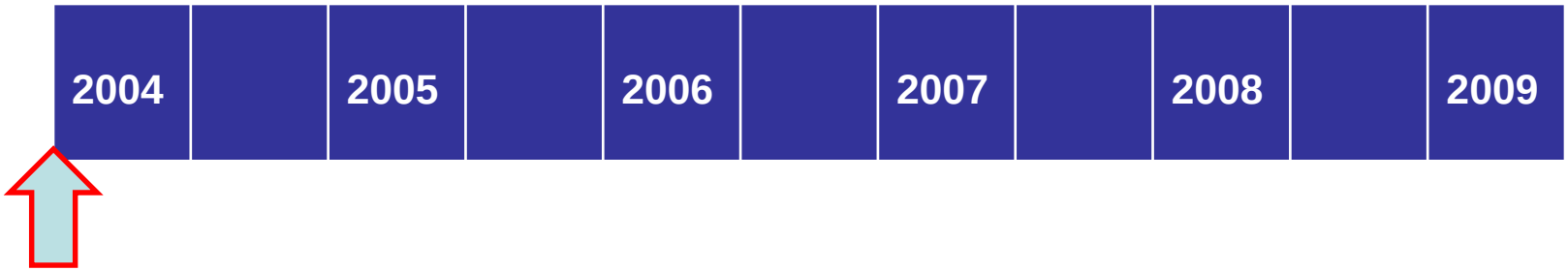
Applied HealthCare Research: How to Get Started

10 components of effective clinical epidemiology

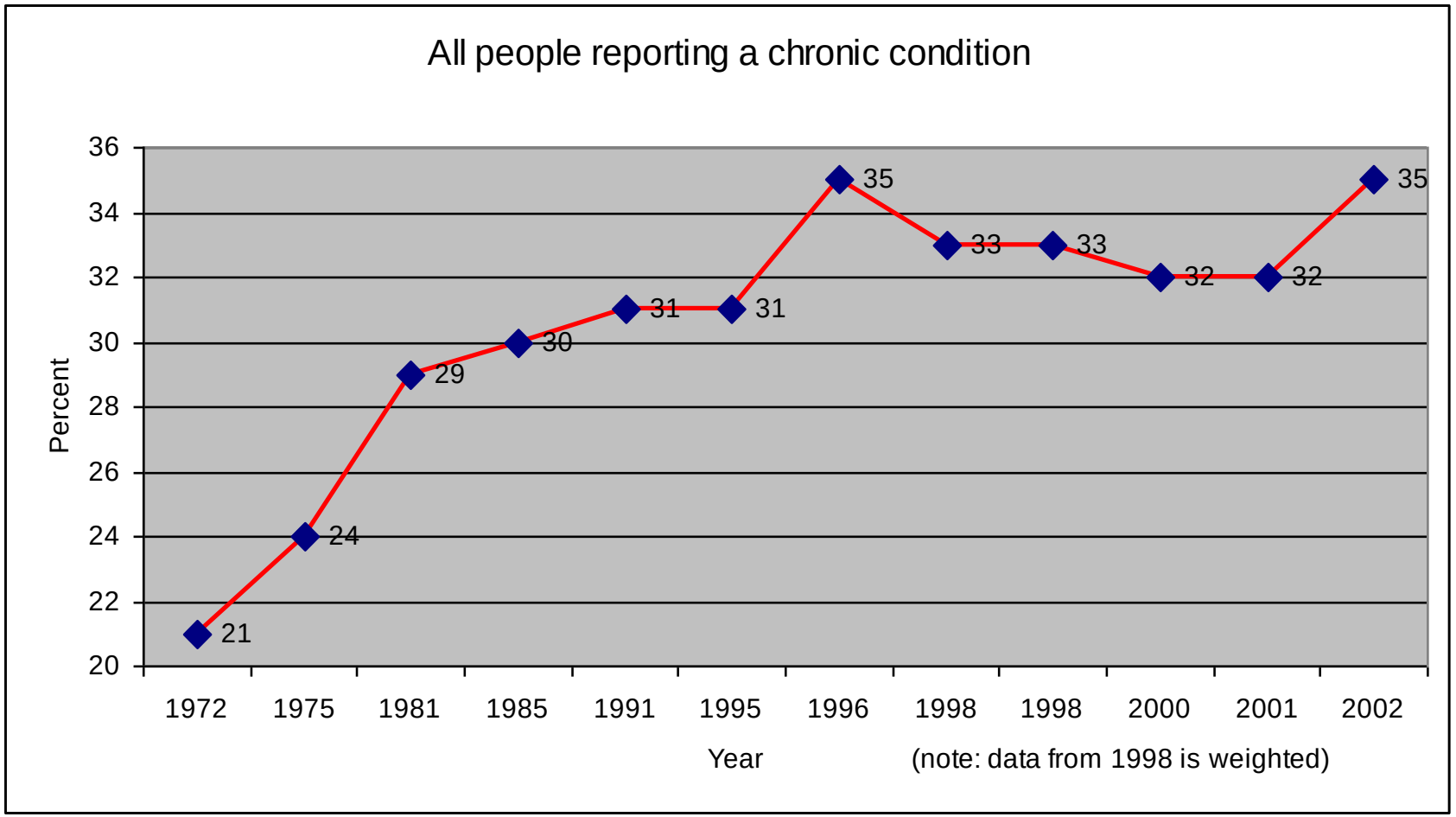
Carl Heneghan

Professor of Evidence-Based Medicine &
Director CEBM

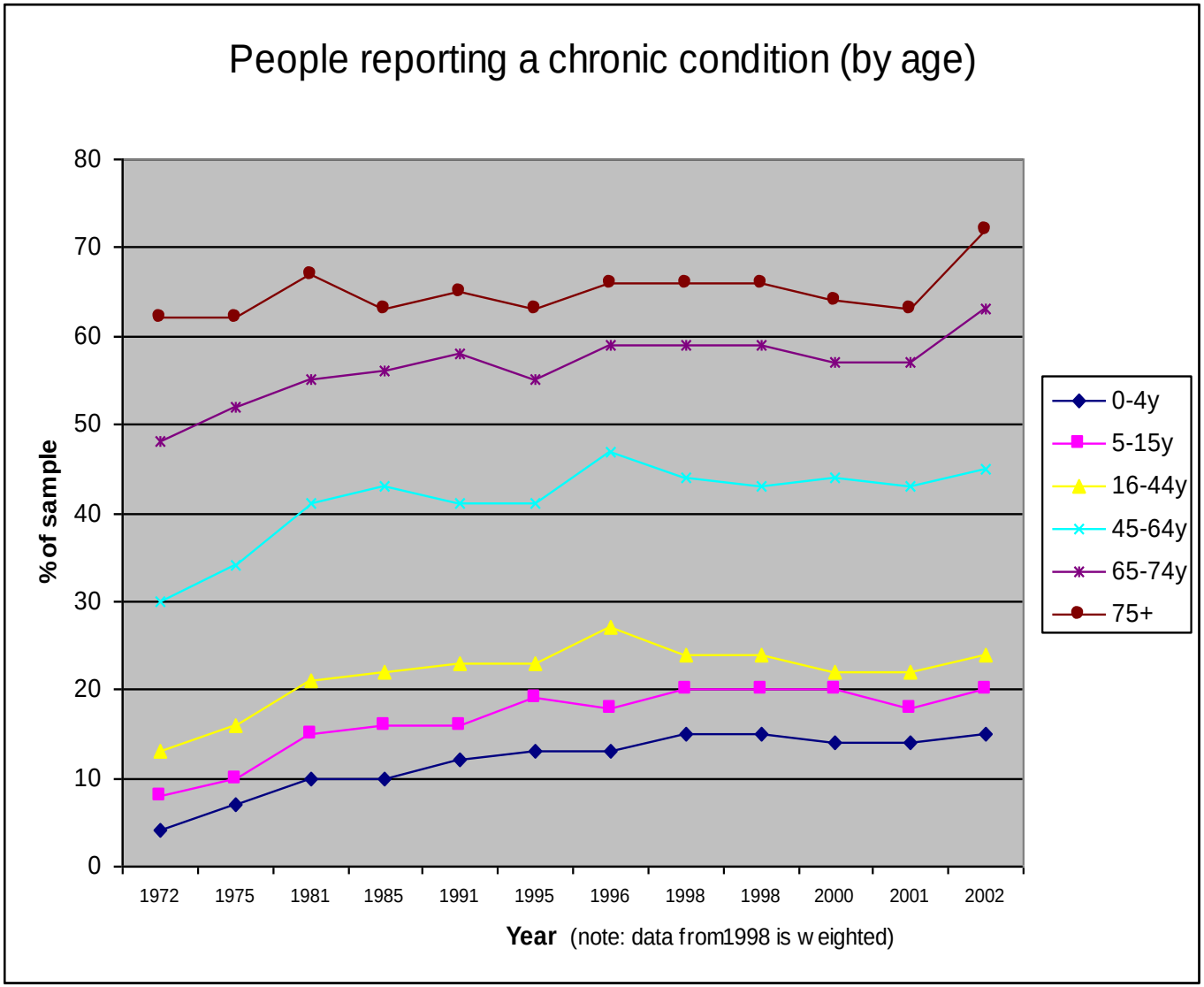
University of Oxford



1. What's the problem that interests you?



Department of Health: Chronic Diseases management; the growing challenge and the strategic response



