NUFFIELD DEPARTMENT OF
PRIMARY CARE
HEALTH SCIENCES

UNIVERSITY OF OXFORD

NMRC Health Services Research Parallel Track
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Patient Adherence or Inertia in the Health Care System

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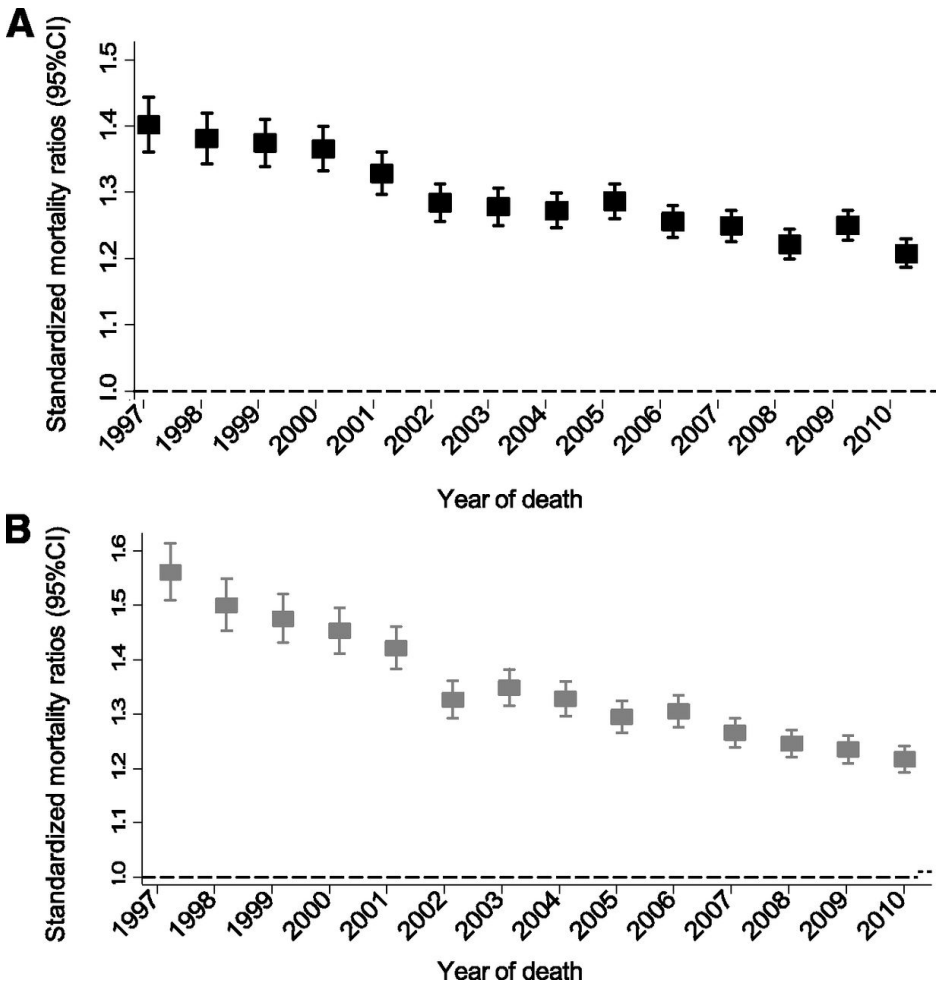
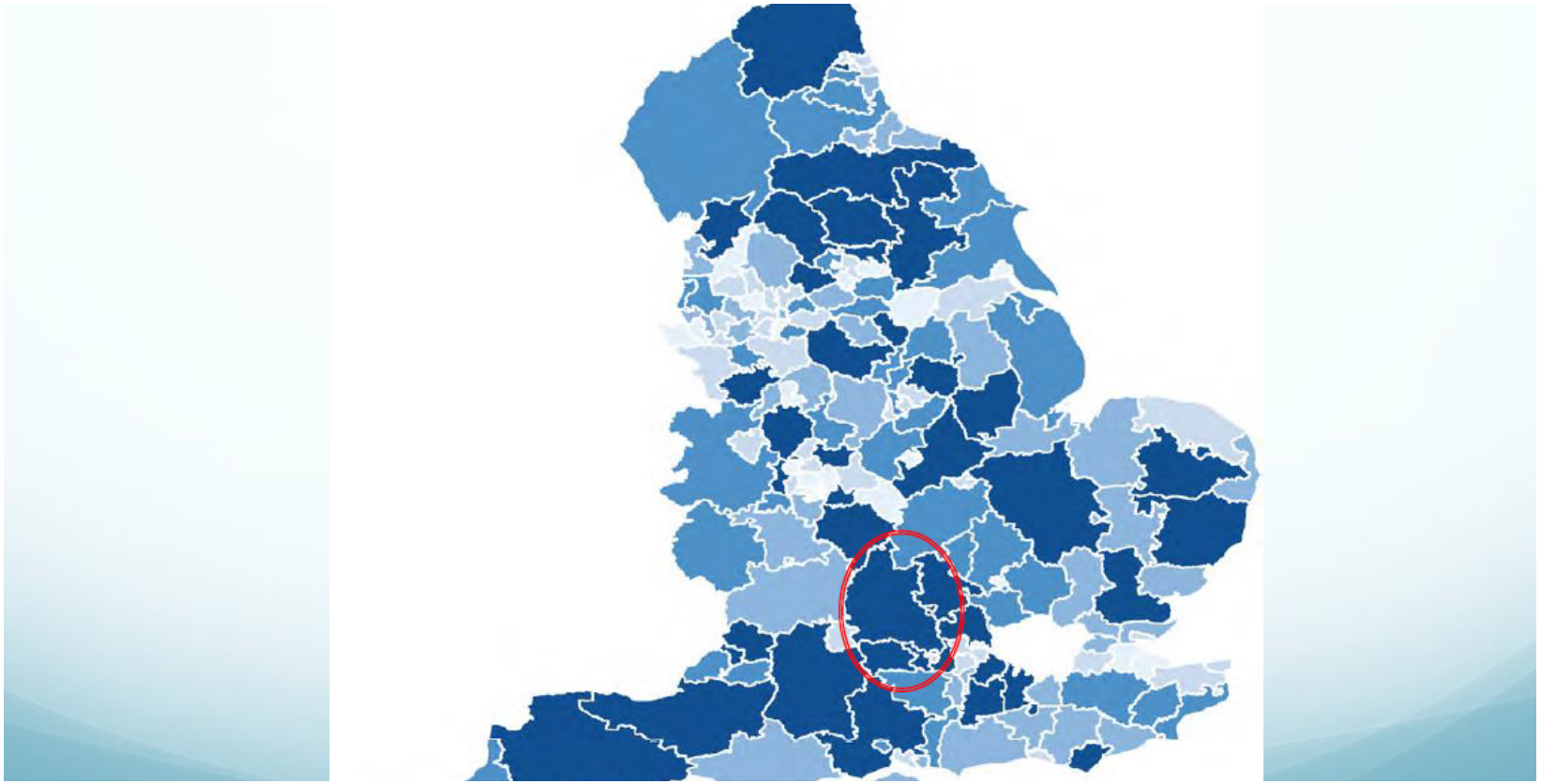
All-cause SMRs in males (A) and females (B) with type 2 diabetes compared with the general population between 1997 and 2010.



