NATIONAL MEDICINES SYMPOSIUM 2025

Diabetes Medication Management During & After Hospital

Transitions in Care

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Diabetes Medication Management with Hospitalisation

Outline

- **Medication use prior to hospital**
- **Medication use during hospital**
- **Medication use after hospital**

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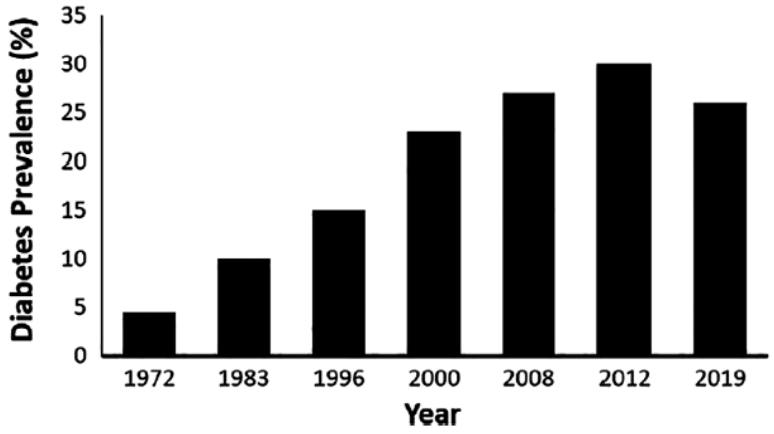
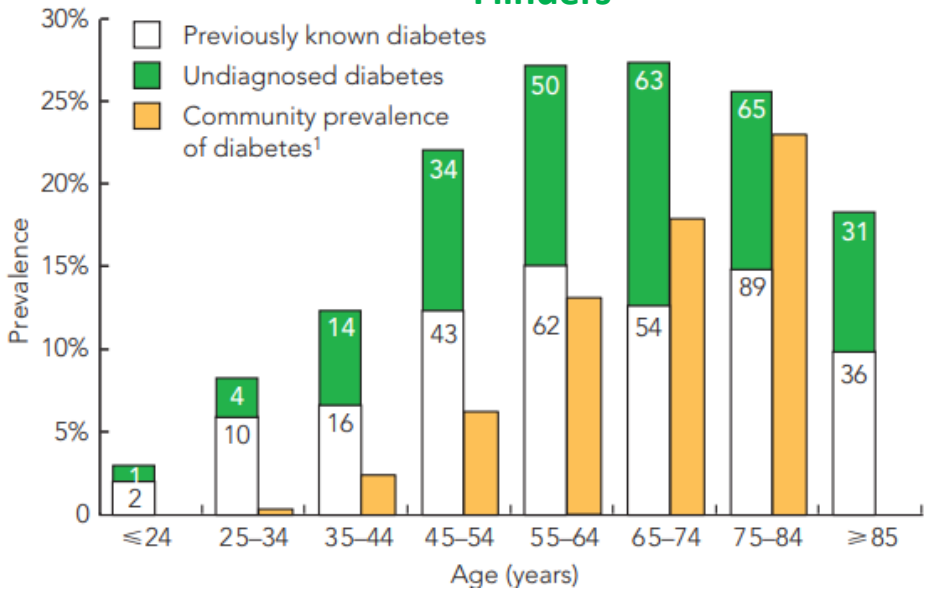
Diabetes affects 1 in 4 inpatients in Australian hospitals

Royal Melbourne



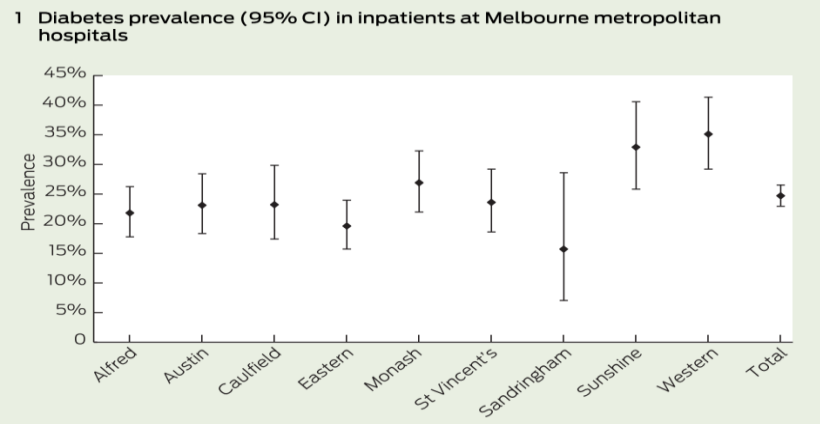
Wang R et al., *IMJ* 2021

Flinders



Valentine N et al., *MJA* 2011

Metro Melbourne Hospitals



Bach L et al., *MJA* 2014

Queensland Inpatient Diabetes Survey (QUIDS)

24% prevalence of diabetes

Donovan P et al., *MJA* 2021

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Acute illness and surgery alters physiology, hence diabetes becomes less stable, characterised by greater glycaemic variability including marked hyper and hypoglycaemia

Diabetes medication management therefore needs to be modified

‘Before Hospital’ ‘In Hospital’ ‘After Hospital’

