

NADC- Diabetes Discovery Improving Inpatient Care at Austin Health

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Diabetes Discovery Initiative

By undertaking routine HbA1c testing among inpatients ≥ 54 using the CERNER Millennium® Health IT System, the initiative was established:

1. To identify and improve the clinical care of inpatients with poor glycaemic control.
1. To investigate the prevalence of diabetes at Austin Health.

Routine Review:		
Endocrinology Team:	General Medicine Advanced Trainee:	
All Inpatients	General Medicine / General Surgery / Orthopaedics / Cardiac Surgery	
HbA1c $\geq 8.3\%$ ($\geq 67\text{mmol/mol}$) (new & known diabetes)	HbA1c 6.5-8.2% (48-66mmol/mol) (new diabetes)	HbA1c 7.5-8.2% (59-66mmol/mol) (known diabetes)

Diabetes Discovery Initiative- 2013

Austin Health Admissions

Inclusion criteria:

≥ 54 yo

Acute admissions

Austin campus

Acute Psychiatry:
≥ 30 yo

Exclusion criteria:

Day cases

Palliative care

HbA1c results
available last 3
months

Automated Cerner Order for HbA1c

Diabetes Discovery Initiative- Registrar Report

- All inpatients with HbA1c \geq 8.3% are reviewed by the endocrine registrar
- HbA1c < 8.3% admitted under high risk units are reviewed by senior gen med registrar

Output to File/Printer/MINE: MINE

*Facility: Austin Hospital, Repat Hospital, Royal Talbot

*Location(s):

<input type="checkbox"/>	Any (*)	
<input type="checkbox"/>	11	11
<input type="checkbox"/>	14	14
<input type="checkbox"/>	4	4

Select Clinical Unit(s) for further filtering:

- ABI Rehab AH
- Acute Assessment Adm
- Amputee Rehabilitati
- Anaesthetics AH
- Cardiac Surg AH
- Cardiology AH
- Child Psychiatry AH
- Clinical Pharmacoln

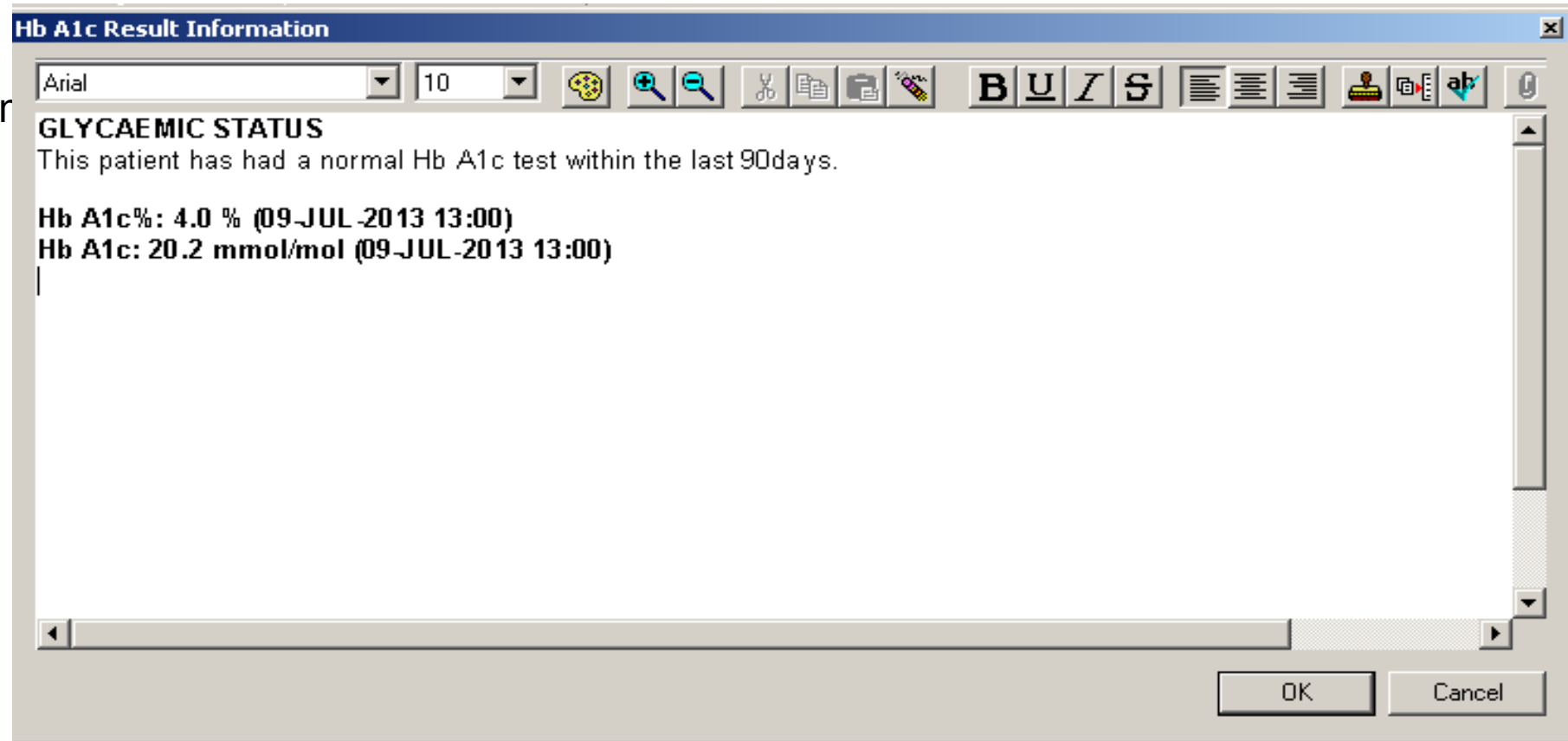
*Patient Types for Report:

