Implementation science: an introduction

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Many challenges for researchers

How to …

- Measure success of implementation programs
- Tailor implementation interventions to determinants of practice
- Include context in the planning and evaluation
- Measure fidelity of planned interventions
- Achieve sustainable improvement
- Create supportive infrastructure for implementation science

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Introduction

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Sometimes new biomedical knowledge is implemented immediately

Example: avoid tonsillectomies in healthy young children

Continuum of research

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Information overload

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Key questions for implementation science

1. **Practice variation:** Who gets high-quality healthcare and does this change over time?

2. **Implementation interventions:** Which interventions and factors contribute to better implementation of recommended practices?

3. **Sustainable improvement:** How can sustained improvement be organized?

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Implementation interventions

- Continuing professional education
- Feedback, reminders, decision support to clinicians
- Organisational changes in skill mix, teams, institutional management
- Patient-mediated interventions, e.g. decision aids, e-health, online communities
- Changes in reimbursement, market and regulations

Largely ineffective

Dissemination of written educational materials

Didactic education

Variably effective

Audit and feedback

Local consensus conferences

Opinion leaders

Patient mediated interventions

Largely effective

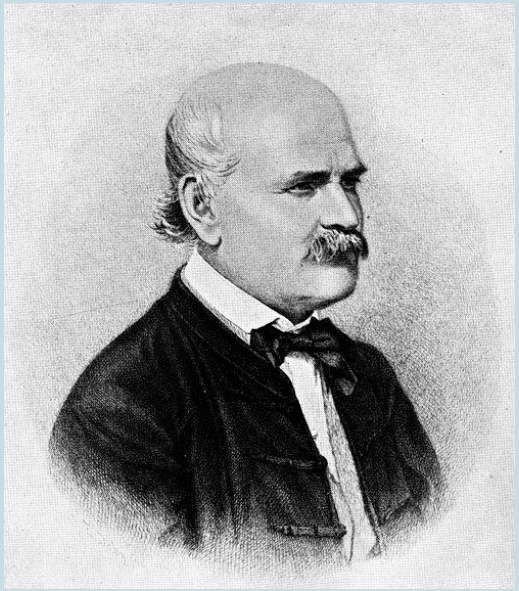
Reminders

Educational outreach (for prescribing)

Interactive educational workshops

Multi faceted interventions

History of knowledge implementation: before 1980



Semmelweis
(1818-1865)

- Education and restricted access to the profession
- Self-regulation of the profession
- “Quality cannot be measured”

Knowledge implementation in the 1980s

Richard Grol

Influence from behavioural sciences, focus on:

- Individual performance as health professional
- Communication with patients and colleagues

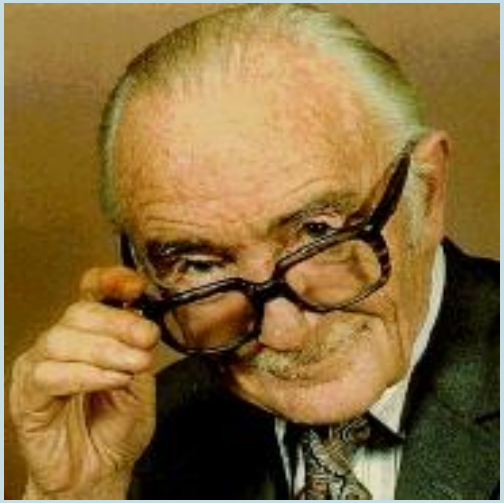
Knowledge implementation in the 1990s- type A

Donald Berwick

Influence from business and management:

- Quality management
- Disease management
- Process redesign

Knowledge implementation in the 1990s- type B

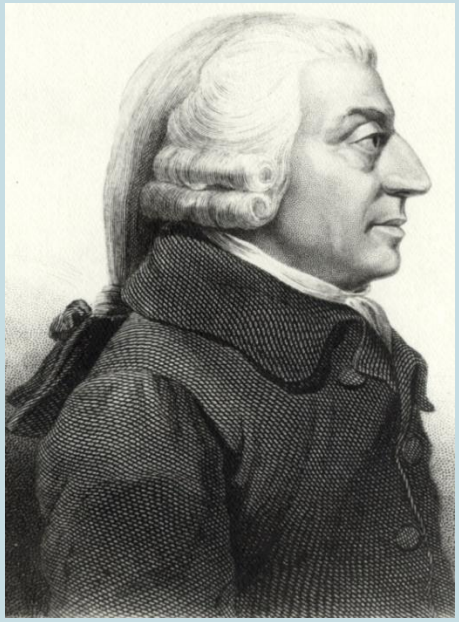


Archie Cochrane

Influence from clinical epidemiology:

- Rigorous evaluations of pragmatically chosen implementation interventions
- Systematic reviews to inform decision makers

Knowledge implementation since the year 2000



Adam Smith
(1723-1790)

Influence from economics and system perspectives:

- Pay for performance, selective contracting
- Informed and active consumers and purchasers
- Strict quality control

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Scientific journals

- Quality and Safety in Health Care
- Implementation Science
- International for Quality in Healthcare
- Journal of Evaluation in Clinical Practice

- General medical and clinical journals, e.g. BMJ, JAMA
- Other health science journals, e.g. Medical Care, Am J Managed Care