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Diabetes Management Pre Hospitalisation Themes

- **Medication complexity**
- **Medication assessment prior to elective surgery**
- **GLP-1 Receptor Agonists (GLP1RA) & SGLT2 Inhibitors (SGLT2i)**

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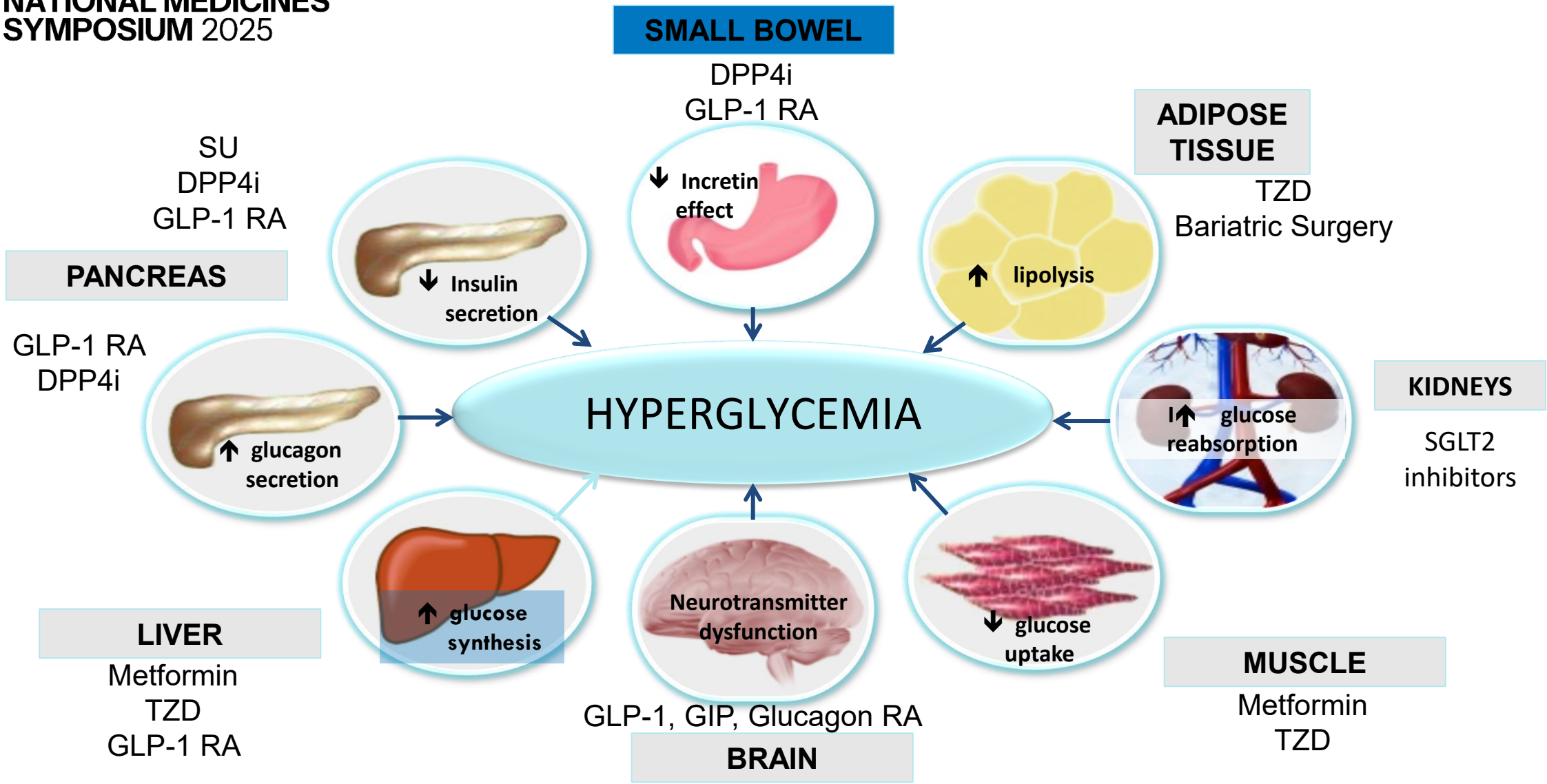
Diabetes medications are proliferating!



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DPP4i, dipeptidyl peptidase-4 inhibitor; GLP-1 RA, glucagon-like peptide-1 receptor agonist; TZD, thiazolidinedione, SU: sulphonurea. DeFronzo RA. Diabetes. 2009;58(4):773–795.

