

## Adjustment factors for calculating mean adjusted HbA1c by paediatric diabetes unit, 2019/20

### Process for calculating the case-mix adjusted mean HbA1c

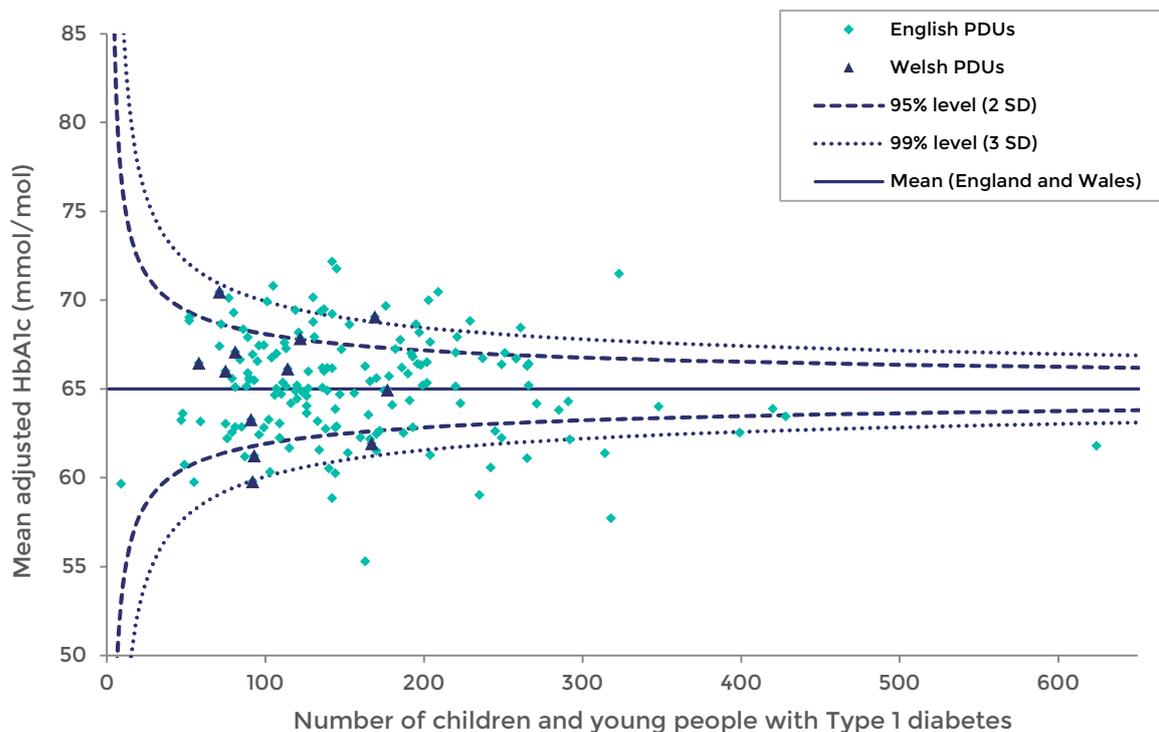
A multiple linear regression model was constructed to estimate the predicted mean HbA1c of children and young people who had at least one valid HbA1c measurement within the audit period after accounting for the following characteristics: age, sex, ethnicity, duration of diabetes, and level of deprivation.

The output of the regression was used to calculate the predicted median HbA1c for each individual child/young person. The predicted median HbA1c is the value we would expect to observe for a given set of characteristics. This was then used to calculate the individual level and unit level adjusted HbA1c:

- Individual level adjusted mean HbA1c = (median HbA1c/predicted HbA1c) \* overall mean HbA1c
- Unit level adjusted mean HbA1c = (sum of median HbA1c/sum of predicted HbA1c) \* overall mean HbA1c

### Type 1 Diabetes

The chart below plots the unit-level mean adjusted HbA1c for children and young people with Type 1 diabetes in England and Wales for 2019/20.



**Estimated effect of age, sex, ethnicity, duration of diabetes and deprivation on mean HbA1c for children and young people with Type 1 Diabetes, 2019/20**

		Estimated coefficient	95% Confidence Interval	P-value
<b>Age</b>	Per year of age	0.90	0.84 - 0.96	<0.000
<b>Sex</b>	Female	-	-	-
	Male	-0.59	-0.97 - -0.20	<0.010
<b>Duration</b>	Per year of diabetes duration	0.55	0.49 - 0.62	<0.000
<b>Deprivation</b>	Most deprived	-	-	-
	2nd most deprived	-2.19	-2.81 - -1.56	<0.000
	3rd least deprived	-3.20	-3.84 - -2.57	<0.000
	2nd least deprived	-5.63	-6.24 - -5.02	<0.000
	least deprived	-6.58	-7.19 - -5.97	<0.000
<b>Ethnic group</b>	White	-	-	-
	Asian	0.44	-0.35 - 1.23	0.278
	Black	5.35	4.14 - 6.56	<0.000
	Mixed	2.75	1.55 - 3.94	<0.000
	Other	-1.84	-3.25 - -0.44	<0.010
	Not stated/unknown	0.20	-0.76 - 1.16	0.684
	Constant	55.09	54.40 - 55.78	<0.000
Adjusted R-squared: 10.9%				
N = 26,045 includes all children and young people with Type 1 diabetes reported to the 2019/20 NPDA with a valid record for HbA1c, sex, age, duration, ethnicity and deprivation.				

Coefficients were estimated through the method of Ordinary Least Square (OLS) using cross-sectional data for the year 2019/20. Robust Standard Errors were obtained using Huber-White sandwich estimators, which accounts for the presence of minor problems about normality and heteroscedasticity. “Asian” and “Not stated/unknown” ethnic categories do not have a statistically significant impact different from the White ethnicity baseline.

Overall, the model explains 10.9% of the variation in mean HbA1c.