

Innovations in Medication Safety

Professor Bryony Dean Franklin
UCL School of Pharmacy and Imperial
College Healthcare NHS Trust

Most common healthcare intervention



But...

Prescribing errors occur in 5% of prescriptions in general practice, and up to 15% in hospitals

Administration errors in about 5% of non-IV doses, and 50% of IV doses

5% of admissions to NHS hospitals are medication-related, half of which are preventable

1-2% of inpatients suffer harm due to medication error

inappropriate use of anti-infectives give rise to *Clostridium difficile*, particularly in older people

Massive concerns about rise in antibiotic resistance

GIVE ME A CHANCE

England's new manager Roy Hodgson makes plea to fans

Sport S1-S5



ROSE PRINCE
Britain's best food isn't
from Blumenthal's
Features page 23



PLACIDO DOMINGO

The tenor has a big date at Wembley

Arts page 27

The Daily Telegraph

Wednesday, May 2, 2012

FINAL

telegraph.co.uk

No 48,809 £1.20

Lethal errors in 2m prescriptions

Doctors are making mistakes in drugs given to one in five patients, with elderly worst affected, says GMC

By Rebecca Smith, Medical Editor

FAMILY doctors are giving out almost two million prescriptions a year containing potentially life-threatening errors, the General Medical Council warns today.

One in five patients is receiving drugs from GPs with mistakes including wrong dosage, incorrect instructions or inadequate monitoring, the doctors' regulator finds. Most of the serious errors related to the blood-thinning drug warfarin, which researchers said could have "catastrophic" consequences if not properly monitored.

Elderly people and young children are twice as likely to be given a prescription with an error, the GMC study into pre-

scribing errors shows. The study found evidence that GPs are signing prescriptions without seeing patients, issuing repeat prescriptions without questions and failing to adjust drug dosages following new tests.

Serious errors uncovered include a 62-year-old woman with an allergy to penicillin who was prescribed flucloxacillin, a similar drug, and elderly patients prescribed warfarin, who should have been closely monitored but who were not tested for two years.

Moderate errors included a four-year-old girl with a stomach upset who was prescribed a drug that should be used "with caution" in children. Minor mistakes included a one-year-old girl who

was given two prescriptions for antibiotics in the same consultation but with different doses stipulated.

Pharmacists investigated the records of 1,700 patients in 15 practices over a 12-month period. One in five patients had been given a prescription with an error. This rose to four in ten of the over-75s. Each extra medicine a person was on increased the risk of errors by 16 per cent.

Among 6,000 prescriptions examined, one in 550 had a severe error. Extrapolated across England, where 900 million prescriptions are issued annually, it would mean 45 million prescriptions contain errors, with 1.8 million classed as severe. Failing to request that the patient be monitored was the most common serious

error followed by prescribing a drug to which the patient was allergic. Almost all serious errors involved warfarin, which has been used as rat poison. It is prescribed to thin the blood in people at risk of blood clots. It must be carefully monitored because it interacts with other drugs and some foods and poses a risk of life-threatening stomach bleeds. In one case, an elderly woman was admitted to hospital with a bleed two weeks after being prescribed warfarin.

Human error was behind most mistakes, the study says. GPs have blamed rushed appointments and complex computer software that makes it easy to select the wrong drug or incorrect dose. They also said nurses sometimes interrupted

them during clinics, which led to errors.

Professor Tony Avery, of Nottingham University, who led the research, said the mistakes could have catastrophic consequences. Referring to the prescribing of warfarin, he said: "It really is an extremely unsafe situation. Bleeds can be catastrophic, they are potentially fatal."

Prof Avery, who is also a GP, called for family doctors to increase their appointment times from the average 13 minutes to 15. He also called for better training and for pharmacists and GP receptionists to carry out medicine reviews and check monitoring arrangements.

Professor Sir Peter Rubin, chairman of the General Medical Council, said GPs had to give prescribing priority. He said

effective computer systems and greater involvement from pharmacists could minimise errors

Martin Astbury, president of the Royal Pharmaceutical Society, said: "The number of mistakes could be reduced by up to 50 per cent if GPs introduced an in-house pharmacist-led support scheme."

Andrew Lansley, the Health Secretary, said the vast majority of prescriptions were checked and corrected by pharmacists. "Patients can be confident that the medicines they receive are safe and appropriate," he said.

Dr Clare Gerada, of the Royal College of GPs, said that of one million daily consultations, "in 95 per cent of cases I prescribe safely and effectively".

MPs want ruling on Murdoch

Last stand, Mr President?



'Hit squads' for Heathrow crisis

24 January 2013 Last updated at 13:18

Antibiotic 'apocalypse'

By James Gallagher

Health and science reporter, BBC News

The rise in drug resistant infections is comparable to the threat of global warming, according to the chief medical officer for England.

Prof Dame Sally Davies said bacteria were becoming resistant to current drugs and there were few antibiotics to replace them.

She told a committee of MPs that going for a routine operation could become deadly due to the threat of infection.

16 November 2012 Last updated at 09:22

Share f t e

Antibiotic resistance 'big threat to health'

COMMENTS (444)

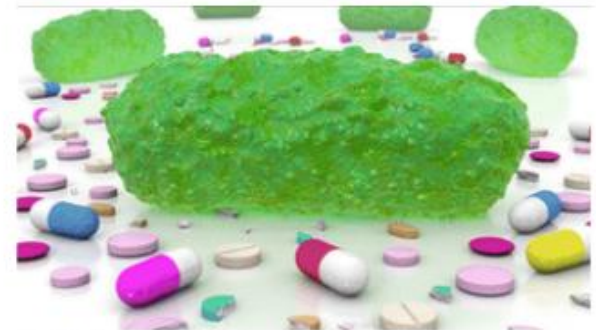
Resistance to antibiotics is one of the greatest threats to modern health, experts say.

The warning from England's chief medical officer and the Health Protection Agency comes amid reports of growing problems with resistant strains of bugs such as E. coli and gonorrhoea.

They said many antibiotics were being used unnecessarily for mild infections, helping to create resistance.

And they urged patients to take more care with how they used medicines.

This is particularly important as there are very few new antibiotics in development.

