

Review of glycaemic control in children with Type 1 Diabetes following change to Hybrid closed loop

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Methodology

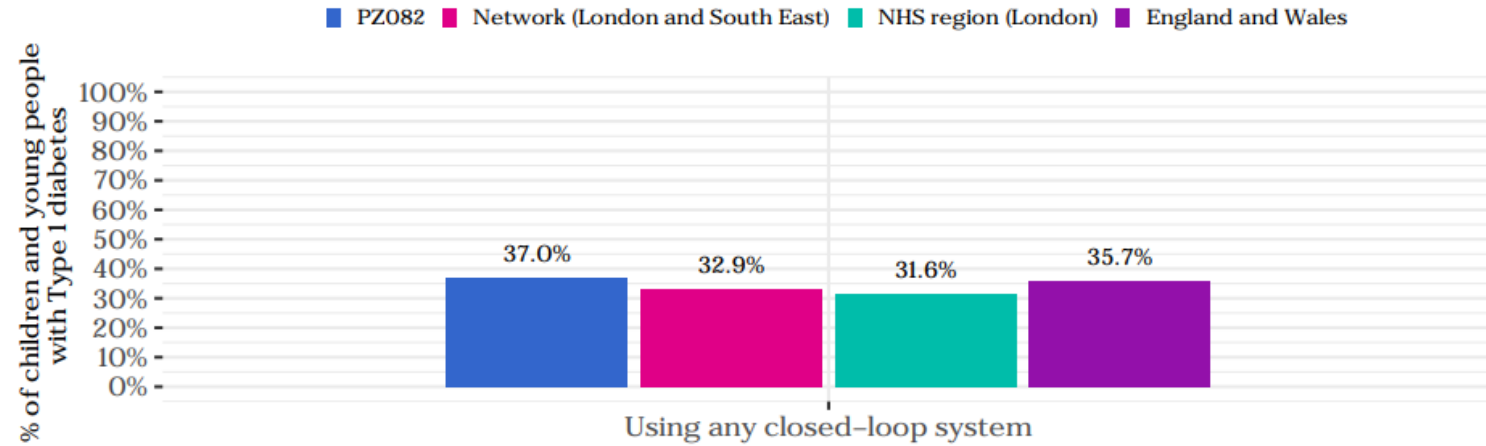
- Reviewed the Hybrid Closed Loop (HCL) data over the last 4 years starting from January 2021 to December 2024
- Collected the HbA1c and target range before starting HCL and 3 time points after starting on HCL- 3months, 6months and 1 year.
- Also looked at the ethnicity distribution and deprivation index of the HCL population

Our current data

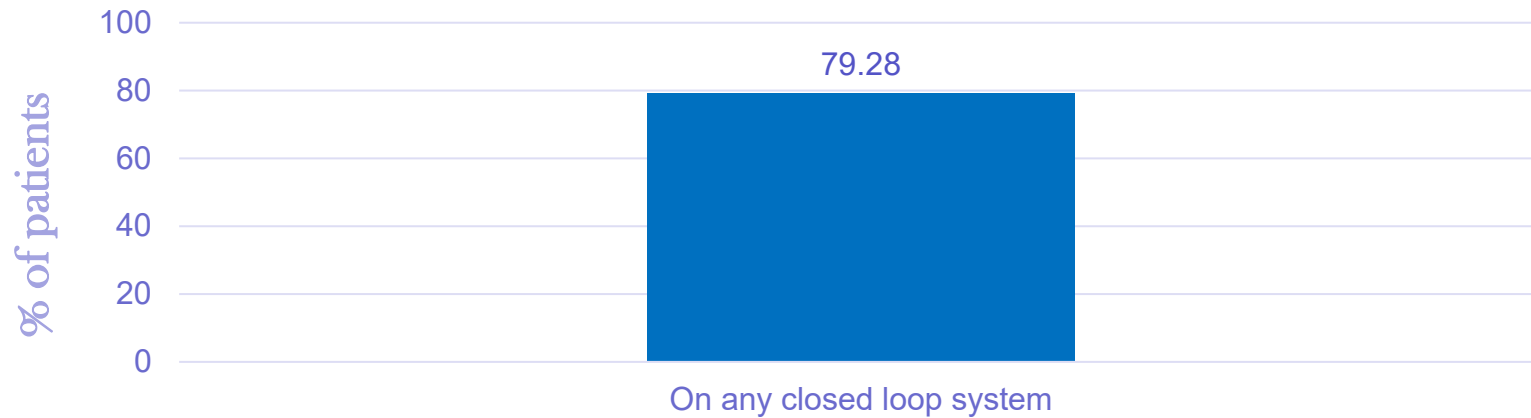
	N total= 123
Diabetes patients under Evelina diabetes team	Type 1 Diabetes: 101
	Type 2 Diabetes : 8
	Monogenic Diabetes: 10
	Post transplant Diabetes: 4
On insulin pump	HCL: 88 (79.2%)
	Conventional: 2 (1.8%)

Percentage of patients on closed loop system- Comparison of the present data with NPDA 2023-2024 data

