

# Inspiring example(s) of pharmacy practice research

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# Pharmacy Practice Research on Prescribing Errors

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# Conflicts of interest

- Nothing to declare

## Questions

1. Pharmacy practice research can involve either the identification of pharmaceutical needs or testing interventions to address those needs Y/N
2. The randomised controlled trial is always the most robust research method for pharmacy practice research. Y/N
3. Before testing the feasibility of an intervention, you should identify the relevant theory and understand the process by which the intervention can act. Y/N

## Learning objectives

- At the end of this session, participants will be able
  - To know the definition of pharmacy practice research in hospital practice
  - To recognise three different purposes of pharmacy practice research
  - To learn about some different examples of high quality pharmacy practice research
  - To list some key factors for high quality research

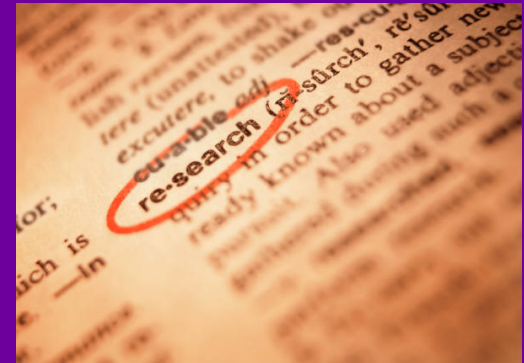
# Outline of presentation

- What is Pharmacy Practice Research?
- Examples of such research for different purposes
- Impact of pharmacy practice research
- Conclusions



# Definitions

# Definitions



- Health services research
  - the investigation of the *health* needs of the community and the effectiveness and efficiency of the provision of services to meet those needs
- Pharmacy practice research
  - the investigation of the *pharmaceutical* needs of the community and the effectiveness and efficiency of the provision of services to meet those needs
- Pharmacy practice research in hospital practice
  - the investigation of the *pharmaceutical* needs of *hospital patients* and the effectiveness and efficiency of the provision of services to meet those needs



# Where do hospital patients have pharmaceutical needs

- On Admission e.g.
  - Medicine reconciliation
  - Identifying and addressing other drug related problems
- During stay e.g.
  - Delivering pharmacy services using new methods
  - Antimicrobial stewardship
  - Pharmacokinetics of high risk drugs

## Where hospital patients have pharmaceutical needs

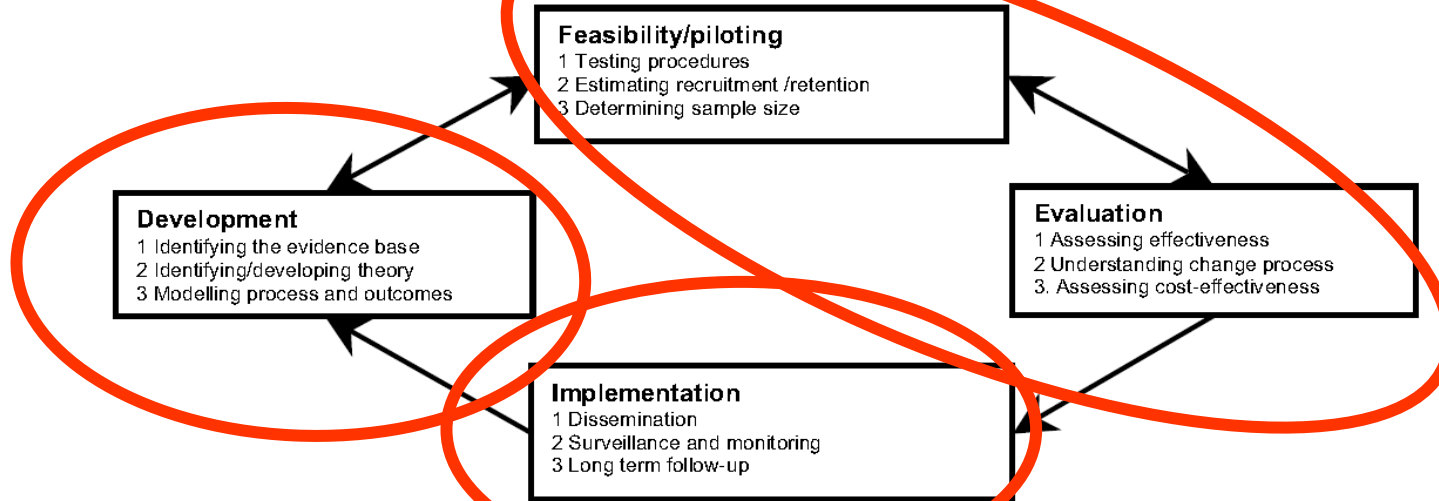
- At Discharge e.g.
  - Patient counselling
  - Liaison with community pharmacists
- Attending Out-patient Clinics e.g.
  - IV antibiotics at home in cystic fibrosis

