KT Competencies

Sharon E. Straus on behalf of the KSRU

Competing Interests

- I have a CIHR team grant in network meta-analysis for the Drug Safety and Effectiveness Network; PI for KT Canada/STIHR
- I am on the Advisory Board for the BMJ, Editorial Board for Journal of Clinical Epidemiology; Associate Editor for ACP Journal Club, CMAJ, Implementation Science

Objectives

- To advance knowledge of KT competencies
- To enhance our knowledge and understanding of the different types of knowledge syntheses

Advancing the science and practice of evidence implementation

- Moving beyond measuring the gaps between evidence and practice/decision making
  - Prioritise which ones to target
- Optimising interventions
  - Head to head trials
  - Economic analyses
  - Mixed methods
    - Understand the dose and formulation
- Measuring impact
- Scaling up and sustaining interventions

Building capacity in KT/Implementation

- Advance the science and practice of implementation/KT

4 core competencies:

- Understanding models of KT and KT research;
- Developing capacity to conduct systematic reviews to address KT questions;
- Developing capacity in qualitative methods to examine factors that influence use of evidence; and,
- Developing skills to evaluate the impact, effectiveness and sustainability of KT strategies in different settings and targeting different stakeholders
    - Implementation Sci 2011;Jan

Capacity Building in KT

Stream 1	**Stream 2**	**Stream 3**
Seminar series	Seminar Series	Seminar Series
Summer Institute	Foundations of KT	Intro to EBHC
Pragmatic Trials	End of Grant KT	Intro to KT
Systematic Reviews		Foundations of KT
Qualitative Methods		
End of Grant KT		
Mentorship		

What is a knowledge synthesis?

- A systematic process to identify, appraise and synthesize all the empirical (including qualitative and quantitative) evidence that meets pre-specified eligibility criteria to answer a given research question

What is a Scoping Review?

- Scoping reviews systematically map the literature available on a topic, identifying the key concepts, theories, sources of evidence, and gaps in research

When are scoping reviews helpful?

- To identify if there is sufficient evidence to complete a full review
- To find where insufficient evidence exists and further primary research is needed

Example: Wound Care

- To conduct a systematic search to identify effective interventions for wound care
- To characterise this literature regarding
  - Study characteristics
  - Patient characteristics
  - Wound care interventions
  - Outcomes

- Tricco A, Antony J, Cogo E, Perrier L, Soobiah C, Ashoor H, Straus SE. Scoping review of wound care interventions. CGS 2013

Methods: Inclusion Criteria

- **P**opulation: Adults ≥ 18 years with acute or chronic wound
  - Acute wounds included burns, lacerations, surgical wounds, traumatic wounds
  - Chronic wounds included venous, arterial, diabetic and pressure ulcers and infected surgical wounds
- **I**nterventions: all wound care interventions were included
- **C**omparisons: all comparators
- **O**utcomes: healing, cost/cost effectiveness, admission to hospital, human resources
- **S**tudy Designs: systematic reviews and economic analyses

