Norfolk and Norwich University Hospitals NHS
NHS Foundation Trust

Inpatient Hyperglycaemia and it's Consequences

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Topics to Cover

- Surgical patients – US data
- Medical patients – NNUH data

Excess Mean Length of Stay in Diabetes Inpatients Aged 18 – 60 Years

269,265 Diabetes Discharges and 4,411,593 Matched Controls

	Mean LOS (days)			Excess LOS (days)		n		
	E10	E11	C	E10	E11	E10	E11	C
Surg.	5.4 (0.1)	5.1 (0.1)	4.2 (0.2)	1.2	0.9	18,032	32,135	1,501,453
T &O	4.8 (0.1)	5.3 (0.2)	4.6 (0.1)	0.2	0.7	8,178	12,203	885,606
GM	4.8 (0.2)	5.4 (0.2)	4.4 (0.1)	0.4	1.0	70,988	82,446	1,709,553
Card.	4.2 (0.1)	4.2 (0.1)	3.8 (0.1)	0.4	0.4	5,307	15,009	229,784
MFE	4.8 (0.2)	5.6 (0.2)	4.7 (0.1)	0.1	0.1	2,444	4,549	85,197

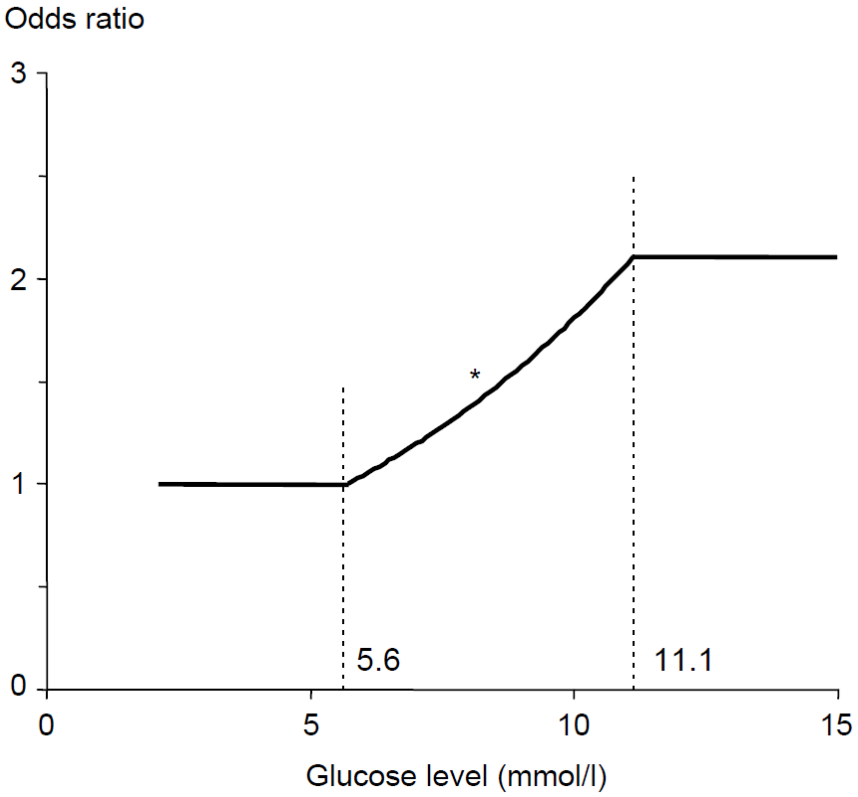
E10 = Type 1 diabetes E11 = Type 2 diabetes c = controls

English Hospitals, 4 consecutive years of discharges 2000-2004

Sampson MJ et al Diabetes Research & Clinical Practice 2007;77(1):92-98

However…..