- Any (*)
- Emergency
- Inpatient
- Outpatient

*Result: Hb A1c, Hb A1c %

Discharge Summaries- Normal HbA1c

- Glycaer



The screenshot shows a software window titled "Hb A1c Result Information". The window has a standard toolbar with icons for font selection (Arial, size 10), zoom, and editing. The main text area contains the following information:

GLYCAEMIC STATUS
This patient has had a normal Hb A1c test within the last 90days.

Hb A1c%: 4.0 % (09-JUL-2013 13:00)
Hb A1c: 20.2 mmol/mol (09-JUL-2013 13:00)

At the bottom right of the window are "OK" and "Cancel" buttons.

Discharge Summaries- Elevated HbA1c

Hb A1c Result Information

Arial 10

GLYCAEMIC STATUS

This patient has an elevated Hb A1c result. Please consider possible diabetes if your patient is not diagnosed.

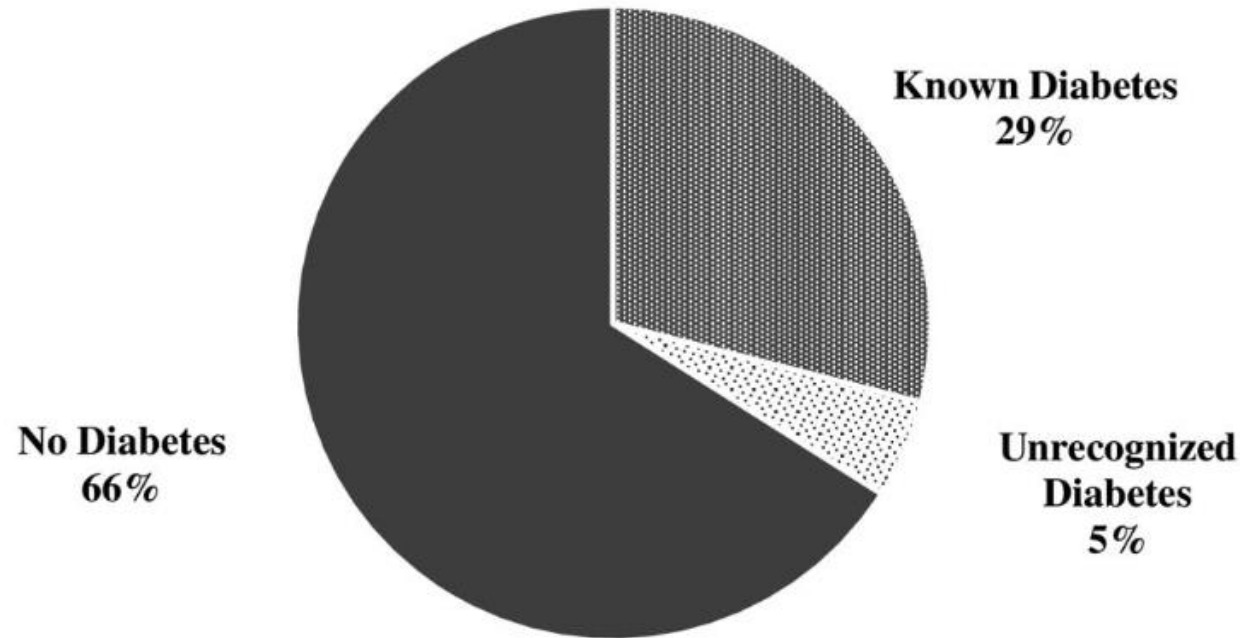
Please make a time to discuss this result with your patient and arrange further management as appropriate. If a diabetes outpatient appointment for this patient has already been made, it will appear below.