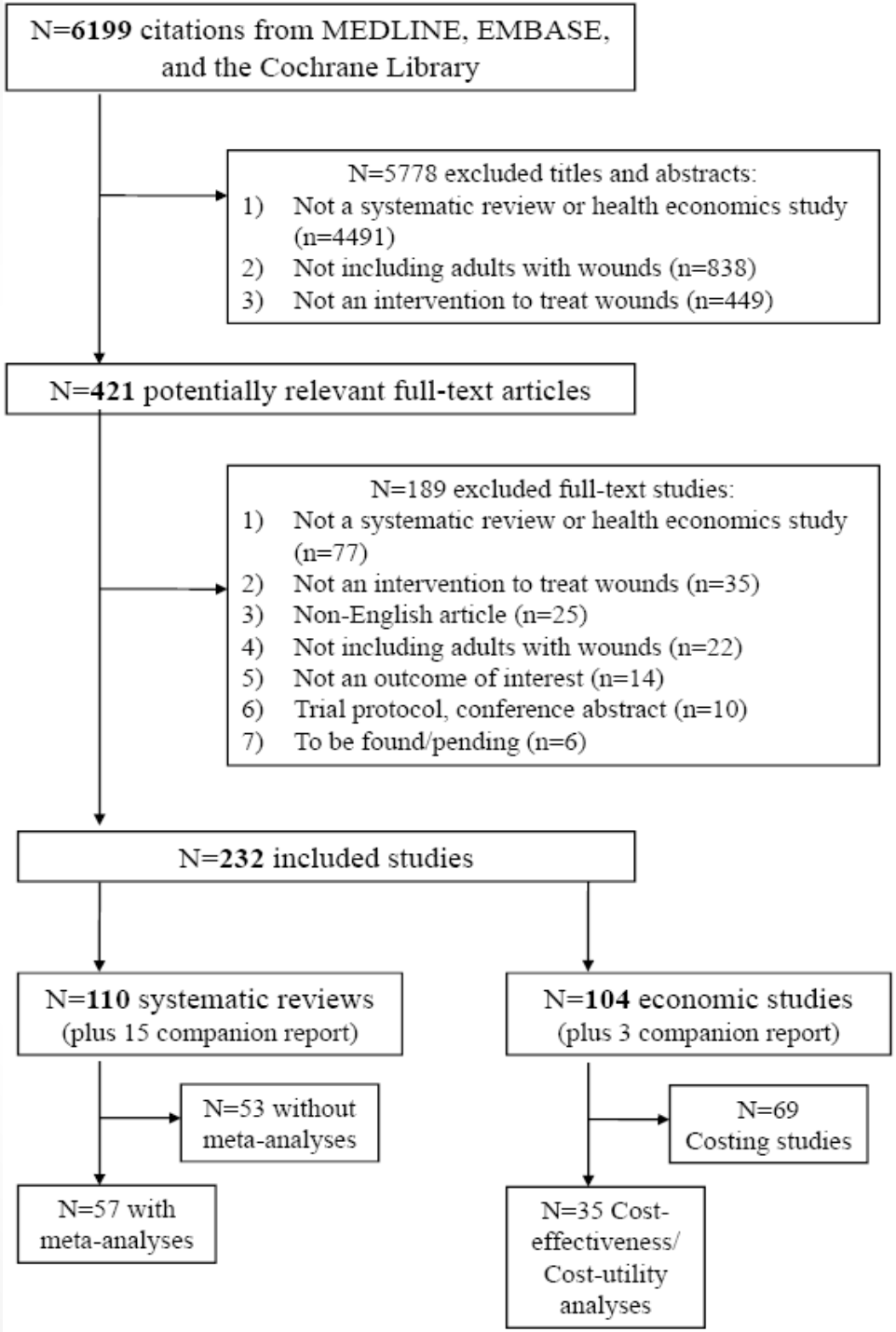
Methods: Search

- The following databases were searched:
  - MEDLINE -1950 to Oct 26, 2012
  - EMBASE – 1980 to Oct 26, 2012
  - Cochrane Library – Issue 10, 2012
- The search was limited to systematic reviews and economic studies using validated search filters
- The search was developed by one information scientist and peer reviewed by another

Methods: Data Abstraction

- All screening and data abstraction performed by 2 people independently
- Data items abstracted included
  - Study characteristics
  - Patient characteristics
  - Outcome results
- Methodological quality assessed
  - Using AMSTAR for systematic reviews
    - 8/11 considered high quality
      - Journal of Clinical Epidemiology 2009, **62:**1013-1020
  - Using Drummond's tool for economic analyses
    - 7/10 considered high quality
      - Methods for the economic evaluation of health care programmes. 3rd edn. Oxford ; New York: Oxford University Press; 2005
- Studies charted

Results


N=6199 citations from MEDLINE, EMBASE, and the Cochrane Library
N=5778 excluded titles and abstracts:
1) Not a systematic review or health economics study (n=4491)
2) Not including adults with wounds (n=838)
3) Not an intervention to treat wounds (n=449)
N=421 potentially relevant full-text articles
N=189 excluded full-text studies:
1) Not a systematic review or health economics study (n=77)
2) Not an intervention to treat wounds (n=35)
3) Non-English article (n=25)
4) Not including adults with wounds (n=22)
5) Not an outcome of interest (n=14)
6) Trial protocol, conference abstract (n=10)
7) To be found/pending (n=6)
N=232 included studies
N=110 systematic reviews (plus 15 companion report)
N=104 economic studies (plus 3 companion report)
N=53 without meta-analyses
N=69 Costing studies
N=57 with meta-analyses
N=35 Cost-effectiveness/ Cost-utility analyses

Results

- 110 systematic reviews
  - 40% were rated as high quality
- 104 economic studies
  - 35 CEAs/CUAs
    - 89% were rated as high quality

Venous Ulcers

- Based on the highest quality systematic reviews for which a meta-analysis was conducted, the following interventions are likely effective
  - High compression stockings versus compression bandages
  - Elastic bandage versus inelastic bandage
  - Multi-layer high compression versus single-layer compression
  - Cadexomer iodine + compression therapy versus usual care + compression therapy
  - 2-layer stocking versus short-stretch bandage
  - Elastic high compression versus multi-layer inelastic compression
  - Tissue engineered skin versus dressings
  - 4-layer bandage versus short-stretch bandage or multi-layer short-stretch bandage
  - Pentoxifylline with or without compression versus placebo or all other treatments

Venous Ulcers

- Based on the highest quality evidence, the following interventions are likely cost-effective:
  - Pentoxifyllline + usual care versus standard compression
  - Four-layer compression bandages versus standard compression or versus short-stretch high compression bandages

What is a Systematic Review?

- Comprehensive review of the literature with assessment of the quality of the evidence
  - +/- meta-analysis

Example: Mild Cognitive Impairment

- To examine the efficacy and safety of cognitive enhancers for patients with MCI

  - Tricco AC, Soobiah C, Berliner S, Ho J, Ng C, Ashoor H, Chen M, Hemmelgarn B, Straus SE. CMAJ 2013; DOI 10.5013

Methods

Data Sources

- MEDLINE, CINAHL, Ageline and EMBASE) reference lists of included studies, trial registries, and conference proceedings, and contacted experts

Eligibility Criteria

- **P**: Patients with a diagnosis of MCI
- **I**: 1 of the following cognitive enhancers:
  - Donepezil
  - Rivastigmine
  - Galantamine
  - Memantine
- **C**: Other cognitive enhancers, placebo or supportive care
- **O**: cognition, function, behaviour, global status, mortality and/or harms
- **S**tudy Design: experimental, quasi-experimental or observational studies
- **T**iming: All years of publication

Methods

Data Abstraction

- Two reviewers independently screened citations and full-text articles, abstracted data in duplicate, and assessed risk of bias using the Cochrane risk-of-bias tool
- Conflicts were resolved by discussion or the involvement of a third reviewer