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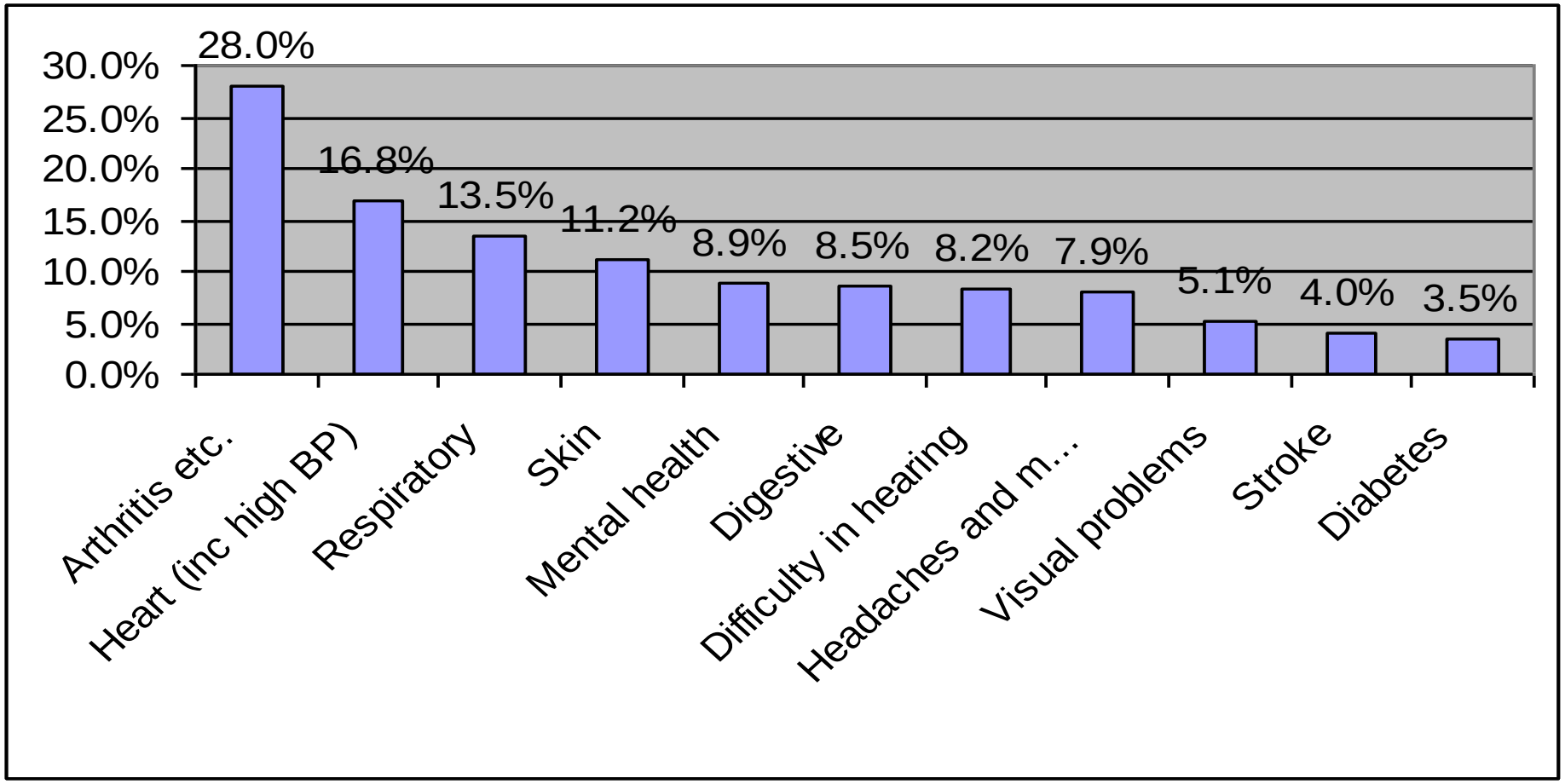
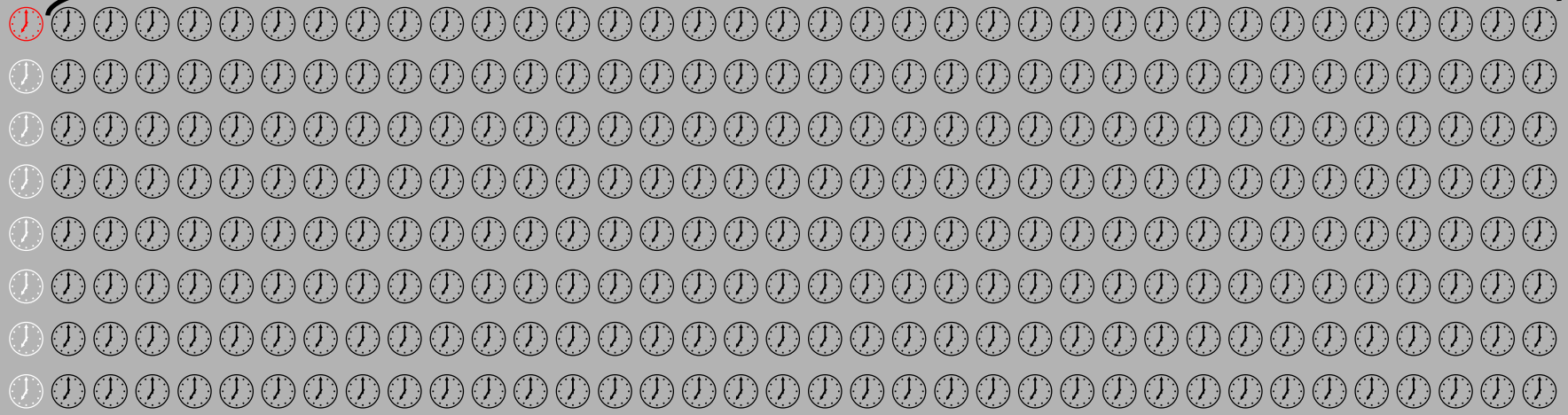


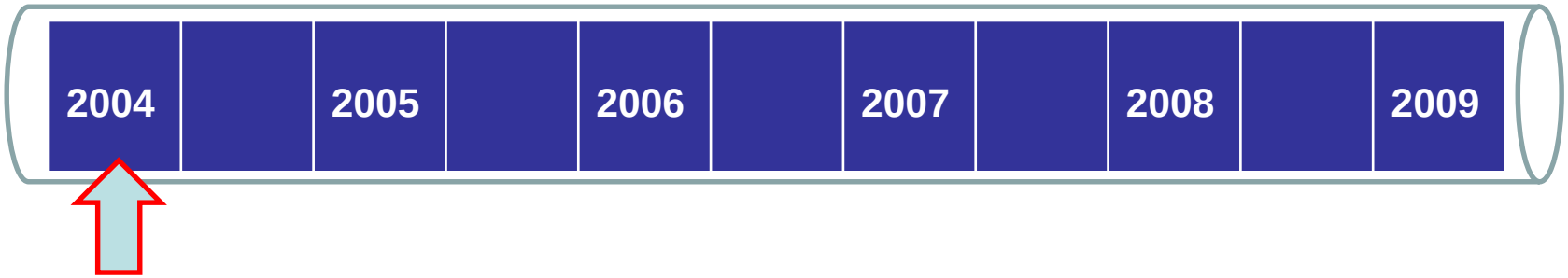
Department of Health: Chronic Diseases management; the growing challenge and the strategic response

Health care professionals may only interact with people with a chronic disease for a few hours a year…

the rest of the time patients care for themselves…



How to get started

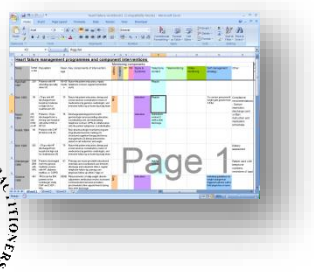


2. Systematic overview of the field

ROYAL COLLEGE OF GENERAL PRACTITIONERS
SCIENTIFIC FOUNDATION BOARD

Title of Project: What is the impact of self-monitoring in chronic disease management? A systematic overview