Jessica L. Harding et al. Dia Care 2014;37:2579-2586

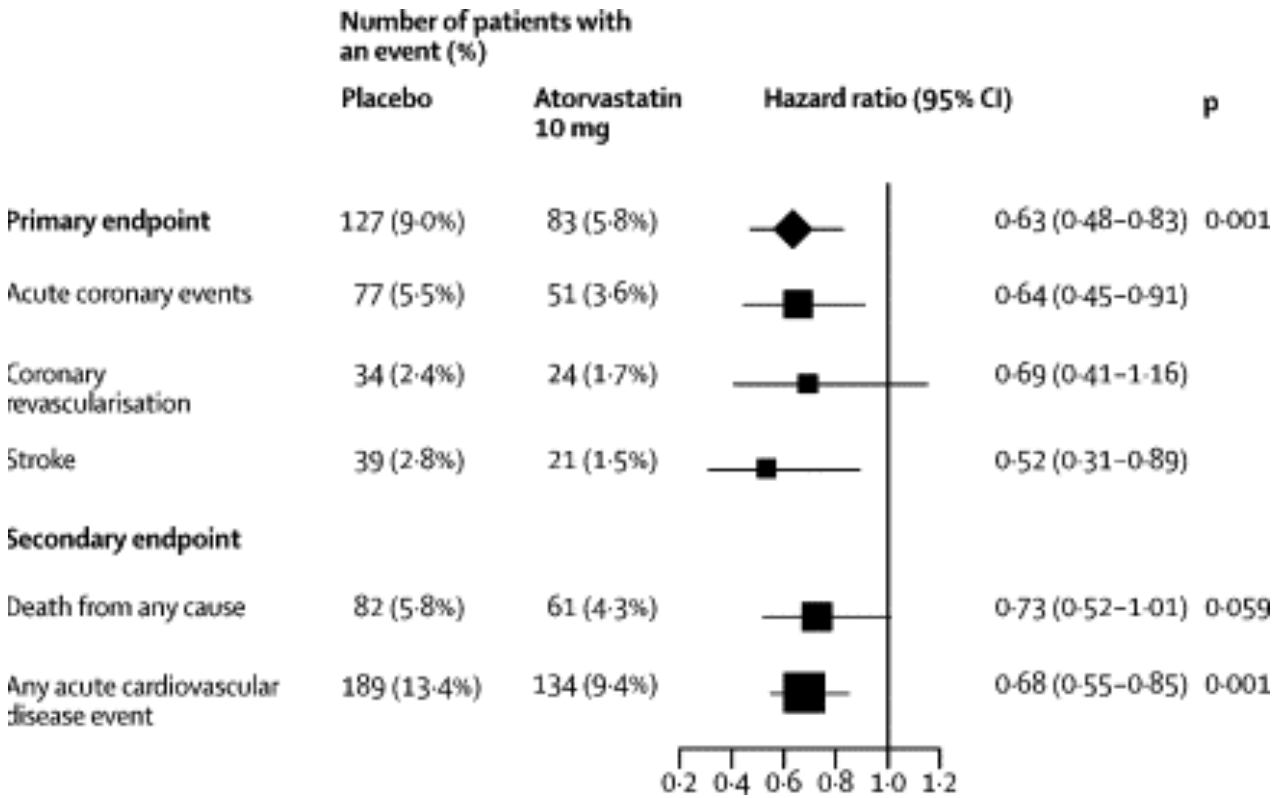
©2014 by American Diabetes Association

Excess mortality risk for people with diabetes



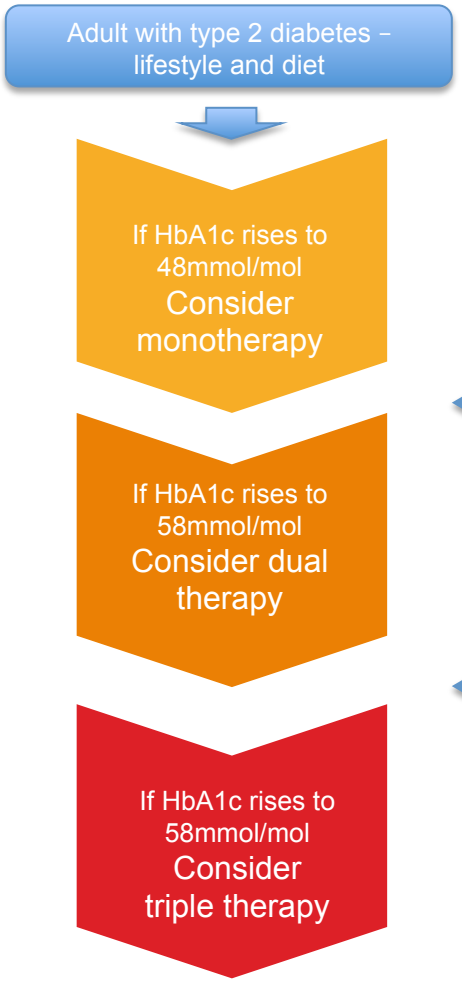
England: National Diabetes Audit 2015

Atorvastatin and diabetes



Calhoun et al The Lancet 2004 364, 685-696

Copyright © 2004 Elsevier Ltd



Delay between attaining threshold and intensification of therapy

1.6 years

6.9 years

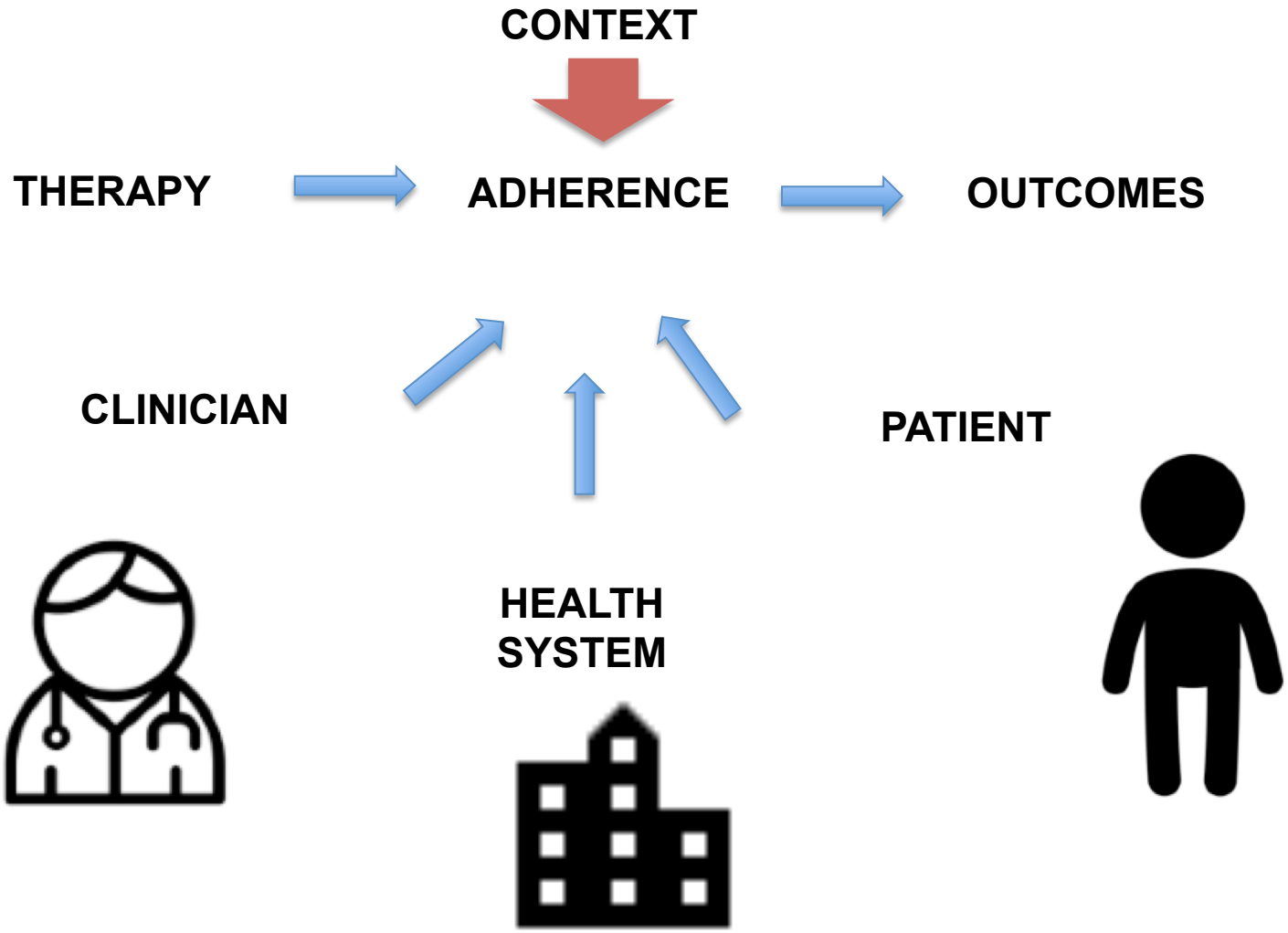
Khunti et al Diabetes Care 2013; 36:3411-3417.

Managing Type 2 Diabetes in Adults. National Institute for Health and Care Excellence (NICE), London UK 2015,

“Adherence”

"the degree to which the person's behaviour corresponds with the agreed recommendations from a health care provider."

World Health Organisation


CONTEXT
THERAPY
ADHERENCE
OUTCOMES
CLINICIAN
PATIENT
HEALTH
SYSTEM

Ineffective use of effective treatments

- Many patients stop taking their medication in the first months of treatment.
- In addition, many patients who continue their medication do not consistently take it as prescribed.
- As a result, adherence rates average around 50% and range from 0% to over 100%.