It is the current practice at Austin Health that any inpatient who has an HbA1c of > 8.5% will be reviewed by the diabetes registrar who will advise the patient of the diagnosis of diabetes if newly diagnosed.

Hb A1c%: 9.0 % (18-JUN-2013 14:41)
Hb A1c: 74.9 mmol/mol (18-JUN-2013 14:41)

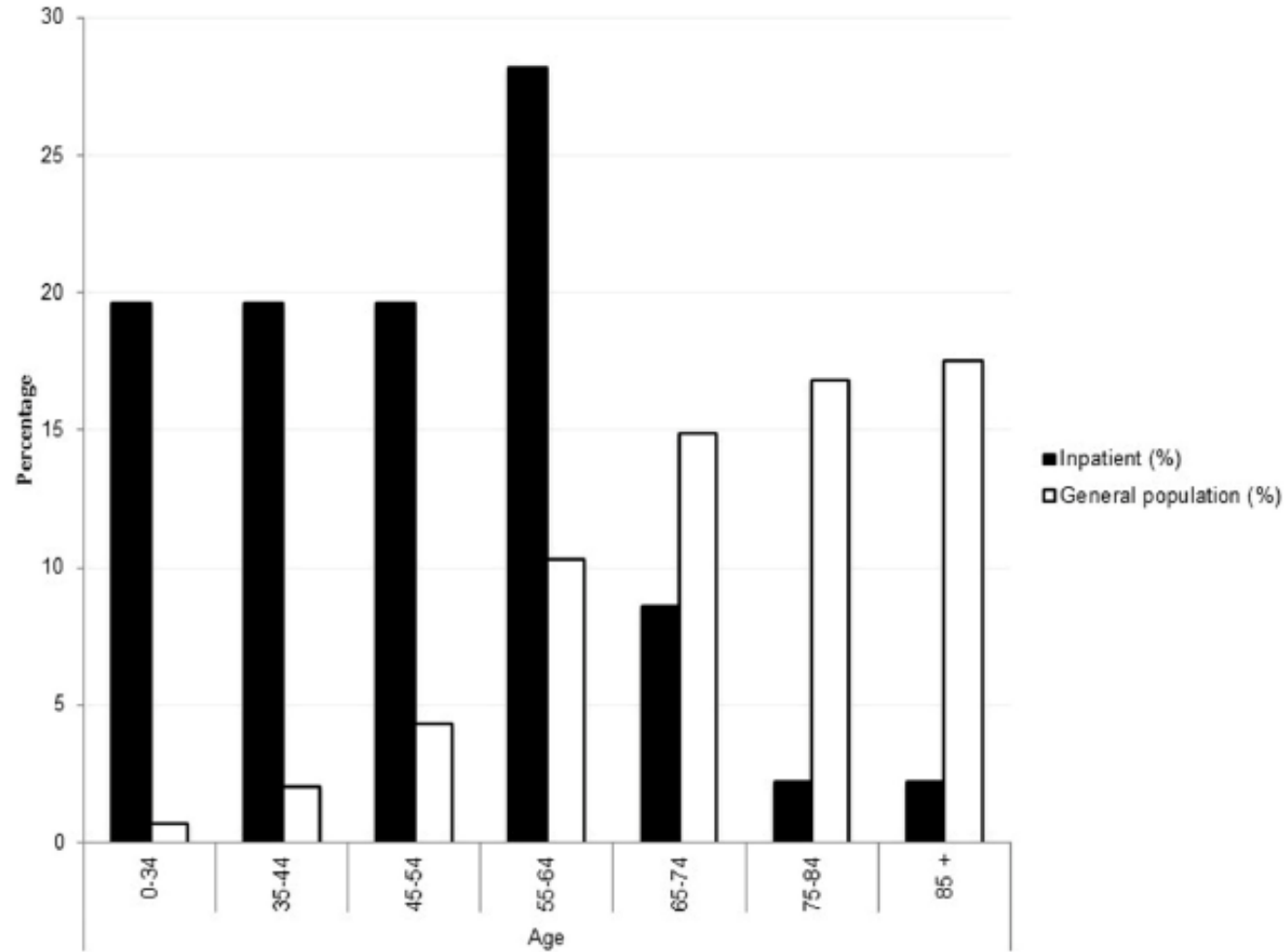
OK Cancel

RESULTS: Diabetes Discovery Initiative: Snapshot of Results: July 2013 – Jan 2014 Inpatients (≥ 54 yo) by Diabetes Status



The prevalence of known, unrecognised and no diabetes among all inpatients aged ≥ 54 years (n=5082)