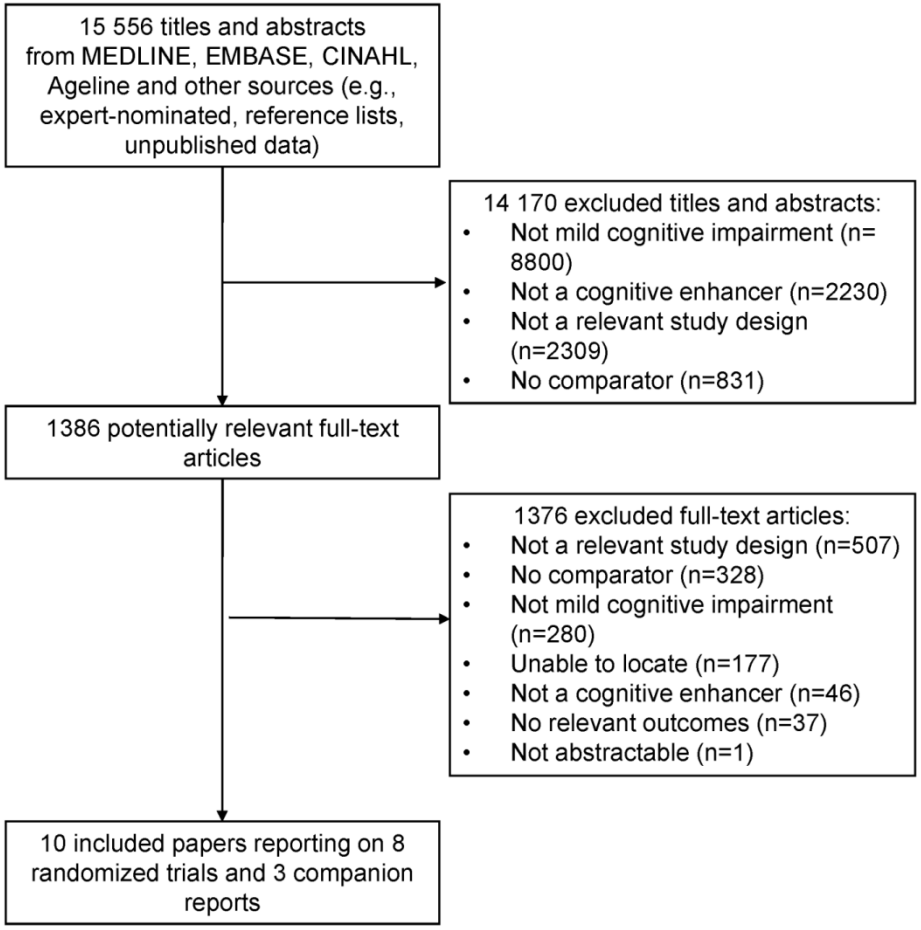
Risk of Bias and Quality Assessment

- Two reviewers independently assessed the studies for risk of bias with the Cochrane Risk of Bias Tool, Cochrane Effective Practice and Organization of Care Risk of Bias Tool, the Newcastle-Ottawa Scale and the McHarm Tool

Analysis

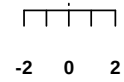
- Random effects analysis

Results


15 556 titles and abstracts from MEDLINE, EMBASE, CINAHL, Ageline and other sources (e.g., expert-nominated, reference lists, unpublished data)
14 170 excluded titles and abstracts:
• Not mild cognitive impairment (n= 8800)
• Not a cognitive enhancer (n=2230)
• Not a relevant study design (n=2309)
• No comparator (n=831)
1386 potentially relevant full-text articles
1376 excluded full-text articles:
• Not a relevant study design (n=507)
• No comparator (n=328)
• Not mild cognitive impairment (n=280)
• Unable to locate (n=177)
• Not a cognitive enhancer (n=46)
• No relevant outcomes (n=37)
• Not abstractable (n=1)
10 included papers reporting on 8 randomized trials and 3 companion reports

Outome: Cognition

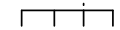
Authors and Year	Treatment	Treatment #Pts	Treatment SMD	Treatment SD	Placebo #Pts	Placebo SMD	Placebo SD	SMD[95% CI]
Doody et al, 2009	Donepezil 5-10	379	-1	8.76	378	-0.13	6.8	-0.11 [-0.25 , 0.03]
Petersen et al, 2005	Donepezil 5-10	253	3.68	5.95	259	3.74	6.97	-0.01 [-0.18 , 0.16]
Salloway et al, 2004	Donepezil 5-10	130	-3.1	5.7	132	-1.2	5.74	-0.33 [-0.57 , -0.09]
Winblad et al, 2008a	Galantamine16-24	437	-1.2	6.08	453	-0.7	6.17	-0.08 [-0.21 , 0.05]
Winblad et al, 2008b	Galantamine16-24	501	-0.6	6.54	510	-0.7	6.85	0.01 [-0.11 , 0.14]
RE Model								-0.07 [-0.16 , 0.01]



Favours Treatment Favours Placebo

Outcome: Vomiting

Authors and Year	Treatment	Treatment #Events	Treatment #Pts	Placebo #Events	Placebo #Pts	Relative Risk [95% CI]
Feldman et al, 2007	Rivastigmine 3-12	164	505	37	509	4.47 [3.20 , 6.24]
Petersen et al, 2005	Donepezil 5-10	15	253	5	259	3.07 [1.13 , 8.32]
Salloway et al, 2004	Donepezil 5-10	12	132	0	137	25.94 [1.55 , 433.73]
RE Model						4.40 [3.21 , 6.03]



0.05 1.00

Favours Treatment Favours Placebo

Conclusions

- Cognitive enhancers did not improve cognition, function or behaviour among patients with MCI
- They were associated with a higher risk of gastrointestinal side effects