Nieuwlaat R, et al. Cochrane Database of systematic reviews 2014: 11: CD000011

Primary vs. Secondary non-adherence

- Discontinued therapy after having had two prescriptions 4%
- Failed to continue treatment after no or only one prescription. 22%

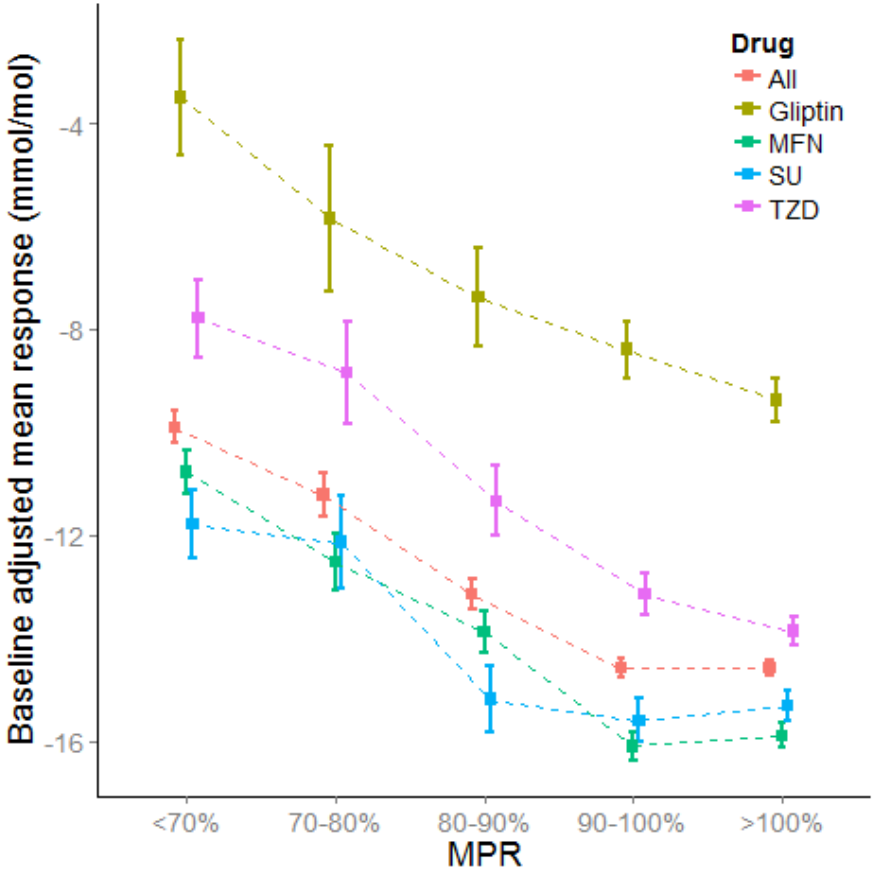
Karter A. Health Services Research **44,** 1640–1661 (2009)

Impact of non-adherence on HbA1c

- Analysis using the Clinical Practice Research Database
- Eight million patients in England and Wales
- Cohort of individuals starting a new glucose lowering treatment
- Medication Prescribing Ratio

Farmer et al. *Diabetes Care* 2016; **39**: 258-263

Change in HbA1c (response) at differing levels of adherence (Medication Prescribing Ratio)



Farmer et al. *Diabetes Care* 2016; **39**: 258-263

“Clinical inertia”

“...the failure of healthcare providers to initiate or intensify therapy when indicated”

Treatment intensification for diabetes

Number of Oral Glucose Lowering (OGL) drugs	Probability of intensification within 7 years	Mean time to intensification with additional OGL	Mean time to intensification with OGL or insulin
1	76%	1.6 years	1.1 year
2	50%	6.9 years	6.3 years
3	22%	-	< 6 years

Khunti et al Diabetes Care 2013; 36:3411-3417.

Clinical impact of delayed treatment

- Delayed intensification together with poor glycaemic control significantly increased the risks of myocardial infarction (67%; P<0.01), heart failure (64%; P<0.01), stroke (51%; P<0.01) and their composite (62%; P<0.01).
- A delay of 1 year in treatment intensification along with HbA1c levels>7.5% (58 mmol/mol) was associated with a comparable increase in risk for cardiovascular events.

Khunti K, et al. Diabetes Obes Metab 2016;18:401–9

Clinical inertia vs appropriate inaction

- Clinical inertia
  - Delays in guideline dissemination
  - Lack of access to education

- Appropriate inaction
  - Elderly patient with co-morbidity
  - Risk of hypoglycaemia
  - Patient choice

Reach et al. Diabetes Metab 2017;43: 501-511.

Non-adherence: understanding why...

- Worries about dependence, tolerance and addiction.
- Taking medicines can be stigmatising.
- Feelings that they have been coerced into taking medicines.
- Some people take medicines or adjust doses when they have symptoms.
- Few discussed regimen changes with their doctors.
- Other reasons…chaotic lives, unavailable medicines, cost.

Pound et al. Soc Sci Med 2005: 61:133-155.

The complexity of the patient experience

- Patients understand the need for medicine...
- ...but adjust dose and timing to suit their lives
- Medications are both good and evil...
- It’s difficult when symptoms, drugs, diet and exercise don’t seem to have any logical relationship...