NPDA 2023- 2024

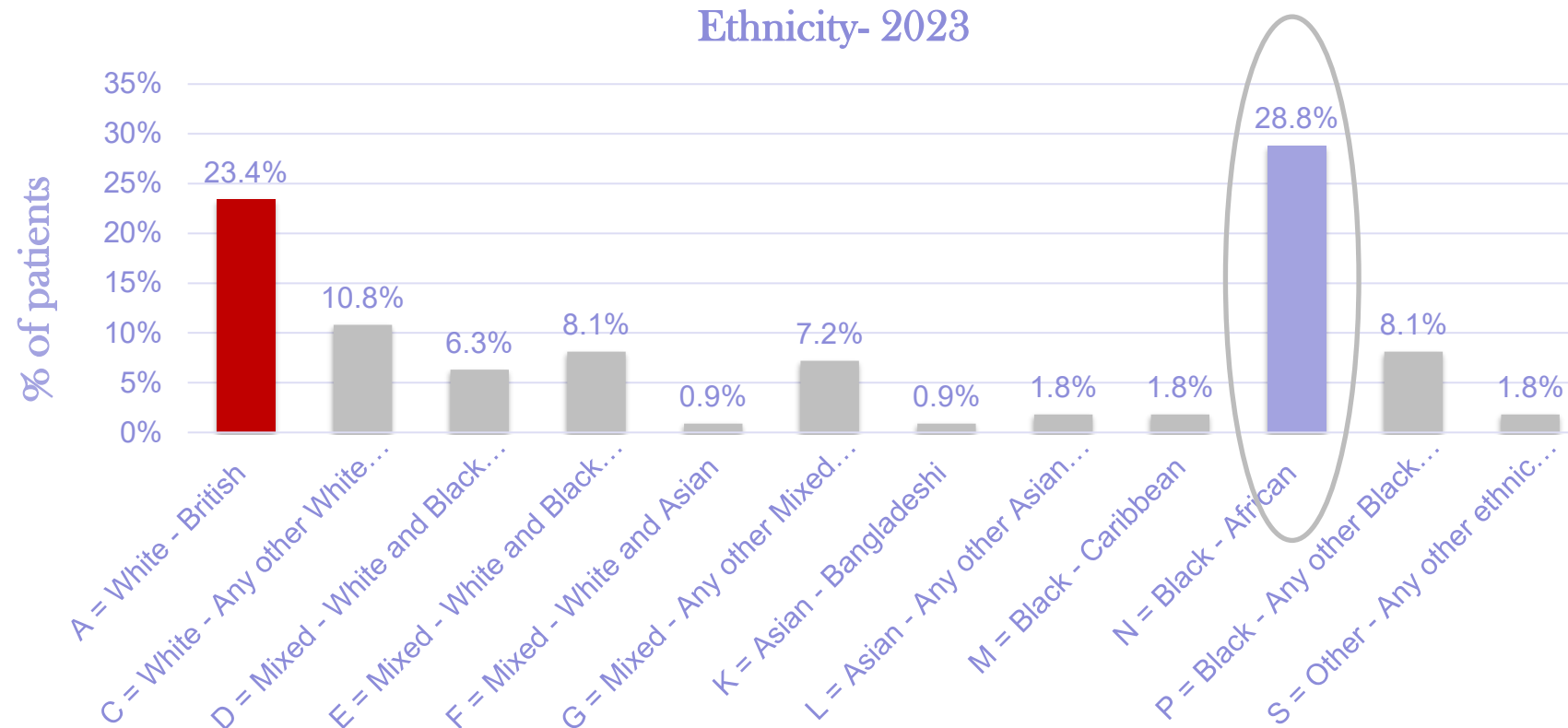


Present data

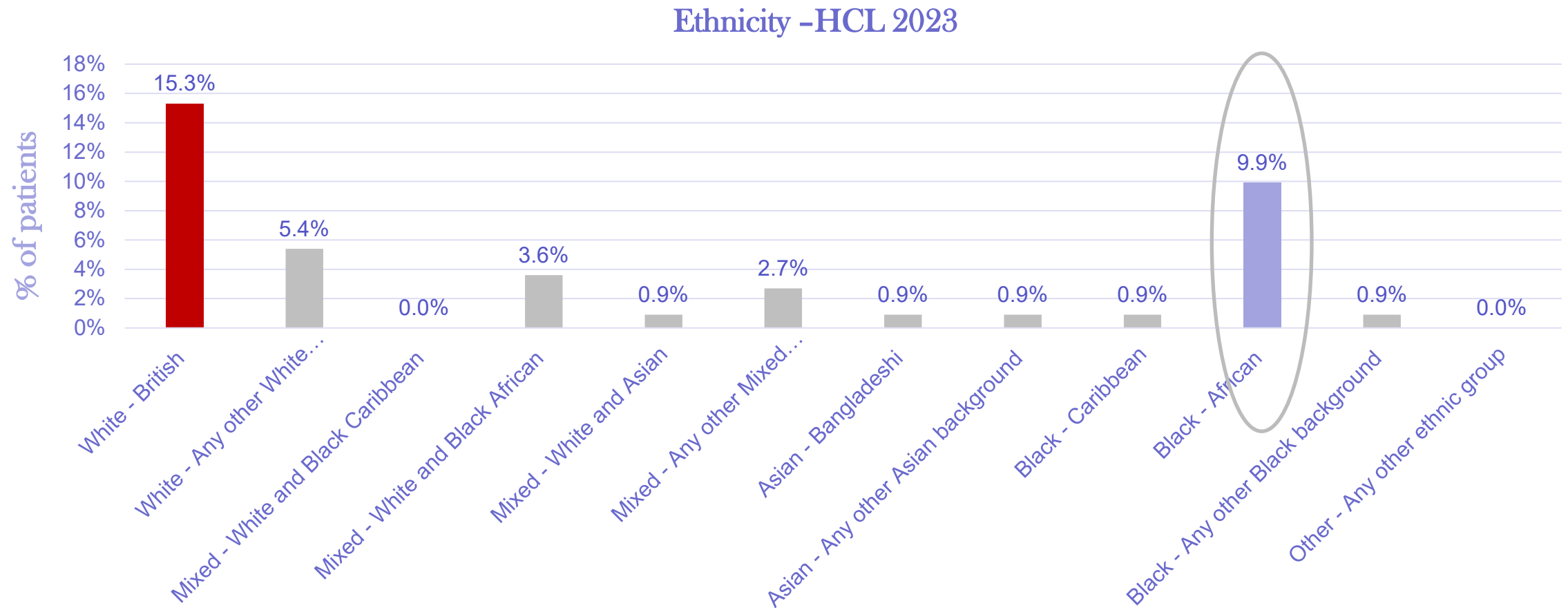


Baseline Characteristics	N (%)
Male	46 (52.27)
Female	42(47.73)
Median Age in years (range)	12.295 (2.08- 19.38)
Mean Age	12.09 +/-4.09
Previous basal bolus insulin therapy	53 (60.22)
Previous standard insulin pump	35 (39.77)
Mean time since first diagnosis in years (Median; Range)	6.25 +/-3.78 (6.03; 0.51-16.75)
Mean duration of HCL start in years (Median; Range)	1.59+/- 0.88 (1.45; 0.29-4.54)