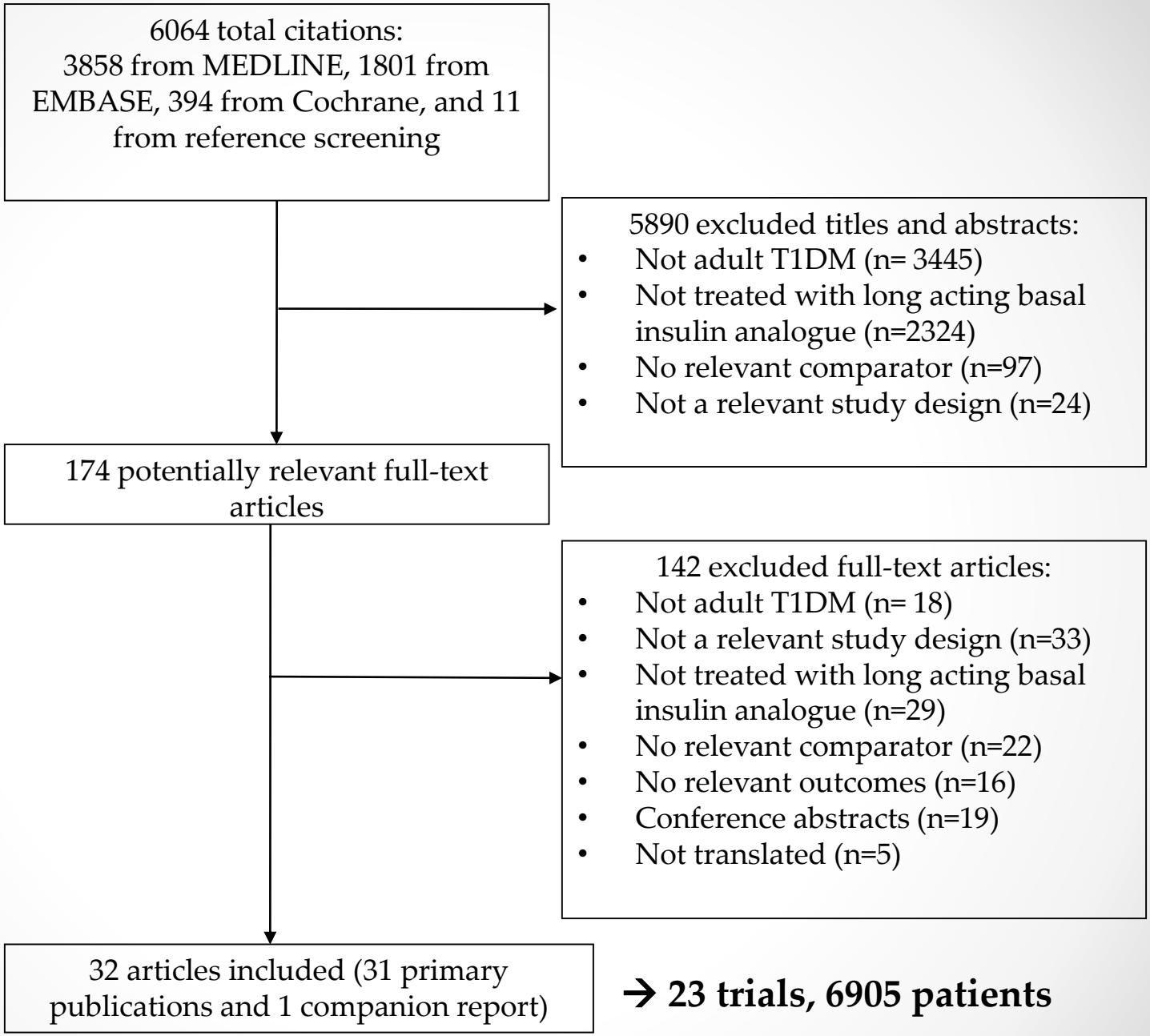
What is a Network Meta-Analysis?

- Builds on traditional meta-analytic techniques and allows the comparison of two or more alternative interventions and the integration of direct and indirect evidence on benefits and harms
- Uses direct and indirect evidence and assesses the consistency across the evidence
  - Mixed treatment comparison

Methods – eligibility criteria

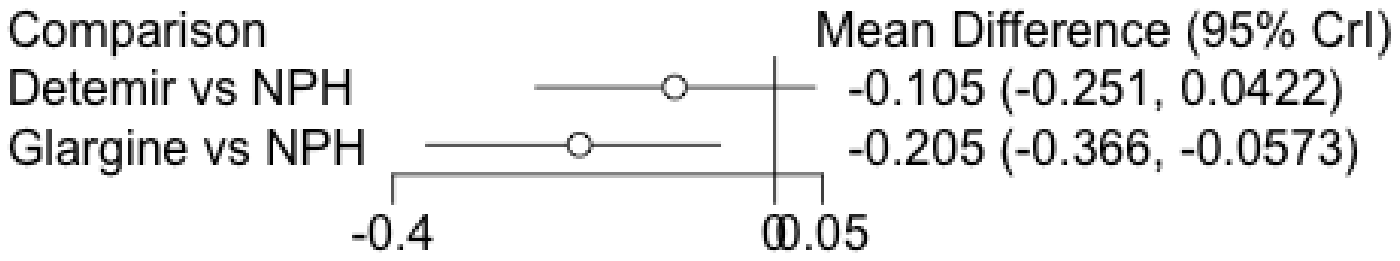
- **P:** adults with type 1 diabetes
- **I:** long-acting insulin analogues (glargine and detemir)
- **C:** intermediate-acting insulin (NPH and lente) or placebo
- **O:** A1C, utilization (e.g., ED visits), hypo/hyperglycemia, weight gain, quality of life, micro-/macrovascular complications, all-cause mortality, incident cancers, cost
- **S**tudy designs: experimental, quasi-experimental, cohort studies

