

Electronic Feedback

*A&F MetaLab Webinar
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Background

Theory: CP-FIT

Electronic feedback examples

PINGR

Conclusion

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Conclusion

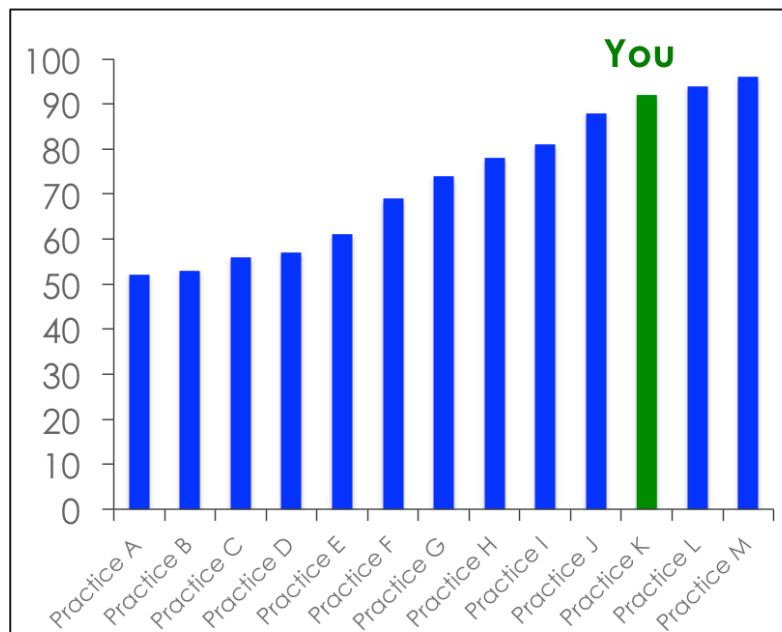
What is electronic feedback?

Audit and feedback (A&F) defined as the provision of clinical performance summaries to healthcare providers and organisations

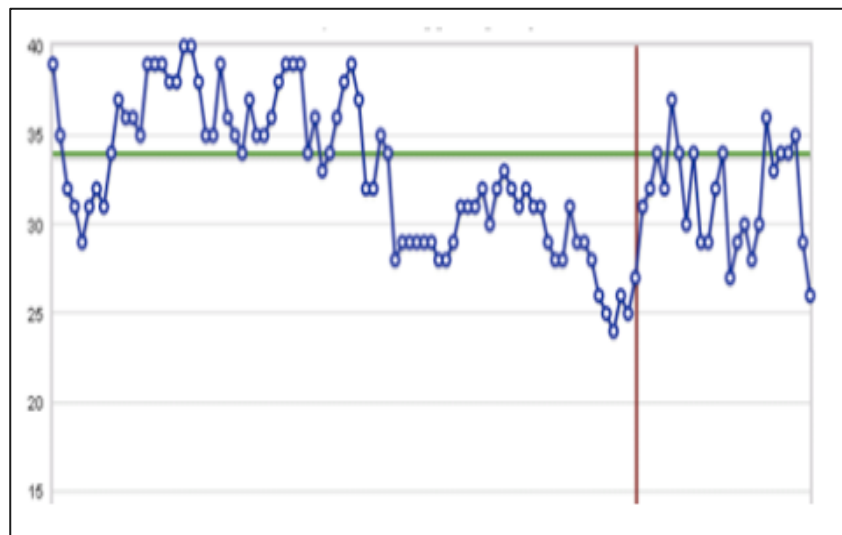
e-A&F can be defined as the utilisation of **interactive computer interfaces** to provide clinical performance summaries to healthcare professionals

Tuti et al. 2017

What is electronic feedback?



"Audit and Feedback"
 "Clinical Intelligence"
 "Performance Measurement"
 "Quality Indicators"
 "Dashboards"
 "Population Health Analytics"
 "Learning Health System"



Indicator	Affected patients	% of eligible patients affected	CCG Avg (%)	New cases	Trend	S to
Age≥65 no GastProt and NSAID	19	2.04	0.32	3	1	
Mtx and no monitoring	12	11.01	2.67	2	-3	
GiB/PUD no GastProt and Antiplatelet	8	6.61	2.49	1	-1	
Asthma and BB Click to view patients...	8	3.67	1.51	2	0	
Aspirin and Antiplatelet	7	3.47	1.11	7	7	
CKD and triple whammy	5	2.86	1.30	5	5	
Warf/NOAC and NSAID	4	19.05	9.05	1	0	
HF and NSAID	3	2.94	2.11	2	-2	
LABA and no ICS	2	0.85	1.07	0	2	



"After careful analysis of all 437 charts, graphs, and metrics, I've decided to throw up my hands and go on a week-long bender. Who's with me?!"

SYSTEMATIC REVIEW

Open Access

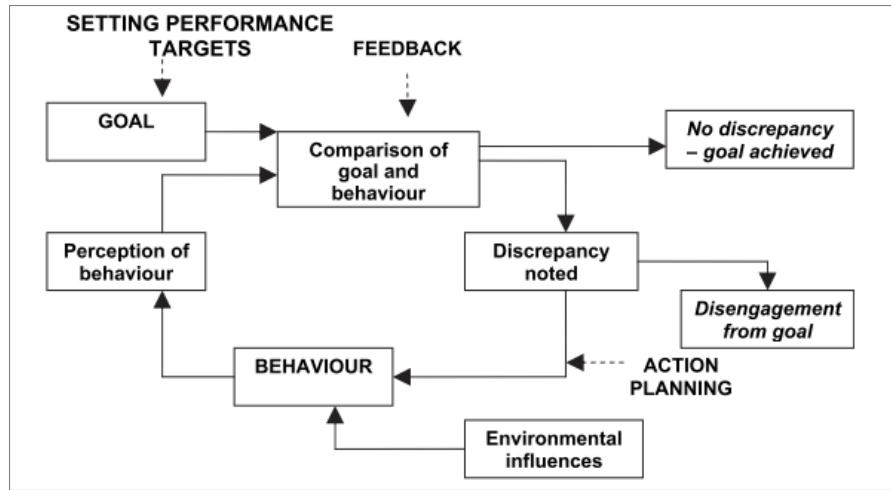


A systematic review of electronic audit and feedback: intervention effectiveness and use of behaviour change theory

Timothy Tuti^{1*} , Jacinta Nzinga¹, Martin Njoroge¹, Benjamin Brown³, Niels Peek^{3,5}, Mike English^{1,2}, Chris Paton² and Sabine N van der Veer^{3,4}

- 7 RCTs
- Only 2 studies used theory to design feedback
- "The effects of e-A&F were found to be highly variable."
- Similar conclusions to Cochrane reviews: 2002, 2006, 2012

Theory may help! But which one...?

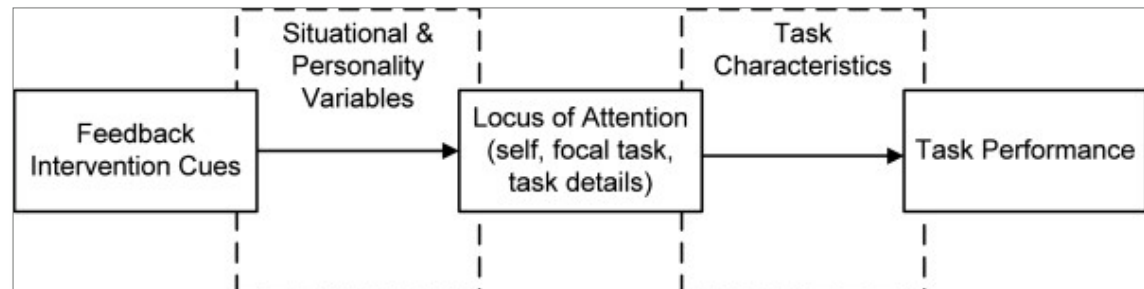


Control Theory

Gardner et al. (2010) Social Science & Medicine.

Feedback Intervention Theory

Kluger & DeNisi (1996). Psychol Bull.



Background

Theory: CP-FIT

Electronic feedback examples

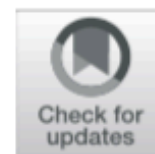
PINGR

Conclusion

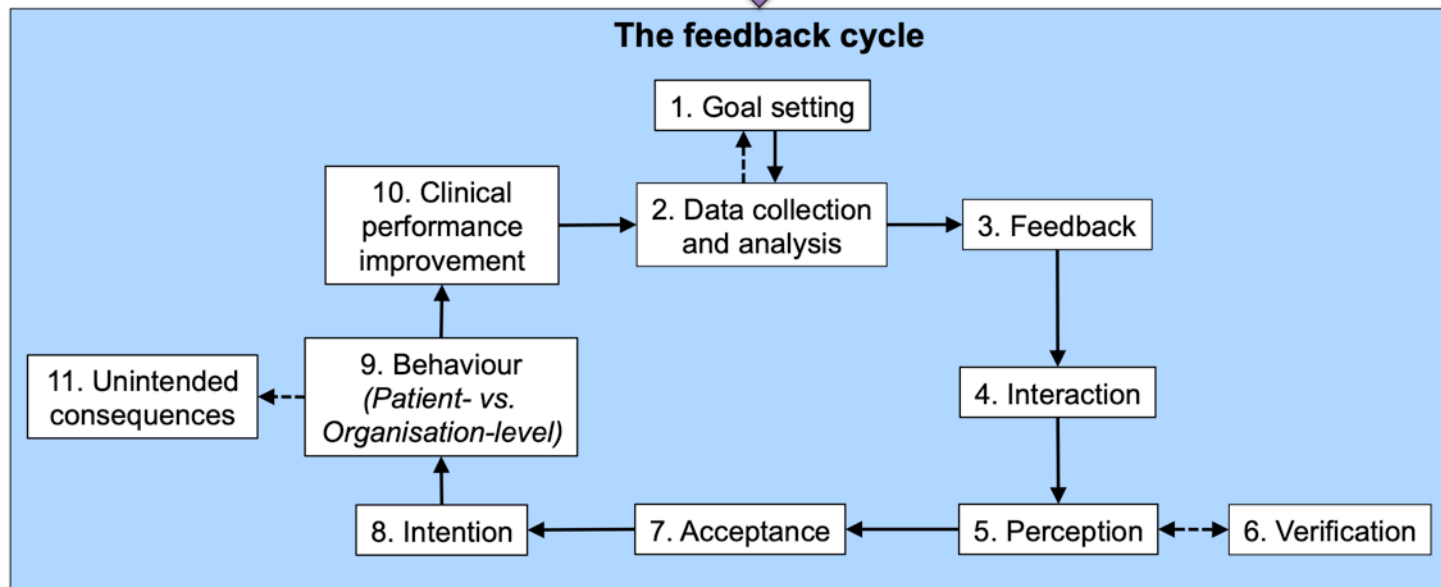
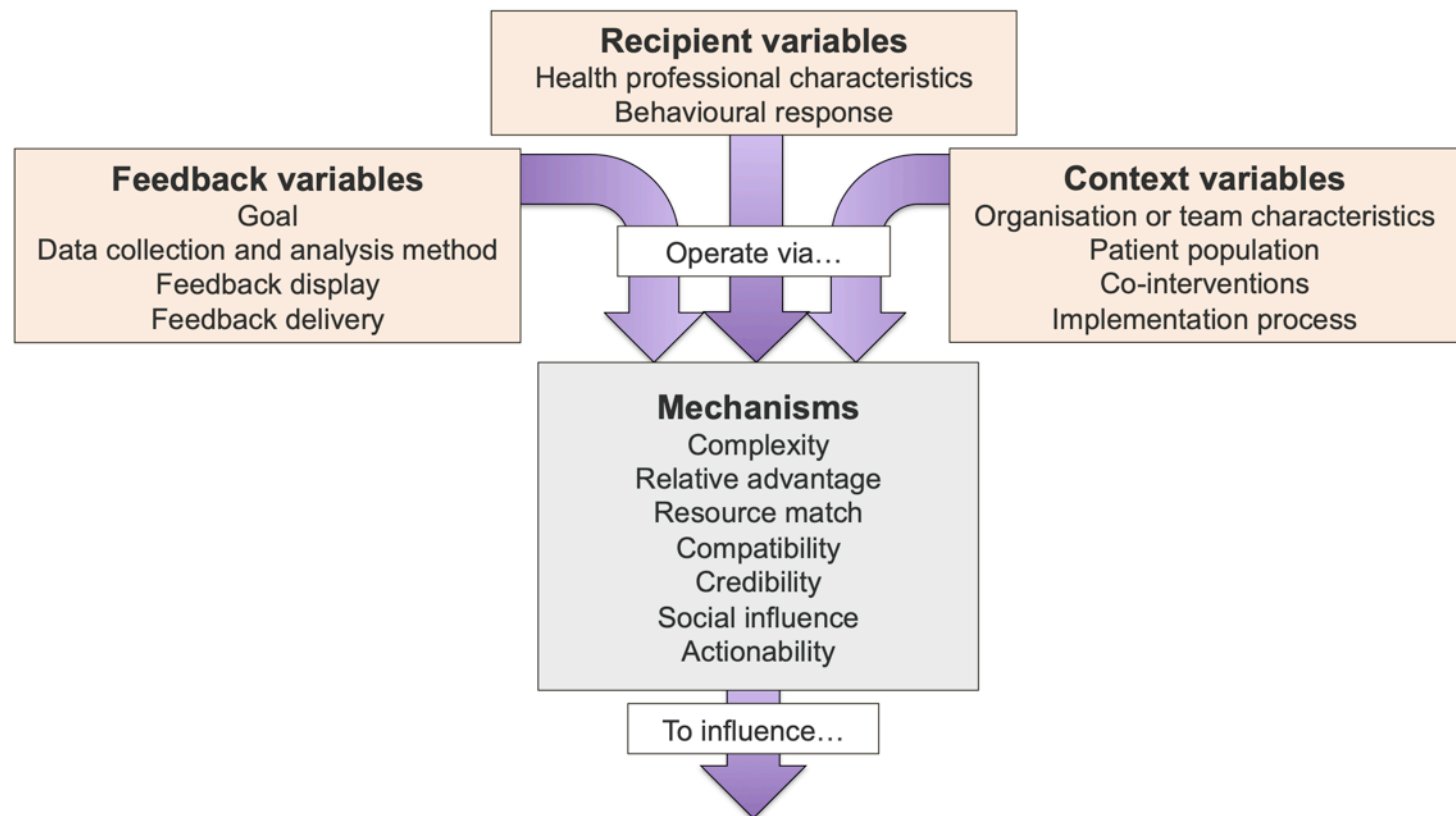
SYSTEMATIC REVIEW

