
# Optimising Peri-Operative Glycaemic Management for the Diabetic Foot

Prof Ketan Dhatariya MBBS MSc MD MS FRCP PhD

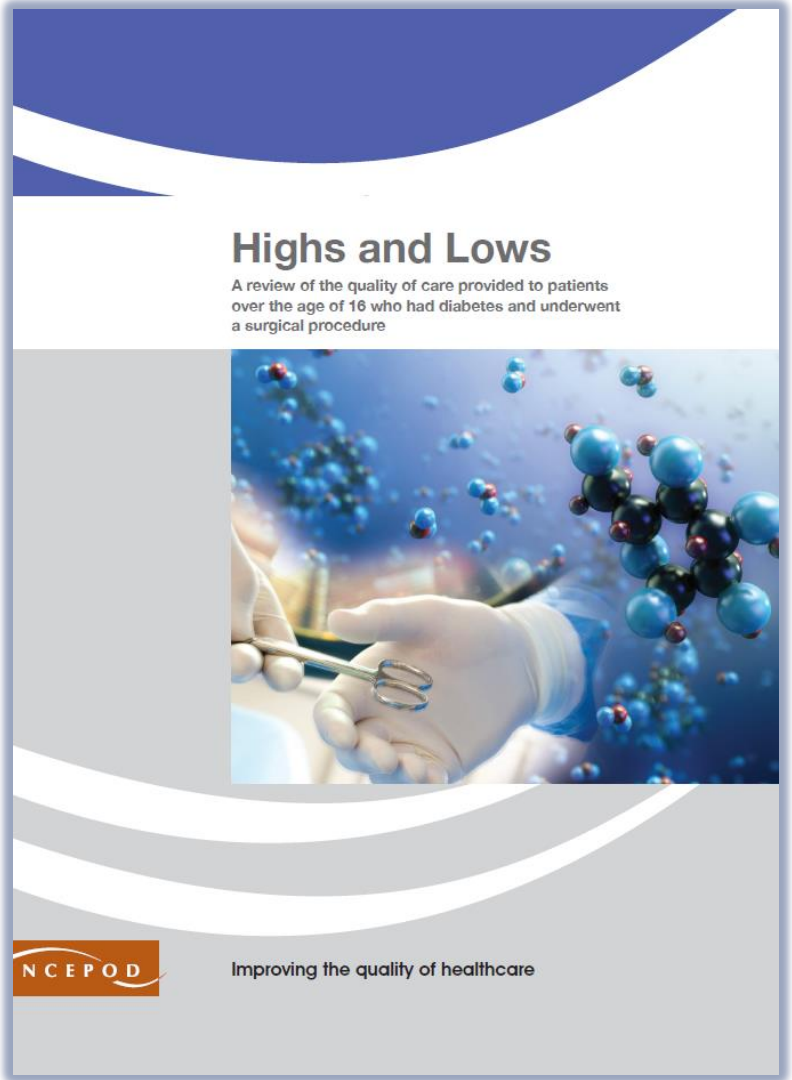
Consultant in Diabetes and Endocrinology

Norfolk and Norwich University Hospitals

# Conflicts of Interest

# Who is This Strange Man?

- I qualified in 1991
- I trained in D&E and G(I)M in London
- I did general practice for 2 years
- I did ITU / anaesthetics for a year
- I did research at Mayo Clinic for 2 years
- I have been in Norwich since 2004
- Currently my other roles include
  - Chair of the Specialist Clinical Exam in D&E and the European Board Exam in Endocrinology, Diabetes and Metabolism
  - President-Elect of the Endocrine Section of the Royal Society of Medicine
  - On the Steering group for the Joint British Diabetes Societies for Inpatient Care




# National Confidential Enquiry into Patient Outcome and Death – NCEPOD Report 2018

https://www.ncepod.org.uk/2018pd.html

# 13 Recommendations

1 Write and implement a national joint policy for the multidisciplinary manag with diabetes who require surgery. In

2 Appoint a clinical lead for perioperative diabetes care in hospitals where surgical services are provided. This person will be responsible for developing policies and processes to:

3 Use a standardised referral process for elective surgery to ensure appropriate assessment and optimisation of diabetes. This should include:
a. Satisfactory HbA1c levels within 3 months of referral

4 Ensure that patients with diabetes undergoing surgery are closely monitored and their glucose levels managed accordingly. Glucose monitoring should be included:
a. at sign-in and sign-out stages of the surgical safety checklist (e.g. WHO safety checklist)
b. in anaesthetic charts
c. in theatre recovery
d. in early warning scoring systems
System markers and alerts should be used to raise awareness of glucose levels, e.g. tagging of electronic medical records, use of a patient passport or unique stickers in paper based case notes.
***(Clinical Lead for Perioperative Diabetes Management, Lead Anaesthetist for Pre-Operative Assessment, Clinical Directors, Medical Directors, Directors of Nursing)***

5 Ensure a safe handover of patients with theatre recovery to ward, this should be the case notes and include:
a. Medications given in theatre
b. Glucose level on leaving the recovery

6 Develop a pre-operative assessment cli and standards for the management of diabetes. These should be developed b

7 Ensure that patients with diabetes at operative assessment clinic prior to e

8 A clinical lead for day surgery* shoul all hospitals providing day surgery se along with the clinical lead for perio management should be responsible patients with diabetes are considered where appropriate. Policies should be ensure patients with diabetes have ec day surgery.
***(Clinical Lead for Day Surgery, Cli Perioperative Diabetes Managem Directors)***

9 Cancellation of elective surgery in patients with diabetes should be avoided, particularly for known clinical reasons. Cancellation rates should be audited locally and the results acted upon.

