

Diabetes at the Front Door

Prof Ketan Dhatariya MBBS MSc MD MS FRCP PhD

Consultant in Diabetes and Endocrinology
Norfolk and Norwich University Hospitals



Disclosures

- In the last 12 months I have received honoraria, travel or fees for speaking or advisory boards from
 - Abbott Diabetes
 - AstraZeneca
 - Boehringer-Ingelheim
 - Eli Lilly
 - Menarini
 - Novo Nordisk
 - Roche
 - Sanofi Diabetes

Prevalence

- Over 20% of all inpatient beds are occupied by someone with diabetes
- People with diabetes stay in hospital for longer than those without diabetes, who have the same condition
- Hyperglycaemia in those without diabetes is associated with greater harm than those with diabetes

<https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-inpatient-audit/2019>

Sampson M et al DRCP 2007;77(1):92-98

Umpierrez GE et al JCEM 2002;87(3):978-982

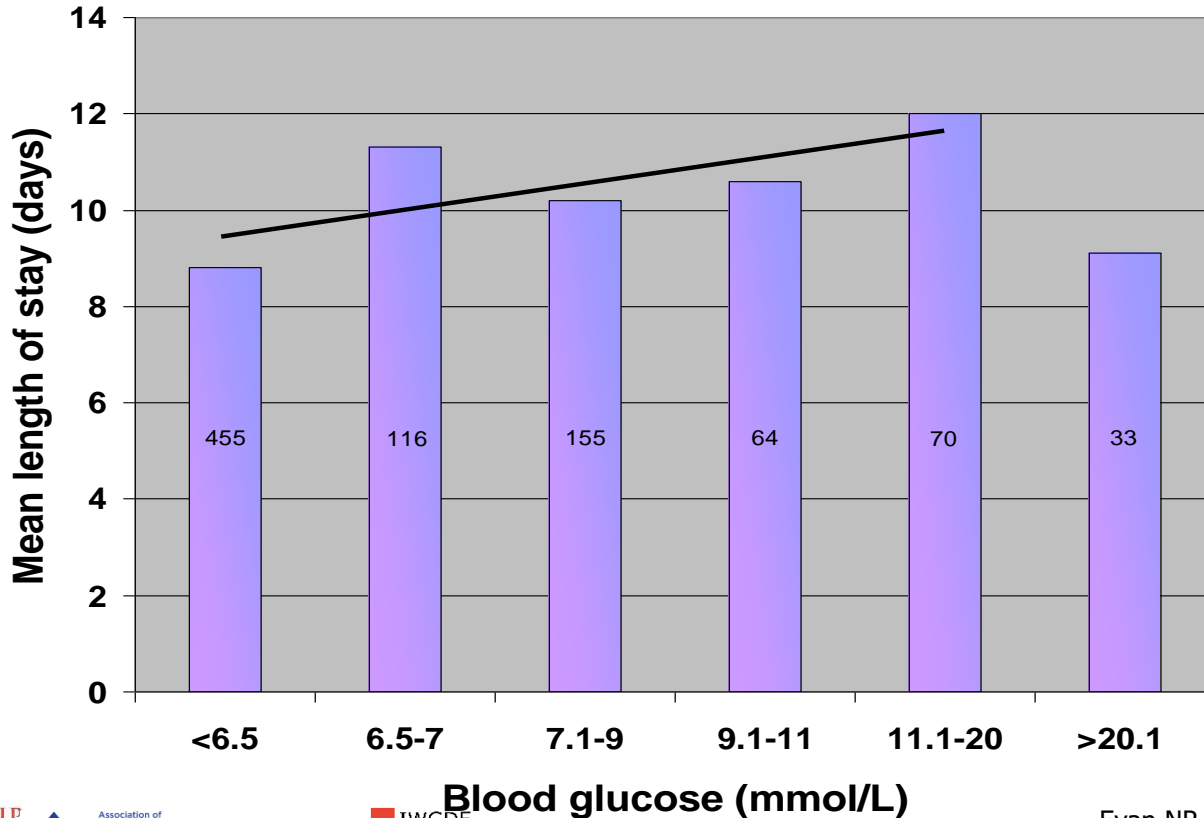
Acute Admissions

- To investigate the relationship between a single glucose concentration at the time of acute hospital admission and outcomes
 - length of stay
 - 28-day readmission rates
 - mortality

Acute Admissions

- We analysed data from all 1502 patients admitted through the Acute Medical Unit at NNUH in February 2010
- 893 had a glucose concentration measured

LOS vs Admission Glucose

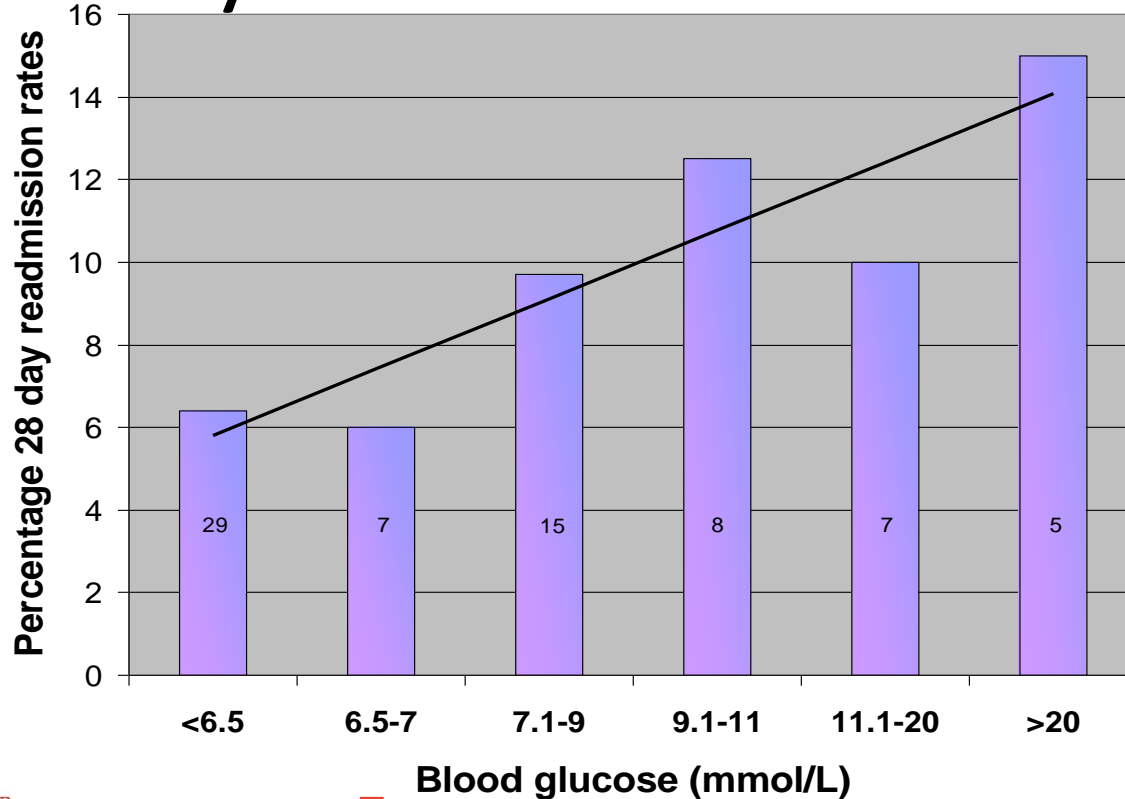


Trend $R^2 = 0.5556$

$P=0.002$

Those above 20mmol/L excluded (most under the diabetes team)