Open Access

Clinical Performance Feedback Intervention Theory (CP-FIT): a new theory for designing, implementing, and evaluating feedback in health care based on a systematic review and meta-synthesis of qualitative research



Benjamin Brown^{1,2*} , Wouter T. Gude³, Thomas Blakeman², Sabine N. van der Veer¹, Noah Ivers⁴, Jill J. Francis^{5,6}, Fabiana Lorencatto⁷, Justin Presseau^{6,8,9}, Niels Peek¹ and Gavin Daker-White²



Hypothesis: Feedback interventions are more effective when ...	Relevant feedback cycle process(es)	Key explanatory mechanism(s)	Illustrative paper reference
<i>Feedback variables</i>			
<i>Goal</i>			
1. <i>Importance</i> : ... They focus on goals recipients believe to be meaningful and often do not happen in practice.	<i>Acceptance, Intention</i>	<i>Compatibility, Credibility</i>	
2. <i>Controllability</i> : ... They focus on goals perceived to be within the control of the recipients.	<i>Acceptance, Intention</i>	<i>Actionability</i>	[62]
3. <i>Relevance</i> : ... They focus on goals perceived as relevant to recipients' jobs.	<i>Acceptance, Intention</i>	<i>Actionability, Compatibility, Relative advantage</i>	[64]
<i>Data collection and analysis method</i>			
4. <i>Conducted by recipients</i> : ... They do not require the recipient to collect or analyse the clinical performance data. (Can also decrease 41. Cost)	<i>Data collection and analysis</i>	<i>Complexity, Resource match</i>	[67]
5. <i>Automation</i> : ... They collect and analyse data automatically rather than manually.	<i>Data collection and analysis</i>	<i>Complexity, Resource match</i>	[68]
6. <i>Accuracy</i> : ... They use data believed by recipients to be a true representation of their clinical performance.	<i>Acceptance</i>	<i>Credibility, Relative advantage</i>	[50]

<i>Data collection and analysis method</i>			
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6. <i>Accuracy:</i> ... They use data believed by recipients to be a true representation of their clinical performance.	<i>Acceptance</i>	<i>Credibility, Relative advantage</i>	[50]
7. <i>Exclusions:</i> ... They allow recipients to exception report patients they feel are inappropriate to include in their performance measurement.	<i>Acceptance</i>	<i>Actionability, Credibility</i>	[70]

<i>Feedback display</i>			
8. <i>Performance level</i> : ... They communicate recipients' current performance has room for improvement.	<i>Intention, Behaviour</i>	<i>Actionability, Compatibility</i>	[64]
9. <i>Patient lists</i> : ... They show the details of patients used to calculate the recipients' clinical performance.	<i>Verification, Acceptance, Perception, Intention, Behaviour</i>	<i>Actionability Complexity Credibility</i>	[50]
10. <i>Specificity</i> : ... They report the performance of individual health professionals rather than their wider team or organisation.	<i>Acceptance, Intention, Behaviour</i>	<i>Actionability</i>	[72]
11. <i>Timeliness</i> : ... They use recent data to calculate recipients' current performance.	<i>Acceptance, Intention, Behaviour</i>	<i>Actionability, Credibility</i>	[50]
12. <i>Trend</i> : ... They show recipients' current performance in relation to their past performance. (Can also increase 40. <i>Observability</i>)	<i>Perception</i>	<i>Complexity, Relative advantage</i>	[73]
13. <i>Benchmarking</i> : ... They compare recipients' current performance to that of other health professionals, organisations or regions.	<i>Perception, Intention, Behaviour</i>	<i>Complexity, Social influence</i>	[74]
14. <i>Prioritisation</i> : ... They communicate the relative importance of feedback contents.	<i>Perception</i>	<i>Complexity, Relative advantage</i>	[55]

<i>Feedback delivery</i>			
16. <i>Function</i> : ... They are perceived to support positive change rather than punish suboptimal performance.	<i>Acceptance</i>	<i>Compatibility</i>	[85]
17. <i>Source knowledge and skill</i> : ... They are delivered by a person or organisation perceived to have an appropriate level of knowledge or skill.	<i>Acceptance</i>	<i>Credibility, Social influence</i>	[86]
18. <i>Active delivery</i> : ... They “push” feedback messages to recipients rather than requiring them to “pull”. (Except if solely delivered face-to-face, which increases 41. <i>Cost</i>)	<i>Interaction</i>	<i>Compatibility, Complexity</i>	
19. <i>Delivery to a group</i> : ... They deliver feedback to groups of recipients.	<i>Perception, Intention, Behaviour (by increasing 28. Teamwork)</i>	<i>Social influence</i>	[98]

<i>Recipient variables</i>			
<i>Health professional characteristics</i>			
20. <i>Feedback attitude</i> : ... They target health professionals with positive beliefs about feedback.	All	Compatibility, Relative advantage	[64]
21. <i>Knowledge and skills in quality improvement</i> : ... They target health professionals with greater capability in quality improvement.	Perception, Intention, Behaviour	Actionability, Complexity, Resource match	[91]
22. <i>Knowledge and skills in clinical topic</i> : ... They target health professionals with greater capability in the clinical topic under focus.	Perception, Intention, Behaviour	Actionability, Resource match	[92]
<i>Behavioural response</i>			
23. <i>Organisation-level and Patient-level behaviour</i> : ... Health professionals undertake changes involving the wider health care system rather than just individual patients in response to feedback. (Can also increase 24. <i>Resource</i>)	Clinical performance improvement	Actionability	[95]

<i>Context variables</i>			
<i>Organisation or team characteristics</i>			
24. <i>Resource</i>: ... Organisations and teams have greater capacity to engage with them. (Can also increase 23. <i>Organisation-level behaviour</i>)	All	<i>Resource match</i>	[98]
25. <i>Competing priorities</i>: ... Organisations and teams have minimal additional responsibilities.	All	<i>Resource match, Compatibility</i>	[90]
26. <i>Leadership support</i>: ... They are supported by senior managers. (Can also increase 23. <i>Organisation-level behaviour</i>)	All	<i>Credibility, Resource match, Social influence</i>	[87]
27. <i>Champions</i>: ... They are supported by individuals in the organisation dedicated to making it a success.	All	<i>Credibility, Resource match, Social influence</i>	[68]
28. <i>Teamwork</i>: ... They are implemented into organisations or teams whose members work together towards a common goal.	<i>Perception, Intention, Behaviour</i>	<i>Actionability, Resource match, Social influence</i>	[72]
29. <i>Intra-organisational networks</i>: ... They are implemented into organisations or teams with strong internal communication channels.	<i>Interaction, Perception, Intention, Behaviour</i>	<i>Actionability, Compatibility, Resource match, Social influence</i>	[51]
30. <i>Extra-organisational networks</i>: ... They are implemented into organisations or teams that actively communicate with external	<i>Perception, Intention, Behaviour</i>	<i>Actionability Resource match</i>	[86]

<i>Patient population</i>			
32. <i>Choice alignment</i> : ... They do not include patients who refuse aspects of care measured in the feedback in their calculations.	<i>Acceptance, Intention</i>	<i>Actionability, Compatibility, Complexity</i>	[105]
33. <i>Clinical appropriateness</i> : ... They do not include patients whose care cannot be safely optimised further.	<i>Acceptance, Intention</i>	<i>Actionability, Compatibility, Complexity</i>	[148]

<i>Co-interventions</i>			
34. <i>Peer discussion</i>: ... They encourage recipients discuss their feedback with peers. (Can also increase 28. <i>Teamwork</i>)	<i>Perception, Intention</i>	<i>Complexity, Resource match, Social influence</i>	[89]
35. <i>Problem solving</i>: ... They help recipients identify and develop solutions to reasons for suboptimal performance (or support recipients to do so).	<i>Perception</i>	<i>Actionability, Compatibility, Complexity, Resource match</i>	[90]
36. <i>Action planning</i>: ... They provide solutions to suboptimal performance (or support recipients to do so).	<i>Intention, Behaviour</i>	<i>Actionability, Complexity, Resource match</i>	[62]
37. <i>External change agents</i>: ... They provide additional staff to explicitly support its implementation.	<i>All</i>	<i>Resource match</i>	[94]

<i>Implementation process</i>			
38. <i>Adaptability</i>: ... They are tailored to the specific needs of the health care organisation and its staff. (Can also increase 31. <i>Workflow fit</i>)	All	<i>Compatibility, Complexity</i>	[69]
39. <i>Training and support</i>: ... They provide training and support regarding feedback (not the clinical topic under scrutiny).	<i>Perception, Intention, Behaviour</i> (by increasing 21. <i>Knowledge and skills in quality improvement</i>)	<i>Actionability, Resource match</i>	[91]
40. <i>Observability</i>: ... They demonstrate their potential benefits to recipients.	All	<i>Relative advantage</i>	[88]
41. <i>Cost</i>: ... They are considered inexpensive to deploy in terms of time, human or financial resources.	All	<i>Resource match</i>	[67]
42. <i>Ownership</i>: ... Recipients feel they “own” it, rather than it has been imposed on them.	All	<i>Compatibility</i>	[149]

Proposition	Relevant explanatory mechanism(s)	Key example hypotheses*
1. <i>Capacity limitations</i> Health care professionals and organisations have a finite capacity to engage with and respond to feedback; interventions that require less work, supply additional resource, or are considered worthwhile enough to justify investment, are most effective.	Complexity Relative advantage Resource match	5. <i>Automation</i> 15. <i>Usability</i> 18. <i>Active delivery</i>
2. <i>Identity and culture</i> Health care professionals and organisations have strong beliefs regarding how patient care should be provided that influence their interactions with feedback; those that align with and enhance these aspects are most effective.	Compatibility Credibility Social influence	1. <i>Importance</i> 6. <i>Accuracy</i> 13. <i>Benchmarking</i>
3. <i>Behavioural induction</i> Feedback interventions that successfully and directly support clinical behaviours for individual patients are most effective.	Actionability	2. <i>Controllability</i> 11. <i>Timeliness</i> 34. <i>Problem solving</i>

How to use CP-FIT

- **42 hypotheses can be used as:**
 - **Design recommendations for feedback**
 - **Testable hypotheses for quant researchers**
 - E.g. feedback is more effective when...
 - They show recipients' current performance in relation to their past performance.
 - They are delivered by a person or organisation perceived to have an appropriate level of knowledge or skill.
 - They are supported by senior managers.
- **Codebook can be used by qualitative researchers to code interviews, focus groups, or observations**
- **Good for process evaluations to explain why feedback may or may not be effective**
 - Highlight weak points in an interventions' logic model
 - Barriers and facilitators to its use (i.e. its variables)
 - *E.g. PINCER case study... on following slides*

Background

Theory: CP-FIT

Electronic feedback examples

PINGR

Conclusion

A case study: PINCER

- **Reference:** Cresswell et al. *Trials*. (2012)
- **Setting:** Primary care (England); Medication safety.
- **Effectiveness:** Effective at reducing proportions of patients at risk of medication safety errors in a randomised controlled trial.
- **Description of intervention:**
 - Pharmacists allocated to GP practices for three days per week.
 - Educational session at beginning.
 - Population-level feedback and lists of patients at risk of medication safety errors to the GP practices (e.g. patients with asthma prescribed beta-blockers)
 - Verbally and in written form.
 - Pharmacists used root cause analysis techniques to identify potential causes of errors, and helped practices make changes to patients' medication.

