

## Introduction

Flash Glucose Monitoring (FM) allows instantaneous monitoring of blood glucose levels. It has been shown to reduce the episodes of hypoglycaemia and reduce HbA1c.<sup>1-2</sup> The association between HbA1c and diabetic retinopathy is well established however it is not known whether new methods of glucose monitoring which may also reduce glucose variability will have an impact on diabetic retinopathy, or if sudden tightening of control may lead to 'early worsening'.<sup>3</sup> We sought to evaluate the impact of the flash glucose monitoring on diabetic retinopathy screening scores.

## Methods

We performed a retrospective observational cohort study of patients commenced on Flash Monitoring in NHS GGC comparing retinopathy scores before and after FM insertion. Using the SCI-diabetes database we identified all T1DM patients who started FM since 2017 and had up to date screening data. We excluded those with existing referable or proliferative disease.

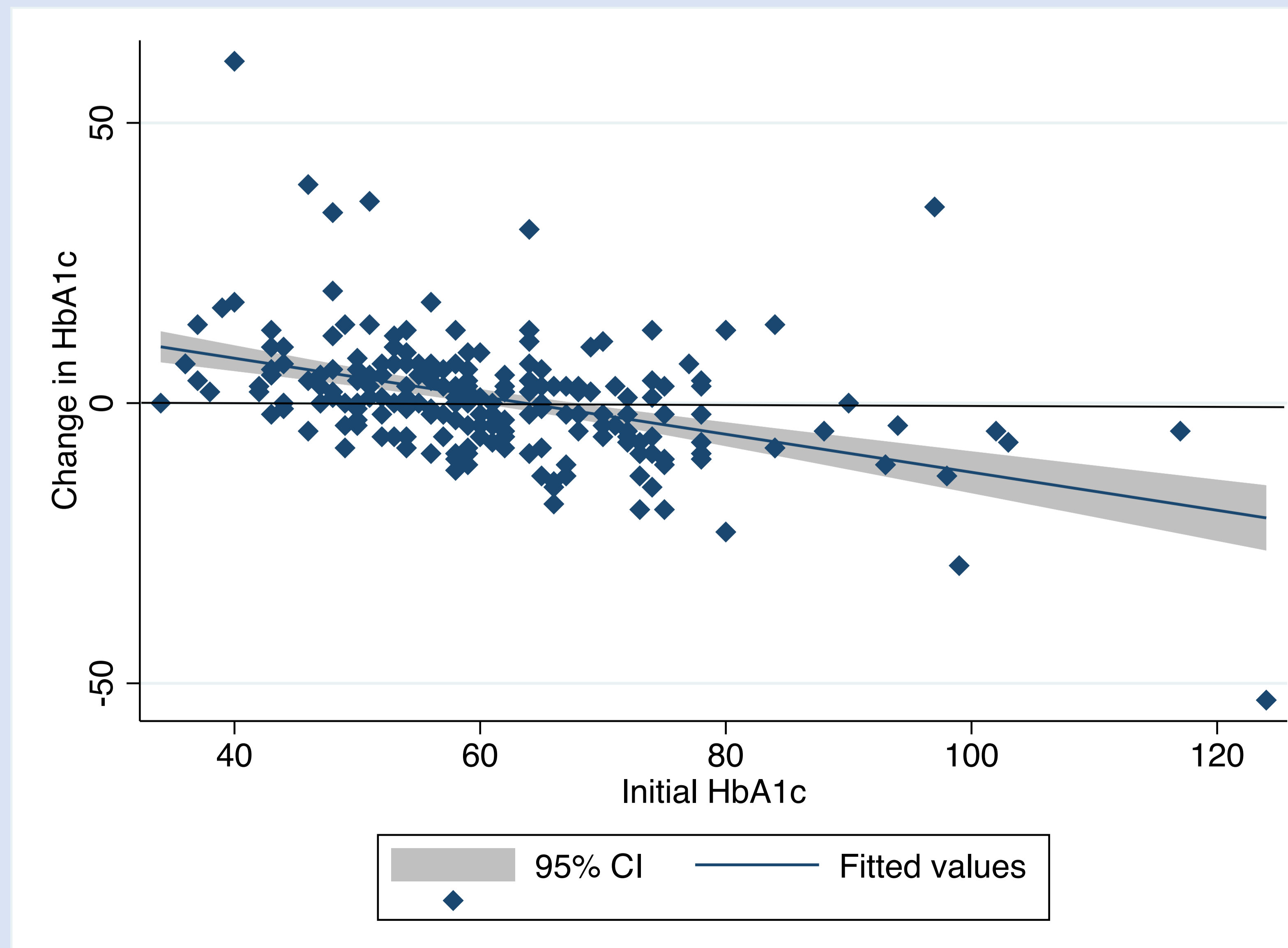
**Table 1.** Retinopathy grading before FM, at 3-12 months and 12-24 months