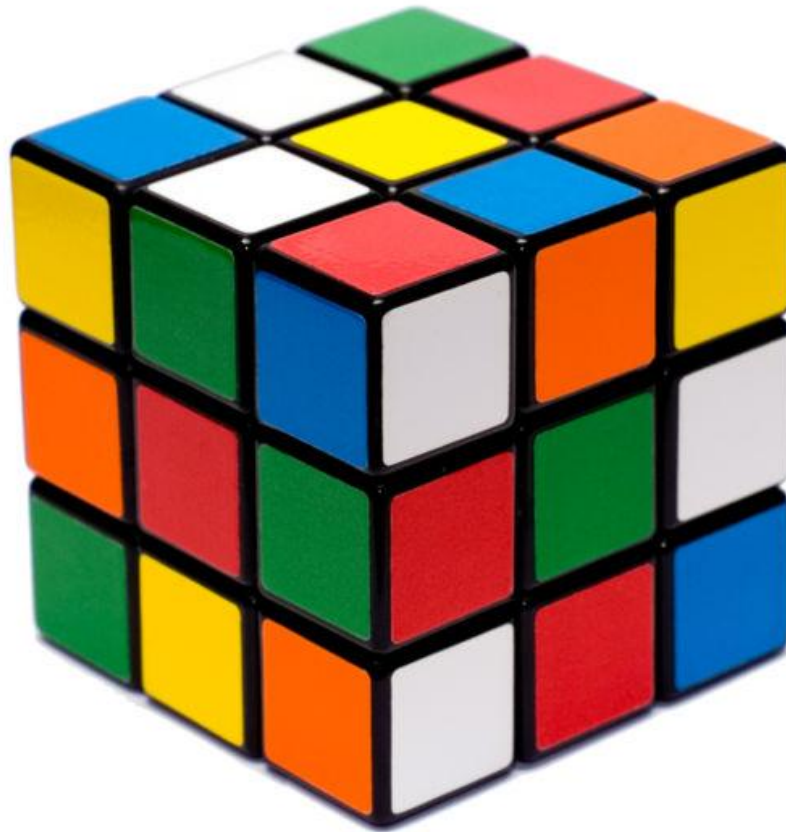


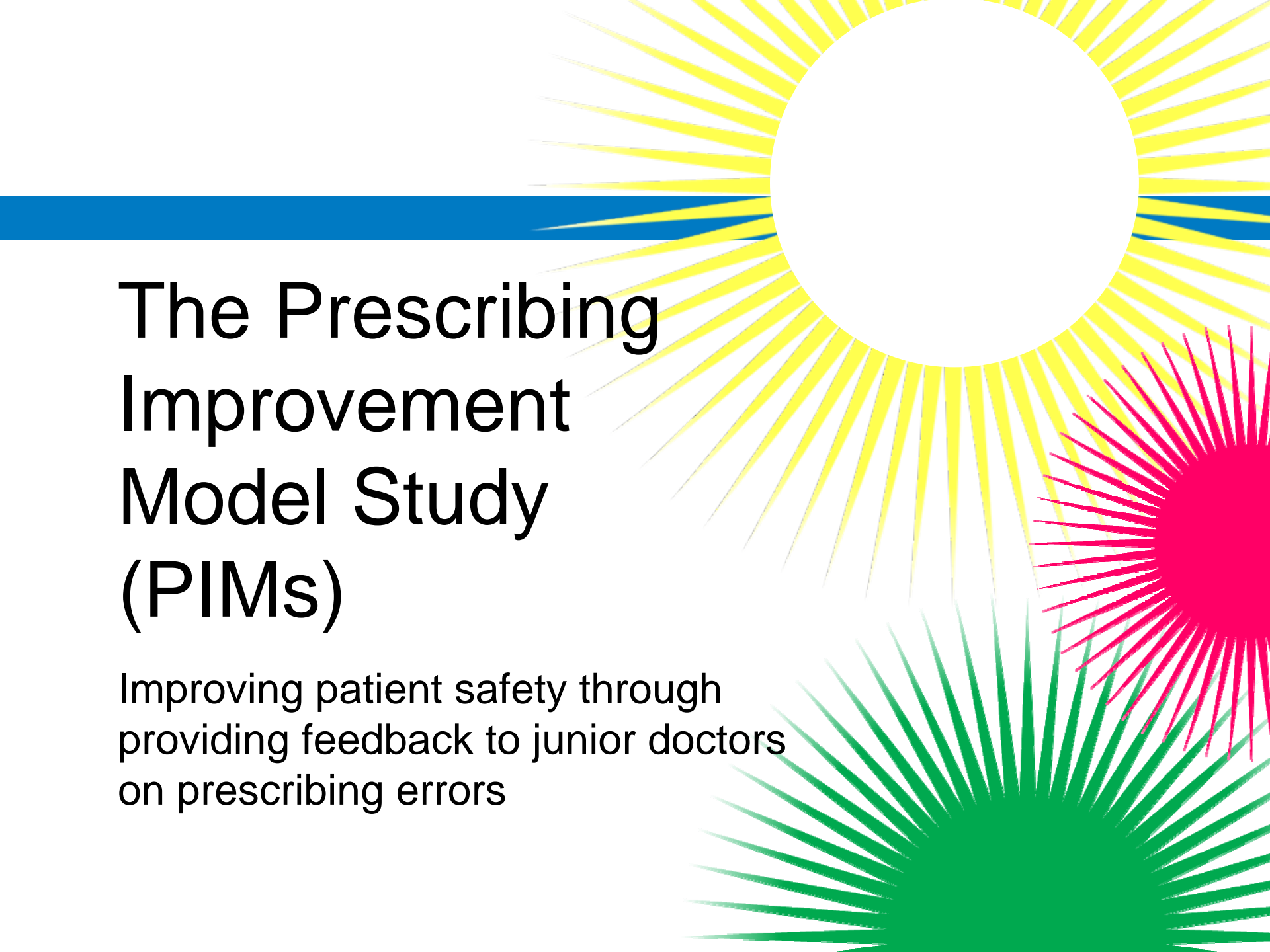
Antibiotic resistance is growing

Related Stories

[Gonorrhoea drugs resistance fear](#)

So what's the solution?





The Prescribing Improvement Model Study (PIMs)

Improving patient safety through providing feedback to junior doctors on prescribing errors

First... identify root causes

ARTICLES

Causes of prescribing errors in hospital inpatients: a prospective study

Original article



Prescribing errors in hospital inpatients: a three-centre study of their prevalence, types and causes

Bryony Dean Franklin,^{1,2} Matthew Reynolds,^{1,2} Nada Atef Shebl,³ Susan Burnett,^{4,5} Ann Jacklin^{1,2}

► An additional appendix is published online only. To view this file please visit the journal online (<http://pmj.bmj.com>).

¹Centre for Medication Safety

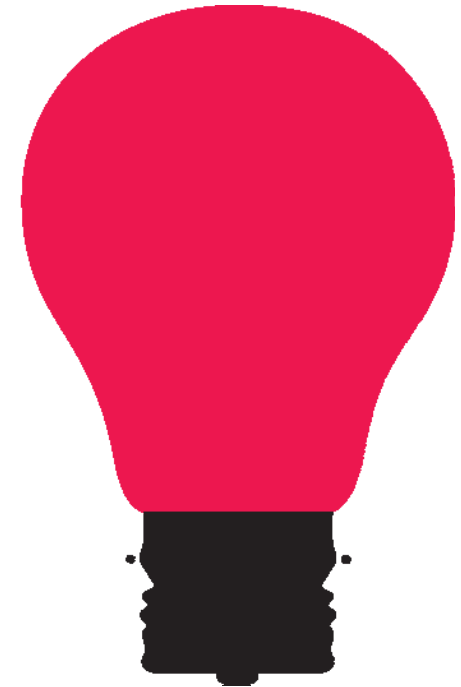
ABSTRACT

Aim To compare the prevalence and causes of prescribing errors in newly written medication orders and how quickly they were rectified, in three NHS organisations.

about similarities or differences in prescribing error rates between wards, specialties or organisations. The only UK study to present comparative data for more than one organisation is in paediatrics.⁹

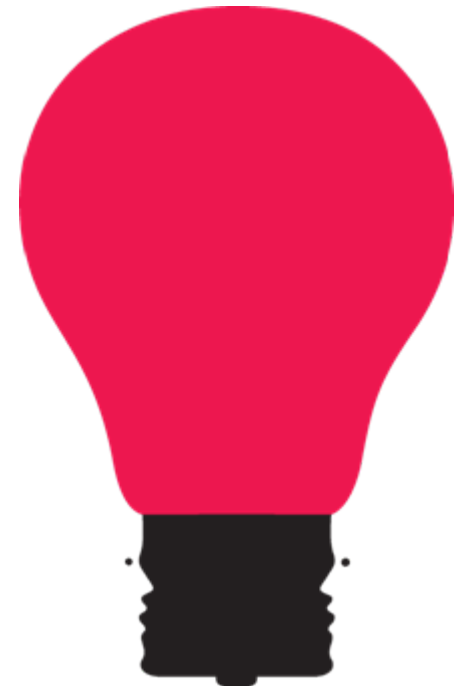
Quotes

“Also for something like aspirin, I know most pharmacists would just add that on to the drug chart and PNC [prescriber not contacted], so not contact the prescriber because it’s so small you wouldn’t contact the doctor just to say, oh it should be enteric coated or, oh it should be dispersible and you didn’t write that on..A lot of the time we’ll change, we’ll add modified release and, without probably telling the doctor”. (Pharmacist)



Quotes

“And there’s another key issue here as well especially if you’re in an area where there’s a lot of doctors rotating, sometimes that phenytoin prescription is written by Doctor X, Doctor X has gone home so I have to go to Doctor Y and get them to change it and that’s fine, they learn something new, but Doctor X who wrote the prescription doesn’t know anything about it”. (Pharmacist)



Is this the problem?



Author's personal copy

Int J Clin Pharm (2013) 35:332–338

DOI 10.1007/s11096-013-9759-y

SHORT RESEARCH REPORT

Feedback on prescribing errors to junior doctors: exploring views, problems and preferred methods

**Jeroen Bertels · Alex M. Almoudaris ·
Pieter-Jan Cortoos · Ann Jacklin · Bryony Dean Franklin**

Prescribing Improvement Model

Aim

- To develop, test the feasibility, and evaluate a practical, low-cost intervention to provide feedback to junior doctors on prescribing errors and increase patient safety.

Three component objectives:

1. To encourage prescribers to identify themselves when prescribing
2. To increase the feedback given by pharmacists to individual prescribers on their prescribing errors
3. To introduce group feedback to junior doctors on common prescribing errors

Focus group with FY1s

This is what our FY1's think...

I want to know about all of the prescribing errors I make, especially the serious ones

There is no need to tip-toe around prescribing errors

I prefer person-to-person feedback on the ward

I've only had positive experiences of feedback, but I wish there was more of it

I would like more teaching about prescribing errors

I'm often asked to amend my prescriptions, but I don't realise I have made an error unless I am told



And what do the public think?

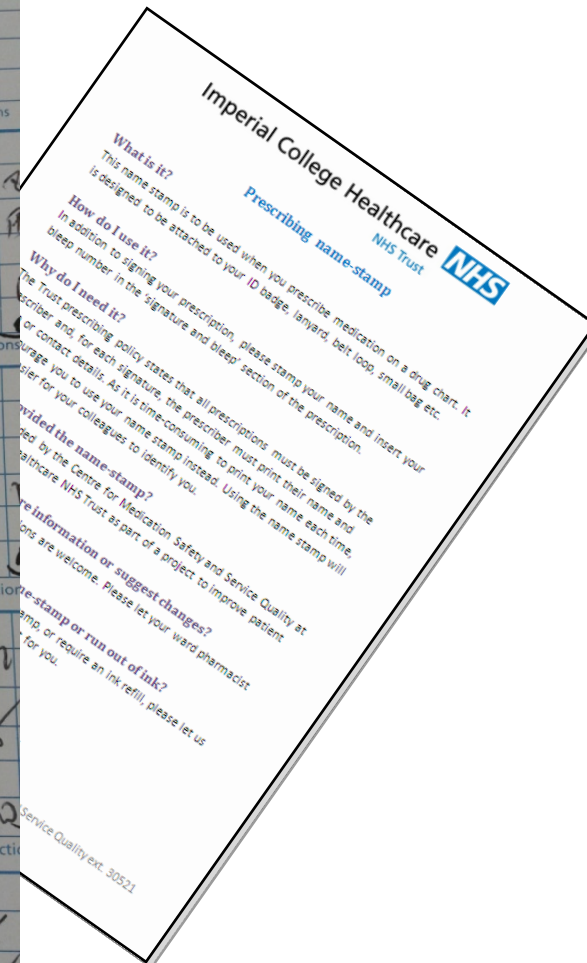
“...it’s OK to screw up once but there ought to be a process that says you’ve screwed up once and we’re going to correct it so that it doesn’t happen again. What’s unforgivable is if you’ve got the ability to go on screwing up time and time again”

