# Use of a simplified local guideline to optimise "front door" management of diabetes and hyperglycaemia in patients with COVID-19

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## Introduction

- One third of all deaths in UK hospitals due to COVID-19 occur in patients with diabetes.
- COVID-19 increases the risk of hyperglycaemia in patients regardless of diabetes diagnosis – this is associated with clear adverse outcomes.[1]
- The National Diabetes Inpatient COVID response team published guidance regarding initial and ongoing management of patients admitted with COVID-19 and diabetes.
- Due to acute pressures in the initial stages of the pandemic, awareness and implementation of this guidance was limited within our Trust.
- We therefore devised a simplified guideline with the intention to improve clinical care for patients with COVID-19-related hyperglycaemia.

## Methods

1. Initial snapshot audit carried out on 13th November 2020:
   - Included all inpatients on the audit date with COVID-19 and diabetes.
   - Age, gender, type of diabetes, maximum level of oxygen support required, admission capillary blood glucose and ketone monitoring, whether patients were taking SGLT2-inhibitors and metformin and whether or not these were reviewed or stopped during admission were recorded.
   - Events and management of hyperglycaemia (defined as blood glucose reading >12mmol/L) were also documented.

2. Simplified version of ABCD National Front Door Guidance was written and agreed by diabetes team and approved by the Trust Rapid Clinical Advisory Group.
   - Guideline disseminated for use within the trust effective 24 Feb 2021, via email communication to all clinical staff and an update on the Trust Intranet.

3. Re-audit on patients admitted with COVID-19 from 24 February 2021 to 25 March 2021, this time including patients both with or without diabetes.

## Standards

**Front Door Guidance - 100%**
1. Glucose measurement in all patients with suspected COVID-19
2. Ketone check in all patients with known diabetes or blood glucose >12mmol/L
3. HbA1c check in all patients with diabetes

**Medication Review - 100%**
1. Stop SGLT-2 Inhibitors
2. Documented review of Metformin

**Glucose Monitoring - 100%**
1. 6-hourly blood glucose monitoring in patients with diabetes or all patients on Dexamethasone.

**Hyperglycaemia Management - 100%**
1. Appropriate management of hyperglycaemia

## Results

### Demographics

- 97 patients included across both audit cycles:
- 36 patients (all with a diagnosis of diabetes) in pre-guideline snapshot audit.
- 61 patients (including patients with and without diabetes) in the post-guideline audit.
- Patients in post-guideline cohort were significantly younger and more likely to require oxygen throughout their admission.



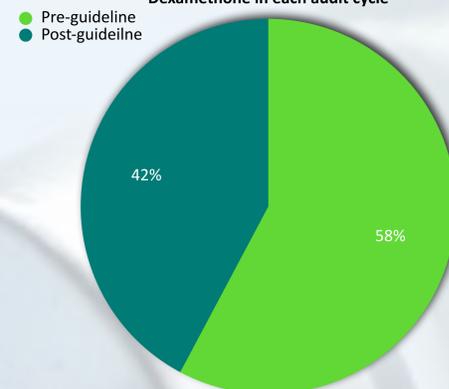Chart 1: Percentage of patients receiving Dexamethone in each audit cycle
- Pre-guideline
- Post-guideilne



