

# What is the difference between EBM and doing research?



Centre for Eye Health

---

**Gordon S. Doig PhD (Epidemiology and Biostatistics)**  
Head of Research, Centre for Eye Health,  
Associate Professor, School of Optometry and Vision Science,  
University of New South Wales, Australia  
[Gordon.Doig@evidencebased.net](mailto:Gordon.Doig@evidencebased.net)  
9 June 2022



**UNSW**  
SYDNEY



# What is the difference between EBM and doing research?

- 1) Diagnostic tests
- 2) Systematic reviews and meta-analyses
- 3) Randomised controlled trials



Centre for Eye Health

---

**Gordon S. Doig PhD (Epidemiology and Biostatistics)**  
Head of Research, Centre for Eye Health,  
Associate Professor, School of Optometry and Vision Science,  
University of New South Wales, Australia  
[Gordon.Doig@evidencebased.net](mailto:Gordon.Doig@evidencebased.net)  
9 June 2022



**UNSW**  
SYDNEY



# Overview

---



[www.EvidenceBased.net](http://www.EvidenceBased.net)



**UNSW**  
SYDNEY



# Overview

---

- If EBM is for clinicians, why should researchers be aware of it?



[www.EvidenceBased.net](http://www.EvidenceBased.net)

# Overview

---

- If EBM is for clinicians, why should researchers be aware of it?
- Show you where EBM comes from.



[www.EvidenceBased.net](http://www.EvidenceBased.net)

# Overview

---

- If EBM is for clinicians, why should researchers be aware of it?
- Show you where EBM comes from.
- Worked example of how EBM can be important to researchers.



[www.EvidenceBased.net](http://www.EvidenceBased.net)

# MEDLINE: Improved access to information.

---

A number of early papers from key people at McMaster University recognised how MEDLINE would transform healthcare

Haynes RB, McKibbin A, Fitzgerald D, Guyatt G, Walker C, Sackett D. How to keep up with the medical literature. V. Access by personal computer to the medical literature. *Ann Intern Med* 1986 ;105:810–824

Haynes RB, McKibbin A, Walker C, Ryan N, Fitzgerald D, Ramsden M. Online access to MEDLINE in clinical settings: a study of use and usefulness. *Ann Intern Med* 1990 ;112:78–84

# MEDLINE: Improved access to information.

---

A number of early papers from key people at McMaster University recognised how MEDLINE would transform healthcare

Because of this information explosion, the EBM Working Group proposed that all future clinicians would need to be taught how to conduct “efficient literature searches”

Haynes RB, McKibbin A, Fitzgerald D, Guyatt G, Walker C, Sackett D. How to keep up with the medical literature. V. Access by personal computer to the medical literature. *Ann Intern Med* 1986 ;105:810–824

Haynes RB, McKibbin A, Walker C, Ryan N, Fitzgerald D, Ramsden M. Online access to MEDLINE in clinical settings: a study of use and usefulness. *Ann Intern Med* 1990 ;112:78–84

Evidence-Based Medicine Working Group. Evidence-Based Medicine A New Approach to Teaching the Practice of Medicine. *JAMA* 1992;268(17):2420-2425.



# MEDLINE: Improved access to information.

---

A number of early papers from key people at McMaster University recognised how MEDLINE would transform healthcare

Because of this information explosion, the EBM Working Group proposed that all future clinicians would need to be taught how to conduct **“efficient literature searches”**

Many people have published guides on how to harness the power of MEDLINE using PubMed

Haynes RB, McKibbin A, Fitzgerald D, Guyatt G, Walker C, Sackett D. How to keep up with the medical literature. V. Access by personal computer to the medical literature. *Ann Intern Med* 1986 ;105:810–824

Haynes RB, McKibbin A, Walker C, Ryan N, Fitzgerald D, Ramsden M. Online access to MEDLINE in clinical settings: a study of use and usefulness. *Ann Intern Med* 1990 ;112:78–84

Evidence-Based Medicine Working Group. Evidence-Based Medicine A New Approach to Teaching the Practice of Medicine. *JAMA* 1992;268(17):2420-2425.