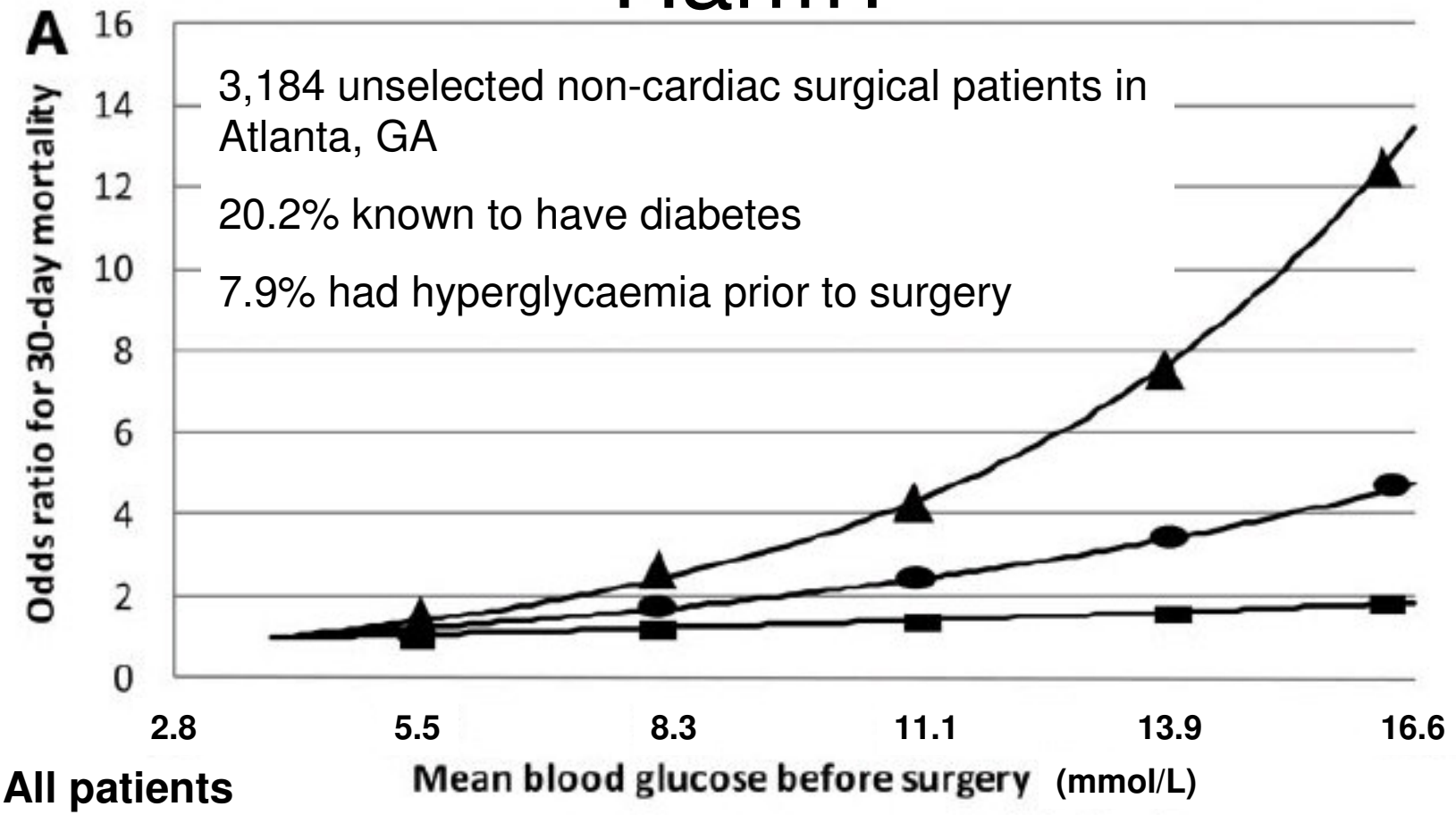
- Other data has confirmed the harm of high pre-operative glucose levels in non-cardiac, non vascular surgery



30 day mortality rates for 989 patients with diabetes – for each mmol/L increase in blood glucose, OR for mortality rose by 1.19 (CI 1.1 - 1.3)

Noorddij PG et al EJE 2007;156(1):137-142

Do High Glucose Levels Cause Harm?