# Some Key Purposes of Pharmacy Practice Research

- Measure – Identify the extent of a problem
- Understand - Identify the cause of a problem
- Change - Intervene to ameliorate a problem

# Developing and evaluating complex interventions: the new Medical Research Council guidance

Figure 1 Key elements of the development and evaluation process



## Area of focus for examples – prescribing errors

- Prescribing error:
  - “An error that occurs when, as a result of a prescribing decision or the prescription-writing process, there is an unintentional, significant reduction in the probability of treatment being timely and effective or increase in the risk of harm when compared to generally accepted practice.”

Dean et al, 2000

# Measuring the extent of a problem

Drug Saf (2015) 38:833–843  
DOI 10.1007/s40264-015-0320-x



ORIGINAL RESEARCH ARTICLE

## Prevalence, Nature, Severity and Risk Factors for Prescribing Errors in Hospital Inpatients: Prospective Study in 20 UK Hospitals

Darren M. Ashcroft<sup>1,2</sup> · Penny J. Lewis<sup>1</sup> · Mary P. Tully<sup>1</sup> · Tracey M. Farragher<sup>3</sup> · David Taylor<sup>4</sup> · Valerie Wass<sup>5</sup> · Steven D. Williams<sup>1,6</sup> · Tim Dornan<sup>7</sup>

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### Abstract

*Introduction* It has been suggested that doctors in their first year of post-graduate training make a disproportionate number of medication orders checked, the grade of prescriber and details of any prescribing errors. Logistic regression models (adjusted for clustering by

## Aims and objectives

- To compare the prevalence of prescribing errors made by first-year post-graduate doctors with that of errors by senior doctors and non-medical prescribers

## EQUIP study

- Prescription chart review
- All newly prescribed items checked
- 19 acute hospital trusts, 7 days
- Errors validated by a panel



# The "Drug Chart"

REGULAR PRESCRIPTIONS		Patient's Name:		Hospital Number:		Allergies:	
Patient Asleep	1	Self Administered	3	Patient Absent	5	Omitted for Clinical Reason	7
Nil by Mouth	2	Patient Refused	4	Drug not available	6	No IV access available	8

**Do NOT alter existing instructions**      **ADMINISTRATION RECORD**

MONTH AND YEAR	DATE																		
Tick or enter times required																			
DRUG (approved name in CAPITALS)	Route																		
	09																		
Dose and Special Directions	Start Date	13																	
	18																		
Signature	Pharm	Stop Date	22																
	sig.																		

Prescription Pad | PT: 'John Doe' | Male | ID: 1 | AGE: 49 Years | DOB: 10-Jul-1963 | INS:UHC CHOICE PLUS

Selected Prescription: doxycycline hyclate 100 mg Cap  
Quantity: 30 Capsule,  
Sig: 1 Capsule twice a day by mouth.

**Write Prescription**      Allergy Warnings      Interactions

Strength: 100 mg      Instructions: po - by mouth       Dispensed Meds In Office

Form: Capsule      Refills: 11       Brand Medically Necessary

Route: Oral      Start Date: Aug 31, 2012       RX - Outside

Quantity: 30      End Date: Feb 27, 2013       OTC

Dosage: Capsule       Print DEA #

Frequency: bid - twice a day      Patient Weight: <lbs>

Provider: Dr. William A. Richards

Instructional Notes: Take with food

Buttons: Pending, Save, Cancel

Sig Characters Remaining: 90



# Error information form

Ref No. 4

Date: 17/4/18

Pharmacist: [redacted]

Ward: [redacted]

Patient initials: [redacted]