10 Develop and implement referral criteria for surgical inpatients with diabetes to:

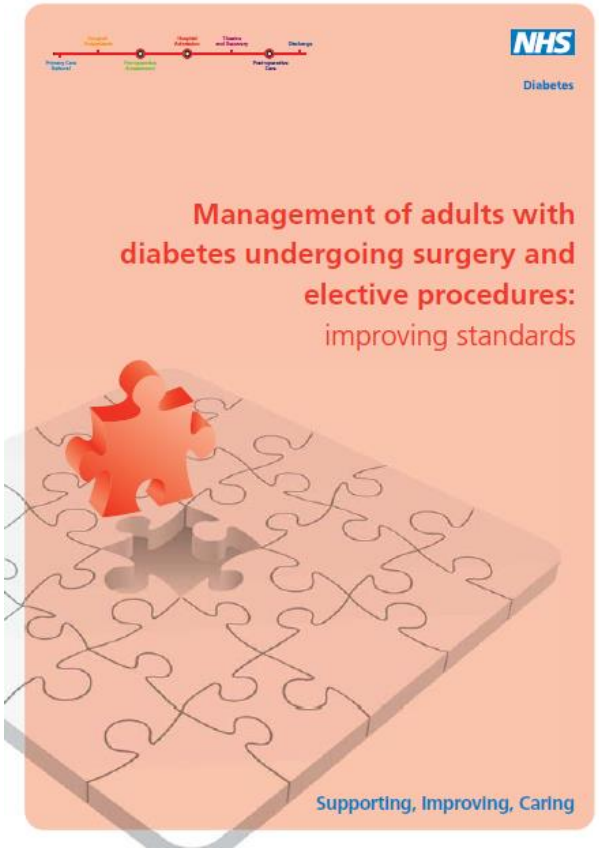
11 Record and monitor the time at which a patient begins fasting (for surgery or clinical reasons). If a

12 Prioritise patients with diabetes on the operating list to avoid prolonged starvation.* Prioritisation of patients with diabetes on operating lists should be subject to local clinical audit and the results acted upon.
***(Lead Anaesthetist for Pre-operative Assessment,***

13 Provide patients with diabetes with education and information about their diabetes management at discharge from hospital as part of the discharge planning process.
***(Diabetes Specialist Nurses, Clinical Lead for Perioperative Diabetes Management)***

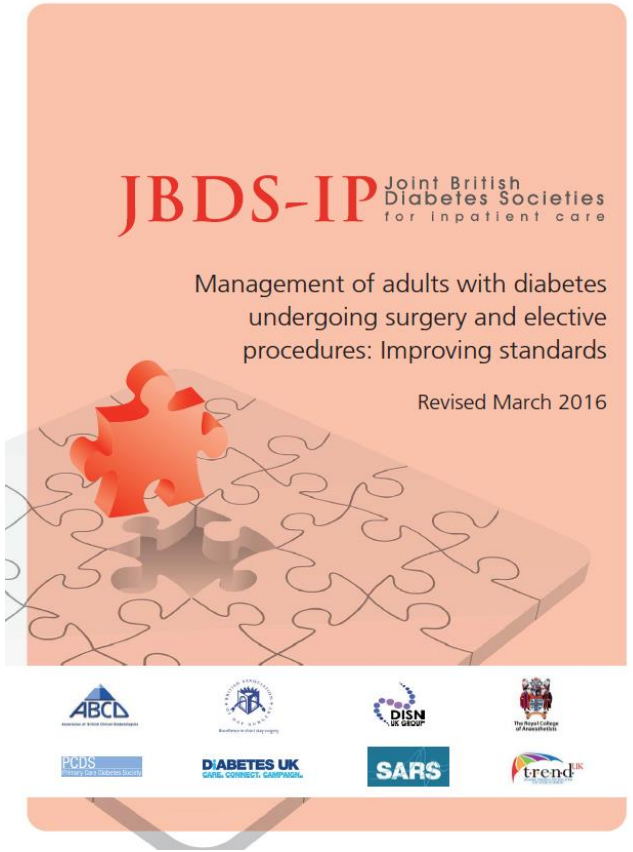
https://www.ncepod.org.uk/2018pd.html

# Guidance



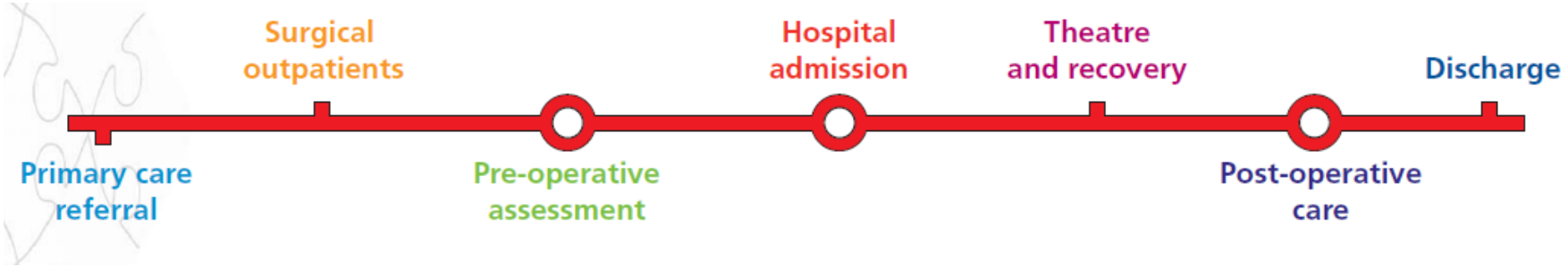

In 2011 Along Came This…..

Revised in 2016…..