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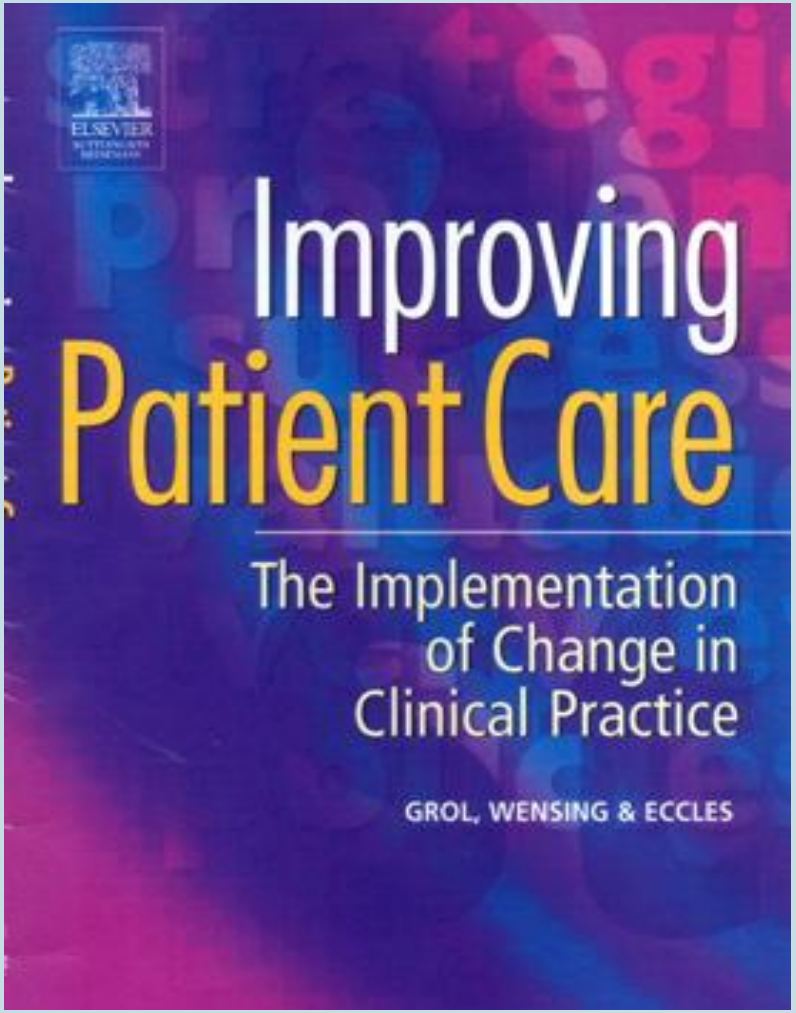

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Our centre

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Key features

- Double mission: scientific and societal
- Yearly > 100 papers and 6-8 Ph.D. theses
- Yearly many policy reports, presentations, training, tools

- Based in one of the seven university hospitals in the Netherlands
- Current yearly budget: 5 million euro, after overhead
- Funding: largely project-based
- Multidisciplinary team, both clinicians and social scientists
- Linked to many stakeholders and universities, both national and international

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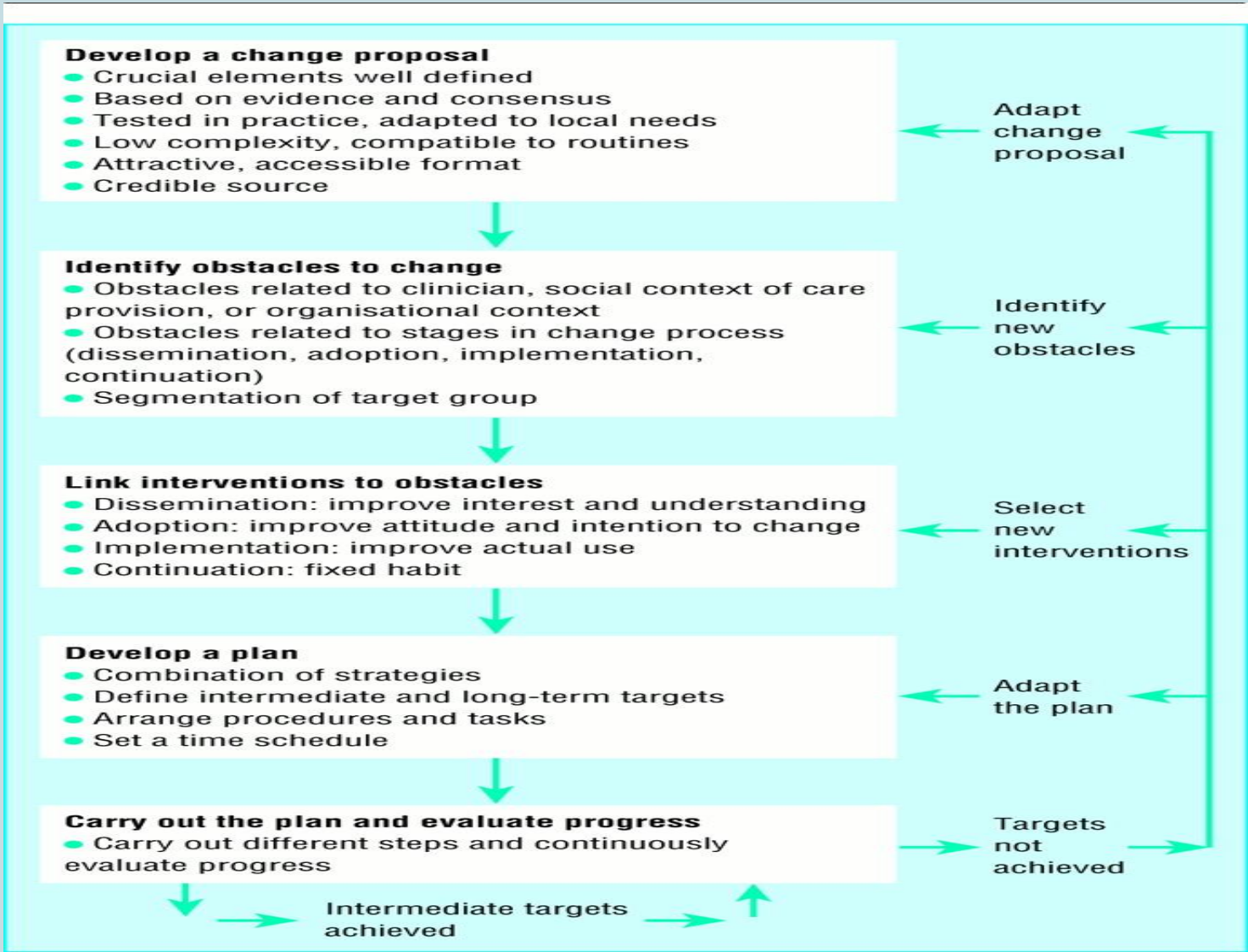
Model underlying most studies at the centre