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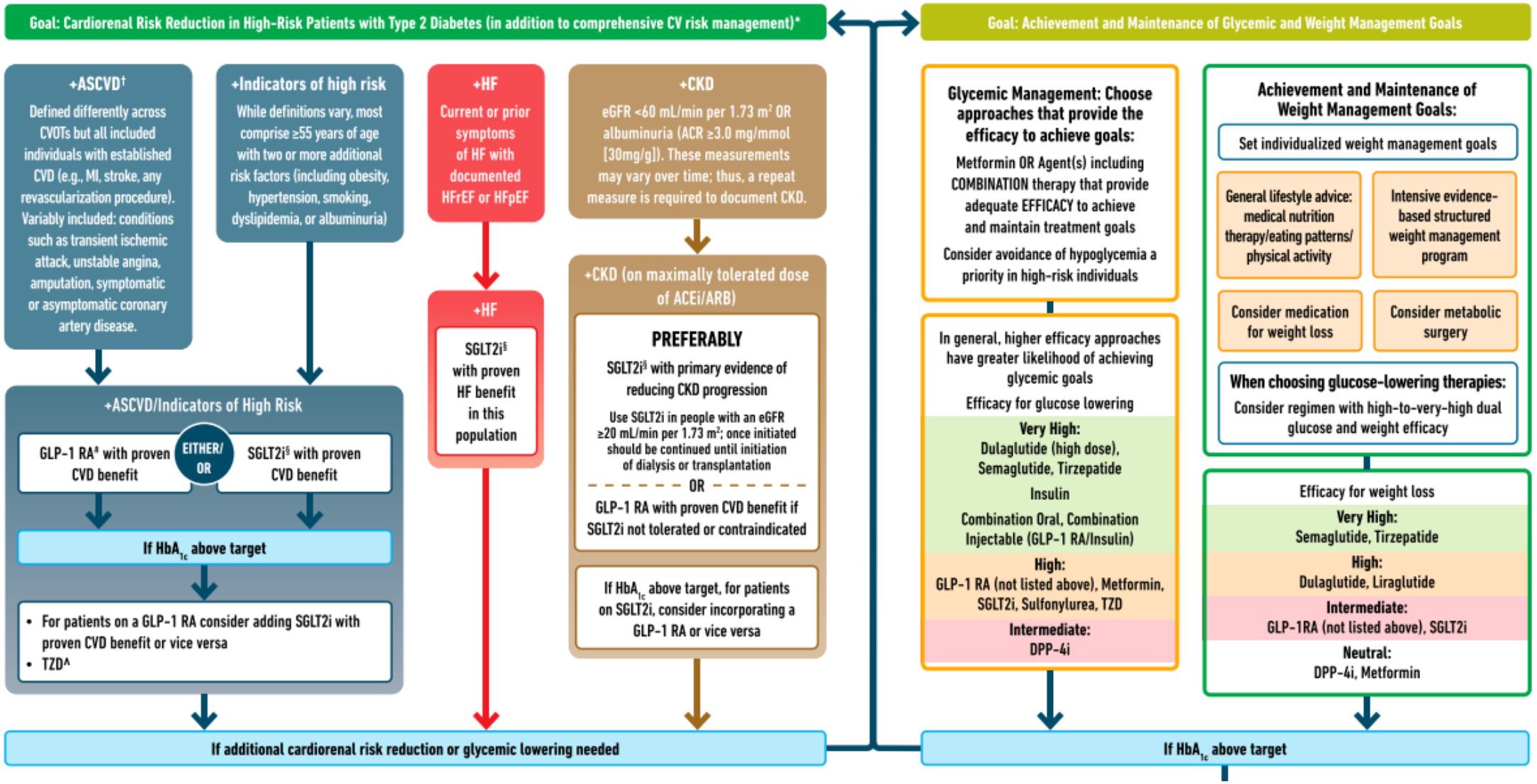
ADA & EASD T2D Management Consensus Guideline



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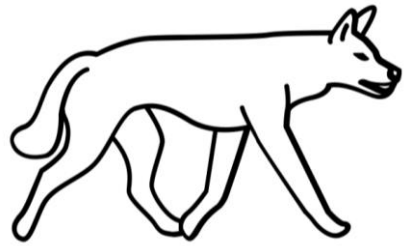
Davies M et al, Diabetes Care 2022

The Journal of Clinical Endocrinology & Metabolism, 2024, **00**, 1–9
https://doi.org/10.1210/clinem/dgae051
Advance access publication 27 January 2024
Clinical Research Article

ENDOCRINE SOCIETY | OXFORD

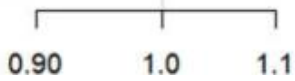
The DINGO Study



Hyperglycemia in Hospital: An Independent Marker of Infection, Acute Kidney Injury, and Stroke for Hospital Inpatients

Rahul D. Barmanray,[1,2,3] Mervyn Kyi,[1,2,3] Leon J. Worth,[4,5] Peter G. Colman,[1,2] Leonid Churilov,[2,3] Timothy N. Fazio,[6] Gerry Rayman,[7] Vicky Gonzalez,[1] Candice Hall,[1]

Outcome	Hyperglycemia (n=1,147)	No hyperglycemia (n=1,411)	Adjusted OR	95% CI	Adjusted P value
Healthcare-associated infection	130 (11.3)	100 (7.1)	1.03	1.01-1.05	0.003 *
Acute kidney injury	120 (10.5)	59 (4.2)	1.07	1.05-1.09	<0.001 ***
Stroke	10 (0.9)	1 (0.1)	1.05	1.04-1.06	<0.001 ***
Acute coronary syndrome	13 (1.1)	6 (0.4)	1.00	0.99-1.01	0.27
Mortality	50 (4.4)	32 (2.3)	1.02	0.99-1.03	0.052



