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Tackling polypharmacy in primary care

Reflecting on learning from the IMPPP clinical trial

Jenny Scott (Chair), Deborah McCahon and Rupert Payne

25 March 2026

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Polypharmacy: the background

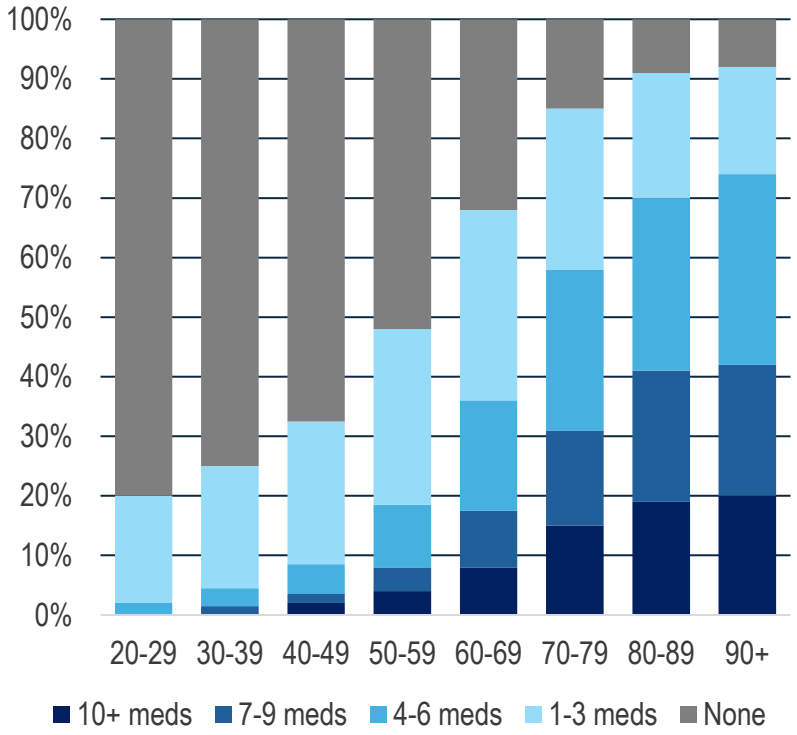
Rupert Payne
University of Exeter

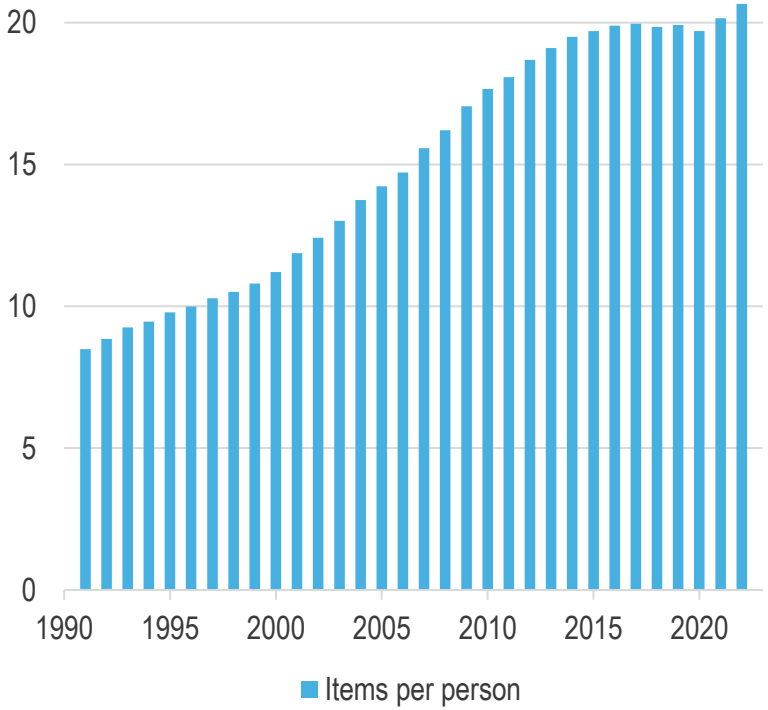
NHS Bristol, North Somerset and South Gloucestershire Integrated Care Board

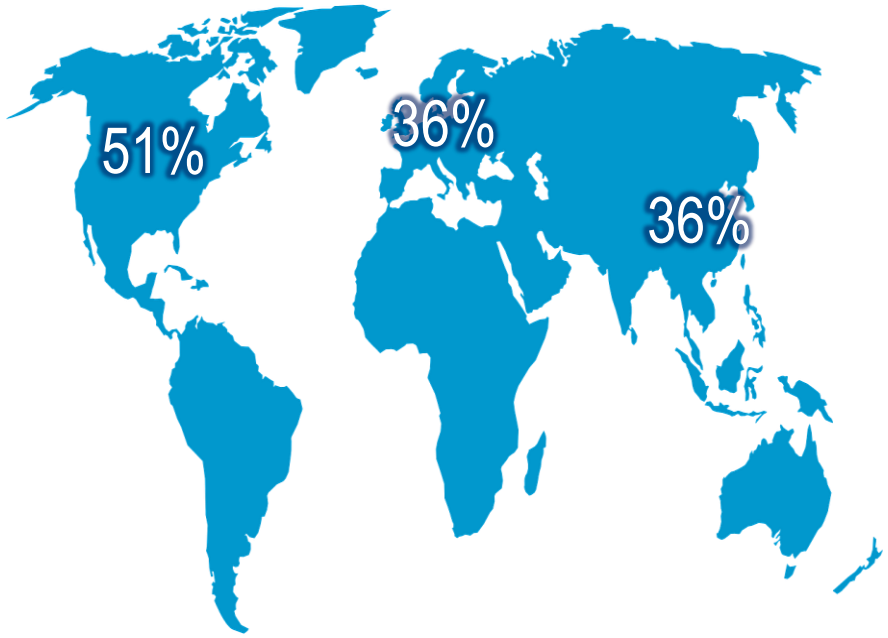
University of BRISTOL

University of Exeter

The size of the problem

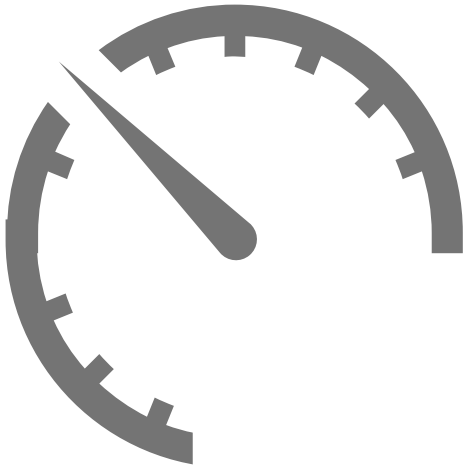






Payne, EJCP 2014; NHS BSA 2023; Delara, BMC Geriatr 2022

National metrics



NHS Business Services Authority

Government report

Department of Health & Social Care

NHS leadership

NHS England

Cross-party activity

appg

The challenge of multiple health conditions…

4/5 of all prescriptions

6× number of medicines

Research

Anna Cassell, Duncan Edwards, Amelia Harshfield, Kirsty Rhodes, James Brimicombe, Rupert Payne and Simon Griffin

The epidemiology of multimorbidity in primary care:

a retrospective cohort study

Abstract

Background

Aim

Design and setting

Method

Results

Conclusion

Keywords

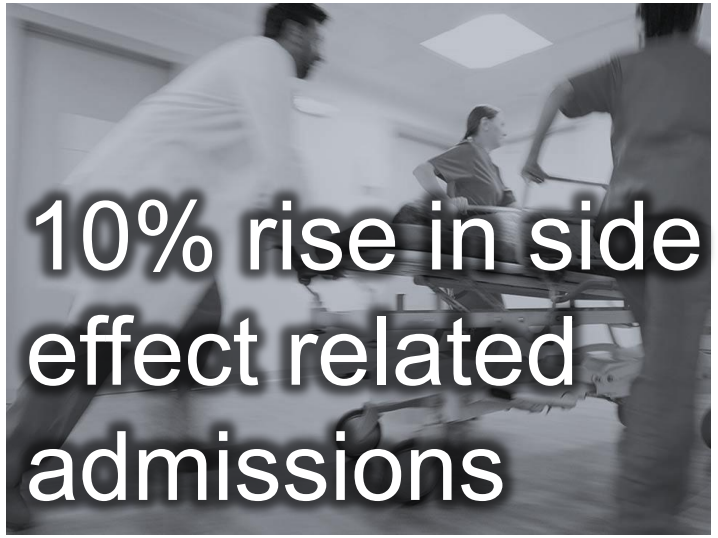
INTRODUCTION

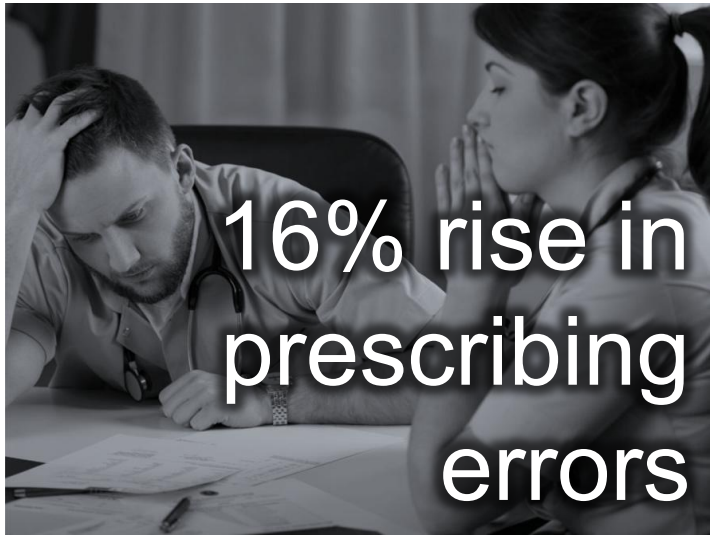
Cassell A, BJGP 2018

Other factors driving polypharmacy

Single-condition guidelines	Poor evidence base	Poor informatics
Lack of training	Clinical complexity	Overstretched clinicians
Sociocultural issues	Multidisciplinary working and professional boundaries	Communication and patient-centred care