Grol.
BMJ 1996

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Measuring guideline-practice gaps

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EPA Cardio project

- 283 general practices from 10 countries: Austria, Belgium, England, Finland, France, Germany, Netherlands, Slovenia, Spain, Switzerland

- 3661 young adults (18-45 years)
- 5106 patients with high CVD risk
- 6085 patients with coronary heart disease

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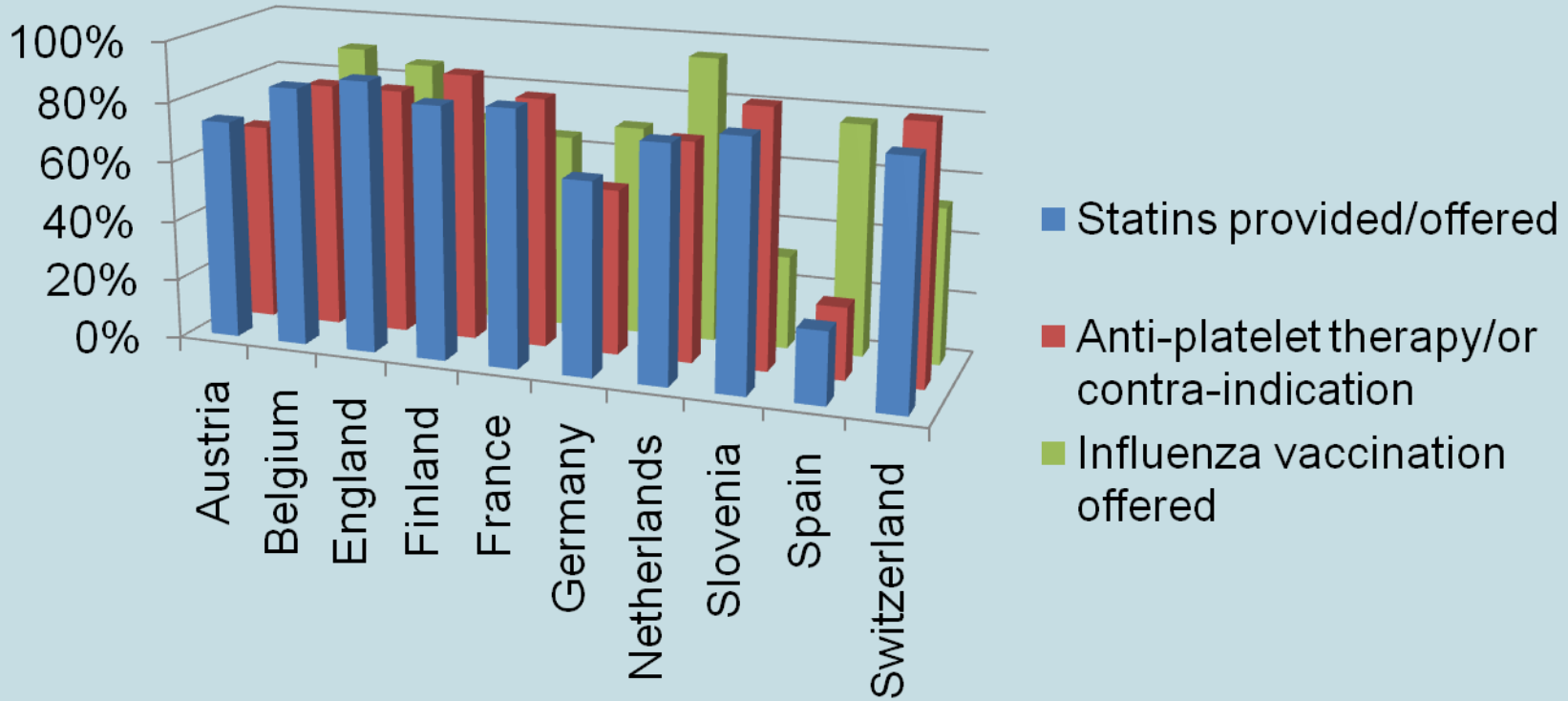
Recorded preventive medical treatments