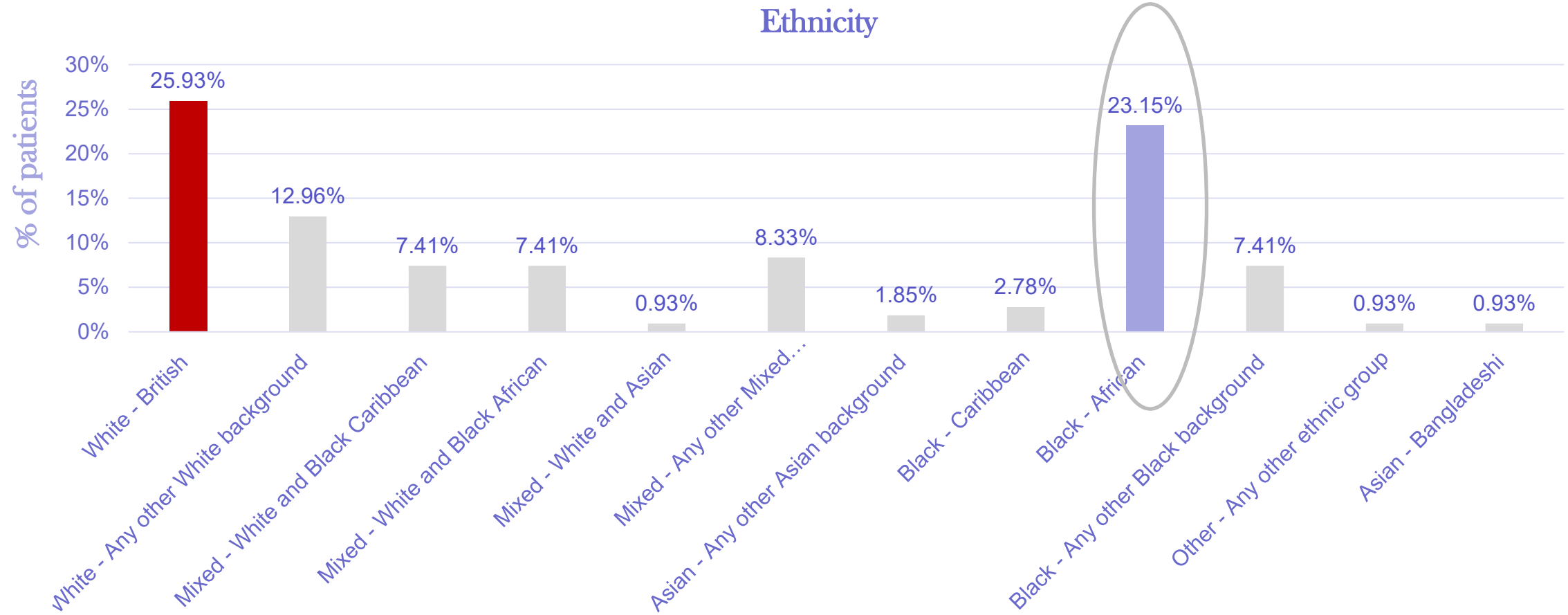
Ethnicity distribution of our Diabetes patients- 2023 data



Ethnicity distribution of patients on HCL- 2023 data



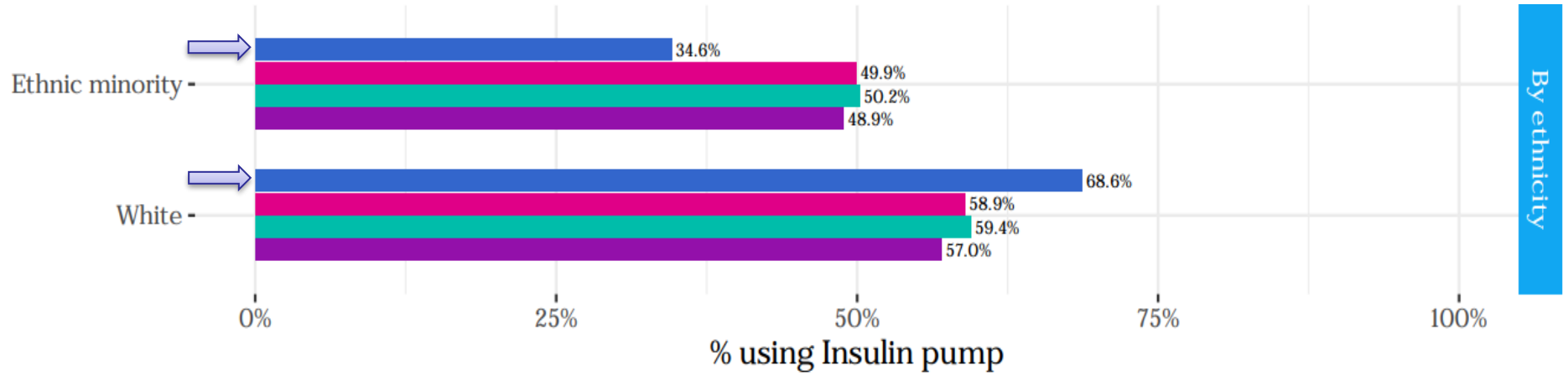
Ethnicity distribution of our Diabetes patients- present data