+1 additional medicine =

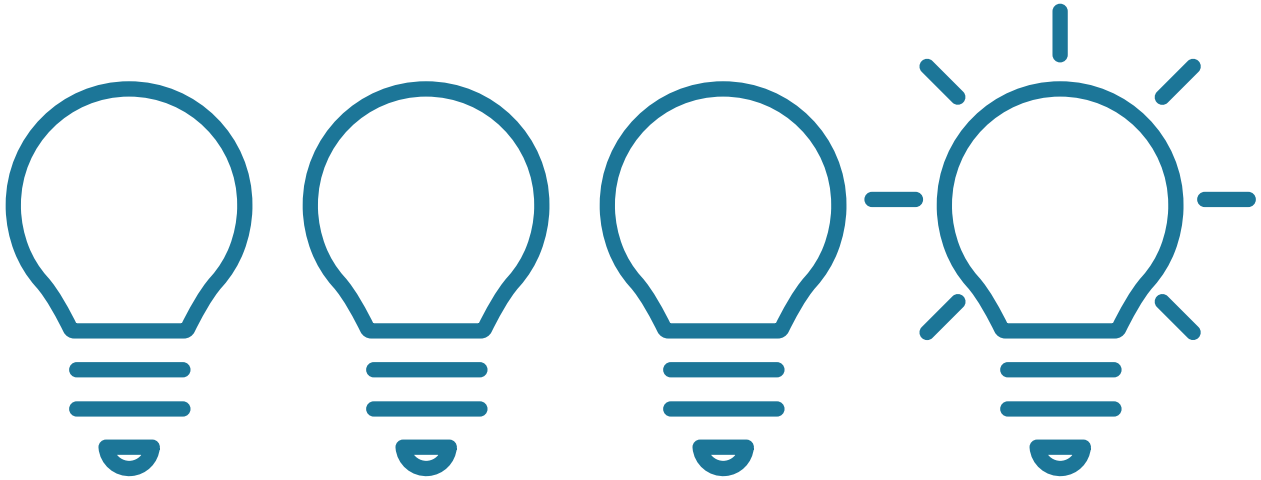


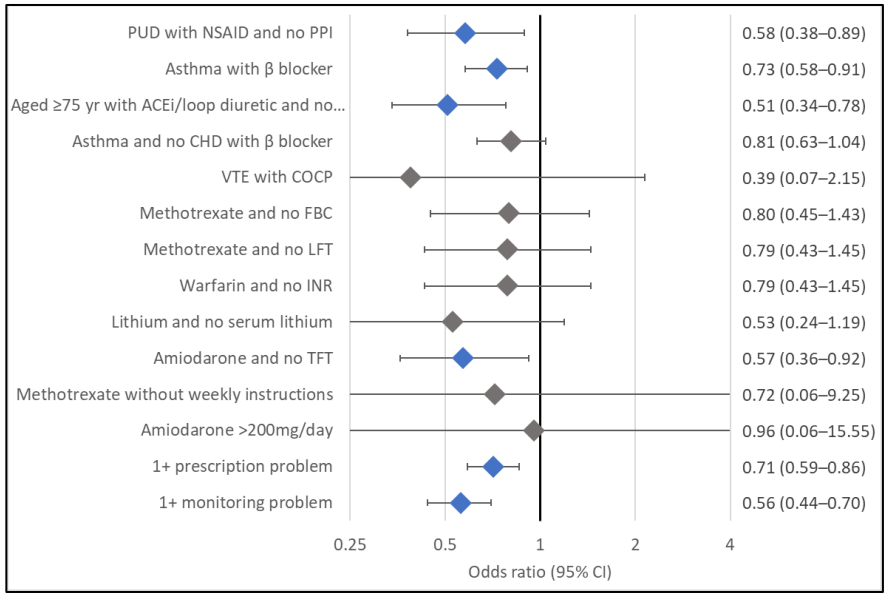


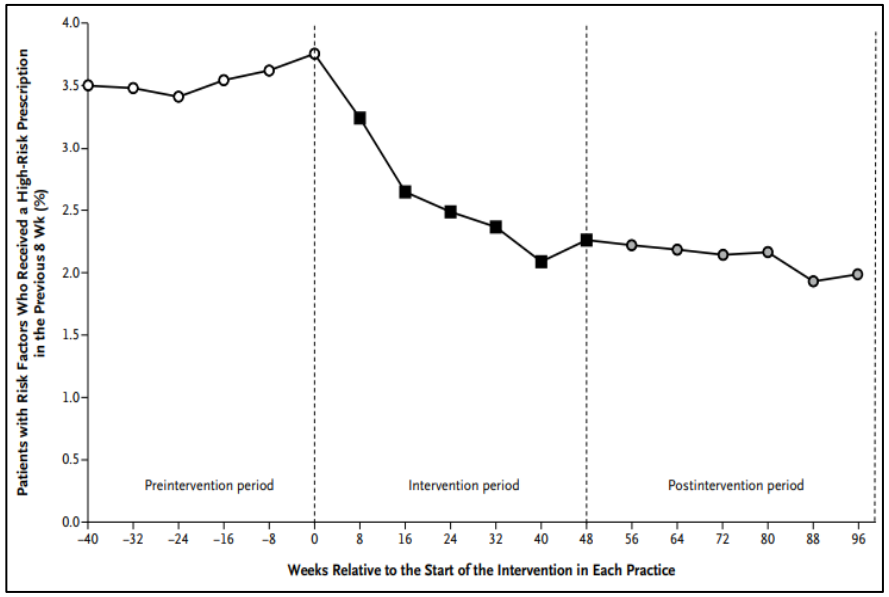
associated with >10 medicines

Osanlou, BMJ Open 2022; PRACtICe study 2012

Solutions – what is the evidence?



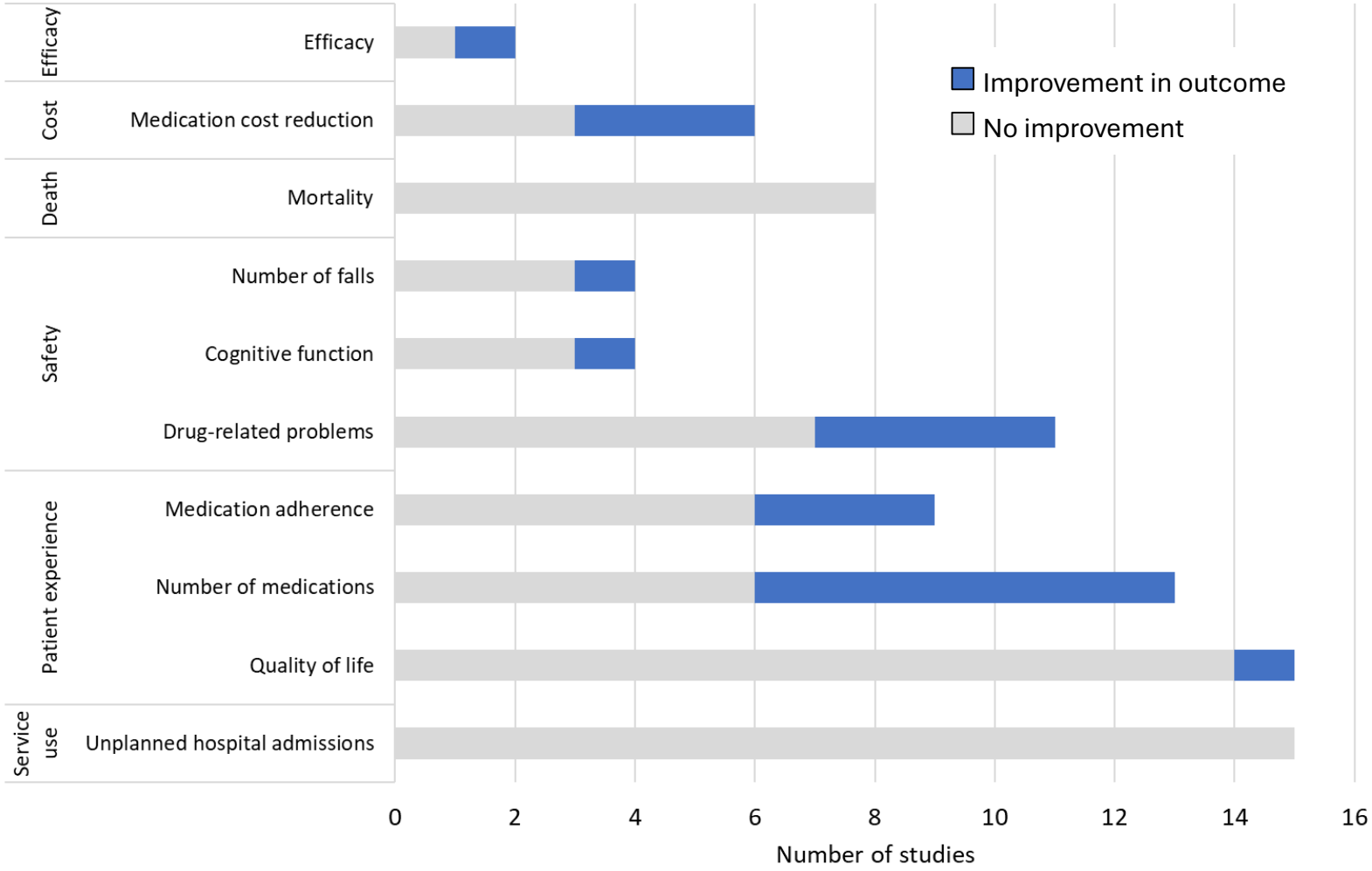




Interventions focused on specific safety issues seem to work

Avery AJ, Lancet 2012; Dreischulte T, NEJM 2016

Evidence lacking for isolated reviews



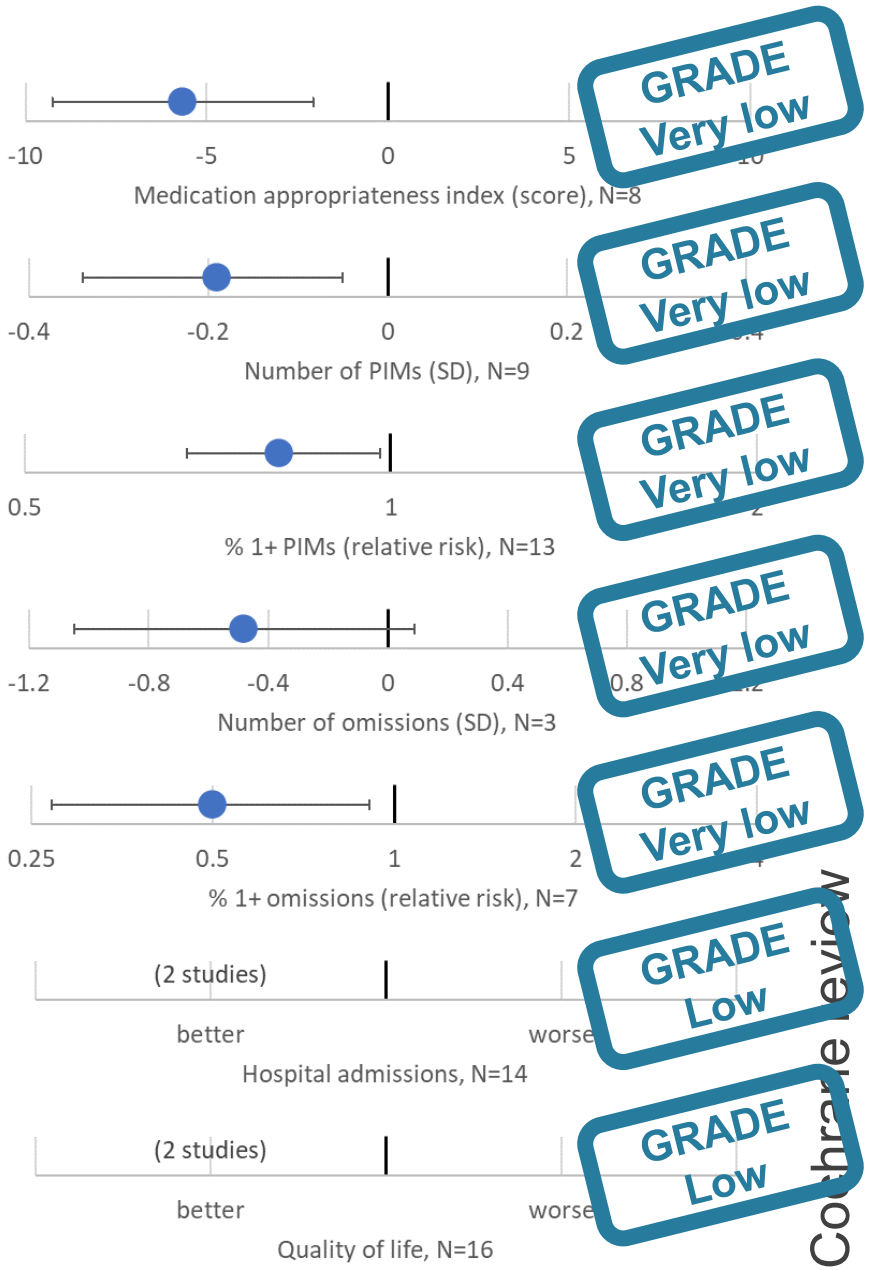
McCahon D, BMC Med 2012

iSimpathy

- Pharmacist-led comprehensive polypharmacy review
  - 28-hr training, 2½-hr intervention, primary and secondary care
  - 3210 patients, 5+ meds (95%), high-risk meds (35%)
  - Before/after (non-randomised) study
- Findings
  - Decrease in number of medicines (12 to 11)
  - Decrease in inappropriate prescribing
  - Potential economic benefits based on medication changes made
  - Other outcomes (admissions, death, etc) not reported