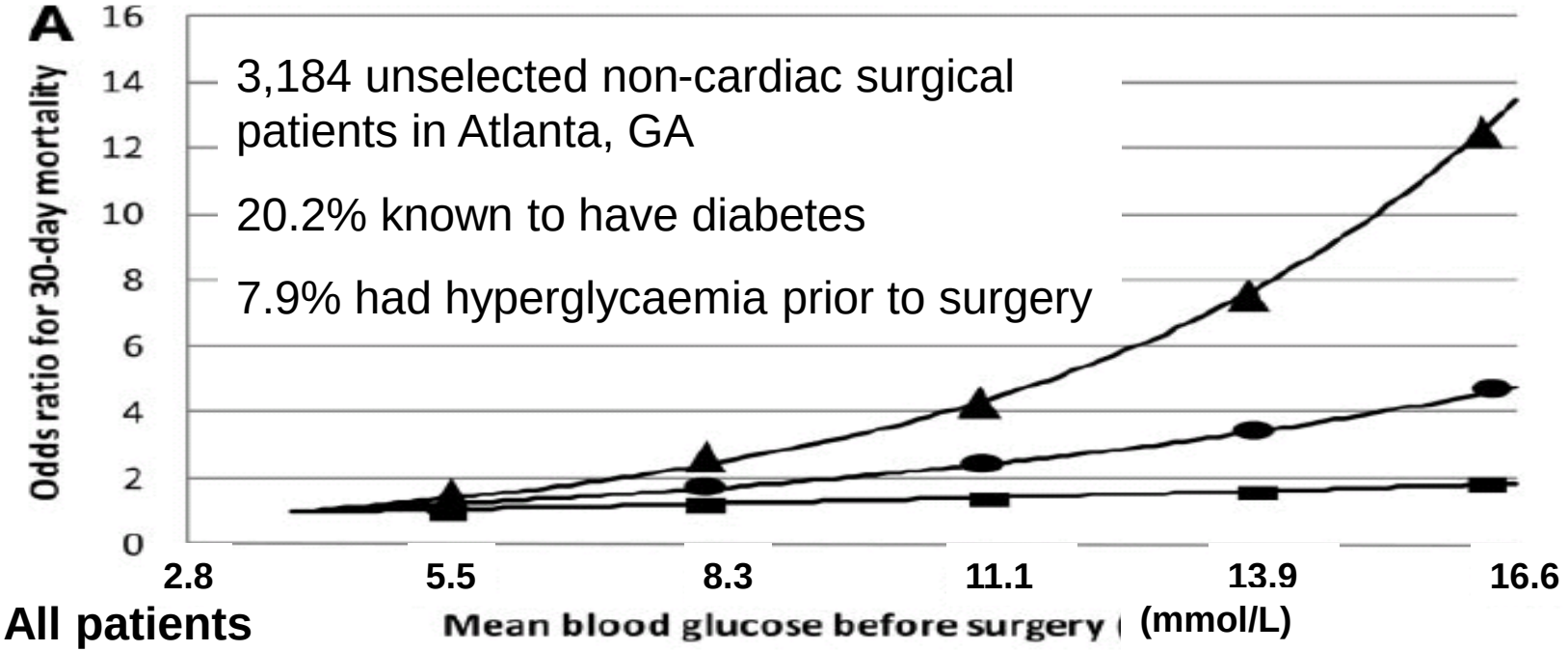



http://www.diabetologists-abcd.org.uk/JBDS/Surgical_guidelines_2015_full_FINAL_amended_Mar_2016.pdf

# The Patient Journey



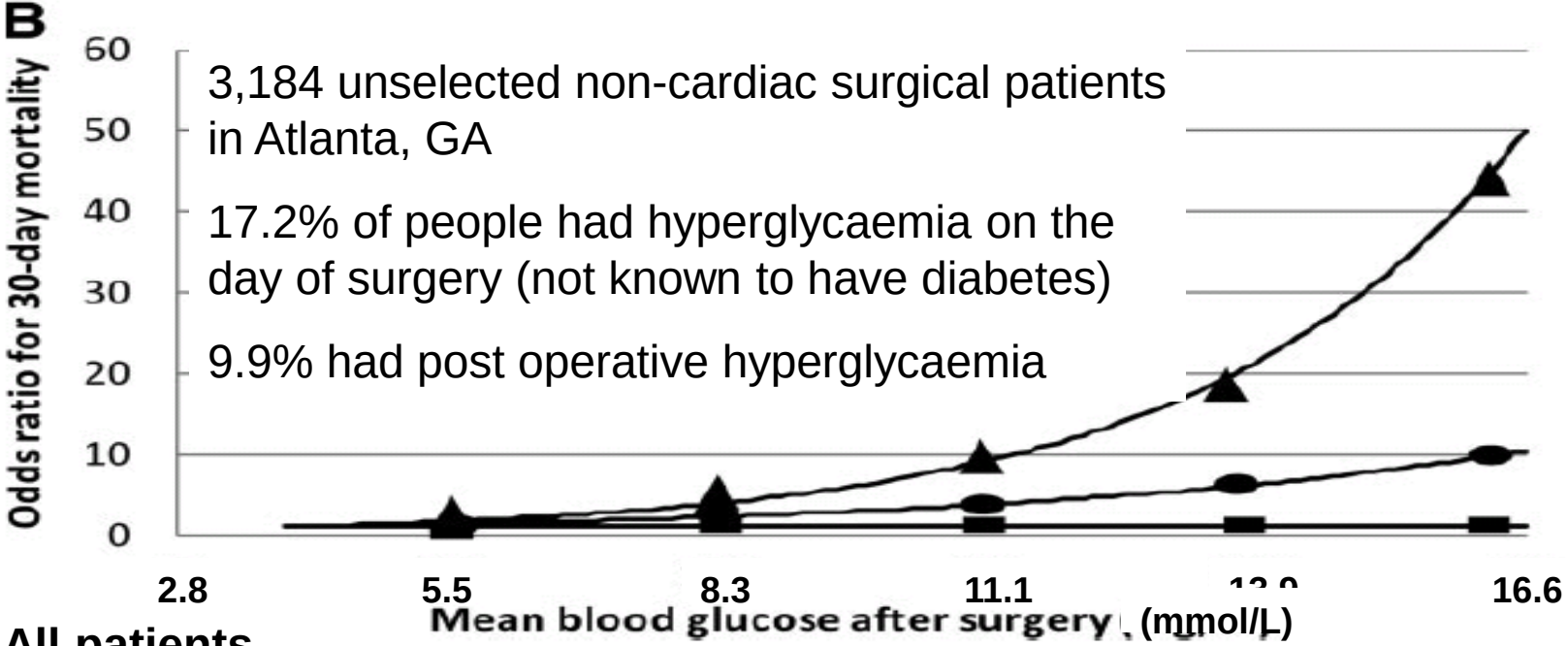
# Do High Glucose Levels Cause Harm?