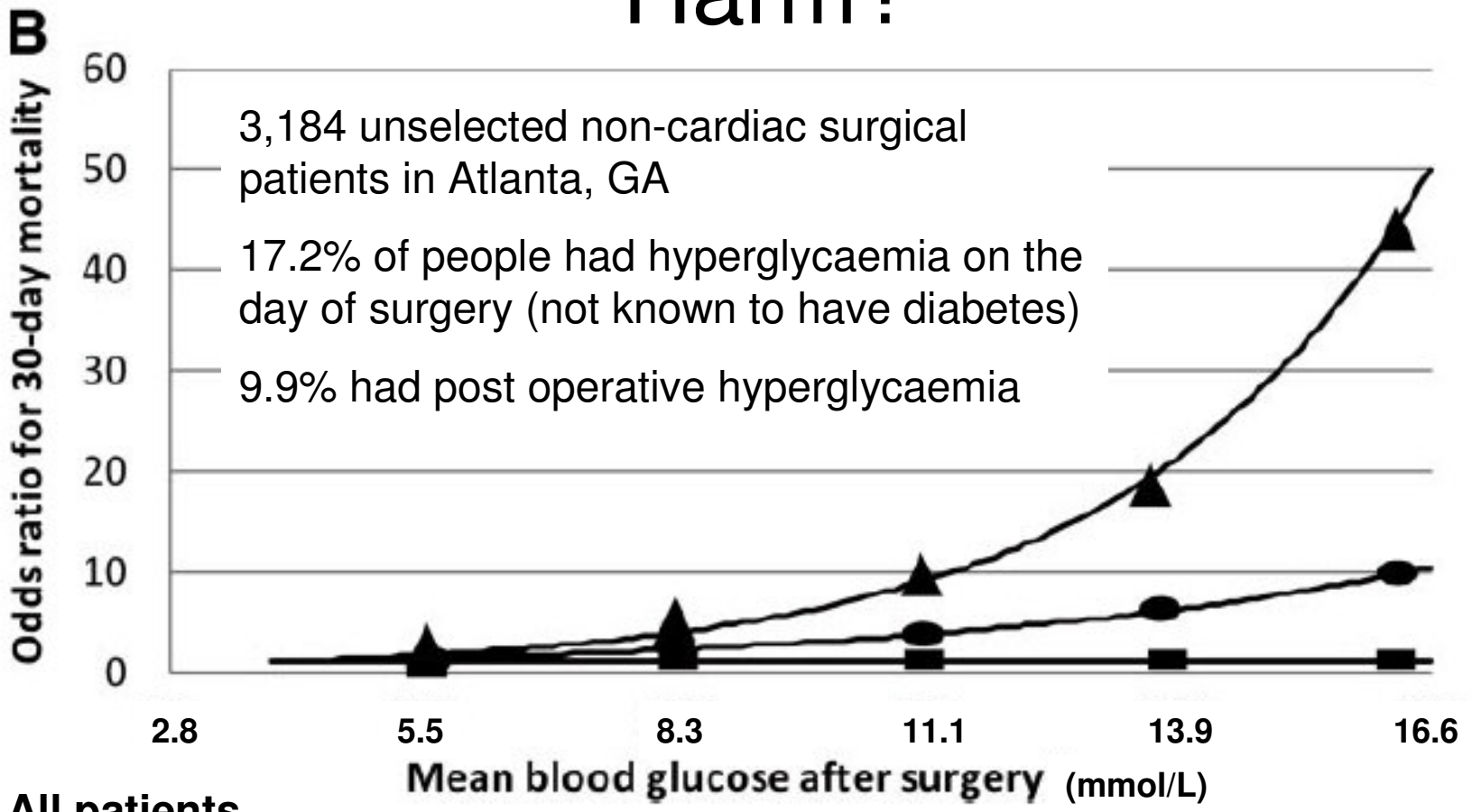
All patients

Patients with diabetes

Patients without diabetes

Frisch A et al Diabetes Care 2010;33(8):1783-1788

Do High Glucose Levels Cause Harm?



- **All patients**
- **Patients with diabetes**
- **Patients without diabetes**

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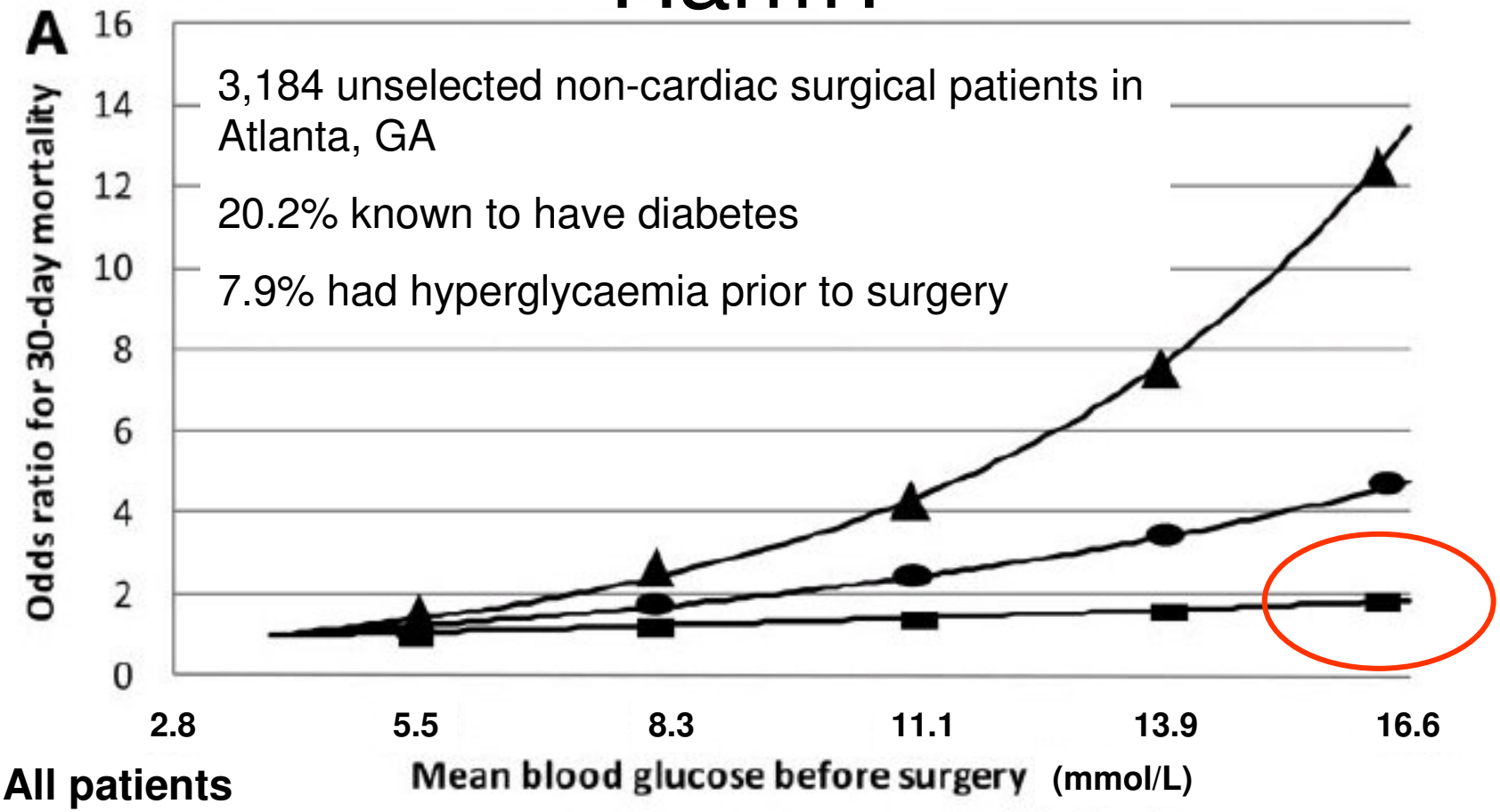