McSharry et al. Diabetic Medicine 2016; 33(10):1330-1338.

Interventions to support taking medication regularly

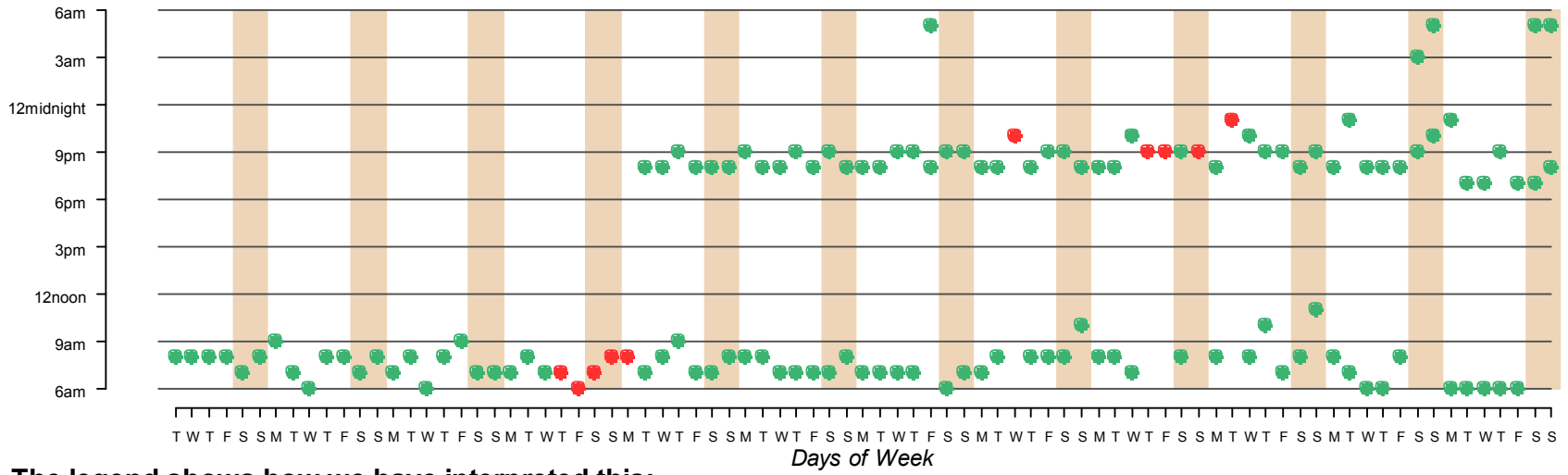
- Discussing concerns and problems to support motivation
  - Theory of Planned Behaviour
  - Pilot work suggests feelings of control are key
- Habit development
  - Simple techniques to reinforce behaviour
  - Action planning

sams
supported adherence to medication

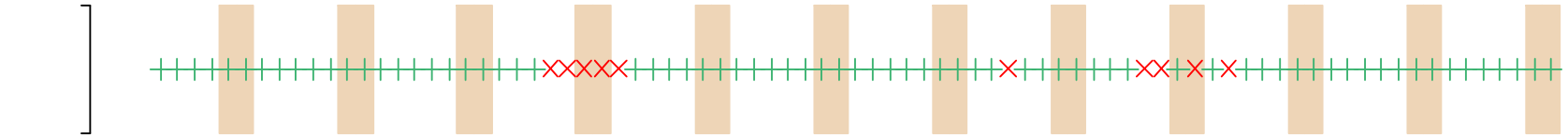
Farmer et al. *BMC Family Practice* 2012; 13(1):30.

this is a record of the time at which you took your tablets each day during the period of the study.

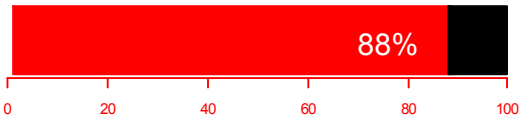
Patients Name: 1 Start Date: 10 Oct 2006 End Date: 31 Dec 2006



The legend shows how we have interpreted this:



+ 1 tablet/s taken correctly
× Extra or fewer tablets taken than prescribed
● No tablets taken
Weekend



73 / 83 days you have taken your medication as prescribed

Farmer et al. *BMC Family Practice* 2012; 13(1):30.