The aim is to identify the effects and components of currently evaluated self-monitoring methods relevant to general practice. We will undertake a systematic overview of current research.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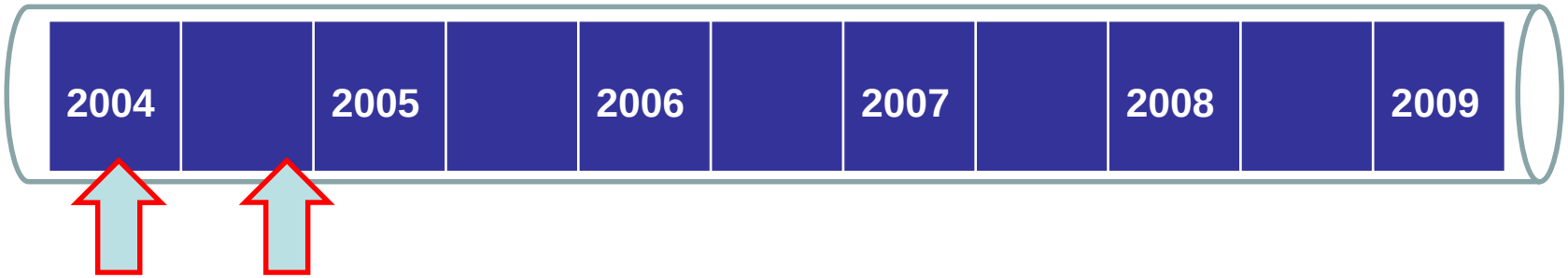
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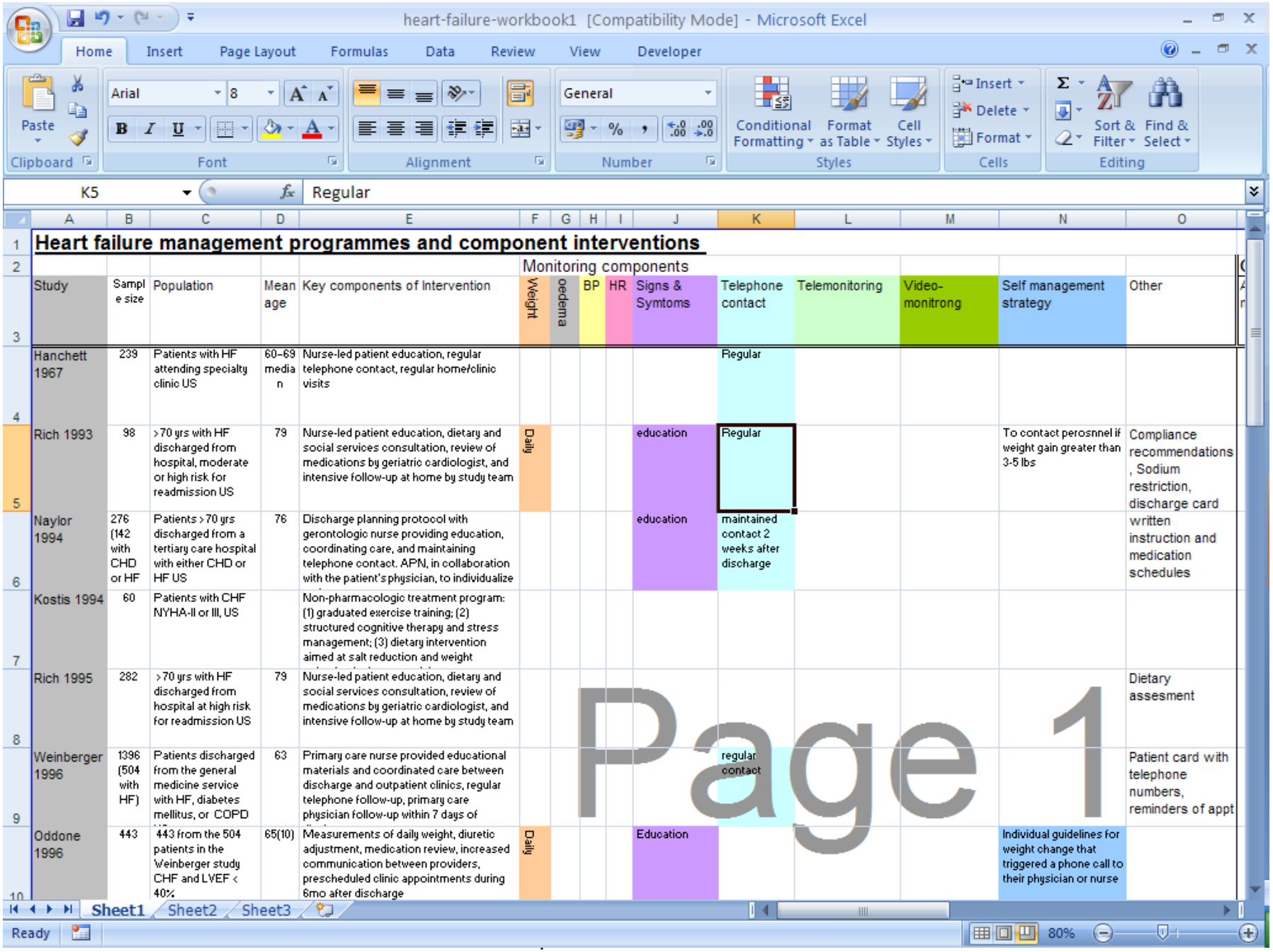
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Styles
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Delete
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Cells
Sort & Filter
Find & Select
Editing
K5
Regular
Heart failure management programmes and component interventions
Monitoring components
Study
Sample size
Population
Mean age
Key components of Intervention
Weight
oedema
BP
HR
Signs & Symtoms
Telephone contact
Telemonitoring
Video-monitrong
Self management strategy
Other
Hanchett 1967
239
Patients with HF attending specialty clinic US
60–69 median
Nurse-led patient education, regular telephone contact, regular home/clinic visits
Regular
Rich 1993
98
>70 yrs with HF discharged from hospital, moderate or high risk for readmission US
79
Nurse-led patient education, dietary and social services consultation, review of medications by geriatric cardiologist, and intensive follow-up at home by study team
Daily
education
Regular
To contact perosnnel if weight gain greater than 3-5 lbs
Compliance recommendations, Sodium restriction, discharge card
Naylor 1994
276 (142 with CHD or HF
Patients >70 yrs discharged from a tertiary care hospital with either CHD or HF US
76
Discharge planning protocol with gerontologic nurse providing education, coordinating care, and maintaining telephone contact. APN, in collaboration with the patient's physician, to individualize
education
maintained contact 2 weeks after discharge
written instruction and medication schedules
Kostis 1994
60
Patients with CHF NYHA-II or III, US
Non-pharmacologic treatment program: (1) graduated exercise training; (2) structured cognitive therapy and stress management; (3) dietary intervention aimed at salt reduction and weight
Rich 1995
282
>70 yrs with HF discharged from hospital at high risk for readmission US
79
Nurse-led patient education, dietary and social services consultation, review of medications by geriatric cardiologist, and intensive follow-up at home by study team
Dietary assesment
Weinberger 1996
1396 (504 with HF)
Patients discharged from the general medicine service with HF, diabetes mellitus, or COPD
63
Primary care nurse provided educational materials and coordinated care between discharge and outpatient clinics, regular telephone follow-up, primary care physician follow-up within 7 days of
regular contact
Patient card with telephone numbers, reminders of appt
Oddone 1996
443
443 from the 504 patients in the Weinberger study CHF and LVEF < 40%
65(10)
Measurements of daily weight, diuretic adjustment, medication review, increased communication between providers, prescheduled clinic appointments during 6mo after discharge
Daily
Education
Individual guidelines for weight change that triggered a phone call to their physician or nurse
Page 1
Sheet1
Sheet2
Sheet3
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Hindawi Publishing Corporation
Evidence-Based Complementary and Alternative Medicine
Volume 2013, Article ID 945895, 18 pages
http://dx.doi.org/10.1155/2013/945895

Review Article

Overview of Systematic Reviews: Yoga as a Therapeutic Intervention for Adults with Acute and Chronic Health Conditions

Marcy C. M

[1] *Department*
[2] *Department*
[3] *Bodleian Hea*

Correspondenc

Received 20 D

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Carl Heneghan

Overview of systematic reviews: Yoga as a therapeutic intervention for adults with acute and chronic health conditions

[PDF] from hindawi.com
Find it @ Oxford

Authors Marcy C McCall, Alison Ward, Nia W Roberts, Carl Heneghan
Publication date 2013/5/1
Journal Evidence
Volume 2013
Publisher Hindawi
Description Objective treatment searched searches as a prim The AMS
Total citations Cited by

2013 201

Open Access Protocol

BMJ Open

Protocol for an overview of systematic reviews of interventions to reduce unscheduled hospital admissions among adults

Niklas Bobrovitz,[1] Igho Onakpoya,[1] Nia Roberts,[2] Carl Heneghan,[1] Kamal R Mahtani[1]

To cite: Bobrovitz N, Onakpoya I, Roberts N, *et al*. Protocol for an overview of systematic reviews of interventions to reduce unscheduled hospital