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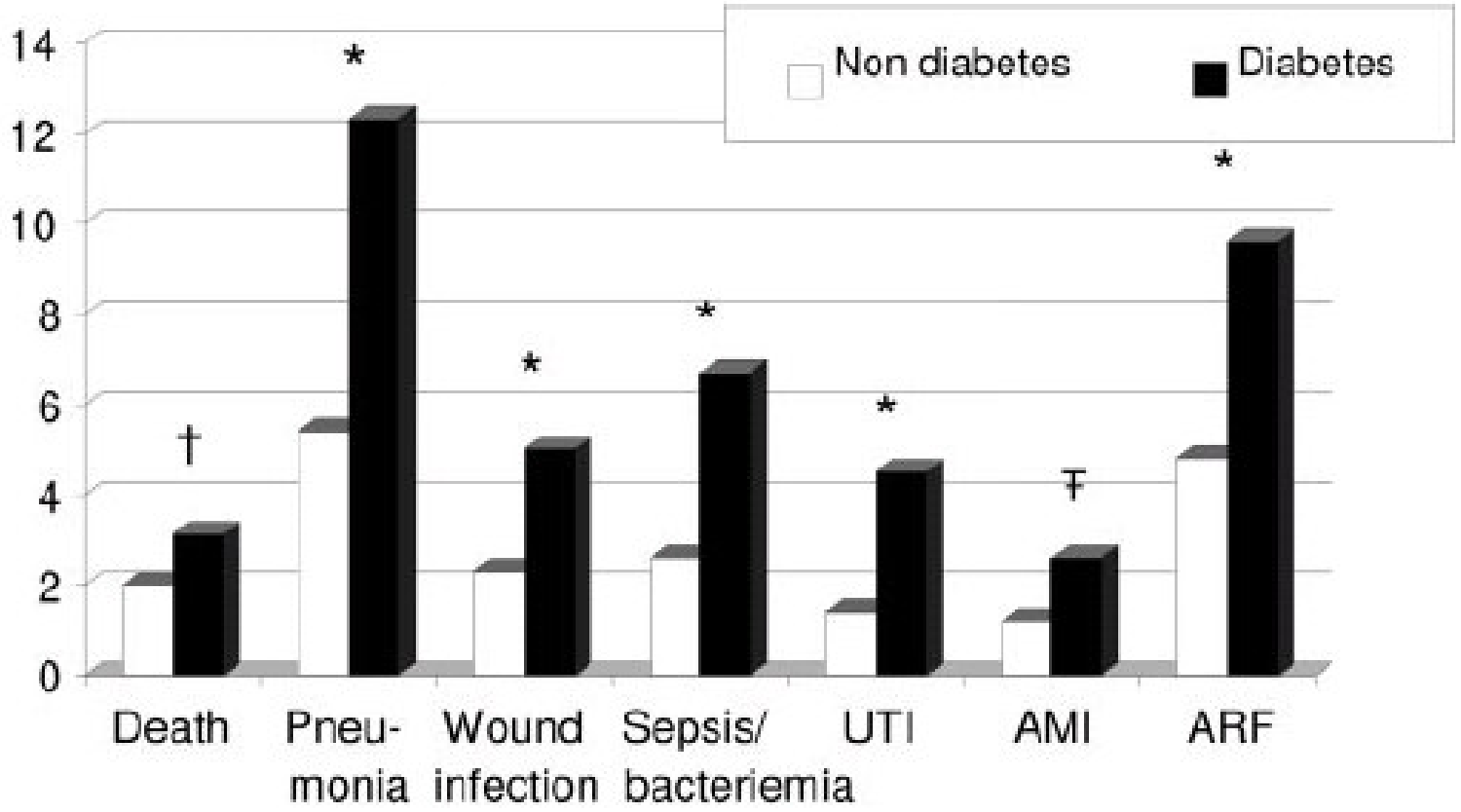

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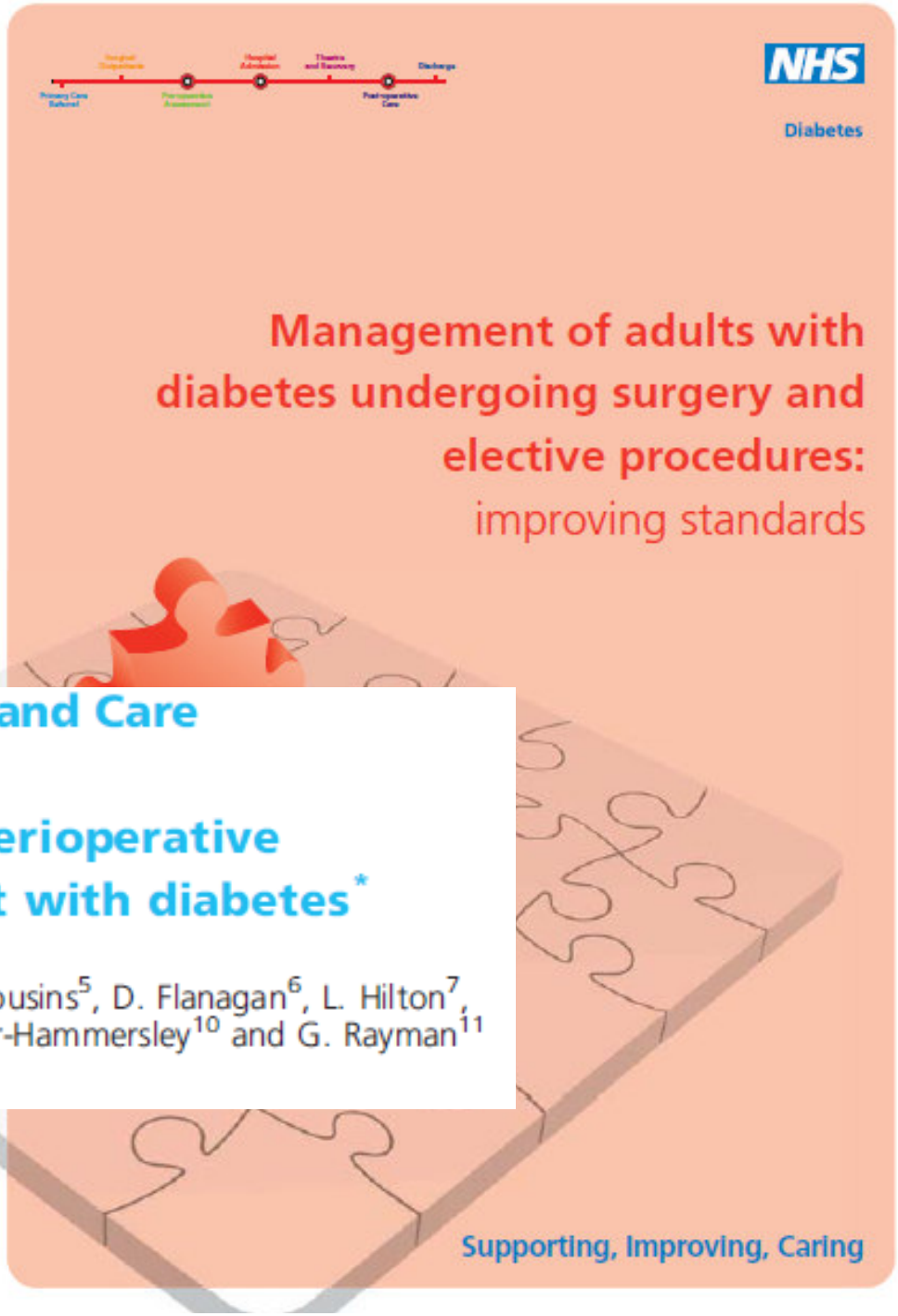
Fortunately There is This…..