iSIMPATHY
making medication personal

Mair A, BMJ Open 2025



Evidence for polypharmacy interventions is poor

Cole JA, Cochrane Database Syst Rev 2023

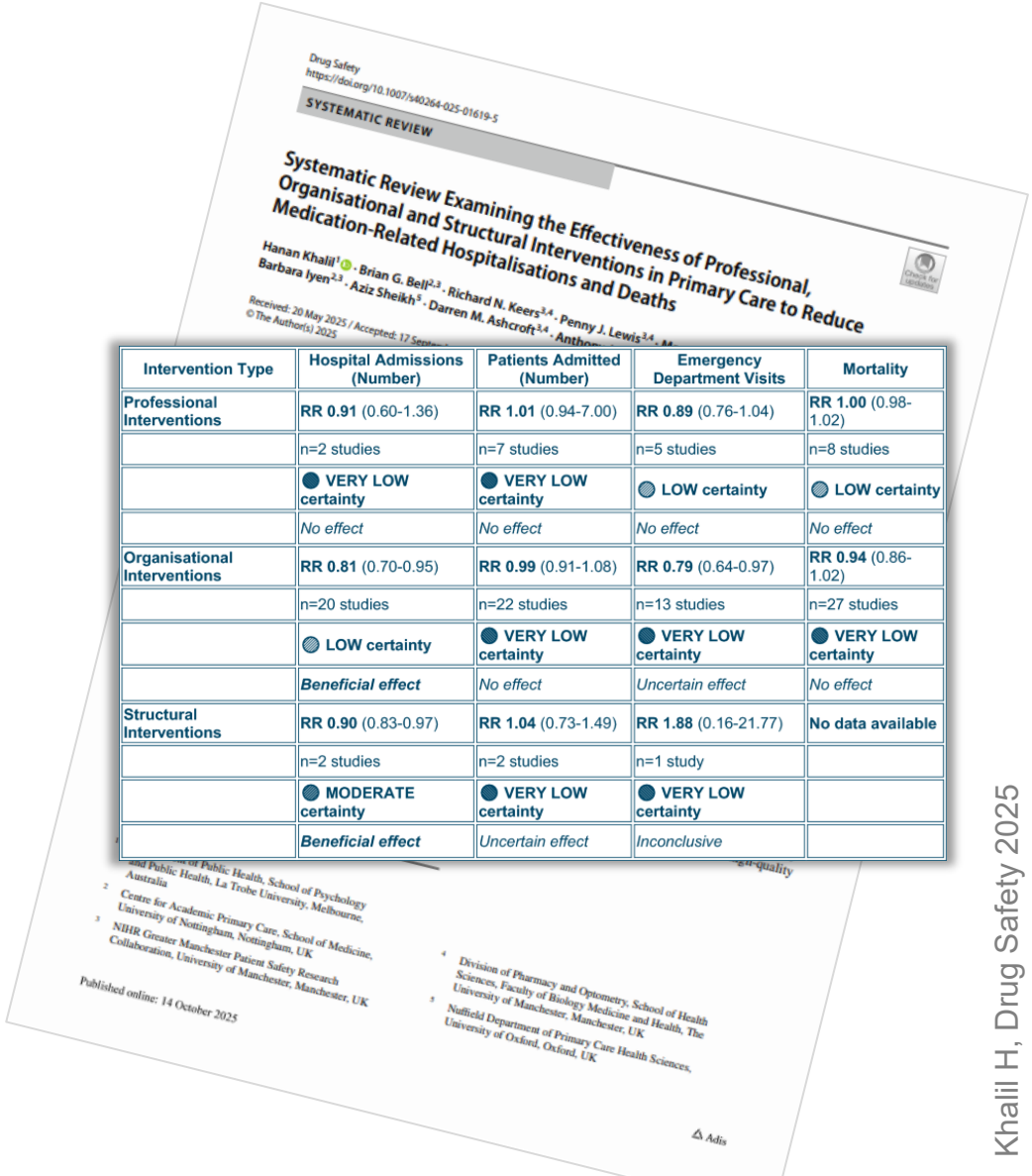
Limited evidence for primary care interventions

- Decreased admission through
  - pharmacist review or MDT care
  - system-level support and quality monitoring

Low certainty

Moderate certainty

- No improvement in admitted patient numbers
- No impact of training or CDS tools
- No improvements in ED visits or deaths



Drug Safety
https://doi.org/10.1007/s40264-025-01619-5

SYSTEMATIC REVIEW

Systematic Review Examining the Effectiveness of Professional, Organisational and Structural Interventions in Primary Care to Reduce Medication-Related Hospitalisations and Deaths

Hanan Khalil[1] · Brian G. Bell[2,3] · Richard N. Keers[3,4] · Penny J. Lewis[3,4] · Barbara Iyen[2,3] · Aziz Sheikh[5] · Darren M. Ashcroft[3,4] ·

Received: 20 May 2025 / Accepted: 17 Sept
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Intervention Type	Hospital Admissions (Number)	Patients Admitted (Number)	Emergency Department Visits	Mortality
Professional Interventions	RR 0.91 (0.60-1.36)	RR 1.01 (0.94-7.00)	RR 0.89 (0.76-1.04)	RR 1.00 (0.98-1.02)
	n=2 studies	n=7 studies	n=5 studies	n=8 studies
	⬤ VERY LOW certainty	⬤ VERY LOW certainty	◍ LOW certainty	◍ LOW certainty
	No effect	*No effect*	*No effect*	*No effect*
Organisational Interventions	RR 0.81 (0.70-0.95)	RR 0.99 (0.91-1.08)	RR 0.79 (0.64-0.97)	RR 0.94 (0.86-1.02)
	n=20 studies	n=22 studies	n=13 studies	n=27 studies
	◍ LOW certainty	⬤ VERY LOW certainty	⬤ VERY LOW certainty	⬤ VERY LOW certainty
	Beneficial effect	*No effect*	*Uncertain effect*	*No effect*
Structural Interventions	RR 0.90 (0.83-0.97)	RR 1.04 (0.73-1.49)	RR 1.88 (0.16-21.77)	No data available
	n=2 studies	n=2 studies	n=1 study	
	◍ MODERATE certainty	⬤ VERY LOW certainty	⬤ VERY LOW certainty	
	Beneficial effect	*Uncertain effect*	*Inconclusive*	

Published online: 14 October 2025

Khalil H, Drug Safety 2025

The evidence for SMRs

medRxiv
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Impact of structured medication reviews on prescribing in English Primary Care: a nationwide observational cohort study

Posted July 23, 2025.

James P Sheppard, Paul A Bateman, Cynthia Wright-Drakesmith, Christopher Clark, Rebecca K Barnes, Andrew Clegg, Gary A Ford, Seema Gadhia, William Hinton, FD Richard Hobbs, Sundus Jawad, Kamlesh Khunti, Gregory Y. H. Lip, Simon de Lusignan, Jonathan Mant, Deborah McCahon, Bernardo Meza-Torres, Rupert A Payne, Rafael Perera-Salazar, Claire Reidy, Anna Seeley, Samuel Seidu, Katherine Tucker, Rik van der Veen, Marney Williams, Richard J McManus

doi: https://doi.org/10.1101/2025.07.23.25332062

This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should *not* be used to guide clinical practice.

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Subject Area
Primary Care Research

Reviews and Context
0 Comment
0 TRIP Peer Reviews
0 Community Reviews
0 Automated Services
0 Blogs/Media
0 Author Videos

Subject Areas

Abstract

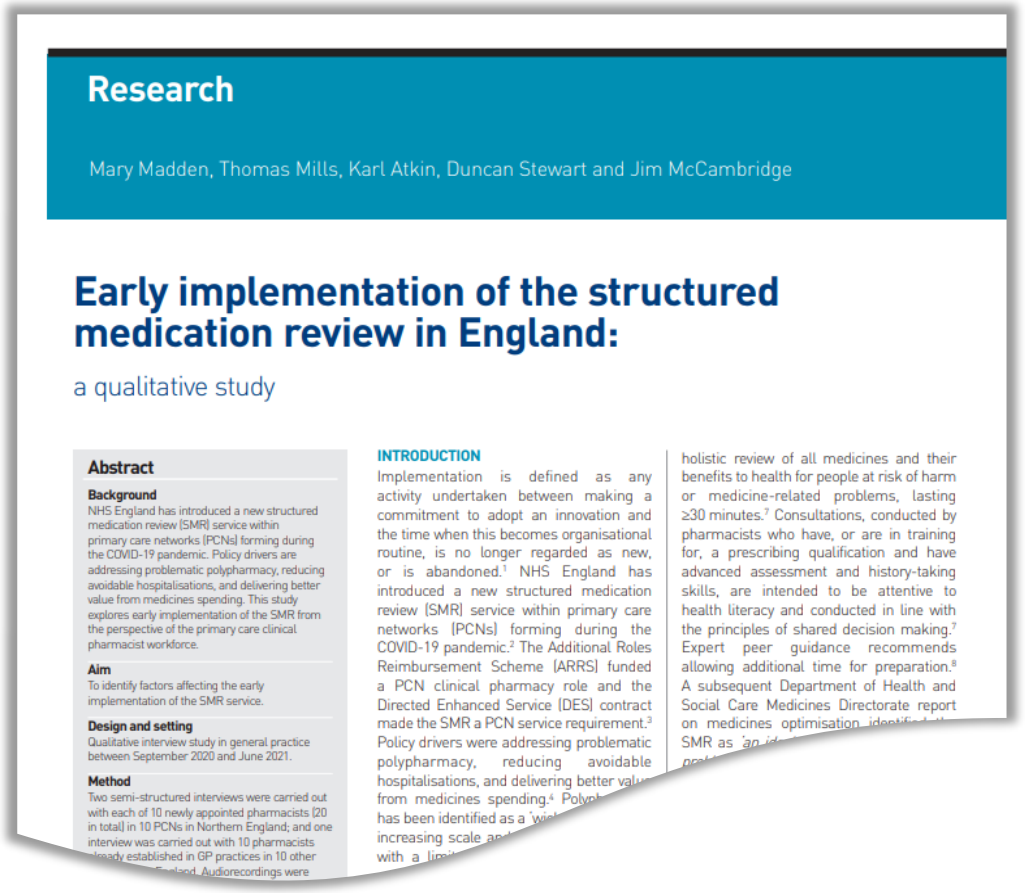
Objectives The present study aimed to evaluate the impact of structured medication reviews (SMRs), by examining the proportion of eligible patients who received a review in the first two years of the programme, and whether SMRs were associated with changes in prescribing.

Design Retrospective observational cohort study.

Setting Patients registered to primary care practices in England contributing data to the Oxford Clinical Informatics Digital Hub (ORCHID) were included between 1st April 2020 and 30th September 2022.

Participants De-identified data were extracted from the electronic health records of individuals registered to ORCHID practices aged ≥65 years, prescribed one or more medications and fulfilling the specific eligibility criteria for a SMR.

Main outcome measures The primary outcome was the proportion of patient[s] ... a review. Further outcomes included the proportion of pot... combinations corrected following...