- All patients
- Patients with diabetes
- Patients without diabetes

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

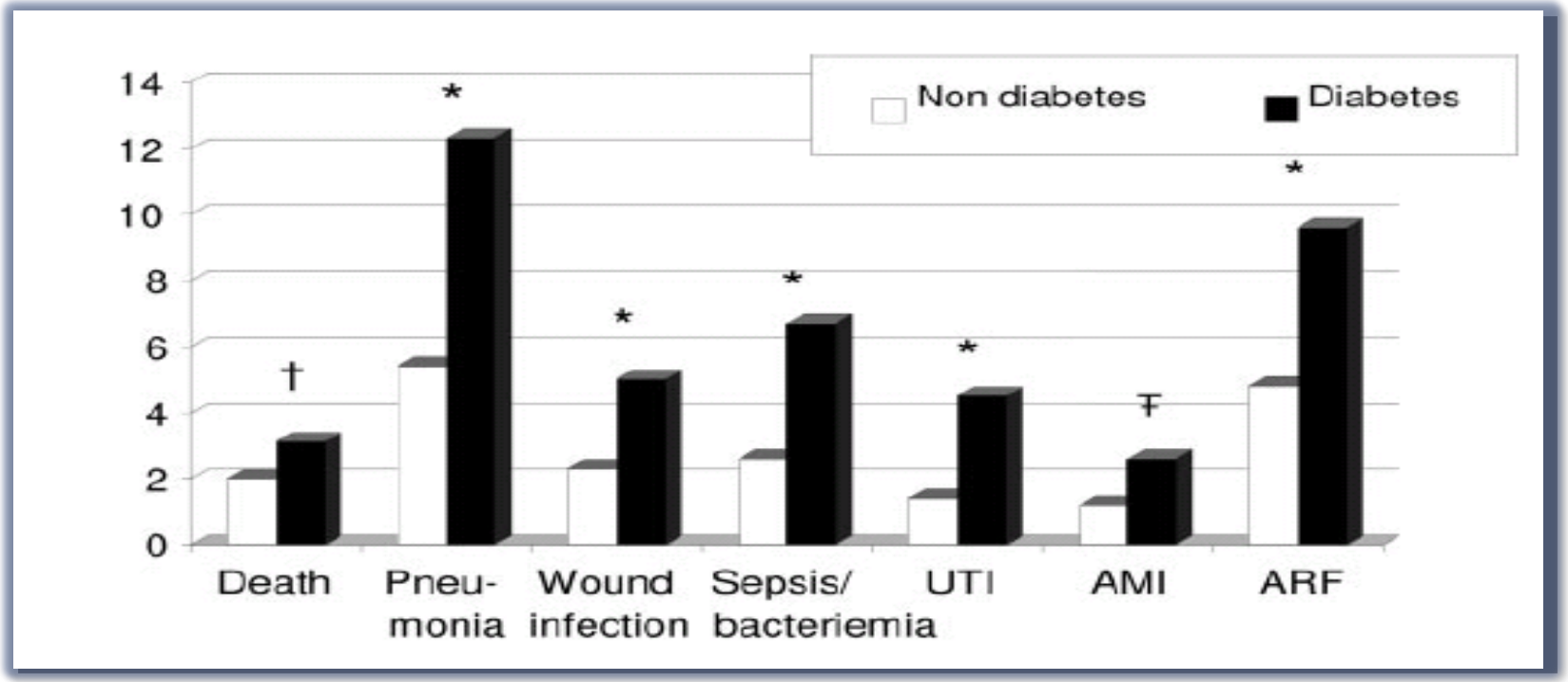
# Do High Glucose Levels Cause Harm?




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

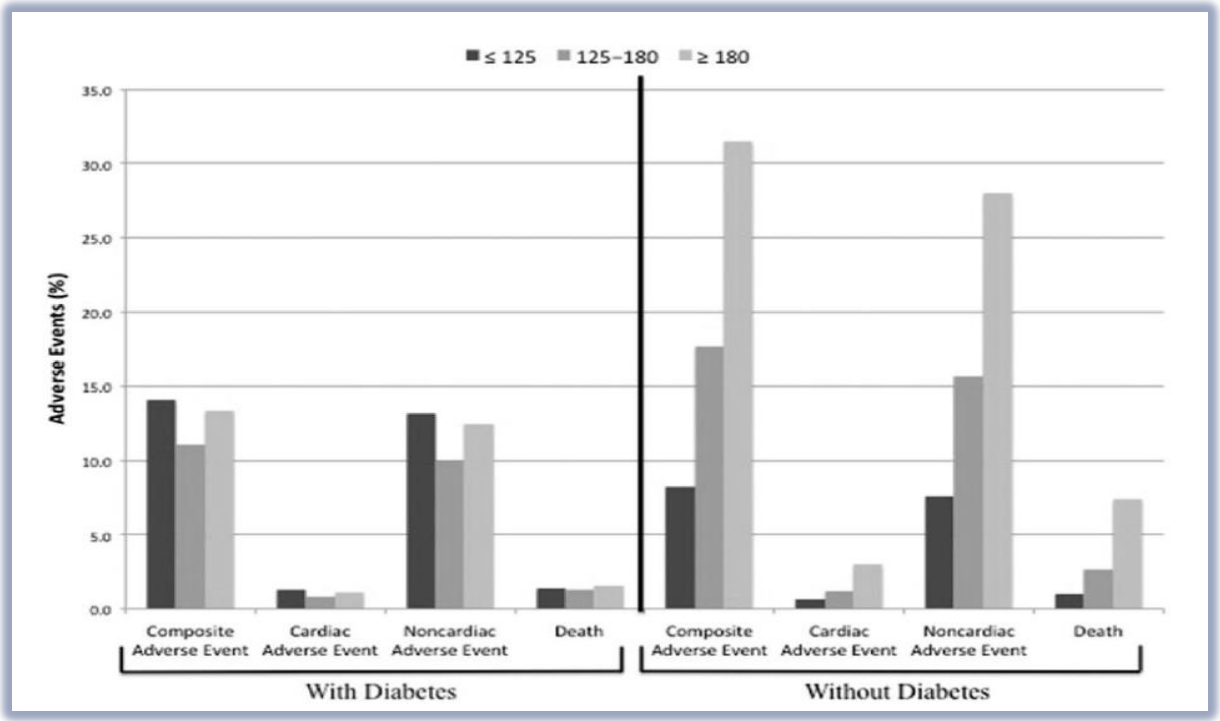
Frisch A et al Diabetes Care 2010;33(8):1783-1788