Ethnicity distribution of patients on HCL- present data



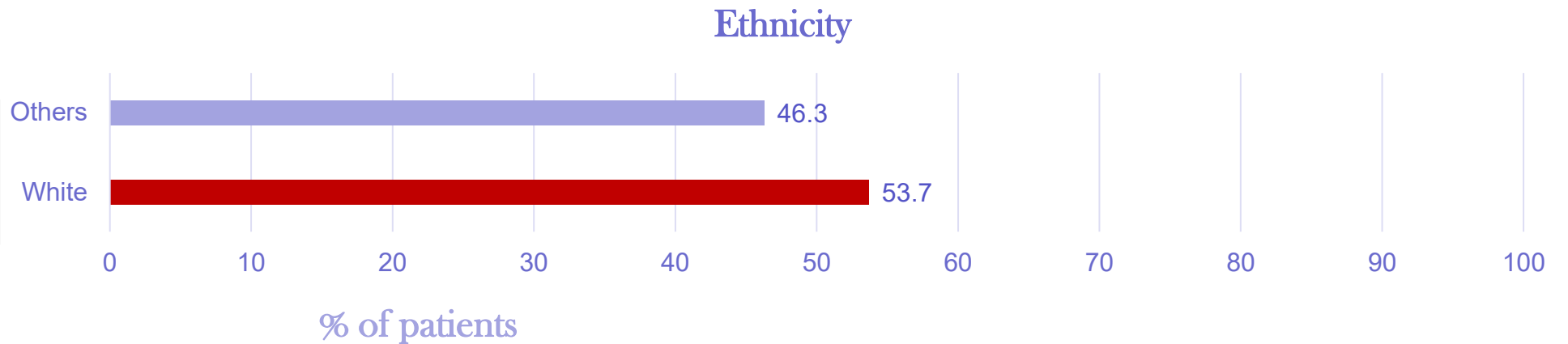
NPDA 2023- 2024



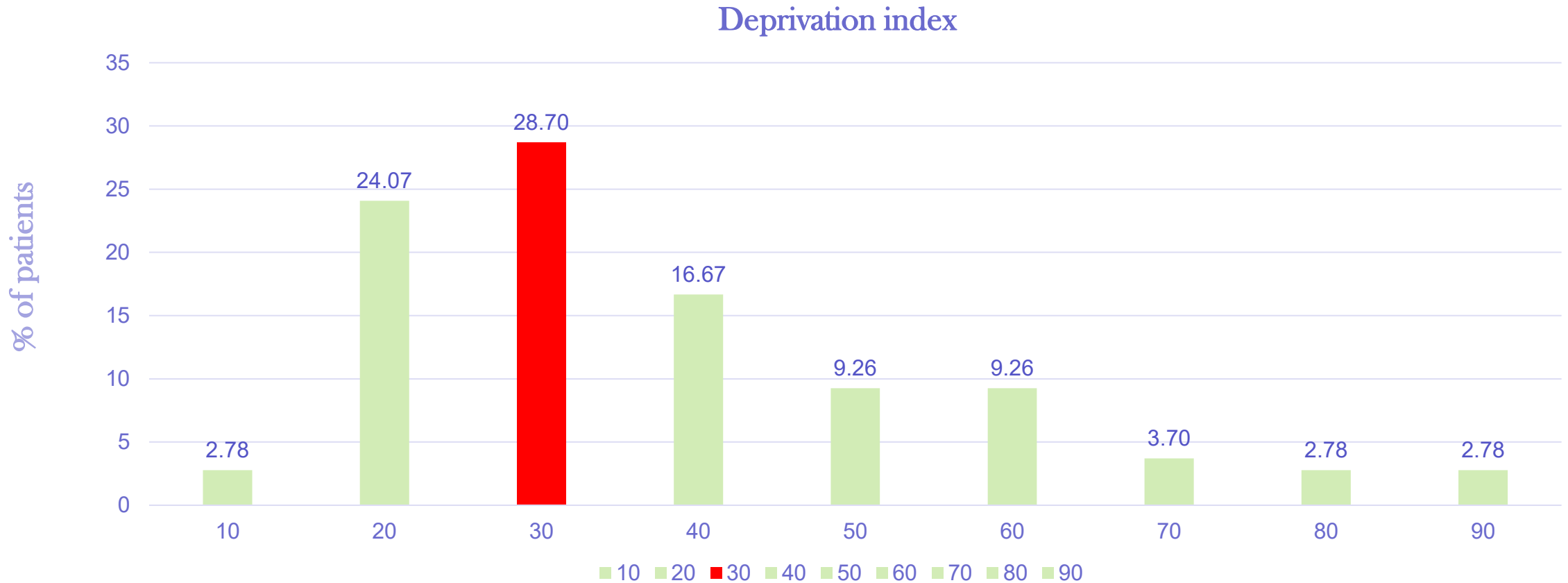
Percentage of children and young people with Type 1 diabetes using an insulin pump by demographics

■ PZ082 ■ Network (London and South East) ■ NHS region (London) ■ England and Wales