Research

Mary Madden, Thomas Mills, Karl Atkin, Duncan Stewart and Jim McCambridge

Early implementation of the structured medication review in England:

a qualitative study

Abstract

Background
NHS England has introduced a new structured medication review (SMR) service within primary care networks (PCNs) forming during the COVID-19 pandemic. Policy drivers are addressing problematic polypharmacy, reducing avoidable hospitalisations, and delivering better value from medicines spending. This study explores early implementation of the SMR from the perspective of the primary care clinical pharmacist workforce.

Aim
To identify factors affecting the early implementation of the SMR service.

Design and setting
Qualitative interview study in general practice between September 2020 and June 2021.

Method
Two semi-structured interviews were carried out with each of 10 newly appointed pharmacists (20 in total) in 10 PCNs in Northern England; and one interview was carried out with 10 pharmacists already established in GP practices in 10 other ... England. Audiorecordings were

INTRODUCTION

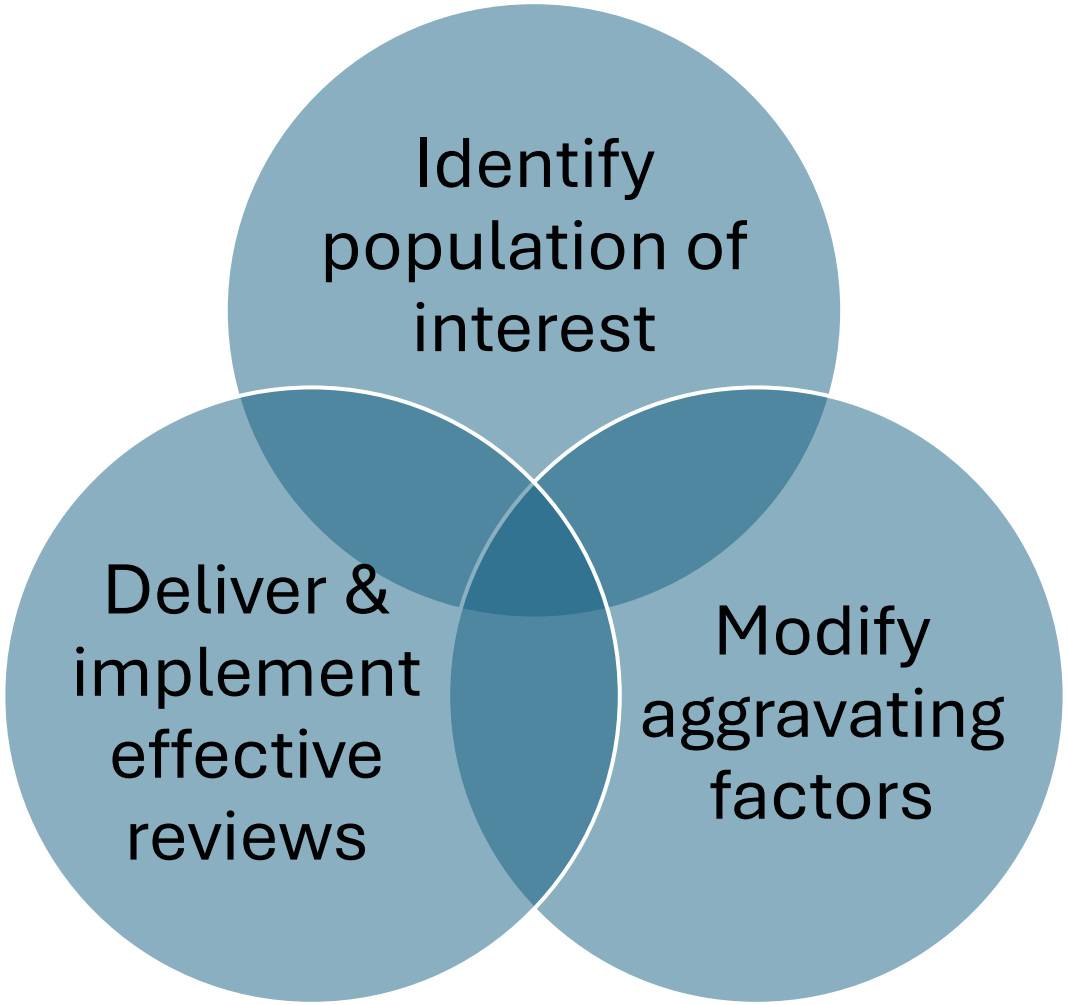
Implementation is defined as any activity undertaken between making a commitment to adopt an innovation and the time when this becomes organisational routine, is no longer regarded as new, or is abandoned.[1] NHS England has introduced a new structured medication review (SMR) service within primary care networks (PCNs) forming during the COVID-19 pandemic.[2] The Additional Roles Reimbursement Scheme (ARRS) funded a PCN clinical pharmacy role and the Directed Enhanced Service (DES) contract made the SMR a PCN service requirement.[3] Policy drivers were addressing problematic polypharmacy, reducing avoidable hospitalisations, and delivering better valu... from medicines spending.[4] Polyph... has been identified as a 'wic... increasing scale and ... with a lim...

holistic review of all medicines and their benefits to health for people at risk of harm or medicine-related problems, lasting ≥30 minutes.[7] Consultations, conducted by pharmacists who have, or are in training for, a prescribing qualification and have advanced assessment and history-taking skills, are intended to be attentive to health literacy and conducted in line with the principles of shared decision making.[7] Expert peer guidance recommends allowing additional time for preparation.[8] A subsequent Department of Health and Social Care Medicines Directorate report on medicines optimisation identifi... SMR as 'an id... profe...

We need better evidence:

- ✓High-quality
- ✓Aligns with practice needs
- ✓Addresses limitations of current strategies