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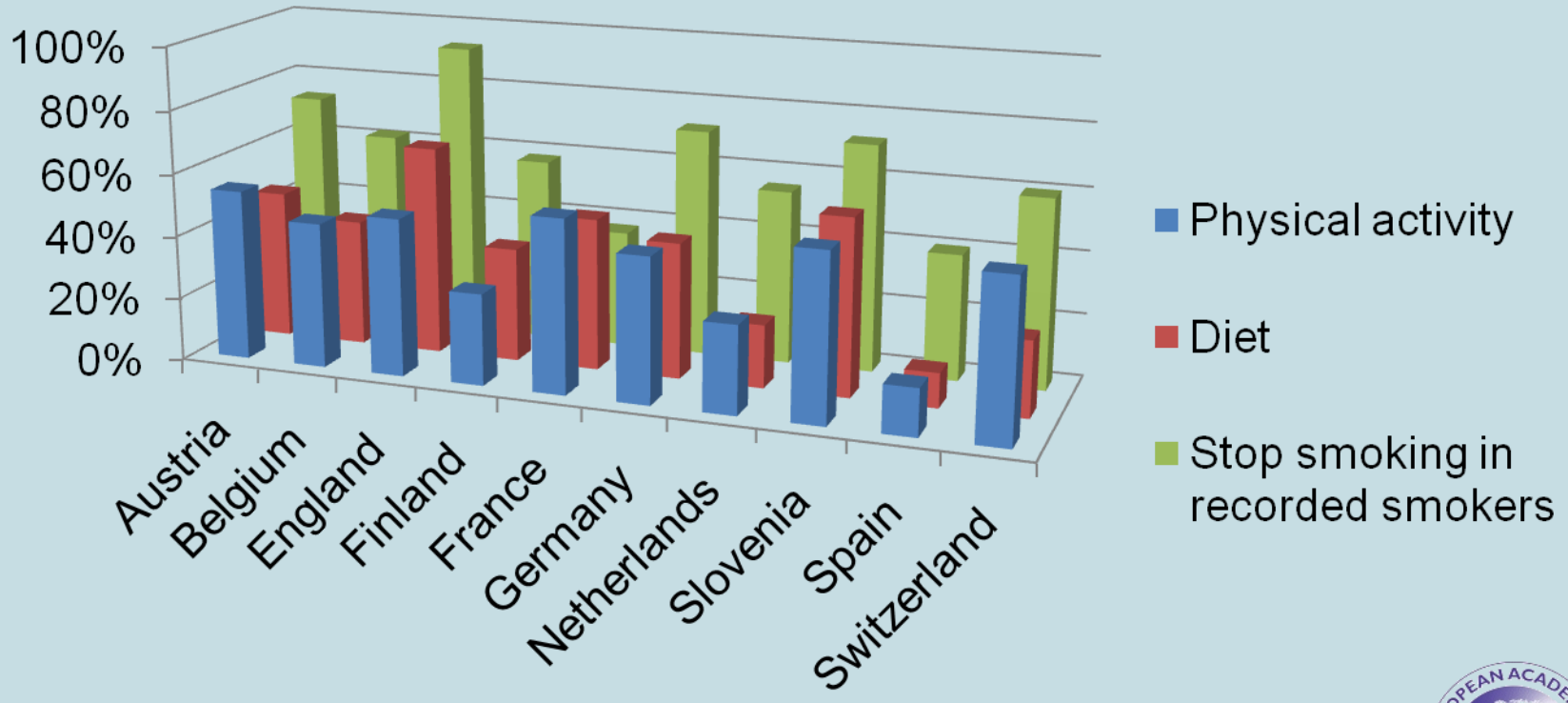
Recorded life style advice given in previous 15 months



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International studies

Pros

- Necessary for analysis of health systems
- Combine expertise from different regions
- Increase the external validity (robustness)

Cons

- Interpretation of comparisons between countries is difficult
- Focus on shared issues, but expense of country-specific issues
- Comparability of measures may be at stake

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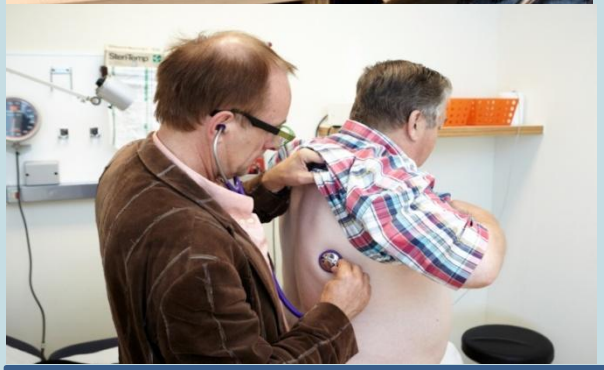
Patient safety

Patient safety in hospital



Patient safety in primary care

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Patient safety research = implementation science

- Unsafety reflects poor implementation of knowledge
- Safety enhancing interventions are similar to implementation interventions
- Research methods for patient safety research are similar to those in implementation research

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Some notes on measures of implementation success

- Mostly performance indicators based on chart audit, using explicit or implicit criteria for assessment
- Focus on measurable behaviours with impact on health outcomes
- This may not reflect use of knowledge in practice however, but only decisions that have been registered

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Implementation interventions

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Cochrane Reviews on professional education (impact on performance)

	N trials	ES
Printed educational material (Farmer 2008)	23	+4%
Educational meetings (Forsetlund 2009)	56	+6%
Educational outreach visits (O'Brien 2007)	34	+5%
Audit and feedback (Jamtvedt 2006)	118	+5%

ES=median change on dichtomous performance measures

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Tailoring implemenation interventions to barriers and enablers

1. Identification of barriers and enablers for implementation
2. Matching implementation interventions to barriers and enablers
3. Apply and assess tailored implementation interventions

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“Determinants of practice”

- “Factors that might prevent or enable improvements, including factors that can be modified and non-modifiable factors that can be used to target interventions” (Oxman 2011)

- May be related to:

- professional behaviour
- organisation of healthcare
- health system arrangements
- (some) patient behaviours
- social and political environment

Types of factors (NICS 2006)

Innovation	Attractiveness, accessibility, feasibility, etc.
Healthcare professional	Awareness, knowledge, attitudes, motivations, routines, etc
Team of professionals	Culture, leadership, collaboration, etc
Patient	Awareness, knowledge, attitudes, motivations, routines, etc
Healthcare organisation	Organisational structure, work flows, resources, etc
Health system	Regulations, reimbursement, policies, etc.

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Important questions regarding tailoring

- Simple or systematic methods?
- Pragmatic or theory-based methods?
- Integrated or separated barrier identification and intervention matching?
- Tailoring per project/practice/practitioner?
- Tailoring: once/repeatedly during the project?

- Identified determinants of practice: are these really the crucial factors in real implementation processes?

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Including context

What is context?