Prevalence of Diabetes in Psychiatry Inpatients



Prevalance of Diabetes in the orthopaedic unit

Orthopedic Ward Diabetes Prevalence

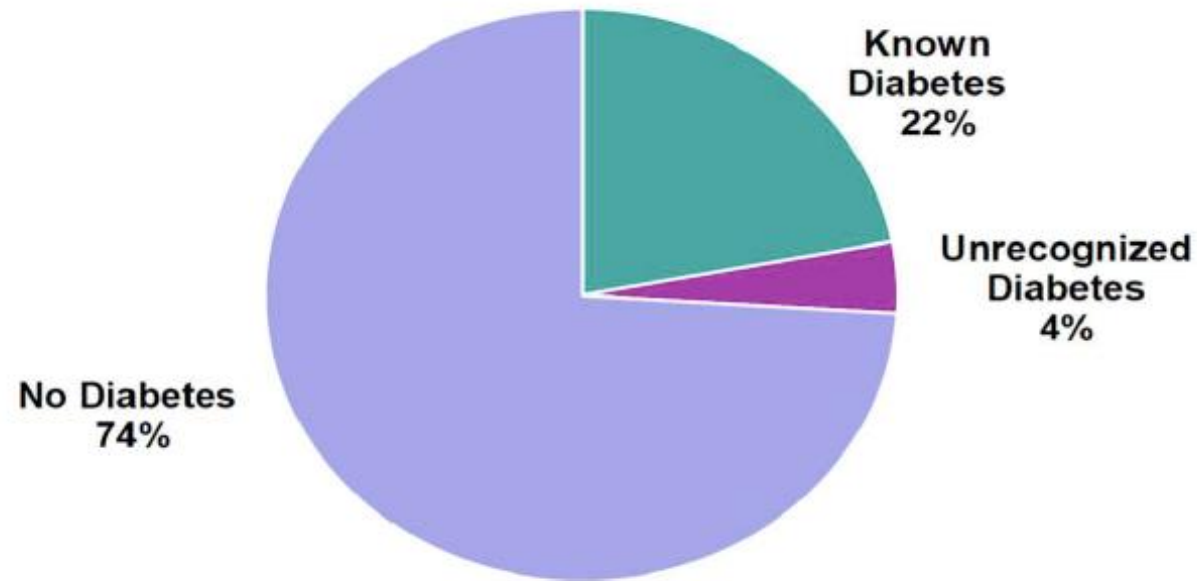
