West Suffolk Hospital NHS

Norfolk and Norwich University Hospitals NHS
NHS Foundation Trust

Peri-operative Glucose Control
Is it Important?

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YDF Day 12th March 2013

A Scenario

- A 45 year old woman with a BMI of 32 kg/m^2 presents to her GP with spasmodic RUQ pain related to eating fatty foods. She has a 4 year history of type 2 diabetes treated with metformin 850 mg tds and gliclazide 80 mg bd
- The GP suspects gall stone disease. This is confirmed on ultrasound. He refers her to the general surgeons for consideration of elective surgery

Question 1

- What information should the referral letter to the surgeons contain?

Up-to-date current diabetes care

- Duration and type of diabetes
- Place of usual diabetes care (primary or secondary care)
- Other co-morbidities
- Treatment
    - For diabetes - oral agents/ insulin doses and frequency
    - For other co-morbidities

Specific complications of diabetes

- At risk foot
- Renal impairment
- Cardiac disease

Recent values for

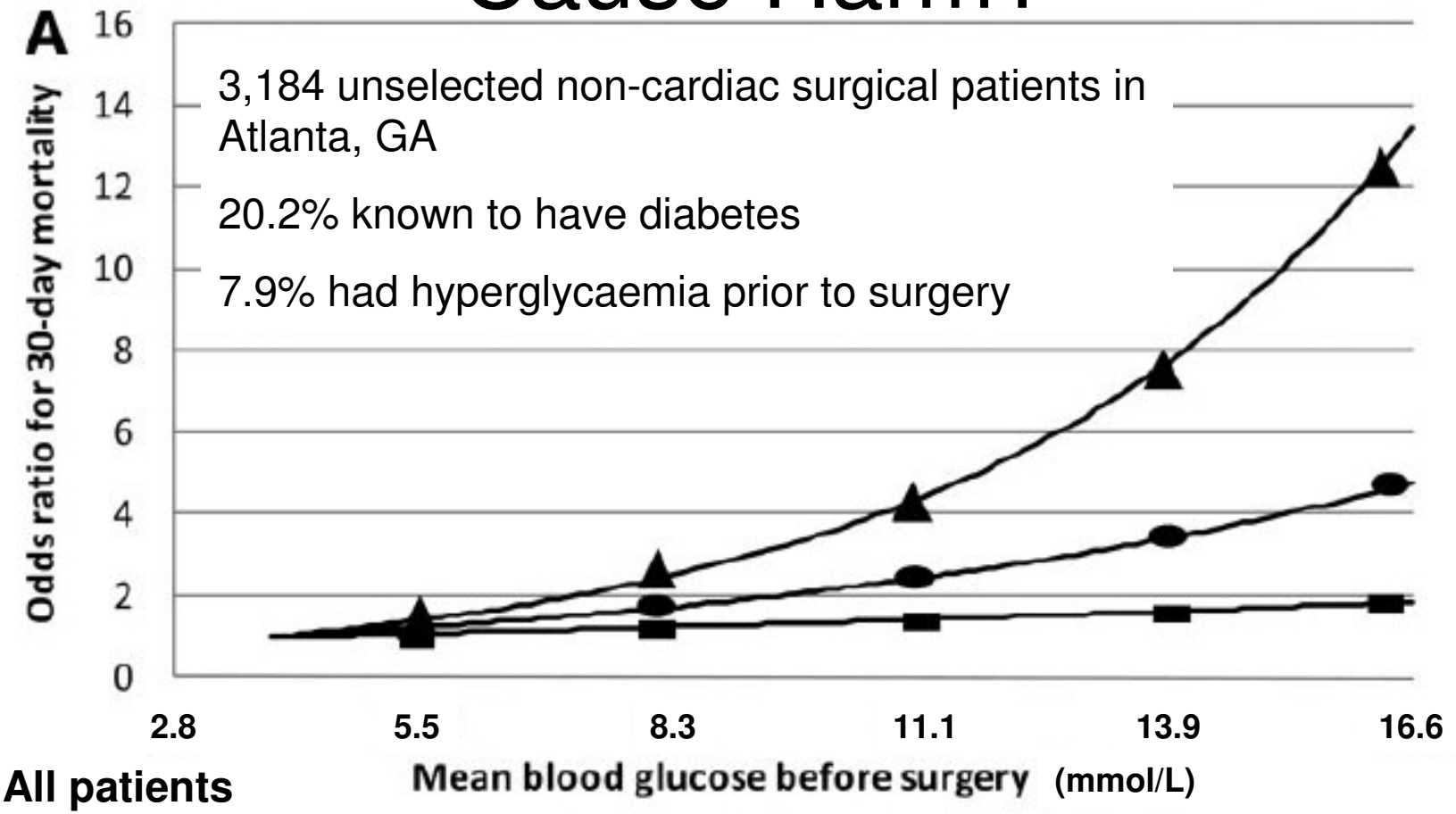
- BMI
- BP
- HbA_{1c}
- eGFR

Who is Responsible for the Diabetes?

- Patient
- GP
- Surgeon in OPD
- Pre-operative assessment clinic staff
- Staff on the wards (nurses and junior doctors)
- Diabetes team
- Theatre and recovery staff

Everyone – and Equally!

Do High Admission Glucose Levels Cause Harm?



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

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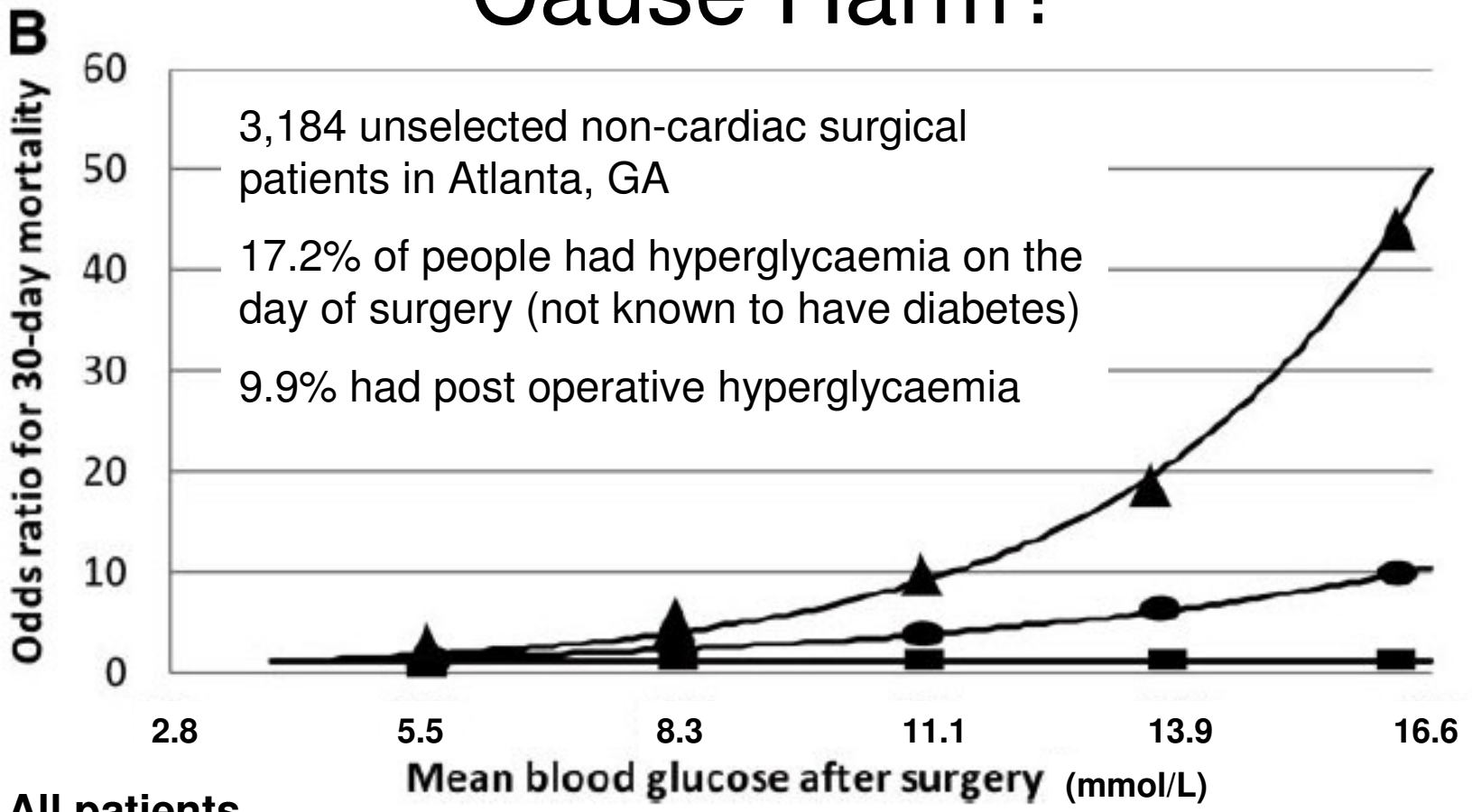