Patient focus group participant

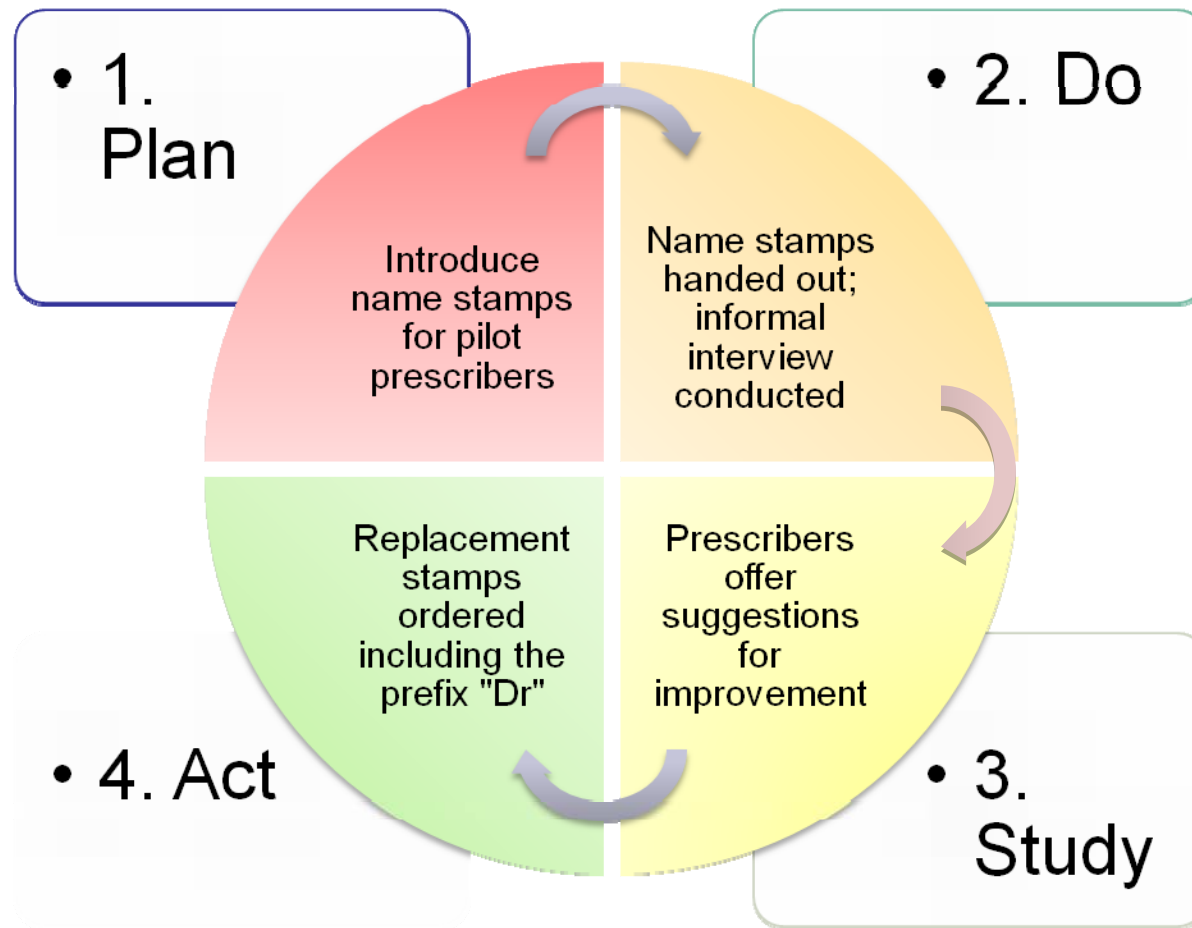
1. Prescriber Identification



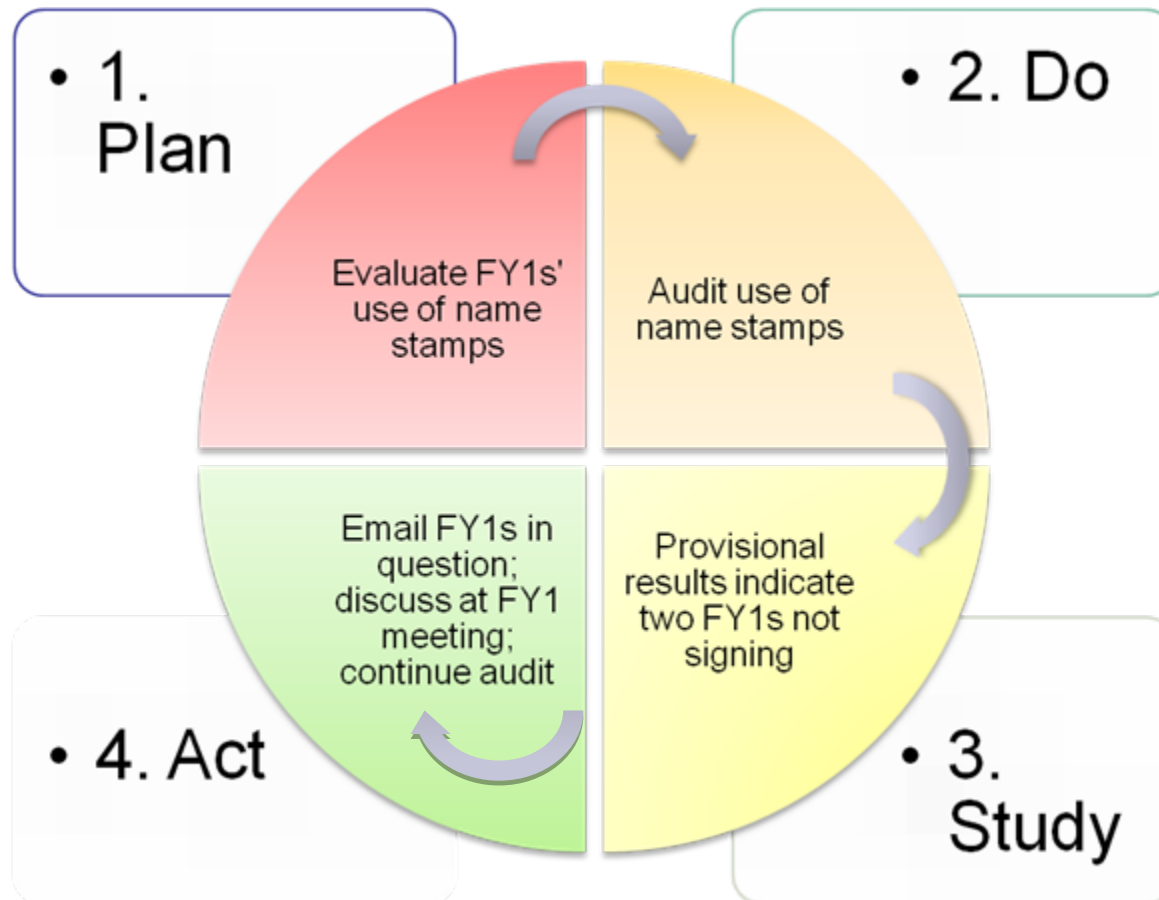
Dose: 50 Micrograms PEG		24/4		12	
Signature/Bleep: Katharine Baker Bleep: 8244 KB		Additional Instructions: can crush. swans before food		18	
Pharmacy: 20P 516 @ 10/10/2014				22	
Patient Medicine on admission: <input checked="" type="checkbox"/> New				Additional Instructions	
Medicine (approved name): DOMPERIDONE LIQUID					
Dose: 20mg	Route: PEG/IV	Start Date: 24/4	Stop Date:	08	12
Signature/Bleep: Katharine Baker Bleep: 8244 KB		Additional Instructions:		14	18
Pharmacy: 20P 516 @ 10/10/2014				22	22
Patient Medicine on admission: <input checked="" type="checkbox"/> New				Additional Instructions	
Medicine (approved name): BACLOFEN LIQUID					
Dose: 20mls	Route: PEG	Start Date: 24/4	Stop Date:	08	12
Signature/Bleep: Katharine Baker Bleep: 8244 KB		Additional Instructions: 20ml = 20mg		14	18
Pharmacy: 20P 516 @ 10/10/2014				22	22
Patient Medicine on admission: <input checked="" type="checkbox"/> New				Additional Instructions	
Medicine (approved name): SODIUM VALPROATE LIQUID					
Dose: 300mg	Route: PEG	Start Date: 24/4	Stop Date:	08	12
Signature/Bleep: Katharine Baker Bleep: 8244 KB		Additional Instructions: 200mg in swl.		14	18
Pharmacy: 20P 516 @ 10/10/2014				22	22
Patient Medicine on admission: <input checked="" type="checkbox"/> New				Additional Instructions	
Medicine (approved name): SALINE NEBS					
Dose: 5mls	Route: NEB	Start Date: 24/4	Stop Date:	08	12