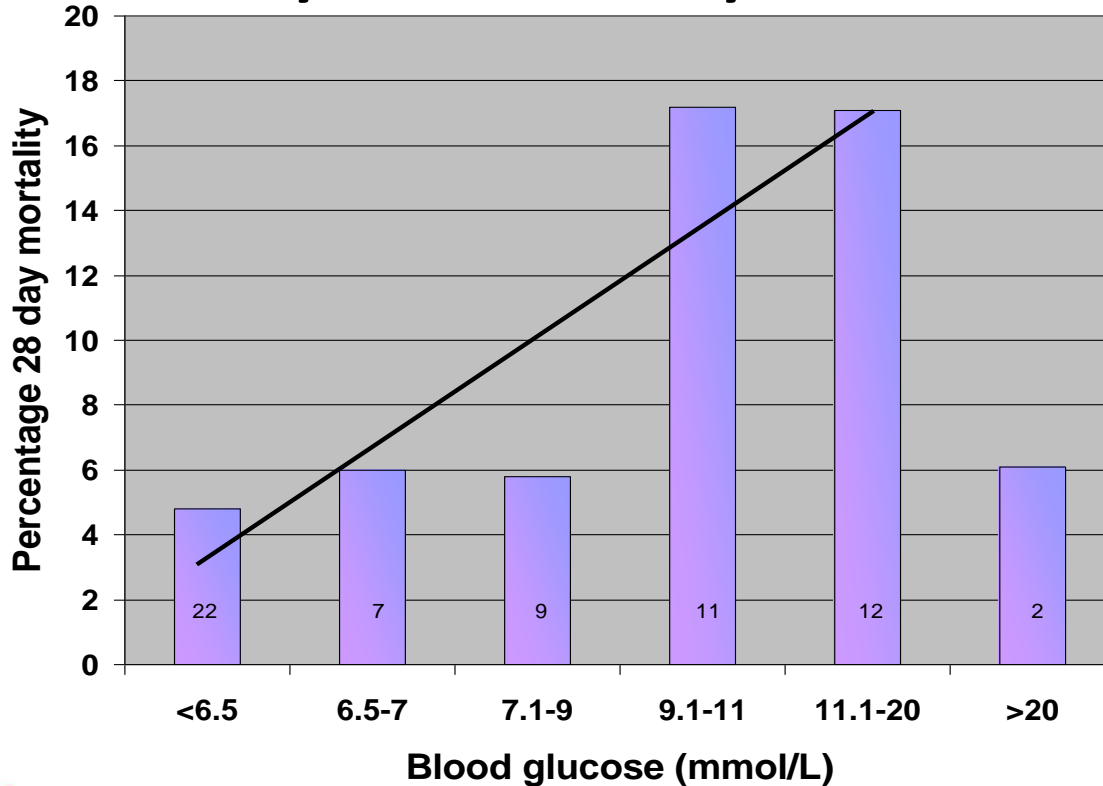
28 Day Readmission vs Admission Glucose



Trend $R^2 = 0.7918$

Of the 1,502 admissions in February 2010, 71 (4.73%) were readmitted within 28 days

28 Day Mortality vs Admission Glucose



Trend $R^2 = 0.7874$

$P < 0.0001$

Of the 1,502 admissions in February 2010, 63 (4.19%) died within 28 days

Help for the Front Door?



Home About Workstreams Academy Reports Webinars Updates

Three new interactive pathways support NHS teams at the 'front door' to care for patients with diabetes

November 1, 2023 | News, Projects and Initiatives



Interactive resources to help ensure people with diabetes receive the best possible hospital care when in emergency and other acute care departments have been developed by the Getting It Right First Time (GIRFT) team.

Interactive versions of three GIRFT pathways for diabetes are now available to support NHS colleagues, demonstrating examples of the processes and key decisions they need to work through to offer best practice to patients in their care.

The pathways relate to:

- The management of patients presenting to the emergency department (ED) with a foot problem
- Initial management of hyperglycaemia in adults in the ED
- The management of patients who are admitted in hypoglycaemia

[Access the GIRFT Interactive pathways for diabetes →](#)

Google “GIRFT”
and “Diabetes”

<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>



Remember – Snack and Tickle

The screenshot shows a web browser displaying the GIRFT (Getting It Right First Time) interactive pathways website. The page title is "Essential safety checks to prevent diabetes related harms arising in ED and acute admissions units". Below the title is a green box with the acronym "SNACK and TICKLE" and its meaning: "Think Insulin, Check Ketones, Look at feet, Examine for loss of protective sensation".

The main content area features five interactive cards:

- Hypoglycaemia:** Illustration of a person thinking about a burger. Text: "Snack should be provided for insulin and SU treated patients to prevent hypo in the department."
- DKA in Type 1 DM:** Illustration of an insulin pen. Text: "Think insulin. A TIME CRITICAL MEDICINE doses must be given on time to prevent DKA and subsequent doses prescribed particularly basal insulin."
- DKA and SGLT-2 Inhibitors:** Illustration of a ketone meter showing '58' and various pills. Text: "Check Ketones in all on SGLT-2 and do not continue if unwell."
- Foot ulcer / infection:** Illustration of feet with a red sore on one foot. Text: "Look at the bare feet – foot infection is a common cause of systemic sepsis."
- Foot pressure ulcer:** Illustration of a foot with a purple ulcer. Text: "Examine for loss sensation = high risk of pressure ulcer. The Ipswich Touch Test is a 30 sec. screening tool. Click here to see video >".

At the bottom of the cards is a link: "< Back to previous page". The footer of the page includes a feedback email address and a copyright notice for GIRFT.

<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Feet

<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Feet

The screenshot shows a web browser window with the URL <https://girft-interactivepathways.org.uk/diabetes-foot-problem/>. The page header includes the NHS logo and 'GIRFT GETTING IT RIGHT FIRST TIME'. The main content area is titled 'Management of patients presenting to ED with a foot problem'. Below the title, there is a paragraph of text: 'All patients presenting with foot ulceration should have a deep swab or tissue taken prior to starting antibiotics. All deep ulcers or suspected osteomyelitis should have an x-ray carried out (ensure site of lesion is specified on request). Consider plain imaging of an insensate foot even if the insult was apparently minor. Further imaging should only be requested after consultation with the MDT'. Below this text is a flowchart starting with a box labeled 'Presenting symptoms'. Two arrows point down from this box to two colored boxes: a purple box labeled 'Ulcer / Wound' and an orange box labeled 'Red, hot, swollen foot with no skin breakage'. Below each of these boxes is another arrow pointing down. At the bottom of the page, there is a link: '< Back to previous page'.