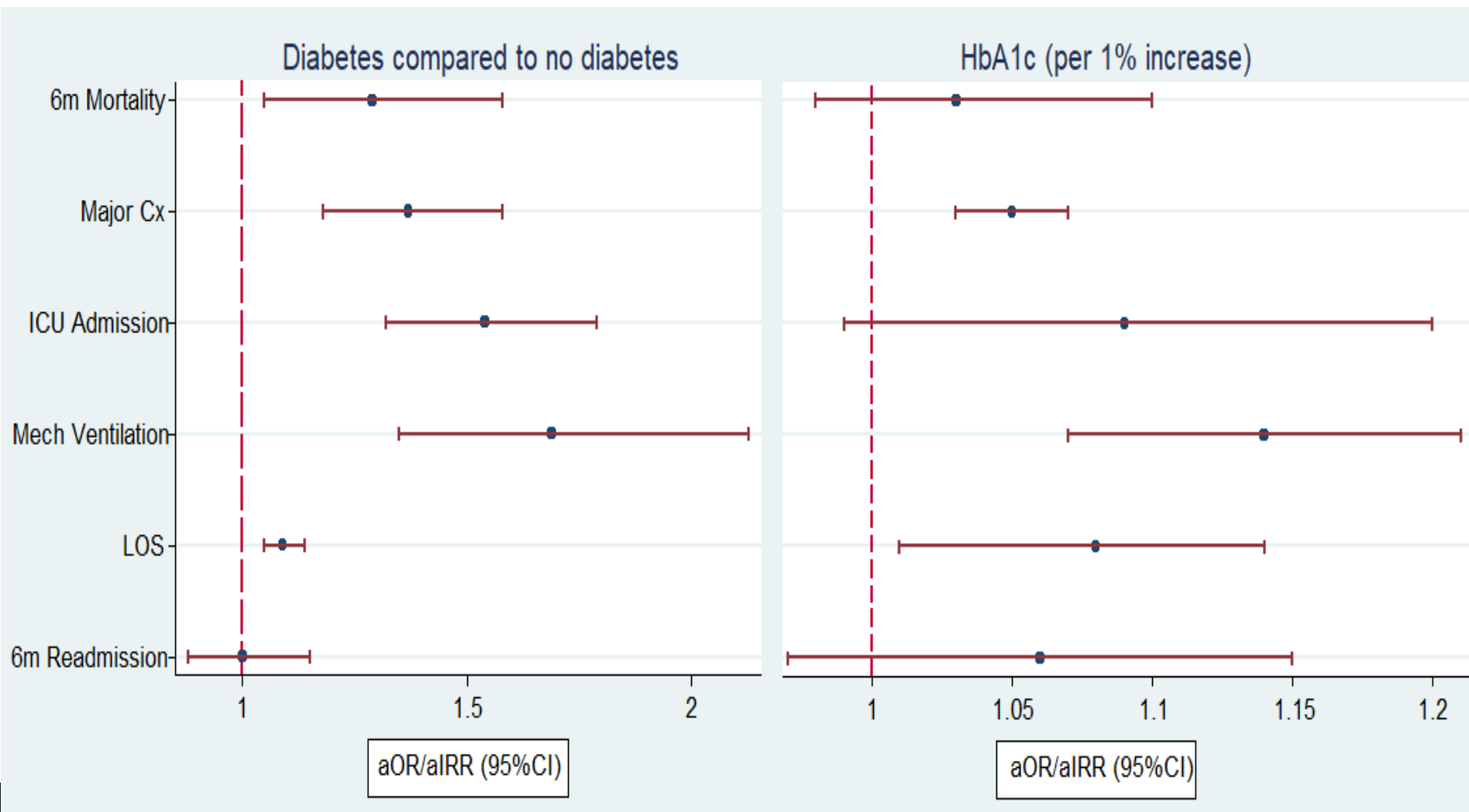


Fig 3. Prevalence of known, unrecognized and no diabetes in inpatients ≥ 54 years.

doi:10.1371/journal.pone.0168471.g003

RESULTS: SURGICAL OUTCOMES (n=7565)