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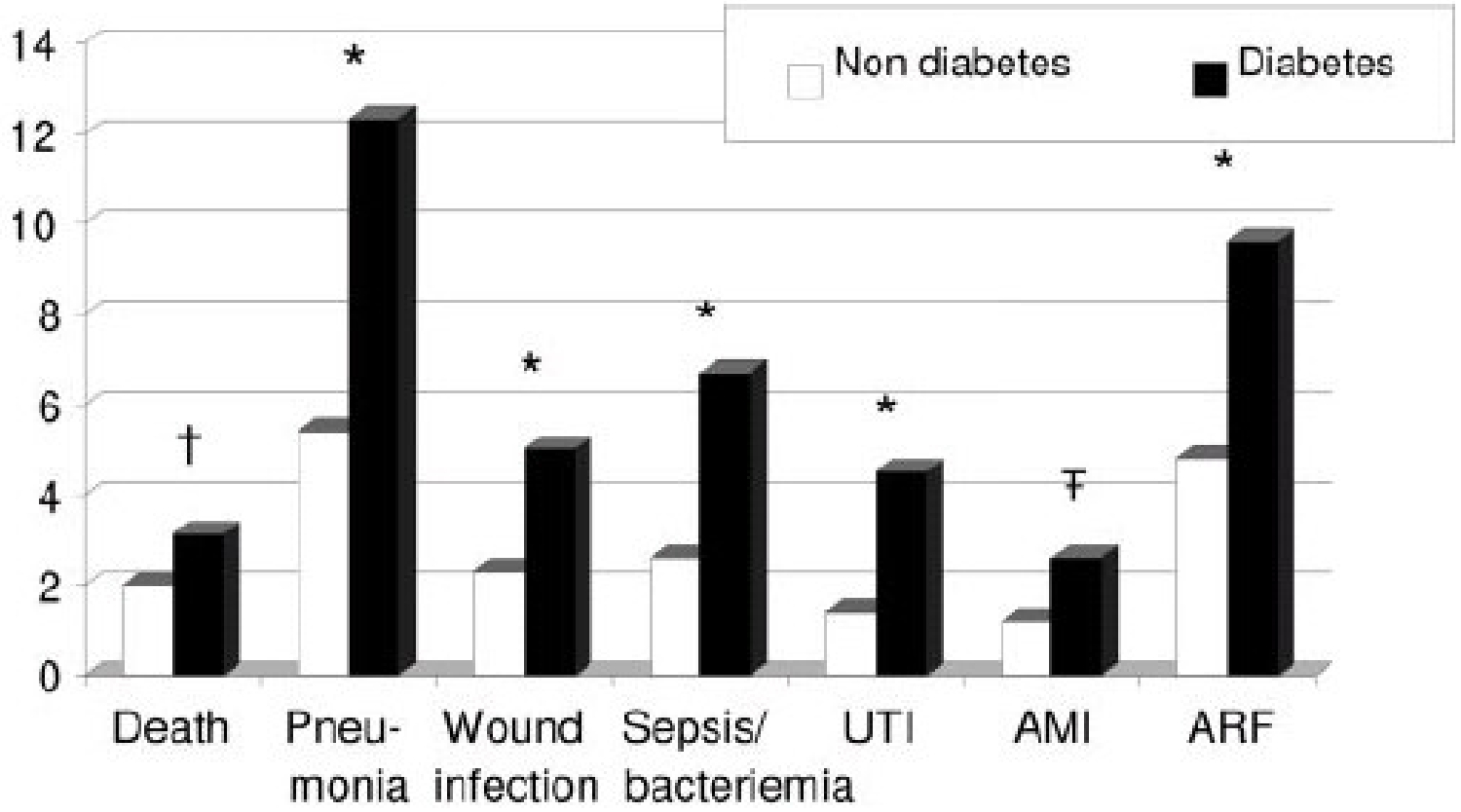