- Everything that is not the implementation intervention?
- Everything that is not related to individual (psychological) factors?
- System in which knowledge implementation occurs (context suggests a psychological approach)

Context: positive definitions

- Teams and social networks
- Organizational structures (e.g. integrated care)
- Resources and financial incentives (e.g. P4P)
- Laws and regulations

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Context of improving mental healthcare in NL

- 29 improvement teams worked to implement guidelines on anxiety, schizofrenia, or double diagnosis
- Data on team composition, participation, functioning and organizational context
- Outcomes data on n=1346 patients

- Few associations between team features and outcomes
- Some support for impact of:
  - managerial support
  - active, inspiring team leaders
  - higher educational level of team members

Versteeg et al.
Implement Sci 2011
(under revision)

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Organisational determinants of primary care for chronic patients?

- Study in 42 practices concerning chronic heart failure (n=357)
- Study in 30 practices concerning diabetes mellitus (n=752)

- Little assocation of outcomes with organisational factors, including:
  - Aspects of chronic care model
  - Organisational culture (CVF)
  - Team functioning (TCI)

Bosch et al. 2008

Bosch et al. 2009

Size of scale influences several aspects of primary care

Studies found relations with:

- physician workload (Wensing 2006)
- structured chronic care (Wensing 2009)
- patient safety management (Gaal 2010)
- patient views of accessibility (Wensing 2008)

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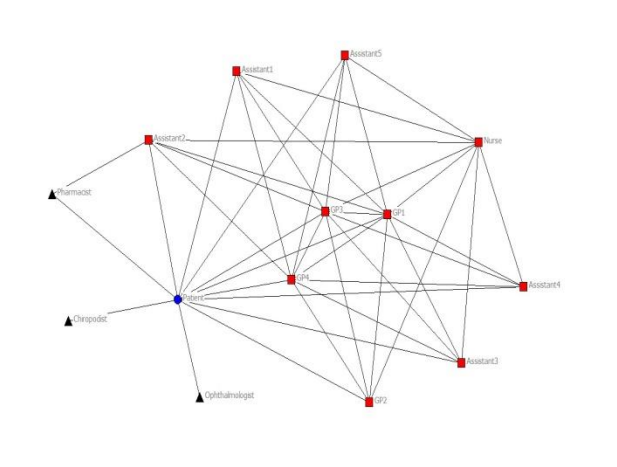
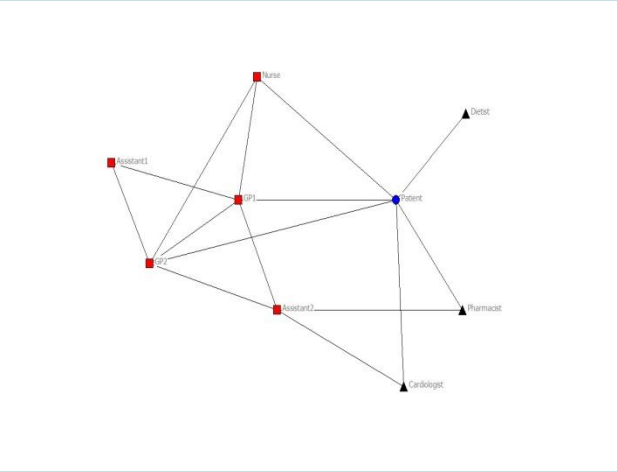
Connections with health professionals in two diabetes patients





- Many patients receive healthcare from a panel of health professionals
- Networks of connections may influence healthcare in several ways
- Social network methods provide an interesting set of tools

Weenink et al. Implement Sci 2011;6:67.

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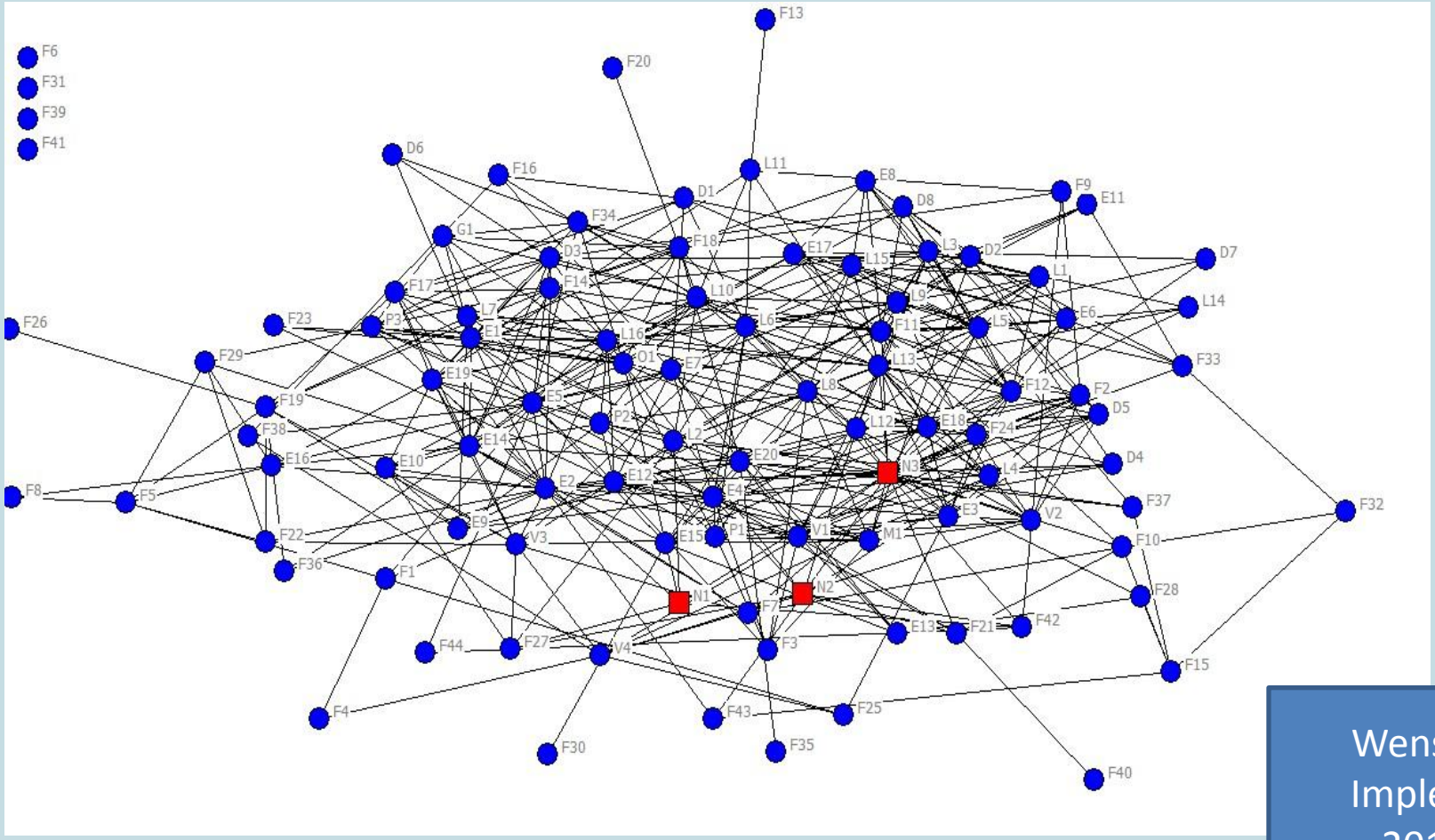
Health professionals involved in treatment of Parkinson's Disease in one region



