



The Management of Hyperglycaemia on the AMU

Dr Ketan Dhatariya MSc MD MS FRCP

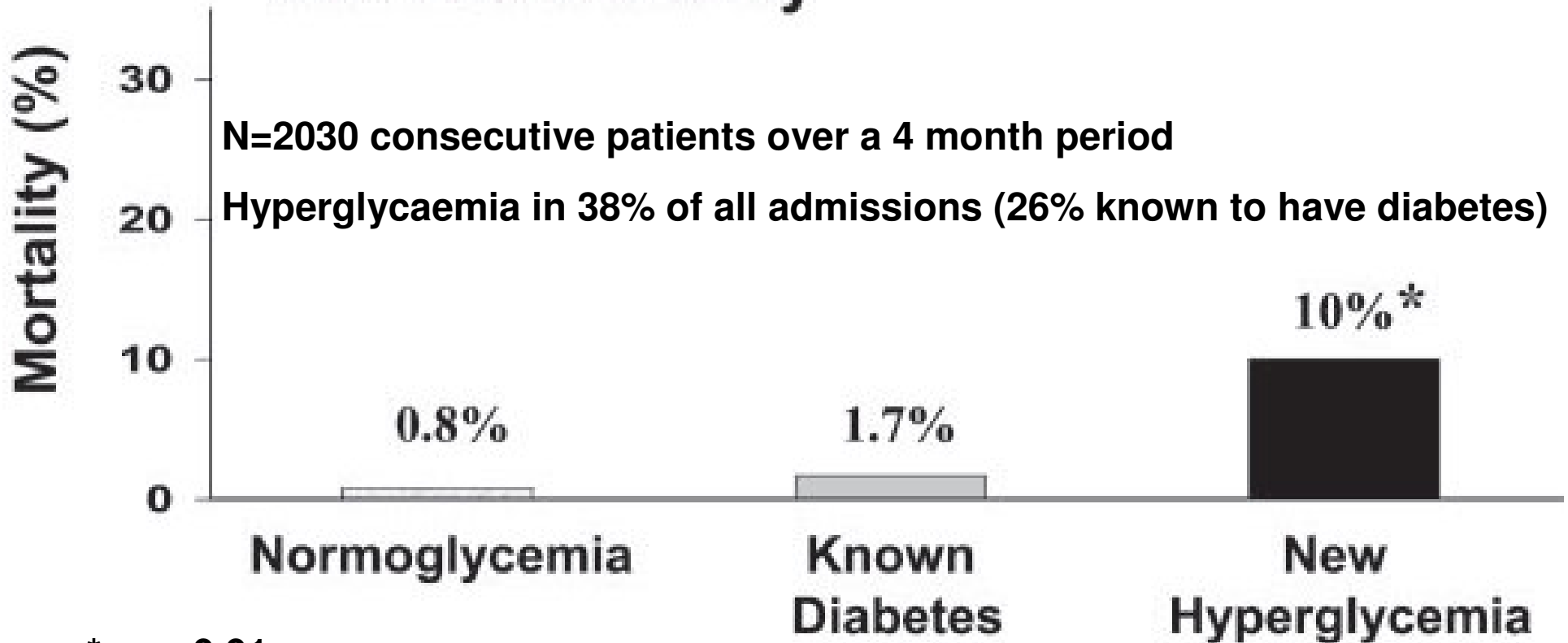
Consultant in Diabetes and Endocrinology
Norfolk and Norwich University Hospitals

Topics to Cover

- Do high admission glucose levels cause harm?
 - US and UK data
 - Surgical and medical patients
- DKA
- HHS
- The future

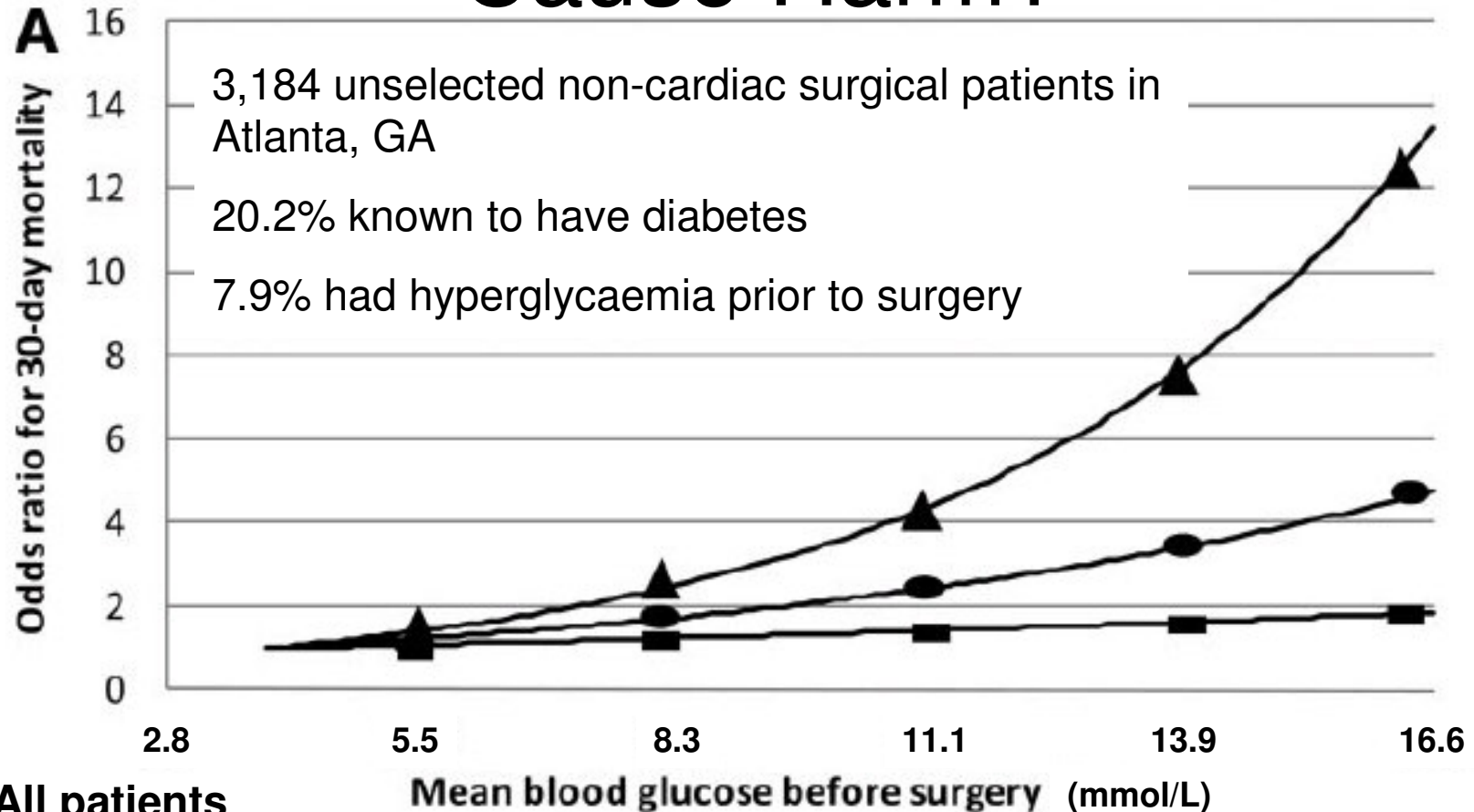
Do High Admission Glucose Levels Cause Harm?

