

# The Bigger Picture

Optimizing electronic audit and feedback through unobtrusive quantitative process evaluations

Wouter Gude

**International  
Audit &  
Feedback  
Summit**

*Leading Change*



Academic Medical Center / University of Amsterdam  
Department of Medical Informatics



@WouterGude

Audit and  
feedback  
intervention



Effect on  
health  
outcomes

# Process evaluations

- Aim to increase our understanding of how interventions achieve effects, by assessing:
  - Quality of implementation, causal mechanisms, and contextual factors associated with outcome variation
- Often use qualitative research methods
  - Interviews, focus groups, observations

# Qualitative evaluations



# Qualitative evaluations



# Qualitative evaluations



What's the bigger picture?

# Optimizing A&F

- The challenge is to understand and optimize A&F interventions
- We suggest the mechanism through which A&F brings about change **can be quantified**
- The mechanism can be studied by harnessing data that are **routinely collected as a by-product** of using digital interventions in real-life

# Optimizing Digital Health Informatics Interventions Through Unobtrusive Quantitative Process Evaluations

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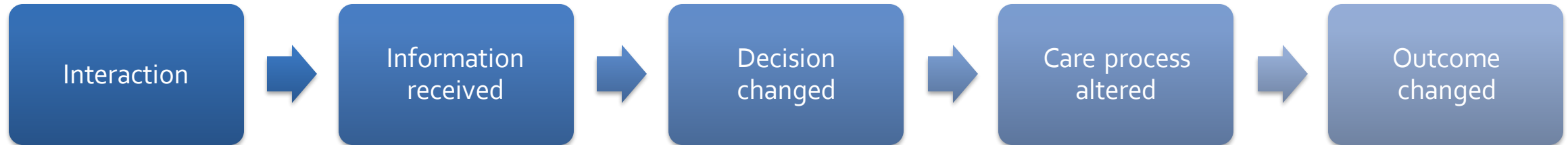
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**Abstract.** Health informatics interventions such as clinical decision support (CDS) and audit and feedback (A&F) are variably effective at improving care because the underlying mechanisms through which these interventions bring about change are poorly understood. This limits our possibilities to design better interventions. Process evaluations can be used to improve this understanding by assessing fidelity and quality of implementation, clarifying causal mechanisms, and identifying contextual factors associated with variation in outcomes. Coiera describes the intervention process as a series of stages extending from interactions to outcomes: the “information value chain”. However, past process evaluations



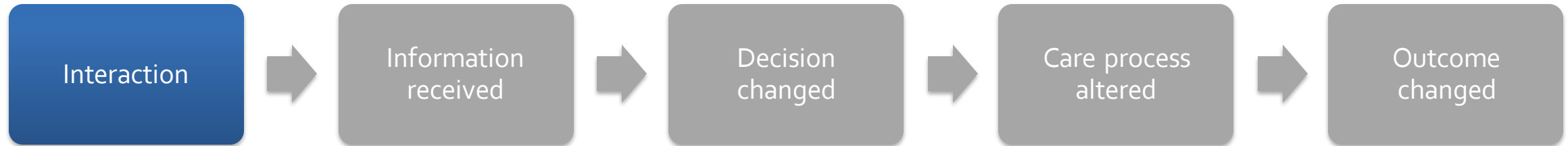
# The information value chain



- There are fewer events as we move down the chain but each event becomes increasingly more useful

# The information value chain

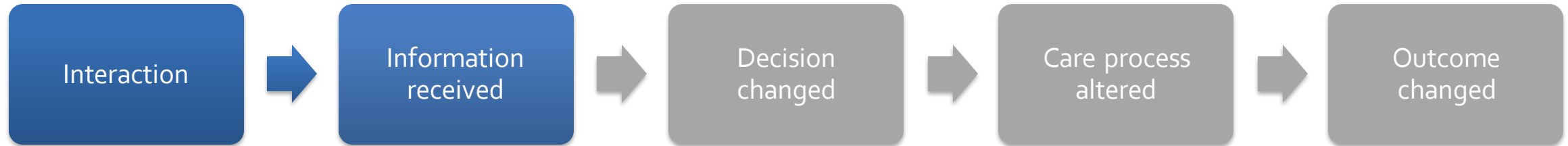
Example: clinical decision support



**A GP prescribing non-selective beta blockers in a patient with asthma is alerted by a CDS system that this may cause exacerbations.**