Diabetes UK Position Statements and Care Recommendations

NHS Diabetes guideline for the perioperative management of the adult patient with diabetes*

K. Dhatariya[1], N. Levy[2], A. Kilvert[3], B. Watson[4], D. Cousins[5], D. Flanagan[6], L. Hilton[7], C. Jairam[8], K. Leyden[3], A. Lipp[1], D. Lobo[9], M. Sinclair-Hammersley[10] and G. Rayman[11] for the Joint British Diabetes Societies

Diabet. Med. 29, 420–433 (2012)

National Guidelines

- Document divided into sections:
  - Primary care
  - Surgical outpatients
  - Pre-operative assessment clinic
  - Hospital admission
  - Theatre and recovery
  - Post-operative care
  - Discharge

Primary Care Responsibilities

- Duration and type of diabetes
- Place of usual diabetes care (primary or secondary)
- Other co-morbidities
- Treatment
  - for diabetes oral agents/ insulin doses and frequency
  - for other co-morbidities
- Complications
  - At risk foot
- Renal impairment
- Cardiac disease
- Relevant measures
- BMI
- BP
- HbA1c
- eGFR

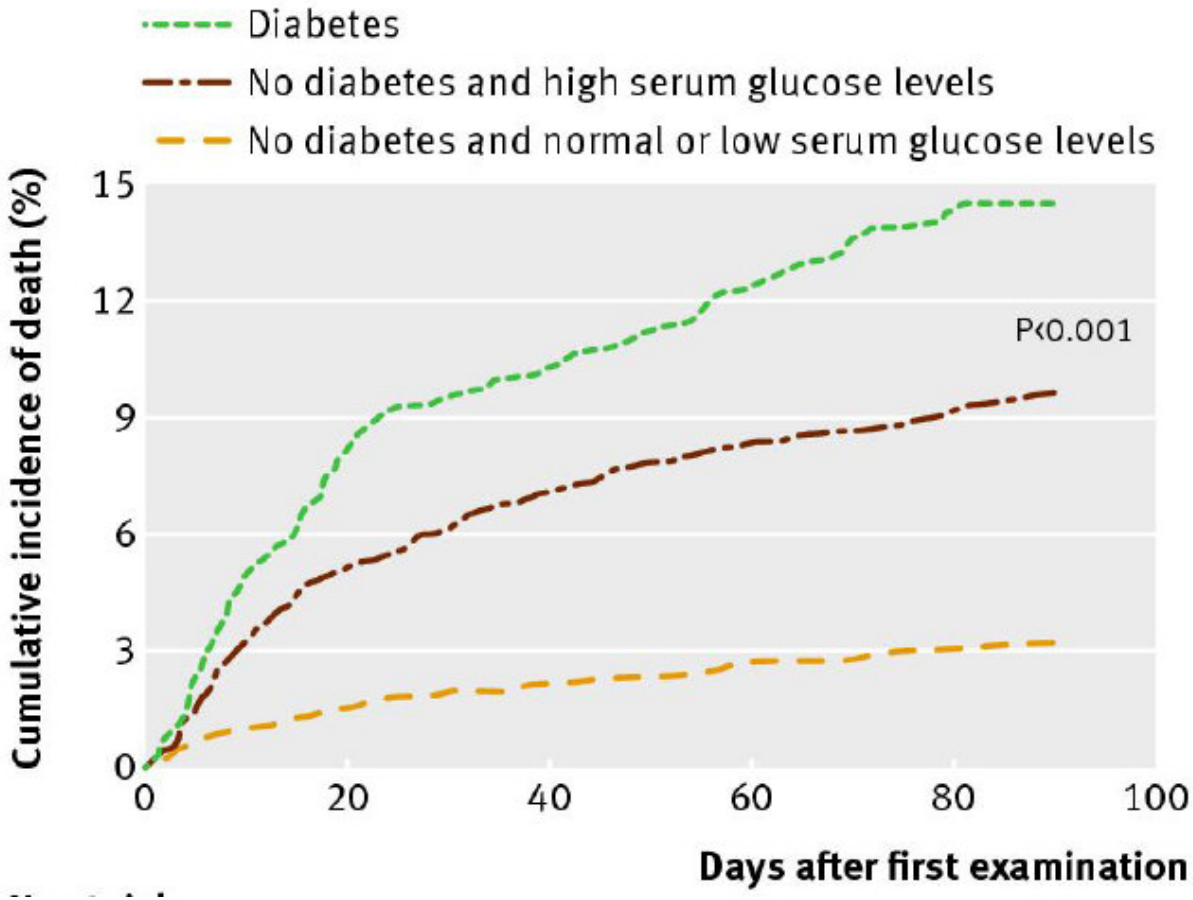
What About Medical Patients?