Non ICU Mortality

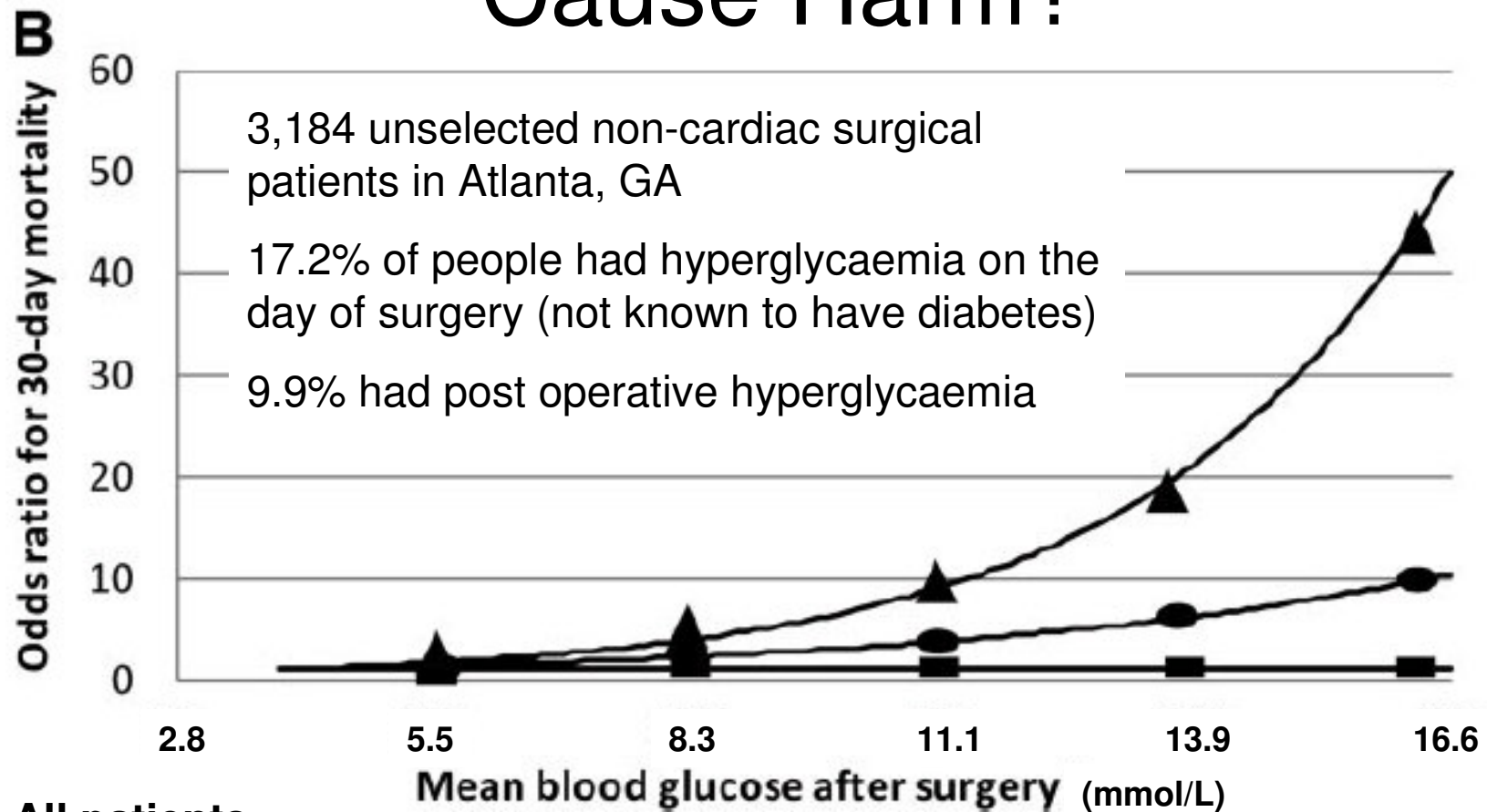


* = $p < 0.01$

Do High Admission Glucose Levels Cause Harm?