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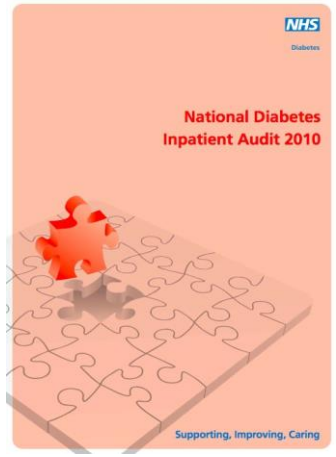
National Diabetes Inpatient Audit

NHS Digital

Inpatient Harms (NaDIA 2016)



Harms	% of inpatients
Hypoglycaemia (<3.0 mmol/L)	1 in 12
Hypoglycaemia requiring injectable treatment	1 in 60
Diabetic Ketoacidosis (DKA) arising in hospital	1 in 25 (of T1D)
Hyperglycaemic Hyperosmolar State (HHS) arising in hospital	1 in 500 (of T2D)
Foot wounds arising in hospital	1 in 75
Medication Errors	**% of inpatients**
Prescription Errors	1 in 5
Management Error (inertia)	1 in 4

Prof. G. Rayman established NaDIA England 2009

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Diabetes Management Pre Hospitalisation
GLP-1 Receptor Agonists avoid cessation

ANZCA Australian and New Zealand College of Anaesthetists

GESA Gastroenterological Society of Australia

NACOS National Association of Clinical Obesity Services

ads Australian Diabetes Society

Clinical Practice Recommendations regarding patients taking GLP-1 receptor agonists and dual GLP-1/GIP receptor co-agonists prior to anaesthesia or sedation for surgical and endoscopic procedures.

Recommendations relating to GLP-1RAs and GLP-1/GIPRAs and sedation or anaesthesia:

- All patients should be asked about the use of GLP-1RAs and GLP-1/GIPRAs prior to anaesthesia or sedation for surgical and endoscopic procedures and be involved in discussion and planning regarding the risk of aspiration.
- Elective preprocedural cessation of GLP-1RAs and GLP-1/GIPRAs is not recommended, and risks hyperglycaemia in people with diabetes and may compromise weight control where patients are taking GLP-1RAs and GLP-1/GIPRAs for this indication.
- Patients should be asked about the use of other medications and medical conditions which may exacerbate gastrointestinal symptoms and delay gastric emptying, such as, but not limited to bowel dysmotility, gastroparesis, and Parkinson's disease.
- Preprocedural diet modification with 24-hour clear fluid diet, followed by standard 6-hour fasting, should be recommended for all patients receiving GLP-1 RAs and GLP-1/GIPRAs.
- Risk mitigation options should be undertaken for those who have not withheld solids for 24 hours. These include detection of residual gastric contents, prokinetic agents, modification of anaesthesia, or deferral of procedure (see figure and explanatory notes).

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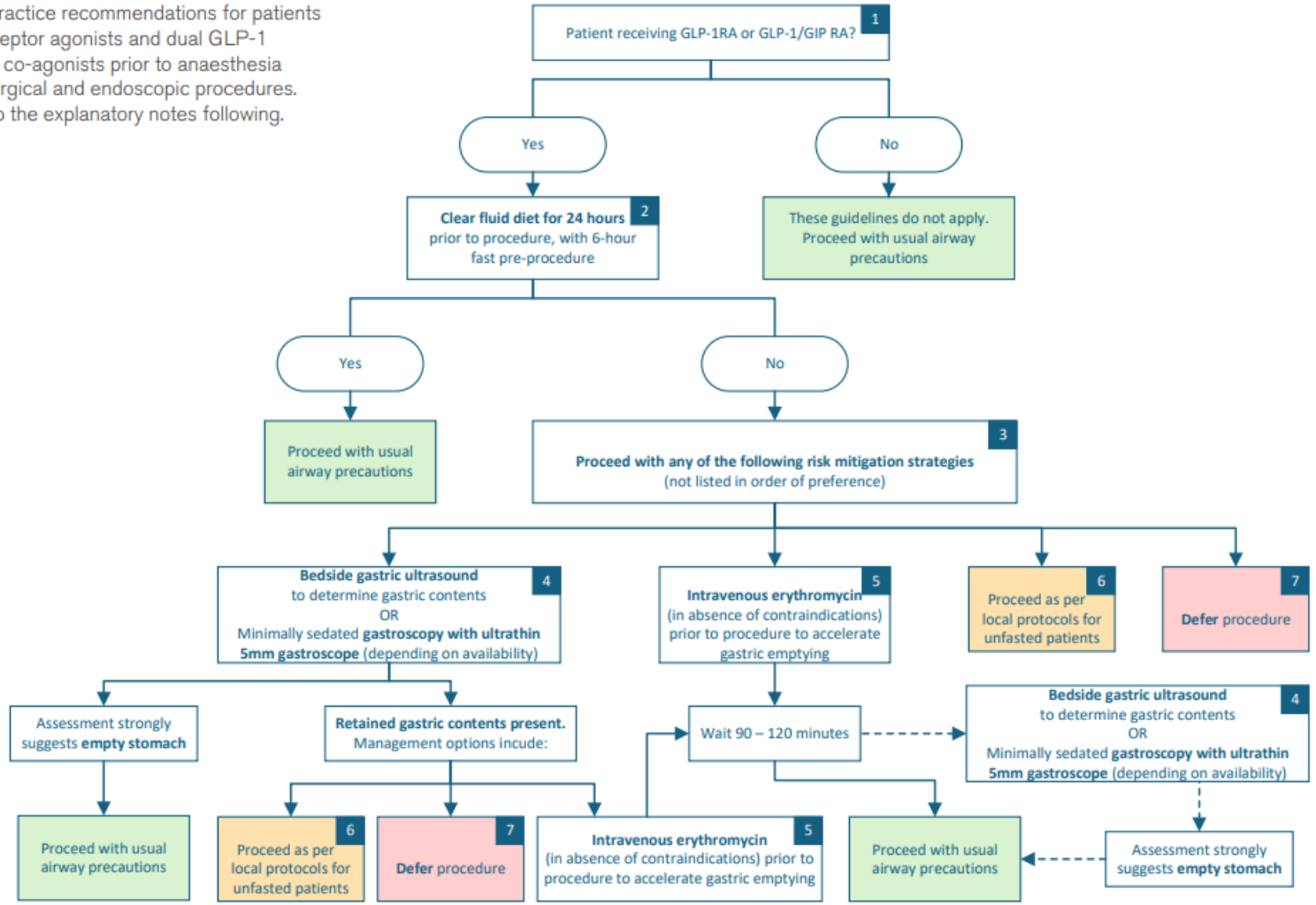
Diabetes Management Pre Hospitalisation GLP-1 Receptor Agonists avoid cessation