### Grade of prescriber

- Foundation year 1
- Foundation year 2
- Specialist trainee/Trust grade (FTSTAs)
- Staff grade (NCCGs)
- Consultant
- Pharmacist
- Nurse
- Not known

### Potential severity of error

(see info booklet for examples)

- Potentially lethal error
- Serious error
- Significant error
- Minor error

### Details of drug involved:

Drug name: Epipen 3.4.3

Dose: 300mcg

Dosage frequency: pm

Form & route: inj / IM

### Patient details:

Age: 21 Sex: M

Any other relevant information about the patient:

Indication for drug: Anaphylaxis

Admitted with resp arrest due to allergy

Actual patient harm caused: Yes  No

### Description of error:

Epipen not prescribed on discharge prescription.  
(3)

<b>Grade of doctor</b>	<b>Number of new items checked</b>	<b>No. of errors</b>	<b>Error rate (%)</b>
FY1	50,016	4,190	8.4
FY2	34,781	3,568	10.3
Specialist trainees/ Trust grades (FTSAs)	16,834	1,391	8.3
Staff grade (NCCGs)	4,395	300	6.8
Consultant	3,177	188	5.9
Pharmacist	179	0	0
Nurse	977	60	6.1
<b>TOTAL</b>	<b>124,260</b>	<b>11,077</b>	<b>8.9%</b>

# Multivariate Analysis

Prescriber	
Consultant	Reference
FY 1	2.13 (1.80 – 2.52)
FY 2	2.23 (1.89 – 2.65)
FTSTA	1.84 (1.54 – 2.19)
NCCG	1.58 (1.29 – 1.94)
Pharmacist	0.84 (0.36 – 1.93)
Nurse	1.00 (0.71 – 1.39)
Prescribing stage	
Inpatient prescription	Reference
Admission	1.70 (1.61 – 1.80)
Rewrite drug chart	0.48 (0.43 – 0.52)
Discharge prescription	0.77 (0.72 – 0.82)
Type of prescription	
Handwritten	Reference
Electronic	0.88 (0.79 – 0.97)

# Identifying the cause of a problem

**BJCP** British Journal of Clinical Pharmacology

DOI:10.1111/bcp.12332

## Exploring the causes of junior doctors' prescribing mistakes: a qualitative study

Penny J. Lewis,<sup>1</sup> Darren M. Ashcroft,<sup>1</sup> Tim Dornan,<sup>2</sup> David Taylor,<sup>3</sup> Val Wass<sup>4</sup> & Mary P. Tully<sup>1</sup>

<sup>1</sup>Manchester Pharmacy School, Manchester Academic Health Sciences Centre, University of Manchester, Manchester, UK, <sup>2</sup>Department of Educational Development and Research, Maastricht University, Maastricht, The Netherlands, <sup>3</sup>Liverpool Medical School Education Research Group, University of Liverpool, School of Medicine, Liverpool and <sup>4</sup>School of medicine, Keele University, Staffordshire, UK

WHAT IS ALREADY KNOWN ABOUT

Research in Social and Administrative Pharmacy xxx (2017) 1–7

Contents lists available at [ScienceDirect](#)



ELSEVIER

Research in Social and Administrative Pharmacy

journal homepage: [www.rsap.org](http://www.rsap.org)

## 'If no-one stops me, I'll make the mistake again': Changing prescribing behaviours through feedback; A Perceptual Control Theory perspective'

Jane Ferguson, BSc MSc PhD<sup>\*</sup>, Chris Keyworth, BSc MSc PhD,  
Mary P. Tully, FFRPS MRPharmS PhD

Manchester Pharmacy, School, University of Manchester, Oxford Road, Manchester, M13 9PL, United Kingdom

# Aim

- To explore the causes of prescribing errors made by first year doctors, concentrating on the interplay between their educational backgrounds and factors in the practice environment

## Method

- Sample
  - Maximum variability sample
  - 30 FY1 doctors
- Recruitment
  - Short recruitment presentations
  - Emails via Postgraduate Deanery
- Data analysis
  - Thematic analysis
  - Categorisation according to Reason's Model of Accident Causation



**Latent conditions**

Organisational processes- workload, handwritten prescriptions  
Management decisions- staffing levels, culture of lack of support for junior staff