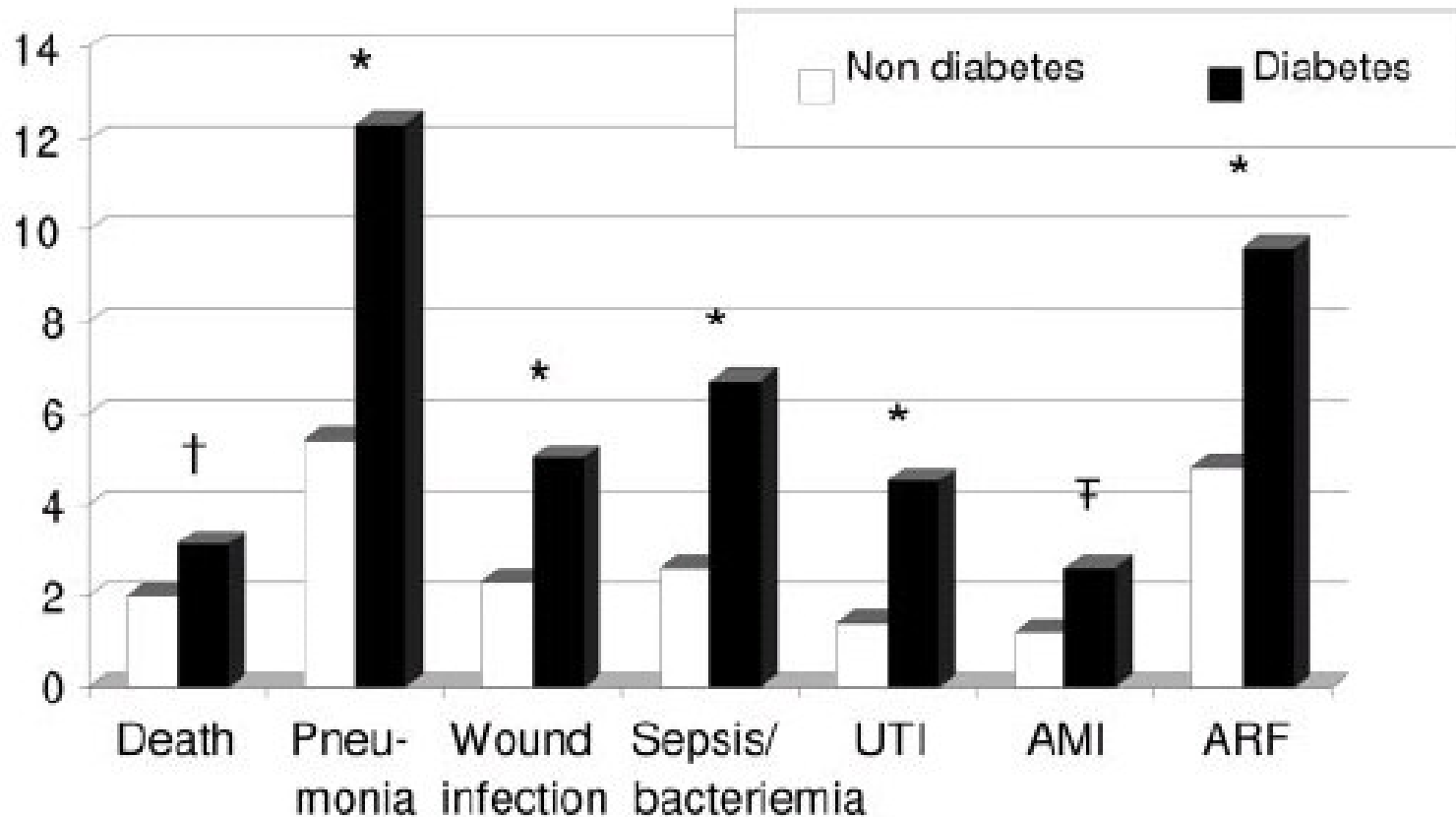


Do High Admission Glucose Levels Cause Harm?