ABSTRACT

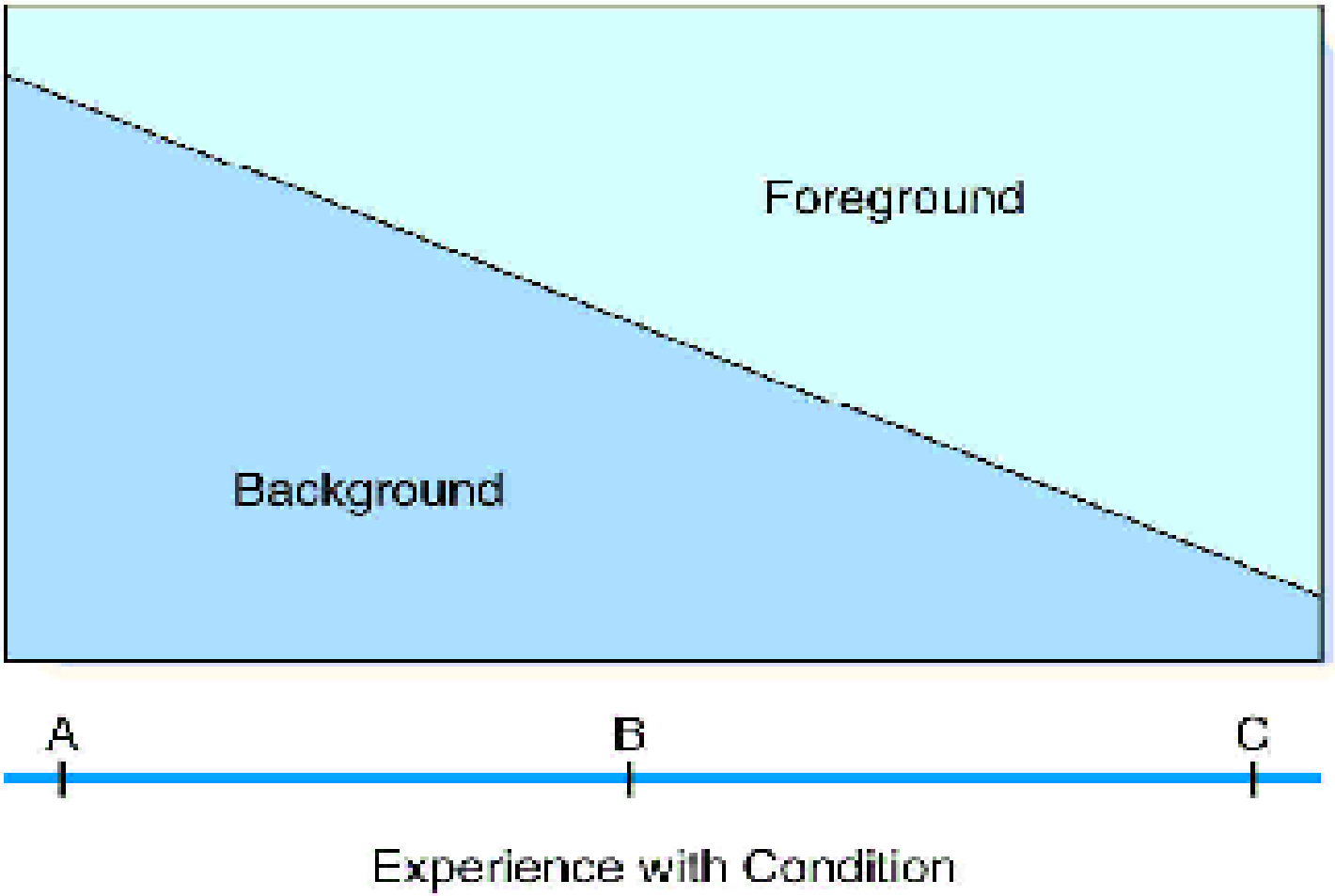
Introduction: Unscheduled hospital admissions are an increasing burden on health systems worldwide. To date, initiatives to reduce admissions have had limited success as it is unclear which strategies

Strengths and limitations of this study

- We are using a novel methodology to hierarchically rank interventions to reduce unscheduled admissions.

3. Defining the question – the hardest bit

Figure 1.1 Background and foreground questions.



Patient presenting with MI

Foreground’ Questions

About actual patient care decisions and actions

For treatment
4 (or 3) components:

In Patients on oral anticoagulation
Does (I) self testing
Compared to usual care
reduce thormbosis (O)

(7 Types of questions)

1. How common is the problem	Prevalence	**PO**
2. Is early detection worthwhile	Screening	**PICO**
3. Is the diagnostic test accurate	Diagnosis	**PICO**
4. What will happen if we do nothing	Prognosis	**PO**
5. Does this intervention help	**Treatment**	**PICO**
6. What are the common harms of an intervention		**PICO**
7. What are the rare harms of an intervention		**PICO**

Box 1

FINER criteria for a good research question

F Feasible

- Adequate number of subjects
- Adequate technical expertise
- Affordable in time and money
- Manageable in scope

I Interesting

- Getting the answer intrigues investigator, peers and community

N Novel

- Confirms, refutes or extends previous findings

E Ethical

- Amenable to a study that institutional review board will approve

R Relevant

- To scientific knowledge
- To clinical and health policy
- To future research

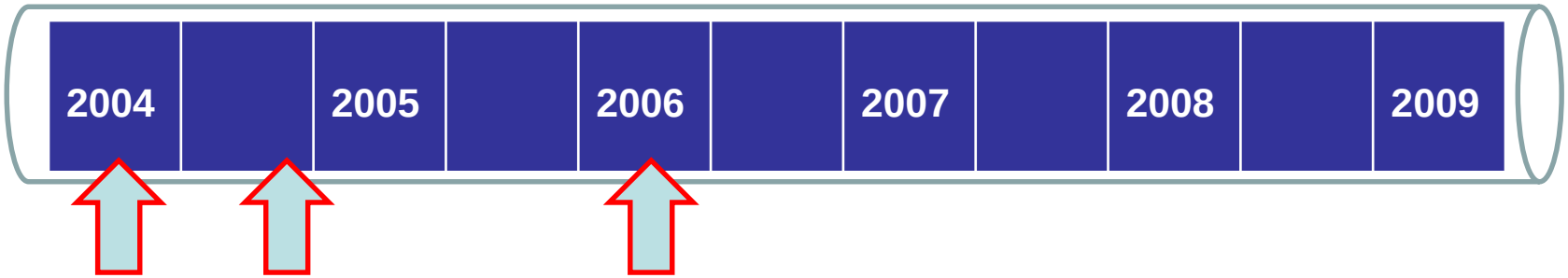
Adapted with permission from Wolters Kluwer Health.[2]

4. Start and end with a systematic review

NIHR DRF 2015 Guidance Notes

Points to consider when preparing an NIHR TCC Training Fellowship Application

NIHR will only fund primary research* where the proposed research is informed by a review of the existing evidence.



THE LANCET

Articles

Self-monitoring of oral anticoagulation: a systematic review and meta-analysis

Dr C Heneghan, MRCGP, P Alonso-Coello, MD, JM Garcia-Alamino, RN, R Perera, PhD, E Meats, BSc, Prof P Glasziou, FRACGP

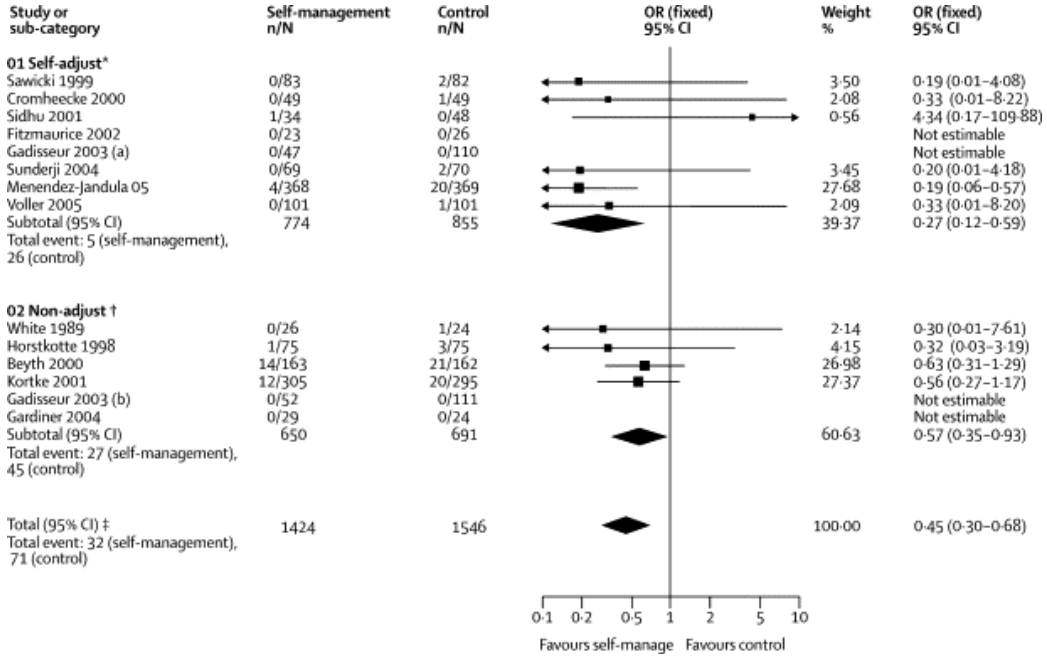
DOI: http://dx.doi.org/10.1016/S0140-6736(06)68139-7

Article Info

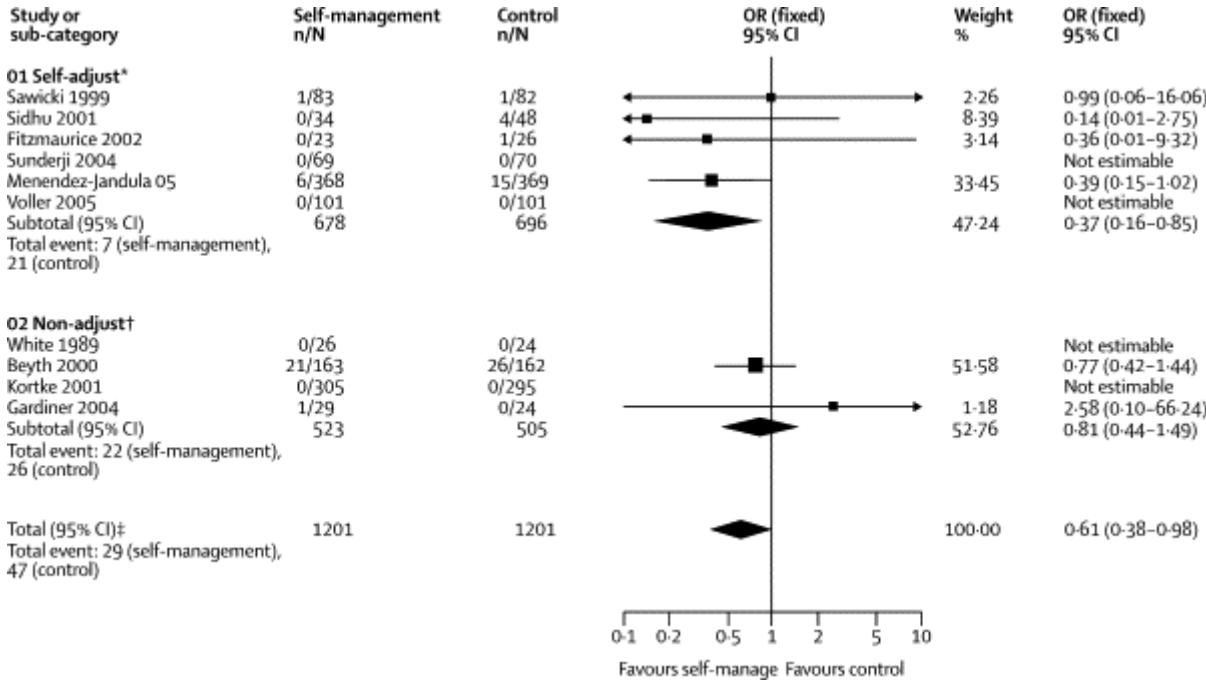
This article can be found in the following collections: Cardiology & vascular-other