# The information value chain

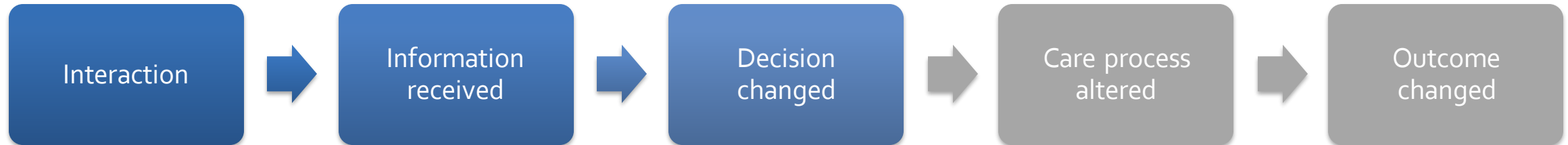
Example: clinical decision support



A GP prescribing non-selective beta blockers in a patient with asthma is alerted by a CDS system that this may cause exacerbations. **When the GP notices the alert...**

# The information value chain

Example: clinical decision support



A GP prescribing non-selective beta blockers in a patient with asthma is alerted by a CDS system that this may cause exacerbations. When the GP notices the alert **and decides to cancel the prescription...**

# The information value chain

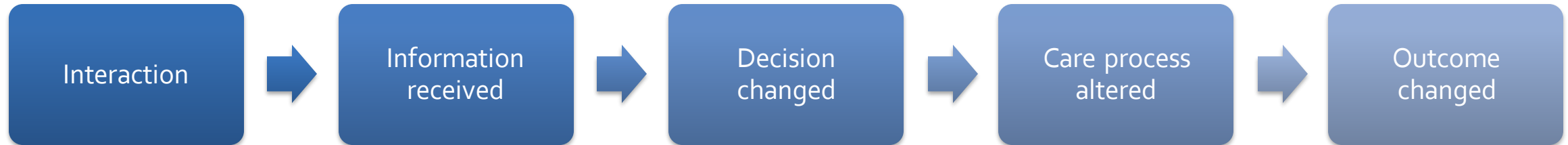
Example: clinical decision support



A GP prescribing non-selective beta blockers in a patient with asthma is alerted by a CDS system that this may cause exacerbations. When the GP notices the alert and decides to cancel the prescription **this will affect the patient's medication regimen...**

# The information value chain

Example: clinical decision support



A GP prescribing non-selective beta blockers in a patient with asthma is alerted by a CDS system that this may cause exacerbations. When the GP notices the alert and decides to cancel the prescription this will affect the patient's medication regimen **and can reduce the risk of asthma exacerbations.**

# The information value chain



- RCTs often already report the final stages (one or both)

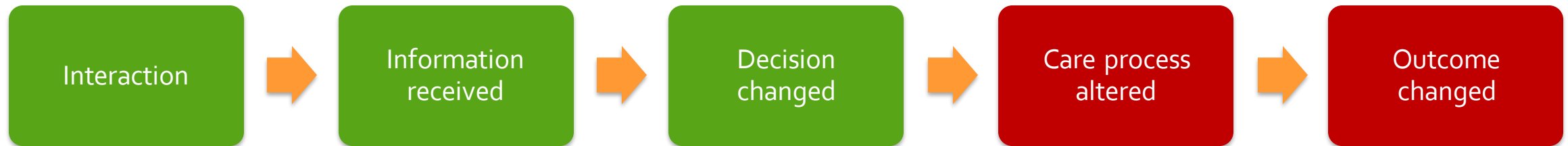
# The information value chain



- RCTs often already report the final stages (one or both)
- Earlier stages could explain the (lack of) events in the final stages i.e. the interventions' observed effectiveness



# The information value chain



- RCTs often already report the final stages (one or both)
- Earlier stages could explain the (lack of) events in the final stages i.e. the interventions' observed effectiveness
- Assessing how success in one stage actually translates into good results at the next stage is of key importance

# Digital interventions

- Provide novel opportunities to observe the entire information value chain because they can log everything that happens, such as:
  - Whether, which and how users interacted with the system
    - E.g., log of mouse clicks, key strokes, page views (stage 1)
  - Which and under what circumstances information was displayed
    - E.g., content of a medication alert for specific patients (stage 2)
  - Clinical decisions
    - E.g., changes to medication prescriptions (stage 3)