Retinopathy	Before FM		3-12months		12-24 months	
R0R0	103	47.6%	67	52.3%	101	44.1%
R1R0	55	24.0%	22	17.2%	48	21.0%
R1R1	64	27.9%	37	28.9%	78	34.1%
R1R2	0	0.0%	0	0.0%	1	0.4%
R0R2	1	0.4%	0	0.0%	1	0.4%
	229		128		229	

## Results

229 patients were identified, mean age 42, 47.5% female, mean duration of diabetes 20 years (1-50), mean HbA1c 61mmol/mol. 59% of the cohort also had a screening visit between 3 and 12 months. The proportions of the cohort with no retinopathy prior to FM and after 1 year was similar, 47.6% vs 44.1%; as was the proportion of patients with maculopathy 88.6% vs 90.4%. Those with 'good control' HbA1c <58mmol/mol remained static, 42%. No patients developed referable or proliferative retinopathy. Higher initial HbA1c appeared to be associated with an improvement in HbA1c,  $p < 0.001$ . When patients who showed a reduction of HbA1c <5mmol/mol, a greater proportion of patients had R0R1 retinopathy or worse at 1 year,  $p = 0.046$ .

**Figure 1.** Relationship between in HbA1c against initial HbA1c. Spearman's  $\rho = -0.462$ ,  $p < 0.001$



**Table 2.** 2x2 table for retinopathy grading before and after 1 year for those with a reduction in HbA1c of  $\leq 5$  mmol/mol. R1R0+ represents those with any retinopathy. McNemar's Chi-squared test for paired data,  $p = 0.046$

		Before FM		
		R0R0	R0R1+	Total
After FM	R0R0	20	4	24
	R1+	12	27	39
	Total	32	31	63

## Conclusions

Introduction of Flash Monitoring in this cohort did not lead to development of proliferative diabetic retinopathy in any patients and therefore appears to be a safe intervention. However, the impact on HbA1c is disappointing with almost no detectable improvement, although those with worse initial control may be more likely to benefit. Those that did have an improvement in HbA1c were more likely to see a worsening of retinopathy score from R0R0 to R1R0 or worse in the first year. Longer term outcomes are needed to assess the true benefit of Flash Monitoring on diabetic retinopathy.

## References

1. Dover AR, Flash glucose monitoring improves outcomes in a type 1 diabetes clinic. J Diabetes Sci Technol 2017;**11**:4423.
2. Bolinder J, . Novel glucose-sensing technology and hypoglycaemia in type 1 diabetes: a multicentre, non-masked, randomised controlled trial. Lancet 2016;**388**:2254–63.[doi:10.1016/S0140-6736\(16\)31535-5](https://doi.org/10.1016/S0140-6736(16)31535-5)
3. Kohner E. Microvascular disease: what does the UKPDS tell us about diabetic retinopathy?. Diabetic Medicine. 2008;**25**:20-24.