A strategy to address polypharmacy



IMPPP trial: intervention and trial design

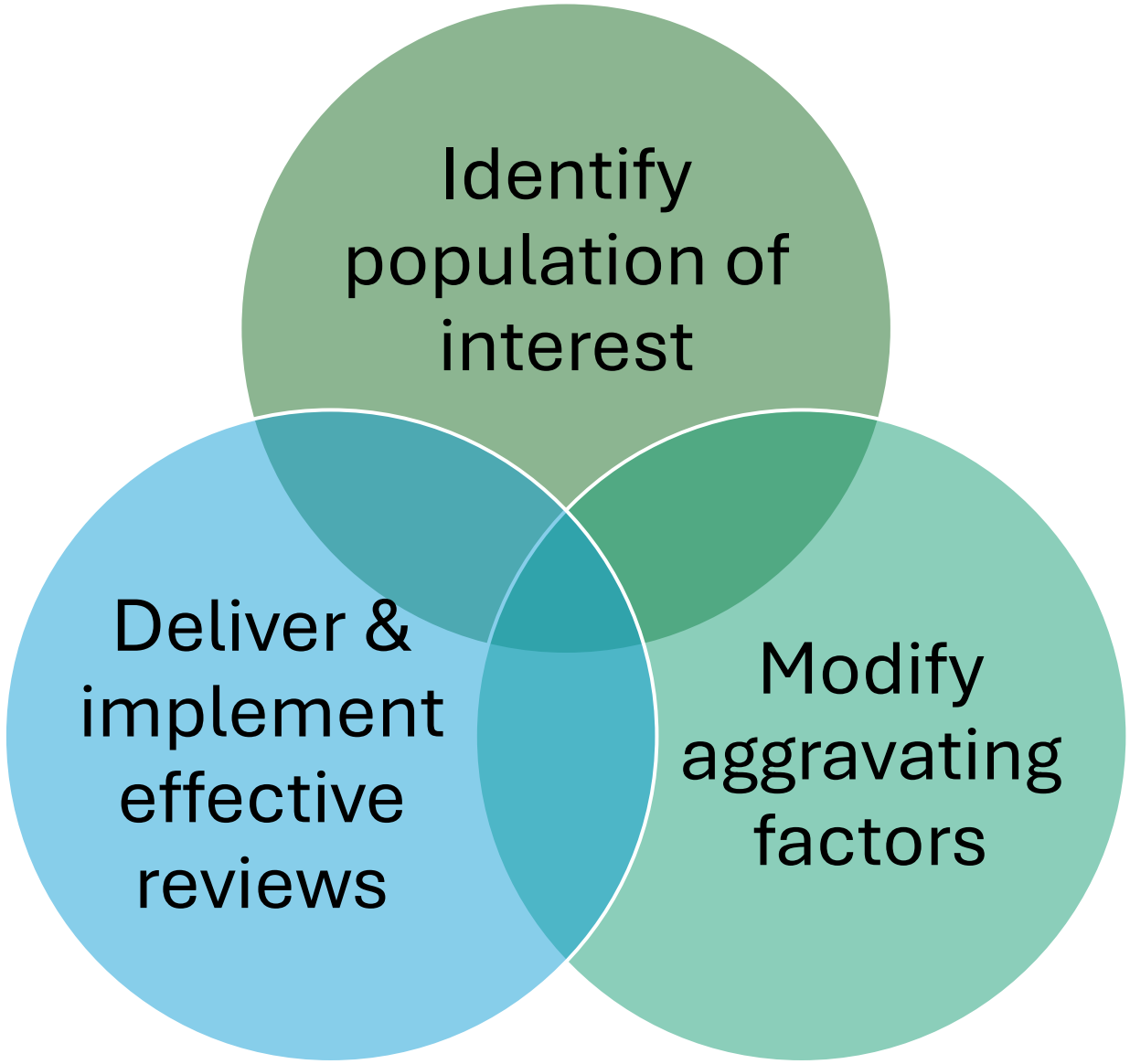
Dr Deborah McCahon

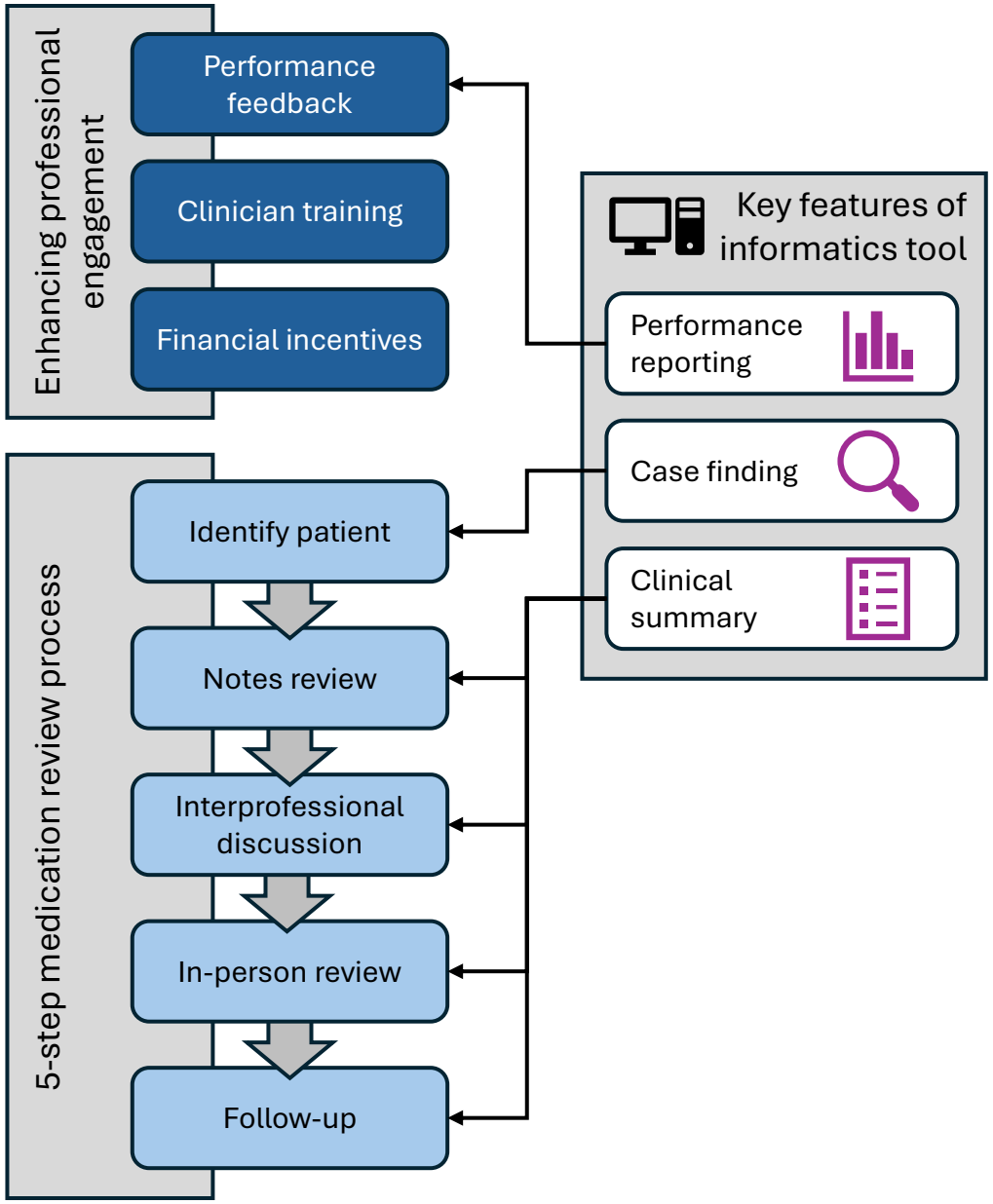
University of Bristol

NHS Bristol, North Somerset and South Gloucestershire Integrated Care Board

University of BRISTOL

Intervention design



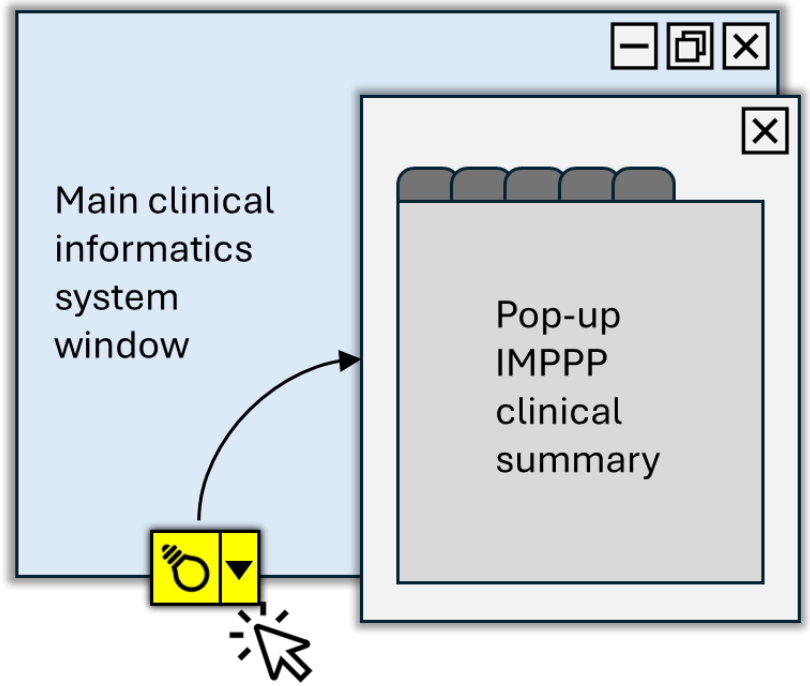


Schematic of IMPPP intervention

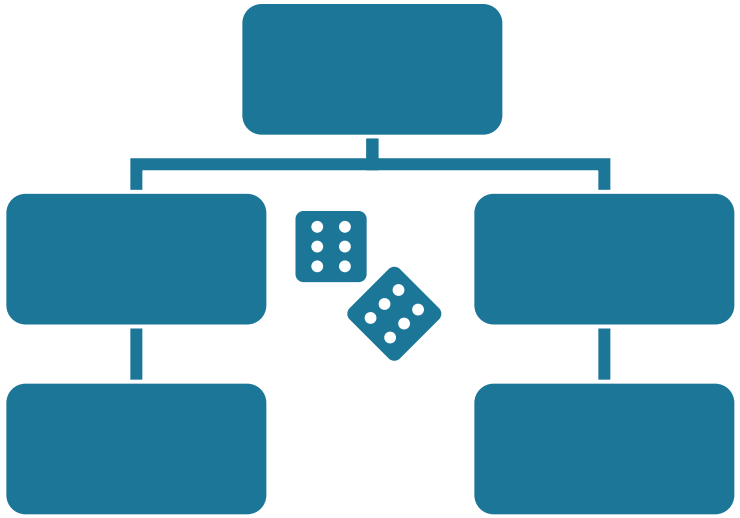
Informatics clinical summary

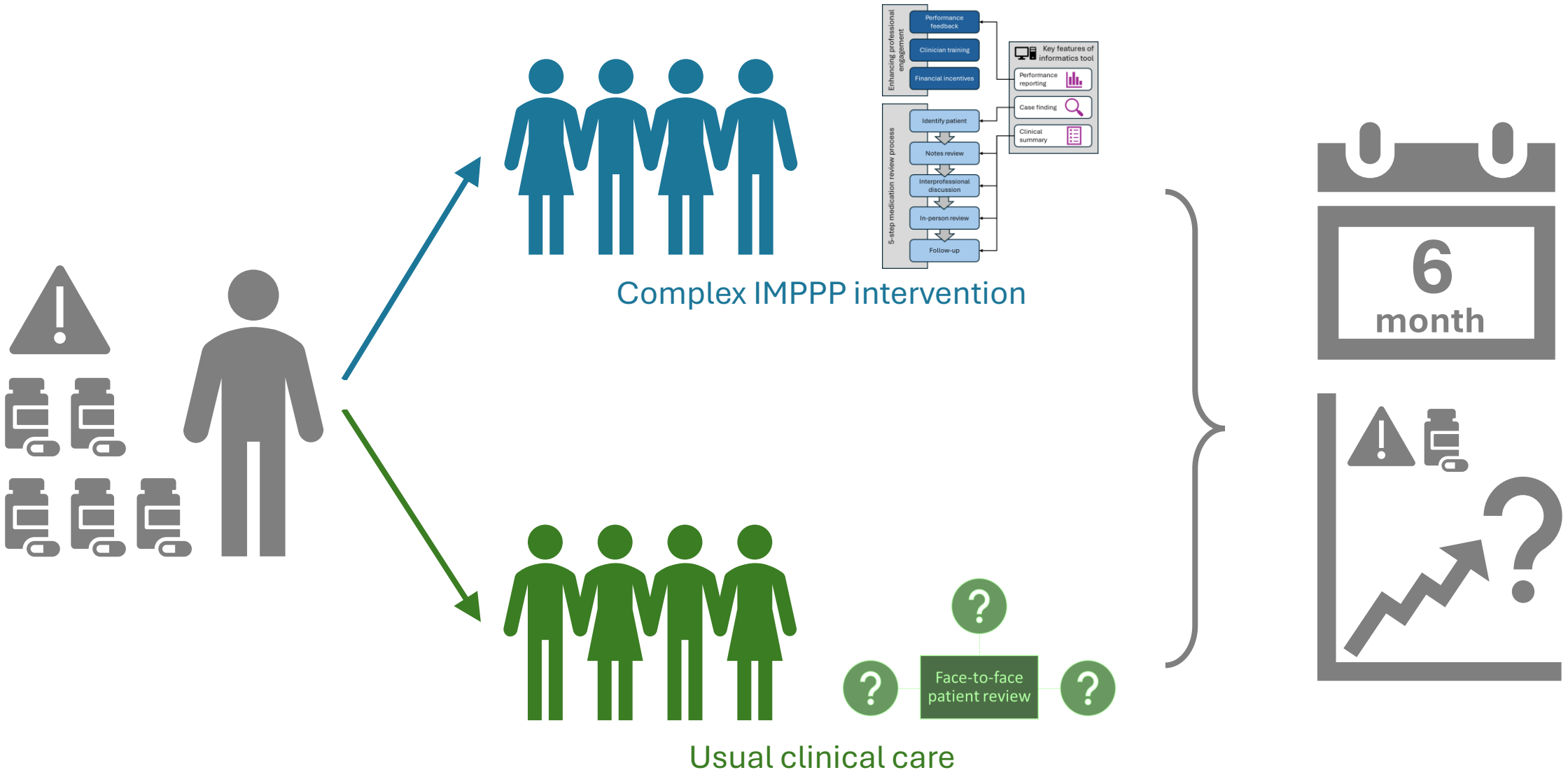
Five key “tabs”:

1. Clinical summary
   - Smoking, weight, BP, bloods, diagnoses
2. Current medications
   - Repeat drug list (+ adherence, side effects)
   - Recent acutes
   - Recorded allergies/intolerances
3. Potentially inappropriate prescribing
4. Previous review data
5. Notes and plan



Trial design





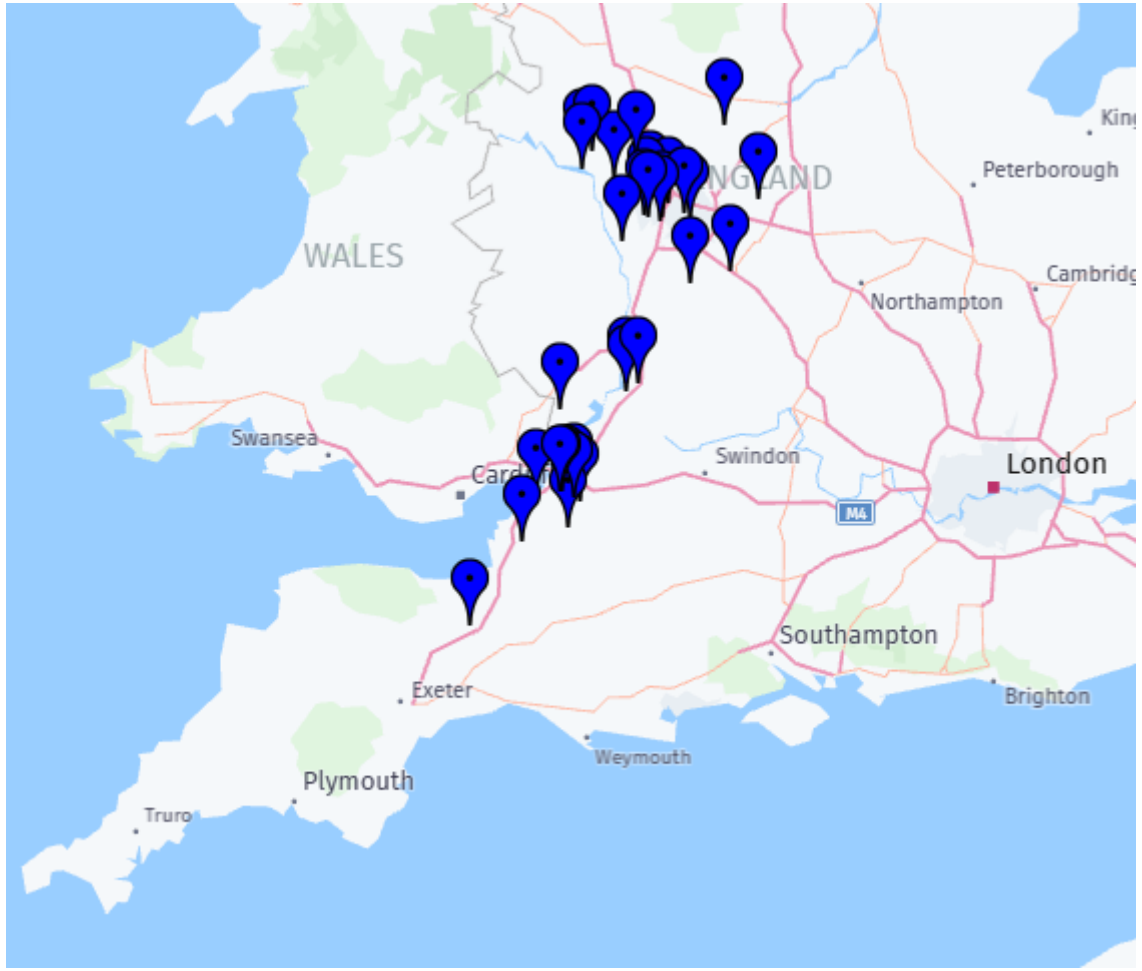
Payne RA, NIHR Open Res 2022

Usual care

- Generally a single, routine annual medication review with a clinician
- No specific management strategy focused on polypharmacy
- Availability of pharmacist in practice not a requirement
- No access to training, monthly performance feedback, computerised clinical summary, or financial incentives.