Results



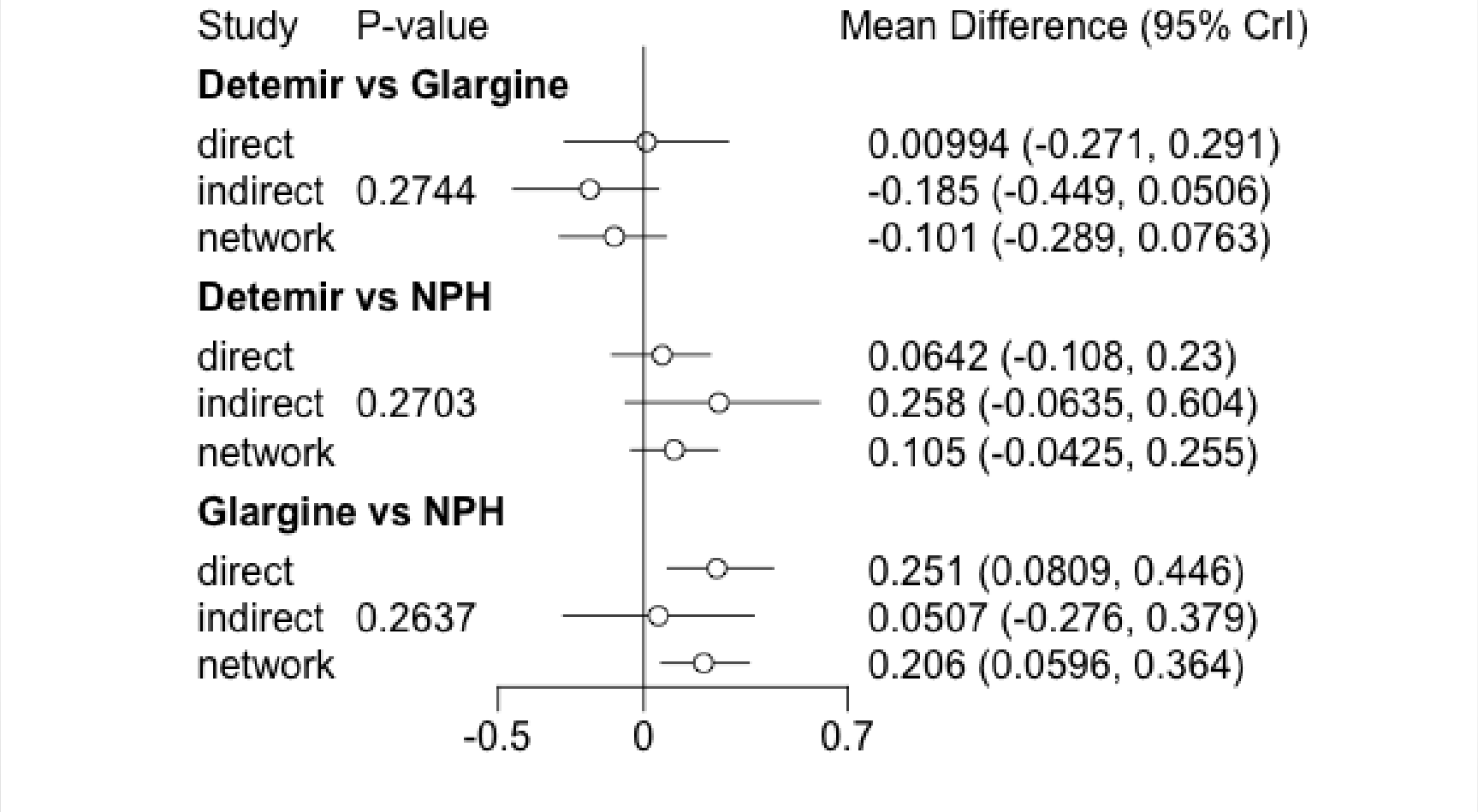
→ 23 trials, 6905 patients

A1C network meta-analysis (n=20 trials, 5086 patients)



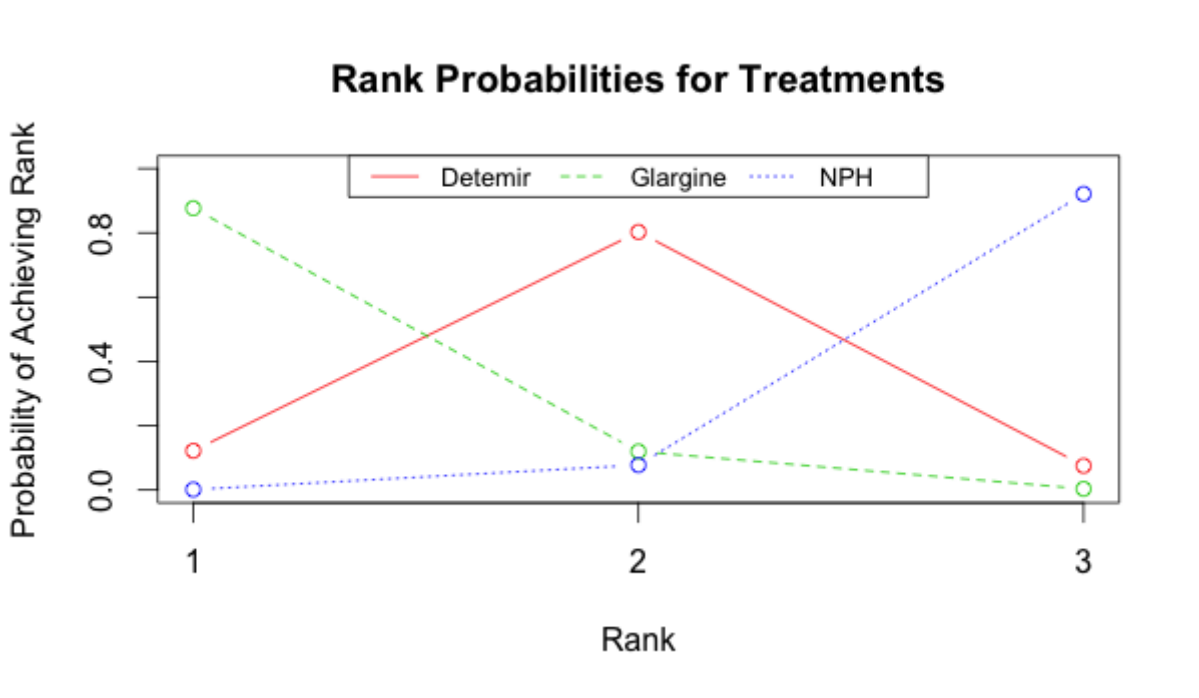
- Detemir not different from NPH
- Glargine superior to NPH

Node-splitting analysis (A1C)