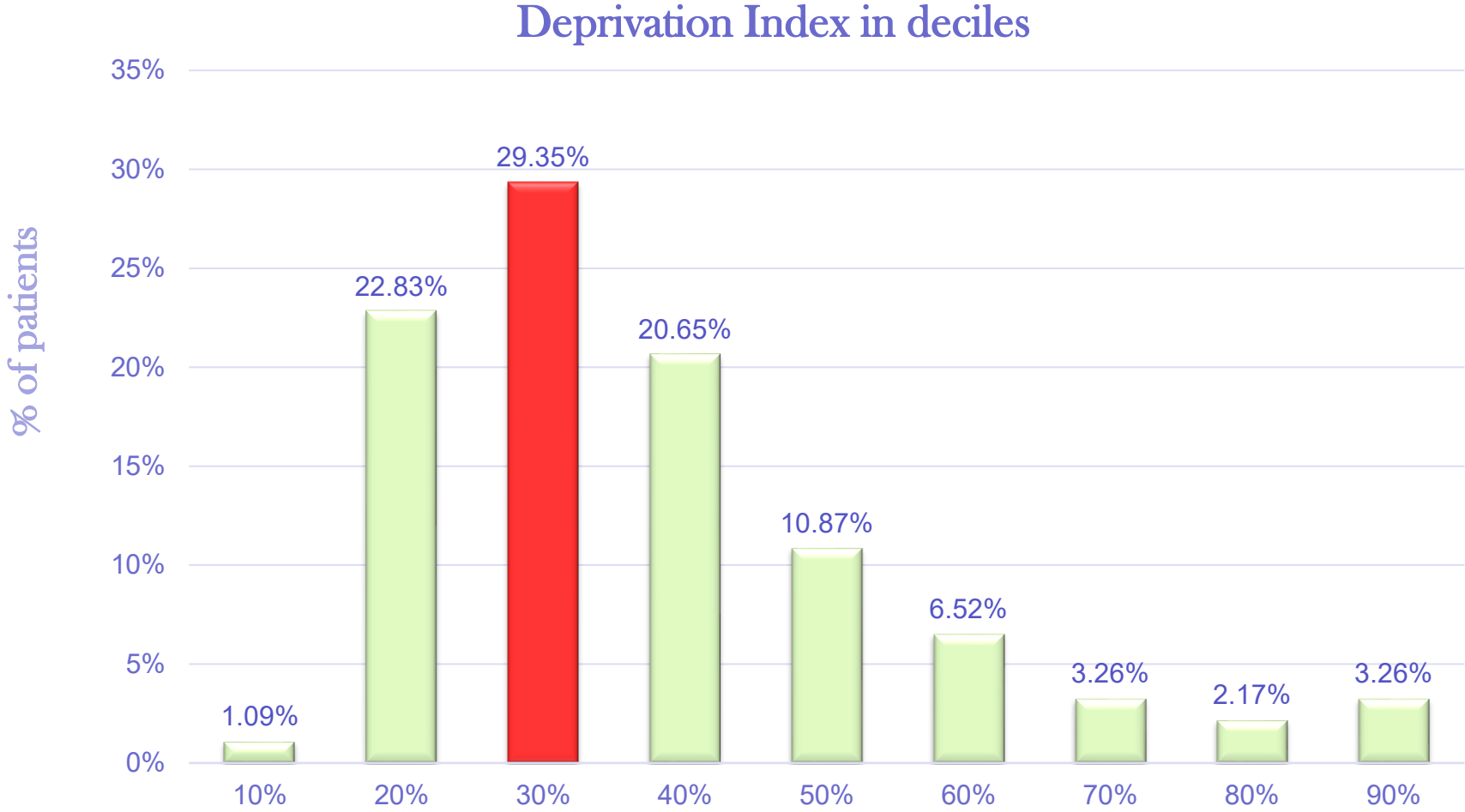
Our present data



Deprivation Index of our Diabetes patients- present data



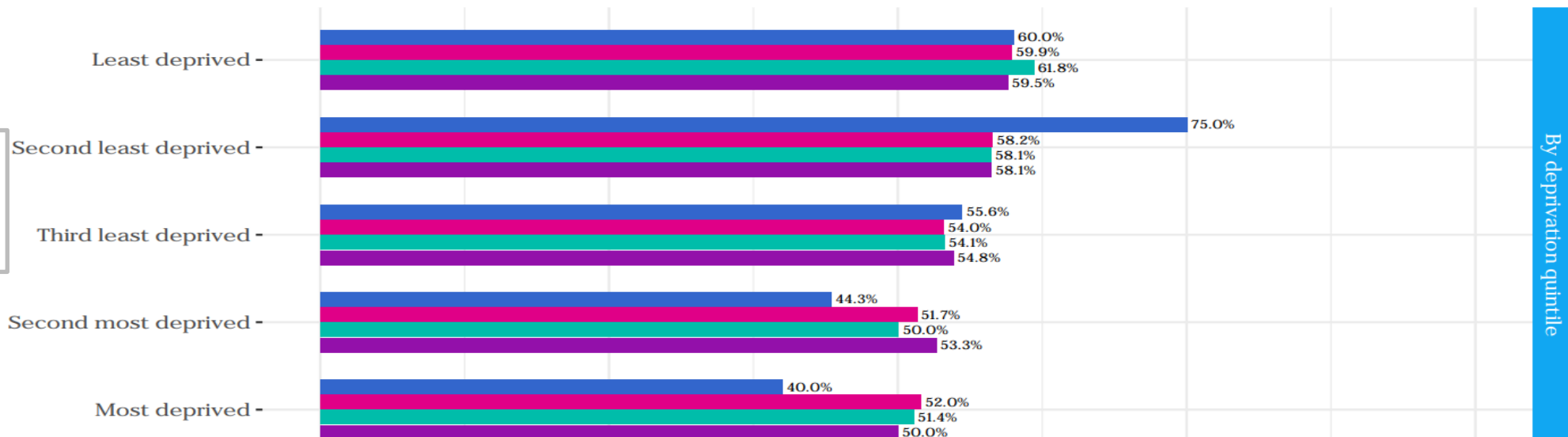
Deprivation Index of patients on HCL- present data



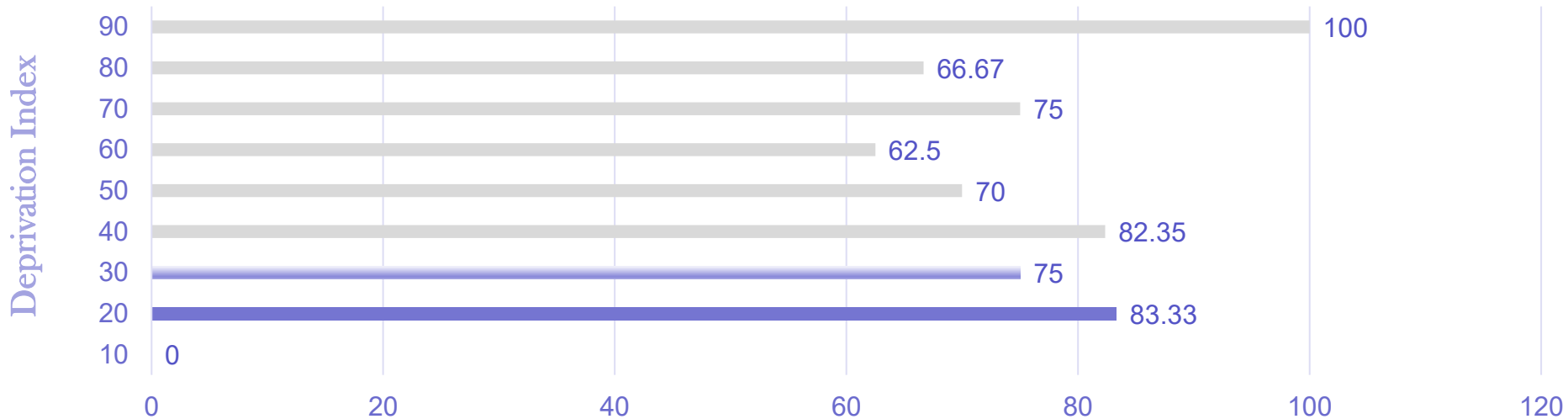
NPDA 2023- 2024

Present data

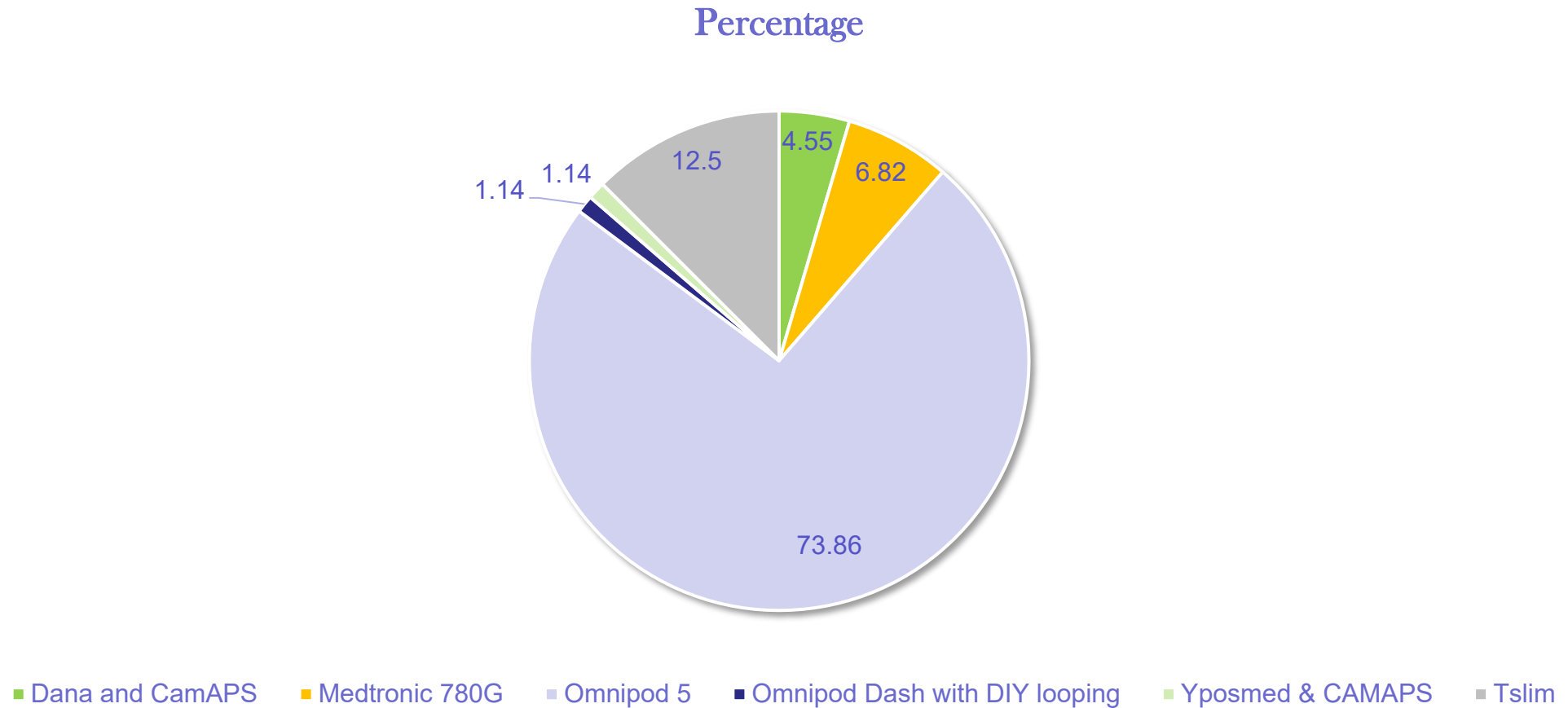
■ PZ082 ■ Network (London and South East) ■ NHS region (London) ■ England and Wales