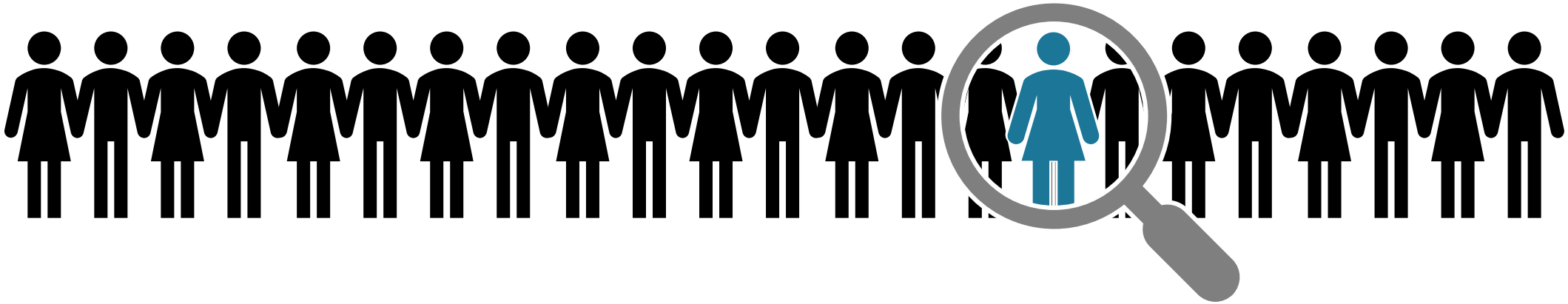
Practices

- List size
  - Median 10,800
  - Range 4650 to 49,000
- Deprivation (IMD, 1=most deprived)
  - Median 6
  - Range 2 to 10
- 30 (81%) have pharmacist
- 19 intervention, 18 control



Patient population

- Up to 50 patients per practice (N=1850)
- Adults 18+ years
- 5+ regular medicines
- 1+ indicator of potentially inappropriate prescribing



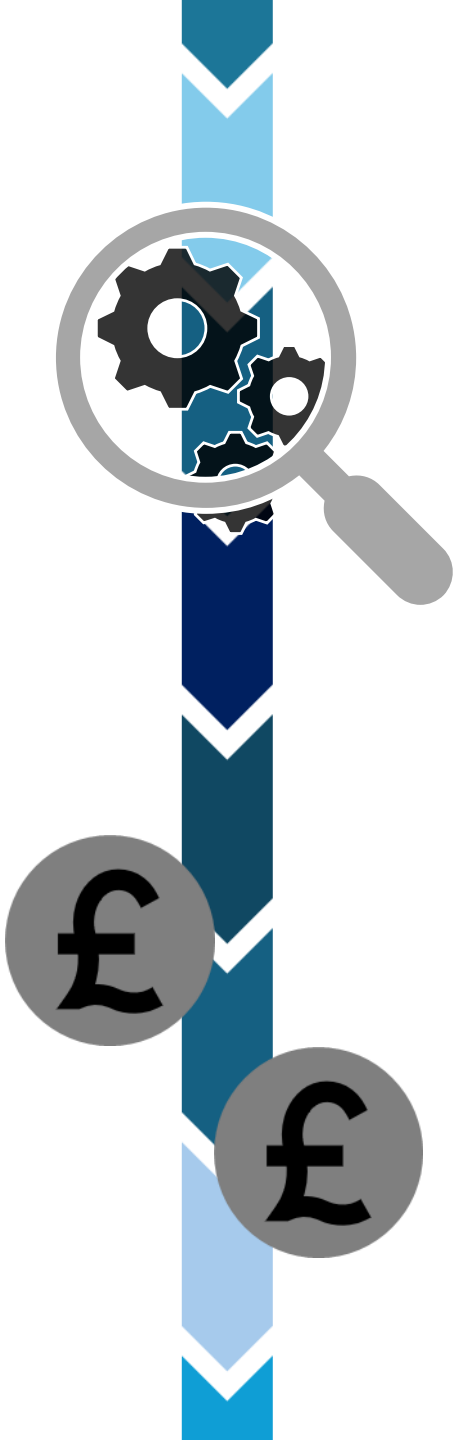
Outcomes

- Primary outcome
  - Mean no. potentially inappropriate prescribing indicators
  - Based on list of >100 indicators (STOPP, START, etc)
  - Examples:
    - ACEi + diuretic + NSAID = AKI risk
    - >65 + aspirin + no PPI = GI bleeding risk
- Secondary outcomes
  - Patient reported
    - QoL, treatment burden, medicines literacy, adherence
  - Service utilisation
    - GP consultations, admissions
  - Death
- Follow-up determined at 26 weeks
- Intention-to-treat analysis

Other evaluation

- Parallel mixed-methods process evaluation
  - Aim: to examine adoption/delivery of intervention and explore patient and clinician experiences
  - Methods: patient surveys, interviews, clinical observations

- Health economic evaluation
  - Aim: to understand cost-effectiveness from NHS perspective
  - Methods: costs from EHR data and patient self-report, QALY outcome



IMPPP trial: Main results

Rupert Payne

University of Exeter

NHS Bristol, North Somerset and South Gloucestershire Integrated Care Board

University of BRISTOL

University of Exeter

Patient characteristics

	Usual care	Intervention
Total number	836 (48%)	891 (52%)
Sex (% female)	50%	48%
Age (median, IQR)	73 (66-79)	73 (65-79)
White ethnicity (%)	93.5%	94.5%
Education: degree qual (%)	18%	17%
Num. co-morbidities	4 (3-5)	4 (3-5)
Num. medicines	8 (6-10)	8 (6-11)
Mean (SD) num. PIP indicators	2.3 (1.7)	2.4 (1.8)

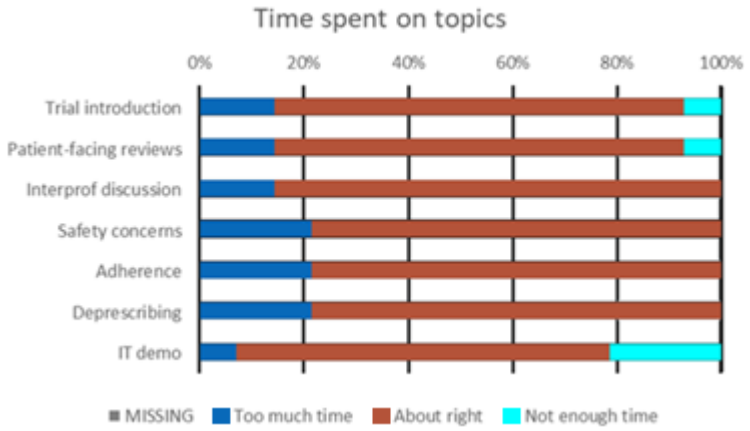
Intervention implementation

Integrated IT tool

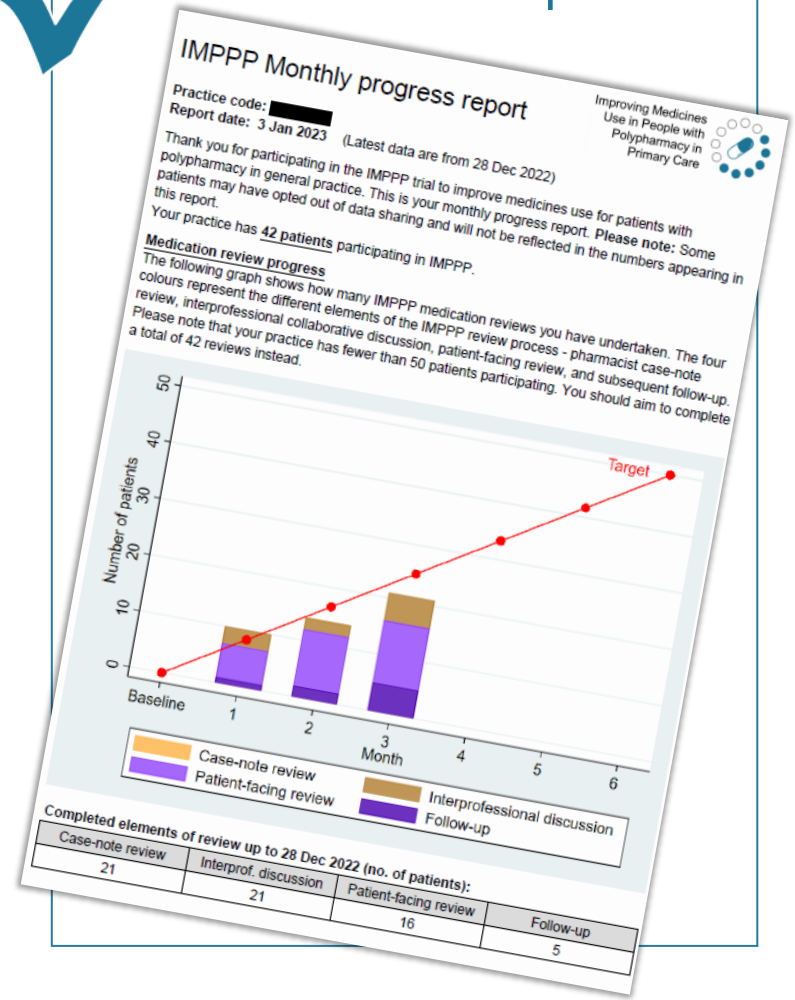
Test results
Medications
Side effect profile
Adherence
PIP indicators
Activity recording