Figure: Clinical practice recommendations for patients taking GLP-1 receptor agonists and dual GLP-1 and GIP receptor co-agonists prior to anaesthesia or sedation for surgical and endoscopic procedures. Numbers relate to the explanatory notes following.



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Diabetes Management Pre Hospitalisation
SGLT2 inhibitors withhold 3 days (2 days pre surgery)

ALERT

Severe Euglycaemic Ketoacidosis with SGLT2 Inhibitor Use in the Perioperative Period

Recommendations for Practice

- SGLT2i be ceased at least 3 days pre-operatively (2 days prior to surgery and the day of surgery) or in other physically stressful situations. This may require an increase in other glucose-lowering drugs during this time.
- Strongly consider postponing non-urgent surgery if SGLT2 inhibitors have not been ceased prior to surgery and either blood ketones are >0.6 mmol/L, or HbA1c is >9.0%, as these are indicators of insulin insufficiency and a higher risk of DKA.
- Routinely check both blood glucose and blood ketone levels in the perioperative period if the patient is unwell or is fasting or has limited oral intake, and has been on an SGLT2i prior to surgery.
- If the blood ketone level is >0.6 mmol/L in an unwell pre- or peri-operative patient or >1.5 mmol/L in all other unwell inpatients who have been on an SGLT2i, the treating medical officer and, where relevant, anaesthetist, should be contacted to perform an URGENT VBG to measure the pH
- It is strongly recommended that all patients with DKA are reviewed by an endocrinologist or physician on-call. If required contact your referral tertiary hospital for advice.
- SGLT2i should only be restarted post-operatively when the patient is eating and drinking and close to discharge (usually 3-5 days post-surgery).
- Patients who have day surgery/procedures should only recommence SGLT2i if on full oral intake. It may be prudent to consider delaying recommencement of SGLT2i for a further 24 hours though consideration should also be given to the impact of withholding these agents (and metformin if on combined medication) on glycaemic control.
- Check blood glucose and blood ketone levels if patient has been taking an SGLT2i (prior to or following surgery) and is unwell in the week following surgery.

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Diabetes Management During Hospitalisation Themes

- **Medication changes for safety and combatting dysglycaemia**
- **Early intervention proactive multi-disciplinary care**
- **Medical device technology in the future**

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Diabetes Management During Hospitalisation

Inpatient management fundamentals

For significant acute illness with longer hospital stay use of basal bolus insulin therapy is favoured
Hence usual diabetes medications are often paused and inpatients transition to multi dose insulin

Sulphonylureas – risk hypoglycaemia
Premixed insulin – risk hypoglycaemia
SGLT2i - ketoacidosis
Metformin – lactic acidosis

Long-acting "basal" insulin

0.20 – 0.25 unit per kg

e.g. Insulin glargine

Provides background insulin to suppress hepatic glucose output esp. overnight

When to use

- Essential in type 1 diabetes
- Patients with existing diabetes
- If persistent hyperglycaemia despite rapid-acting insulin

Short-acting "bolus" insulin

0.20 - 0.25 unit per kg (tds divided)

e.g. Novorapid, Actrapid

Covers immediate or short-term rise in glucose

When to use

- With meals
- Stress hyperglycaemia
- Patients without diabetes who don't require basal insulin
- "top up" insulin

Special considerations

- Total daily dose
  - Intravenous insulin requirements
  - Pre-admission regimen
- Weight-based calculations
- Nutritional supplements
- Oral intake
- Renal function (25-50% decrease insulin)
- Addition of non-insulin diabetes medications for insulin sensitisation

(e.g. DPP4 inhibitors, GLP1RA)