By deprivation quintile

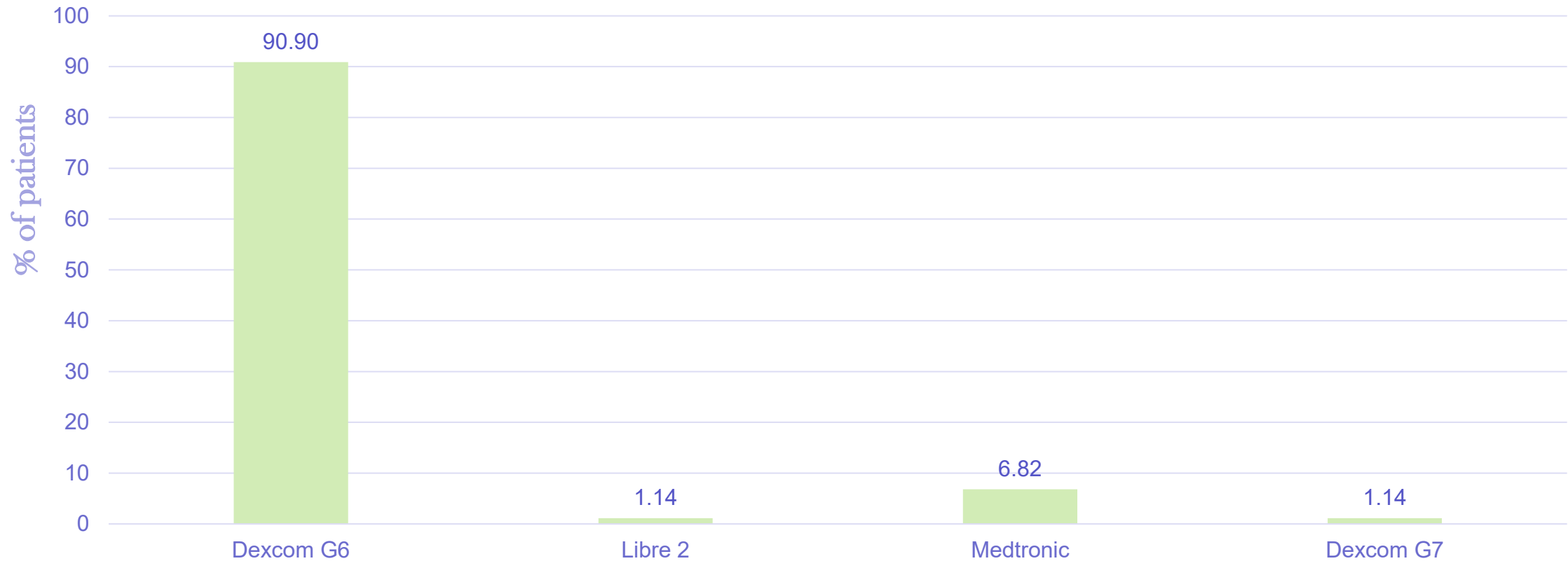


Distribution of various HCL pumps used



Real time- continuous Glucose monitoring (CGM)