Plan – Do – Study – Act

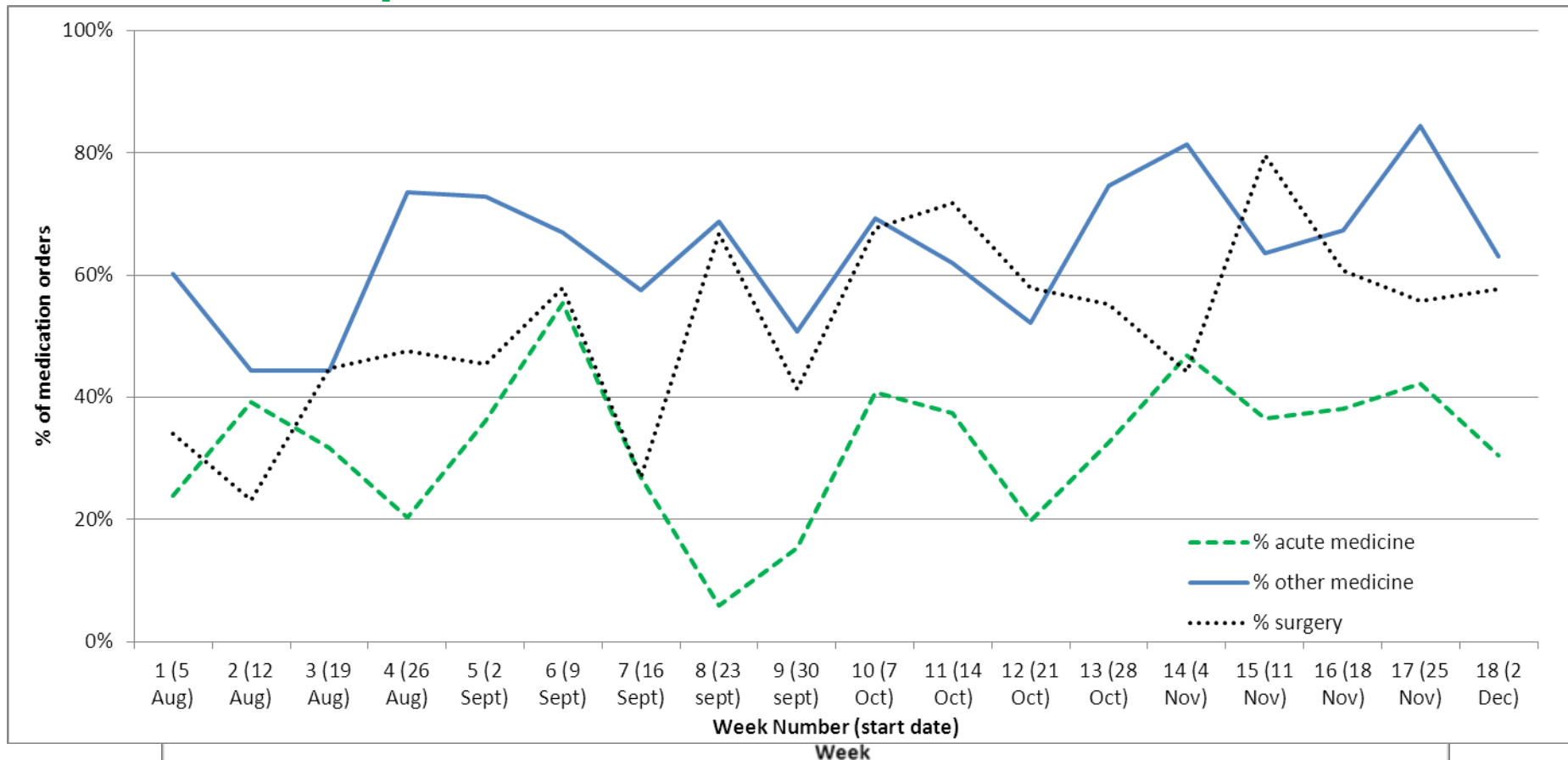


Plan – Do – Study – Act



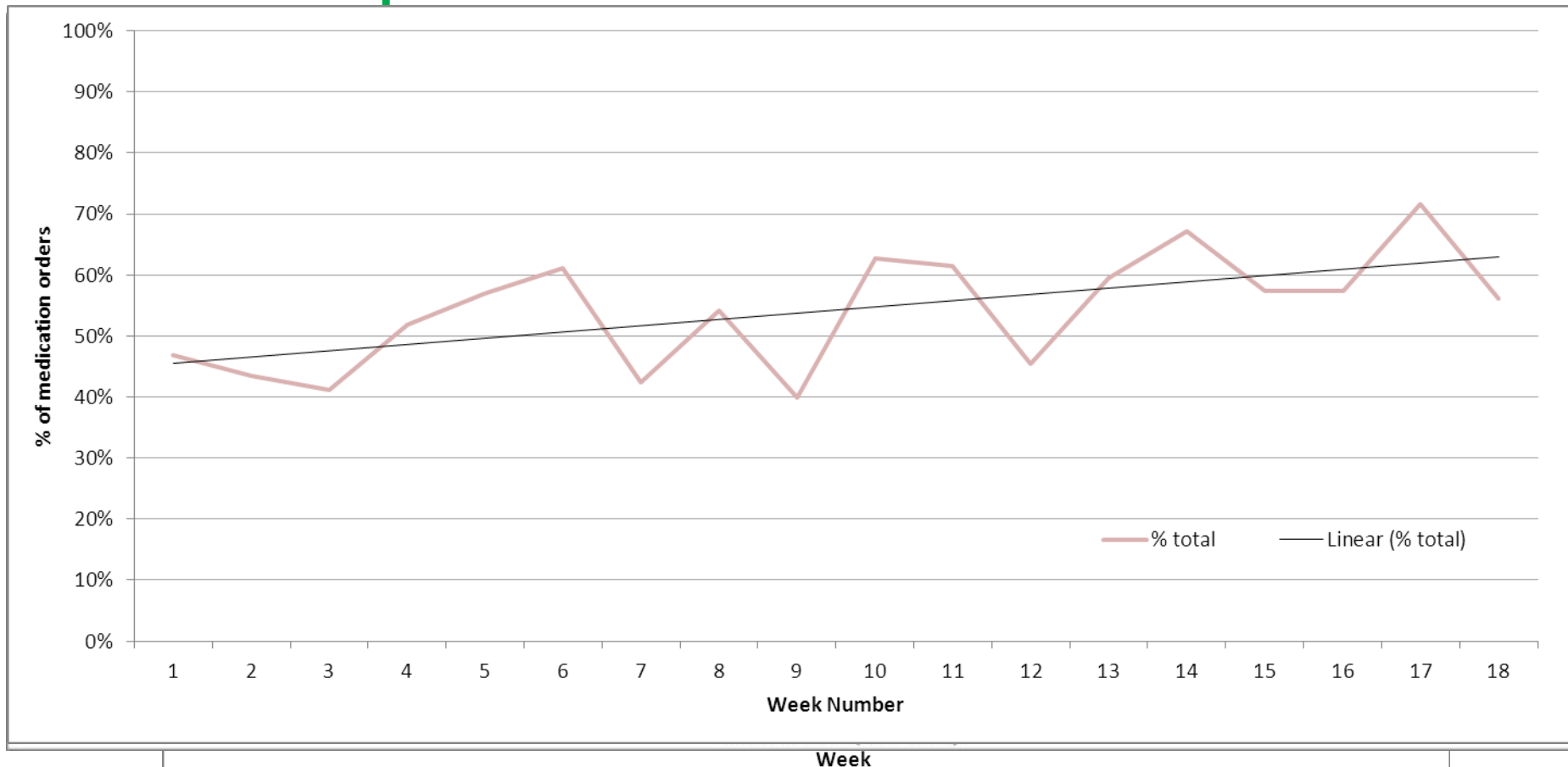
Fortnightly data

- Percentage of inpatient medication orders written FY1s where the prescriber is identifiable





Fortnightly data

- Percentage of inpatient medication orders written FY1s where the prescriber is identifiable



2. Individual feedback

- Pharmacists asked to:
 - Identify individual prescriber
 - Contact individual prescriber
 - Tell them an error made
 - Suggest how to avoid the error
- Publicity and education
- Accompanied visits


Imperial College Healthcare  NHS Trust  The Health Foundation
Inspiring Improvement

PROVIDING FEEDBACK ON PRESCRIBING ERRORS TO JUNIOR DOCTORS

The Prescribing Improvement Model (PIM)

Prescribing errors occur in up to 15% of UK inpatient medication orders and 1% of patients are harmed. Foundation year 1 (FY1) doctors are often unaware of making errors and receive little feedback on how to prevent them.

This is what our FY1's think...



I want to know about all of the prescribing errors I make, especially the serious ones

I've only had positive experiences of feedback, but I wish there was more of it

There is no need to tip-toe around prescribing errors

I would like more teaching about prescribing errors

I prefer person-to-person feedback on the ward

I'm often asked to amend my prescriptions, but I don't realise I have made an error unless I am told

PHARMACISTS:
When you identify a prescribing error made by a FY1, we would like you to:

- Identify the prescriber (encourage your FY1s to use their name-stamps)
- Contact the prescriber, preferably in person
- Tell them that they have made an error
- Provide feedback and explain how to prescribe the drug correctly
- Check their understanding so they do it right the next time

We hope this change will provide education to junior doctors, decrease prescribing errors and improve patient safety.

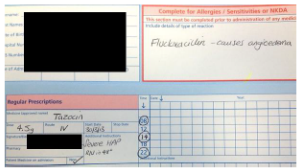
26/01/17

3. “Prescribing tips”

- Sent fortnightly
- “Spot the error”
- Discusses one or two errors in more depth
- Readable (i.e. not much to read!)
- Identify and link to relevant prescribing resources

Avoid errors in penicillin sensitive patients: good prescribing tip of the fortnight
(this prescription has been re-written to maintain the anonymity of the prescriber)

Can you spot the error?



The error

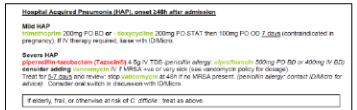
- 1) This patient has a documented allergy to flucloxacillin, a type of penicillin.
- 2) This patient has been prescribed Tazocin® (piperacillin/tazobactam) which contains penicillin and is therefore contra-indicated as this patient had a severe adverse reaction to another penicillin.