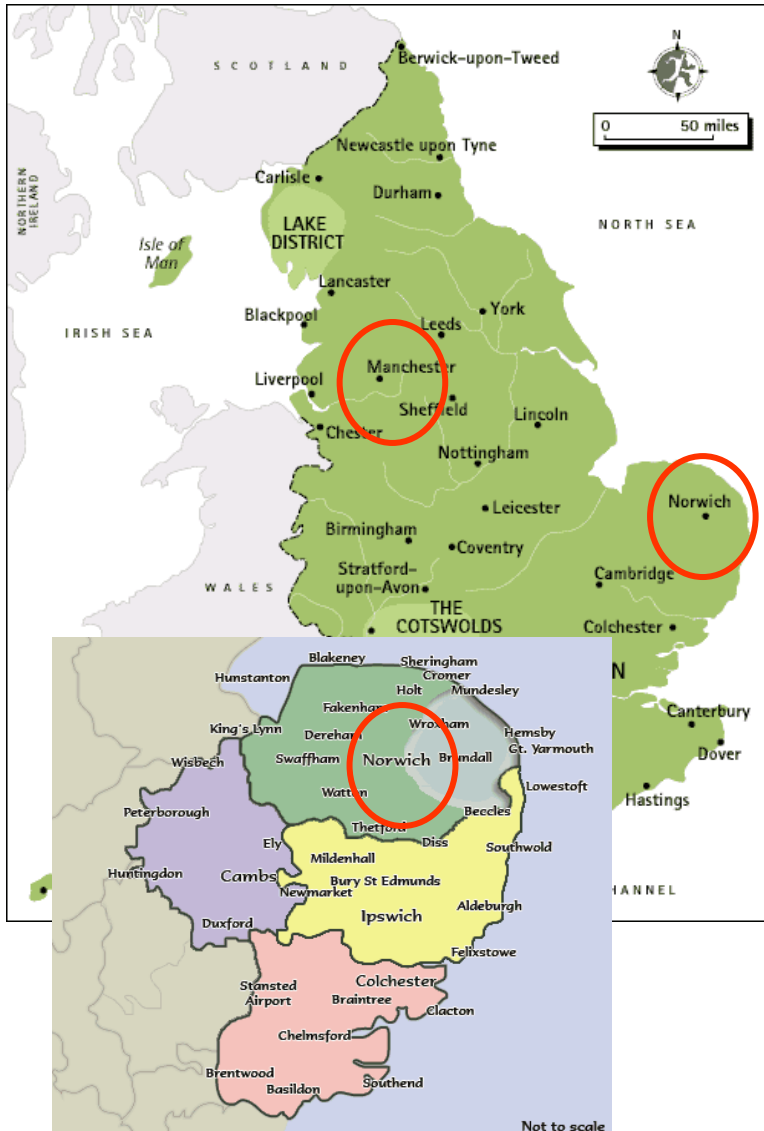


- All patients
- Patients with diabetes
- ▲ Patients without diabetes

Do High Admission Glucose Levels Cause Harm?



How Common is it?



- NNUH is a 989 bedded hospital that serves a population of 600,000 over an area of about 2000 square miles
- Our average MAU intake is 60 patients every 24 hours

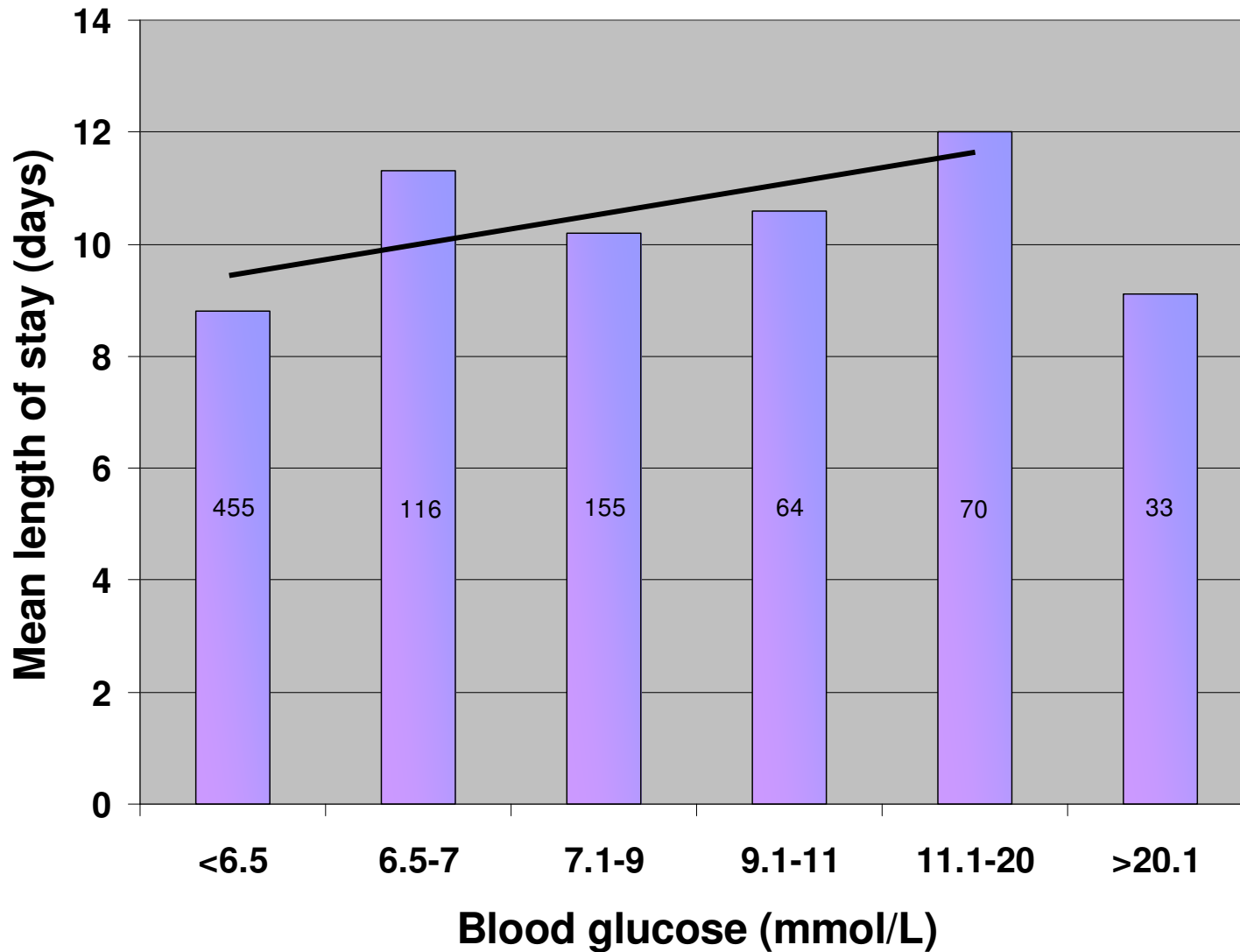
So, Is it Important?