Summary | Full Text | Tables and Figures | References

Summary



Self-monitoring & thromboembolic events
OR 0.45 (0.30-0.68)



Self-monitoring & death
OR 0.61 (0.38 to 0.98)

5. Identify gaps in your skills

Clinical Epidemiology for the uninitiated

Skills Level	Score
No idea of the skill	1
Heard of the skill and would be able to undertake basics	2
Could undertake the skill but would require considerable help	3
Could undertake the skill requiring input only for the most difficult tasks	4
Can teach the skill	5

6. Develop further research questions –

Delivering safe and effective anticoagulation for patients – further questions

1. Which subgroups benefit from self-monitoring?
2. Can you replicate trial results in practice?
3. How useful is time in range as a predictor of adverse events?
4. Can we predict successful self monitoring of anticoagulation at the outset?

Which subgroups benefit from self-monitoring?

Executive Summary
Prevention of Thromboembolic Events: The Role of Point of Care Management

David Fitzmaurice[1], Dieter Horstkotte[2]

[1]*Department of Primary Care and General Practice, The University of Birmingham, Birmingham, UK,* [2]*Department of Cardiology, Heart and Diabetes Center North Rhine-Westphalia, Ruhr University Bochum, Bad Oeynhausen, Germany*

The Journal of Heart Valve Disease 2007;16:184-186

The Infection, Thrombosis, Embolism and Bleeding Working Group of the Society for Heart Valve Disease (SHVD) held an International Symposium and Workshop, in Berlin, from 28th to 30th September 2006. A total of 80 participants was involved, with attendees from around Europe, Israel and the United States. A range of topics were discussed, from the organization

Sessions II and III were interactive workshops on the development of registries for valvar patients receiving oral anticoagulation and patient training for self-management of oral anticoagulation. Data were presented from the UK training model, with points of contention discussed betwee agreement regardi

risk of valve failure, for example, in the first few months following surgery, or in pregnant women.

Sessions IX and X focused on the developments of new POC devices for oral anticoagulation management, including the INRatio (S. Testa, Cremona, Italy), PROTIME (U. Taborski, Ludwigshafen, Germany), SmartCheck (H. Kamlah, Dannenfels, Germany), and the CoaguChek XS (B. Piso, Vienna, Austria). Two reports were made from Oxford, UK, providing data on a meta-analysis of published data for self-testing and management of oral anticoagulation (C. Heneghan), with a call for trialists to collaborate in an individual patient-level meta-analysis (R. Perera).

7. Look for methodological issues

Can you replicate the trial results in practice?

BMJ 2008;336:1472-1474 (28 June), doi:10.1136/bmj.39590.732037.47

Analysis

What is missing from descriptions of treatment in trials and reviews?

Paul Glasziou, *professor of evidence based medicine*[1], **Emma Meats**, *research assistant*[1], **Carl Heneghan**, *senior clinical research fellow*[1], **Sasha Shepperd**, *NIHR research scientist in evidence synthesis*[2]

[1] Centre for Evidence-Based Medicine, Department of Primary Health Care, University of Oxford, Oxford OX3 7LF, [2] Department of Public Health, University of Oxford

What is missing from descriptions of treatment in trials and reviews?

Replicating non-pharmacological treatments in practice depends on how well they have been described in research studies, say **Paul Glasziou** and **colleagues**

Have you ever read a trial or review and wondered exactly how to carry out treatments such as a "behavioural intervention," "salt reduction," or "exercise programme"? Although CONSORT and related initiatives have focused on the assessment of validity and presentation of results,[1 2] less attention has been given to the adequacy of the description of the treatment used. For pharmacological treatments the description would need to include the dose, titration, route, timing, duration, and any monitoring used. For complex treatments the problems are even greater.

Why are full descriptions of treatment

receiving numerous requests for additional details from doctors and patients, the author of a randomised trial on graded exercise for chronic fatigue syndrome[6] subsequently published a supplementary article with a more detailed "prescription."[7] Similarly, it is not possible to set up a stroke unit, offer low fat diets, or give smoking cessation advice without sufficient details on the components that were planned and delivered.[8]

Extent of the problem

To assess the extent of problems with descriptions of treatment we prospectively assessed 80 consecutive studies selected for abstraction in the journal *Evidence-Based Medicine*

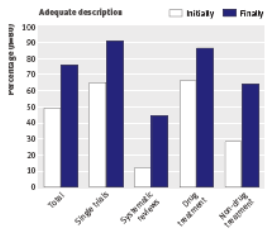


Fig 2 | Percentage of studies with sufficient description of treatment initially (based only on

HOME | FULL RESULTS | THE PROBLEM | OUR APPROACH | OUR TEAM | CONTACT

COMPARE

TRACKING SWITCHED OUTCOMES IN CLINICAL TRIALS

Outcome switching in clinical trials is a serious problem (**read why**). We are systematically checking every trial published in the top five medical journals, to see if they have misreported their findings.

First, we compare each clinical trial report against its registry entry. Some trials report their outcomes perfectly. For the others, we count how many of the outcomes specified in the registry were never reported. And we count how many outcomes were silently added.

Second, whenever we detect unreported or added outcomes, we write a letter to the journal pointing them out, so that readers are aware of the problems. We are tracking which journals have published our letters after 4 weeks - and which haven't (see **our approach**).

Here's what we've found so far. Our project is ongoing since October 2015, and these numbers are updated live.

66	9	355	336
TRIALS CHECKED TO DATE	TRIALS WERE PERFECT	OUTCOMES NOT REPORTED	NEW OUTCOMES SILENTLY ADDED

How useful is time in range as a predictor of adverse events?

American Heart Association.
Learn and Live.

Circulation

Circulation: C
Quality and

Anticoagulation control and prediction of adv
systemat
Yi Wan, Carl Heneghan, Rafael Perera, Nia R
Bankhead, and
CIRCULATIONAHA

Carl Heneghan

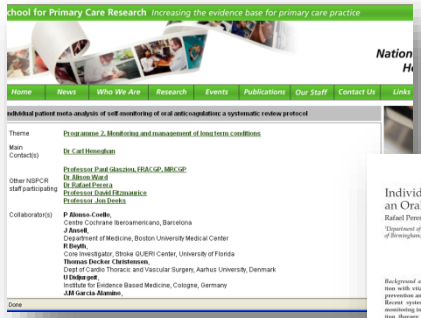
Anticoagulation control and prediction of adverse events in patients with atrial fibrillation a systematic review

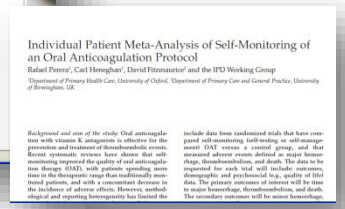
[HTML] from ahajournals.org
Find it @ Oxford

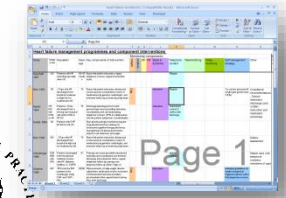
Authors	Yi Wan, Carl Heneghan, Rafael Perera, Nia Roberts, Jennifer Hollowell, Paul Glasziou, Clare Bankhead, Yongyong Xu
Publication date	2008/11/1
Journal	Circulation: Cardiovascular Quality and Outcomes
Volume	1
Issue	2
Pages	84-91
Publisher	Lippincott Williams & Wilkins
Description	Methods and Results— We searched MEDLINE, EMBASE, and Cochrane through January 2008 for studies of atrial fibrillation patients receiving vitamin-K antagonists that reported INR control measures (percentage of time in therapeutic range [TTR] and percentage of INRs in range) and major hemorrhage and thromboembolic events. In total, 47 studies were included from 38 published articles. TTR ranged from 29% to 75%; percentage of INRs ranged from 34% to 84%. From studies reporting both measures, TTR significantly correlated with percentage of INRs in range ...
Total citations	Cited by 242

