on MDI (72.8 ± 20.5) ($p=0.003$). (Fig5)

Treatment type	Mean HbA1c \pm SD (mmol/mol)	n(%)
Insulin pump therapy	64.1 ± 12.9	37(21.3%)
Multiple daily injections	72.8 ± 20.5	137(78.7%)

Figure 5: Multiple injections vs pump therapy

Miscellaneous

- Age at first diagnosis and number of clinic visits per year did not seem to affect HbA1c.
- 'overweight' or 'obese' children tend to have a higher HbA1c than those who have normal BMI ($p=0.3$).

CONCLUSIONS

Older children especially adolescents, black ethnic origin and a longer duration of diabetes adversely affect T1DM control and HbA1c. Those on insulin pump therapy had an improved control. Targeted measures to improve management in these at-risk groups, at a local level, are imperative. Careful analysis of NPDA data at a PDU level is a useful exercise to determine local priorities.

[1] National Institute for Health and Care Excellence. Diabetes (type 1 and type 2) in children and young people: diagnosis and management <https://www.nice.org.uk/guidance/ng18/resources/diabetes-type-1-and-type-2-in-children-and-young-people-diagnosis-and-management-1837278149317> (accessed 15 June 2015)

[2] National Paediatric Diabetes Audit Project Board, Royal College of Paediatrics and Child Health. National Paediatric Diabetes Audit 2013-2014: Notes on Data Analysis for Audit Year 2013-14