- 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 ≥ 11.1 mmol/l in non-diabetic individuals was followed-up

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%)

LOS vs Admission Glucose

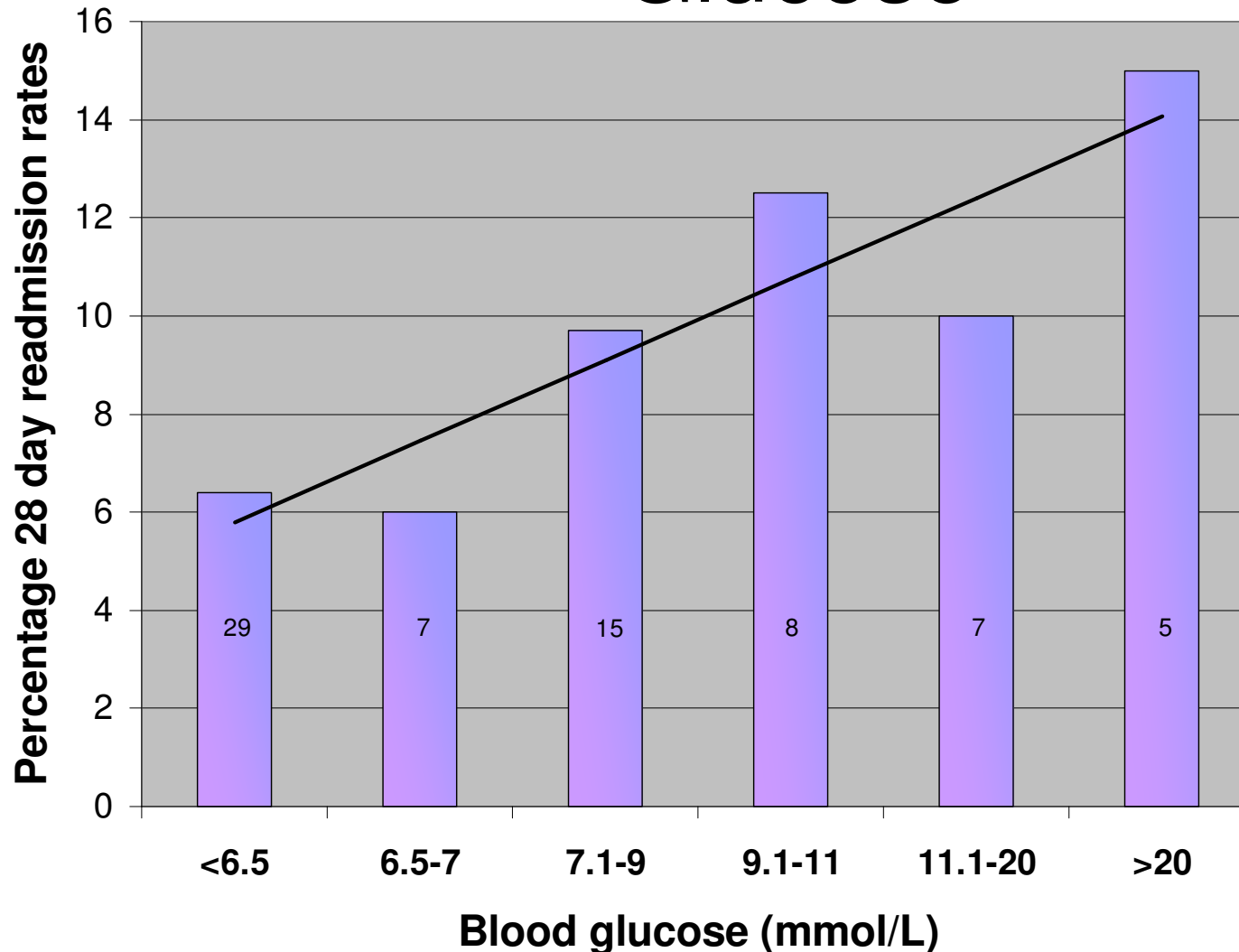


Trend $R^2 = 0.5556$

$P=0.002$

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

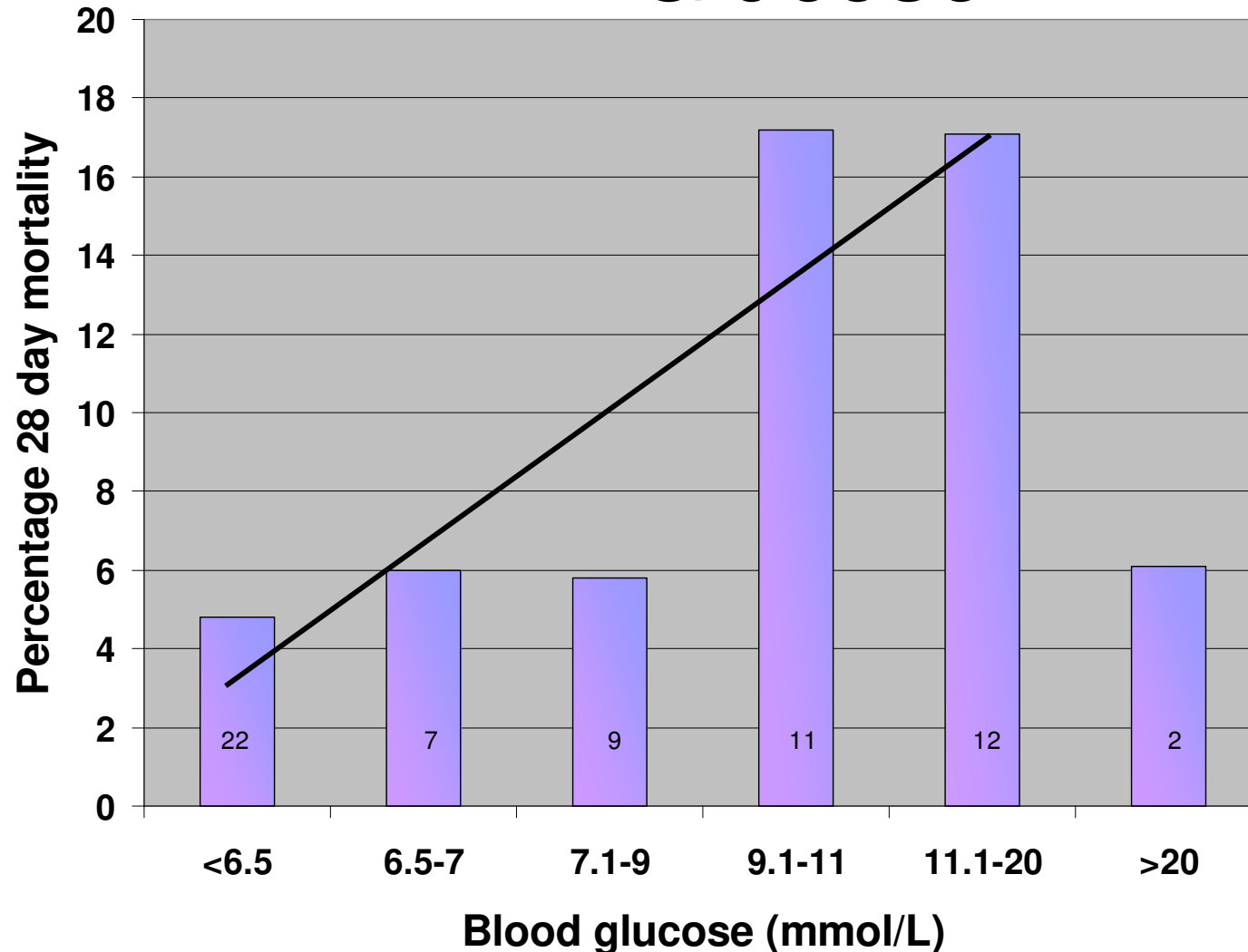
28 Day Readmission vs Admission Glucose