**Error-producing conditions**

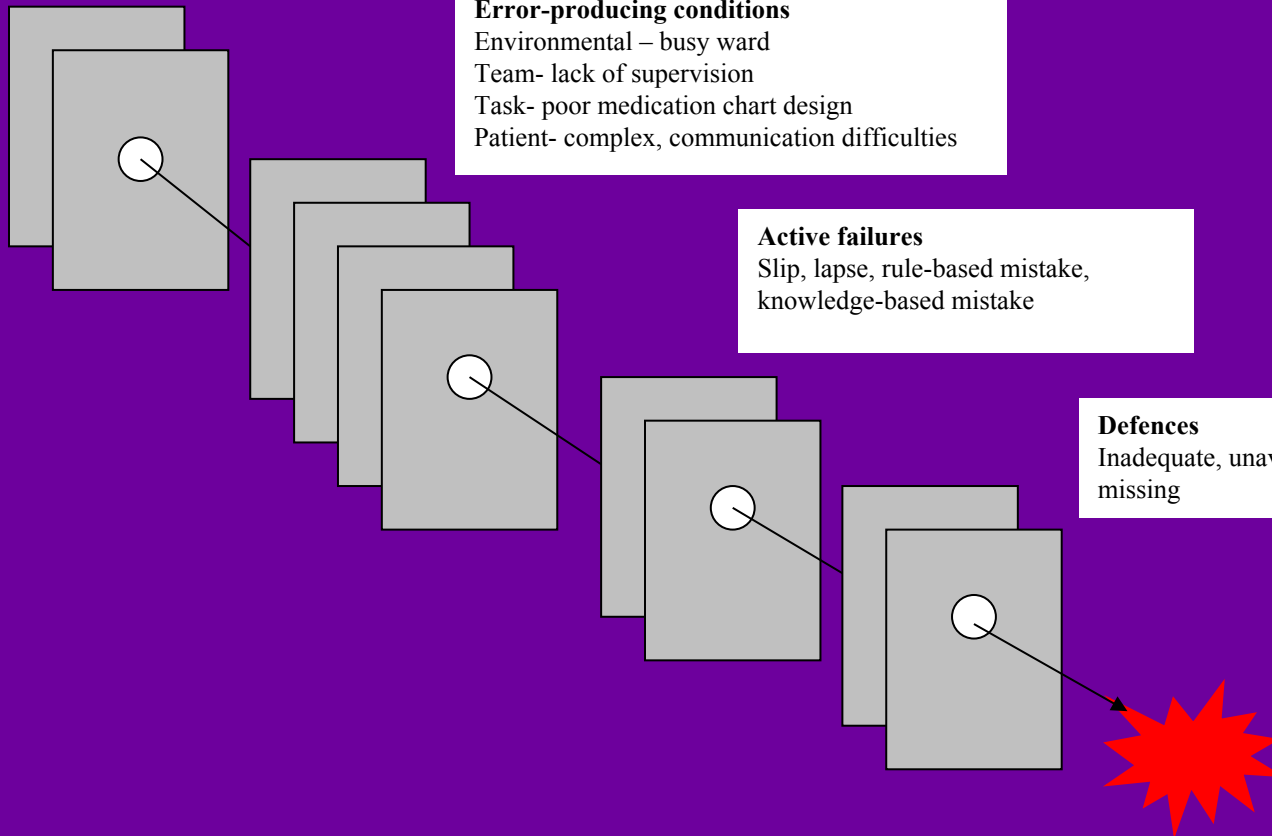
Environmental – busy ward  
Team- lack of supervision  
Task- poor medication chart design  
Patient- complex, communication difficulties