Yong et al ADS, Perth, 2017

Results of multivariate regression in ACS inpatients

	n	Diabetes vs no diabetes OR/IRR* (95% CI)	p value	Pre-diabetes vs no diabetes OR/IRR* (95% CI)	p value
Length of stay (IRR)	847	1.18 (1.02-1.35)	0.02	1.07 (0.93-1.23)	0.35
28-day readmission (OR)	847	1.31 (0.73-2.37)	0.37	1.12 (0.61-2.04)	0.71
In-hospital mortality (OR)	847	1.09 (0.46-2.59)	0.85	0.76 (0.31-1.86)	0.55
Acute pulmonary oedema (OR)	847	2.60 (1.39-4.84)	<0.01	1.11 (0.57-2.19)	0.76
12-month recurrent ACS (OR)	831	1.86 (1.01-3.41)	0.046	0.93 (0.48-1.81)	0.83
12-month mortality (OR)	831	1.34 (0.75-2.37)	0.32	0.81 (0.45-1.47)	0.49

Results of multivariate regression in stroke inpatients

Adjusted outcome analyses comparing diabetes to no diabetes

Outcomes	N	Diabetes	No Diabetes	IRR/OR [^] (95% CI)	p-value
Length of Stay (IRR)	365	6 (3, 11)	5 (2, 10)	1.29 (1.08-1.54)	0.004
28-day Readmission (OR)	365	5.8%	4.0%	1.37 (0.52- 3.67)	0.525
In-hospital mortality (OR)	365	12.7%	13.6%	1.12 (0.58- 2.12)	0.737
6-Months Mortality (OR)	323	29.8%	21.7%	1.90 (1.10- 3.30)	0.022
Modified Rankin Score 2-6 (OR)	247	74.4%	68.6%	1.56 (0.85-2.86)	0.149

Adjusted for age, atrial fibrillation status, stroke type and admission ambulation status

Conclusions

- Approximately one-third of all inpatients ≥ 54 years have diabetes.
- Routine inpatient HbA1c measurement to determine glycemic status allows rapid identification of inpatients with previously unrecognized diabetes and poor glycemic control.
- We demonstrate a feasible method of conducting such an initiative, utilizing electronic health infrastructure to identify patients at greatest risk for prioritization for review.
- The Diabetes Discovery initiative has led to system change at Austin Health.

Acknowledgements

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Diabetes Discovery Registrars

DNE

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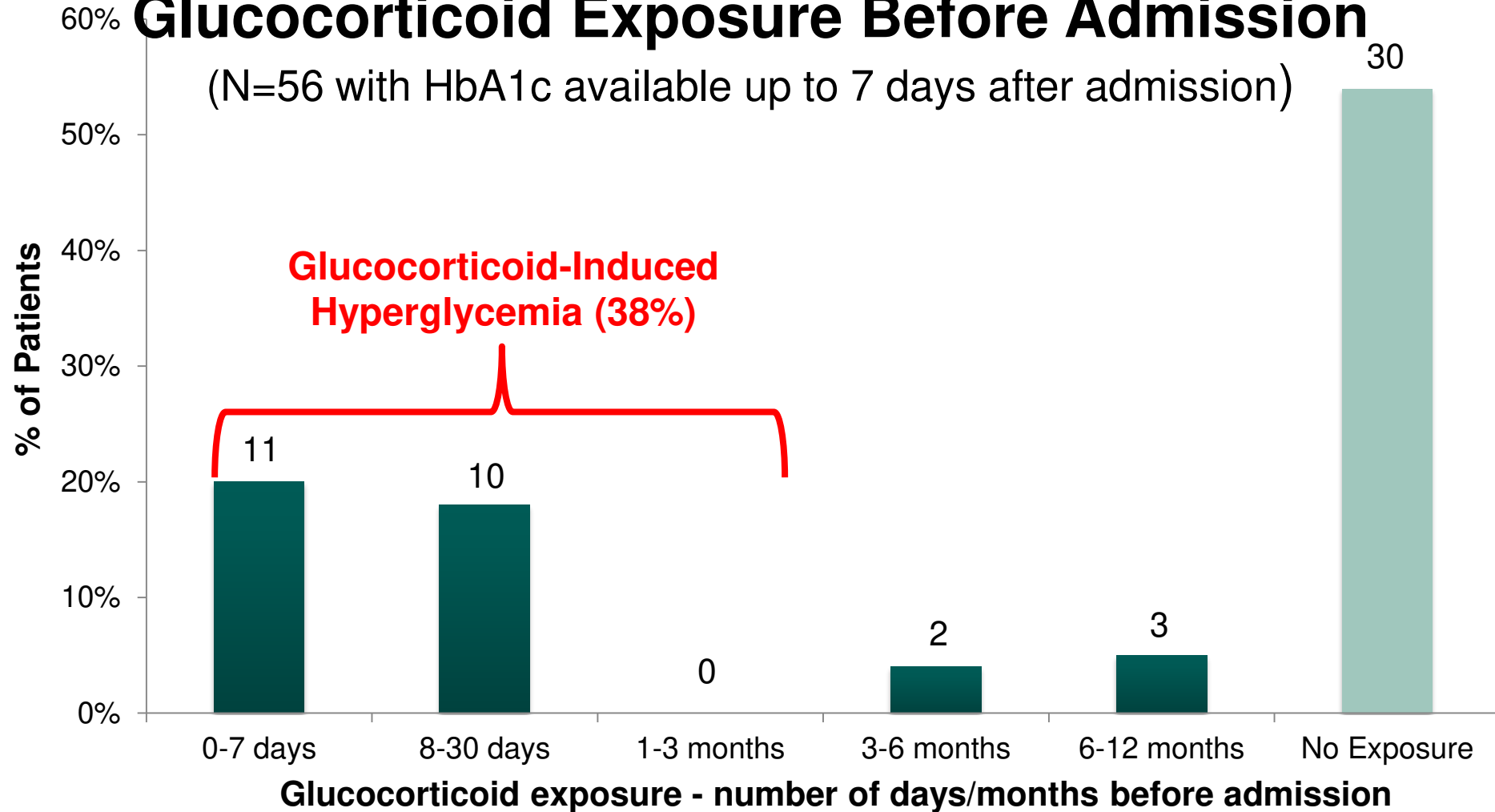
Fergus Kerr (Chief Medical Officer)
Director Acute Operations