[illegible]



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	Patients with Exceptions																						
		Peptic U	Asthma	ACEI	Thromb	Methotr	Warfarin	Lithium	Amiodar			NSAID	Bblocker	Renal fun	CHC	FBC	LFT	INR	Llevel	TFT	Weekly	200mg	
3	Patient Name																						
4	XXXX																						
5	XXXX				Y										*								
6	XXXX		Y										*										
7	XXXX		Y										*										
8	XXXX		Y										*										
9	XXXX				Y										*								
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39	XXXX		Y										*										
40	XXXX		Y										*										

NSAIDs and Gastrointestinal Bleeding

Patients with a history of peptic ulcer should not be prescribed NSAIDs without gastrointestinal protection

What are the risks of gastrointestinal injuries with NSAIDs?

NSAIDs are responsible for 3,500 hospital admissions and 400 deaths from ulcer bleeding each year in the UK.^{1,2} Symptomatic ulceration is thought to occur in between 1% and 4% of patients treated with NSAIDs.³ A number of factors increase the risk of gastrointestinal bleeds including age and previous history of peptic ulcer. The latter has been shown to increase the risks of further ulceration and/or gastrointestinal bleeds between three- and thirteen-fold in patients prescribed non-selective NSAIDs.^{3,4}

What are the relative gastrointestinal risks of non-selective NSAIDs

The Committee on Safety of Medicines (CSM) advice in the British National Formulary lists the relative safety of seven non-selective NSAIDs in relation to upper GI side-effects (see table 1).⁵ The CSM advises that the NSAIDs associated with low risk are generally preferred. The lowest recommended dose should be initiated and not more than one oral NSAID should be used at a time.

Table 1: Relative gastrointestinal safety of non-selective NSAIDs

Drug	Risk of serious upper gastrointestinal side effects
Ibuprofen	Low Risk
Diclofenac	Intermediate Risk
Indometacin	Intermediate Risk
Ketoprofen	Intermediate Risk
Naproxen	Intermediate Risk
Piroxicam	Intermediate/Higher Risk
Azapropazone	High Risk

What advice is available regarding the prescribing of NSAIDs in patients with a history of a peptic ulcer?

All NSAIDs (including selective inhibitors of COX-2) are contra-indicated in patients with active peptic ulceration and non-selective NSAIDs in patients with a history of peptic ulcers.⁵ Patients with a history of gastrointestinal ulceration or bleeding have between a 3 and 13-fold increase in their risk of bleeding on an NSAID.^{3,4} In addition, the combination of NSAIDs and low-dose aspirin may increase the risk of gastrointestinal side-effects and this combination should only be used if absolutely necessary.⁴

How can the risk of gastrointestinal bleeding with NSAIDs be reduced?

Reviews of randomised controlled trials have found that misoprostol, proton pump inhibitors (PPIs) and double dose H₂ receptor antagonists are effective at preventing chronic NSAID related endoscopic gastric and duodenal ulcers.^{6,7} Only misoprostol 800 micrograms per day has been directly shown to reduce the risk of ulcer complications such as perforation haemorrhage, but its usefulness is limited by diarrhoea. Lower doses of misoprostol are less effective and are still associated with diarrhoea. A review by Jacobsen and Phillips stated that in patients with a history of ulcer complications associated with NSAID therapy, neither COX-2 selective inhibitors nor PPIs may be

effective in the secondary prophylaxis of ulcer complications. The safest approach in these high-risk patients may be to avoid NSAID therapy altogether.⁷

What place do COX-2 selective inhibitors have?

COX-2 selective inhibitors have been shown to have a reduced risk of gastrointestinal events compared to non-selective NSAIDs.^{4,5,6} However, rofecoxib and valdecoxib have recently been withdrawn from the market following concerns about their cardiovascular safety profile. This is likely to be a class effect, and hence COX-2 selective inhibitors are now contraindicated in patients with established ischaemic heart disease, cerebrovascular disease, and moderate or severe heart failure. The balance of gastrointestinal and cardiovascular risk should be considered for all patients, especially those with risk factors for cardiovascular disease and those taking low dose aspirin.⁸ However, COX-2 selective inhibitors still have a role to play in patients at high risk of gastrointestinal ulceration, who do not have cardiovascular disease, or risk factors for it. These patients should be prescribed the lowest effective dose of COX-2 selective inhibitor for the shortest necessary time period.

References

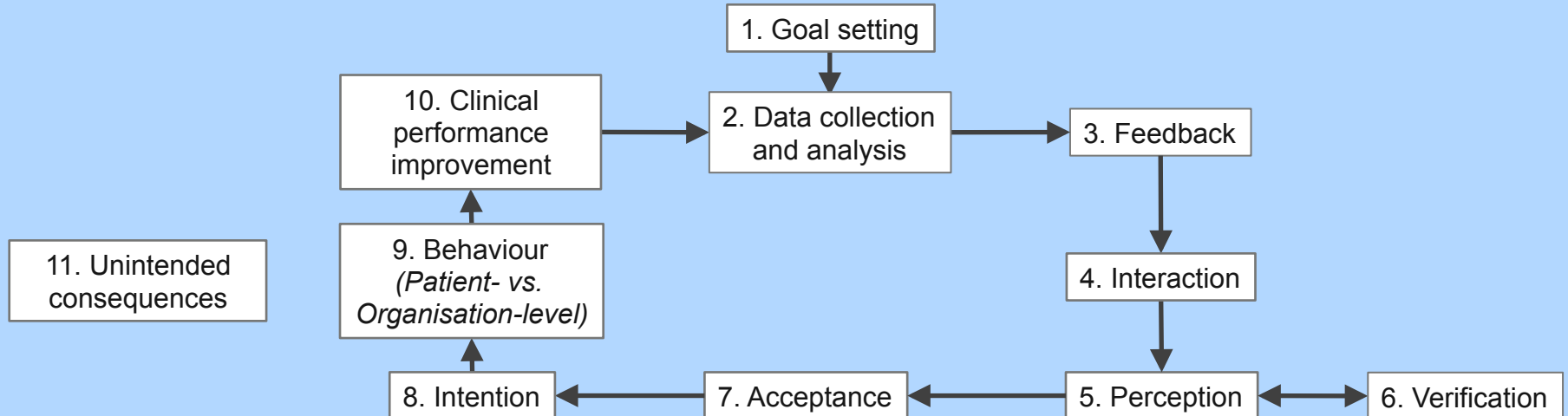
1. Langman, MJS. Ulcer complications associated with anti-inflammatory drug use. What is the extent of the disease burden? *Pharmacoepi Drug Safety* 2001;10:13 - 9
2. Hawkey, CJ & Langman MJS. Non-steroidal anti-inflammatory drugs: overall risks and management. Complementary roles for COX-2 inhibitors and proton pump inhibitors. *Gut* 2003;52:600 - 8
3. Cryer B. Management of NSAID-associated upper gastrointestinal problems. *JMCP* 2005; 11 (supplement 2): S2 - S9.
4. Laine L *et al.* Stratifying the risk of NSAID-related upper gastrointestinal clinical events: results of a double-blind outcomes study in patients with rheumatoid arthritis. *Gastroenterology* 2002;123:1006 - 12
5. Joint Formulary Committee. *British National Formulary*, 49th Edition. London: British Medical Association and The Royal Pharmaceutical Society of Great Britain, 2005.
6. Rostom A *et al.* Prevention of NSAID-induced gastroduodenal ulcers. *The Cochrane Database of Systematic Reviews* 2002, Issue 4.
7. Jacobsen RB & Phillips BB. Reducing clinically significant gastrointestinal toxicity associated with Nonsteroidal Antiinflammatory Drugs. *Ann Pharmacother* 2004; 38: 1469 - 81
8. Committee on Safety of Medicines. Updated advice on the safety of selective COX-2 inhibitors. Letter to healthcare professionals on 17th February 2005. Available from http://www.mhra.gov.uk/home/ldcplg?ldcService=SS_GET_PAGE&ssDocName=CON1004250&ssSourceNodeid=227&ssTargetNodeid=221 (accessed 20th March 2006)

Feedback variables

Recipient variables

Context variables

The feedback cycle



“All GPs and their teams recognized that prescribing errors were an important and potentially preventable problem.”

Feedback variables

Goal

Importance +
Relevance +

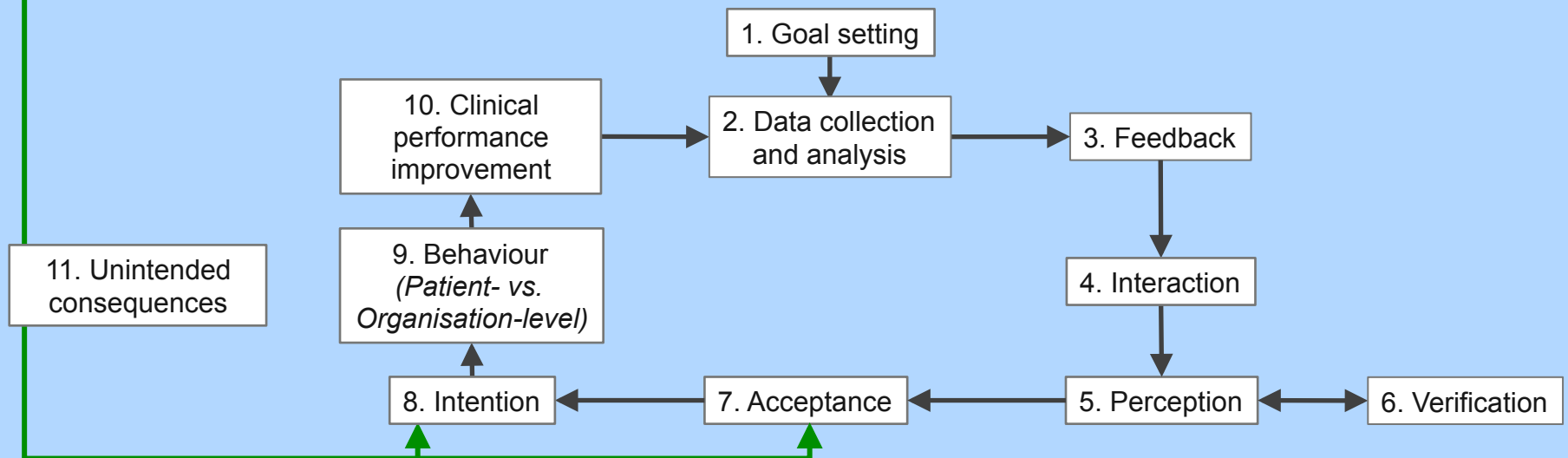
Recipient variables

Context variables

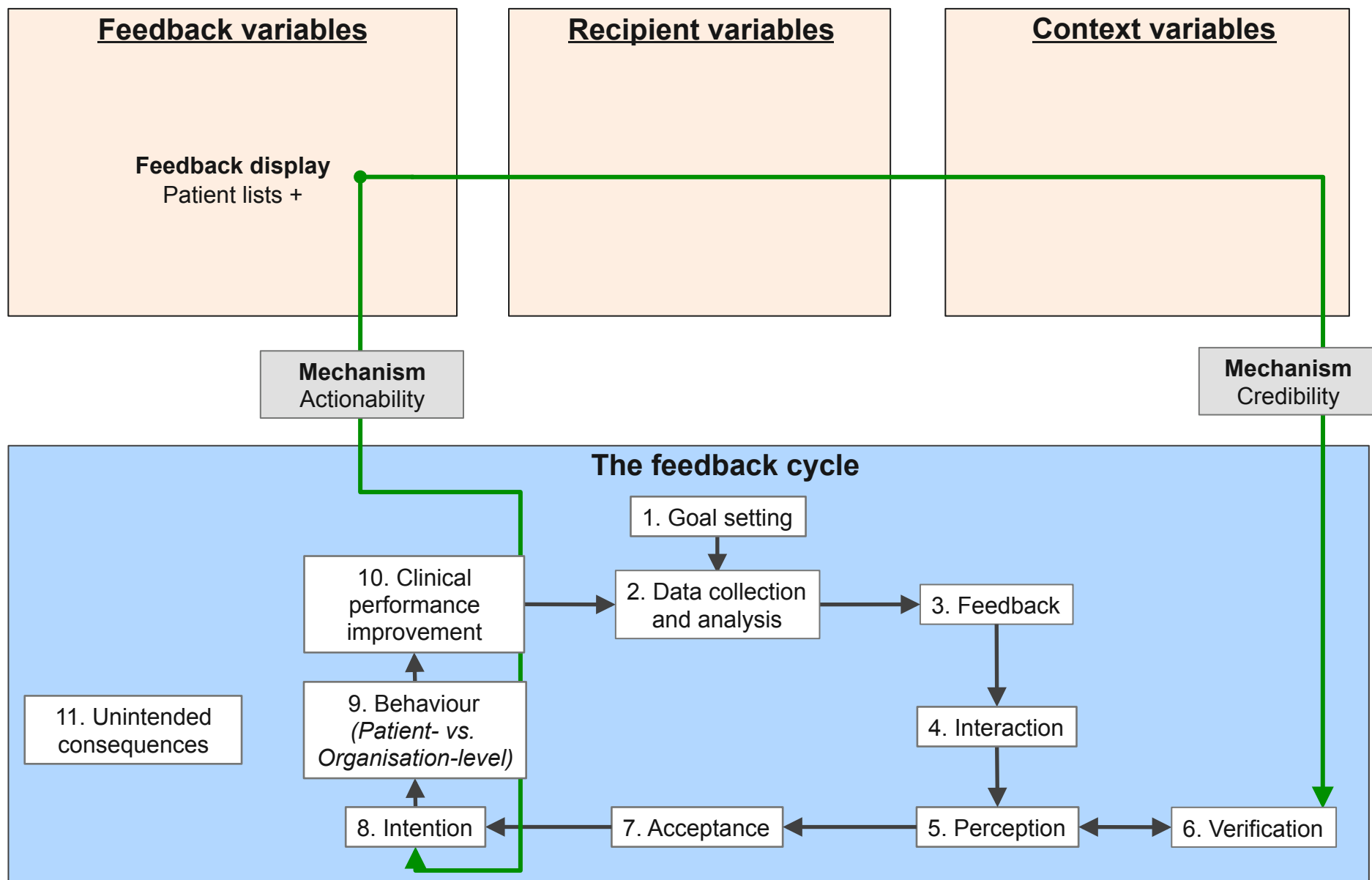
Mechanisms

Compatibility,
Credibility

The feedback cycle



“GPs felt it was difficult to comment [on potential medication safety errors] without knowing the identity of the patients and their history.”