Always check a patient's allergy status before prescribing any medicine.



Administration of a penicillin based drug to a patient with a history of hypersensitivity reactions to penicillin can be fatal.

Prescribing tips:

- Always establish the nature of any allergy and document it on the chart and notes. It is important to confirm whether the allergy is severe, less severe or an intolerance/ side effect. The nature of the reaction will guide prescribing decisions.
- For information related to penicillin allergies, refer to the document [Documented Penicillin Sensitivity, antibiotic prescribing in a penicillin sensitive patient](#) on the intranet. This document uses a 'traffic-light' system: **RED drugs are contraindicated** for penicillin allergic patients, **AMBER drugs are to be used with caution**, **GREEN drugs are safe** for penicillin-allergic patients.
- The [Adult Treatment of Infection Policy](#) gives an alternative treatment option for patients with an allergy to penicillin.



- information on penicillin allergies can also be found in the [Antibiotic App](#) (download onto a smartphone [here](#) or scan the QR code).





- Be aware of commonly used brand names for combination drugs which contain penicillin e.g. Augmentin® (co-amoxiclav), Tazocin® (piperacillin/tazobactam), Timentin® (ticarcillin/ clavulanic acid) and prescribe as the generic name.

Remember to use your name-stamp when prescribing

Have you lost your name-stamp? Click [here](#) to order a replacement
Do you need an ink refill for your name-stamp? Click [here](#) to order one
Do you find this feedback useful? [Email](#) us and let us know your thoughts

Matt Reynolds on behalf of the Pharmacy Good Prescribing Team
This work forms part of the Prescribing Improvement Model (PIM) project (2/9/2013 vfinal)



3. “Prescribing tips” - topics

- Unusual frequencies
- Oral opioids
- Treating DVTs
- Insulin
- Laxatives
- Inhalers

Evaluation

- **Process measures**

- Weekly audit on identifiable prescribers
- Pharmacists assessed for feedback provision

- **Outcome measures**

- Prevalence of prescribing errors
- Questionnaire
- Focus groups

Intervention and control hospitals

Intervention hospital



Results

- **Questionnaire results from April 2013**

We asked all junior doctors if they agreed with the statement:

“I am aware of all major prescribing errors I make”

77% agreed / strongly agreed

The complementary statement to pharmacists:

“I believe FY1s are aware of all major prescribing errors they make”

31% agreed / strongly agreed

Reflections

- Need to take time to LISTEN
- Need a rigorous approach

Downloaded from qualitysafety.bmj.com on October 16, 2013 - Published by group.bmj.com
BMJ Quality & Safety Online First, published on 11 September 2013 as 10.1136/bmjqs-2013-001862


OPEN ACCESS

Systematic review of the application of the plan–do–study–act method to improve quality in healthcare

Michael J Taylor,^{1,2} Chris McNicholas,² Chris Nicolay,¹ Ara Darzi,¹ Derek Bell,² Julie E Reed²

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/bmjqs->

ABSTRACT
Background Plan–do–study–act (PDSA) cycles provide a structure for iterative testing of

INTRODUCTION
Delivering improvements in the quality and safety of healthcare remains an inter-

Hopefully...

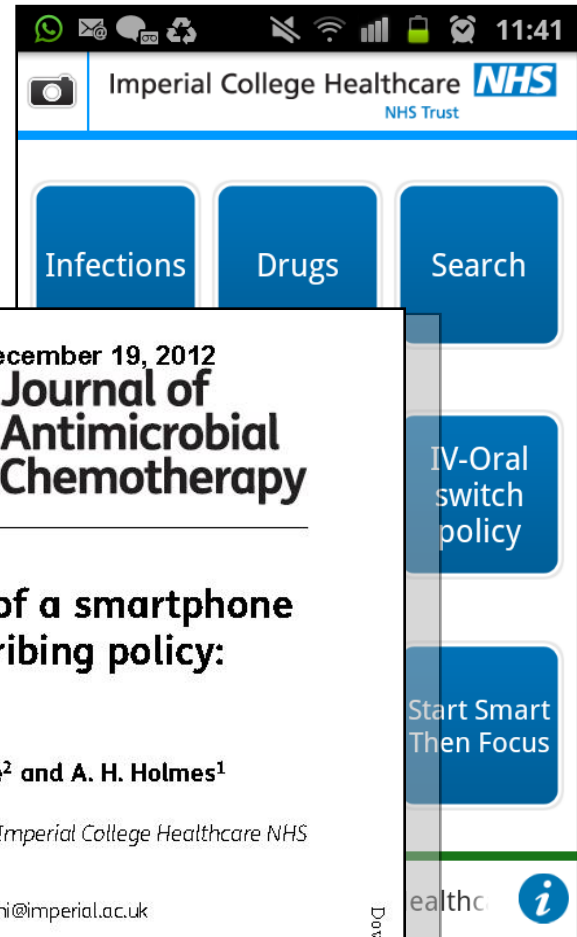


Image and spec may vary slightly to actual product.

Other innovations

Smartphone apps

- Point of care antimicrobial prescribing support to health care professionals



[Click to increase the magnification of the entire page](#)

Journal of Antimicrobial Chemotherapy Advance Access published December 19, 2012

J Antimicrob Chemother
doi:10.1093/jac/dks492

**Journal of
Antimicrobial
Chemotherapy**

An analysis of the development and implementation of a smartphone application for the delivery of antimicrobial prescribing policy: lessons learnt

E. Charani^{1*}, Y. Kyratsis¹, W. Lawson², H. Wickens², E. T. Brannigan², L. S. P. Moore² and A. H. Holmes¹

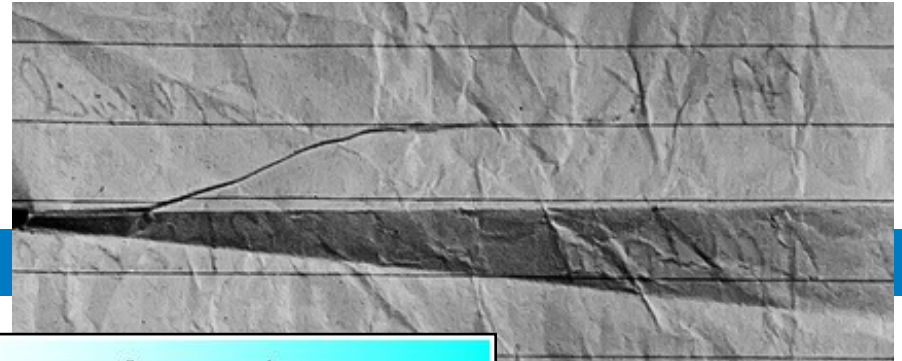
¹The National Centre for Infection Prevention and Management, Imperial College London, London, UK; ²Imperial College Healthcare NHS Trust, London W12 0HS, UK

*Corresponding author. Tel: +44-(0)203-313-1553; Fax: +44-(0)208-383-3394; E-mail: e.charani@imperial.ac.uk

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ihealth

Dr-CARD



Analgesia—acute

Paracetamol PO / PR

Paracetamol IV >50%
≤50%

Ibuprofen PO

Naproxen PO

Codeine PO

Dihydrocodeine PO

Tramadol PO / IM

Morphine PO

Morphine IM / SC

Antihistamines

Chlorphenamine PO

Chlorphenamine IM

Laxatives

Senna PO

Lactulose PO

Macrogol (e.g. Movicol)

Glycerol 4g PR

Phosphate PR

FY1 DOSE REMINDER

In severe renal or hepatic

Insulin sliding scale

prescribed as 50 units of soluble insulin (e.g. Human Actrapid) in 50ml sodium chloride 0.9%

BM range (mmol/L)	Insulin administration rate
0.0-3.9	0.5 units/hour (recheck every 15mins)
4.0-7.9	1 units/hour
8.0-11.9	2 units/hour
12.0-15.9	3 units/hour
16.0-19.9	4 units/hour
≥20.0	6 to 8 units/hour

(If >20mmol/L for 2 hours contact medical staff)

Not for use in patients with HONK, in level 2 or 3 patients, or in theatre or recovery—see The Source

For enquiries contact the WARD PHARMACIST or MEDICINES INFORMATION
Ext: 11703/11713. Out of hours contact the on-call pharmacist via switchboard.