<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Feet

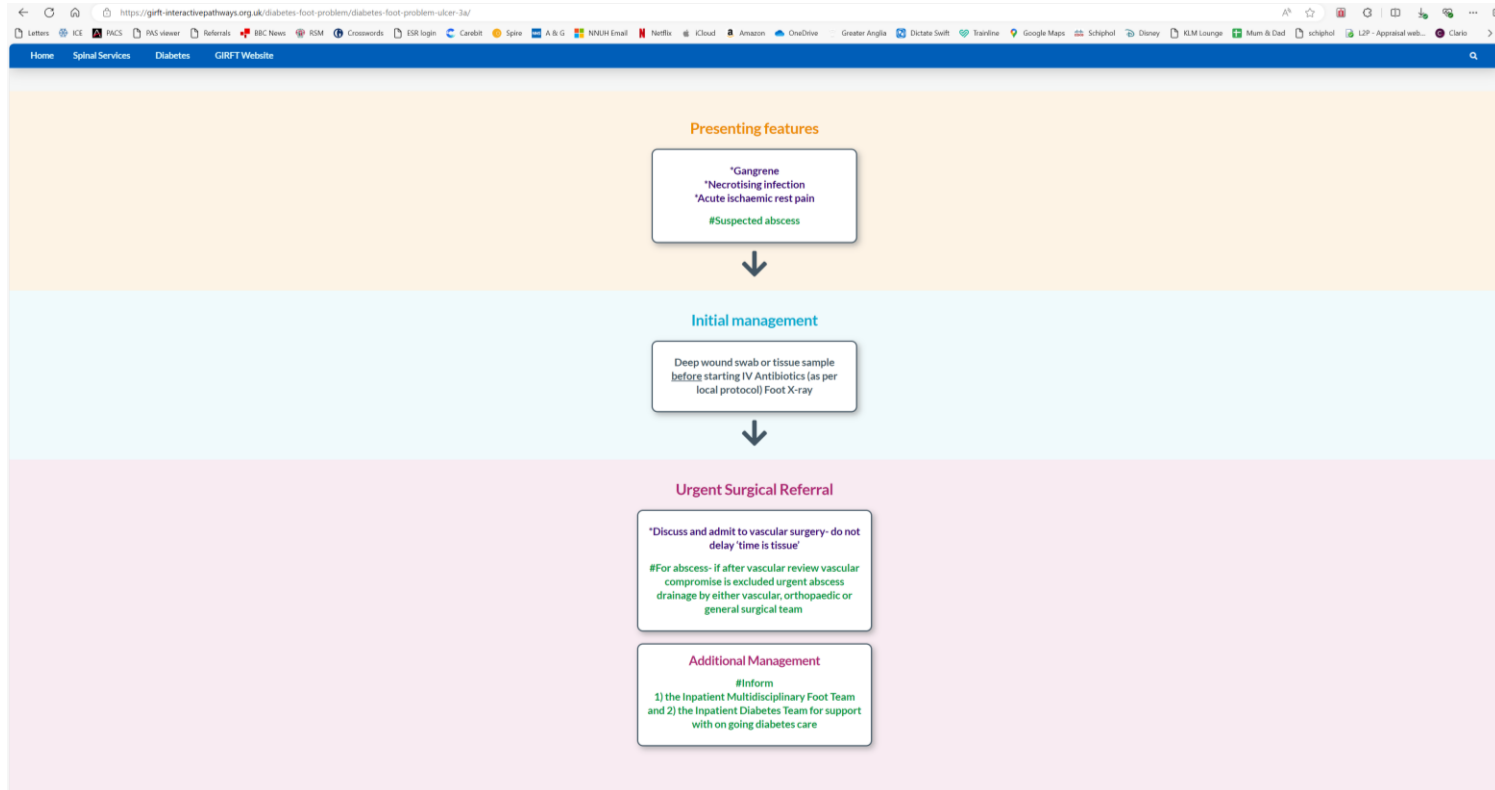
The screenshot shows a web browser displaying the GIRFT interactive pathways website. The page title is "Ulcer / Wound". Under the heading "Presenting features", there are three colored boxes with arrows pointing downwards:

- Red box:** *Gangrene
*Necrotising infection
*Acute ischaemic rest pain
#Suspected abscess
- Blue box:** Systemically unwell
Spreading infecting/ cellulitis
Deep seated bone or soft tissue infection suspected
- Purple box:** Not unwell – Mild infection / no infection

Below the boxes is a "Back to previous page" link. The footer contains contact information and copyright details for GIRFT.

<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Feet



<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Hyperglycaemia

Initial management of hyperglycaemia in adults in the ED

Presentation in ED

First - [click here](#) to be reminded of the essential safety checks for all people with diabetes "Snack and Tickle"

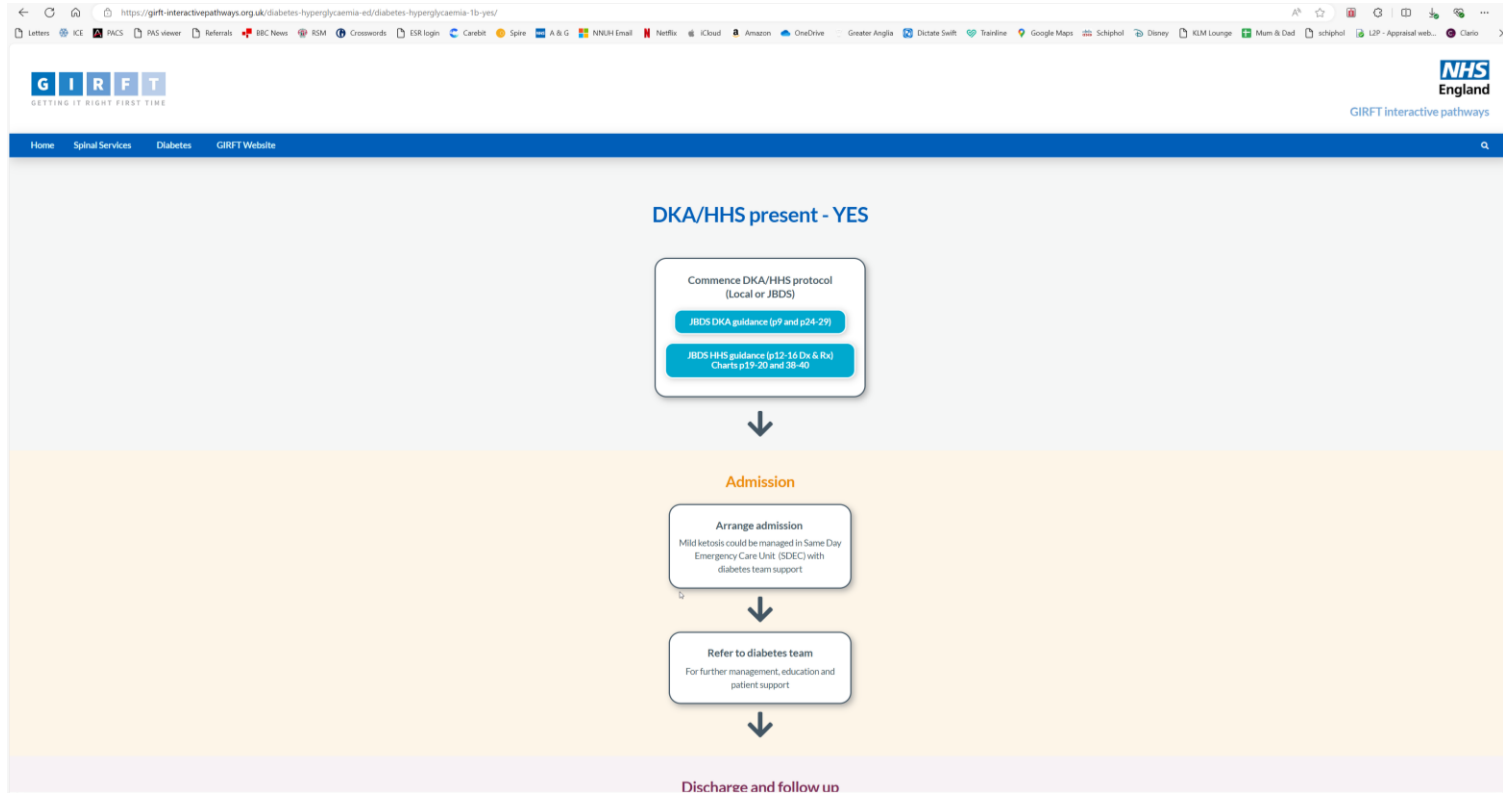
DKA/HHS present
NOTE: if acidotic but CBG ≤ 15 mmol/L, check ketones to exclude 'euglycaemic' ketoacidosis