The Specialist Treatment of Inpatients: Caring for Diabetes in Surgery (STOIC-D Surgery) Trial: A Randomized Controlled Trial

Early Diabetes Care Improves Outcomes

- **Multidisciplinary**
  - Endocrinologist
  - Diabetes Nurse Practitioner
  - Diabetes Educator
  - Dietiatian
  - Pharmacist
- **Electronic-based care**
  Digital tools including
  Networked Blood Glucose Meters and EMR
- **Bedside care**
  facilitates patient-centred care

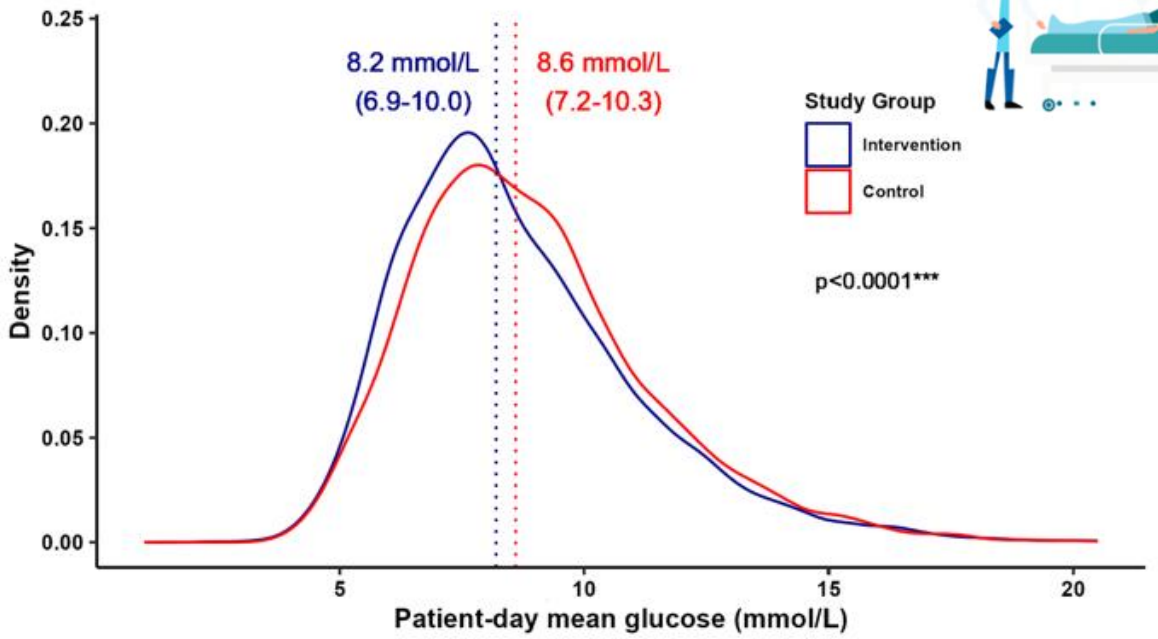

Figure 2—PDMG by study group. Summary statistics are given as median (IQR). ***$P < 0.001$.

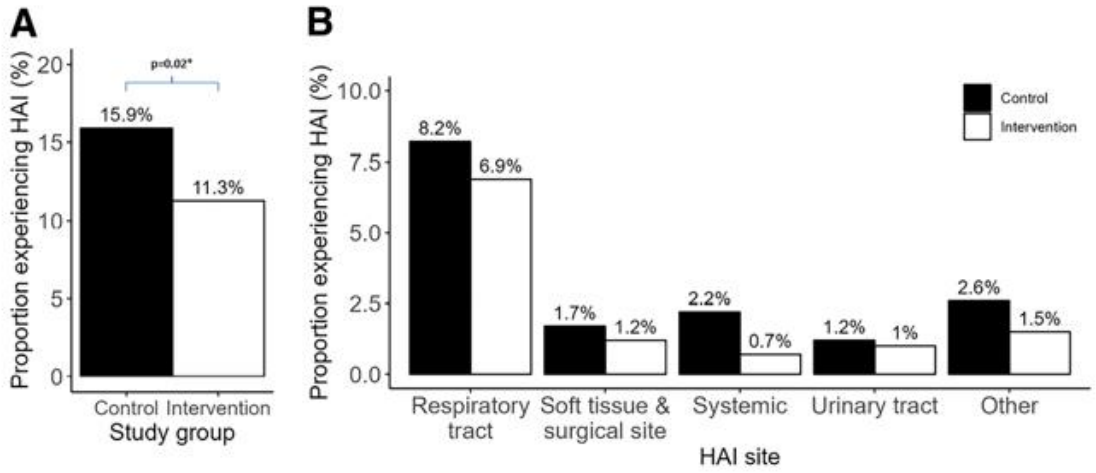

Figure 3—HAI by study group *A*) overall and *B*) categorized by infection site. *$P < 0.05$.