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 $R^2 = 0.7874$

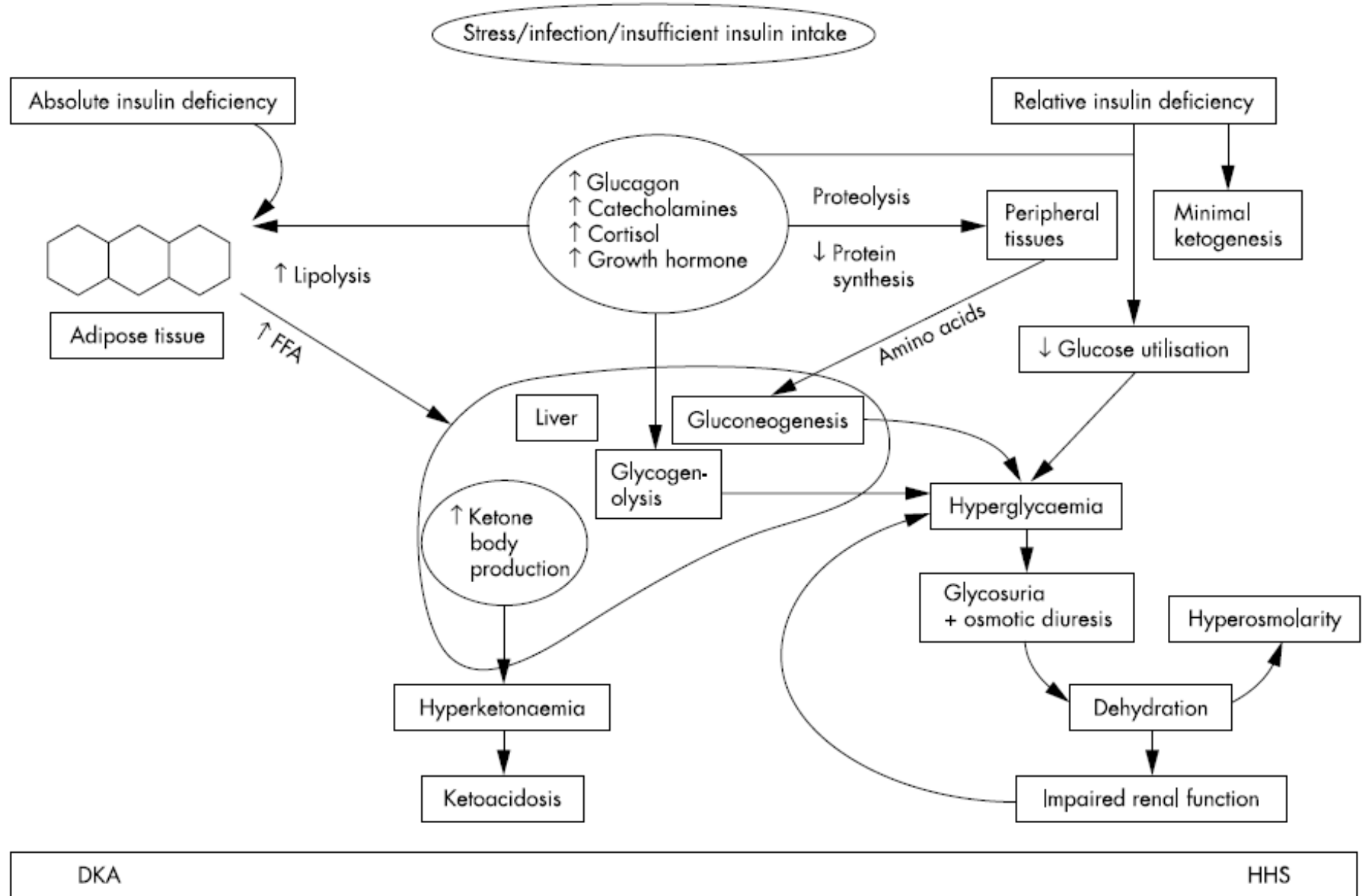
$P < 0.0001$

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

Follow up

- 37 (2.5%) of the total number of admissions were individuals without an existing diagnosis of diabetes who had an admission blood glucose of $\geq 11.1\text{mmol/l}$
- Of these, only 19 (51.4%) received further follow-up at 28 days