Select the answer

YES NO

<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Hyperglycaemia



<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Hyperglycaemia

Discharge and follow up

Criteria for discharge

METABOLIC

- glucose ≤ 15 mmol/l (ideally < 10.0 mmol/l)
- capillary ketones ≤ 1.0 mmol/l

PHYSIOLOGICAL

- NEWS2 score ≤ 2
- Capillary refill time ≤ 2 seconds
- No postural drop

FUNCTIONAL

- Able to drink and/or eat (depending on pre-morbid state)
- Back to pre-morbid state
- Minimal osmotic symptoms

CLINICAL

- No other clinical reason for admission

↓

Support diabetes self-management

Provide your patient with this QR code to upload supporting information to their phone eg sick day rules

<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

As a Reminder

- The management of DKA and HHS has now been unified across the world (it is now based mainly on the UK guideline)

Diabetologia (2024) 67:1455–1479
<https://doi.org/10.1007/s00125-024-06183-8>

CONSENSUS REPORT



Hyperglycaemic crises in adults with diabetes: a consensus report

Guillermo E. Umpierrez¹ · Georgia M. Davis¹ · Nuha A. ElSayed^{2,3} · Gian Paolo Fadini^{4,5} · Rodolfo J. Galindo⁶ · Irl B. Hirsch⁷ · David C. Klonoff⁸ · Rozalina G. McCoy^{9,10} · Shivani Misra^{11,12} · Robert A. Gabbay^{2,3} · Raveendhara R. Bannuru² · Ketan K. Dhatariya^{13,14}

Diabetes Care Volume 47, August 2024

1257



Hyperglycemic Crises in Adults With Diabetes: A Consensus Report

Diabetes Care 2024;47:1257–1275 | <https://doi.org/10.2337/dci24-0032>



Guillermo E. Umpierrez,¹
Georgia M. Davis,¹ Nuha A. ElSayed,^{2,3}
Gian Paolo Fadini,^{4,5} Rodolfo J. Galindo,⁶
Irl B. Hirsch,⁷ David C. Klonoff,⁸
Rozalina G. McCoy,^{9,10} Shivani Misra,^{11,12}
Robert A. Gabbay,^{2,3}
Raveendhara R. Bannuru,² and
Ketan K. Dhatariya^{13,14}

CONSENSUS STATEMENT

Umpierrez GE et al Diabetes Care 2024;47(8):1257-1275
Umpierrez GE et al Diabetologia 2024;67(8):1455-1479

Hypoglycaemia

https://girft-interactivepathways.org.uk/diabetes-hypoglycaemia-management/

GIRFT
GETTING IT RIGHT FIRST TIME

NHS England
GIRFT interactive pathways

Home Spinal Services Diabetes GIRFT Website

Management of patients admitted with hypoglycaemia

First - [click here](#) to be reminded of the essential safety checks for all people with diabetes
"Snack and Tickle"

↓

Presentation

Select the appropriate presenting feature

- Admitted with hypoglycaemia
CBG <4.0 mmol/l
- Admitted having recovered from hypoglycaemia
CBG now >4.0 mmol/l

↓ ↓

< Back to previous page

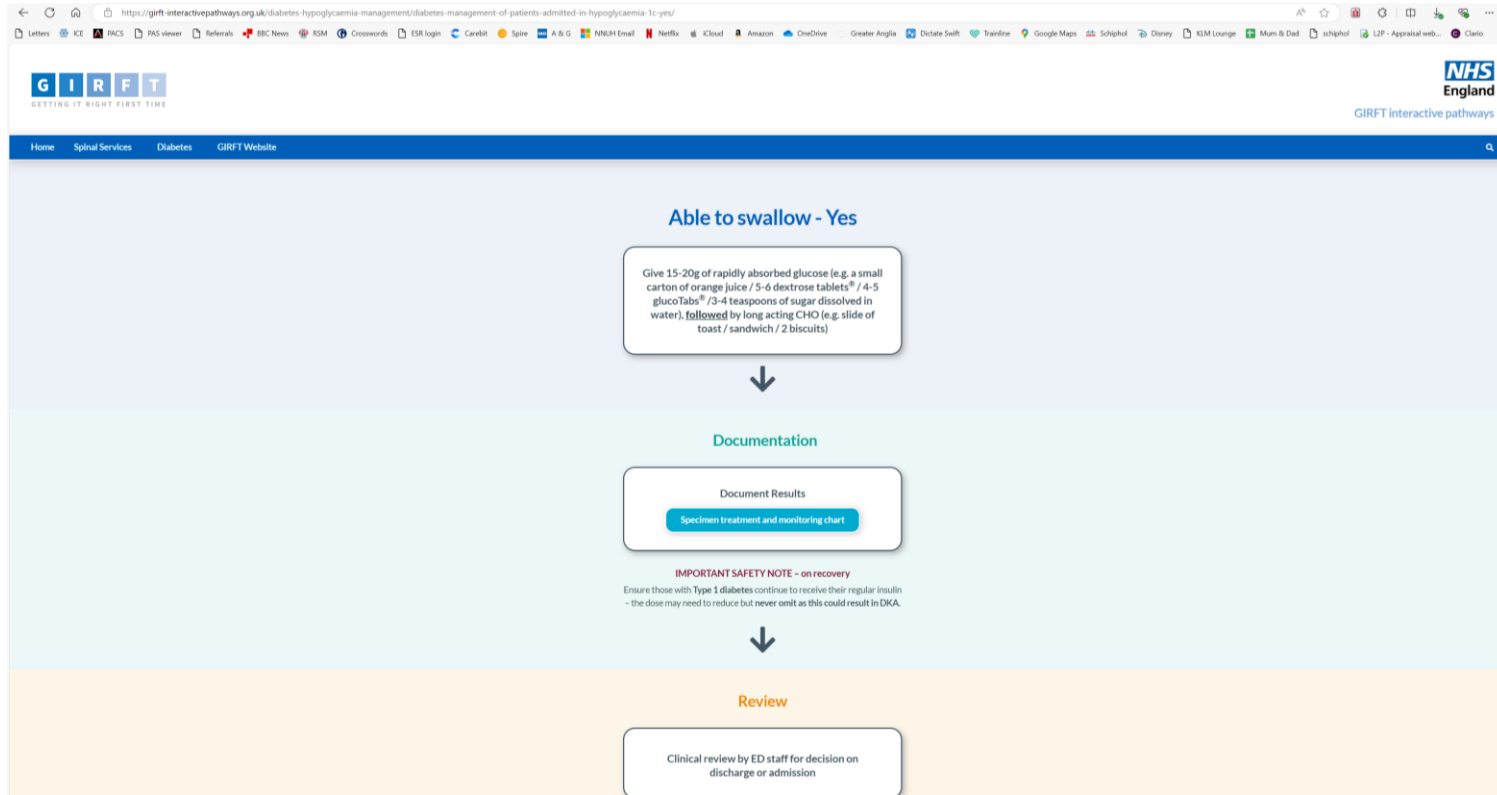
<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Hypoglycaemia