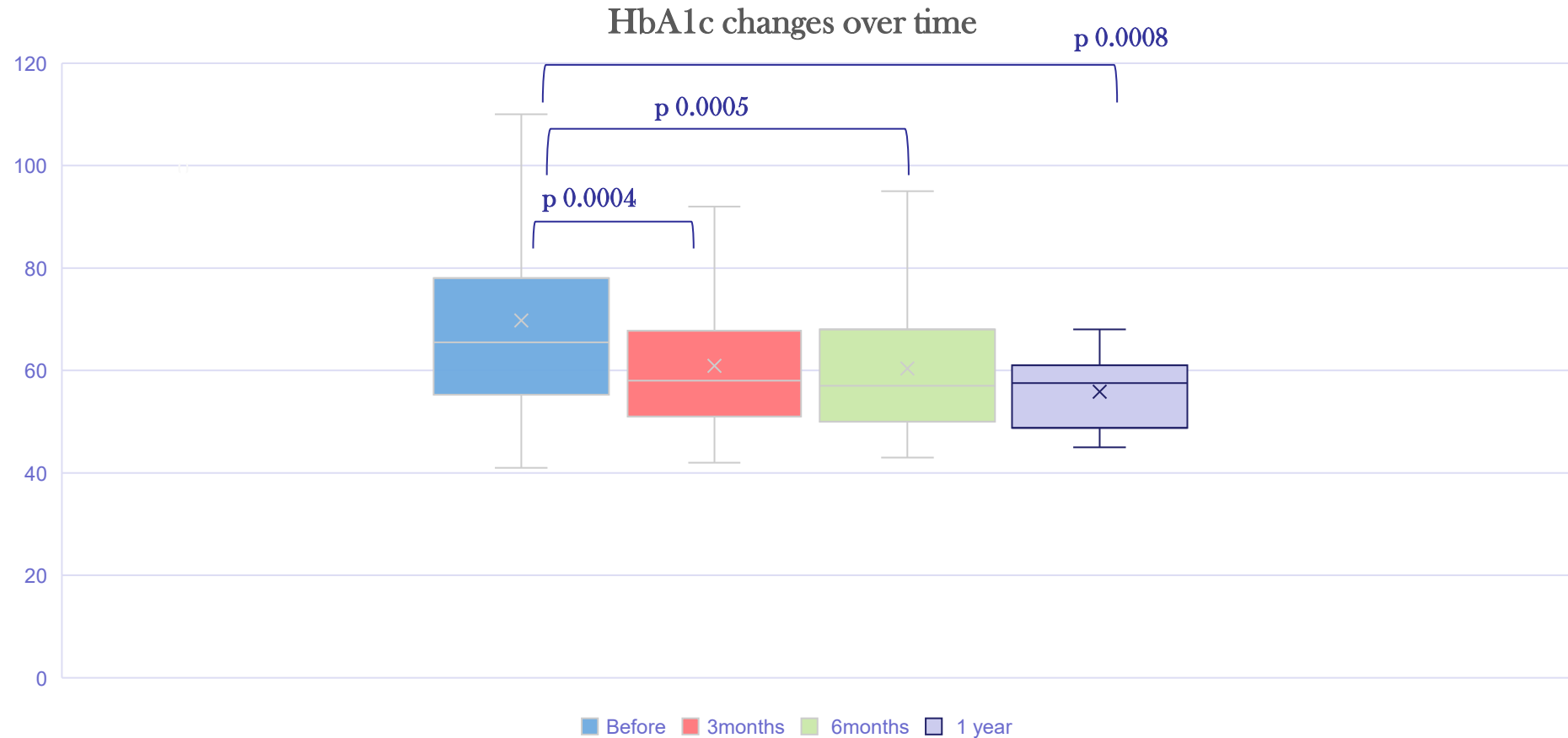
RT CGM



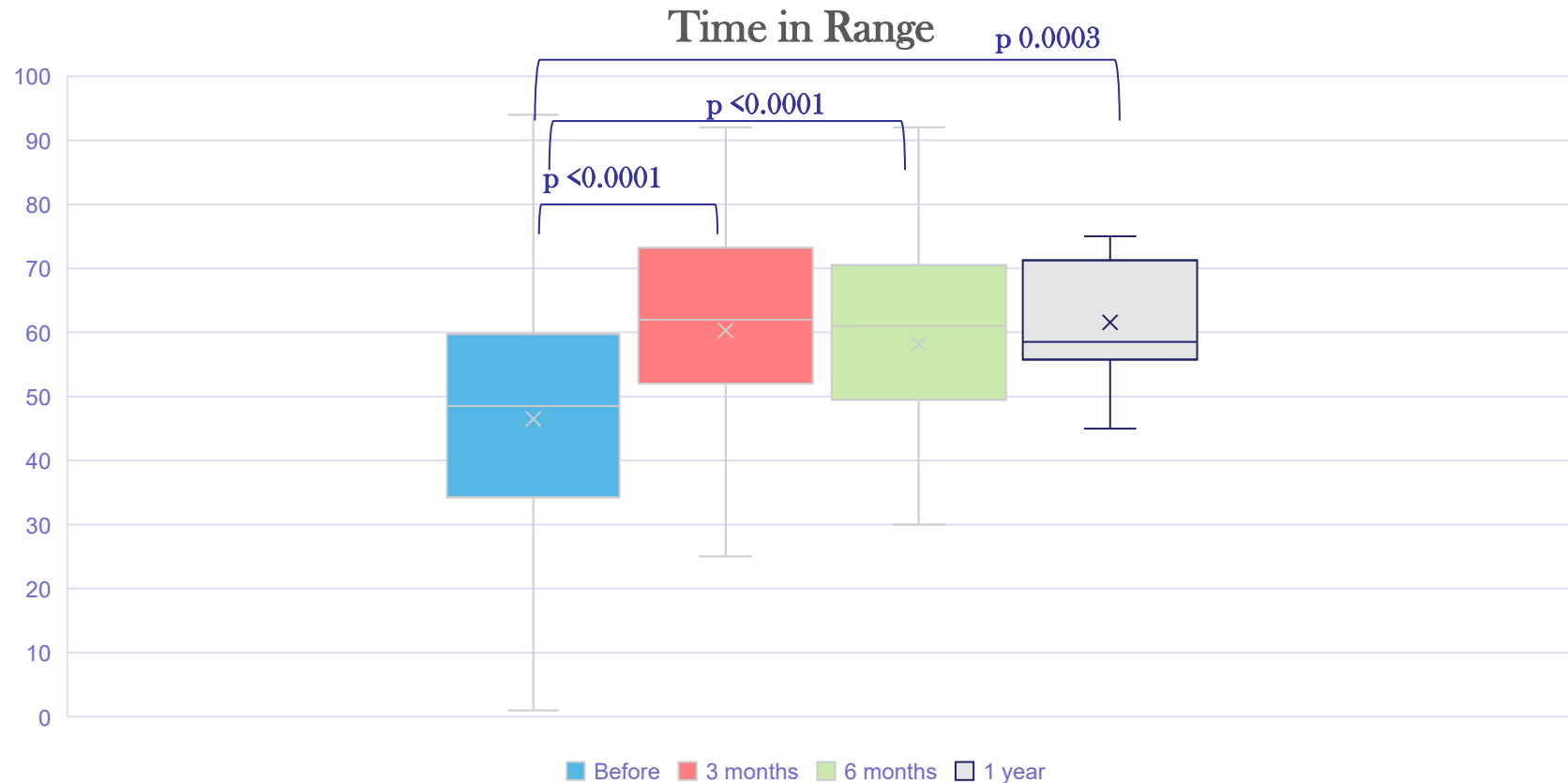
Data Analysis

	Mean ± Standard deviation (Median)			
	n	HbA1C (mmol/l)	n	Time in Range (%)
Before HCL	88	69.77 +/-18.5 (65.5)	88	46.49 +/-18.19(48.5)
90 days after HCL initiation	80	60.91 +/-12.69 (58)	78	60.29 +/-15.32 (62)
180 days after HCL initiation	69	60.39 +/-12.94 (57)	67	59.95 +/-15.54 (61)
1 year after HCL initiation	22	55.86 +/- 6.49 (57.5)	22	61.55 +/-8.71 (58.5)
		Average reduction over 1 year is 13.9mmol/l		Average increase in 1 year is 15.06%

Box plot demonstrating the Median and Mean HbA1c (represented by cross) before and after HCL initiation



Box plot demonstrating the Median and Mean time in range (represented by cross) before and after HCL initiation