# Do High Glucose Levels Cause Harm?




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

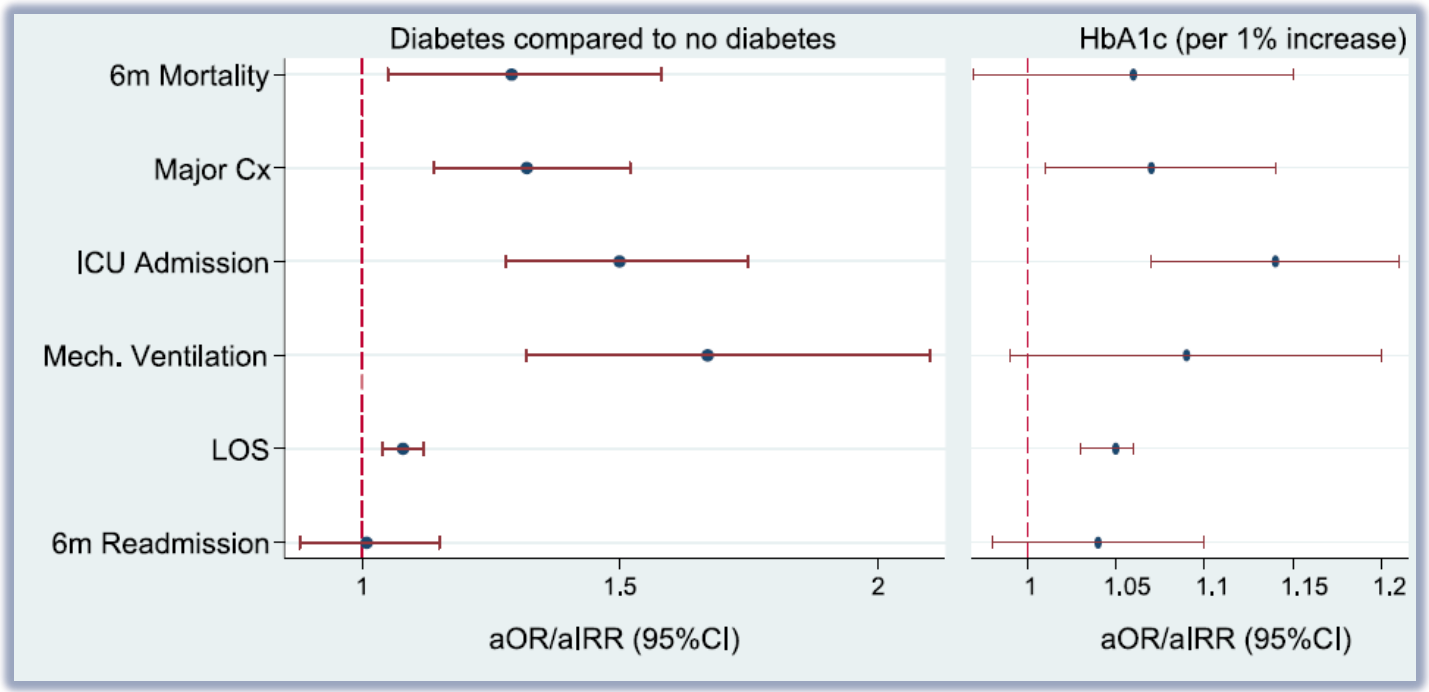
# Hyperglycaemia in Previously Normoglycaemic People is Bad




Composite endpoint = readmission; ITU; falls; any infection; debridement; AKI; re-operation