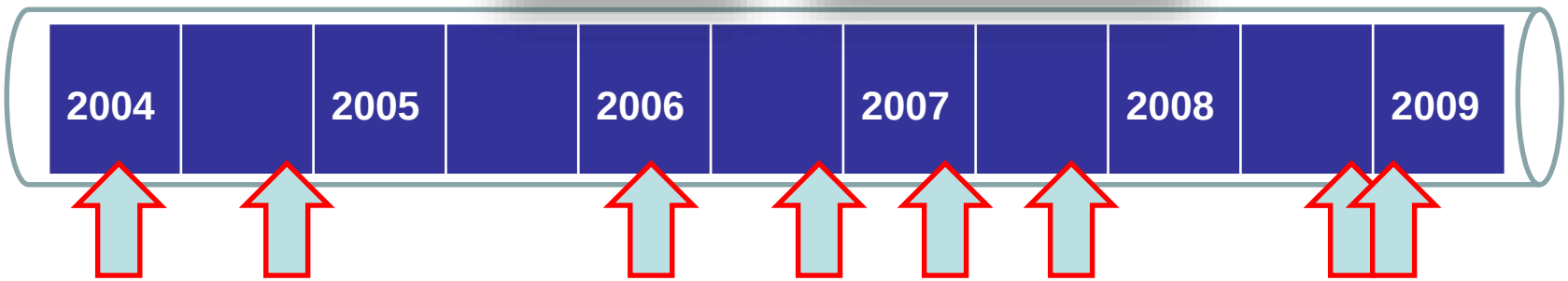
Scholar articles Anticoagulation control and prediction of adverse events in patients with atrial fibrillation a systematic review

8. Look for effects in real world populations









Br J Gen Pract. 2015 Jul; 65(636): e428–e437.
Published online 2015 Jun 29. doi: 10.3399/bjgp15X685633

Cohort study of Anticoagulation Self-Monitoring (CASM): a prospective study of its effectiveness in the community

Aim

To estimate the current levels of control and adverse events in patients self-monitoring OAT, explore the factors that predict success, and determine whether the level of side effects reported from randomised controlled trials are translated to a non-selected population.

Design and setting

Prospective cohort study in the UK.

Method

Participants were aged ≥18 years and registered with a GP. Main outcomes were the proportion of participants, over 12 months, who were still self-monitoring, had not experienced adverse events, and had achieved >80% of time in therapeutic range (TTR).

Results

- In total, 296 participants were recruited (median age 61 yrs, 55% male).
- **Predominately professional or held a university qualification (83%).**
- At 12 months, 267 (90%) were still self-monitoring.
- Mean TTR was 75% (SD 16.9).
- Six serious and two minor adverse events were reported by GPs.
- **Only 46% of participants received any in-person training at the outset.**
- Increased age (P = 0.027), general wellbeing (EQ-5D visual score, P = 0.020), and lower target INR (P = 0.032) were all associated with high (>80% TTR) levels of control.

Conclusion

The findings show that, even with little training, people on OAT can successfully self-monitor, and even self-manage, their INR. TTR was shown to improve with age. However, widespread use of self-monitoring of INR may be limited by the initial costs, as well as a lack of training and support at the outset.

9. It takes at least two people to do applied heath research

1. Cohort study of Anticoagulation Self-Monitoring (CASM): a prospective study of its effectiveness in the community. **Ward** A, Tompson A, Fitzmaurice D, Sutton S, Perera R, **Heneghan** C. Br J Gen Pract. 2015

2. Supporting patients to self-monitor their oral anticoagulation therapy: recommendations based on a qualitative study of patients' experiences.
Tompson A, **Heneghan** C, Fitzmaurice

3. Current practice of venous thrombo
McFarland L, Murray E, Harrison S, **H**

4. ExPeKT--Exploring prevention and
McFarland L, **Ward** A, Greenfield S, M
BMJ Open. 2013 Apr 2;3(4). pii: e0027

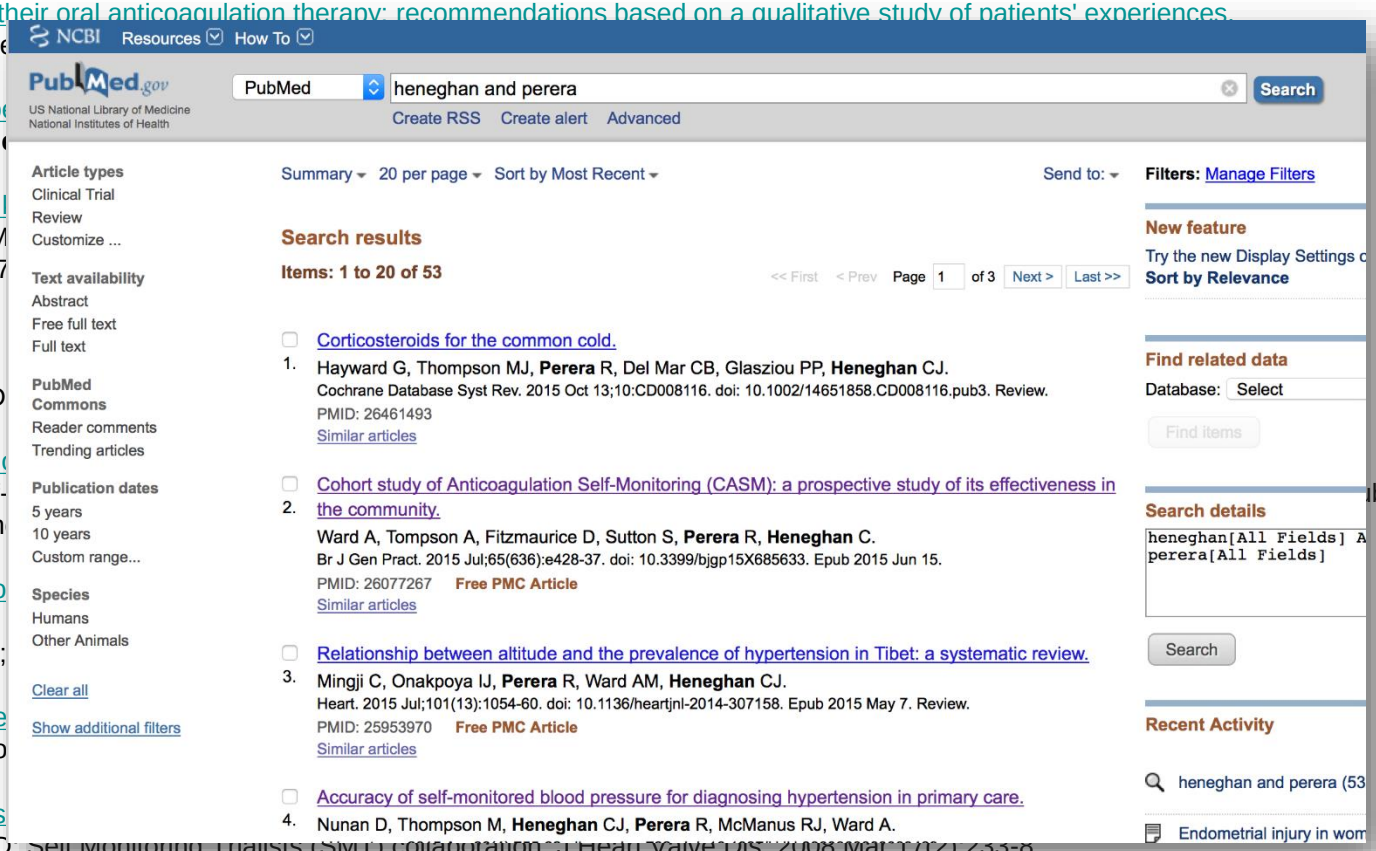
5. Optimal loading dose of warf
Mahtani KR, **Heneghan** CJ, Nu
Cochrane Database Syst Rev. 2012 D

6. Self-monitoring of oral anticoagulati
Heneghan C, **Ward** A, Perera R; Self-
2011 Nov 30. Review. Erratum in: Lan

7. Optimal loading dose for the initiatio
Heneghan C, Tyndel S, Bankhead C,
BMC Cardiovasc Disord. 2010 Apr 19;

8. Self-monitoring and self-manageme
Garcia-Alamino JM, **Ward** AM, Alonso

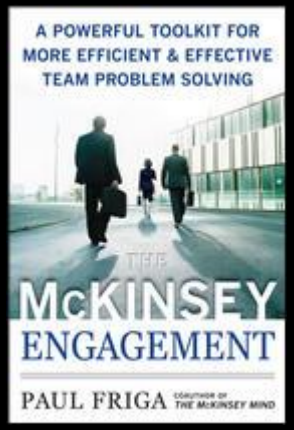
9. Individual patient meta-analysis of s
Perera R, **Heneghan** C, Fitzmaurice D, Self Monitoring Trialists (SMT) collaboration. J Heart Valve Dis. 2008 Mar;17(2):233-8.



10. Self-monitoring of oral anticoagulation: a systematic review and meta-analysis.
Heneghan C, Alonso-Coello P, Garcia-Alamino JM, Perera R, Meats E, Glasziou P. **Lancet**. 2006 Feb 4;367(9508):404-11. Review.

10. Get organized and then get organized a bit more

TEAM	FOCUS
Interpersonal	Analytic
Talk	Frame
Evaluate	Organize
Assist	Collect
Motivate	Understand
	Synthesize



What does impact look like?

NIHR Dissemination Centre

NHS
National Institute for Health Research

NIHR Signal Self-monitoring of war

Published on 21 August 2015

Cost effectiveness

Expert commentary

The NIHR Health Technology assessment adds to a substa
anticoagulation.