Home

Upload

Feedback

Quality  
improvement plan

Clinic info

Log out

Start date trial: 01-05-2013

**Available reports**

- | Available reports                                  | Period                  |
|--|-------------------------|
| <input type="radio"/> Feedback report 1            | 01-05-2013 - 25-09-2013 |
| <input checked="" type="radio"/> Feedback report 2 | 01-05-2013 - 21-01-2014 |

Open report

**Process indicators**

Indicator	Percentage	Target Status	Select as target for improvement?
1. Patients for whom all needs assessment data are collected concerning <i>physical functioning</i>	69%	✓	<input checked="" type="checkbox"/>
2. Patients for whom all needs assessment data are collected concerning <i>psychological functioning</i>	59%	⚠	<input checked="" type="checkbox"/>
3. Patients for whom all needs assessment data are collected concerning <i>social functioning</i>	82%	✓	<input type="checkbox"/>
4. Patients for whom all needs assessment data are collected concerning <i>cardiovascular risk factors</i>	87%	✓	<input type="checkbox"/>
5. Patients for whom all needs assessment data are collected concerning <i>lifestyle factors</i>	89%	✓	<input type="checkbox"/>
6. Patients who are offered a CR programme tailored to their needs	55%	⚠	<input checked="" type="checkbox"/>
7. Patients who finish their CR programme: <i>education programme</i>	77%	⚠	<input type="checkbox"/>
8. Patients who finish their CR programme: <i>exercise therapy</i>	74%	⚠	<input checked="" type="checkbox"/>
9. Patients who finish their CR programme: <i>relaxation and stress management training</i>	39%	⚠	<input checked="" type="checkbox"/>
10. Patients who finish their CR programme: <i>lifestyle change therapy</i>	76%	✓	<input type="checkbox"/>
11. Patients whose rehabilitation goals are evaluated after CR	N/A	⚪	<input checked="" type="checkbox"/>
12. Patients whose cardiovascular risk factors are evaluated after CR	N/A	⚪	<input type="checkbox"/>

**Outcome indicators**

13. Patients who successfully resume work	60%	✓	<input type="checkbox"/>
14. Patients who quit smoking after CR	33%	⚠	<input type="checkbox"/>
15. Patients who meet the physical activity norm: exercise norm	88%	✓	<input type="checkbox"/>
16. Patients who meet the physical activity norm: fit norm	25%	⚠	<input type="checkbox"/>

# Example: CARDSS Online



Significant loss of events down the chain! \*

**Question:** what drives clinicians to act upon feedback? \*\*

\* **Gude et al. Implement Sci 2016** Effect of a web-based audit and feedback intervention with outreach visits on the clinical performance of multidisciplinary teams: a cluster-randomized trial in cardiac rehabilitation.

\*\* **Gude et al. BMJ Qual Saf 2016** How does audit and feedback influence intentions of health professionals to improve practice? A laboratory experiment and field study in cardiac rehabilitation.

# How does audit and feedback influence intentions of health professionals to improve practice? A laboratory experiment and field study in cardiac rehabilitation

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► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/bmjqs-2015-004795>).

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## ABSTRACT

**Objective** To identify factors that influence the intentions of health professionals to improve their practice when confronted with clinical performance feedback, which is an essential first step in the audit and feedback mechanism.

**Methods** We conducted a theory-driven laboratory experiment with 41 individual professionals, and a field study in 18 centres in the context of a cluster-randomised trial of electronic audit and feedback in cardiac rehabilitation. Feedback reports were provided through a web-based application, and included performance scores and benchmark comparisons (high, intermediate or low performance) for a set of process and outcome indicators. From each

However, there was substantial variation in these intentions, because professionals disagreed with benchmarks, deemed improvement unfeasible or did not consider the indicator an essential aspect of care quality. These phenomena impede intentions to improve practice, and are thus likely to dilute the effects of audit and feedback interventions.

**Trial registration number** NTR3251, pre-results.

## INTRODUCTION

Healthcare organisations increasingly adopt audit and feedback (A&F) strategies to monitor and improve their quality of care.<sup>1-3</sup> A&F interventions provide health professionals with an

Analysis of the information value chain can reveal **obstructions in the specific parts of the process** and explain variations in observed effects

This **increases our understanding** of health informatics interventions, and guides topics for **further investigation** (e.g. qualitative)

What's the bigger picture?







Thank you



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Department of Medical Informatics

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**International  
Audit &  
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**THANK YOU.**

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