The screenshot shows a web browser displaying an interactive pathway for hypoglycaemia management. The page title is "Admitted with hypoglycaemia CBG <4.0 mmol/l". Under the heading "Treatment", the pathway starts with a box: "URGENT treatment according to local protocol". An arrow points down to a decision box: "Able to swallow?". Below this are two options: "YES" (in a purple box) and "NO" (in an orange box). Arrows point down from both options. At the bottom of the page, there is a link: "Back to previous page".

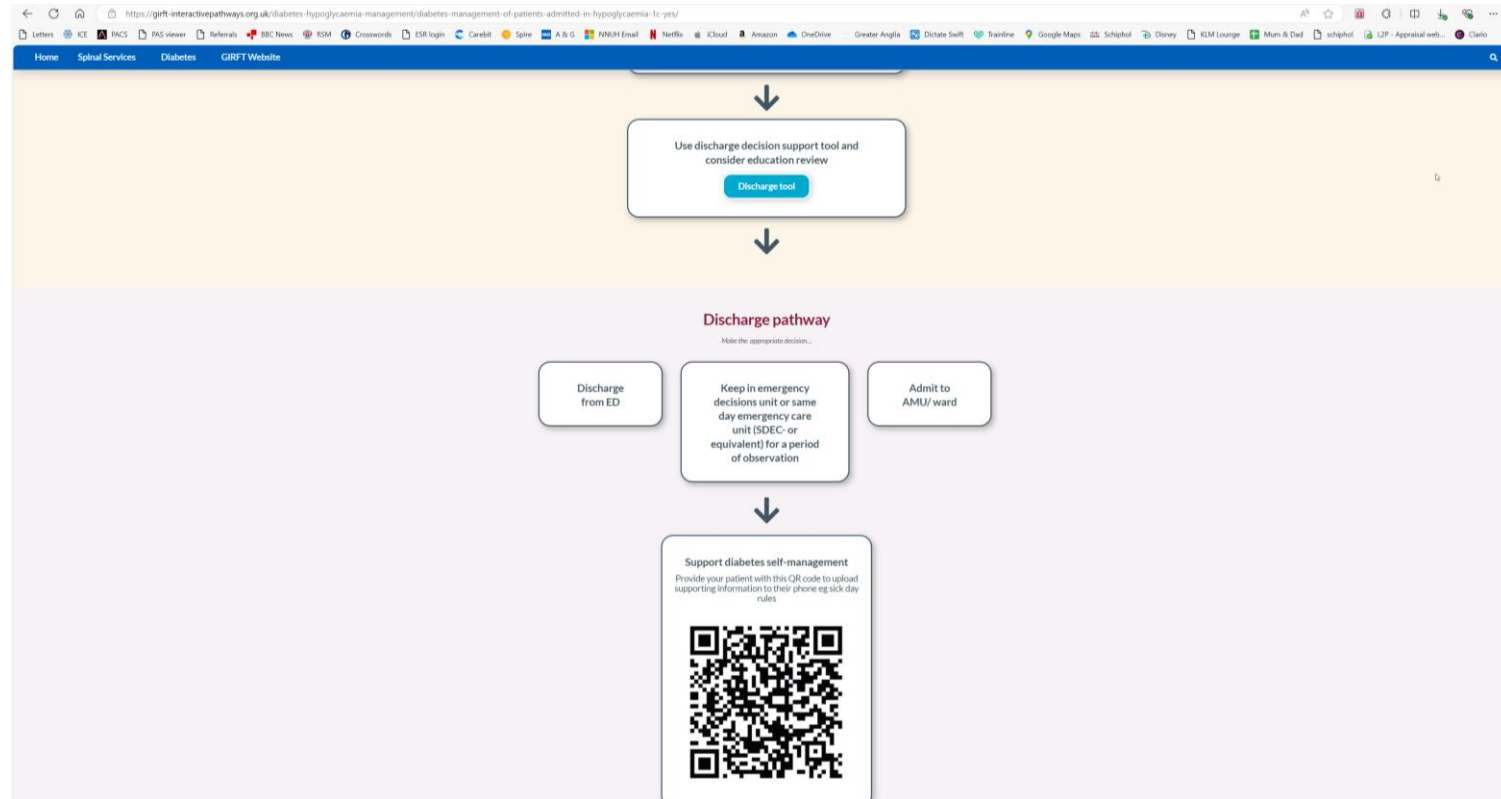
<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