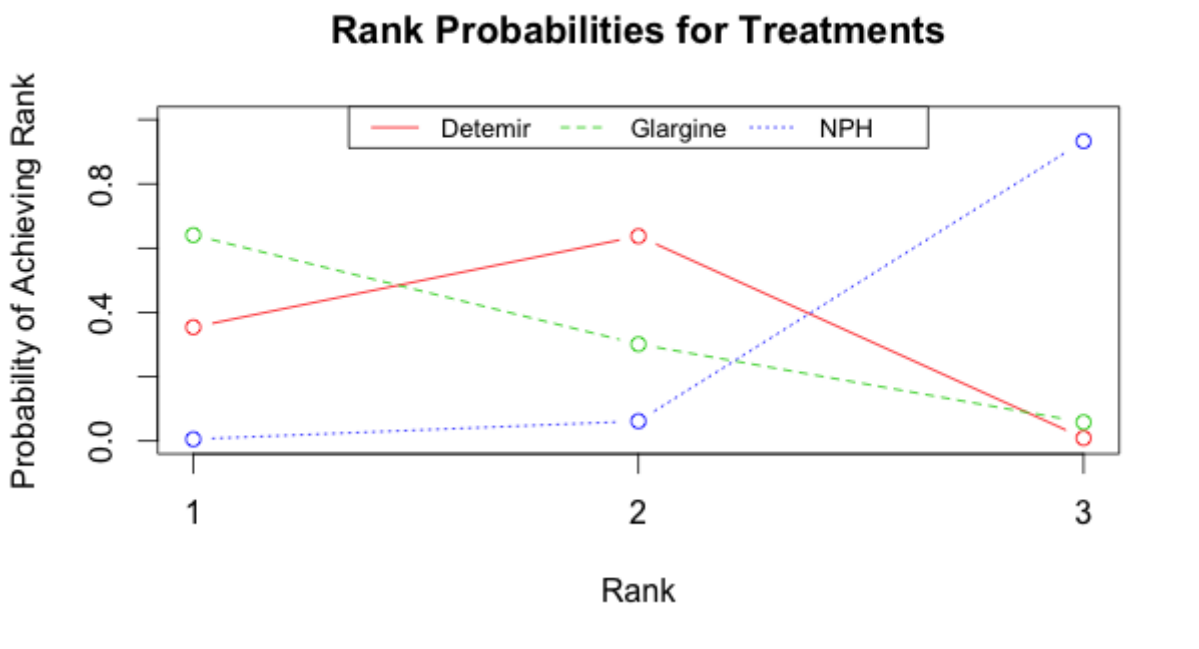
- Results from direct and indirect consistent

Rankogram (A1C)



- Glargine high probability of ranking first

Rankogram (severe hypoglycemia)



- Glargine high probability of ranking first

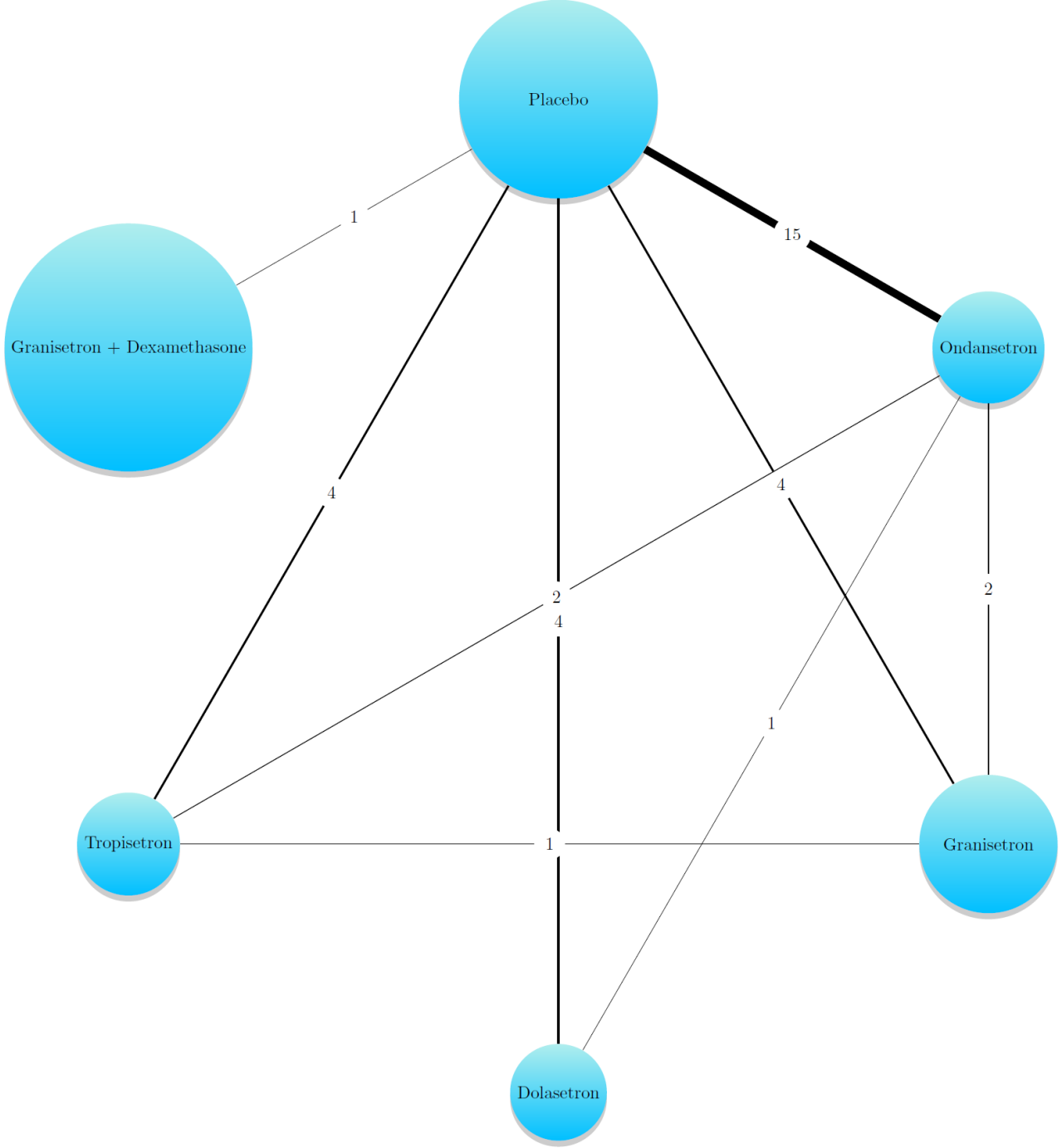


Figure 1: Network configuration for the arrhythmia dataset

Limitations

- Methods still in their infancy
  - Node splitting
  - Presentation of results
  - Ranking of treatments

What is a Realist Review?