"There was a widely held belief that a pharmacist-centered intervention was a credible solution. 'I think pharmacists are obviously much, much better informed than we are' (GP)"

Feedback variables

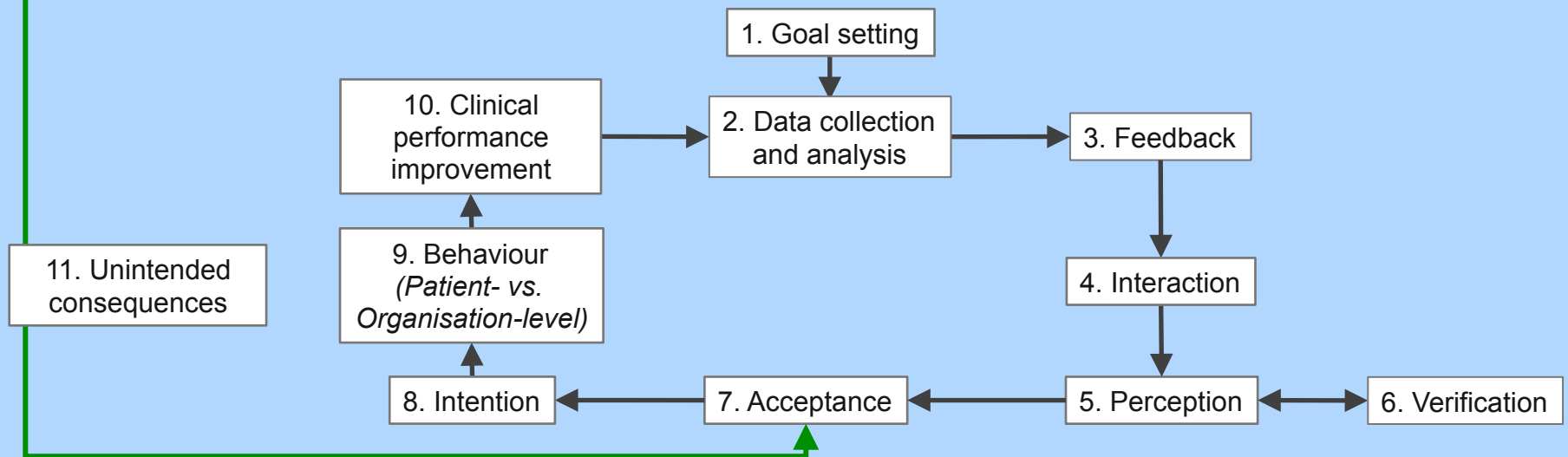
Feedback delivery
Source knowledge
and skill +

Recipient variables

Context variables

Mechanisms
Compatibility,
Credibility

The feedback cycle



“The busy practice environment meant that there were often conflicting priorities within practices. ‘I think they’ve got so many priorities ... PINCER ...[is] possibly not top of the list.’ (Pharmacist)”

Feedback variables

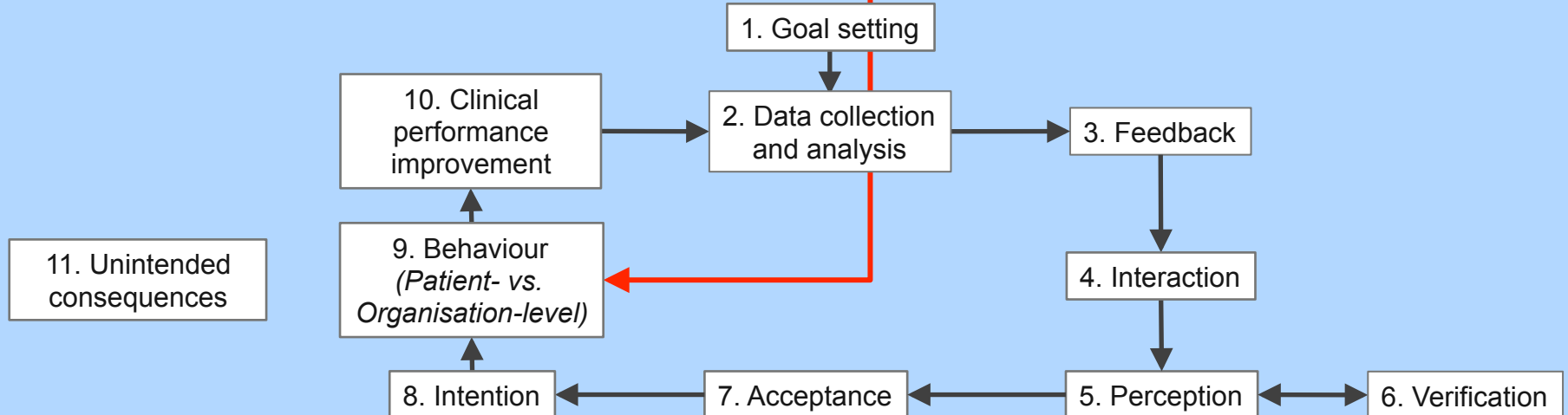
Recipient variables

Context variables

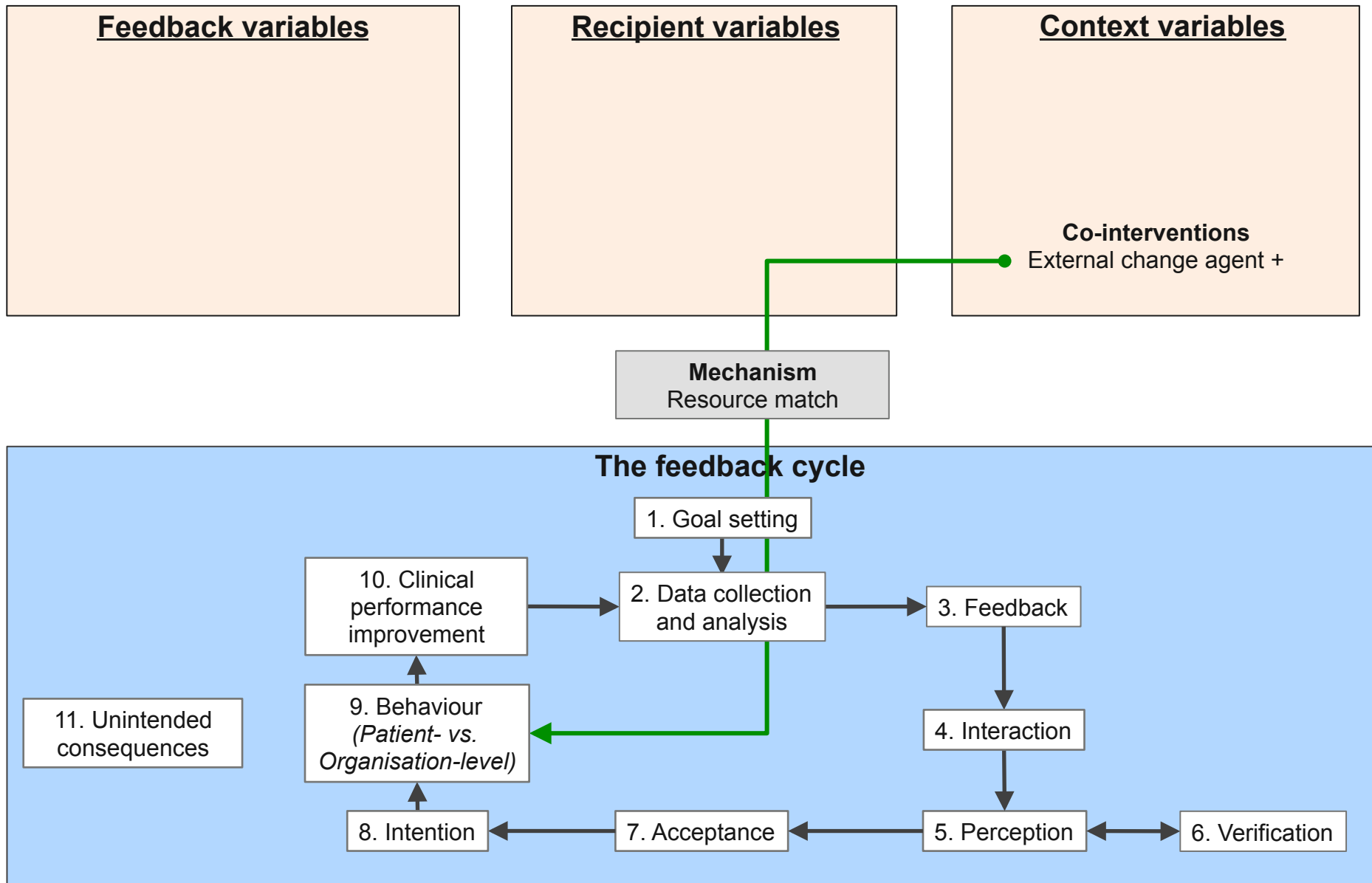
Organisation or team
Resource –
Competing priorities +

Mechanism
Resource match

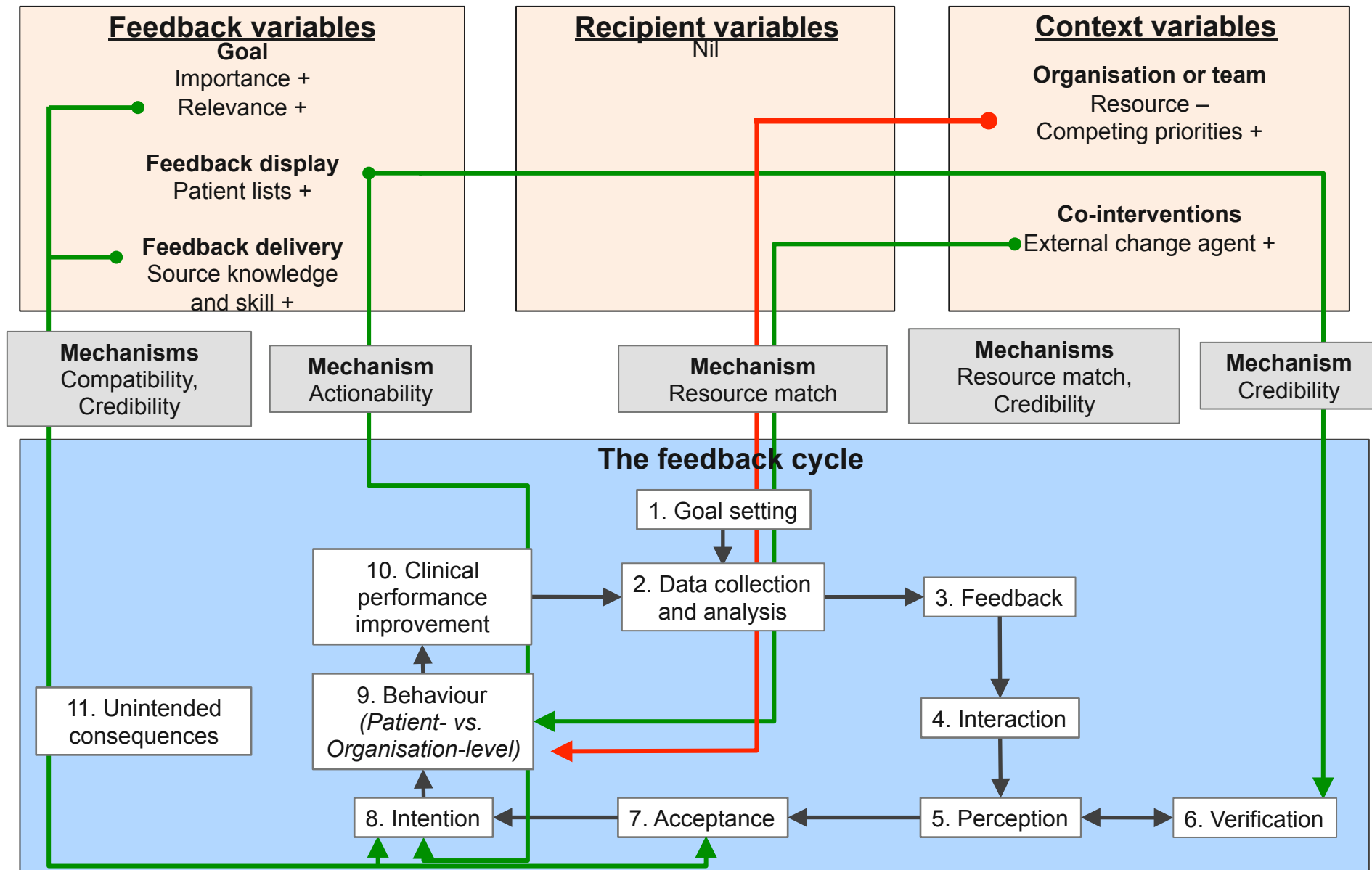
The feedback cycle



“Pharmacists in all PINCER intervention practices were highly valued and given the authority to address many of the issues themselves... PINCER pharmacists may be viewed as ‘change agents’”.