Hypoglycaemia

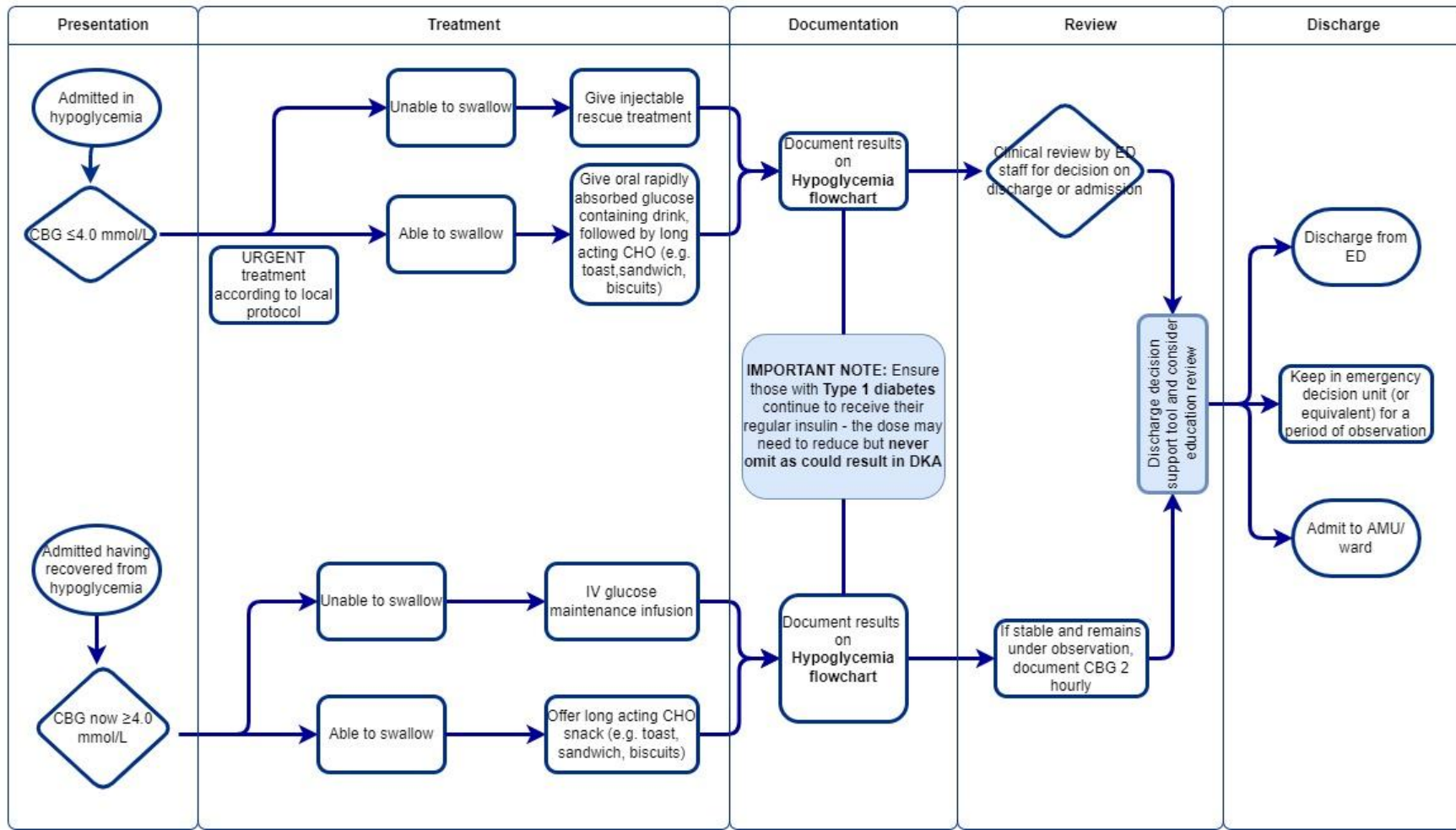


<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>

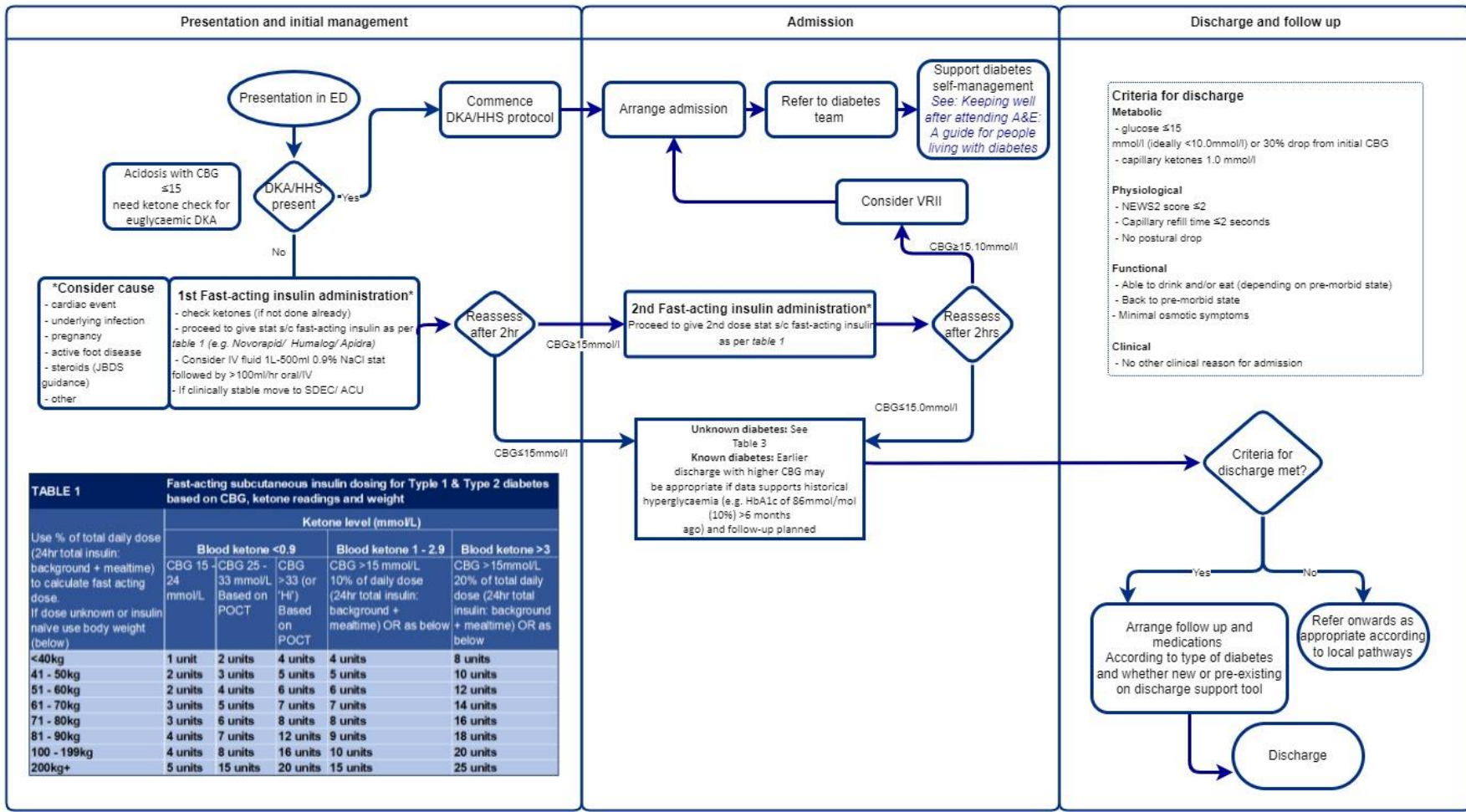
Hypoglycaemia



<https://gettingitrightfirsttime.co.uk/three-new-interactive-pathways-support-nhs-teams-at-the-front-door-to-care-for-patients-with-diabetes/>