This review is supplemented by a recent NIHR-funded stud
successfully self-monitor, and even self-manage, in the cor
has reported that self-monitoring was effective in the long t

Therefore the evidence clearly supports the adoption of sel
supports effective strategies to reduce thromboembolic eve

**Professor Carl Heneghan, Professor of Evidence-Base
Sciences University of Oxford**

WHO Collaborating Centre for Self-Care

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WHO Collaborating Centre for Self-Care

KEEP INFO

For the lates
newsletter.

Sign up

The Nuffield Department of Primary Care Health Sciences has been designated a World Health Organization (WHO) Collaborating Centre for Self-Care in recognition of its international reputation in patient self-monitoring and self-management of cancer, cardiovascular disease and other non-communicable disease (NCD).

The research, training and education undertaken in collaboration with the WHO aims to embed primary care practice to support NCD patient self-care in low and middle income countries.

Over the next four years, the WHO Collaborating Centre for Self-Care will coordinate a network of research centres to promote implementation

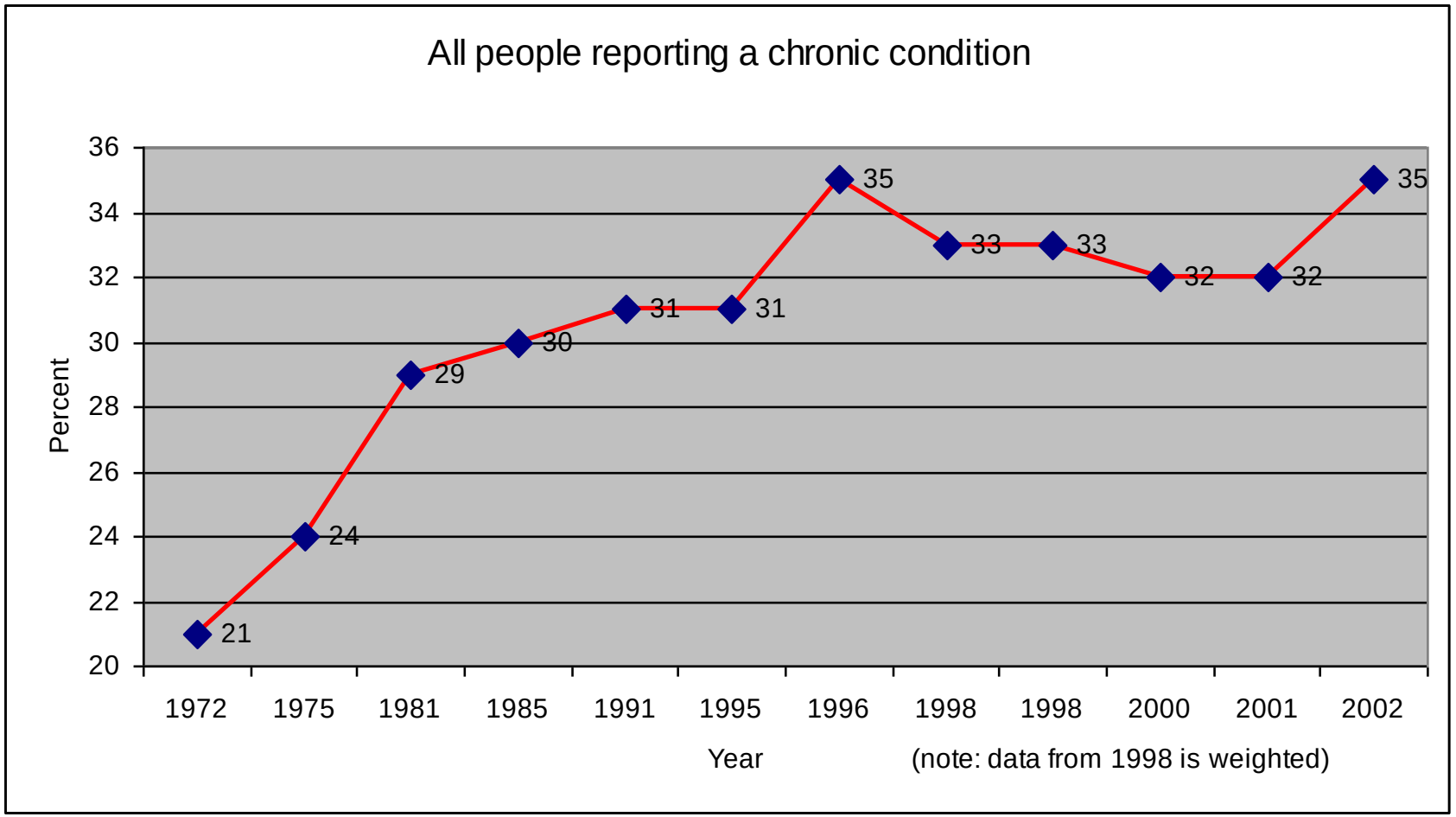
OUR TEAM

Carl Heneghan
Professor of Evidence-Based Medicine

Alison Ward
Director of Postgraduate Studies

Recap

1. What's the problem that interests you?



Department of Health: Chronic Diseases management; the growing challenge and the strategic response

2. Systematic overview of the field

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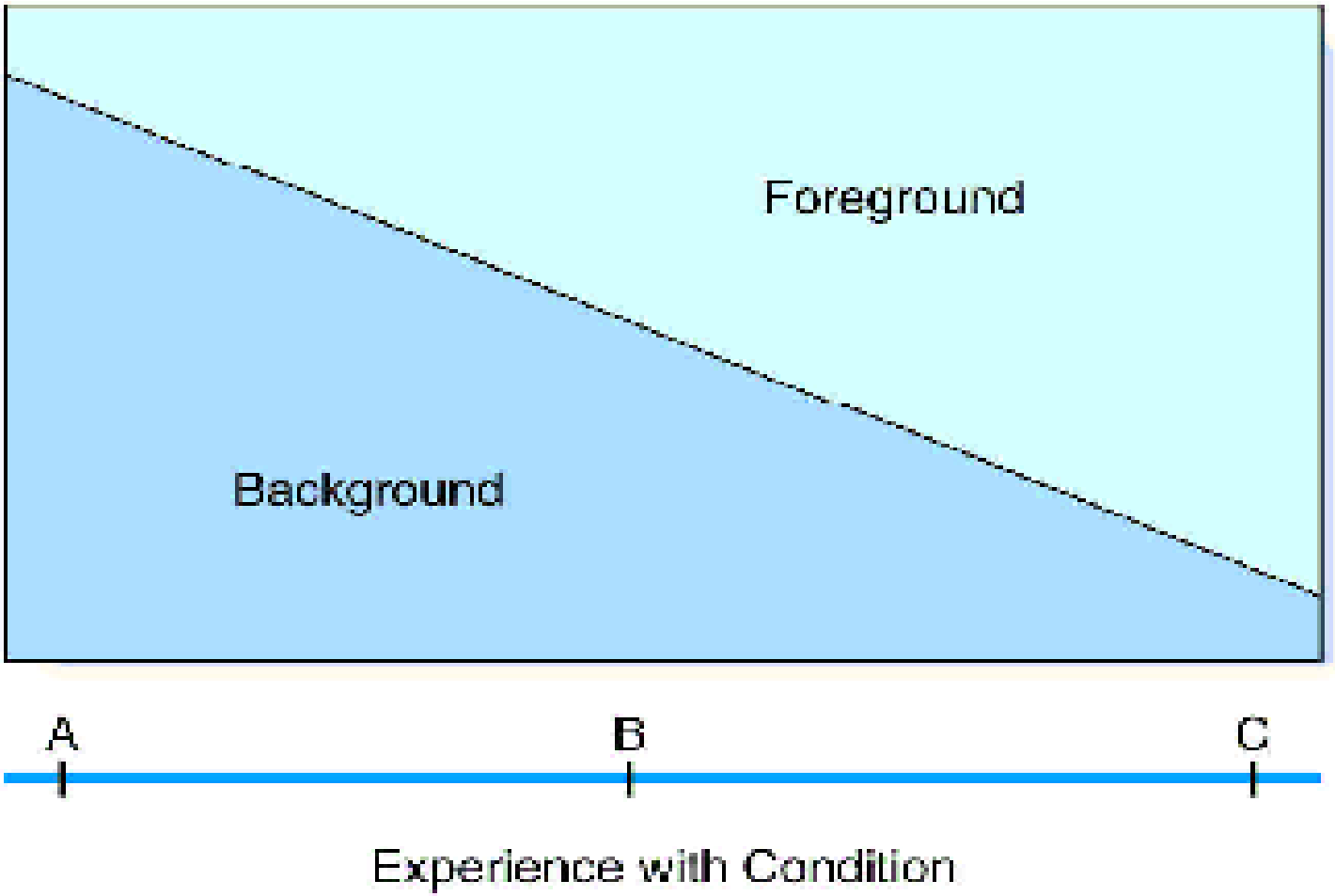
3. Defining the question – the hardest bit

Figure 1.1 Background and foreground questions.