Wensing et al. Implement Sci 2011;6:66.

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Fidelity (and effectiveness) of implementation interventions

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The issues

- Ideally, implementation programs focus on clinical interventions of proven value
- An issue is whether clinical interventions remain effective after implementation, because these interventions tend to be adapted when implemented
- A further issue concerns the fidelity of implementation interventions

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Improving cardiovascular risk management by involving nurses (Koelewijn 2010)

- Nurse-led cardiovascular risk management focused on life style adherence: decision aids and motivational interviewing versus minimal nurse-support
- Cluster RCT with 615 patients from 25 primary care practices

- **Fidelity:** Successful implementation of the nurse-led program, improved life style counseling

- **Effectiveness:** No effects on diet, physical exercise, or 10-year risk

Reducing benzodiazepine use by involving pharmacists (Van de Steeg 2009)

- Pharmacist-led implementation of a discontinuation letter for patients, targetted at barriers for improvement, versus minimal standard implementation
- Cluster RCT with 19398 eligible patients, identified in 89 public pharmacies

- **Fidelity**: succesful implementation of the program in 72% of pharmacies versus 47% in control group

- **Effectiveness:** No difference on % patients who received discontinuation letter (20 versus 13%)

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Were these implementation programs successful?

- Fidelity of planned implementation activities was good or at least reasonable
- Absence of outcome measures does not equal absence of improved outcomes
- (but some studies have reported on dilution of effects after implementation as compared to clinical research)

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Sustainability of improvement

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Adherence to clinical guidelines for primary care in The Netherlands

Different studies on adherence to clinical guidelines

(average % adherence over many specific recommendations):

1980 (24 regional guidelines, 57 GPs)	44%
1987 (24 regional guidelines, 75 GPs)	55%
1991 (12 national guidelines, 62 GPs)	66%
2000 (35 national guidelines, 200 GPs)	69%
2003 (57 indicators, 190 GPs)	74%

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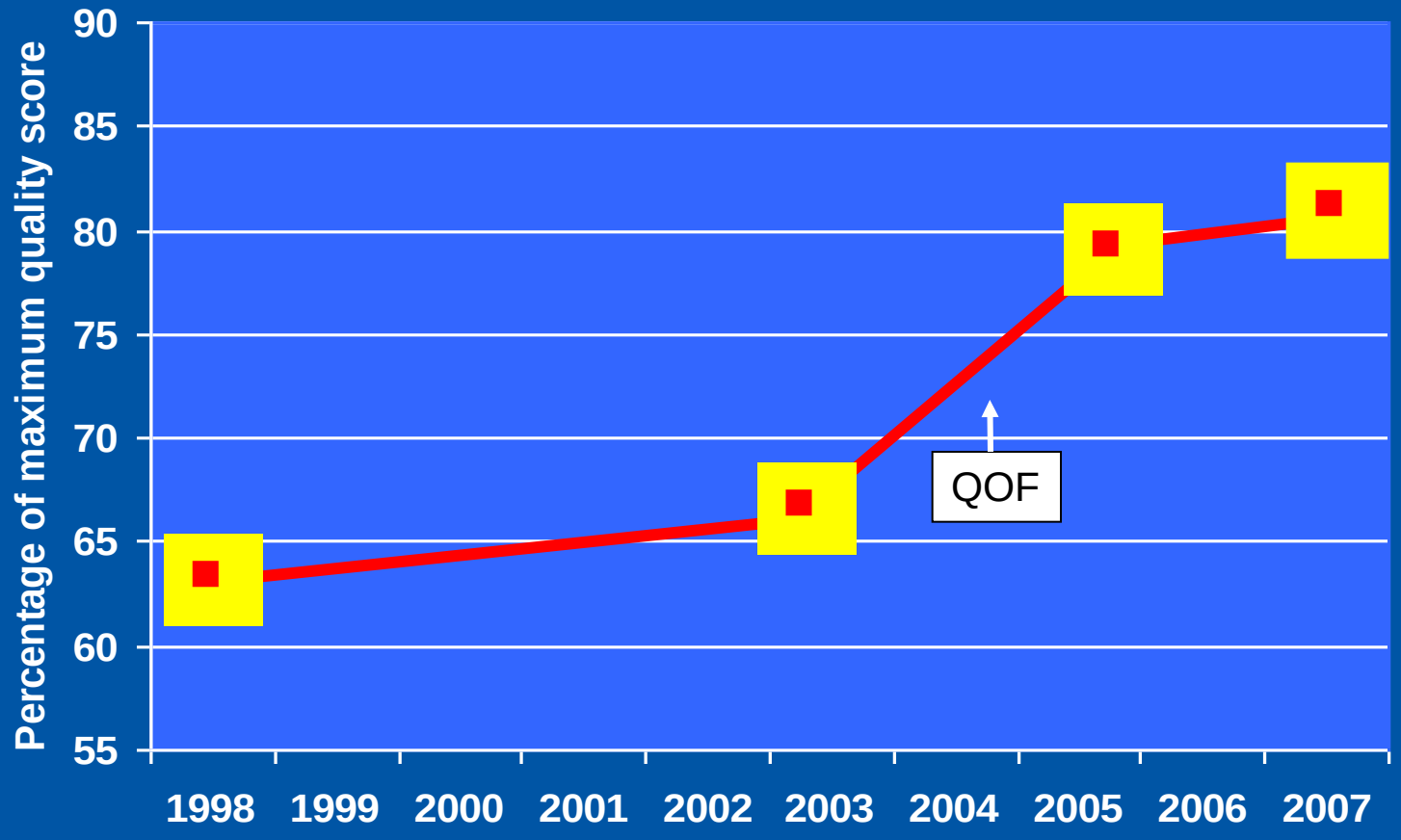
2003 UK pay for performance scheme "Quality and Outcomes Framework"

