TOWARDS EVIDENCE BASED RESEARCH

– the importance of a systematic approach to earlier studies when planning a new study

Hans Lund, Professor
Centre for Evidence Based Practice
Western Norway University of Applied Sciences

On behalf of the EBRNetwork
Disclosure & Reservations

Intellectual conflicts of interests:
• Chairman of the Evidence Based Research Network
• Author of text-books about Evidence Based approaches
• Teacher on courses about Evidence Based approaches

Reservations:
• Biased towards health science.
• Narrow perspective – but the general principles may be very clear, since health science is dealing with "killing people".
The Scientific Ideal
“If, as is sometimes supposed, science consisted in nothing but the laborious accumulation of facts, it would soon come to a standstill, crushed, as it were, under its own weight……

The work which deserves, but I am afraid does not always receive, the most credit is that in which discovery and explanation go hand in hand, in which not only are new facts presented, but their relation to old ones is pointed out.”

Lord Rayleigh at the 54th meeting of the British Association for the Advancement of Science held in Montreal in 1884.
(Thanks to I. Chalmers, LV Hedges, H Cooper, 2002)
The assumption
One would think:
No paper has ever been published without references to earlier published scientific results. What's the problem?
The evidence
A systematic review for meta-research papers examining authors use of references

From more than 27,000 identified hits following a search, more than 70 papers were identified. Almost all studies from health science.
Refer only to a small fraction of earlier research

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of studies</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>No references to all studies</td>
<td>5 studies</td>
<td>Goudie 2010; Robinson 2011; Schrag 2011; Sheth 2011; Sawin 2015</td>
</tr>
<tr>
<td>No use or poor use of SR in Introduction</td>
<td>3 studies</td>
<td>Goudie 2010; Clarke 2013; Jones 2013</td>
</tr>
<tr>
<td>No use or poor use of SR in Discussion</td>
<td>6 studies</td>
<td>Clarke 1998; Clarke 2002; Clarke 2007; Clarke 2010; Clarke 2013; Helfer 2015</td>
</tr>
</tbody>
</table>
Fergusson 2005

Trials testing aprotinin in cardiac surgery – on blood transfusion as outcome (NOT death, too few participants in each study to measure that).

After 1994:
More than 2500 received unnecessary placebo!
Figure 6  Citations of prior publications.
Habre 2014
Lidocain before propofol

56 studies
SR from 2000 questioning the necessity of performing further trials.

136 NEW studies since 2000
49 clinically relevant
87 REDUNDANT STUDIES

Example
Choose their references based upon preferences and strategic considerations

<table>
<thead>
<tr>
<th>Number of studies</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive, supportive and significant studies is more often cited than negative, critical and non-significant</td>
<td>6 studies</td>
</tr>
<tr>
<td>Subjective reasons for choosing references</td>
<td>3 studies</td>
</tr>
<tr>
<td>Do not use citations to support the studies</td>
<td>1 study</td>
</tr>
</tbody>
</table>
How citation distortions create unfounded authority: analysis of a citation network

Steven A Greenberg, associate professor of neurology

Fig 2 | Citation bias against content critical of claim. Shown are citation frequencies to four authoritative supportive primary data papers and six primary data papers containing data critical of claim
Thornley 2015
Why choosing a specific reference?

87 were interviewed

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author known</td>
<td>24%</td>
</tr>
<tr>
<td>Original seminal work in the field</td>
<td>15%</td>
</tr>
<tr>
<td>Journal or conference known</td>
<td>10%</td>
</tr>
<tr>
<td>Known institution or research group</td>
<td>8%</td>
</tr>
<tr>
<td>Sound method</td>
<td>8%</td>
</tr>
<tr>
<td>Researcher (author) wrote it</td>
<td>5%</td>
</tr>
<tr>
<td>Known database or source</td>
<td>4%</td>
</tr>
<tr>
<td>Lots of cites to paper</td>
<td>3%</td>
</tr>
<tr>
<td>Theoretical approach</td>
<td>3%</td>
</tr>
<tr>
<td>And so on ...</td>
<td></td>
</tr>
</tbody>
</table>
The solution

No new studies without prior systematic review of existing evidence

Efficient production, updating and dissemination of systematic reviews
INITIATIVES

No new studies without prior systematic review of existing evidence

- Meta-research
- Development of methods to use Systematic Reviews in Research
- Promotion of an Evidence Based Approach in Research Execution

Efficient production, updating and dissemination of systematic reviews

- ICASR
  International Collaboration for the Automation of Systematic Reviews
- Participating in and encouraging to research to improve production, update and dissemination of Systematic Reviews
integrity  \textit{in\'tegrit\'e} | noun

1 the quality of being honest and having strong moral principles.
2 the state of being whole and undivided: upholding integrity.

Thanks for your attention