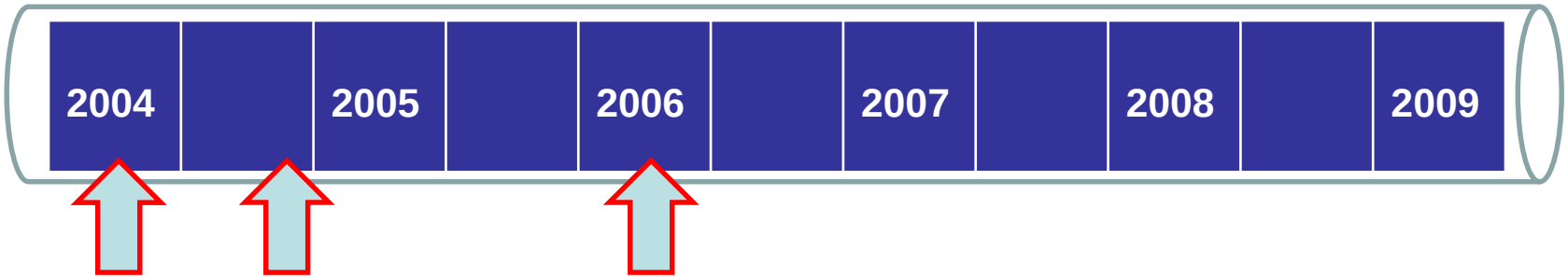


4. Start and end with a systematic review

NIHR DRF 2015 Guidance Notes

Points to consider when preparing an NIHR TCC Training Fellowship Application

NIHR will only fund primary research* where the proposed research is informed by a review of the existing evidence.



5. Identify gaps in your skills

Clinical Epidemiology for the uninitiated

Skills Level	Score
No idea of the skill	1
Heard of the skill and would be able to undertake basics	2
Could undertake the skill but would require considerable help	3
Could undertake the skill requiring input only for the most difficult tasks	4
Can teach the skill	5

6. Develop further research questions –

Delivering safe and effective anticoagulation for patients – further questions

1. Which subgroups benefit from self-monitoring?
2. Can you replicate trial results in practice?
3. How useful is time in range as a predictor of adverse events?
4. Can we predict successful self monitoring of anticoagulation at the outset?

7. Look for methodological issues

Can you replicate the trial results in practice?

BMJ 2008;336:1472-1474 (28 June), doi:10.1136/bmj.39590.732037.47

Analysis

What is missing from descriptions of treatment in trials and reviews?

Paul Glasziou, *professor of evidence based medicine*[1], **Emma Meats**, *research assistant*[1], **Carl Heneghan**, *senior clinical research fellow*[1], **Sasha Shepperd**, *NIHR research scientist in evidence synthesis*[2]

[1] Centre for Evidence-Based Medicine, Department of Primary Health Care, University of Oxford, Oxford OX3 7LF, [2] Department of Public Health, University of Oxford

What is missing from descriptions of treatment in trials and reviews?

Replicating non-pharmacological treatments in practice depends on how well they have been described in research studies, say **Paul Glasziou** and **colleagues**

Have you ever read a trial or review and wondered exactly how to carry out treatments such as a "behavioural intervention," "salt reduction," or "exercise programme"? Although CONSORT and related initiatives have focused on the assessment of validity and presentation of results,[1 2] less attention has been given to the adequacy of the description of the treatment used. For pharmacological treatments the description would need to include the dose, titration, route, timing, duration, and any monitoring used. For complex treatments the problems are even greater.

Why are full descriptions of treatment

receiving numerous requests for additional details from doctors and patients, the author of a randomised trial on graded exercise for chronic fatigue syndrome[6] subsequently published a supplementary article with a more detailed "prescription."[7] Similarly, it is not possible to set up a stroke unit, offer low fat diets, or give smoking cessation advice without sufficient details on the components that were planned and delivered.[8]

Extent of the problem

To assess the extent of problems with descriptions of treatment we prospectively assessed 80 consecutive studies selected for abstraction in the journal *Evidence-Based Medicine*

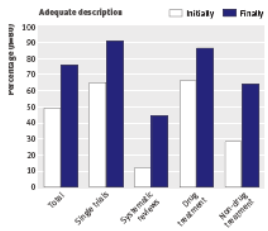
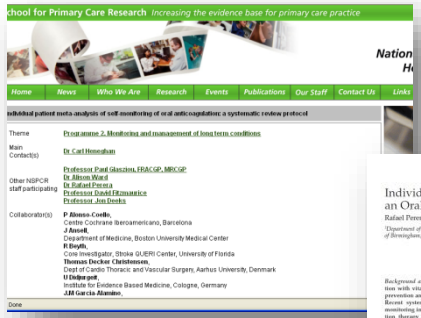
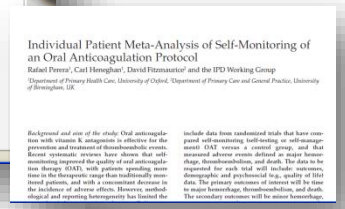
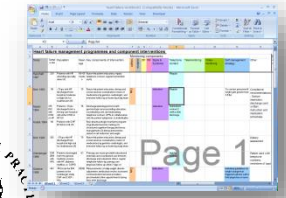


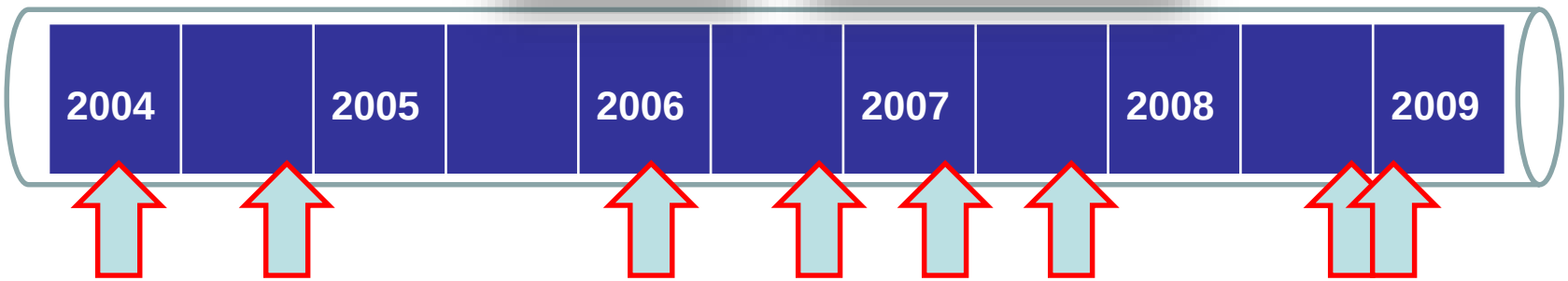
Fig 2 | Percentage of studies with sufficient description of treatment initially (based only on

8. Look for effects in real world populations









9. It takes at least two people to do applied heath research

1. Cohort study of Anticoagulation Self-Monitoring (CASM): a prospective study of its effectiveness in the community.**Ward** A, Tompson A, Fitzmaurice D, Sutton S, Perera R, **Heneghan** C. Br J Gen Pract. 2015

2. Supporting patients to self-monitor their oral anticoagulation therapy: recommendations based on a qualitative study of patients' experiences.
Tompson A, **Heneghan** C, Fitzmaurice D, Sutton S, Harrison S, **Ward** A. Br J Gen Pract. 2015

3. Current practice of venous thromboembolism prevention in acute trusts: a qualitative study.
McFarland L, Murray E, Harrison S, **Heneghan** C, **Ward** A, Fitzmaurice D, Greenfield S. BMJ Open. 2014

4. ExPeKT--Exploring prevention and knowledge of venous thromboembolism: a two-stage, mixed-method study protocol.
McFarland L, **Ward** A, Greenfield S, Murray E, **Heneghan** C, Harrison S, Fitzmaurice D.
BMJ Open. 2013 Apr 2;3(4). pii: e002766. doi: 10.1136/bmjopen-2013-002766. Print 2013.

5. Optimal loading dose of warf
Mahtani KR, **Heneghan** CJ, Nι
Cochrane Database Syst Rev. 2012 Dec 12;12:CD008685. doi: 10.1002/14651858.CD008685.pub2.

6. Self-monitoring of oral anticoagulation: systematic review and meta-analysis of individual patient data.
Heneghan C, **Ward** A, Perera R; Self-Monitoring Trialist Collaboration. Lancet. 2012 Jan 28;379(9813):322-34. doi: 10.1016/S0140-6736(11)61294-4. Epub 2011 Nov 30. Review. Erratum in: Lancet. 2012 Mar 24;379(9821):1102.

7. Optimal loading dose for the initiation of warfarin: a systematic review.
Heneghan C, Tyndel S, Bankhead C, Wan Y, Keeling D, Perera R, **Ward** A.
BMC Cardiovasc Disord. 2010 Apr 19;10:18. doi: 10.1186/1471-2261-10-18. Review.

8. Self-monitoring and self-management of oral anticoagulation.
Garcia-Alamino JM, **Ward** AM, Alonso-Coello P, Perera R, Bankhead C, Fitzmaurice D, **Heneghan** CJ. Cochrane Database Syst Rev. 2010

9. Individual patient meta-analysis of self-monitoring of an oral anticoagulation protocol.
Perera R, **Heneghan** C, Fitzmaurice D; Self Monitoring Trialists (SMT) collaboration. J Heart Valve Dis. 2008 Mar;17(2):233-8.

10. Self-monitoring of oral anticoagulation: a systematic review and meta-analysis.
Heneghan C, Alonso-Coello P, Garcia-Alamino JM, Perera R, Meats E, Glasziou P. **Lancet**. 2006 Feb 4;367(9508):404-11. Review.

Get organized and then get organized a bit more, and then get organized a bit more, and then get organized a bit more and then get organized a bit more and then get organized a bit more and then get organized a bit more and then get organized a bit more and then get organized a bit more Oh and Get organized

Applied HealthCare Research: How to Get Started

10 components of effective clinical epidemiology

Thank You

Carl Heneghan
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Director CEBM
University of Oxford