Overall: All essential feedback cycle processes are successful. Thus PINCER was effective.



A case study: The Prescribing, Information and Communication System (PICS)

- **Reference:** Redwood et al. *BMC Med Inf. Decis Mak.* (2013)
- **Setting:** Secondary care hospital (England); Prescribing.
- **Effectiveness:** Ineffective at reducing the number of prescription and laboratory alerts ignored by junior doctors in a randomised controlled trial.
- **Description of intervention:**
 - Clinical performance data were collected from a Clinical Decision Support System (CDSS) embedded in an electronic health record.
 - The CDSS alerted users when medication was prescribed that contravened local guidelines, or when a patient's laboratory test results required attention. Alerts could be actioned or ignored.
 - The proportion of ignored alerts per month was fed back to junior doctors in a web-based dashboard using tables and graphical charts.
 - Email reminders with a link to the dashboard were sent every week.

Ignored Lab Alarms



Performance **0.0** % of alarms ignored

Month	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11
You	3.8%	9.1%	11.1%	8.3%	0%	0%
Cohort	82.9%	83.6%	73.8%	77.0%	73.5%	70.0%

Excessive Dosing



Performance **3** Warning(s)

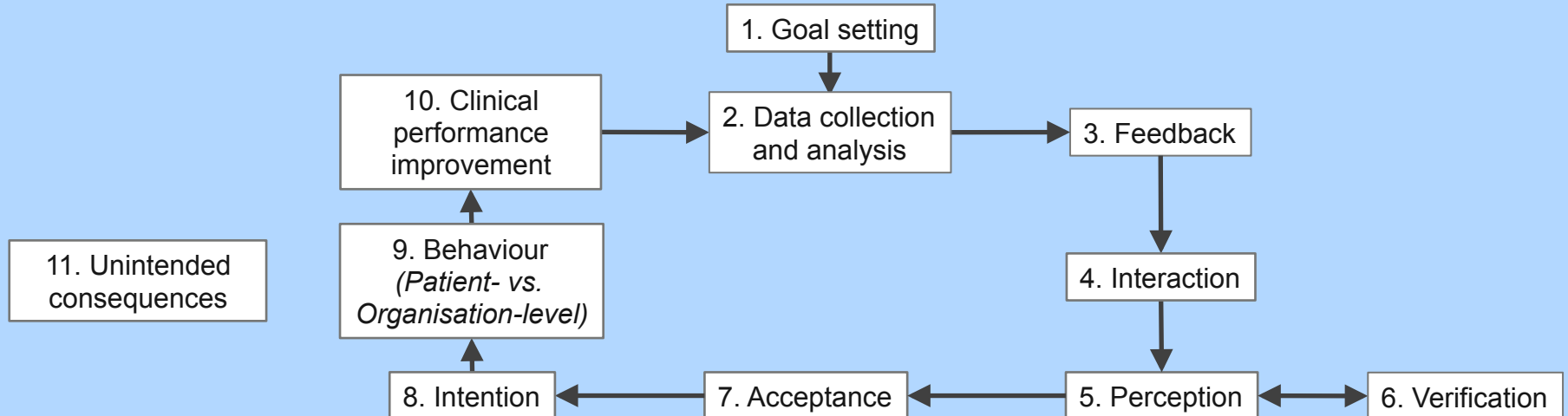
Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11
9	8	3	12	0	0

Feedback variables

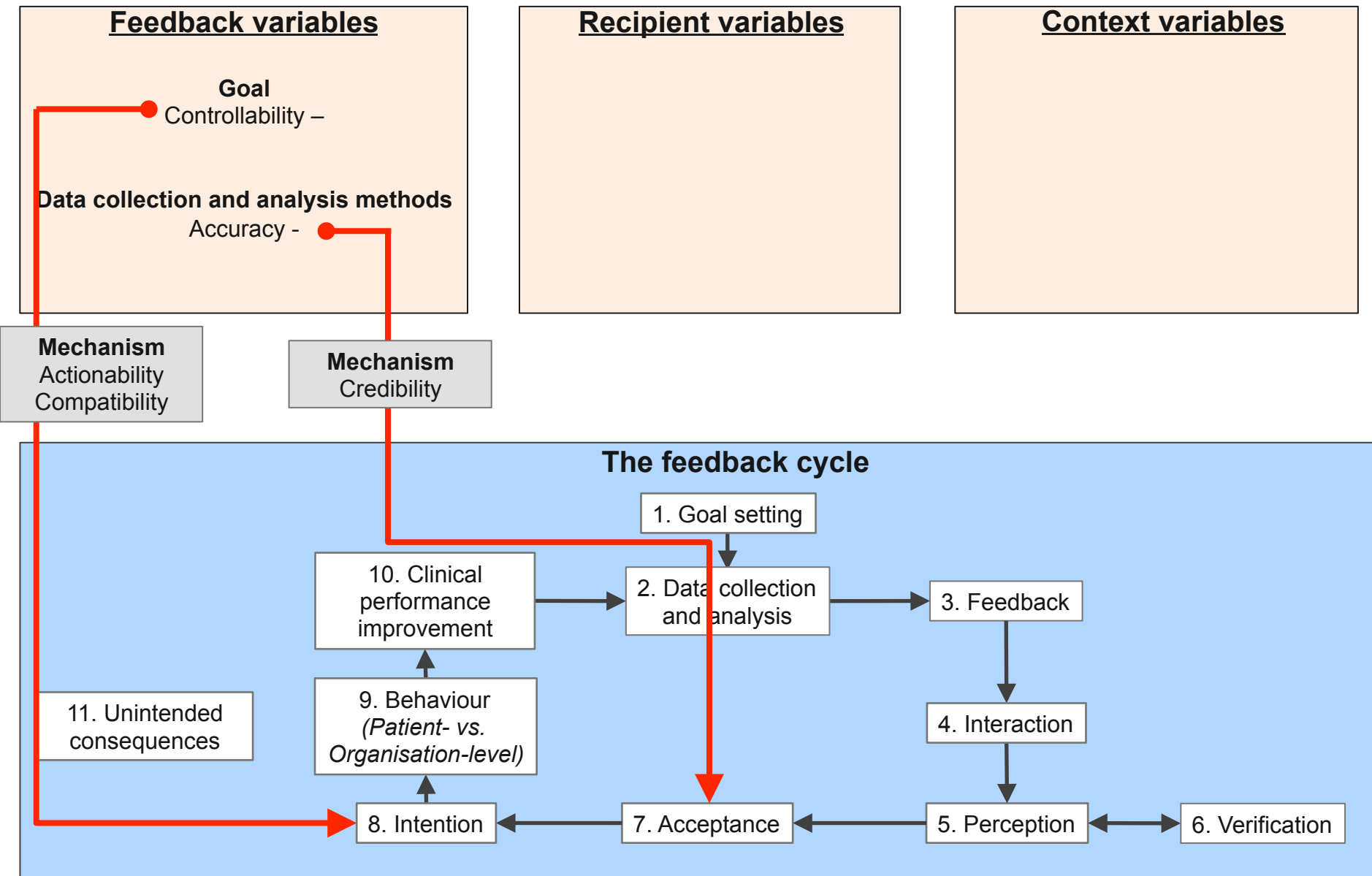
Recipient variables

Context variables

The feedback cycle



““Decisions to put patients on drugs isn’t really down to us anyway. I wouldn’t say ‘start a patient on laxatives or painkillers’, but then other than emergency treatment I never really start a patient on drugs by my own means. I will always go through a senior doctor... So are you looking at the right cohort as to who makes the decisions?” (Individual Interview 3).”



“Overnight when I do nights and things flash up and it’s in the relevant directorate (...) then clearly I can’t click ‘ignore’ because that is my responsibility so I go and deal with it, whatever that alert might be. But during the day, you know if things start flashing up and it’s not my patient...you know there’s a lot of patients in this hospital. I’m not going to respond to everything...” (Individual Interview 5)”