Our interventions

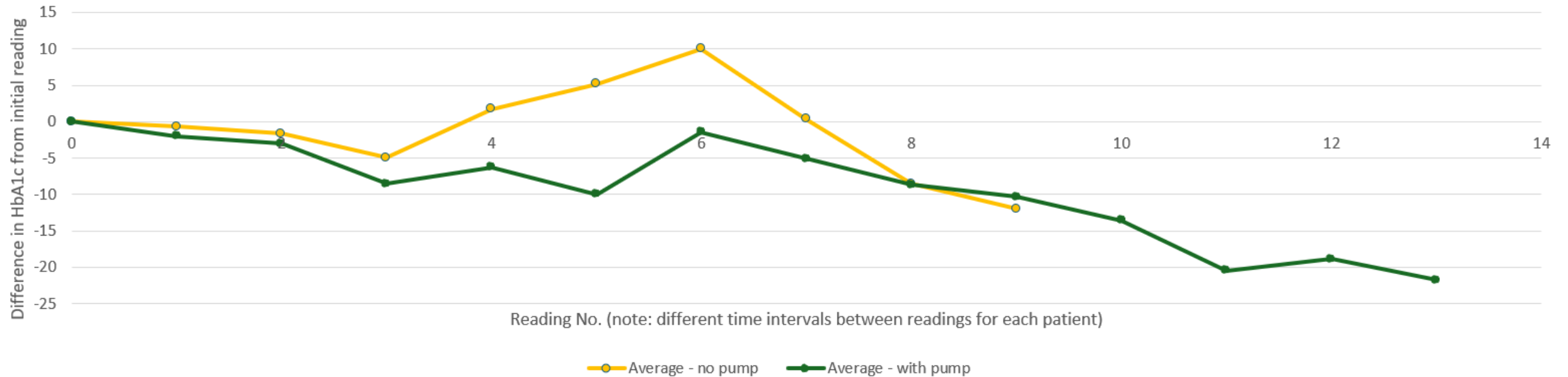
To improve our outcome

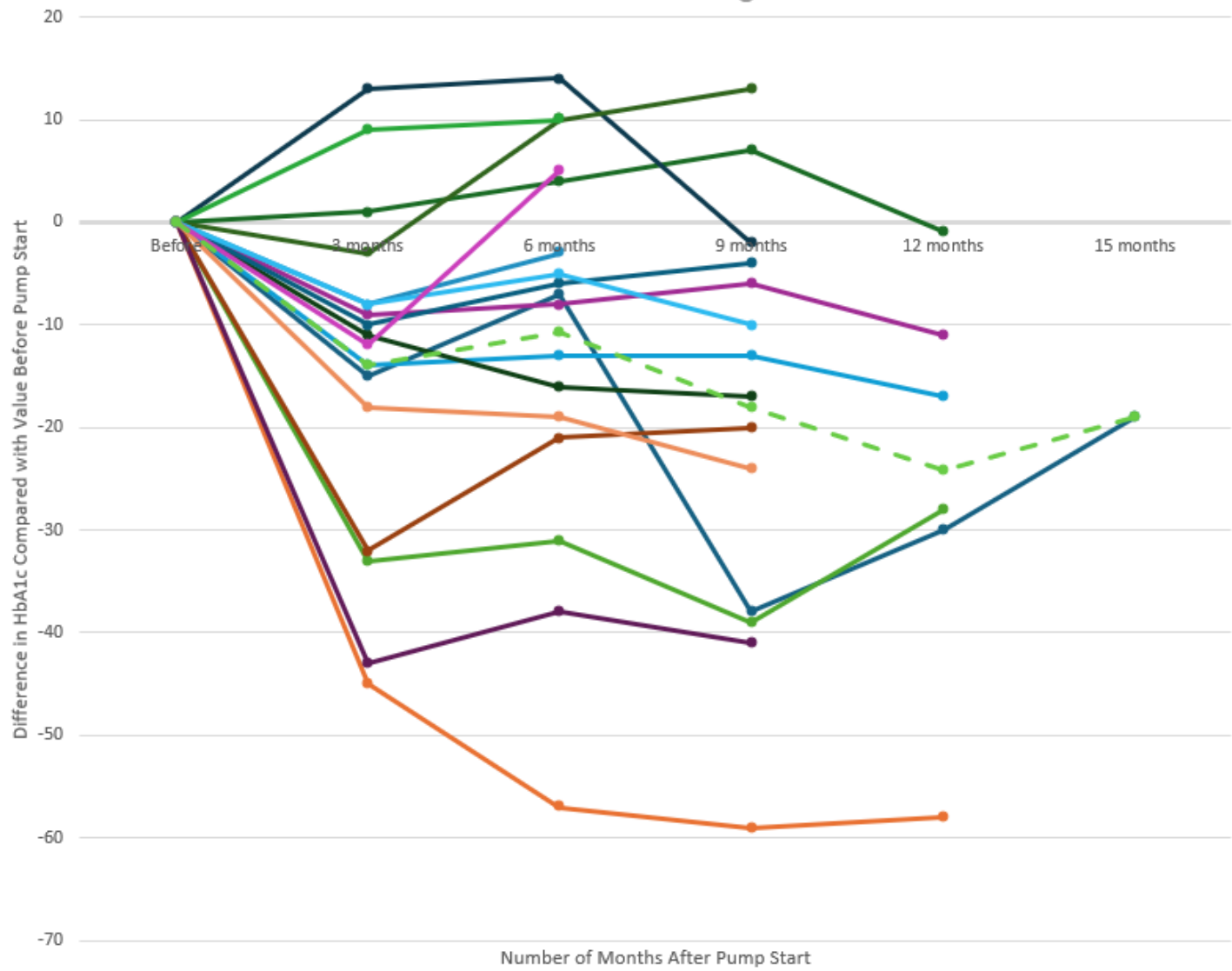
- HbA1c support clinic
- Family social events

HbA1c support clinic

- Children and young people were invited to the HbA1c support clinic with the agreement that they will be discharged once HbA1c is under 70mmol/l
- Clinic started in Spring 2023
- **19 patients**
- 13 patients went onto a HCL of which 1 came off the pump a few months later and back onto MDI. Two young people were on an insulin pump but upgraded to HCL (one had a lot of sensor issues)
- **Discharged:** 6 of which 5 went on HCL
- **Left service:** 2 (not on pump or HCL)

Average HbA1c over time for children and young people attending the support clinic





Family social events

- Organised by the Family Support Worker/Health and Wellbeing Practitioner
- Parents coffee morning
- Parents WhatsApp Group
- Cinema outings
- London Eye event
- Summer Party for children and siblings
- Nandos event with DUK - Together Type 1

- Tree of life- planned for May 2025
- Teddy bear clinic for children under 7 years of age planned for the end of May 2025

Conclusion

- Significant improvement in glycaemic control after switching to Hybrid close loop system- both in terms of HbA1c and Time in range
- Improvement in variation in ethnicity groups and deprivation index- in using HCL when compared to the previous year's data
- Our interventions to improve the outcome- HbA1c support clinic

Literature review



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ORIGINAL ARTICLE

Automated Insulin Delivery for Young People with Type 1 Diabetes and Elevated A1c

Alisa Boucsein, Ph.D.,¹ Yongwen Zhou, M.D.,^{1,2} Venus Michaels,¹ Jillian J. Haszard, Ph.D.,³ Craig Jefferies, M.D.,^{4,5} Esko Wiltshire, M.D.,^{6,7} Ryan G. Paul, Ph.D.,^{8,9} Amber Parry-Strong, Ph.D.,⁶ Maheen Pasha, M.Sc.,¹⁰ Goran Petrovski, Ph.D.,¹⁰ Martin I. de Bock, Ph.D.,^{11,12} and Benjamin J. Wheeler, Ph.D.^{1,13}





- Open-label randomized controlled trial
- Age group: 7-25 years with type 1 diabetes
- Randomised in a 1:1 ratio either to use an automated insulin delivery system (Minimed 780G) or usual diabetes care of multiple daily injections or non-automated pump therapy (control)
- Elevated glycemia (glycated hemoglobin $\geq 8.5\%$ with no upper limit).
- The primary outcome was the baseline-adjusted between-group difference in glycated Hemoglobin at 13 weeks.



- 37 automated insulin delivery and 43 controls
- At 13 weeks, the mean (\pm SD) glycated hemoglobin decreased from $10.5\pm 1.9\%$ to $8.1\pm 1.8\%$ in the automated insulin delivery group
- relatively consistent in the control group, changing from $10.4\pm 1.6\%$ to $10.6\pm 1.8\%$

THANK YOU