BLUEBAY MEDICAL SYSTEMS

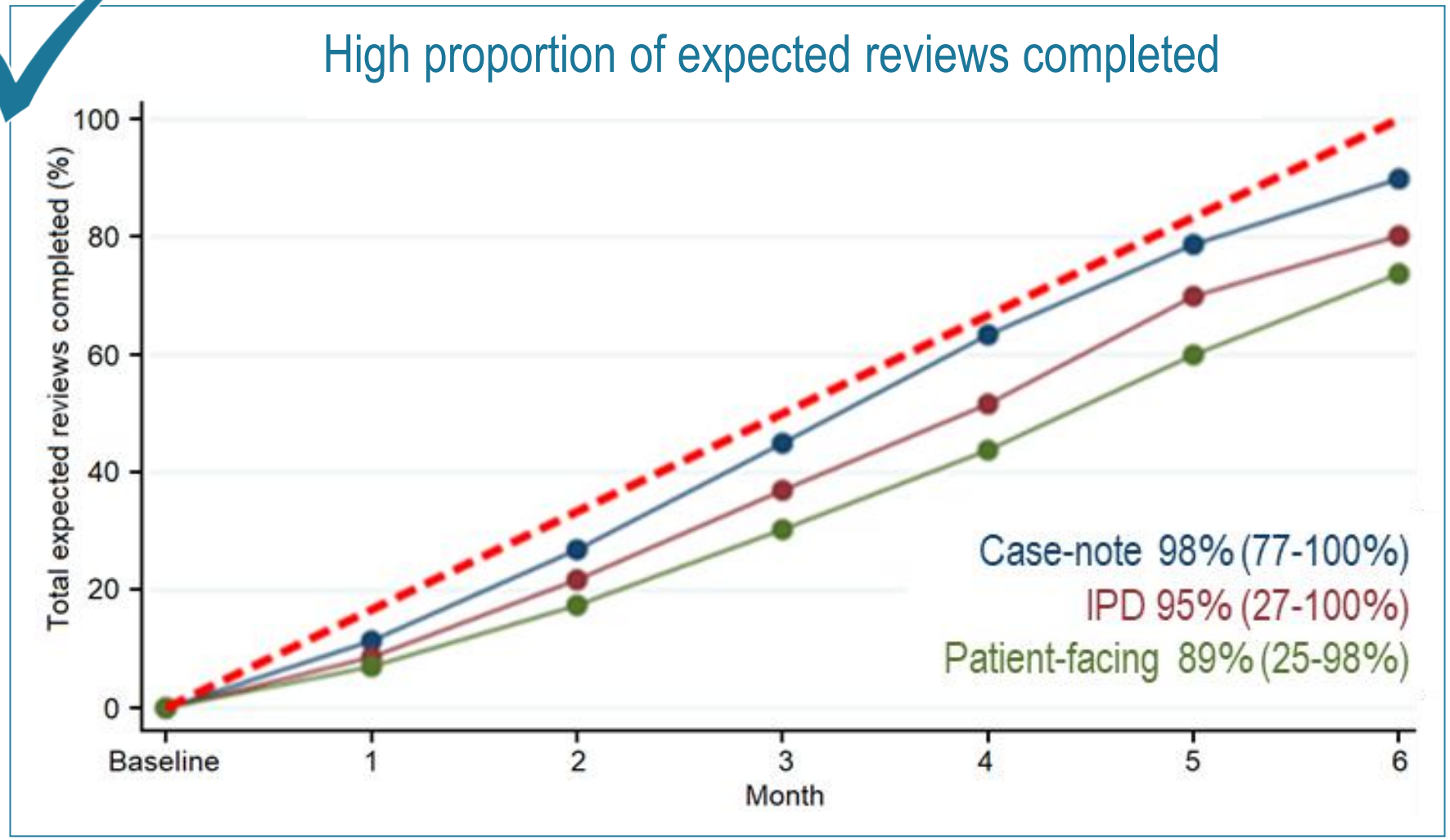
Positive training feedback



Performance reports



Intervention implementation

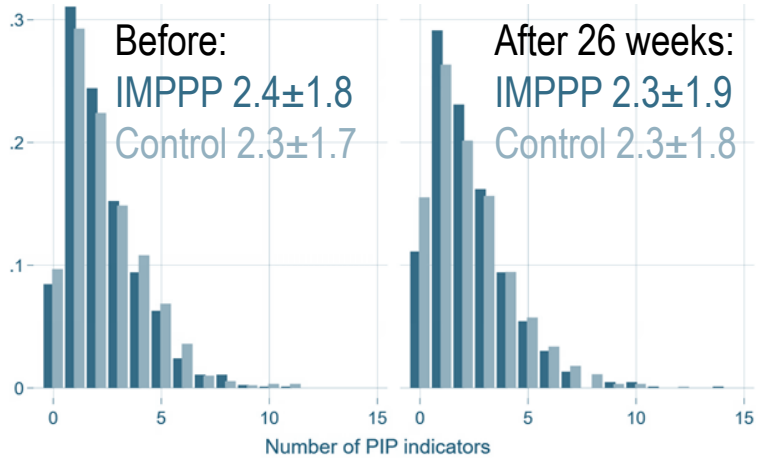


Primary outcome
Change in potentially inappropriate prescribing

No evidence that IMPPP intervention is different from usual care in reducing potentially inappropriate prescribing

Mean difference in no. PIP

–0.007 (–0.21 to 0.20), p=0.95



RA Payne, Lancet Healthy Longev 2025

Sub-group and secondary analyses
Do other factors affect the results?

Unaffected by

- intervention compliance
- outliers or IT system
- sociodemographic factors
  - sex, age, deprivation
- mental health

PIP may be reduced in patients with lower medicine count or multimorbidity

		Change in number of PIP		
	N	**Change**	95% CI	**p**
No. medicines				
Low	987	**-0.189**	-0.403, 0.025	**0.083**
High	700	**0.230**	-0.027, 0.486	**0.079**
Multimorbidity				
Low	836	**-0.174**	-0.373, 0.025	**0.086**
High	851	**0.129**	-0.027, 0.398	**0.317**

RA Payne, Lancet Healthy Longev 2025

Secondary outcomes of interest
Medications and patient reported measures

No effect on medication count or adherence

Quality of life unaffected but treatment burden slightly improved

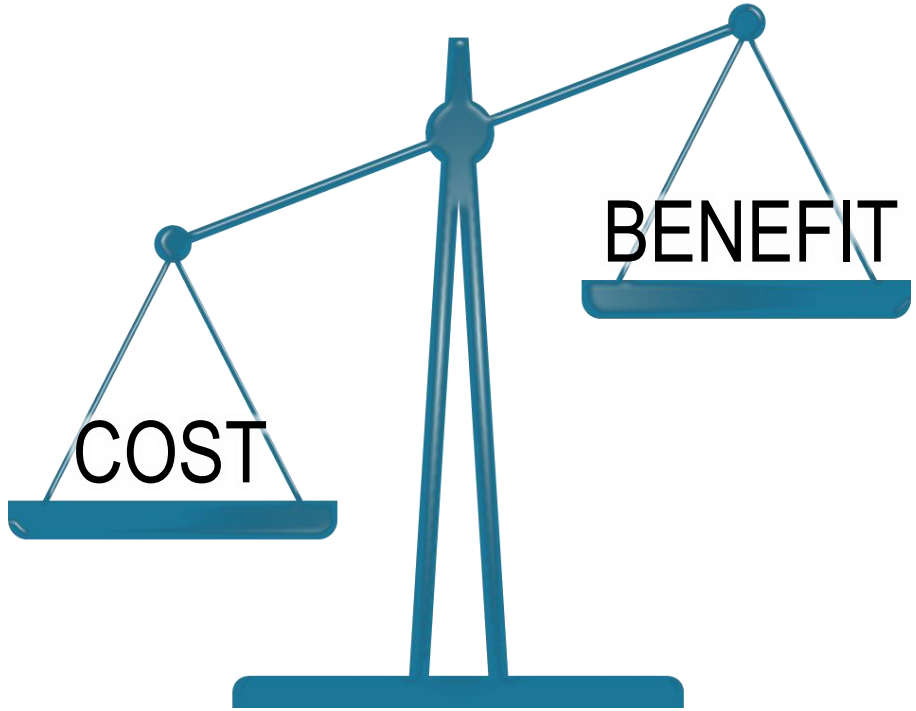
Outcome*	IMPPP	Control	N	p
No. meds	8 (6,11)	8 (6,11)	1687	**0.662**
Adherence	80 (67,92)	80 (67,91)	1687	**0.140**
Quality of life	61 (45,80)	60 (42,75)	1179	**0.332**
Treatment burden	10 (2.5,20)	12.5 (2.8,23)	1152	**0.028**

*Adherence=medication possession ratio; QoL=EQ-VAS; Tx burden=multimorbidity treatment burden questionnaire

Health economics

- Adjusted mean QALYs similar in both groups
- Mean adjusted costs higher in intervention group
- £5225 per PIP indicator avoided

- 6% probability of cost-effectiveness at NICE £20K/QALY threshold



- Strengths
  - Large, well-designed study
  - Implementable
  - Achievable in clinical practice
  - >97% data completeness
- Limitations
  - Usual care has improved with time
  - No robust measure for “patient reported” outcomes
  - Some missing data for secondary outcomes

Why are things not improving?

- Intractable problem
  - Complexity, clinical uncertainty, too “big” a problem
  - Easier patients may improve, “focused” interventions work
- Wrong patients
  - Multiple medicines not necessarily a problem
- We are measuring the “wrong” outcome
  - PIP measures only “technical” quality
  - Patient experience and quality of life – hard to measure, insensitive to change
  - “Hard” outcomes (admissions, death) – minimal impact

Summary

- Large and robust study of patient-level intervention for polypharmacy
- No improvement in potentially inappropriate prescribing
  - Less complex patients may improve
- Small improvement in treatment burden but not quality of life, adherence or drug count

- But there are some other positives…

Process evaluation findings

Dr. Deborah McCahon

University of Bristol

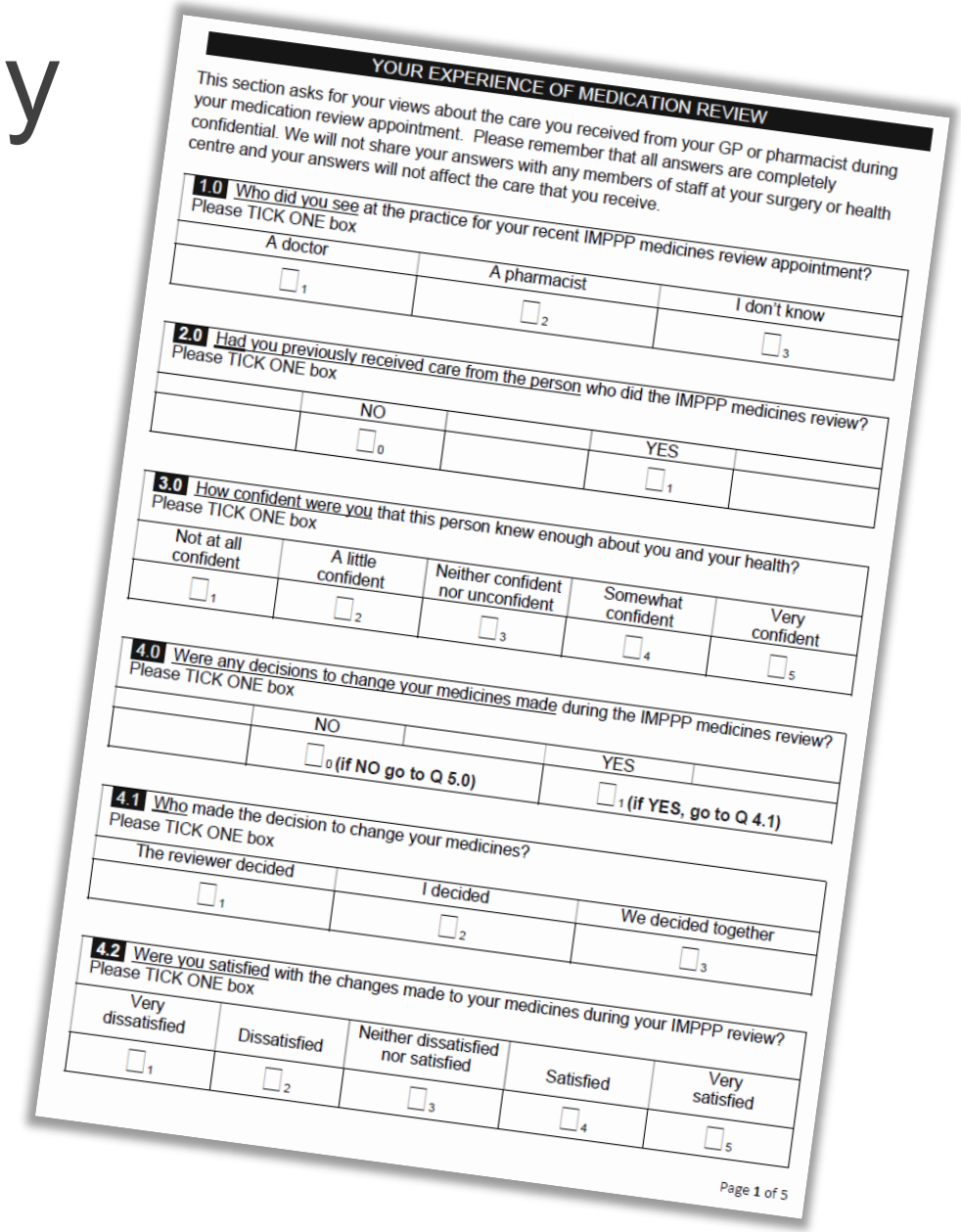
NHS Bristol, North Somerset and South Gloucestershire Integrated Care Board

University of BRISTOL

Methods

Patient experience survey

- Online or paper
- After medication review (intervention)
  - 767 responses (72.5%)
- Questions:
  - Nature of review (duration, clinician, mode)
  - Satisfaction and perceptions of shared decision making
  - Views on processes and outcomes of the review



YOUR EXPERIENCE OF MEDICATION REVIEW

This section asks for your views about the care you received from your GP or pharmacist during your medication review appointment. Please remember that all answers are completely confidential. We will not share your answers with any members of staff at your surgery or health centre and your answers will not affect the care that you receive.