Feedback variables

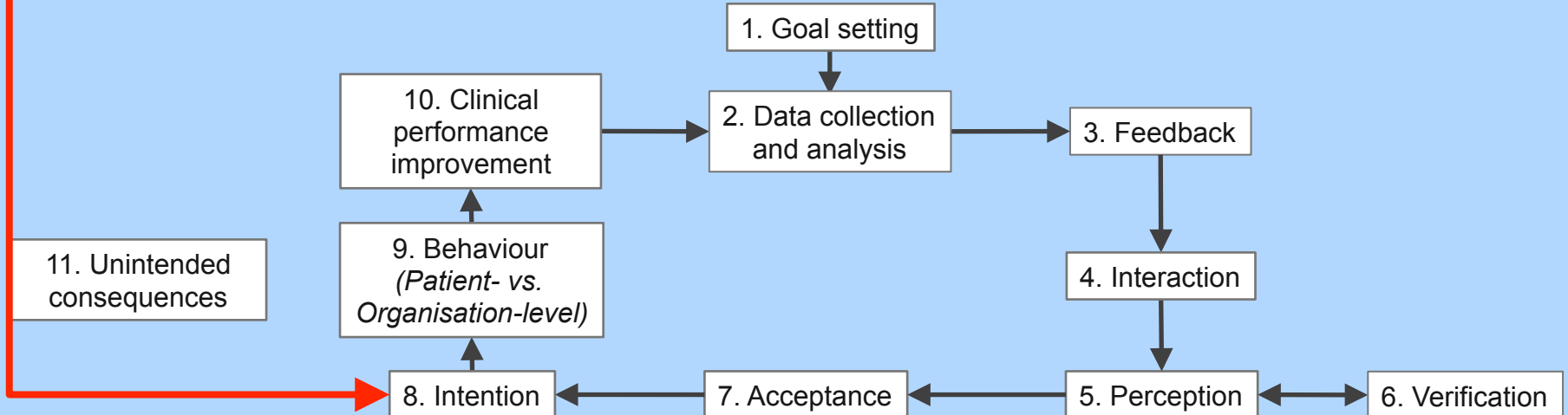
Goal
Relevance –

Recipient variables

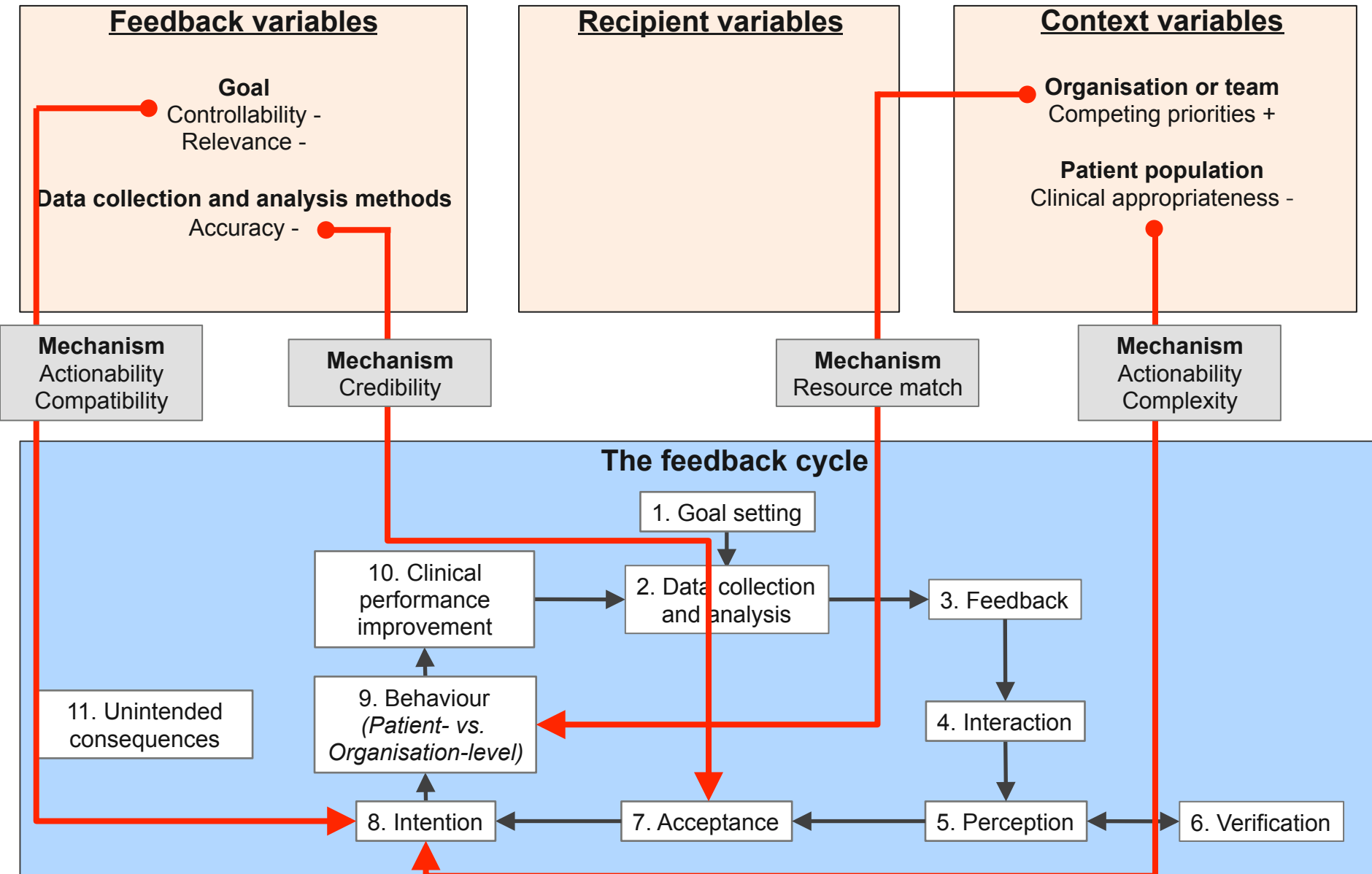
Context variables

Mechanism
Actionability
Compatibility

The feedback cycle



“Overnight when I do nights and things flash up and it’s in the relevant directorate (...) then clearly I can’t click ‘ignore’ because that is my responsibility so I go and deal with it, whatever that alert might be. But during the day, you know if things start flashing up and it’s not my patient...you know there’s a lot of patients in this hospital. I’m not going to respond to everything...” (Individual Interview 5)”



“Doctors’ priorities change in emergencies, and they are less likely to sign off alerts”

“Military patients have a set pain protocol which involves (...) prescribing a number of opioids. So every time that I put somebody on this pain protocol, I get a red alert saying ‘multiple opioid drugs prescribed, are sure you want to proceed?’, so I tick yes but obviously then on the dashboard I will get a negative mark if you like.” (Individual Interview 6)”

Feedback variables

Recipient variables

Context variables

Organisation or team
Competing priorities +

Patient population
Clinical appropriateness -

Mechanism

Resource match

Mechanism

Actionability
Complexity

The feedback cycle

1. Goal setting

2. Data collection
and analysis

3. Feedback

4. Interaction

10. Clinical
performance
improvement

9. Behaviour
(*Patient- vs.
Organisation-level*)

8. Intention

11. Unintended
consequences

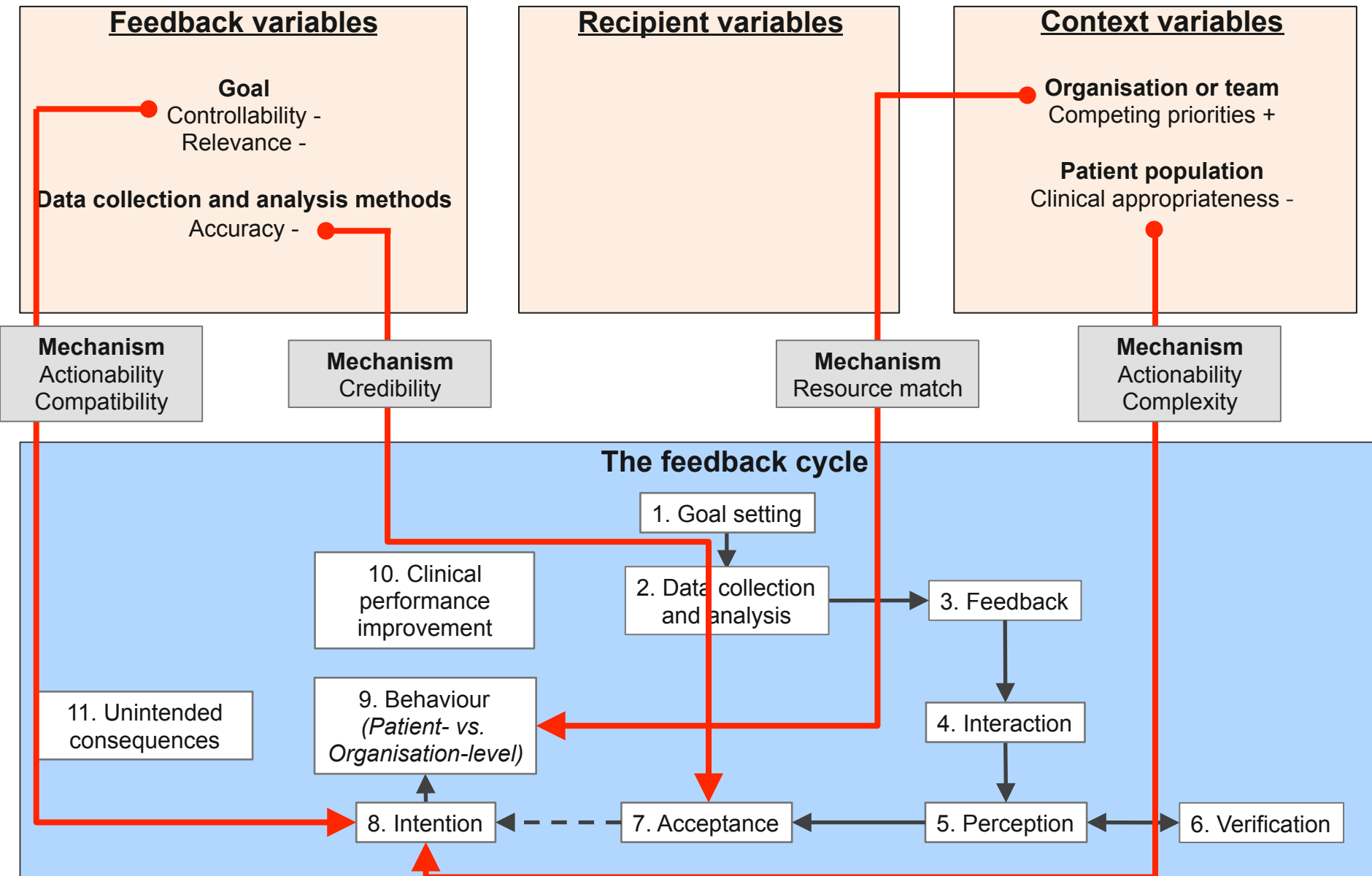
7. Acceptance

5. Perception

6. Verification



Overall: Acceptance and Intention feedback processes were all weakened, with the Behaviour process completely failing. Thus PICS was ineffective.



Persistent gaps in (e-A&F) knowledge

Found during systematic review for CP-FIT:

- What do we mean by good **usability**?
- How do we implement **action planning**?
- How do we promote **organisational level behaviour**?

→ I developed the **The Performance Improvement plan Generator (PINGR)** to try and address these.