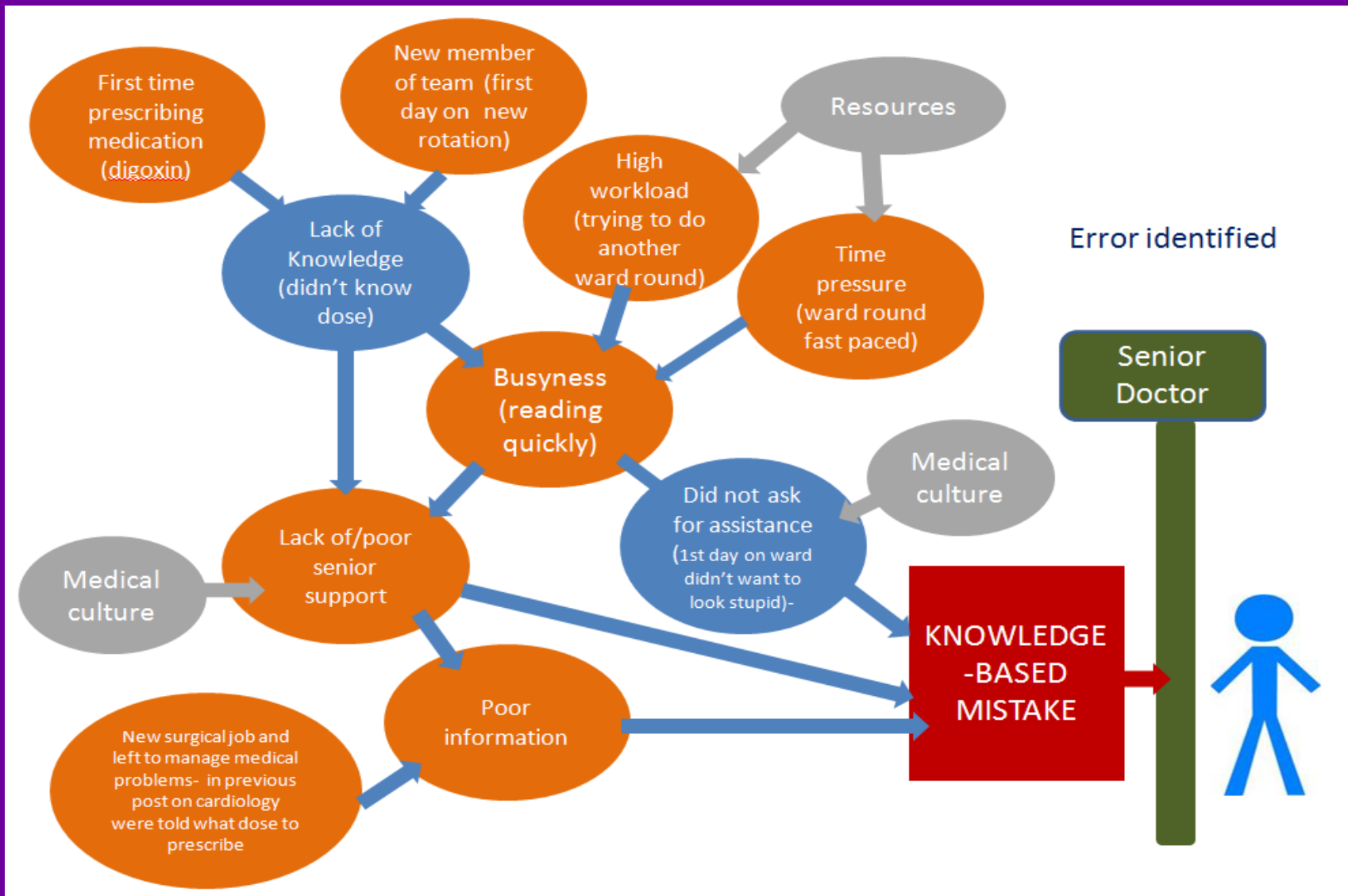
**Active failures**

Slip, lapse, rule-based mistake, knowledge-based mistake

**Defences**

Inadequate, unavailable, missing





## Lack of feedback on prescribing errors

- “I found this quite difficult, because, erm, I suppose you never really... I reckon I've probably made a lot more errors than I can recall, and/or have been aware of, if you know what I mean. So I reckon a lot of the errors just go, sort of, disappear somewhere and either someone sorts them out or changes them.” Interview 2
- “...every time you know you've made a mistake it changes the way you prescribe it I think. It's just the ones that you don't know when you've made a mistake.” Interview 29

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## We need to change things...