IMPORTANT NOTE: Ensure those with **Type 1 diabetes** continue to receive their regular insulin - the dose may need to reduce but **never omit** as could result in DKA



- *Consider cause**
- cardio event
 - underlying infection
 - pregnancy
 - active foot disease
 - steroids (JBDS guidance)
 - other

- 1st Fast-acting insulin administration***
- check ketones (if not done already)
 - proceed to give stat s/c fast-acting insulin as per table 1 (e.g. Novorapid/ Humalog/ Apidra)
 - Consider IV fluid 1L-500ml 0.9% NaCl stat followed by >100ml/hr oral/IV
 - If clinically stable move to SDEC/ ACU

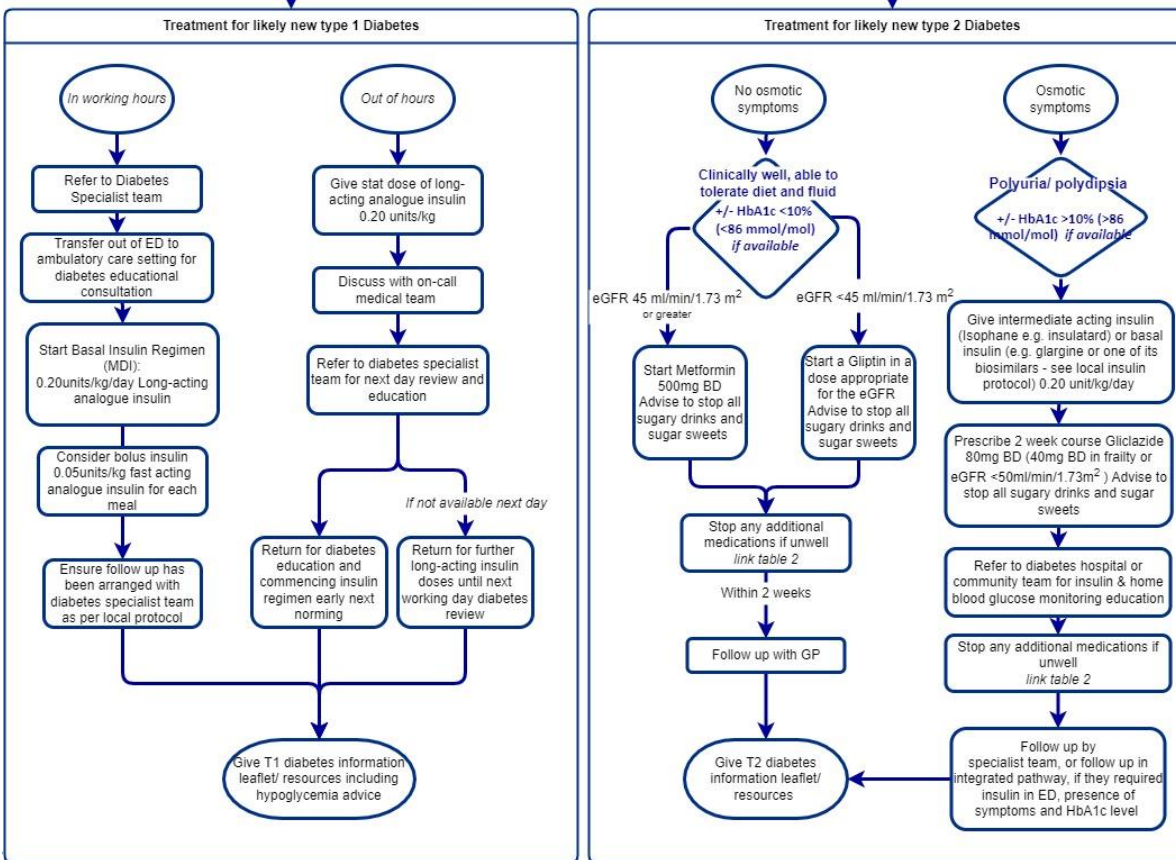
TABLE 1 Fast-acting subcutaneous insulin dosing for Type 1 & Type 2 diabetes based on CBG, ketone readings and weight

Use % of total daily dose (24hr total insulin: background + mealtime) to calculate fast acting dose. If dose unknown or insulin naive use body weight (below)	Ketone level (mmol/L)					
	Blood ketone <0.9		Blood ketone 1 - 2.9		Blood ketone >3	
	CBG 15-24 mmol/L	CBG 25-33 mmol/L (Based on POCT)	CBG >33 (or 'H')	CBG >15 mmol/L 10% of daily dose (24hr total insulin: background + mealtime) OR as below	CBG >15mmol/L	CBG >15mmol/L
<40kg	1 unit	2 units	4 units	4 units	8 units	8 units
41 - 50kg	2 units	3 units	5 units	5 units	10 units	10 units
51 - 60kg	2 units	4 units	6 units	6 units	12 units	12 units
61 - 70kg	3 units	5 units	7 units	7 units	14 units	14 units
71 - 80kg	3 units	6 units	8 units	8 units	16 units	16 units
81 - 90kg	4 units	7 units	12 units	9 units	18 units	18 units
100 - 199kg	4 units	8 units	16 units	10 units	20 units	20 units
200kg+	5 units	15 units	20 units	15 units	25 units	25 units

- Criteria for discharge**
- Metabolic**
- glucose ≤15 mmol/l (ideally <10.0mmol/l) or 30% drop from initial CBG
 - capillary ketones 1.0 mmol/l
- Physiological**
- NEWS2 score ≤2
 - Capillary refill time ≤2 seconds
 - No postural drop
- Functional**
- Able to drink and/or eat (depending on pre-morbid state)
 - Back to pre-morbid state
 - Minimal osmotic symptoms
- Clinical**
- No other clinical reason for admission

Review by senior A&E (SpR/ Consultant) to confirm discharge plan

Classification of type 1 or type 2 diabetes

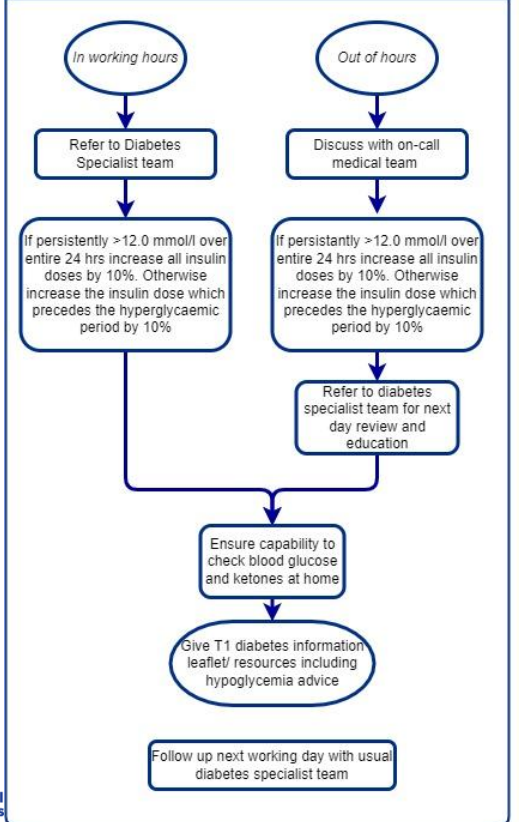


This tool is to support discharge for patients with pre-existing diabetes. For patients with new diabetes, see supporting document here.