SAMS Intervention: Trial results

	Behavioural Intervention arm N=110	**Standard Care arm** N=77
HbA1c (baseline)	8.34	8.29%
HBA1c (final visit)	8.34 (0.15)	8.21 (0.12)
Days correct taken (%)	77.4 (2.5)	69.0 (3.4)

sams
supported adherence to medication

Farmer et al. *BMC Family Practice* 2012; 13(1):30.

Active management of treatment intensification

- Type 2 diabetes patients with poor control
- Enhanced role for the practice nurse in leading insulin initiation and mentoring by a registered nurse with diabetes educator credentials
- Cluster trial evaluation.
- Impact on HbA1c (-0.6% between groups)
- No severe hypoglycaemia

Furler, J. *et al. BMJ* j783–10 (2017).

Influence of health systems on type 2 diabetes

- Financial constraints faced by the patient. e.g. co-payments for medication - a barrier to control and/or adherence outcomes.
- Reducing out-of-pocket payments can improve diabetes outcomes.
- Lack of access to health services and medication is a barrier to achieving good diabetes outcomes.

Ong, S. E. *et al. PLoS ONE* **13,** e0195086–42 (2018).

Health system facilitators for type 2 diabetes

- Integrated, innovative care models were positively associated with improved diabetes outcomes.
- Pharmacist involvement improves outcomes.
- Education programmes led by health professionals showed mostly positive effects on glycaemic control.

Ong, S. E. *et al. PLoS ONE* **13,** e0195086–42 (2018).

Using automated prescription refill for statin prescriptions improves adherence and reduces LDL cholesterol levels for people with diabetes

Sarkar U. et al. *Med Care*. 2014 Mar;52(3):194-201.

Telephone consultations with a pharmacist

- Setting: Online pharmacy
- 670 patients with type 2 diabetes, individually randomised
- Two tailored telephone consultations with a pharmacist, 4–6 weeks apart, plus a written summary of the discussion and a medicines reminder chart versus usual care.
- 10% versus 19.5% non adherent on the basis of prescriptions.

Lyons et al.. *BMJ Qual.Saf*. 2016;25:759-769.

Low-intensity telephone outreach

- Multispecialty Group Practice (Integrated Managed Care)
- 2378 patients newly prescribed HbA_{1c} / lipid lowering drug
- Phone call from a diabetes educator or pharmacist focussing on use of medicines vs. usual care
- 6 month persistence – intervention 49.1% vs control 49.5%

O'Connor et al.. *Diabetes Care*. 2014; 37:3317-3324.

Objectives and design of the StAR trial

Objectives

- To assess the effect of an automated treatment adherence support programme delivered by mobile-phone based short messaging system (SMS) text messaging for people with high blood pressure on levels of blood pressure at 12 months.

Evaluation design

- Single-blind, individually randomised, three-arm, parallel group trial.

Outcomes

- Systolic blood pressure measured using a standard protocol with a validated automated oscillometric sphygmomanometer.
- Availability of blood pressure lowering medication calculated from dispensing and clinic record data

* StAR

Bobrow, Farmer et al. *Circulation* 2016; **132**:592-600

Personalisation of messages

- Library of SMS text messages
- Messages used in the interventions in English, isiXhosa, and Afrikaans.
- The information-only messages aimed to motivate collecting and taking medicines and provide education about hypertension and its treatment.
- Participants allocated to the interactive adherence support could also respond to selected messages to changer or cancel an appointment and change the timing and language of the text messages.