- 433 patients admitted with an exacerbation of COPD from St George's in Tooting in 01/02
- Absolute risk of adverse outcomes (death or prolonged stay) increased ~15% per 1 mmol/L increase in glucose

Glucose level (mmol/L)	<6.0	6.0 - 6.9	7.0 - 8.9	>9.0
Mortality (%)	11.6	15.9	21.3	31.0

Baker EH et al Thorax 2006;61(4):284-289

Admission Glucose and Risk of Death in COPD



Lepper PM et al BMJ 2012;344:e3397

Norfolk and Norwich Data

- We analysed the data for all 1,502 patients admitted through our AMU in February 2010

- We assessed
  - admission blood glucose,
  - LOS
  - 28-days readmission and mortality
  - whether admission blood glucose ≥11.1mmol/l in non-diabetic individuals was followed-up

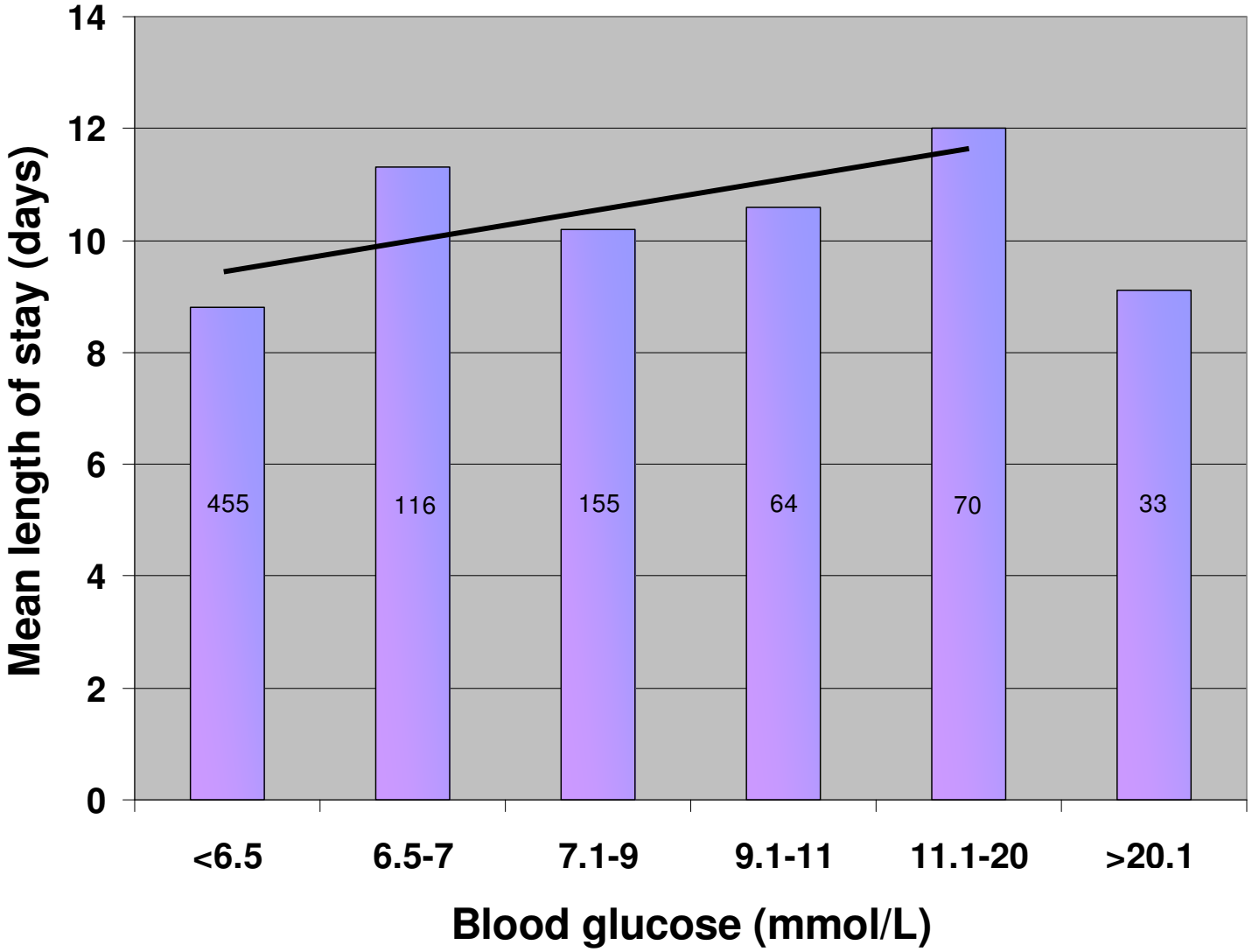
Evans N, Dhatariya K Clinical Medicine 2012;12(2):137-139

Who Admitted Them?