Kotagal M et al Annals of Surgery 2015;261(1):97-103

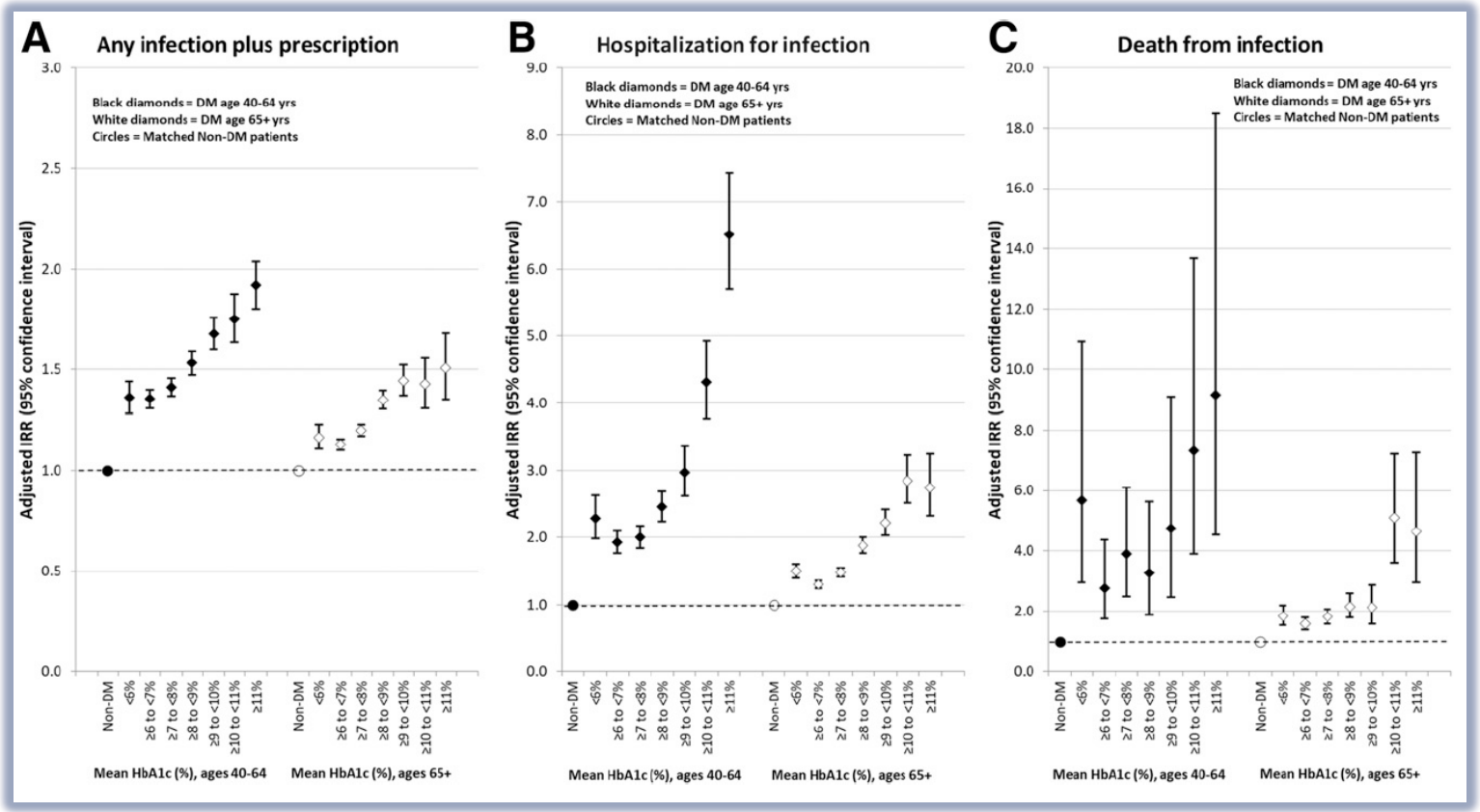
# 7,565 Canadians From 1 Hospital




Prospective (May 2013-January 2016), observational, adjusted, aged ≥54

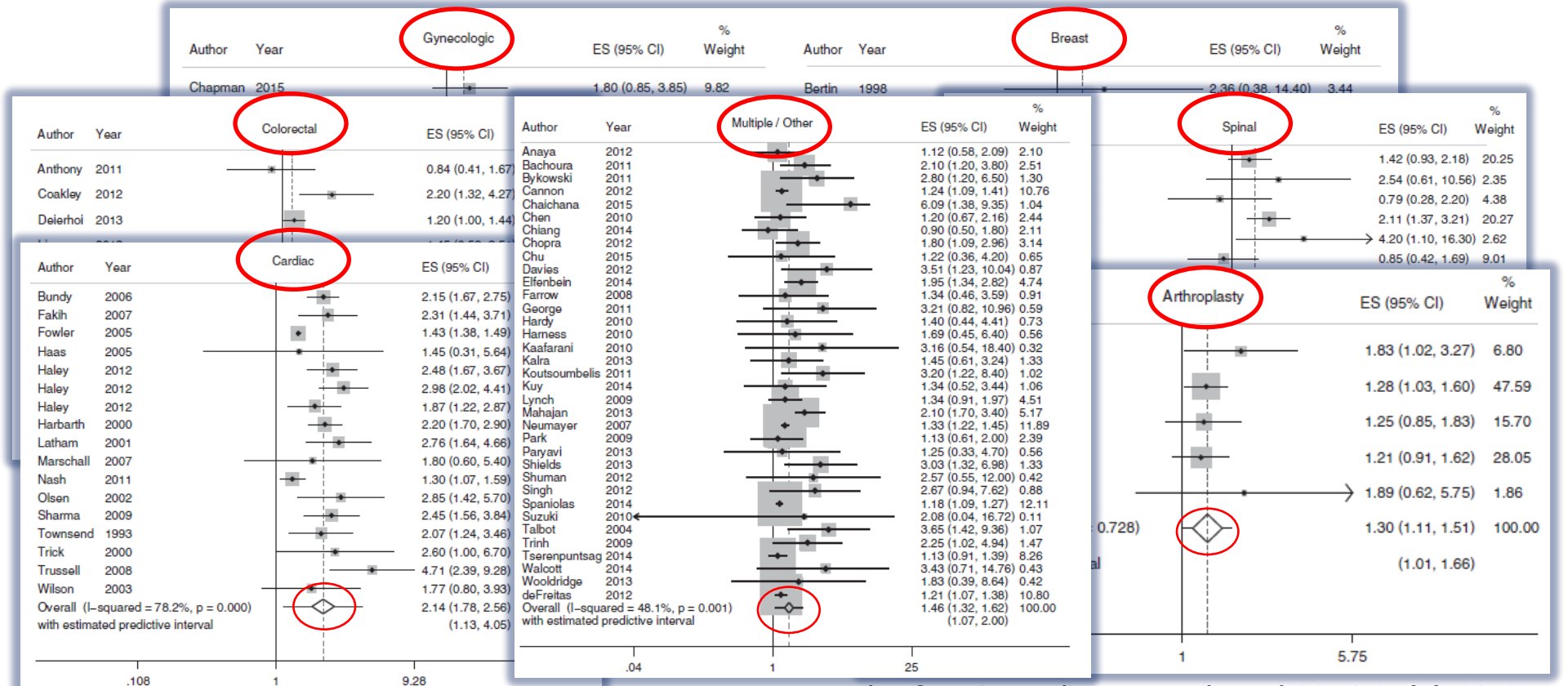
Yong PH et al Diabetes Care 2018;41(6):1172-1179

# Infections




Critchley JA et al Diabetes Care 41(10):2127-2135

# Glucose and SSI – A Variety of Specialities




Martin ET et al Infect Control Hosp Epidemiol 2016;37(1):88-99

# More Observational Data

- Observational data from 55 US hospitals
- Over 5 years
- Outcomes of 18,278 patients
  - 11,633 of whom who had a BG measured pre op, on day 1 post op or day 2 post op

Kwon S et al Ann Surgery 2013;257(1):8-14

# Outcomes

**TABLE 2.** Adjusted Multivariate Logistic Regression Analysis on the Effect of Perioperative Hyperglycemia (>180 mg/dL at Any Point on the Day of Surgery, Postoperative Day 1, or Postoperative Day 2) on Outcomes Presented as Odds Ratio and 95% Confidence Intervals (Within Parenthesis)

| | Composite Infections (n = 491) | Deaths (n = 48) | Reoperative Interventions (n = 257) | Anastomotic Failures (n = 43) | Myocardial Infarctions (n = 13) |
|---|---|---|---|---|---|
| Hyperglycemia | 2.0 (1.63–2.44) | 2.71 (1.72–4.28) | 1.8 (1.41–2.3) | 2.43 (1.38–4.28) | 1.15 (0.43–3.1) |