Diabetic Ketoacidosis and HHS



How it's Been Done so Far

- ABC
- Lots of normal saline
- Stat intravenous insulin followed by constant or variable rate intravenous insulin infusion
- A few other things (potassium, phosphate, \pm bicarbonate, etc.)

What was *Actually* Happening...

- Hopefully make the correct diagnosis
- Give a bit of, or too much, insulin; give (too much) fluid
- Criminally assault patient with arterial blood gas assessment, despite O₂ sats being 100%
- Put patient in a corner or on a non-medical ward...dependent on what bed manager says

What was *Actually* Happening...

- Forget to repeat bloods, or forget to call lab for result
- Forget to review patient
- Correct potassium 4 hours after it falls
- Stop long-acting subcutaneous insulin to ensure delayed recovery

Thankfully There are These

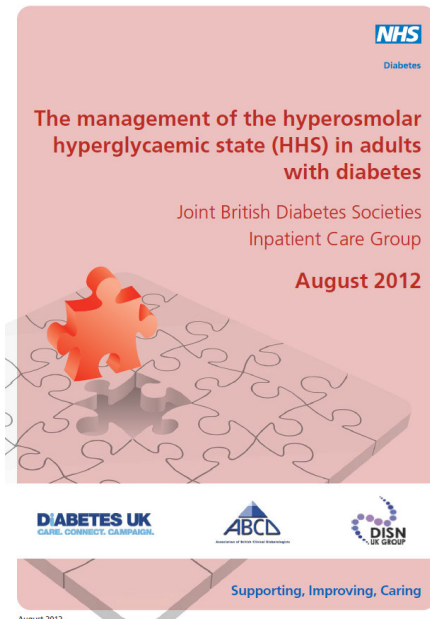
Diabetes UK Position Statements and Care Recommendations

Joint British Diabetes Societies guideline for the management of diabetic ketoacidosis

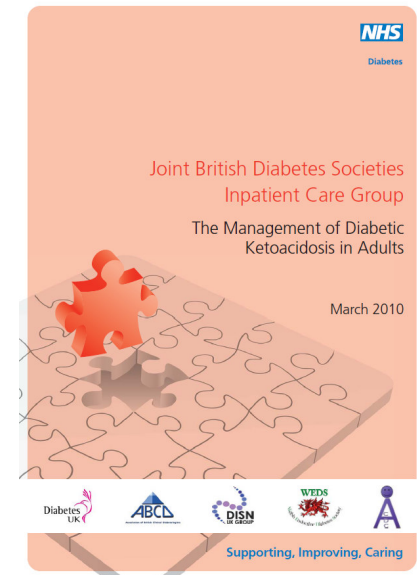
M. W. Savage, K. K. Dhatariya, A. Kilvert, G. Rayman, J. A. E. Rees, C. H. Courtney, L. Hilton, P. H. Dyer and M. S. Hamersley, for the Joint British Diabetes Societies¹

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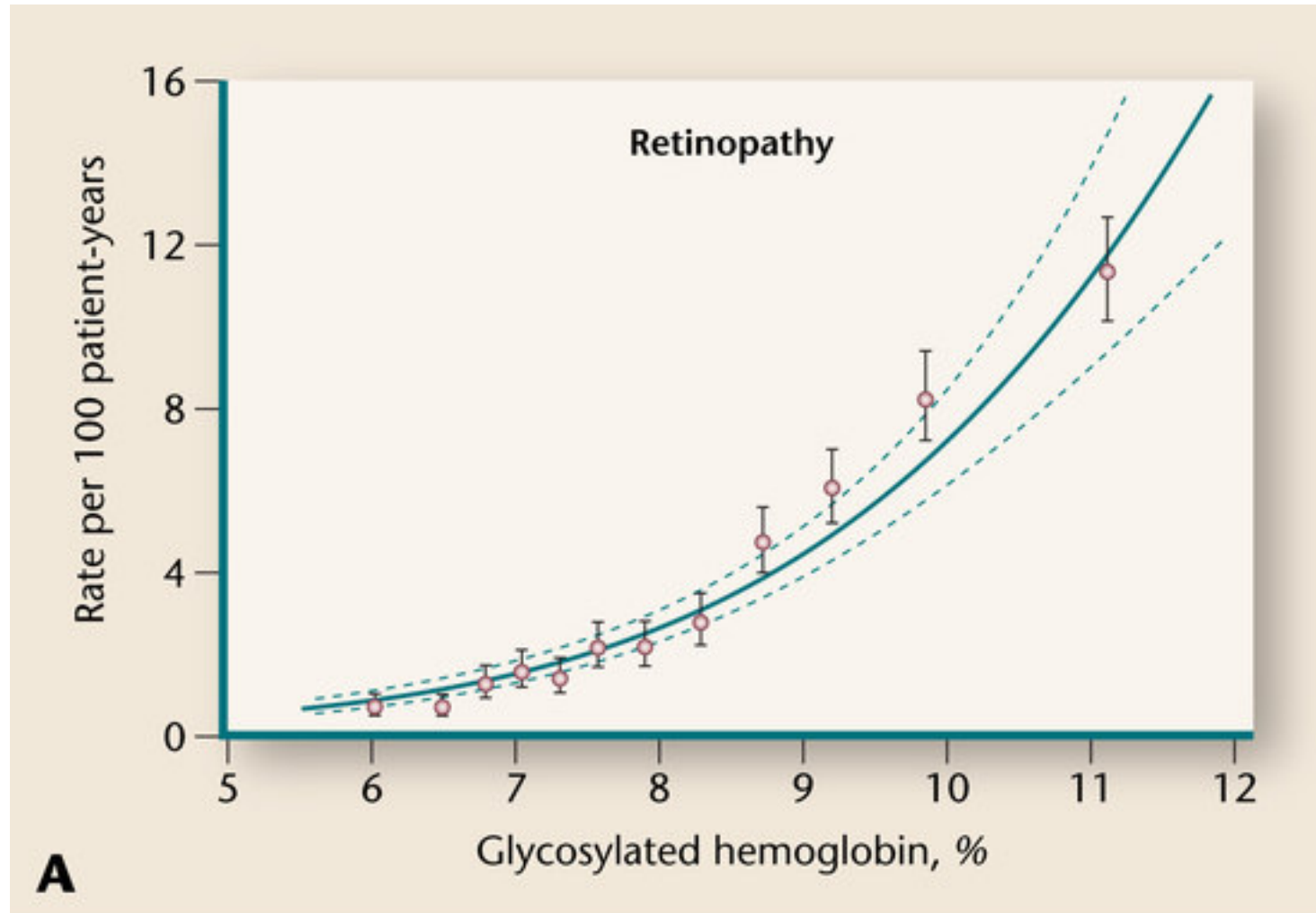
Both published on the NHS Diabetes Website – the HHS guideline is in the process of being submitted to Diabetic Medicine