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Barmanray R et al, Diabetes Care 2024

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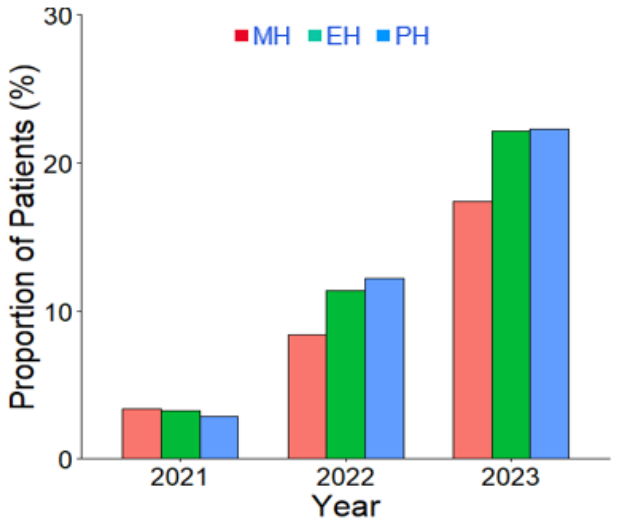
Diabetes Management During Hospitalisation

CGM & Insulin Pumps Medical Device Technology will transform future inpatient care

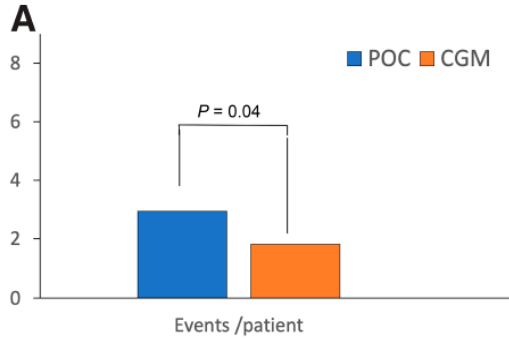
Inpatient CGM use on the rise for people with T1D



Wang R et al Int Med J 2025

Real-time CGM in Acute Care may decrease hypoglycaemia

n=185 Medicine or Surgery Wards
T2D or T1D on Insulin
Dexcom G6 CGM Real time vs usual POC BG

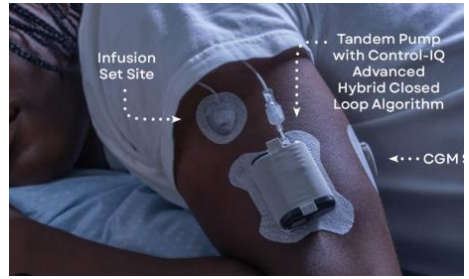


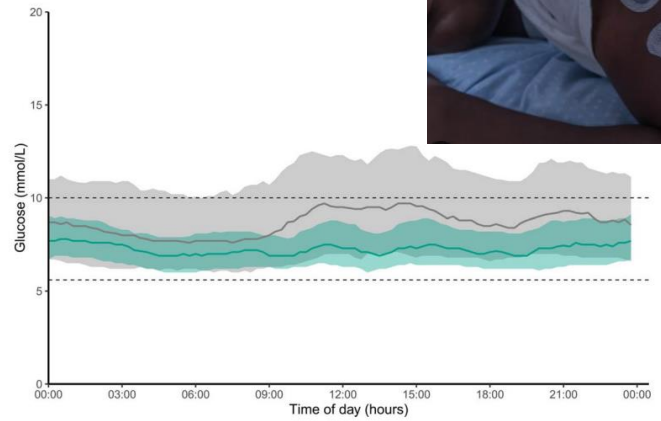
39% decrease hypoglycaemia events in Patients who experience initial hypoglycaemia

Spanakis E et al Diab Care 2022

Automated Insulin Delivery Pump Systems in Acute Care

n=37 Abdominal surgery
Diabetes or Pre-Diabetes HbA1c ≥5.7%
Randomised Fully Closed Loop Pump vs Usual Care





Time in target glucose range 3.9 – 10mmol/L
Improved 80% FCL vs 54% UC (>6 hrs per day)

Krutkyte G et al Anna Surg 2025

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Diabetes Management Post Hospitalisation Themes

- **Medications needs to be revised with transition to home**
- **Early intervention improves outcomes**

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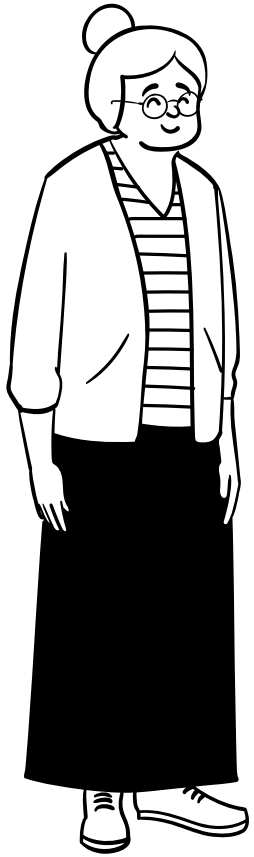
Diabetes Management Post Hospitalisation

Discharge planning considerations

Pre-existing glycaemic status
HbA1c
6-7%: maintain baseline therapy
7-9%: escalate with SGLT2i or GLP1-RA or insulin
>9%: insulin

Communication of diabetes management plan



Medication adjustment
Short-term: Insulin titration
Long-term: Adjunctive therapies & potential insulin wean

Patient preference & related factors

Safety

Cardio-kidney metabolic health

Follow up health professional care
Primary care
Specialist care short term
Specialist care long term

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Which diabetes medication?