General Practices in the vicinity of Austin Health

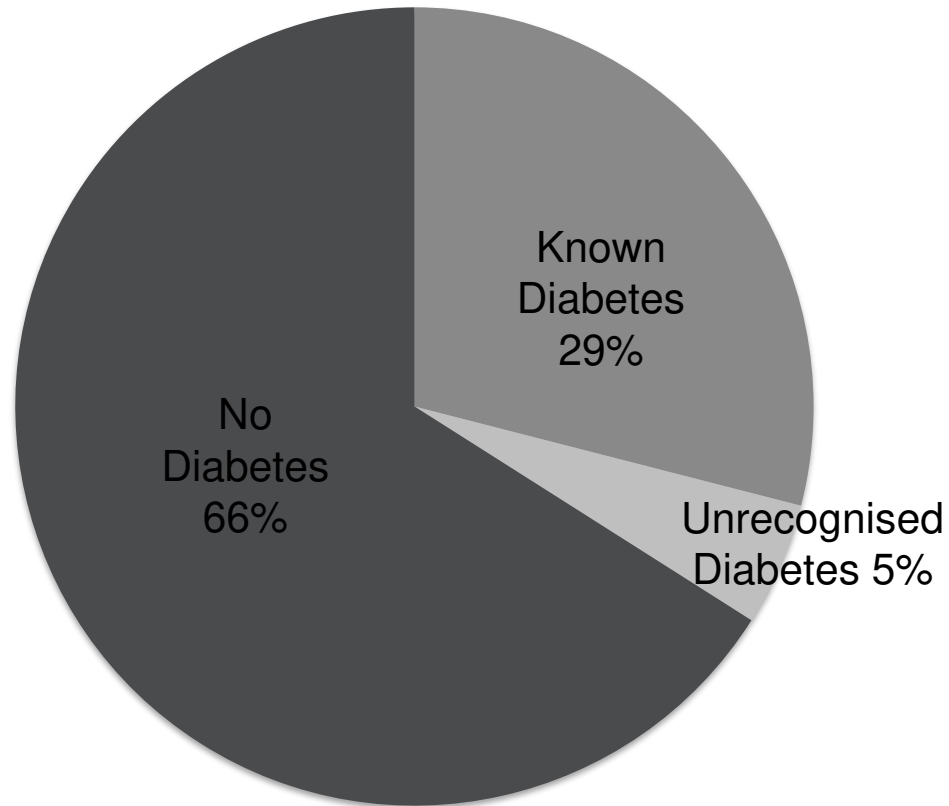
Results Oncology and Haematology Inpatients