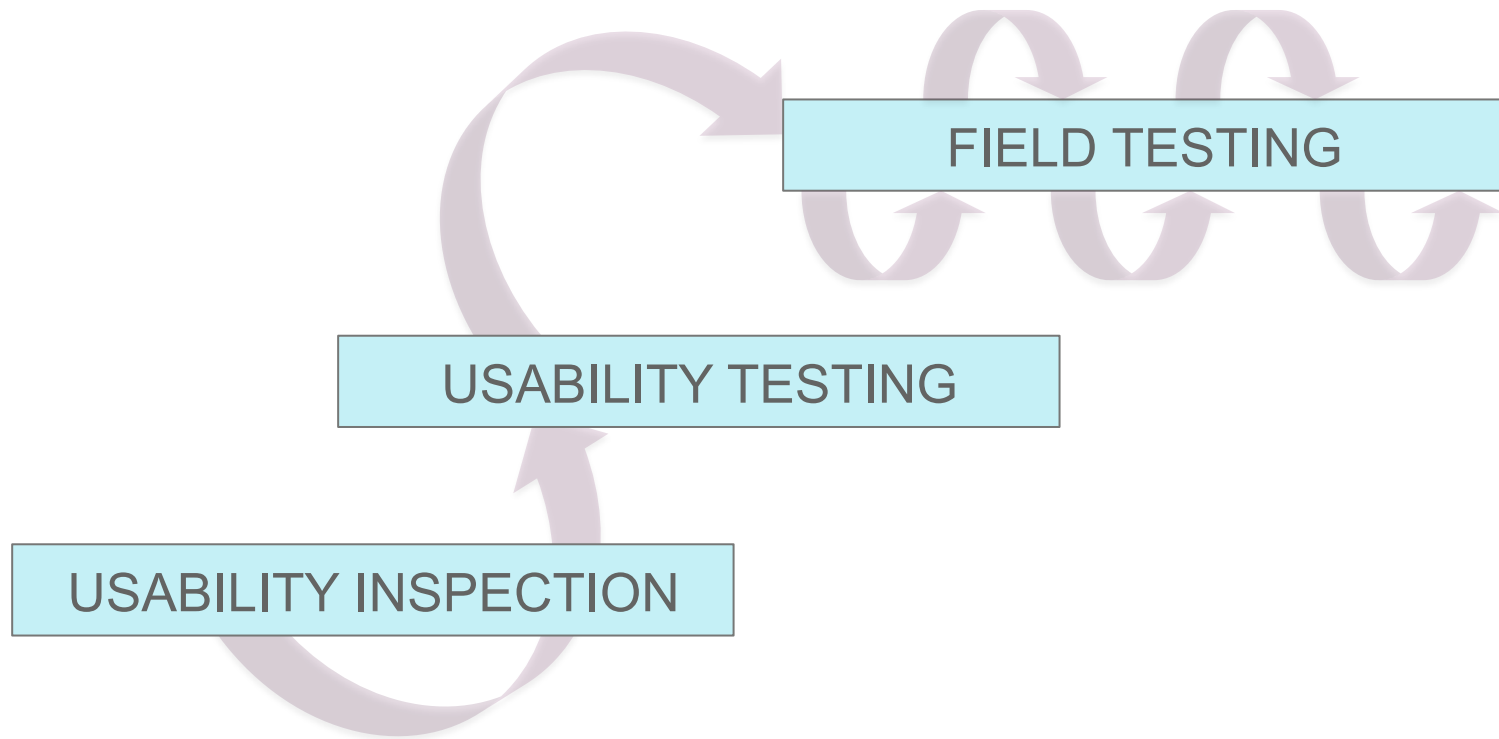
Background

Theory: CP-FIT

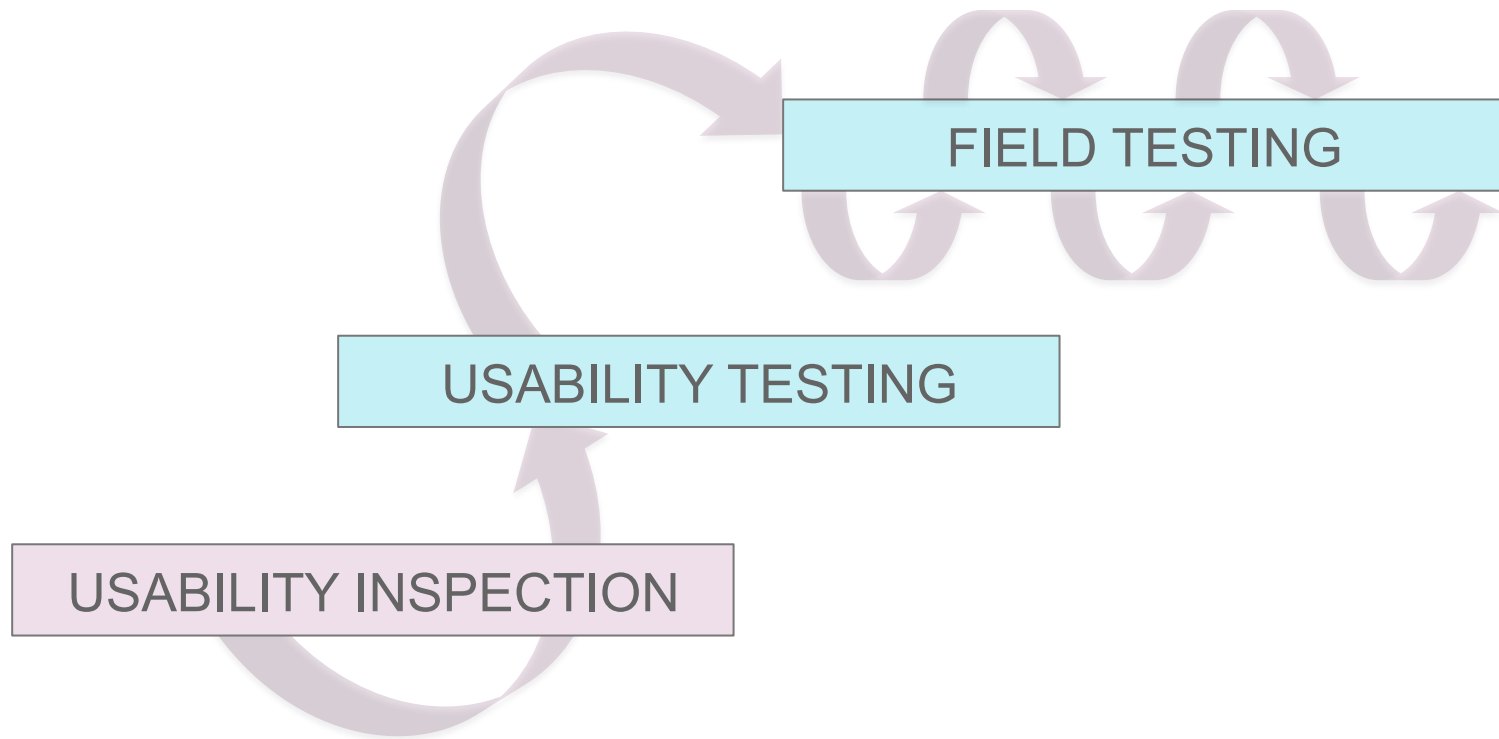
Electronic feedback examples

PINGR

Conclusion



Software experts
Cognitive Walkthrough
Heuristic Evaluation

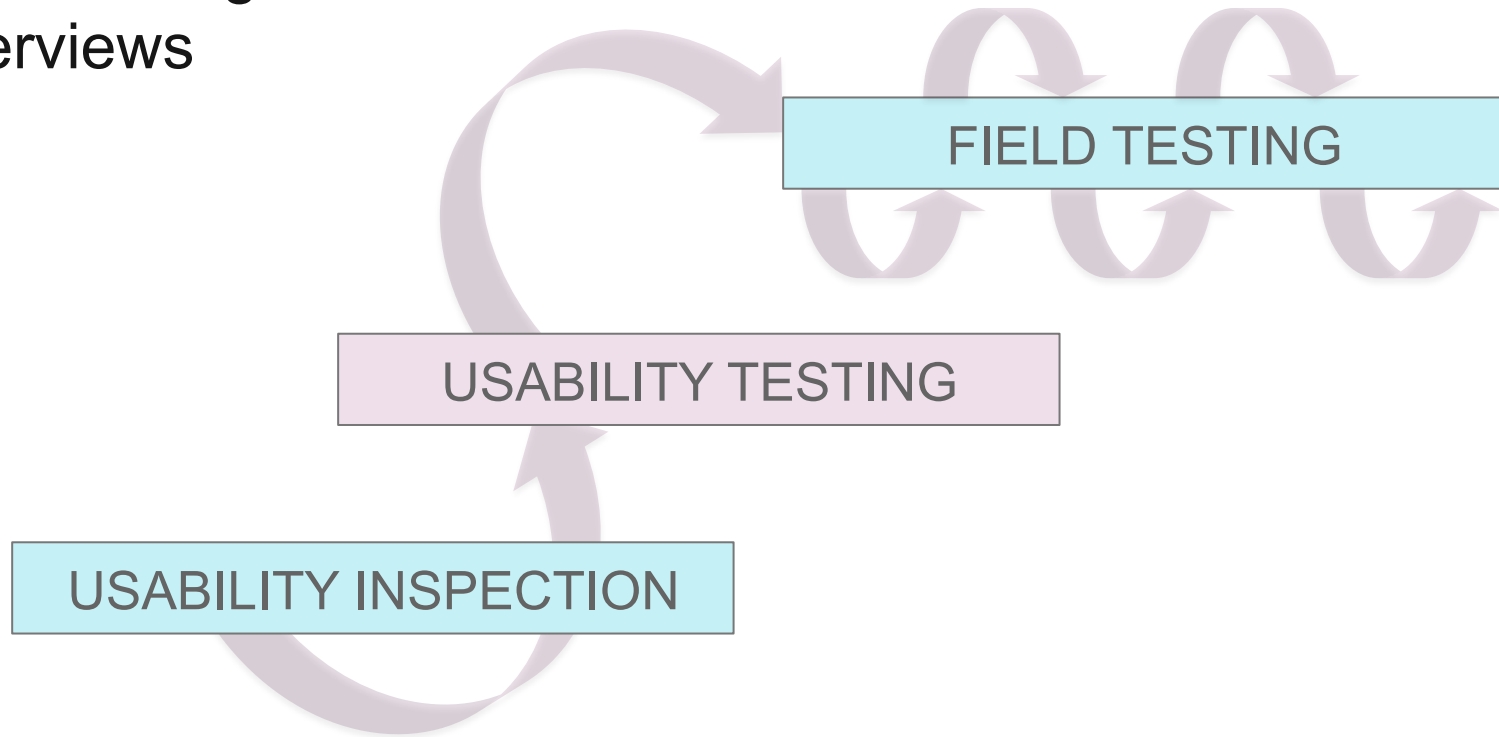


GPs

Task analysis

Eye tracking

Interviews



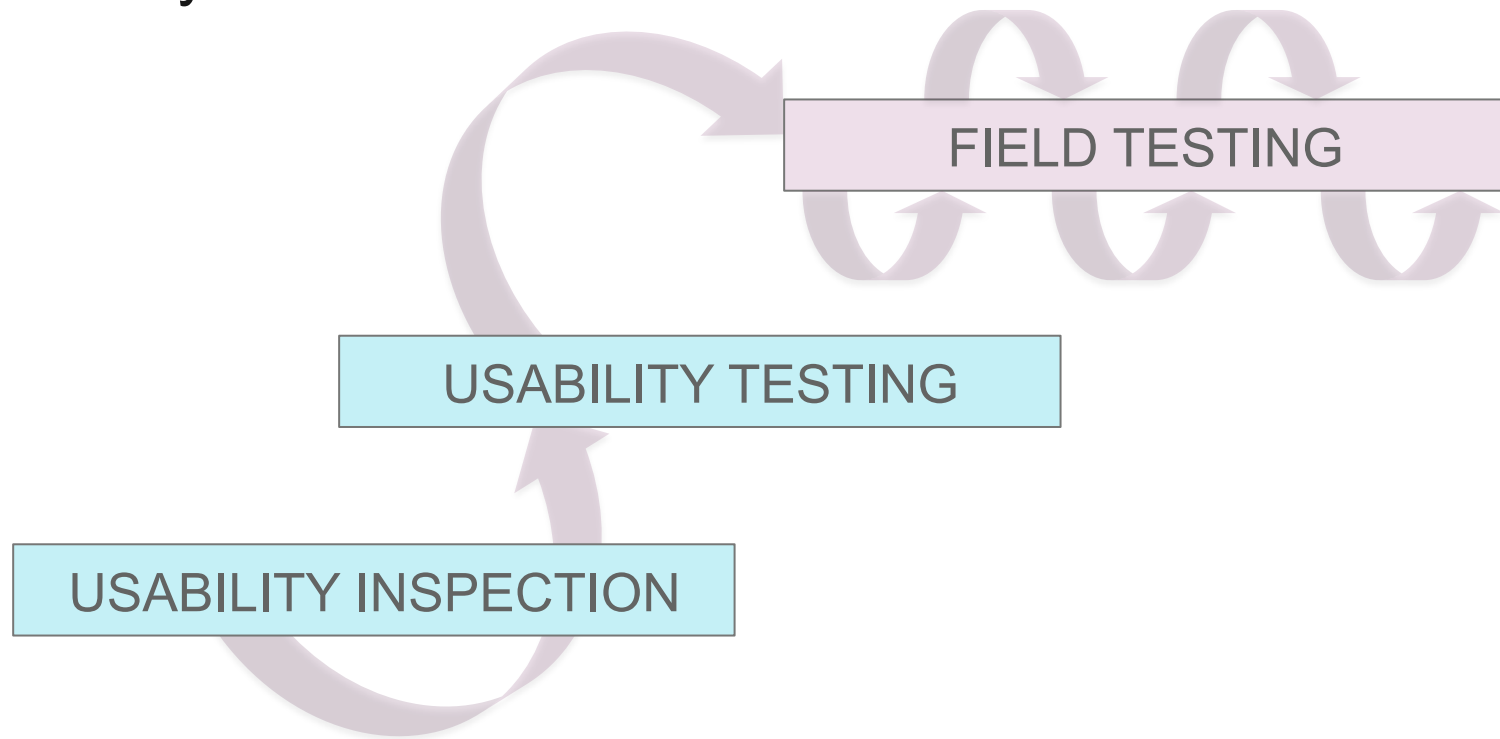
Borycki et al. 2013

MRC 2008

Selected GP practices

Interviews

Web analytics



Borycki et al. 2013

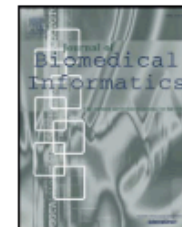
MRC 2008



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Multi-method laboratory user evaluation of an actionable clinical performance information system: Implications for usability and patient safety



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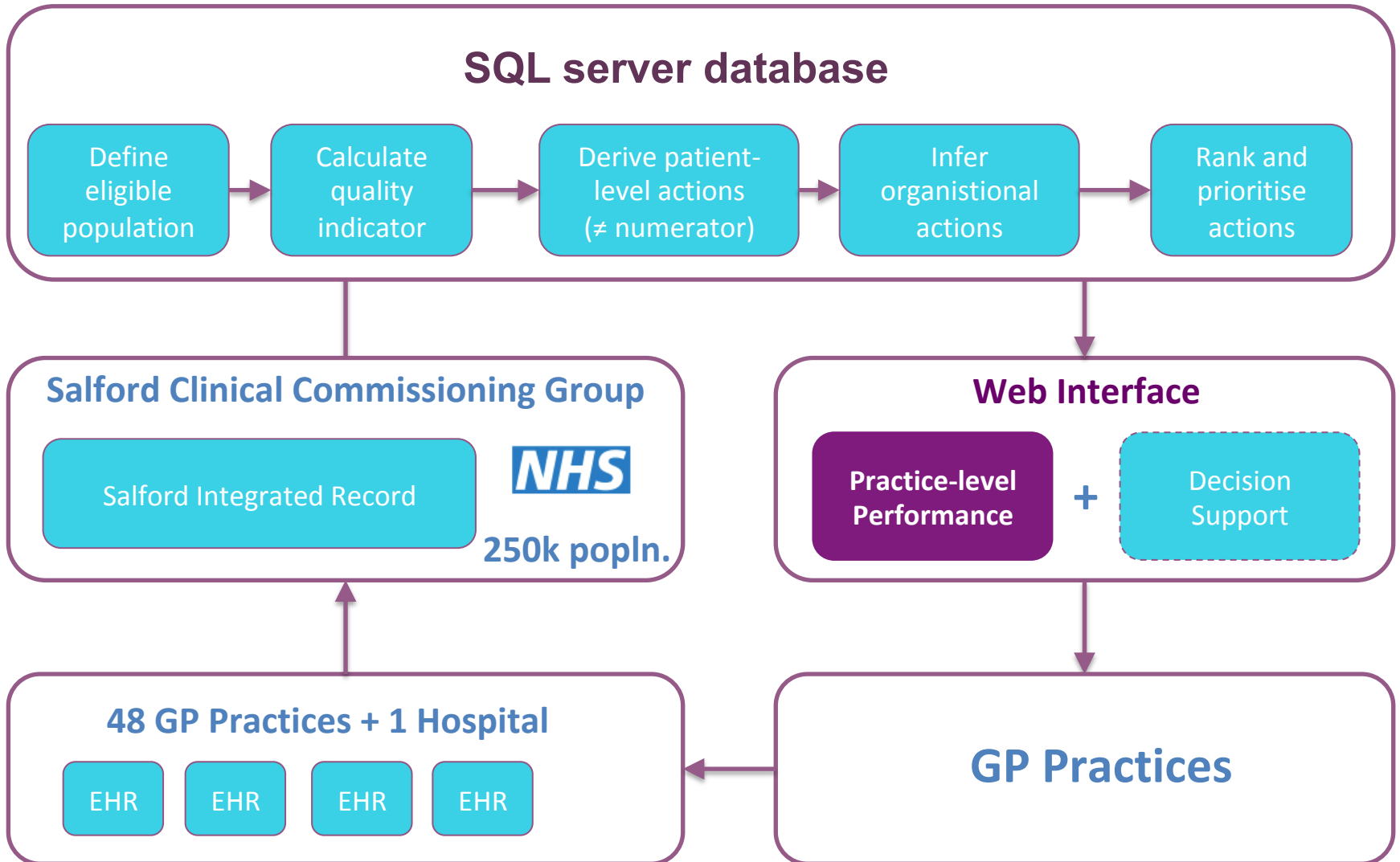
Interface design recommendations for computerised clinical audit and feedback: Hybrid usability evidence from a research-led system