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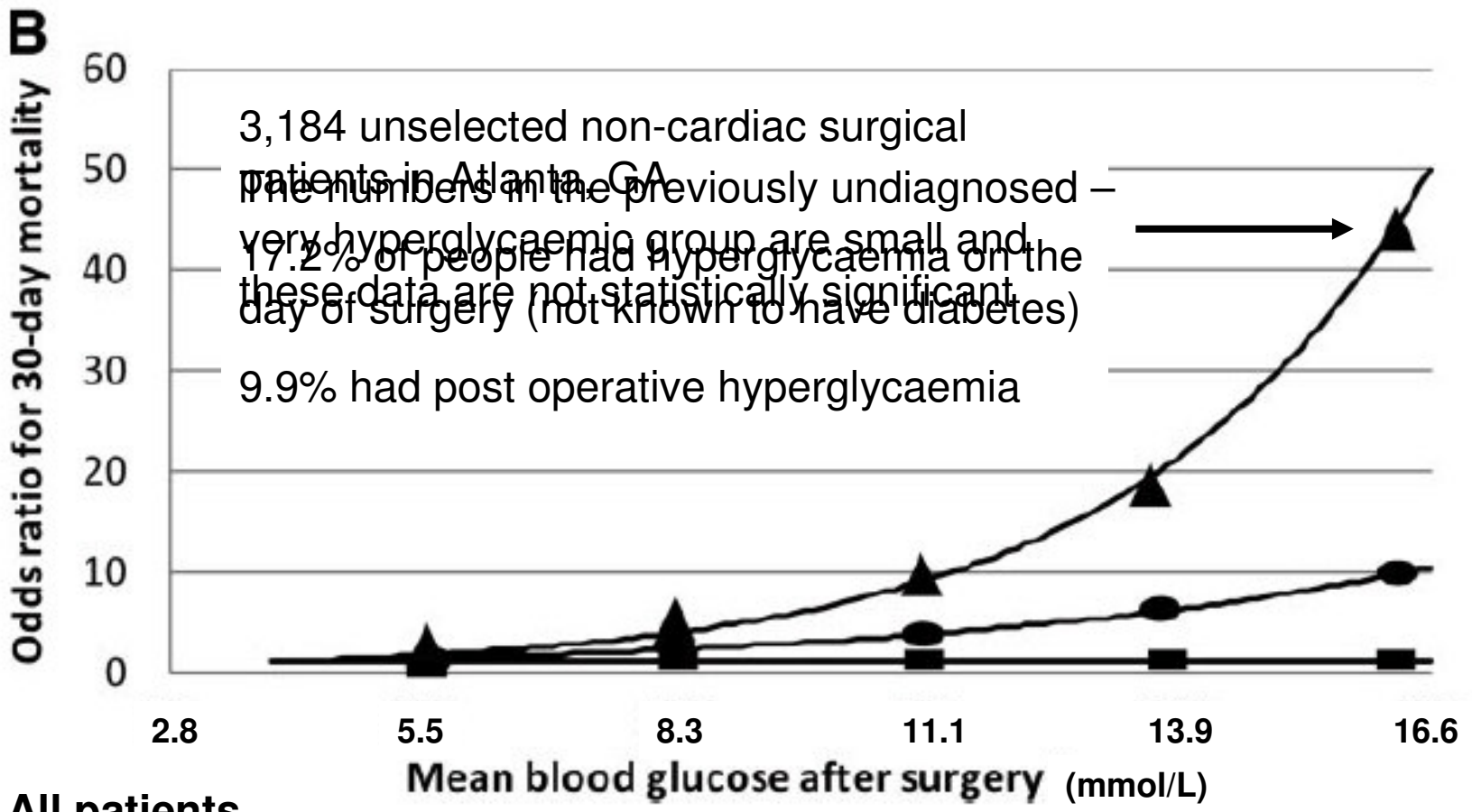
An Admission