Warfarin initiation protocol

Where anticoagulation not urgent (can wait 2 weeks or more), consider referral to GP

Where inpatient anticoagulation needed:

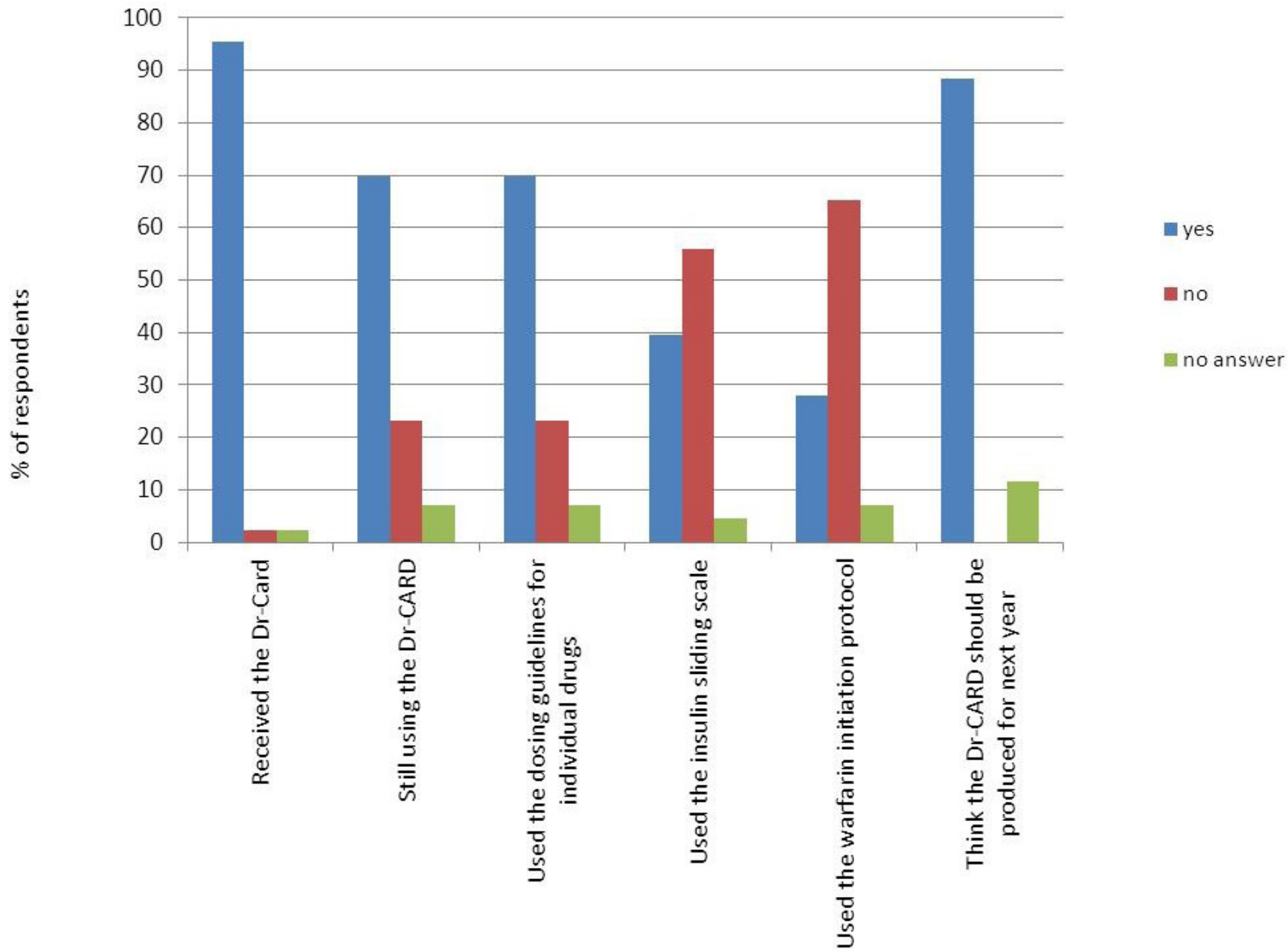
5mg OD on day 1, and refer to The Source for dosing thereafter.

- Take baseline INR prior to starting warfarin
- Consider lower starting dose if >75yrs, <55kg, cardiac/hepatic failure, severe renal impairment, on interacting drugs.
- Consider higher starting dose if >100kg, on interacting drugs.

Antibiotics

For guidelines see **quick links** on The Source or download the ABX APP →





Pharmacists on ward rounds

- Pharmacists who attend consultant-led ward rounds make more interventions per patient than those who provide only a standard ward pharmacy service.

■ PROFESSIONAL ISSUES

Clinical Medicine 2011, Vol 11, No 4: 312–16

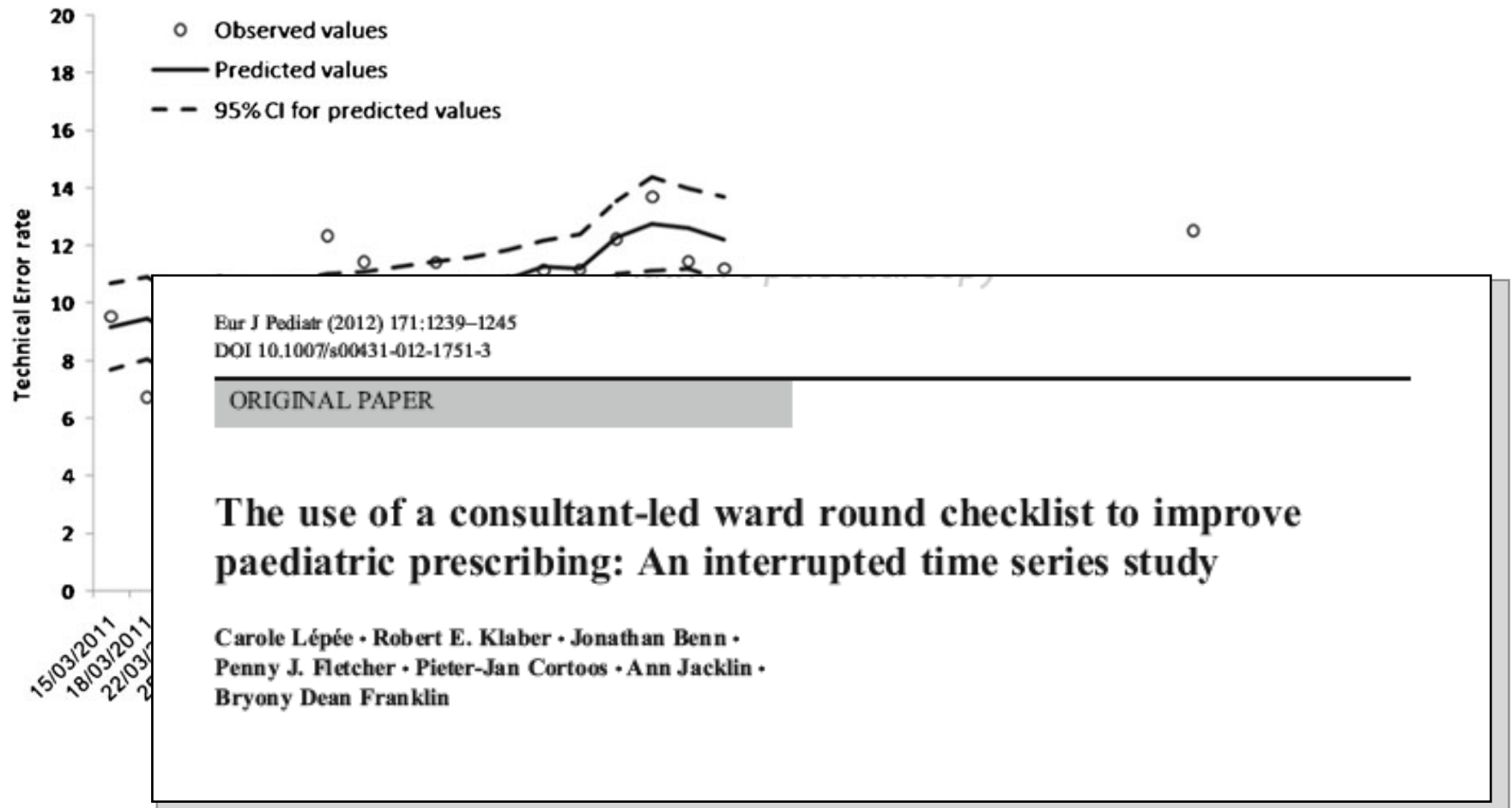
Including pharmacists on consultant-led ward rounds: a prospective non-randomised controlled trial

Gavin Miller, Bryony Dean Franklin and Ann Jacklin

ABSTRACT – This study aimed to compare interventions made by pharmacists attending consultant-led ward rounds in addition to providing a ward pharmacy service with those made

information about the medication or patient can contribute to such errors.⁴ If pharmacists attend ward rounds, detailed information and advice on medication can be provided at the point of pre-

“Check and Correct”



And what next..?

Hospital electronic prescribing

[Click to create PDF Using Acrobat.com](#)