Medication	Glucose reduction	Hypo risk	Weight	CV Events	Heart Failure	CKD	MASLD
Metformin	High	No	Neutral	Potential benefit	Neutral	Neutral	Neutral
SGLT2i	Medium-high	No	Loss	Benefit	Benefit	Benefit	Unknown
GLP-1 RA	High-very high	No	Loss	Benefit	HFpEF benefit	Benefit	Benefit
GIP/GLP-1 RA	Very high	No	Loss	Benefit	Benefit	Unknown	Benefit
Insulin	Very high	Yes	Gain	Neutral	Neutral	Neutral	Unknown

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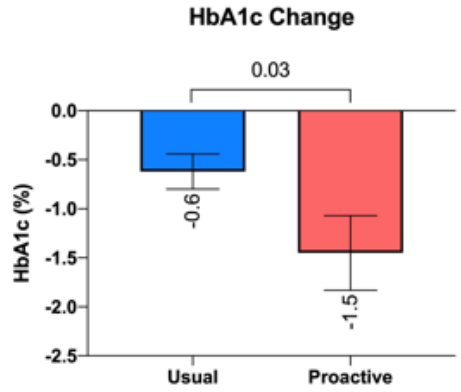
Diabetes Management Post Hospitalisation

Evidence that early intervention with specialist multi-disciplinary diabetes care in hospital improves glycaemia post hospitalisation

RAPIDS RCT

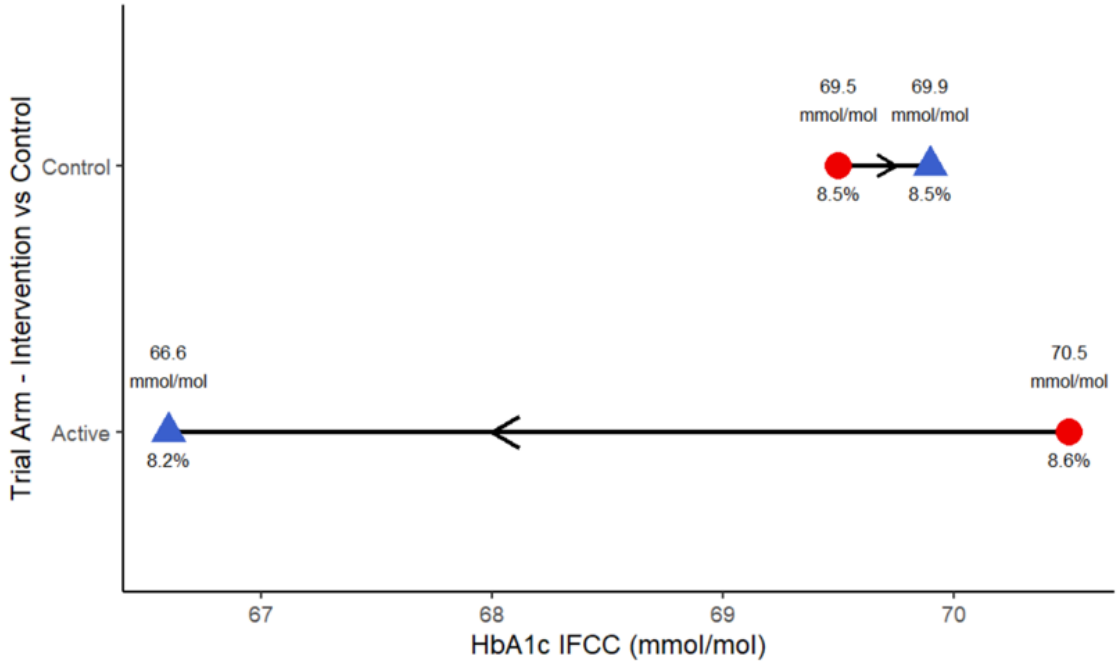
Subgroup (admission HbA1c >8.0%)



Admission HbA1c	**9.6** (1.4)	**10.0** (1.8)
Follow-up HbA1c	**9.0** (1.8)	**8.5** (1.7)
Change in HbA1c	**-0.6**	**-1.5**

Kyi M et al J Hosp Med 2023

STOIC-D Surgery RCT



Gamage I et al JCEM 2025

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Diabetes Medication Management with Hospitalisation

Summary of Transitions in Care

Pre Hospitalisation

- Assessment for safe usage of diabetes medications prior to hospitalisation is key
- Optimising glycaemia to avoid perioperative dysglycaemia is ideal

During Hospitalisation

- Some diabetes medications needs to paused and basal bolus insulin regimens are frequently used
- Early Inpatient Diabetes multi-disciplinary care is warranted for high risk/complex patient scenarios with the intent of improving patient-centred care in hospital and post discharge

Post Hospitalisation

- Communication of diabetes medication changes and follow up plans are paramount
- Cardio-kidney metabolic protective medications (GLP1RA, SGLT2i) should be considered where appropriate

Acknowledgements

Dr Georgina Manos Endocrinology Registrar Royal Melbourne Hospital

The Royal Melbourne Hospital

Thank you for listening

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