- “...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”

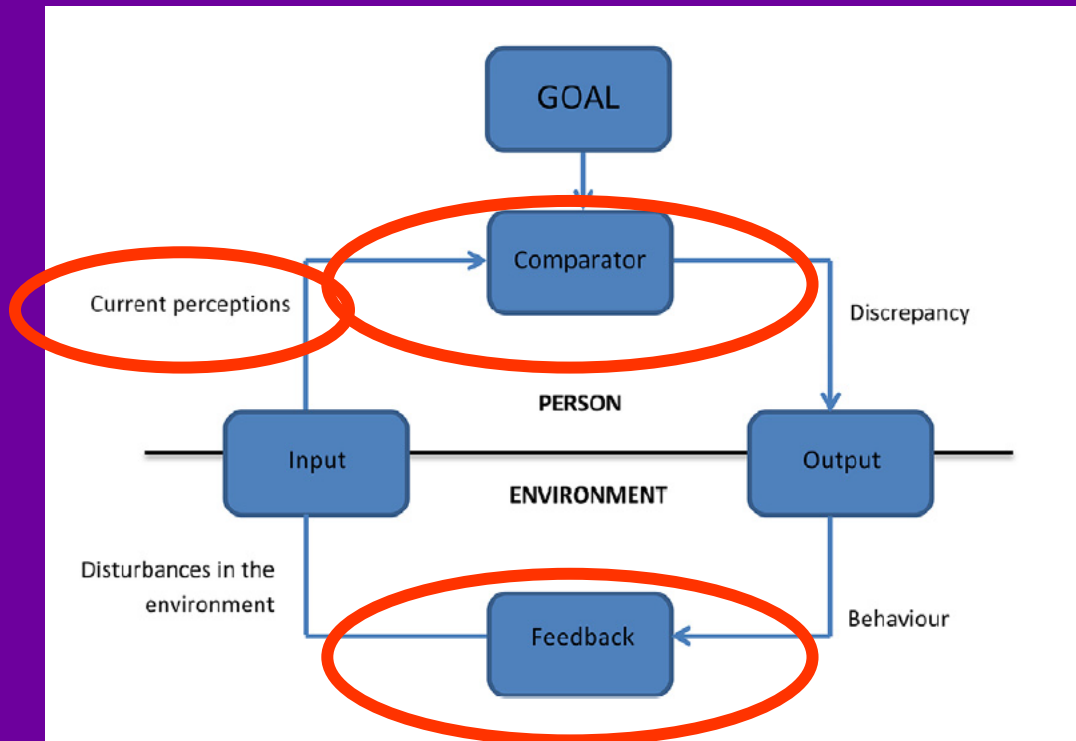
Patient focus group participant

# Behaviour change interventions

- Strategies for behaviour change geared towards
  - Raising awareness
  - Providing advice
  - Motivating or scaring
- Rarely theory driven or evidence-based
- Good intentions are not always translated into action

Armitage, 2014

# Perceptual Control Theory analysis of Audit & Feedback





# Intervening to ameliorate a problem

*J Antimicrob Chemother* 2016; **71**: 1415–1425  
doi:10.1093/jac/dkv482 Advance Access publication 24 February 2016

**Journal of  
Antimicrobial  
Chemotherapy**

## **Pharmacist-led feedback workshops increase appropriate prescribing of antimicrobials**

**Lucy McLellan<sup>1,2\*</sup>, Tim Dornan<sup>1,3</sup>, Pippa Newton<sup>2</sup>, Steven D. Williams<sup>2,4</sup>, Penny Lewis<sup>4</sup>, Douglas Steinke<sup>4</sup> and Mary P. Tully<sup>4</sup>**

<sup>1</sup>Department of Educational Development and Research, Maastricht University, PO Box 616, 6200 MD, Maastricht, The Netherlands;  
<sup>2</sup>University Hospital of South Manchester, Southmoor Road, Wythenshawe, Manchester M23 9LT, UK; <sup>3</sup>Centre for Medical Education, Queen's University Belfast, Belfast BT7 1NN, Northern Ireland, UK; <sup>4</sup>Manchester Pharmacy School, Manchester Academic Health Sciences Centre (MAHSC), University of Manchester, Oxford Road, Manchester M13 9PT, UK

# Who to target?

- Junior doctors
  - Do about 70% of prescribing
  - Expertise development
- Senior doctors
  - ‘Team’ prescribing
  - Support for junior colleagues
  - Creation of safety culture