3,184 unselected non-cardiac surgical patients in Atlanta, GA

17.2% of people had hyperglycaemia on the day of surgery (not known to have diabetes)

9.9% had post operative hyperglycaemia

The numbers in the previously undiagnosed – very hyperglycaemic group are small and these data are not statistically significant

All patients

Patients with diabetes

Patients without diabetes

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Why Do Things Go Wrong?

- Lack of awareness
  - Failure to identify people with diabetes
- Lack of institutional guidelines
  - Less of an issue now (see my presentation at DUK on Thursday morning)
- Poor knowledge of diabetes amongst staff delivering care
  - See George JT et al's TOPDOC paper QJM
- Complex polypharmacy and insulin prescribing errors
  - Several documents on insulin safety – NPSA / NHS Diabetes e-learning packages

For Elective Surgery What is the Recommended Maximum HbA1c?

- 53 mmol/mol
- 58 mmol/mol
- 64 mmol/mol
- 69 mmol/mol
- 75 mmol/mol

For Emergency Surgery?

- Continue their usual diabetes medication regimen
- Use a fixed rate intravenous insulin infusion
- Use a subcutaneous insulin ‘sliding scale’
- Use a variable rate intravenous insulin infusion
- Wait until the HbA1c is less than 69 mmol/mol

For Short Starvation Times, How Should Drugs be Manipulated Pre-operatively?

- Insulin
- OHA’s

Insulins	Day prior to admission	Day of surgery	
		Patient for AM surgery	Patient for PM surgery
Once daily (evening) (e.g. Lantus® or Levemir®. Insulatard®, Humulin I®, Insuman®)	No dose change*	Check blood glucose on admission	Check blood glucose on admission
Once daily (morning) (Lantus® or Levemir® Insulatard®, Humulin I®, Insuman®)	No dose change	No dose change*. Check blood glucose on admission	No dose change*. Check blood glucose on admission
Twice daily (e.g. Novomix 30®, Humulin M3® Humalog Mix 25®, Humalog Mix 50®, Insuman® Comb 25, Insuman® Comb 50 twice daily Levemir® or Lantus®)	No dose change	Halve the usual morning dose. Check blood glucose on admission. Leave the evening meal dose unchanged	Halve the usual morning dose. Check blood glucose on admission. Leave the evening meal dose unchanged
Twice daily - separate injections of short acting (e.g. animal neutral, Novorapid® Humulin S®) Apidra® **and intermediate acting** (e.g. animal isophane Insulatard® HumulinI® Insuman®)	No dose change	Calculate the total dose of both morning insulins and give half as intermediate acting only in the morning. Check blood glucose on admission. Leave the evening meal dose unchanged	Calculate the total dose of both morning insulins and give half as intermediate acting only in the morning. Check blood glucose on admission. Leave the evening meal dose unchanged
3, 4, or 5 injections daily	No dose change	**Basal bolus regimens:** omit the morning and lunchtime short acting insulins. Keep the basal unchanged.* **Premixed AM insulin:** halve the morning dose and omit lunchtime dose Check blood glucose on admission	Take usual morning insulin dose(s). Omit lunchtime dose. Check blood glucose on admission