Glucocorticoid Exposure Before Admission

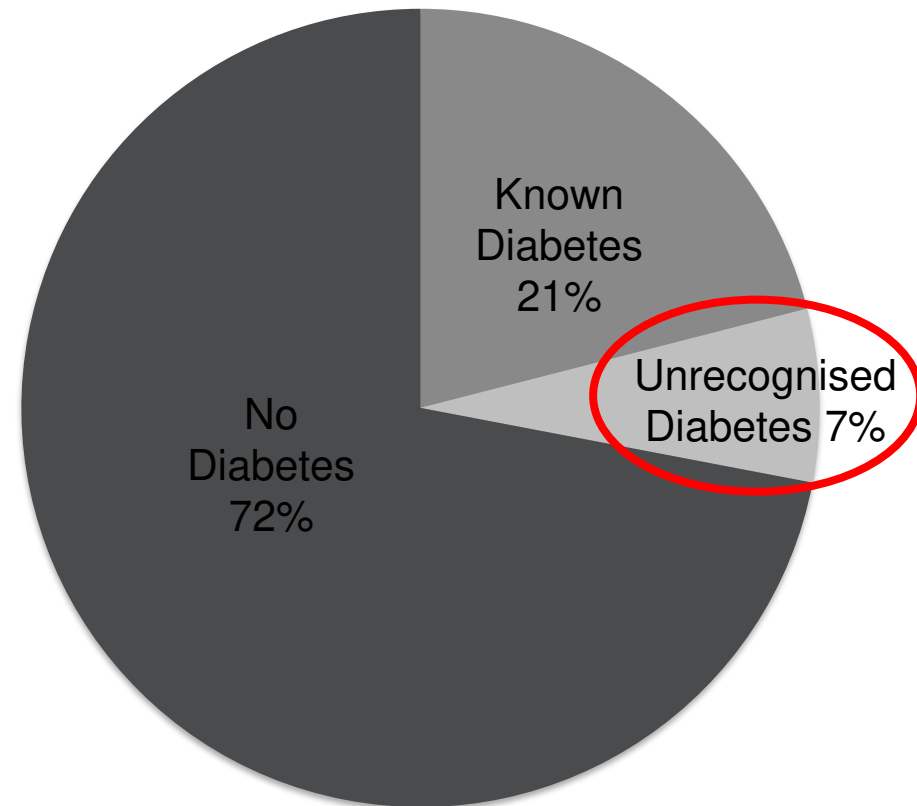
(N=56 with HbA1c available up to 7 days after admission)



**All
Inpatients ≥ 54 yo:
July 2013-Jan 2014***



**Haematology & Oncology
Inpatients ≥ 54 yo:
July 2013-Jan 2015**



- Something about pre diabetes here

ACS Data- HbA1c analysed as a continuous variable

	n	HbA1c OR/IRR* (95% CI)	p value
Length of stay (IRR)	847	1.05 (1.01-1.10)	0.03
28-day readmission (OR)	847	0.99 (0.82-1.19)	0.90
In-hospital mortality (OR)	847	1.21 (0.96-1.53)	0.11
Acute pulmonary oedema (OR)	847	1.28 (1.09-1.49)	<0.01
12-month Recurrent ACS (OR)	831	1.06 (0.88-1.28)	0.52
12-month mortality (OR)	831	1.13 (0.95-1.35)	0.17



Results: Post Stroke

Adjusted analyses of the Association of HbA1c (as a continuous variable) with stroke outcomes

Outcomes	N	IRR/OR [^] (95% CI)	p-value
Length of Stay (IRR)	610	1.08 (1.02- 1.16)	0.010
28-day Readmission (OR)	610	1.09 (0.84- 1.43)	0.498
In-hospital mortality (OR)	610	0.91 (0.70- 1.20)	0.517
6-Months Mortality (OR)	528	1.27 (1.08- 1.51)	0.005
Modified Rankin Score 2-6 (OR)	421	1.23 (0.97- 1.57)	0.081

Adjusted for age, atrial fibrillation status, stroke type and admission ambulation status