

# SEASONAL VARIATION OF HbA1c

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## BACKGROUND

A large percentage of the NHS diabetes budget is spent on complications.

Good glycaemic control is a key factor in the management of patients with diabetes as this plays a principal role in reducing both microvascular and macrovascular complications.

Some studies have demonstrated monthly fluctuations in glycaemic control, highlighting the need to consider seasonal effects when managing patients with diabetes.

## OBJECTIVES

The objective of this paper is to establish if there is a seasonal variation of HbA1c in a large cohort of Scottish patients with type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM).

## MATERIALS AND METHODS

The study cohort included 171,442 Scottish NHS patients. HbA1c readings were used to calculate mean HbA1c by month, for tests carried out between 2008 and 2010.

A high summer group was defined as patients with a higher HbA1c value in summer months than winter months. A high winter group was defined similarly but HbA1c being higher during the winter months.

Those who do not have a significant variation between summer and winter were placed in the stable group.

## RESULTS

There was a significant temporal trend in the mean HbA1c levels for all patients in the study with a maximal variation of 2.4 mmol/mol ( $p < 0.01$ ) between May and August (Figure 1).

The mean number of patients in the high winter, high summer, and stable groups were 77,720 (45.3%), 53,656 (31.3%), and 40,066 (23.4%) respectively.

For patients with a seasonal variation the majority had a high HbA1c in winter with a maximum variation of 8.7 mmol/mol ( $p < 0.01$ ) between March and September (Figure 1).

Associations with seasonal variation of HbA1c included social deprivation, male gender, type 1 diabetes mellitus, increasing BMI and increasing diastolic blood pressure (DBP).

## CONCLUSION

This large population study demonstrates that there was a significant HbA1c variation throughout the year, with the majority having high HbA1c in winter.

There may be a biological circannual rhythm directly producing a cyclical variation in HbA1c, however patient controlled lifestyle factors (such as changes in diet, activity level, and adherence to medication) are more likely contributing factors.

It is important for clinicians and patients to be aware of the influence of the time of year on the HbA1c value, especially in the context of meeting treatment target goals for HbA1c.

Empowering patients with this knowledge may be of great value in improving glycaemic control in the winter months, and thus, reducing the cardiovascular complications of diabetes mellitus.

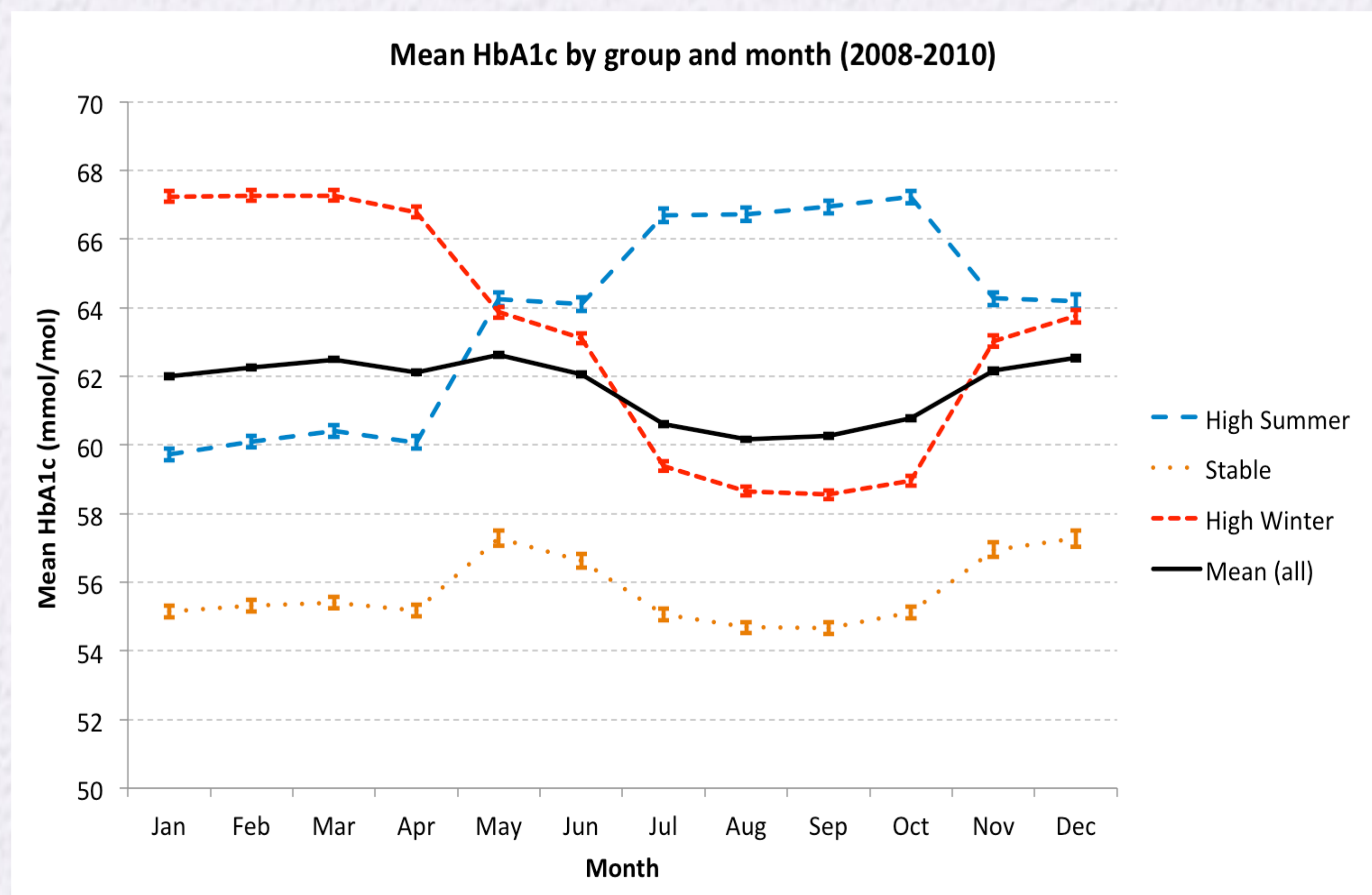


Figure 1: Mean HbA1c (with 95% confidence intervals) by group and month