



**Sussex Community**  
NHS Foundation Trust

# Diabetes Care for You Ketone Testing Guidelines

For Healthcare Professionals in Brighton and Hove CCG and  
High Weald Lewes and Havens CCG



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heart of the community*

<b>Reader Box</b>	
<b>Description</b>	Ketone testing guidelines
<b>Date published</b>	2020
<b>Date due for review</b>	2025
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<b>Primary audience</b>	Healthcare professionals who care for adult patients with type 1 diabetes
<b>Secondary audience(s)</b>	Healthcare professionals who care for adult high risk patients with type 2 diabetes (e.g. those with multiple dosing injections (MDI) who are ketosis prone, or pancreatic disease-induced diabetes, i.e. type 3c diabetes
<b>Notes</b>	Acknowledgement to Oxfordshire CCG Ketone Testing and Sick Day Rules Guidance

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# Ketone Testing Guidelines

## Scope

This ketone testing guidance is for adults with type 1 diabetes, but may also be applicable to:

- A small group of high risk patients with type 2 diabetes (e.g. those with multiple dosing injections (MDI) who are ketosis prone i.e. DKA in the past, or who are known to have low endogenous production)
- Those with pancreatic disease-induced diabetes, i.e. type 3c diabetes

## Why does Diabetic Keto Acidosis (DKA) happen?

DKA is due to a profound reduction of circulating insulin relative to the body's requirements. It is characterised by hyperglycaemia, acidosis and ketonaemia. It is a medical emergency with a significant morbidity and mortality and should be diagnosed promptly and managed intensively. Precipitating conditions include infection/acute illness and inadequate insulin or purposeful omission.

## Prevention

Education programmes are key for people with diabetes, particularly concerning what to do in cases of illness (see 'Sick day rules', page 4). Please refer, if appropriate, to Diabetes Care for You to consider BHITE type 1 diabetes education (Brighton, High Weald and Havens Intensive Type 1 Diabetes Education Programme) if the patient has not attended DAFNE (Dose Adjustment For Normal Eating) or BHITE or equivalent previously.

## Ketone testing

Blood ketone strips are more effective at detecting ketonaemia than urine ketone strips, since they provide 'real time' results and test for the main types of ketones. Therefore blood ketone testing is the preferred test, along with education and training.

Locally, the blood ketone strips are either Glucomen Areo strips, compatible with Glucomen Areo 2k device, and used with the Joint Formulary-approved GlucoMen Aero Sensor blood glucose test strips, or Keto Sens strips, compatible with the CareSens Dual meter.

Patients who have completed BHITE and are carbohydrate counting using the respective glucose meter (Accu-Chek Aviva Expert or FreeStyle InsulinX), would have two meters, with either the Glucomen Aero 2k device or the CareSens Dual device to test for ketones, and their blood glucose meter to facilitate their carbohydrate counting.

Any ketone meters with cost-effective blood glucose test strips of equivalent price could be considered as alternative options as well.

<b>Ketone strips and compatible blood glucose strips that can be used with the one meter available on FP10/drug tariff (January 2020)</b>	<b>Ketone strips (10)</b>	<b>Blood glucose Strips (50)</b>
GlucoMen areo Ketone Sensors Strips (Glucomen Areo 2K meter)	£9.95	£9.95
KetoSens ketone strips (CareSens Dual Meter)	£9.95	£9.95

Patients in the at-risk group for DKA who become unwell will need to test both capillary glucose and blood ketone levels every two hours, depending on levels, until blood ketones return to a satisfactory level. It is recommended that strips are prescribed in quantities to allow patients to maintain a supply of two boxes (20 strips) at home. If a patient does not use blood ketone test strips within approximately one year then a prescription for replacement strips will need to be issued before their expiry.

## Sick day rules

All diabetes patients should be educated on how to manage their condition when they are ill. To complement the education session or verbal advice given, the appropriate leaflet should be printed and handed to the patient:

- SCFT sick day rules: ketone testing and illness management in type 1 diabetes – this leaflet includes general advice on what to do when patients with type 1 and 2 diabetes are unwell as well as how to manage insulin and metformin.
- [Type 2 diabetes: what to do when you are unwell](#) - this leaflet from Trend UK includes general advice on what to do when patients are unwell, and covers how to manage insulin, metformin, SGLT inhibitors, GLP1 agonists and sulphonylureas for people with type 2 diabetes.

<http://trend-uk.org/wp-content/uploads/2017/02/161212-TREND-unwell-v4.pdf>

Trend UK also have guidance available for people with both type 1 and 2 diabetes, although the advice may differ from that provided by Diabetes Care for You (DCFY).

[https://trend-uk.org/wp-content/uploads/2020/03/A5\\_T1Illness\\_TREND\\_FINAL.pdf](https://trend-uk.org/wp-content/uploads/2020/03/A5_T1Illness_TREND_FINAL.pdf)

(type 1)

[https://trend-uk.org/wp-content/uploads/2020/03/A5\\_T2Illness\\_TREND\\_FINAL.pdf](https://trend-uk.org/wp-content/uploads/2020/03/A5_T2Illness_TREND_FINAL.pdf)

(type 2)

**Practices and Out of Hours services are advised to ensure they have the ability within the service to test for blood ketones for those patients on SGLT2i who may present with normoglycaemic DKA, as per [MHRA advice](#).**

## Additional counselling points

When handing the leaflet to patients the following points should be discussed:

- If ketone levels are 3.0mmol/l or higher, the patients should always contact an appropriate healthcare professional for additional advice and support
- Blood ketone testing is the preferred option
- If the patient is vomiting, unable to keep fluids down, or is unable to control their blood glucose or ketone levels they must seek urgent medical advice
- It may be more appropriate for some people with type 2 diabetes (ketosis prone diabetes), MODY and type 3c diabetes to follow the advice for type 1 diabetes patients - the specialist will have made the patient and GP aware if this is the case
- Explore willingness to test glucose and ketones and adjust quantity to supply accordingly

## For further information contact:

Diabetes Care for You on 0300 303 8066

## Ketone testing strips for adults

The following high risk adult patients should receive ketone testing strips to self-monitor when required.

- Insulin pump users (two boxes)
- Patients with a history of admissions with ketoacidosis within last five years (two boxes)
- HbA1c >11% (97 mmol/mol) or blood glucose often > 20 mmol/l (two boxes)
- Pregnant patients with type 1 diabetes (two boxes)
- Newly diagnosed type 1 diabetes (one box)
- Patients with type 2 diabetes on MDI who are ketosis prone/pancreatic disease (one box)



DCFY/Level 4 Providers will identify high risk patients through admissions and outpatient appointments.

For those identified as needing testing strips:

### **Specialist responsibilities are to:**

- Initiate ketone monitoring
  - Provide training and education
  - Provide meter and initial strip
  - Communicate the above to Primary Care
- 
- How to use strips
  - When to use strips
  - What to do with results



### **GP responsibilities are to:**

- Provide ongoing strips to patients initiated in secondary care
- Reinforce training on meter use
- Reinforce education on dealing with high ketone levels so that patients knows what to do if their readings are high