- 25% of GPs' income relates to a complex set of initially 146 quality indicators
  - Chronic disease management
  - Practice organisation
  - Additional services
  - Patient experience (consultation length and patient surveys)

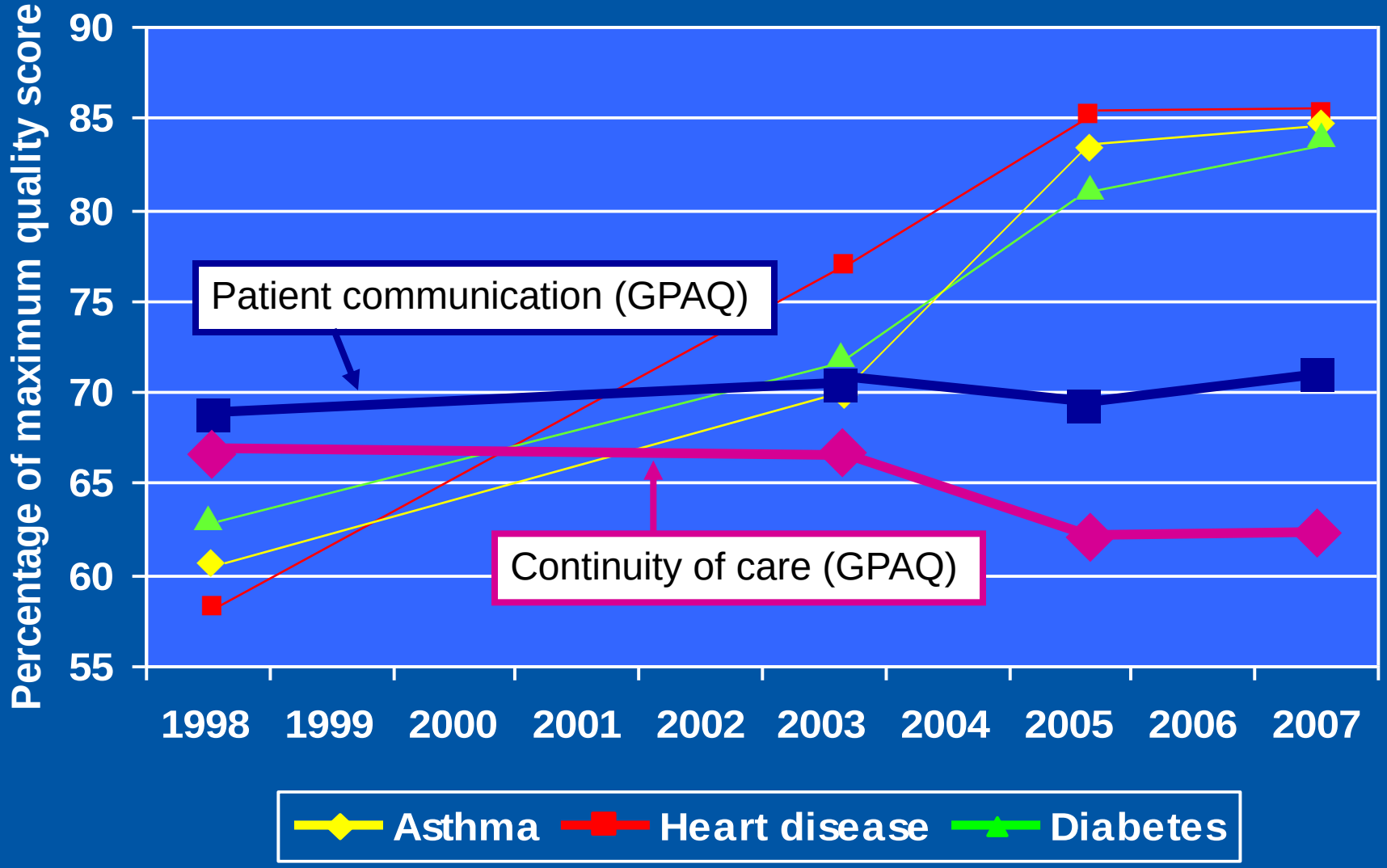
- 79% of the 70% of GPs who voted

Quality of care before and after the introduction of P4P



QUIP_ 1998-2007 (Campbell/Roland 2008)
Interrupted time series analysis

Patient reported outcomes compared to asthma, heart disease and diabetes scores



Campbell/Roland 2008

Infrastructure for implementation science

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Infrastructure for implementation: some observations in the Netherlands