# Current problems with behaviour change

- People are
  - Largely aware of the risks of their behaviour
  - Know at least some ways they could change their behaviour
  - On average, are motivated to change

Armitage, 2014

# Supporting the volitional phase

- Implementation intentions
  - Increase likelihood that behaviour will be performed because it ensures that cues in the environment will trigger the behaviour in the future
  - Mental link between a critical situation that is made accessible and an appropriate behavioural response
  - Speeds up development of habits

Gollwitzer, 1993

## Supporting the volitional phase

- If-then plans or implementation intentions
- **If** I am prescribing a long list of meds
- **Then** I will prescribe the urgent/important meds first

# Aim

- To conduct a feasibility study to investigate whether and how structured A&F sessions will reduce antimicrobial suboptimal prescribing rates by junior doctors
- To explore doctors' acceptability of receiving feedback on their errors and their perceptions of the impact feedback had on their prescribing behaviours

# Intervention Workshops

- Ran by pharmacist experienced in medical education
- Doctors received their written A&F confidentially
- Group discussion on challenging antimicrobial prescriptions identified
- Setting an individual intention to increase appropriateness of their antimicrobial prescribing
- Stating a ‘commitment to change’ between 1-10
- Summarising similarities and differences in objectives and commitment to change

## Data analysis

- Prescribing data collected by ward pharmacists
- Appropriateness assessed by validation panel
- Normalised rate per prescriber

$$= \frac{\text{number of suboptimal antimicrobial prescriptions}}{\text{number of antimicrobial prescriptions}}$$

- Comparison of rates between groups using t-test



# Interviews

- Interviewed 10 doctors - 5 from each group
- Asked about
  - Their experience prescribing antimicrobials
  - Their views on normal feedback practices
  - Their experiences following the intervention
- Analysed using a constant comparative method

# Results

	Intervention	Control
<b>Appropriate antimicrobial prescribing</b>		
A1 Choice/use based on recognised best practice	37 (49.3%)	51 (39.5%)
<b>Suboptimal choice of antimicrobial medication</b>		
S1 Not needed	2 (2.7%)	3 (2.3%)
S2 Not followed Trust/other guidance	5 (6.7%)	8 (6.2%)
S3 Suboptimal choice for patient due to age etc	0	1 (0.8%)
<b>Suboptimally written regimen/instructions</b>		
S4 Sub-optimal regimen	31 (41.3%)	62 (48.1%)
S5 Sub-optimal or no duration	0	1 (2.1%)
<b>All suboptimal prescribing</b>	<b>38 (50.7%)</b>	<b>78 (60.5%)</b>
<b>Overall total</b>	<b>75 (100%)</b>	<b>129 (100%)</b>

# Results

- Normalised rate of suboptimal prescribing per prescriber
  - Intervention group =  $0.32 \pm 0.36$
  - Control group =  $0.68 \pm 0.36$

(p-value=0.0005)

# Results

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## Feedback sessions

- “Just a feeling of relief that most of us junior doctors are pretty much in the same boat, it’s not just me that is a bit oblivious to certain aspects of antimicrobial prescribing!...That’s one of the things I appreciate the most of this intervention...[I’m] not really different from other junior doctors.”

Doctor 2

- “Yeah, I think it’s good to see what you’re doing well and what you’re doing badly like individually, you know, because I think a lot of the time there’s a focus on not singling people out on the wards and saying you’re doing that wrong. And I think it’s a good thing to do really.” Doctor 10

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## Discussion

- A&F intervention decreased some types of suboptimal prescribing
- Positive attractor within a complex system of behavioural influences
- Possible to change doctors' perceptions of acceptable, typical and best practice
- Limited by the affordances and agency available to the doctors