The Future

- First – a glimpse into the murky past of diabetes related eye disease
- In 1978 Kelly M West wrote “The extent to which the level of hyperglycaemia determines the risk of retinopathy is not at all clear. This is the most important issue at hand and deserves high priority in epidemiologic research”

Retinopathy and Glycaemic Control

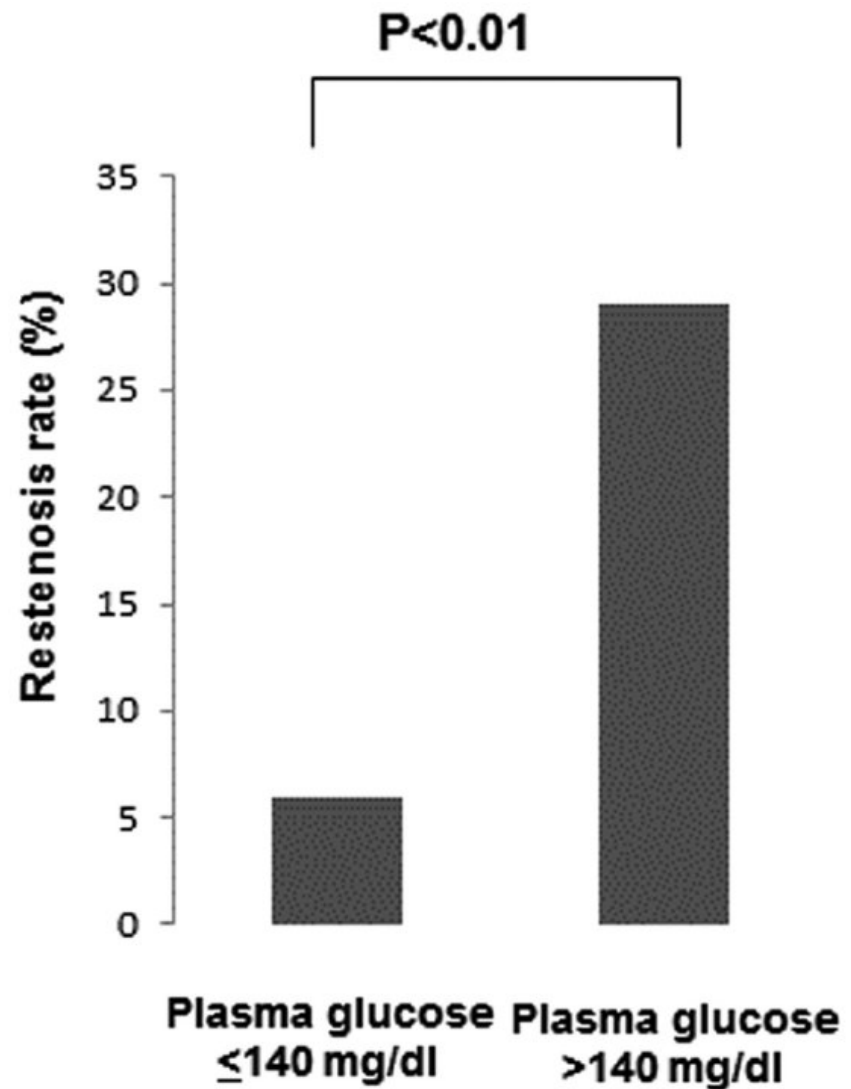


The Future

- If acute admission hyperglycaemia is associated with poor outcomes in medical and surgical patients, then does lowering glucose on admission make a difference?

Tantalising Evidence

- Peri-procedural tight glycaemic control during early PCI for coronary intervention reduced re-stenosis rates by >50% at 6 months



What Does that Tell us?

- That we need intervention trials!



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