OPEN ACCESS Freely available online

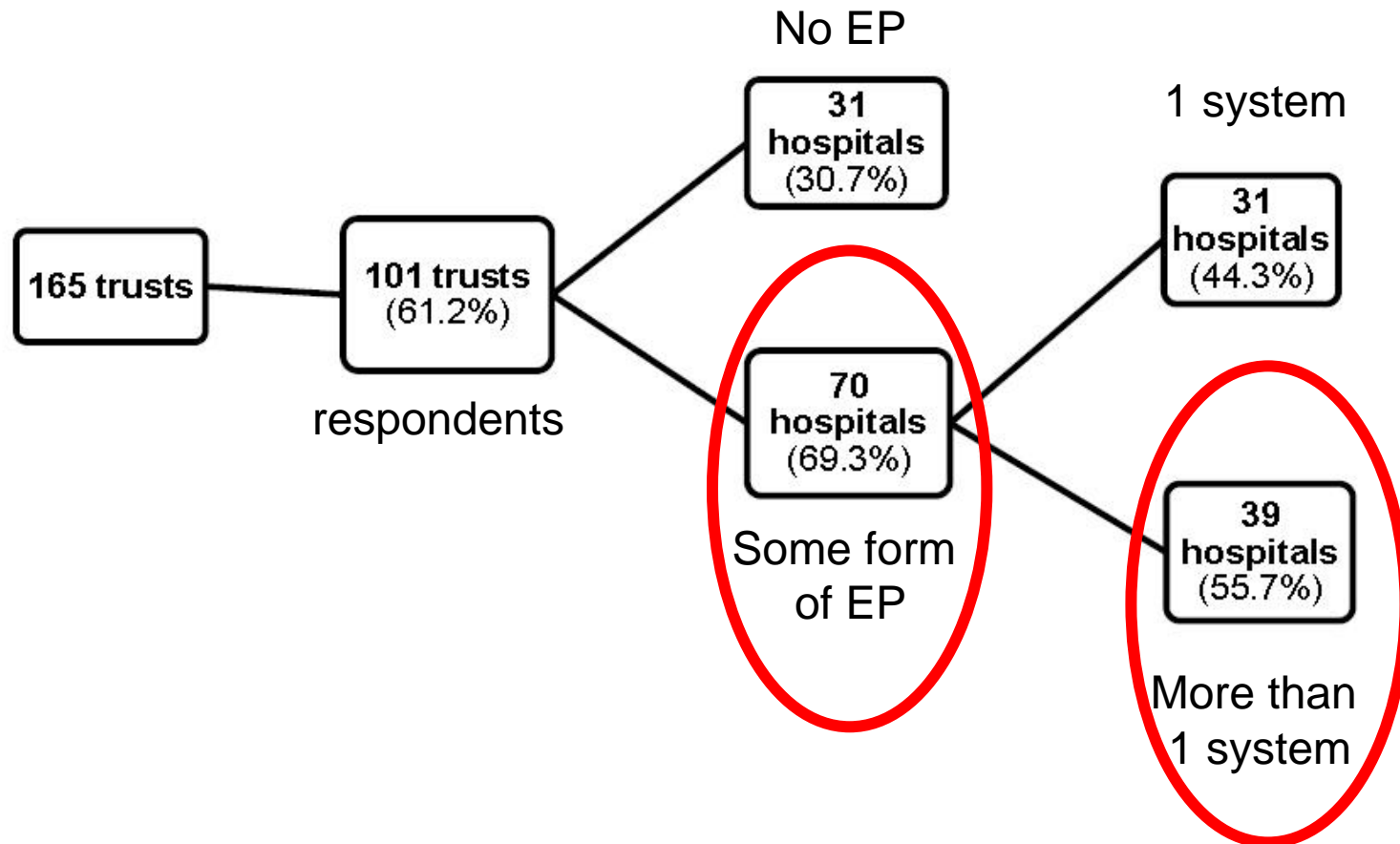
 PLOS ONE

The Use and Functionality of Electronic Prescribing Systems in English Acute NHS Trusts: A Cross-Sectional Survey

Zamzam Ahmed^{1,2}, Monsey Chan McLeod^{1,2}, Nick Barber¹, Ann Jacklin¹, Bryony Dean Franklin^{1,2*}

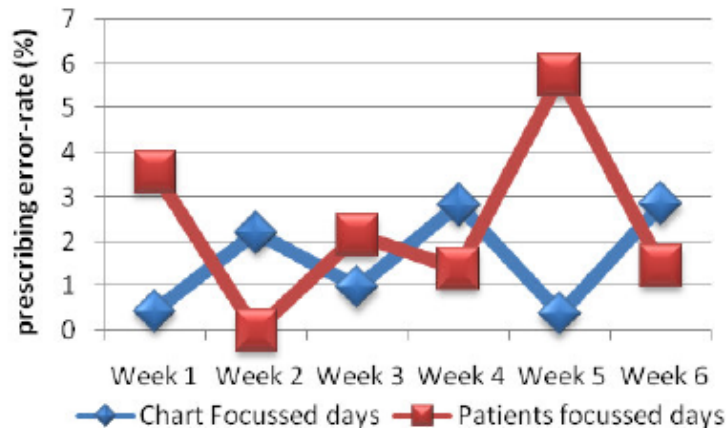
¹The Centre for Medication Safety and Service Quality, UCL School of Pharmacy, London, United Kingdom, ²Pharmacy Department, Imperial College Healthcare NHS Trust, London, United Kingdom

Hospital electronic prescribing

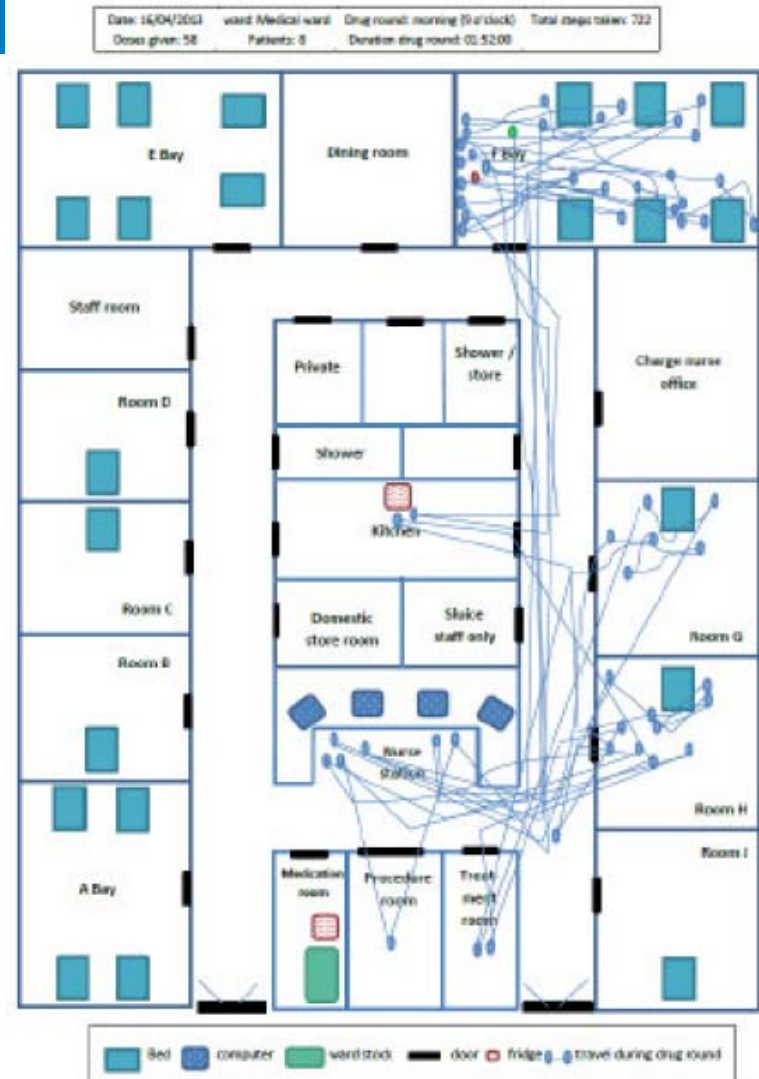
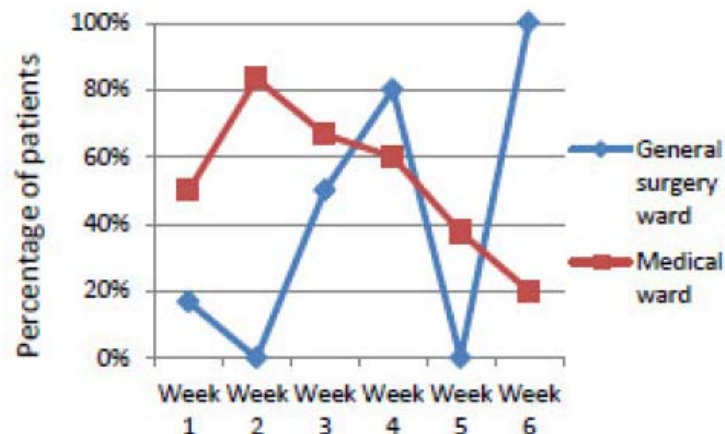


Hospital electronic prescribing and medication administration

Overall identified prescribing error-rate



Percentage of patients for whom doses were left at the bedside



“IMPRESS” study

How do hospital inpatients engage with medication safety?

How would they LIKE to engage with medication safety?

How does this differ between paper-based and electronic medication records?

What interventions are needed?

Further app developments

- Cross-sector smartphone applications:
 - point of care antimicrobial prescribing support
 - antimicrobial therapy information to patients
 - linking whole health system
- Collaboration with Public Health England (ex-HPA)
- Grant from Imperial College Healthcare Charity



Better use of our workforce

Published in final edited form as:

J Infect Prev. 2011 January ; 12(1): 6–10. doi:10.1177/1757177410389627.

Covering more Territory to Fight Resistance: Considering Nurses' Role in Antimicrobial Stewardship

R Edwards^{(1),*}, LN Drumright⁽¹⁾, M Kiernan^{(2),(3)}, and A Holmes^{(1),(4)}

¹ The National Centre for Infection Prevention and Management, Division of Infectious Diseases, Imperial College London, London, W12 OHS, UK