- What works for whom, under what circumstances and why
- Primary focus is on the causal mechanisms or theories that underlie types of interventions or programmes and aims to build explanations across interventions or programmes, which share similar underlying theories of change

Getting started

- **P** – Patients/participants/population, problem, policy intentions or uses
- **I** – Health services interventions, programs
- **C** – Circumstances, context, concept
- **O** – Barriers, facilitators, attitudes, knowledge
- **T** – Candidate theories that can be used to explain the intervention (successes and failures)
  - Among lower SES people living in India (P), can health insurance interventions (I) improve access to quality care (O)?

Limitations

- Lack explicit guidance on how to deal with contradictory evidence or weight of evidence
  - Comes down to the judgments and perspectives of the research team
- Quality assessment not always a component
- Different approaches to searching
- Will not necessarily produce specific answers to particular decision needs since all conclusions are contextual

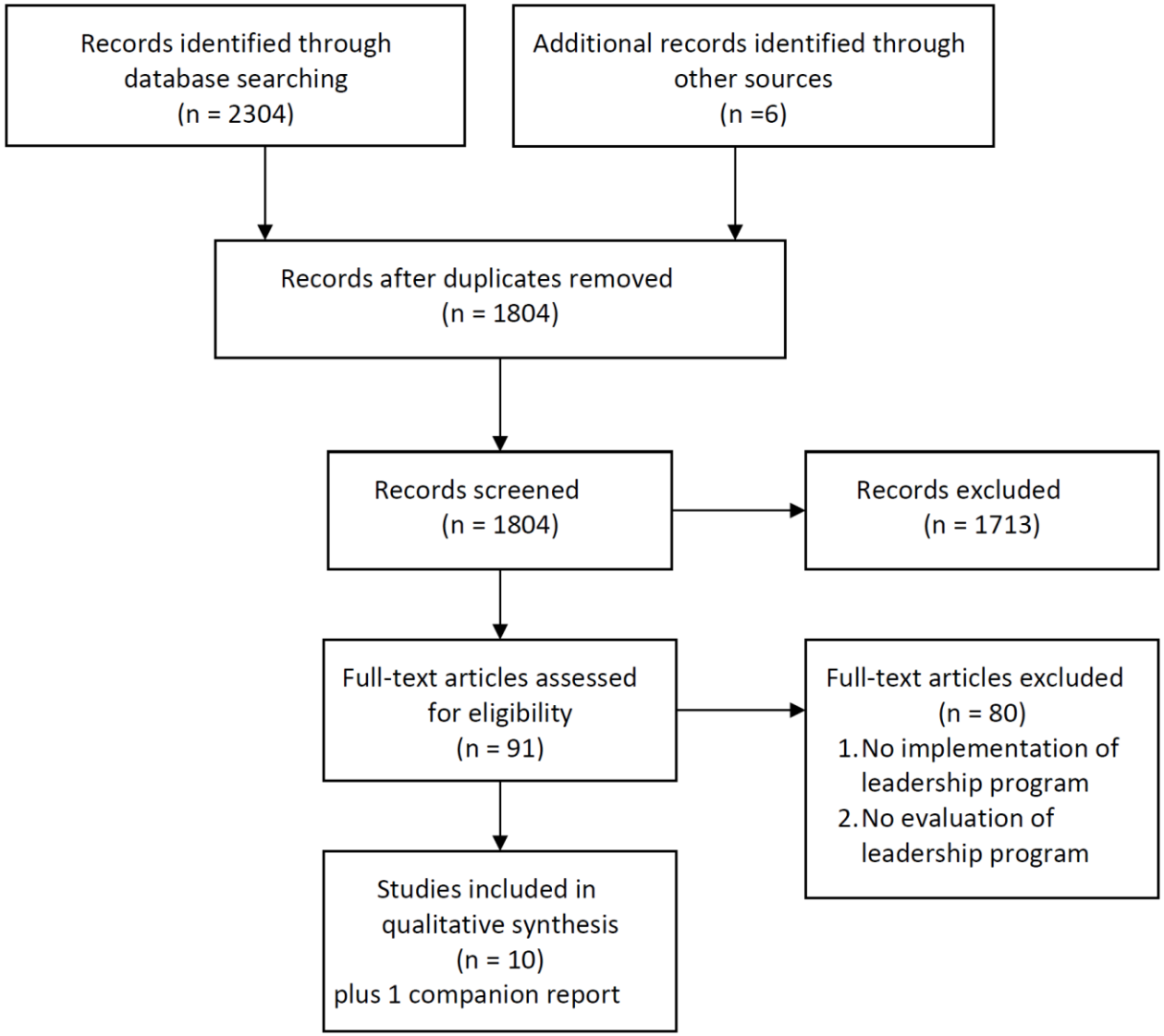
Example of realist review

- To identify the impact of leadership training programs at academic medicine centers (AMCs) on physicians' knowledge, skills, attitudes, behaviors, and outcomes and to understand what works for whom, and under what circumstances
  - Straus SE, Soobiah C, Levinson W. Academic Medicine 2013

Inclusion criteria

- **P**: physicians in academic centres
- **I**: any training initiatives for staff physicians targeting any type of leadership
- **C**: circumstances, context
- **O**: measures of academic promotion or other physician-level outcomes, such as job satisfaction, retention, absenteeism, leadership positions attained, and self-efficacy.
- **S**: any qualitative or quantitative study

Figure 1. Study Flow chart



Results

- All studies were at substantial risk of bias
- Highest quality ones showed that
  - leadership training programs affected participants' advancement in
    - academic rank (48% versus 21%, $P = .005$)
    - hospital leadership position (30% versus 9%, $P = .008$)
  - participants were more successful in publishing papers (3.5 per year versus 2.1 per year, $P < .001$) compared to nonparticipants
- Qualitative studies found that certain elements like time management and goal setting were particularly important in these interventions and were perceived to be useful in their jobs