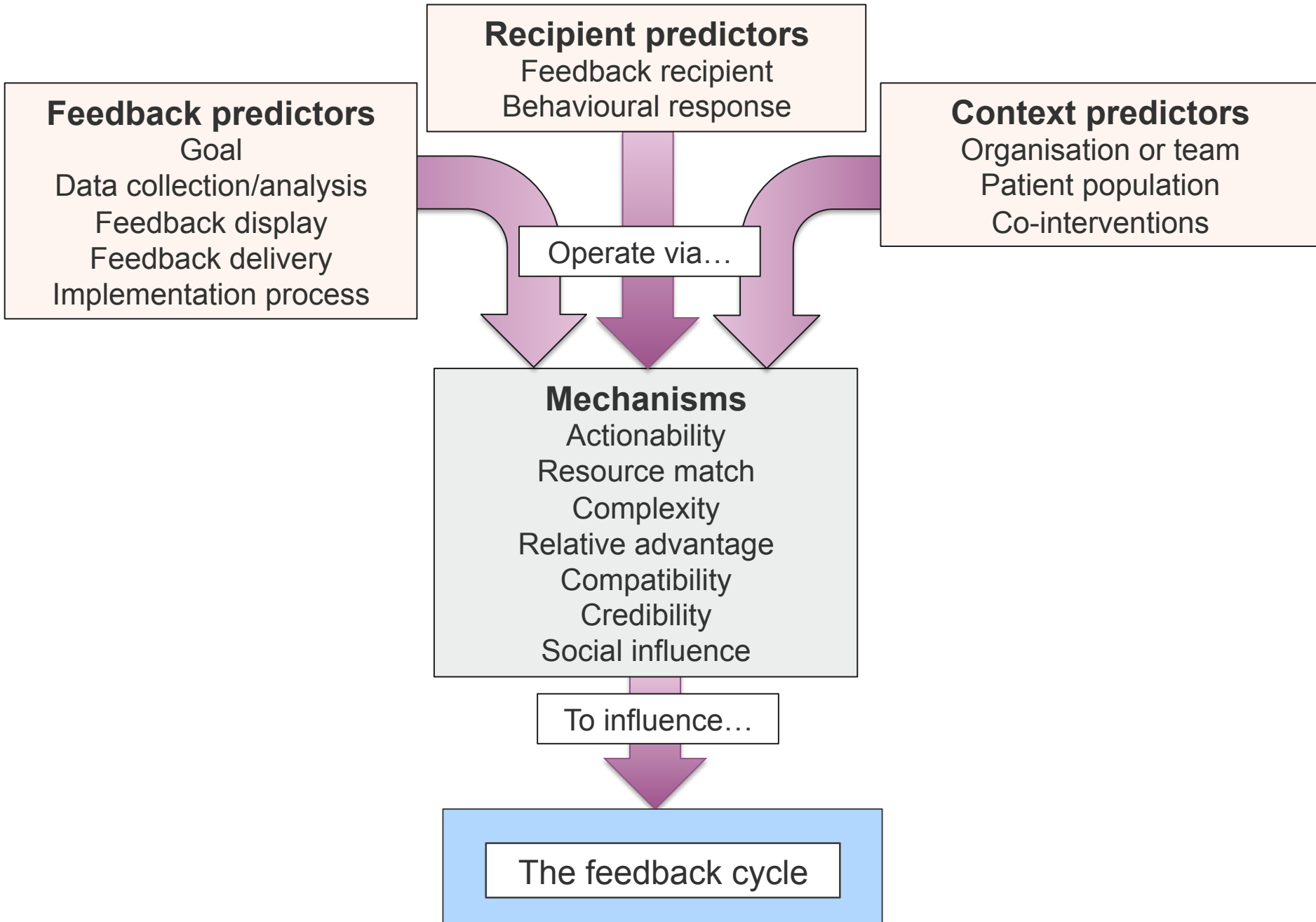
Benjamin Brown^{*}, Panos Balatsoukas, Richard Williams, Matthew Sperrin, Iain Buchan

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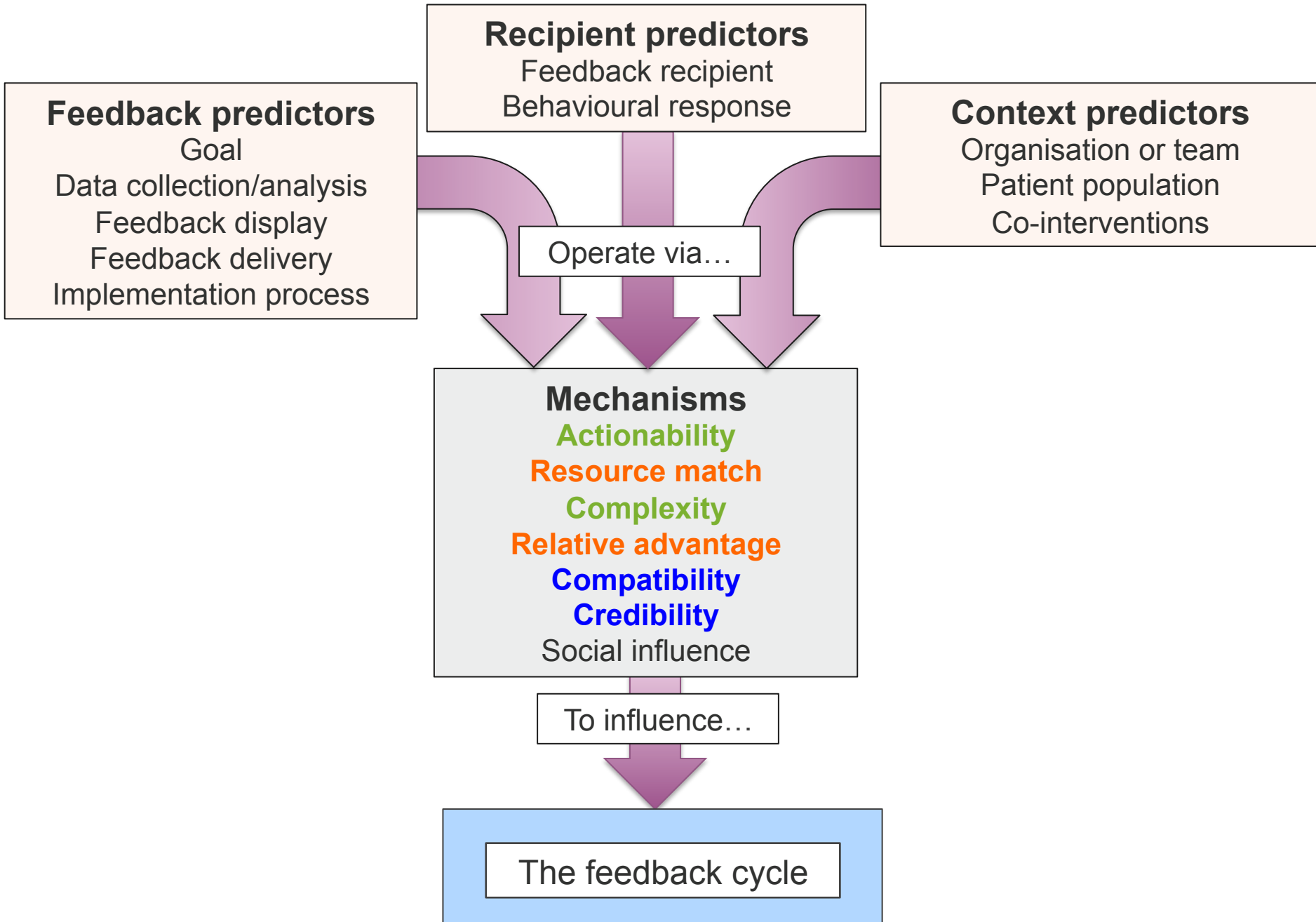
PINGR data flows



Facilitating and inhibiting factors?



Facilitating and inhibiting factors?



Facilitating and inhibiting factors?

Relative advantage vs Resource match

Predictors

Feedback display
Co-interventions



Mechanisms

Relative advantage



Interaction
Intention

"I think it's a really, really exciting programme in terms of **so easy to use**... it just seems to be much more **user friendly** with lots of really relevant information and guidance as well."
Nurse, practice B, follow-up interview

Facilitating and inhibiting factors?

Relative advantage vs Resource match

Predictors

Organisation / team
Feedback display



Mechanisms

Resource match



Interaction
Intention

"To be honest with you, the main thing is we're so busy at the moment, we've not got a lot of time even for the stuff we're doing on a day to day basis. And part of that is because of staff shortages due to being under capacity in terms of doctors and also doctor illness recently as well, and lots of calls on our time. So I'd say that's one of the main reasons [for not using PINGR]"

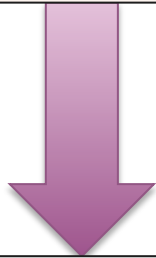
GP, practice C, follow-up interview

Facilitating and inhibiting factors?

Compatibility vs Credibility

Predictor

Goal



Mechanisms

Compatibility



Acceptance

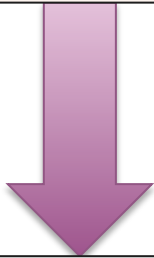
"I'm actually trying to improve prevalence. So, I thought the blood pressure one was particularly good on that. So, I've gone through all the blood pressure indicator and I've got [name] now inviting the ones that we've targeted on here, we've invited them in probably most of them the 24 hour. So, yeah, so I found that really useful."

GP, practice E, follow-up interview

Facilitating and inhibiting factors?

Compatibility vs Credibility

Predictor
Goal



Mechanisms
Credibility



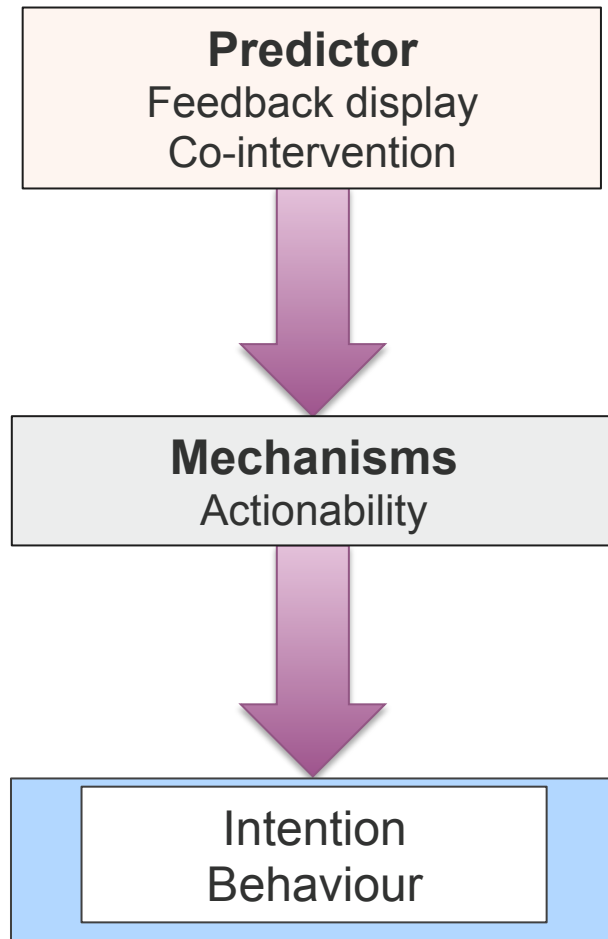
Acceptance

"So my slight thing say with adding that [CKD staging] code, I don't want to over-complicate things when we're so pushed for time. I know that's really good to have the proper code on, but does that really benefit anyone? Do you know what I mean?"

GP, practice F, first interview

Facilitating and inhibiting factors?

Actionability vs Complexity



"It's really, really good... I think that it's the next step beyond what we've had so far in terms of the software. So, you know, QOF, sort of, got us very processed, didn't it, **but what it didn't really do was actually drive up the quality because it wasn't actually helping us to take the next, kind of, step. And I do find it, I do find it useful to be prompted about, you know dosage changes or whatever it might be.**"

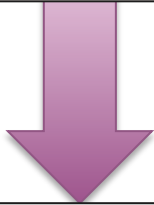
GP, practice A, baseline interview

Facilitating and inhibiting factors?

Actionability vs Complexity

Predictor

Feedback display
Co-intervention
Patient population



Mechanisms

Complexity



Intention
Behaviour

"Of all the patients the CKD ones tend to be the hardest to get their blood pressure within the goals and they're usually under renal and they're usually under optimum therapy anyway."

Nurse, practice 8, second interview

The PINGR project is ongoing

- Finalising field test paper with updated data (~2 years)
 - more robust estimates on impacts
- Roll out across Greater Manchester (population ~2m)
- Focus on specific disease areas
- COPD, late effects of cancer
- Feedback directly to patients

Background

Theory: CP-FIT

Electronic feedback examples

PINGR

Conclusion

Conclusion

- e-A&F is A&F with **interactive computer interfaces**
- It's variably effective
- Reviewed theory
- In particular CP-FIT
- Examples of how to **evaluate** e-A&F using CP-FIT – PINCER, PICS
- Examples of how to **design** e-A&F - PINGR

Thank you



“After careful analysis of these charts, graphs, and metrics,
*I have been able to effectively and efficiently improve the care of
my patients*”

Benjamin.Brown@manchester.ac.uk