Tablets	Day prior to admission	Day of surgery	
		Patient for AM surgery	**Patient for PM surgery**
Acarbose	Take as normal	Omit morning dose if NBM	Give morning dose if eating
Meglitinide (repaglinide or nateglinide)	Take as normal	Omit morning dose if NBM	Give morning dose if eating
Metformin (procedure not requiring use of contrast media*)	Take as normal	Take as normal	Take as normal
Sulphonylurea (e.g Glibenclamide, Gliclazide, Glipizide, etc.)	Take as normal	Once daily AM omit Twice daily omit AM	Once daily AM omit Twice daily omit AM and PM
Pioglitazone	Take as normal	Take as normal	Take as normal
DPP IV inhibitor (e.g. Sitagliptin, Vildagliptin, Saxagliptin)	Take as normal	Omit on day of surgery	Omit on day of surgery
GLP-1 analogue (e.g. Exenatide, Liraglutide)	Take as normal	Omit on day of surgery	Omit on day of surgery

What is the Evidence For All This?

- There isn't any

BMJ

BMJ 2013;346:f134 doi: 10.1136/bmj.f134 (Published 17 January 2013)

PRACTICE

UNCERTAINTIES

Should inpatient hyperglycaemia be treated?

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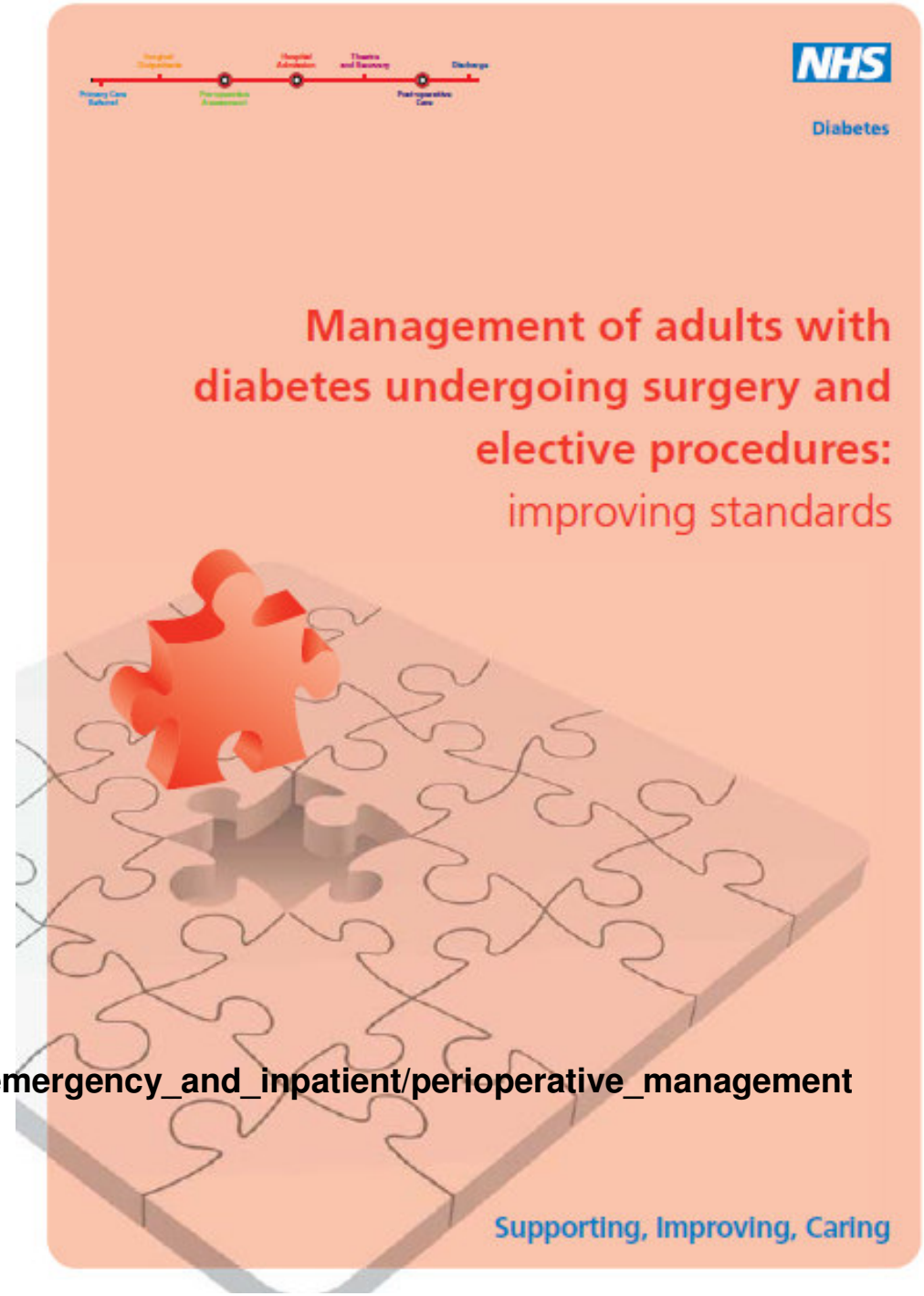
The ITU Story