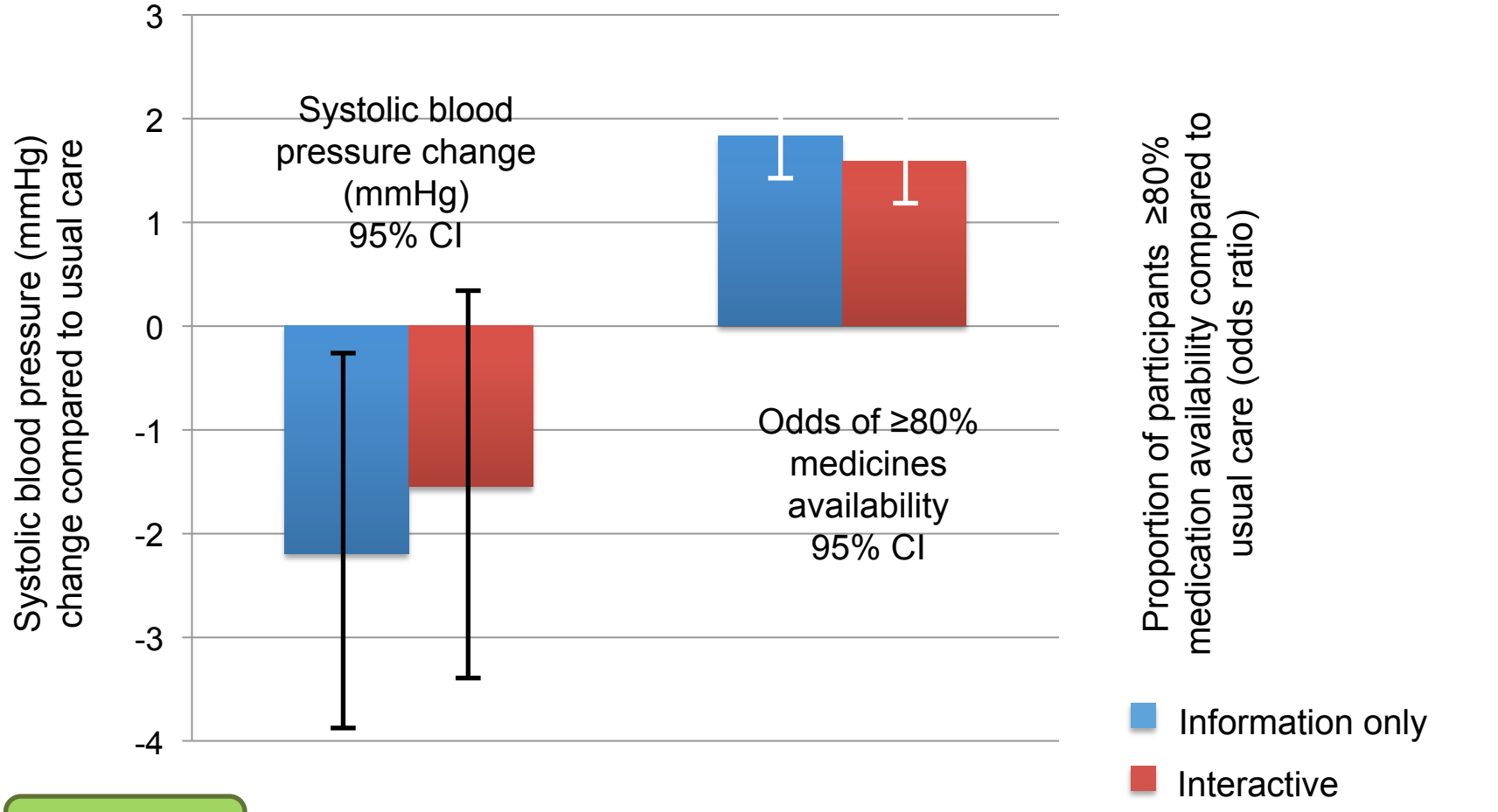
* StAR

Bobrow, Farmer et al. *Circulation* 2016; **132**:592-600

Automated delivery and follow up for applicability and scalability of SMS text-messaging

* StAR

Summary of findings by intervention groups compared to usual care over one year



* StAR

Bobrow, Farmer et al (2016) *Circulation.*

Mobile phone text-messaging for people with type 2 diabetes in sub-Saharan Africa

Objectives
To assess the effect of SMS text-messaging across three sites in South Africa and Malawi

People
Treated for type 2 diabetes

sana

OpenMRS
MEDICAL RECORD SYSTEM

MRC National Institute for Medical Research

GACD
GLOBAL ALLIANCE FOR CHRONIC DISEASES
AN ALLIANCE OF HEALTH RESEARCH FUNDERS

Future interventions to support adherence

There is no evidence that low adherence can be ’cured’. Thus, effective methods to improve adherence must be maintained for as long as the treatment is needed, requiring interventions that can be integrated into the care system in a cost-effective manner.

Nieuwlaat R, et al. Cochrane Database of systematic reviews 2014: 11: CD000011

Effective medicines use for type 2 diabetes

- SuMMiT-D is a six-year development programme funded by the NIHR Programme Grant Funding Board
- Development of behavioural intervention delivered by mobile devices and SMS messaging
- Trial evaluation with individual patient consent
- Integration with EHR for prescribing records at a national level to enhance effectiveness

NIHR: RP-PG-1214-20003

https://www.phctrials.ox.ac.uk/studies/summit-d

In conclusion...

- Individual and health system factors all contribute to ineffective use of effective medication.
- There are small effects from a range of factors.
- Multiple interventions targeting a range of different issues to support patients and clinicians.
- Integrating care – need for data sharing.