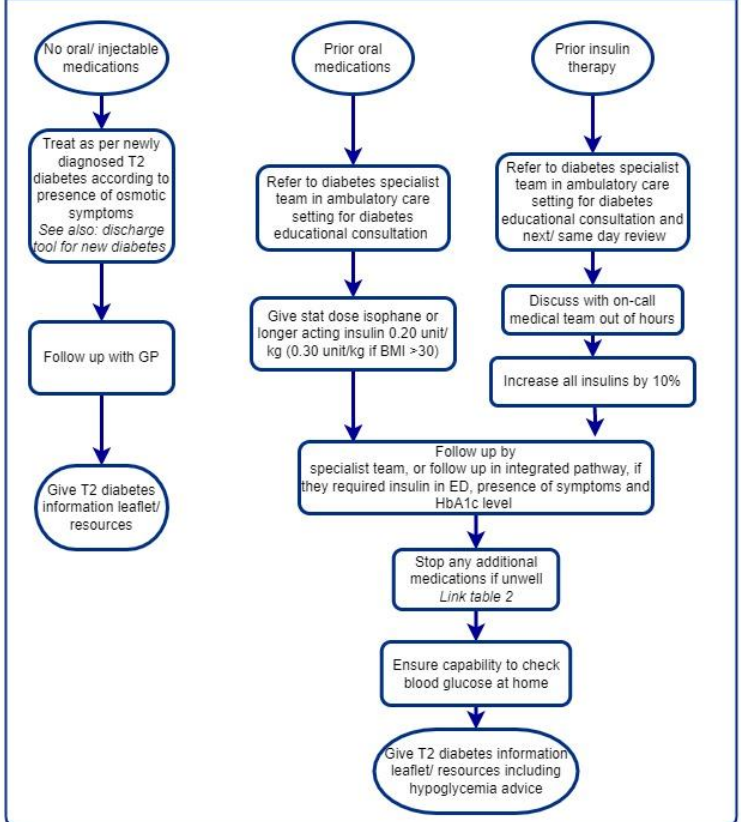
Review by senior A&E (SpR/ Consultant) to confirm discharge plan

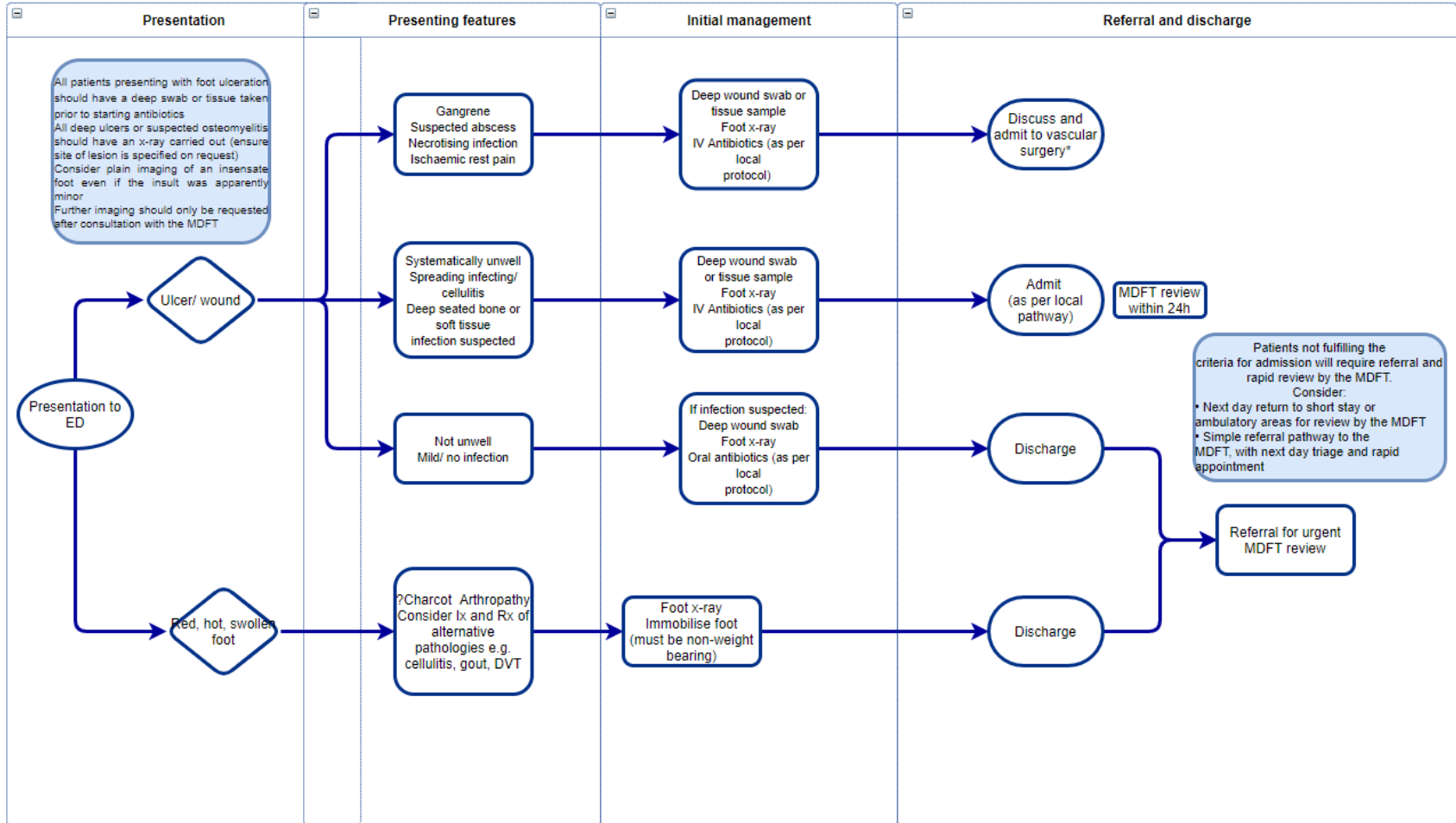


Discharge in type 1 diabetes with hyperglycaemia



Discharge in type 2 diabetes with hyperglycaemia





Other Tools

In Summary




- Diabetes and hyperglycaemia remains very prevalent at the front door
- They are associated with harm – however that is measured
- There are many tools available to help non-specialists

“JBDS” “Guidelines”

Diabetes at the Front Door

www.norfolkdiabetes.com

ketan.dhatariya@nnuh.nhs.uk

 @ketandhatariya
 @JBDSIP
 @ABCDiab