- 2001 Leuven (Surgical) 1548 Positive
  Van den Berghe G et al NEJM 2001;345:1359-1367
- 2006 Leuven (Medical) 1200 Neutral / Positive
  Van den Berghe G et al NEJM 2006;354:449-461
- 2008 VISEP (Septic) 537 Stopped early
  Brunkhorst FM et al NEJM 2008;358:125-139
- 2008 De la Rosa (General) 504 Neutral
  De La Rosa G et al Critical Care 2008;12:R120
- 2009 GluControl 1078 Stopped early / Neutral
  Preiser J-C et al Intensive Care Medicine 2009 35:1738-1748
- 2009 Leuven (PICU) 700 Positive
  Vlasselaers D et al Lancet 2009;373:547-556
- 2009/12 NICE-SUGAR 6104 Harmful (especially hypos)
  The NICE-SUGAR Study Investigators NEJM 2009;360:1283-1297
  NEJM 2012;367:1108-1118
- 2012 Boston Children's 980 Neutral
  Agus MS et al NEJM 2012;367(13):1208-1219

What Can You Do?



http://www.diabetes.nhs.uk/areas_of_care/emergency_and_inpatient/perioperative_management

Does Anyone Use The Guidelines?

- Recently collected data from 135 out of 180 DSU across England, Wales and Scotland
- 24% of all DSUs do not routinely manage patients with T1DM
- 44% and 28.8% do not have care pathways for managing T1DM and T2DM respectively
- 41% of all DSUs said that they use VRIII's, but only 13% reported using a GIK regimen if required

Modi A et al – Gold medal winning abstract presented at BADS 21/22 June 2012

Does Anyone Use The Guidelines?

- Most units manage T2DM by minimally modifying the patients' usual regimen, and 20% of all units do not alter the patient's diabetic regime at all apart from ensuring that they are scheduled first on the operating list
- 13 units reported having managed T2DM in their DSUs for a longer time period than that for T1DM

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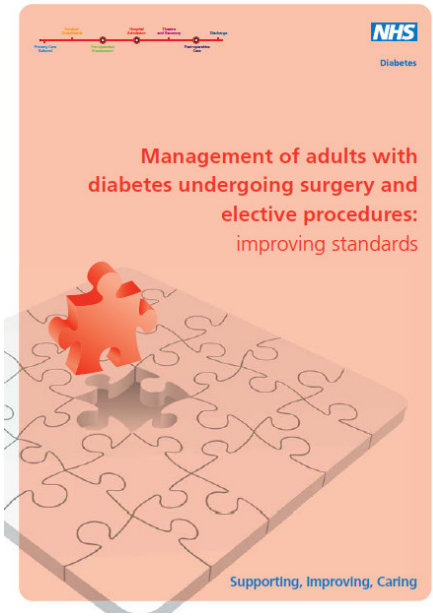
In Summary

- You have the opportunity to intervene and make a difference to the people with diabetes having surgery in your institution
- Talk to your surgeons / anaesthetists / pre-operative assessment clinic staff
- It's not going to be easy



Any questions?