## Conclusions about this research topic

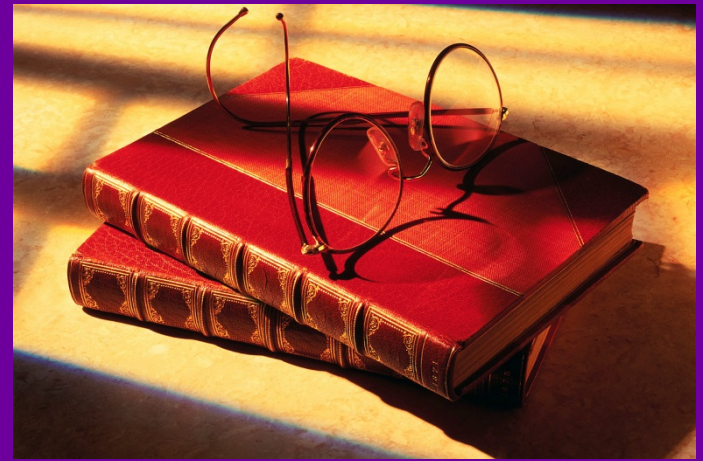
- Prescribing errors are common & causes are multifactorial
- Junior doctors are often rushed, inundated by jobs and under pressure
- A&F is acceptable to doctors of all grades but needs to fit in the busy clinical environment
- A&F may well change prescribing behaviour but will need a large study to show the impact
- Will likely need to be coupled with other system changes



# Lessons to be learned about pharmacy practice research

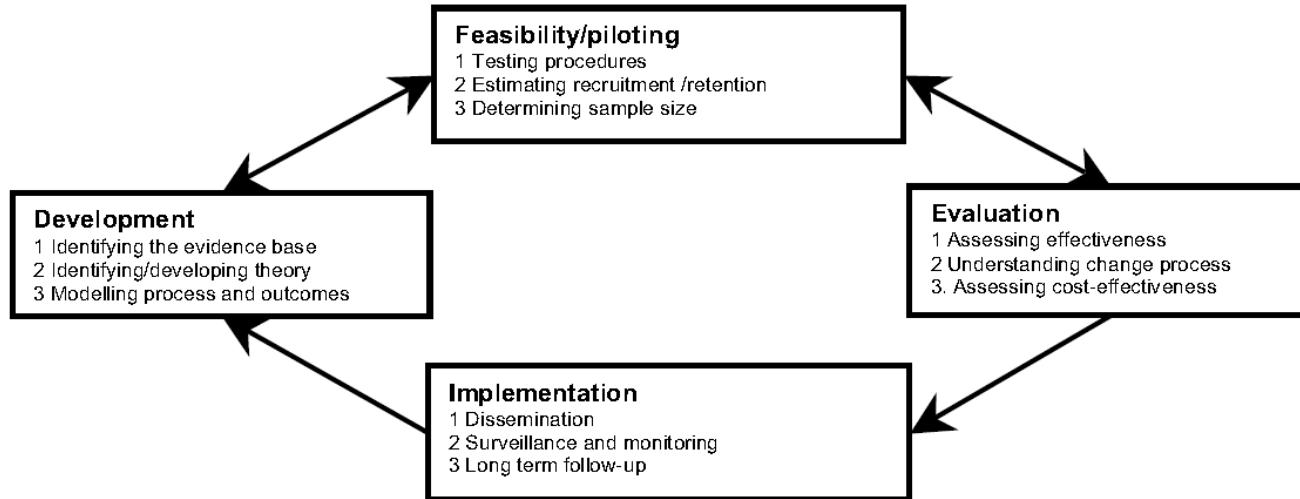
# Lessons that can be learnt

- Importance of
  - Understanding all parts of process want to change



# Developing and evaluating complex interventions: the new Medical Research Council guidance

Figure 1 Key elements of the development and evaluation process



# Lessons that can be learnt

- Importance of
  - Understanding all parts of process want to change
  - Using theory to inform research
  - Using robust study design to address your aims and objectives
- Multidisciplinary
  - collaboration outside department
  - input within pharmacy department



## Questions

1. Pharmacy practice research can involve either the identification of pharmaceutical needs or testing interventions to address those needs Y/N
2. The randomised controlled trial is always the most robust research method for pharmacy practice research. Y/N
3. Before testing the feasibility of an intervention, you should identify the relevant theory and understand the process by which the intervention can act. Y/N

# Answers

1. Pharmacy practice research can involve either the identification of pharmaceutical needs or testing interventions to address those needs **Y**
2. The randomised controlled trial is always the most robust research method for pharmacy practice research. **N**
3. Before testing the feasibility of an intervention, you should identify the relevant theory and understand the process by which the intervention can act. **Y**