- Supporting implementation in healthcare has become a service industry itself, which is only partly connected to implementation science.
- Implementation activities are mainly organized in projects for which funding is arranged. This reduces the ability to learn and improve over a longer period of time.
- Recruitment of talented researchers to implementation science remains challenging

Wensing et al.
Report ZONMW, 2010

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Conclusion: much work to do …

1. Measures of implementation success
2. Tailoring to determinants of practice
3. Including context (system)
4. Fidelity of interventions
5. Sustainability of changes
6. Infrastructure for implementation (science)

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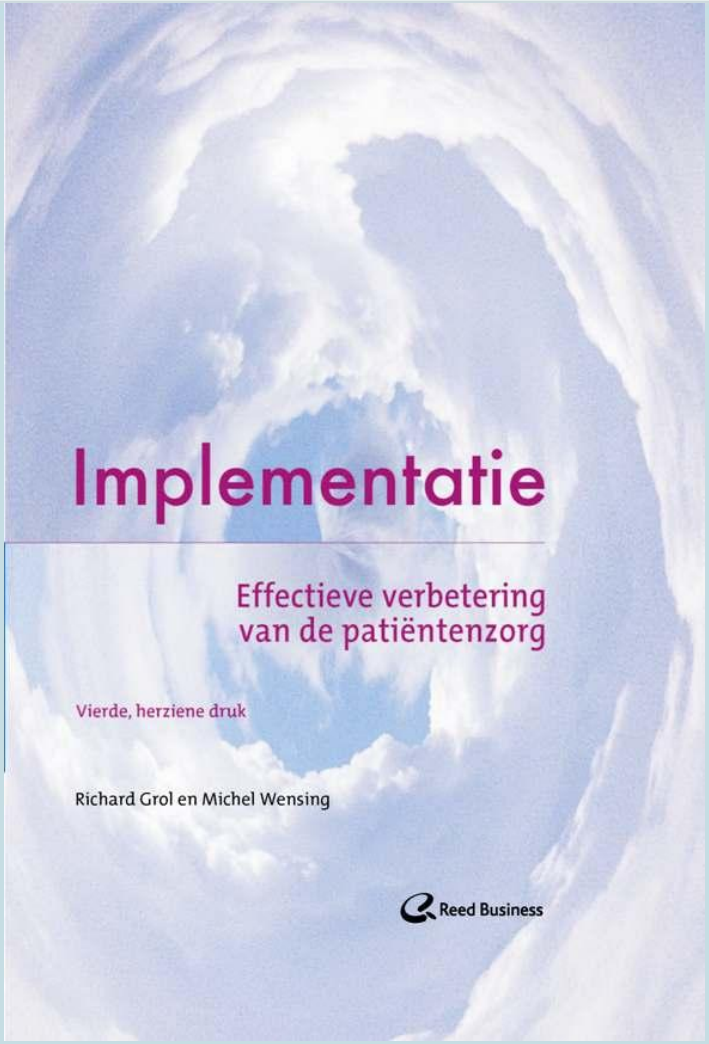

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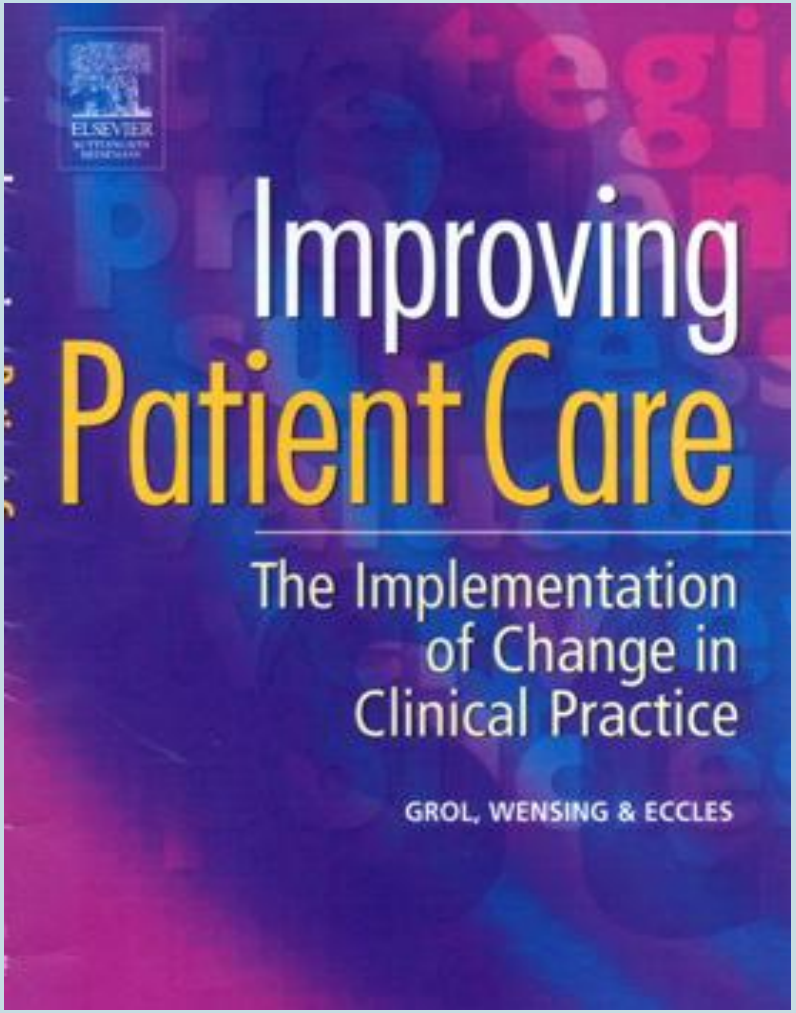

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