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
  o Prioritise which ones to target

• Optimising interventions
  o Head to head trials
  o Economic analyses
  o 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

<table>
<thead>
<tr>
<th>Stream 1</th>
<th>Stream 2</th>
<th>Stream 3</th>
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</thead>
<tbody>
<tr>
<td>Seminar series</td>
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<td>Summer Institute</td>
<td>Foundations of KT</td>
<td>Intro to EBHC</td>
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<td>Pragmatic Trials</td>
<td>End of Grant KT</td>
<td>Intro to KT</td>
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<td>Systematic Reviews</td>
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<td>Foundations of KT</td>
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<td>Qualitative Methods</td>
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<td>End of Grant KT</td>
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<td>Mentorship</td>
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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

Methods: Inclusion Criteria

• Population: Adults ≥ 18 years with acute or chronic wound
  o Acute wounds included burns, lacerations, surgical wounds, traumatic wounds
  o Chronic wounds included venous, arterial, diabetic and pressure ulcers and infected surgical wounds

• Interventions: all wound care interventions were included

• Comparisons: all comparators

• Outcomes: healing, cost/cost effectiveness, admission to hospital, human resources

• Study Designs: systematic reviews and economic analyses
Methods: Search

• The following databases were searched:
  o MEDLINE - 1950 to Oct 26, 2012
  o EMBASE – 1980 to Oct 26, 2012
  o 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
- 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=53 without meta-analyses
N=57 with meta-analyses

N=104 economic studies (plus 3 companion report)
N=69 Costing studies
N=35 Cost-effectiveness/ Cost-utility analyses
Results

• 110 systematic reviews
  o 40% were rated as high quality
• 104 economic studies
  o 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
  o High compression stockings versus compression bandages
  o Elastic bandage versus inelastic bandage
  o Multi-layer high compression versus single-layer compression
  o Cadexomer iodine + compression therapy versus usual care + compression therapy
  o 2-layer stocking versus short-stretch bandage
  o Elastic high compression versus multi-layer inelastic compression
  o Tissue engineered skin versus dressings
  o 4-layer bandage versus short-stretch bandage or multi-layer short-stretch bandage
  o 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:
  o Pentoxifylline + usual care versus standard compression
  o 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
  o +/- meta-analysis
Example: Mild Cognitive Impairment

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

  o 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:
  o Donepezil
  o Rivastigmine
  o Galantamine
  o Memantine
• **C**: Other cognitive enhancers, placebo or supportive care
• **O**: cognition, function, behaviour, global status, mortality and/or harms
• **Study Design**: experimental, quasi-experimental or observational studies
• **Timing**: 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=8,800)
- Not a cognitive enhancer (n=2,230)
- Not a relevant study design (n=2,309)
- No comparator (n=831)

1,386 potentially relevant full-text articles

1,376 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
## Outcome: Cognition

<table>
<thead>
<tr>
<th>Authors and Year</th>
<th>Treatment</th>
<th>#Pts</th>
<th>SMD</th>
<th>SD</th>
<th>#Pts</th>
<th>SMD</th>
<th>SD</th>
<th>SMD [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doody et al, 2009</td>
<td>Donepezil 5-10</td>
<td>379</td>
<td>-1</td>
<td>8.76</td>
<td>378</td>
<td>-0.13</td>
<td>6.8</td>
<td>-0.11 [-0.25, 0.03]</td>
</tr>
<tr>
<td>Petersen et al, 2005</td>
<td>Donepezil 5-10</td>
<td>253</td>
<td>3.68</td>
<td>5.95</td>
<td>259</td>
<td>3.74</td>
<td>6.97</td>
<td>-0.01 [-0.18, 0.16]</td>
</tr>
<tr>
<td>Salloway et al, 2004</td>
<td>Donepezil 6-10</td>
<td>130</td>
<td>-3.1</td>
<td>5.7</td>
<td>132</td>
<td>-1.2</td>
<td>5.74</td>
<td>-0.33 [-0.57, -0.09]</td>
</tr>
<tr>
<td>Winblad et al, 2008a</td>
<td>Galantamine16-24</td>
<td>437</td>
<td>-1.2</td>
<td>6.08</td>
<td>453</td>
<td>-0.7</td>
<td>6.17</td>
<td>-0.08 [-0.21, 0.05]</td>
</tr>
<tr>
<td>Winblad et al, 2008b</td>
<td>Galantamine16-24</td>
<td>501</td>
<td>-0.6</td>
<td>6.54</td>
<td>510</td>
<td>-0.7</td>
<td>6.85</td>
<td>0.01 [-0.11, 0.14]</td>
</tr>
</tbody>
</table>

-2 0 2

Favours Treatment  Favours Placebo
Outcome: Vomiting

<table>
<thead>
<tr>
<th>Authors and Year</th>
<th>Treatment</th>
<th>Placebo</th>
<th>Relative Risk [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petersen et al, 2005</td>
<td>Donepezil 5-10</td>
<td>15</td>
<td>253</td>
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<tr>
<td>Salloway et al, 2004</td>
<td>Donepezil 5-10</td>
<td>12</td>
<td>132</td>
</tr>
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RE Model: 4.40 [3.21, 6.03]
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
  o 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
- **Study designs:** experimental, quasi-experimental, cohort studies
Results
6064 total citations:
3858 from MEDLINE, 1801 from EMBASE, 394 from Cochrane, and 11 from reference screening

5890 excluded titles and abstracts:
- Not adult T1DM (n=3445)
- Not treated with long acting basal insulin analogue (n=2324)
- No relevant comparator (n=97)
- Not a relevant study design (n=24)

174 potentially relevant full-text articles

142 excluded full-text articles:
- Not adult T1DM (n=18)
- Not a relevant study design (n=33)
- Not treated with long acting basal insulin analogue (n=29)
- No relevant comparator (n=22)
- No relevant outcomes (n=16)
- Conference abstracts (n=19)
- Not translated (n=5)

32 articles included (31 primary publications and 1 companion report)

→ 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
• Glargine high probability of ranking first
Figure 1: Network configuration for the arrhythmia dataset.
Limitations

• Methods still in their infancy
  o Node splitting
  o Presentation of results
  o 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

Records identified through database searching (n = 2304)

Additional records identified through other sources (n = 6)

Records after duplicates removed (n = 1804)

Records screened (n = 1804)

Full-text articles assessed for eligibility (n = 91)

Studies included in qualitative synthesis (n = 10)
plus 1 companion report

Records excluded (n = 1713)

Full-text articles excluded (n = 80)
1. No implementation of leadership program
2. No evaluation of leadership program
Results

• All studies were at substantial risk of bias
• Highest quality ones showed that
  o leadership training programs affected participants’ advancement in
    • academic rank (48% versus 21%, $P = .005$)
    • hospital leadership position (30% versus 9%, $P = .008$)
  o 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)
Why should we care?

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

• Academics who were mentors
  o Reported greater career satisfaction
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?
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.