Chart 2: Front Door Guidance
- Pre-Guideline
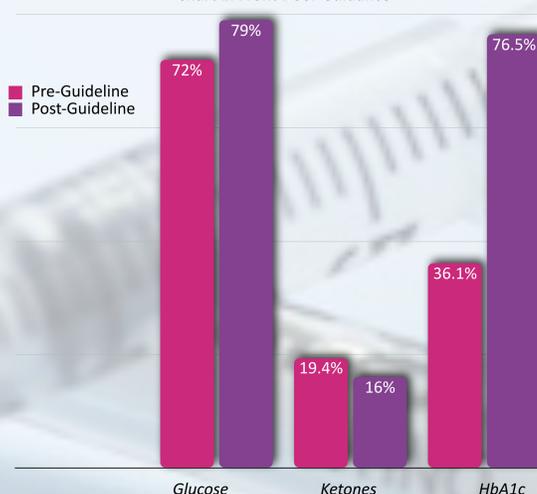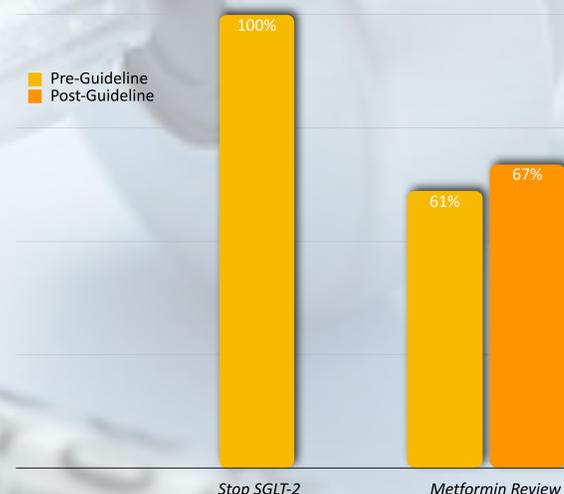- Post-Guideline



Chart 3: Medication Review
- Pre-Guideline
- Post-Guideline

*Charts 2 and 3 above demonstrate the compliance to 2 of the 4 audit standards before and after dissemination of the local guideline.*

### Results

**Improvement** in:
- "Front door" measurement of capillary blood glucose (from 72% to 79%).
- HbA1c checks (36.1% to 76.5%, p=0.006) in patients with known diabetes or hyperglycaemia on admission.
- Review of metformin prescribing (61% to 67%).

Ketone checking (19.4% to 16% compliance), hourly monitoring of blood glucose levels (19% to 11% compliance), and hyperglycaemia management (from 63% to 47% compliance) still need to be improved, as there was a slight decline following new guideline implementation. This likely reflects the extreme pressures with regard to staffing and re-deployment, insufficient equipment and the continuously evolving approach to the management of COVID-19 throughout the pandemic.

## Discussion

Knowledge of baseline HbA1c is important as higher HbA1c is associated with a nearly twofold increase in COVID-19 related deaths. Another study[5] showed significant association between pre-infection HbA1c and risk of severe COVID-19 infection.

Limitations of our project include the small numbers of patients involved. Due to time pressures on clinical staff and enforcement of social distancing during the pandemic, it was not possible to disseminate our local guideline via traditional face-to-face methods. We felt that using email communication rather than in-person discussion of the new guidelines was less impactful. We acknowledge that the initial snapshot audit did not capture longitudinal data, in contrast to the post-guideline audit which included inpatients over a one month period and therefore results should be interpreted with some caution.

There were two indirect positive outcomes from the project. Firstly, it highlighted the need for better access to ketone meters across the Trust. Urgent funding was used to purchase additional ketone meters for all general medical wards, which will prove beneficial for the care of all patients with diabetes, even beyond the pandemic. Secondly, our project increased awareness about "euglycaemic diabetic ketoacidosis" and the importance of suspending SGLT-2 inhibitors during a period of acute illness. This is vital and generalisable knowledge which will be useful as SGLT-2 inhibitor use undoubtedly increases across multiple clinical contexts.

## Conclusions

To our knowledge, this is the largest and most comprehensive audit conducted to gauge compliance with the ABCD Covid-19 Diabetes Front Door Guidance.

We propose that a simplified guideline adapted to local needs has the potential to improve compliance. Implementation of our local guideline led to an improvement in capillary blood glucose measurement on admission, significantly higher assessment of HbA1c in patients with diabetes (p=0.006), and improved review of Metformin safety in patients with diabetes and COVID-19 infection or those without diabetes experiencing hyperglycaemia in this context.

## References

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