² Infection Prevention Society, UK

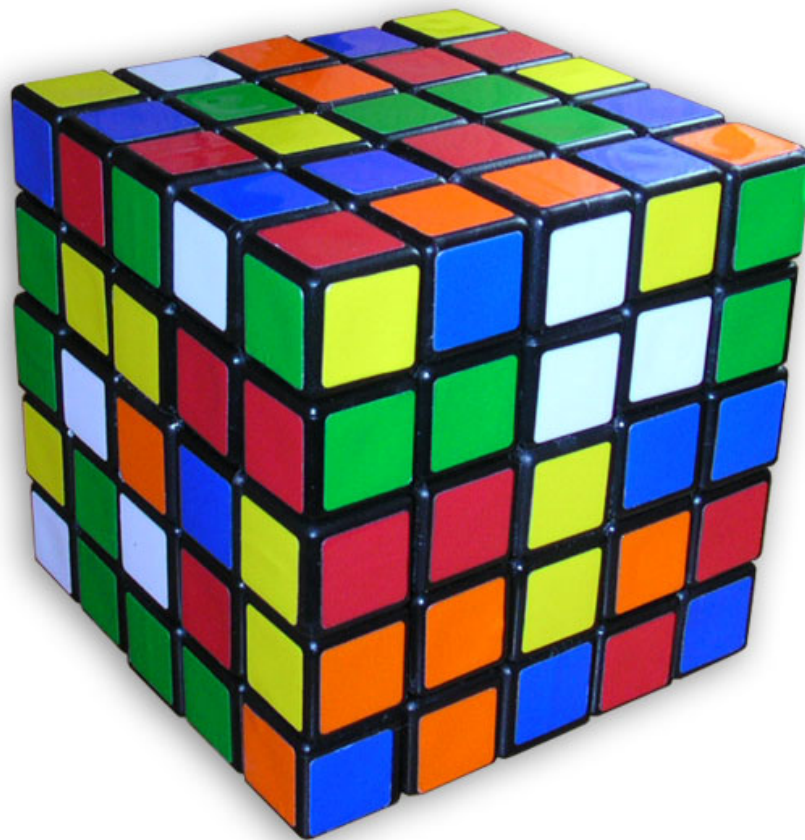
³ Southport and Ormskirk Hospital NHS Trust, UK

⁴ Imperial College Healthcare NHS Trust, London, UK

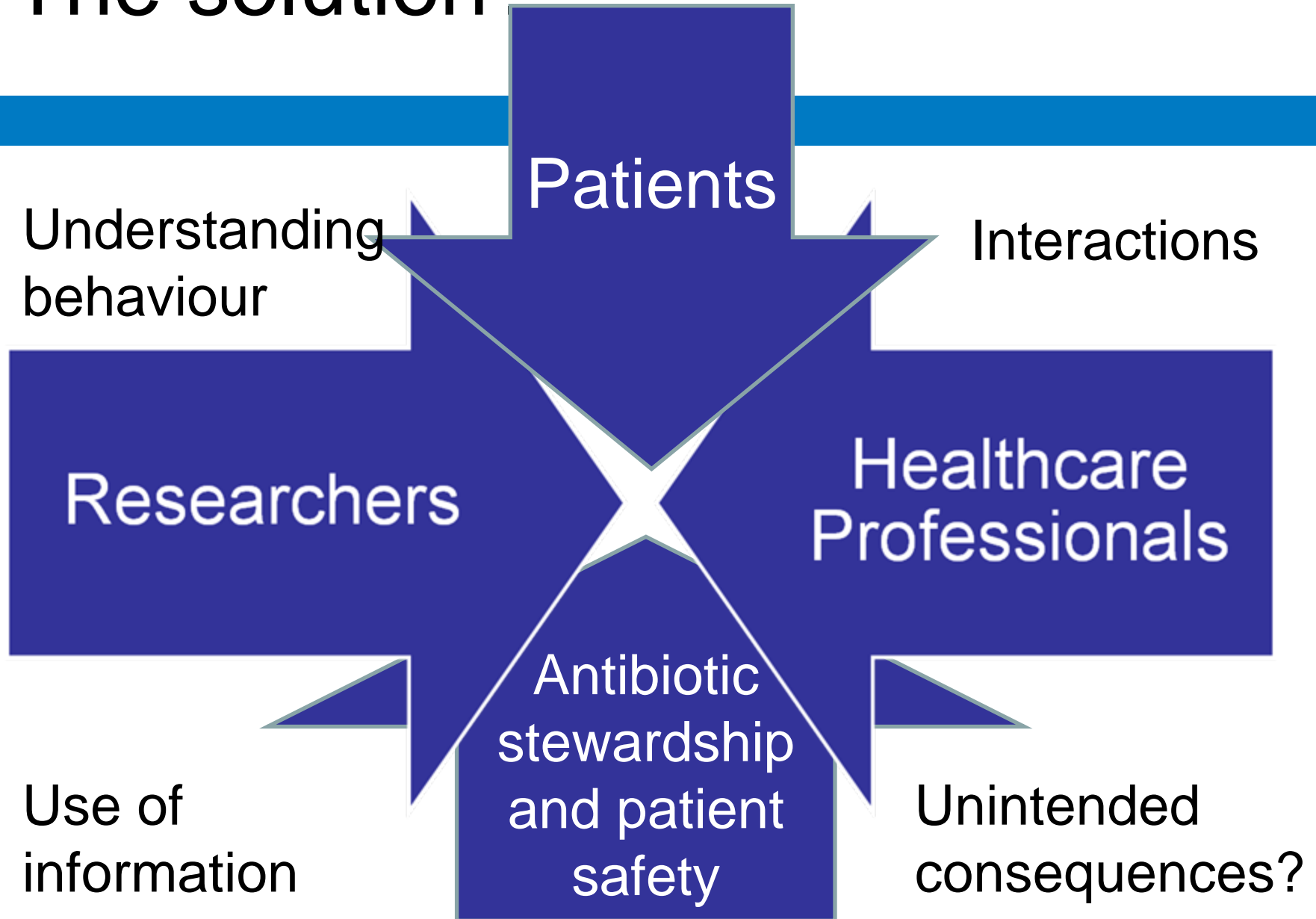
Abstract

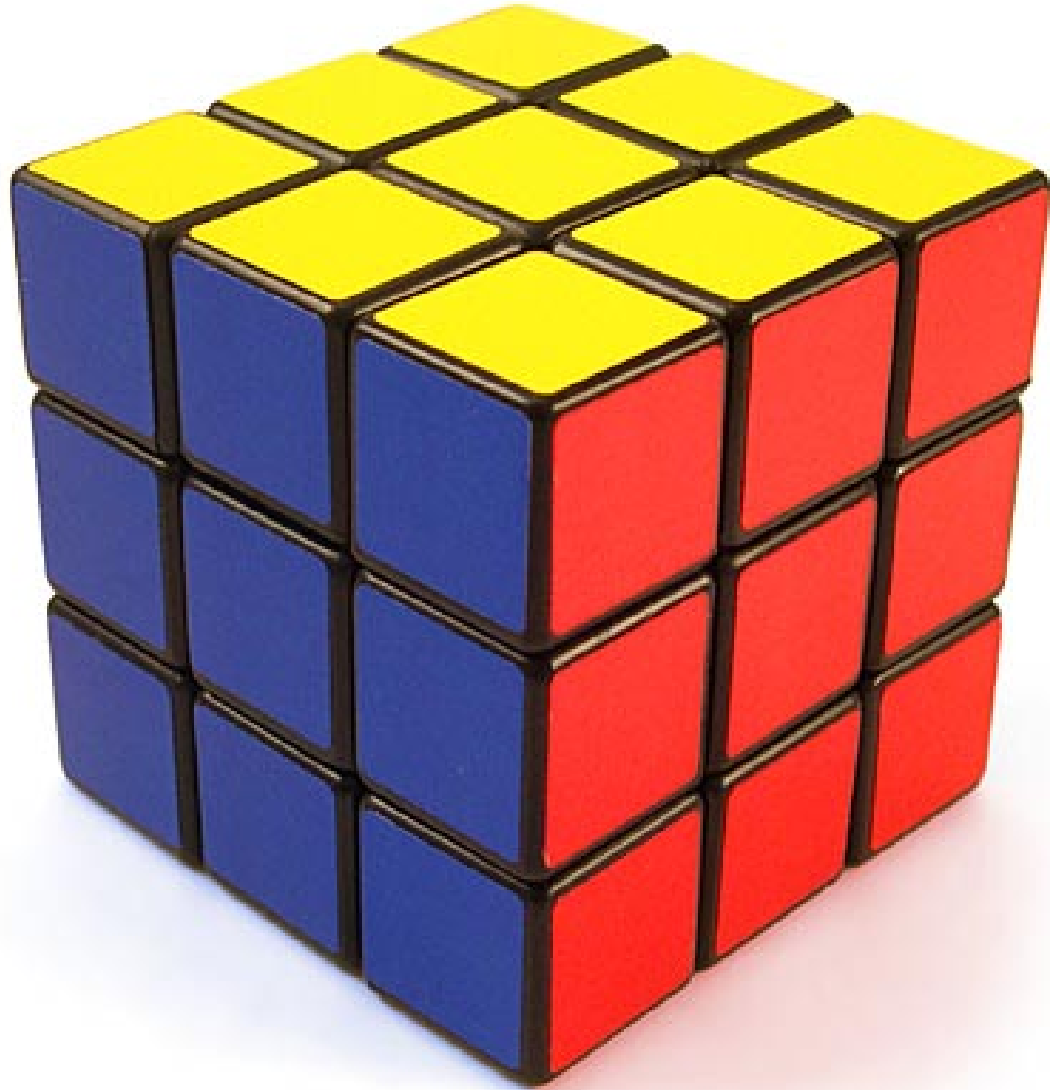
The potential contribution nurses can make to the management of antimicrobials within an in-patient setting could impact on the development of antimicrobial resistance (AMR) and healthcare associated infections (HCAIs). Current initiatives promoting prudent antimicrobial prescribing and management have generally failed to include nurses, which subsequently limits the extent to which these strategies can improve patient outcomes. For antimicrobial stewardship (AS) programmes to be successful, a sustained and seamless level of monitoring and decision making in relation to antimicrobial therapy is needed. As nurses have the most consistent presence as patient carer, they are in the ideal position to provide this level of service. However, for nurses to truly impact on AMR and HCAIs through increasing their profile in AS, barriers and facilitators to adopting this enhanced role must be contextualised in the implementation of any initiative.

The solution?



The solution?





Acknowledgements



Imperial College Healthcare 
NHS Trust

Imperial College
London


*National Institute for
Health Research*