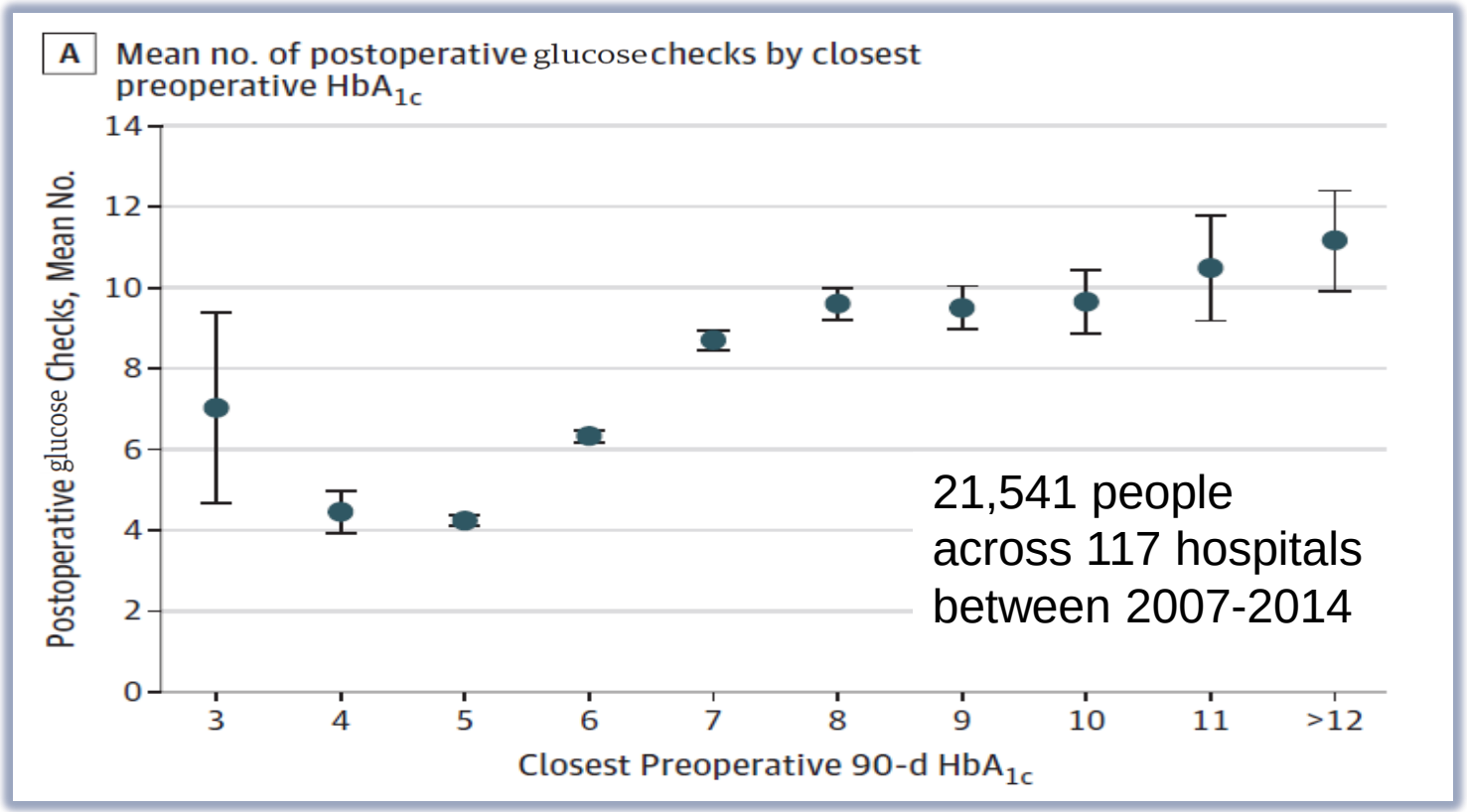
High glucose levels were associated with poor outcomes

| | | | | | |
|---|---|---|---|---|---|
| Diabetes[§] | | | | | |
| Noninsulin-dependent | 0.51 (0.37–0.69) | 0.48 (0.25–0.93) | 0.63 (0.44–0.9) | 0.45 (0.21–0.99) | 0.77 (0.15–4.08) |
| Insulin-dependent | 0.52 (0.35–0.76) | 0.78 (0.36–1.68) | 0.54 (0.35–0.85) | 0.49 (0.18–1.32) | 1.66 (0.26–10.71) |

But – **knowing** that someone had diabetes was protective (?increased vigilance)

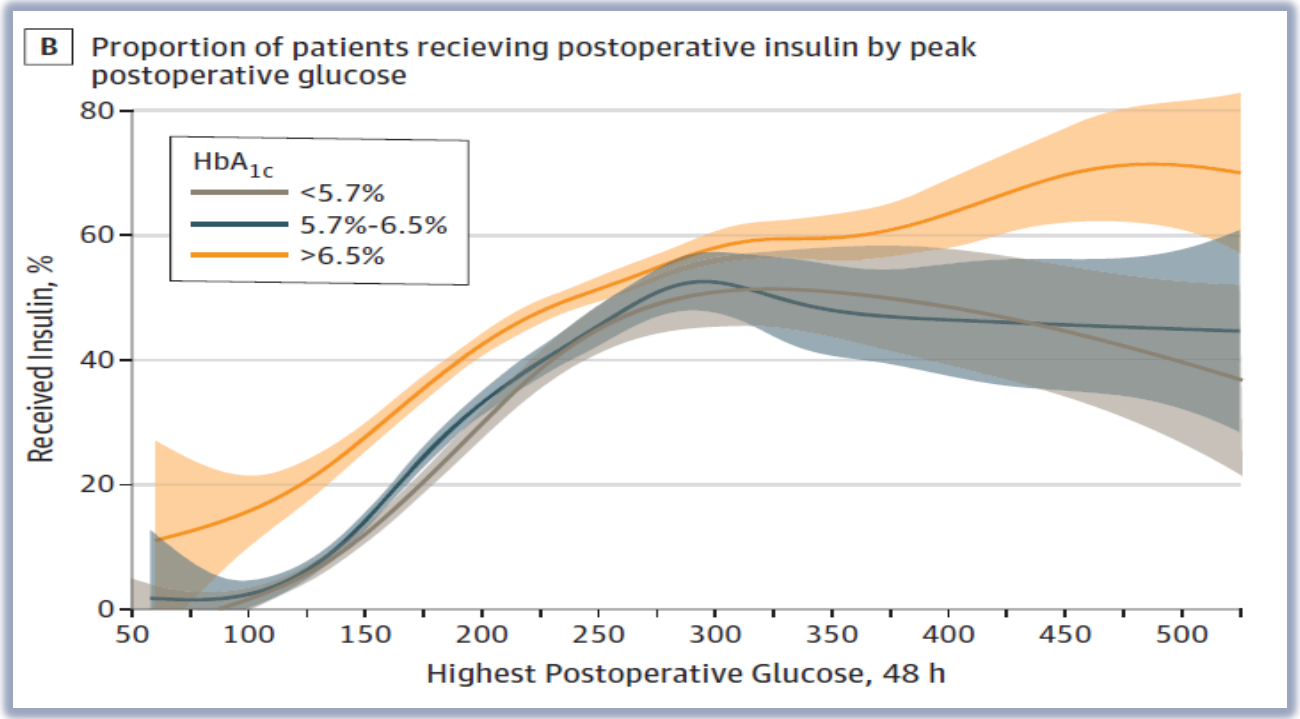
Kwon S et al Ann Surgery 2013;257(1):8-14