Specialty	Number of patients	Number with diabetes
Medicine for the elderly	577	94 (16.3%)
Cardiology	221	25 (11.3%)
Respiratory	200	28 (14%)
Nephrology	30	9 (30%)
Gastroenterology	132	18 (13.6%)
Endocrinology	30	22 (73%)
Neurology	77	12 (16.9%)
Dermatology	1	0 (0%)
Haematology	16	0 (0%)
Oncology	56	4 (7.4%)
General medicine	162	27 (16.7%)

Evans N, Dhatariya K Clinical Medicine 2012;12(2):137-139

LOS vs Admission Glucose



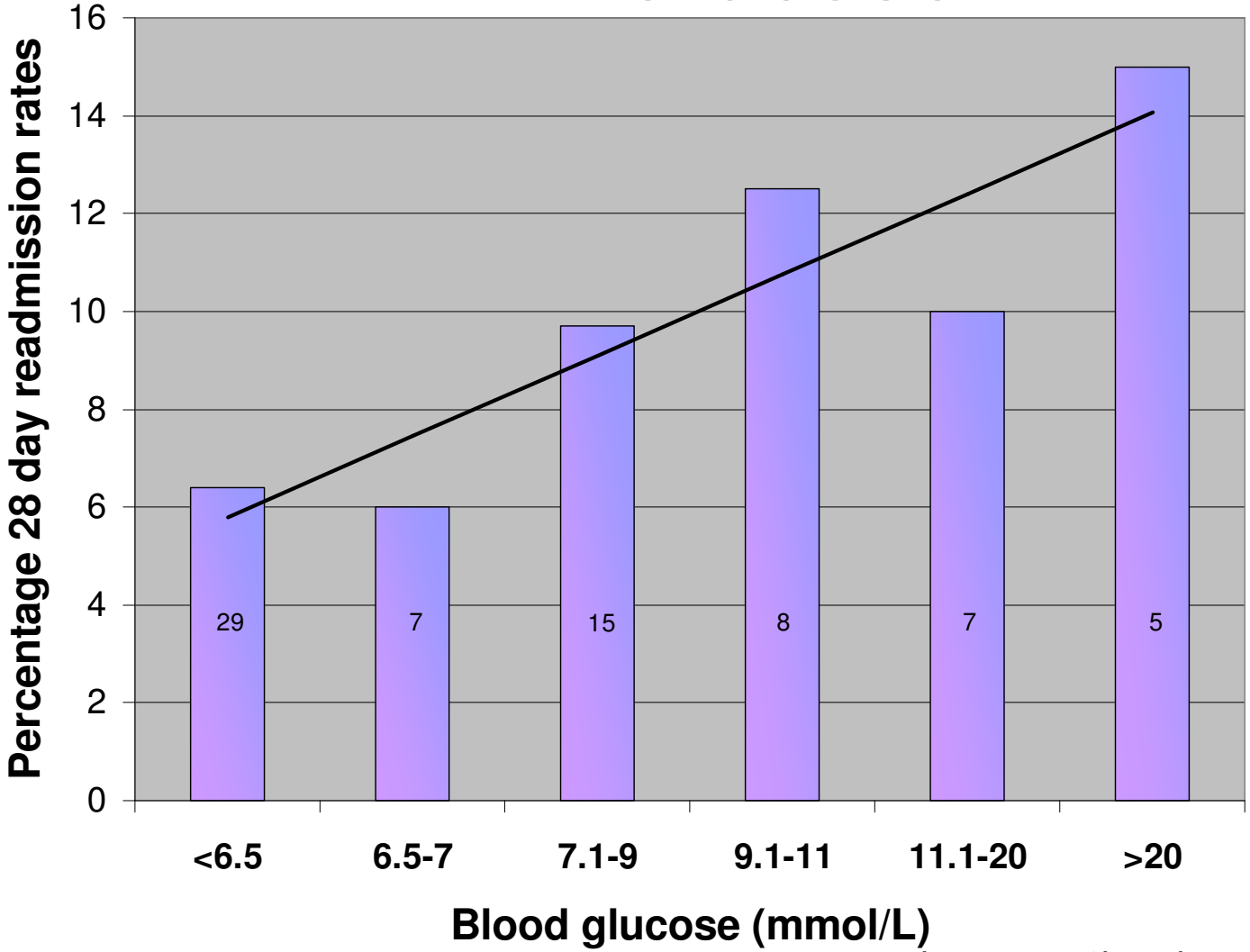
Trend R^2 = 0.5556

P=0.002

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

Evans N, Dhatariya K Clinical Medicine 2012;12(2):137-139

28 Day Readmission vs Admission Glucose

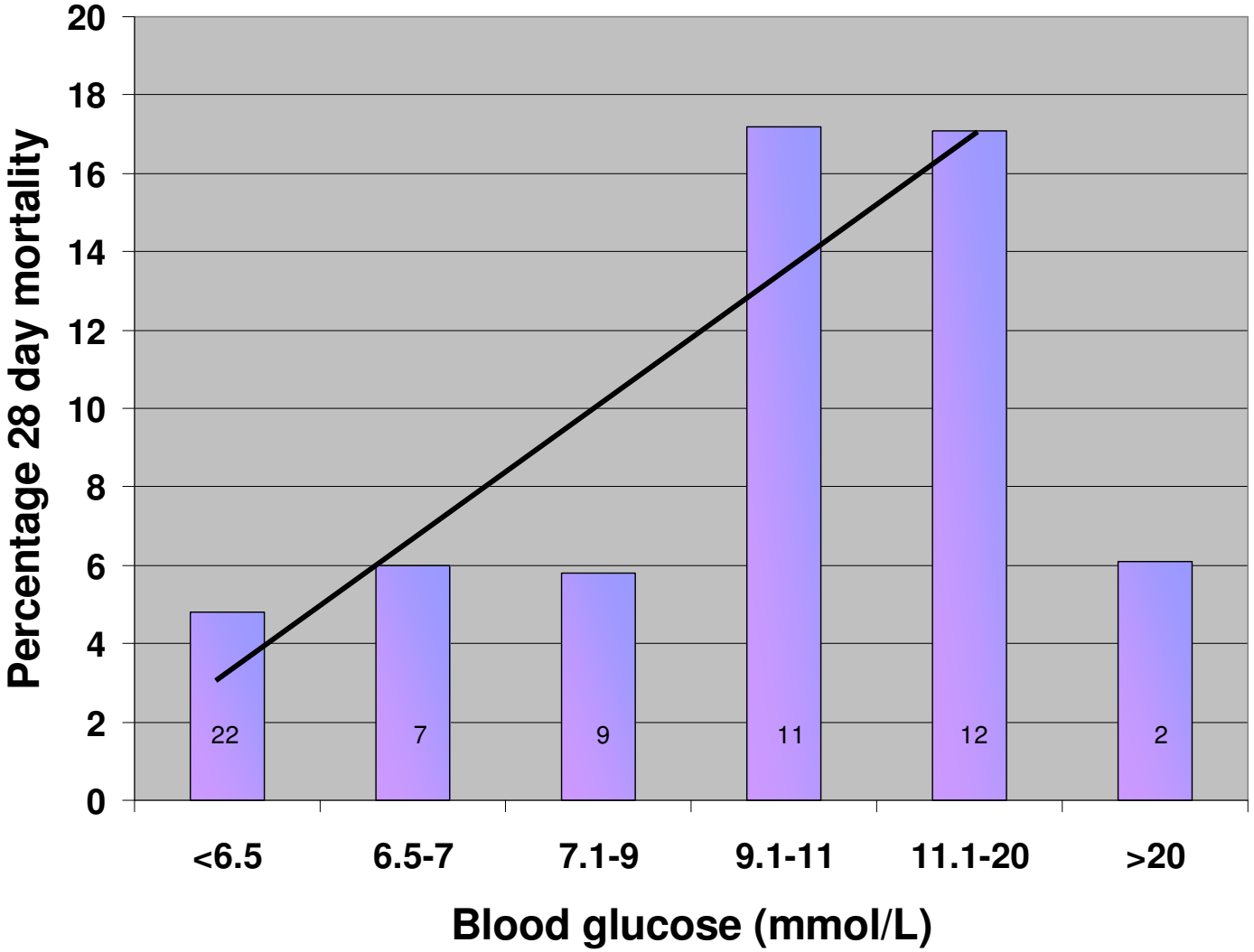


Trend R^2 = 0.7918

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

Evans N, Dhatariya K Clinical Medicine 2012;12(2):137-139

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

Evans N, Dhatariya K Clinical Medicine 2012;12(2):137-139

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Documents to Help

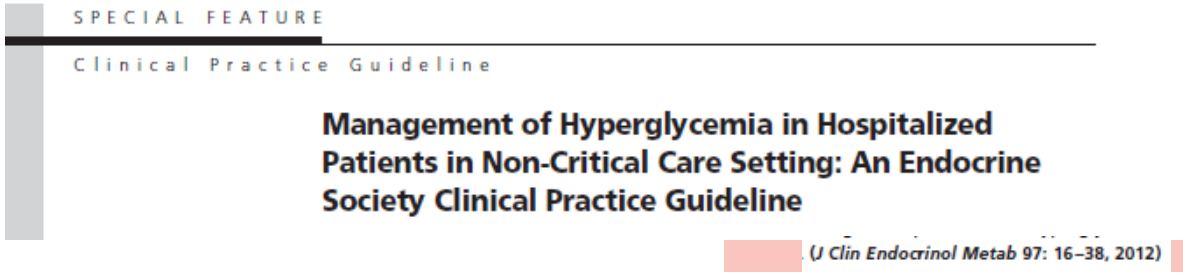
Joint British Diabetes Societies
Inpatient Care Group

The Hospital Management of
Hypoglycaemia in Adults
with Diabetes Mellitus

Management of adults with diabetes undergoing surgery and elective procedures:
improving standards

Self-management of diabetes in hospital

Joint British Diabetes Societies
for Inpatient Care Group


SPECIAL FEATURE

Clinical Practice Guideline

Management of Hyperglycemia in Hospitalized Patients in Non-Critical Care Setting: An Endocrine Society Clinical Practice Guideline

(*J Clin Endocrinol Metab* 97: 16–38, 2012)

What is Lacking?

- Interventional studies to show that lowering glucose makes a difference to outcomes
- The will to make this happen

What Can *You* Do?

- Ensure that all patients with diabetes on your list are labelled as having diabetes
- Ensure that if a patient is referred for surgery, that you or your GP colleagues give all of the relevant information on the referral letters
- Try to optimise their glycaemic control prior to referral for surgery

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