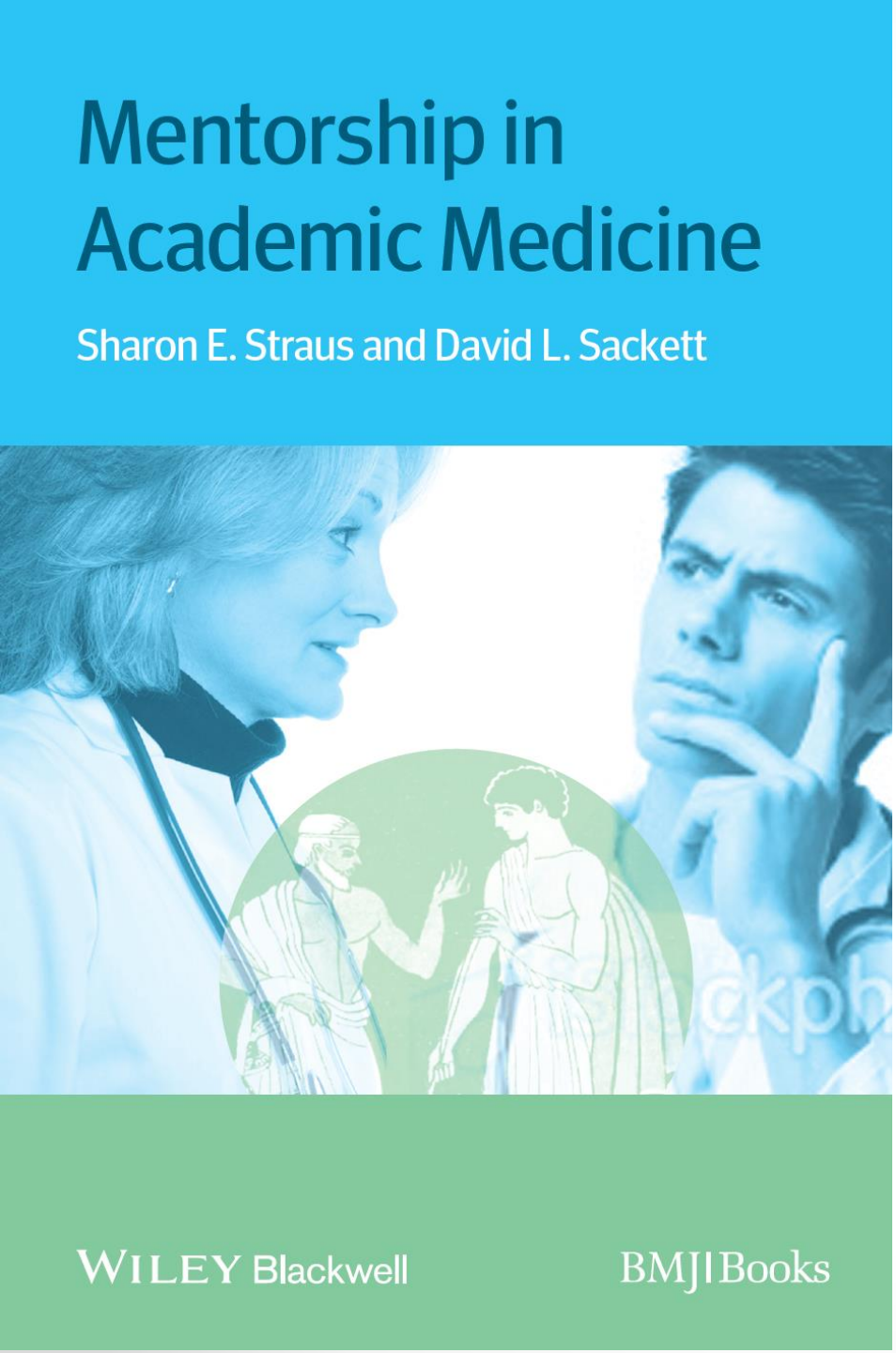
Mentorship

Why should we care?

- Systematic review of literature identified 39 studies
  - 34 cross sectional self-report surveys
    - Median sample size 219
    - Median response rate 62%
  - 3 before and after case series
  - 1 case control study
  - 1 cohort study
  - (updated search April 2012 and identified 13 additional studies – all case control or cross sectional self-report surveys)
    - JAMA 2006;296:1103-15.

Why should we care?

- Academics who got mentored
  - Reported greater career satisfaction
  - Received more peer reviewed grants
  - Published more peer reviewed publications
  - Were promoted more quickly
  - Were more likely to stay at their institutions
- Academics who were mentors
  - Reported greater career satisfaction



- www.mentorshipacademicmedicine.com

A tip: Stepped care for saying 'no'

- Don't say 'yes' right away
- Don't let yourself be flattered into saying 'yes'
- Make sure you know what is expected
- Consider the opportunity cost
- Say 'no' nicely
- Learn from your mistakes
  - Sackett and Oxman, Clinical Trials, 2013

Ways of saying 'no' nicely

- Just say no
  - I can't
- I'm not allowed
  - My mentor/boss won't let me
  - I have already (e.g. supervised 2 students this year) which is the quota set by my mentor/boss
- I need to focus elsewhere
  - I need to focus on my research, teaching…
  - I would like to do more of this activity when my career takes off
- It wouldn't be fair to others
  - I already have xx students and taking another on would not help the new student and would diminish my ability to help others
- I'm the wrong person to ask
  - Have you considered asking Salim Yusuf?

Methods – NMA synthesis

- Bayesian network meta-analysis performed using Markov chain Monte Carlo (MCMC) simulation.
- We used a burn-in sample of 20,000 followed by 50,000 samples for inference.
- Convergence of the MCMC samples was assessed with the Gelman-Rubin-Brooks diagnostic plot and test.
- Default prior distributions (in all cases non-informative) were adopted for all parameters in the model.
- Node-splitting method was used for inconsistency analysis.
- We used R and JAGS software packages.