# Probably




Jones CE et al JAMA Surg 2017;152(11):1031-1038

# The Highest Pre-op HbA1c Were Most Likely to go onto Insulin Post-op

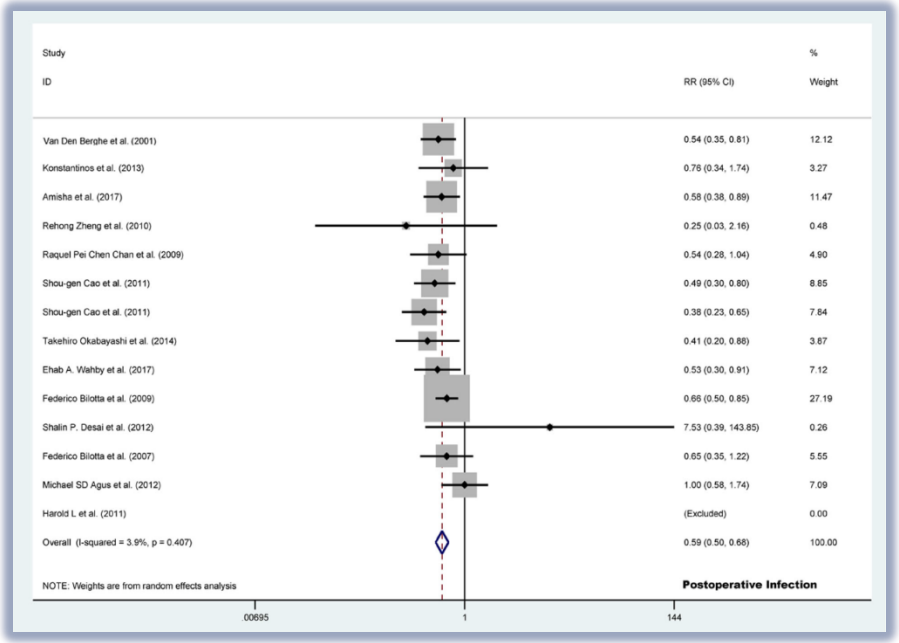



Jones CE et al JAMA Surg 2017;152(11):1031-1038

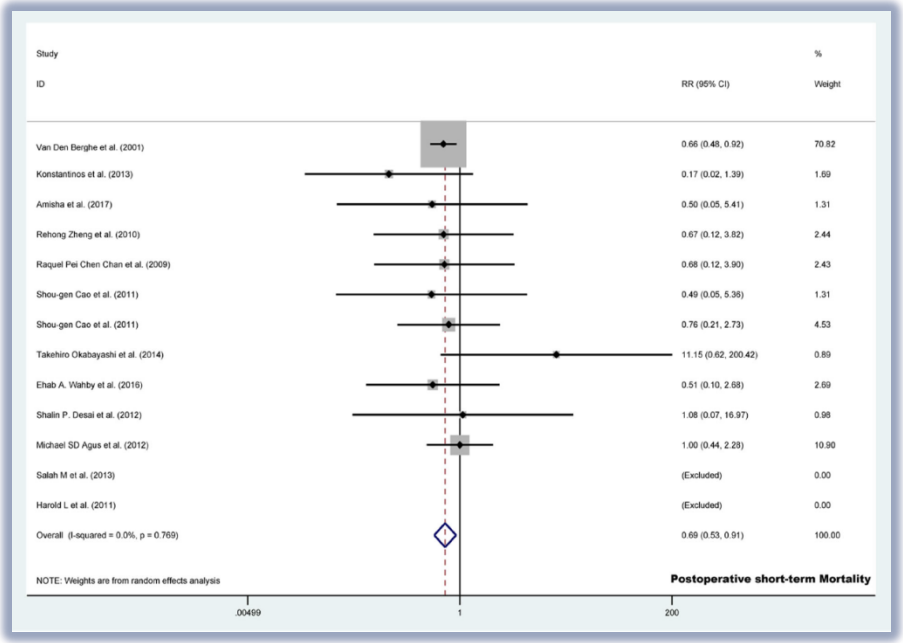
# There is a Trend Emerging

- Data from the 2010-2012 Surgical Care and Outcomes Assessment Programme across 55 hospitals in the US
- 40,836 patients, of whom 19% had DM, and of whom 47% had a peri-operative BG test
- Those who had not been identified as having diabetes or those who developed post-operative hyperglycaemia had the worst outcomes

# But Are There Any Data Showing That Improving Control Makes a Difference?




Infection




Mortality

Wang YY et al BMC Endo Dis 2018;18:42

# But Implementation is Hard Work!

**Perioperative diabetes care: room for improving the person centredness**

I. Hommel[1], P. J. van Gurp[2], C. J. Tack[2], J. Liefers[1], J. Mulder[1], H. Wollersheim[1] and M. E. J. L. Hulscher[1]

**Impact of a multifaceted strategy to improve perioperative diabetes care**

I. Hommel[1], H. Wollersheim[1], C. J. Tack[2], J. Mulder[1], P. J. van Gurp[2] and M. E. J. L. Hulscher[1]

Hommel I et al Diab Med 2015;32(4):561-568
Hommel I et al Diab Med 2017;34(2):287-285

# Who Do I think Should Have Glycaemic Assessment by Preoperative HbA1c

- Anyone at risk!
  - Over 40 years old (?30 in South Asians)
  - FH of DM
  - Personal history of GDM
  - Hyperlipidaemia
  - Hypertensive
  - BMI >27Kgm$^2$

Norfolk and Norwich University Hospitals NHS
NHS Foundation Trust


# Optimising Peri-Operative Glycaemic Management for the Diabetic Foot

www.norfolkdiabetes.com

ketan.dhatariya@nnuh.nhs.uk

@ketandhatariya