1.0 Who did you see at the practice for your recent IMPPP medicines review appointment?
Please TICK ONE box

A doctor	A pharmacist	I don't know
☐ 1	☐ 2	☐ 3

2.0 Had you previously received care from the person who did the IMPPP medicines review?
Please TICK ONE box

NO	YES
☐ 0	☐ 1

3.0 How confident were you that this person knew enough about you and your health?
Please TICK ONE box

Not at all confident	A little confident	Neither confident nor unconfident	Somewhat confident	Very confident
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

4.0 Were any decisions to change your medicines made during the IMPPP medicines review?
Please TICK ONE box

NO	YES
☐ 0 **(if NO go to Q 5.0)**	☐ 1 **(if YES, go to Q 4.1)**

4.1 Who made the decision to change your medicines?
Please TICK ONE box

The reviewer decided	I decided	We decided together
☐ 1	☐ 2	☐ 3

4.2 Were you satisfied with the changes made to your medicines during your IMPPP review?
Please TICK ONE box

Very dissatisfied	Dissatisfied	Neither dissatisfied nor satisfied	Satisfied	Very satisfied
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

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Interviews

- Patients (N=28), GPs (6), pharmacists (13)
- Purposive sampling to maximise experiences
  - Varied practice population and pharmacist provision
  - Varied patient characteristics
- Phone or video
- Semi-structured interview using topic guide
  - Previous experiences
  - Expectations and understanding
  - Experience of intervention

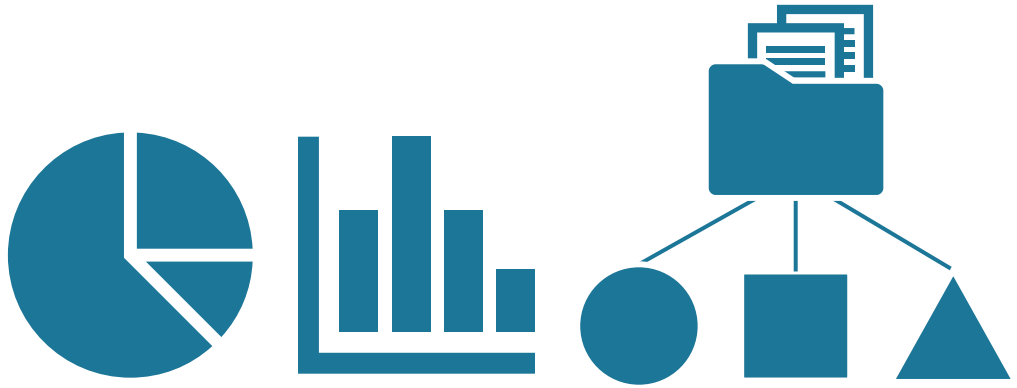
Clinical observations

- Sampling approach similar to interviews
- Audio-recorded patient-facing review (N=27)
- GPs & pharmacists audio-recorded subset of their IPCDs (N=17)

Analysis

- Survey data summarised
- Verbatim transcription of observations/interviews
- Thematic analysis using deductive and inductive approaches
- Findings brought together across all sources
- Interpreted using the SHARE model of decision-making

Results

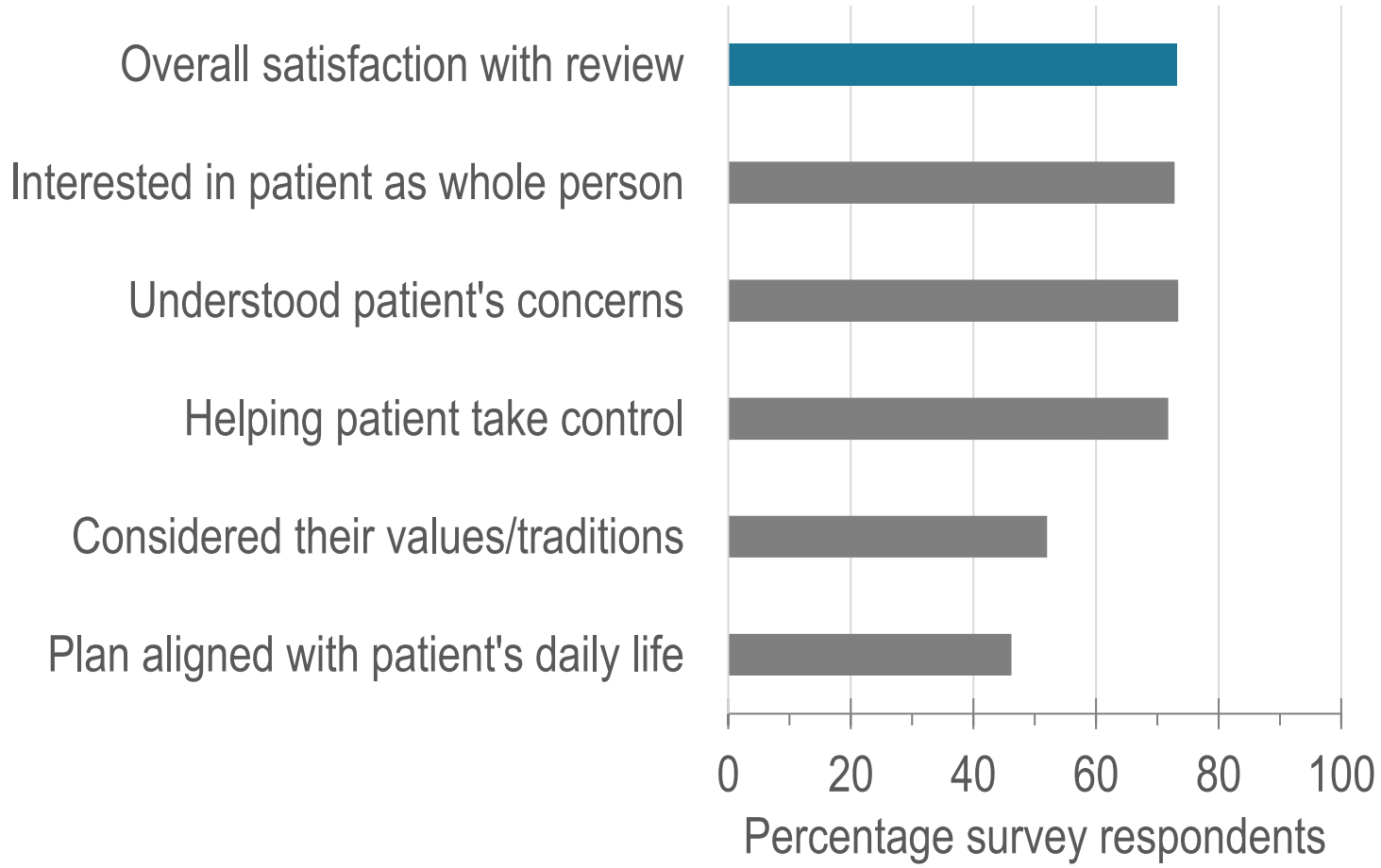


Approach to review by patient

- Patient expectations
  - Positive (seeking knowledge or reassurance, opportunity for change)
  - Negative (exclusion from decision making, wanting to maintain status quo)

- Relationship with clinician
  - 75% patients were unfamiliar with person conducting review
  - Pharmacist undertook most reviews - considered appropriate use of resources
  - Some doubted pharmacist ability to make changes
  - Reassured by GP-pharmacist discussion and pharmacist acknowledgement of uncertainty

Patient satisfaction with review



73.2%

of respondents satisfied with their review

Satisfaction strongly associated with **shared decision making**

Shared decision-making themes

- Pharmacists often sought patient involvement early, but greater use of pre-review information might have helped
- Just over half patients received medication information which they valued, but frustration if questions not fully addressed
- ~60% patients had priorities discussed, and patients felt preferences were heard, understood & addressed
- Majority felt agreement was reached; some patients preferring clinician-led decisions, some happy to reject suggestions
- Verbal summaries were common and valued by patients, but only 8% had written plan and 21% had follow-up arranged

Patient reflections

- Patients valued the review when:
  - it was meaningful
  - they were actively involved
  - ongoing support was offered

- Improvements
  - Additional information in advance
  - Post-review summary document

Benefits of interprofessional discussion

- Strengthening teamwork & collaboration
  - Improved understanding of roles & teamwork
  - Overcame isolated working patterns
  - Greater meaningful and consistent communication
  - Protected time allowed 2-way discussion
- Learning together and building confidence
  - Value of different perspectives and shared learning
  - Pharmacists' confidence grew
  - Increased patient trust
- Working together to tackle complex care
  - Enabled reflection, shared knowledge, & planning
  - Helped management of complex and holistic care
  - Highlighted issues otherwise missed

Benefits observed after only few patients, and many wanted discussions to continue after the trial

Facilitating factors

- Supportive culture
- Trust and valuing each other's skills
- Equal standing
- Shared goals

} improved teamwork and more productive decision-making

Challenges

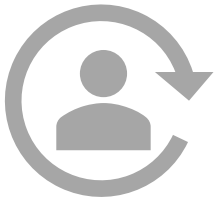
- Lack of time
- In-person meetings preferred but harder to arrange
- Scheduling challenging across multiple sites
- Often only one GP and pharmacist involved

Conclusions

Key messages

- Multiple data sources provide in-depth, triangulated results
  - Limitations included survey response bias and representativeness
- Patients reported high satisfaction
  - Pharmacist-led, phone reviews generally acceptable but some missed opportunities for open discussion
  - Patients want to be informed, prepared and priorities considered
  - Review needs seen as part of continuing process of care
- Interprofessional collaboration
  - Short, structured IPC feasible in routine practice and valued by clinicians
  - Improves teamworking, communication and shared learning
  - Supports medication review and increases patient trust
  - Time pressures remain a challenge

Implications for practice and policy



- Incentivise more patient-centred reviews
  - Enhance patient experience
  - Improved preparation and follow-up valued

- Encourage dedicated interprofessional discussion
  - Improved working relationships, shared skills, greater patient trust
  - Protected, funded, regular meetings with named GP, reviewing multiple patients (vs tokenistic/ad hoc)
  - Ensure patients aware

- Revisit current review policy
  - Reviews more focused on defined problems
  - Focus on patient-centred outcomes

- Other elements? Training, incentives, feedback, IT
  - More research required!

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