P Kang, M Kalloniatis, GS Doig. Using Updated PubMed: New Features and Functions to Enhance Literature Searches. *JAMA* 2021; 326(6):479-480.

## **MEDLINE: Improved access to information.**

---

**It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.**

## **MEDLINE: Improved access to information.**

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....

## **MEDLINE: Improved access to information.**

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change?

## MEDLINE: Improved access to information.

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change? Not all reported results of experiments are valid.

Campbell DT. Factors relevant to the validity of experiments in social settings. *Psychol Bull* 1957;54:297-312.

## MEDLINE: Improved access to information.

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change? Not all reported results of experiments are valid. Inconvenient results are often ignored, even in major clinical trials.

Campbell DT. Factors relevant to the validity of experiments in social settings. *Psychol Bull* 1957;54:297-312.

Sackett DL, Gent M. Controversy in counting and attributing events in clinical trials. *N Engl J Med* 1979;301:1410-2.



UNSW  
SYDNEY



## MEDLINE: Improved access to information.

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change? Not all reported results of experiments are valid. Inconvenient results are often ignored, even in major clinical trials. Not all randomised trials are actually even randomised.

Campbell DT. Factors relevant to the validity of experiments in social settings. *Psychol Bull* 1957;54:297-312.

Sackett DL, Gent M. Controversy in counting and attributing events inclinical trials. *N Engl J Med* 1979;301:1410-2.

Altman DG. Randomisation. Essential for reducing bias. *BMJ* 1991;302:1481-2.



UNSW  
SYDNEY



## MEDLINE: Improved access to information.

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change? Not all reported results of experiments are valid. Inconvenient results are often ignored, even in major clinical trials. Not all randomised trials are actually even randomised. Sometimes researchers outright cheat!

Campbell DT. Factors relevant to the validity of experiments in social settings. *Psychol Bull* 1957;54:297-312.

Sackett DL, Gent M. Controversy in counting and attributing events inclinical trials. *N Engl J Med* 1979;301:1410-2.

Altman DG. Randomisation. Essential for reducing bias. *BMJ* 1991;302:1481-2.

Schulz KF. Subverting randomization in controlled trials. *JAMA* 1995;274:1456-8.



UNSW  
SYDNEY





## MEDLINE: Improved access to information.

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change? Not all reported results of experiments are valid. Inconvenient results are often ignored, even in major clinical trials. Not all randomised trials are actually even randomised. Sometimes researchers outright cheat!

In the face of an impending information explosion in the early 1990's, what should we do?

Campbell DT. Factors relevant to the validity of experiments in social settings. *Psychol Bull* 1957;54:297-312.

Sackett DL, Gent M. Controversy in counting and attributing events inclinical trials. *N Engl J Med* 1979;301:1410-2.

Altman DG. Randomisation. Essential for reducing bias. *BMJ* 1991;302:1481-2.

Schulz KF. Subverting randomization in controlled trials. *JAMA* 1995;274:1456-8.



UNSW  
SYDNEY



## MEDLINE: Improved access to information.

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change? Not all reported results of experiments are valid. Inconvenient results are often ignored, even in major clinical trials. Not all randomised trials are actually even randomised. Sometimes researchers outright cheat!

In the face of an impending information explosion in the early 1990's, what should we do?

1) Address the source

- Improve the quality of *our* research

Campbell DT. Factors relevant to the validity of experiments in social settings. *Psychol Bull* 1957;54:297-312.

Sackett DL, Gent M. Controversy in counting and attributing events inclinical trials. *N Engl J Med* 1979;301:1410-2.

Altman DG. Randomisation. Essential for reducing bias. *BMJ* 1991;302:1481-2.

Schulz KF. Subverting randomization in controlled trials. *JAMA* 1995;274:1456-8.



UNSW  
SYDNEY



# MEDLINE: Improved access to information.

---

It was originally thought that improved access to information would be an unmitigated good thing because it would help research findings become accepted into practice.

But.....should all research drive practice change? Not all reported results of experiments are valid. Inconvenient results are often ignored, even in major clinical trials. Not all randomised trials are actually even randomised. Sometimes researchers outright cheat!

In the face of an impending information explosion in the early 1990's, what should we do?

- 1) Address the source
  - Improve the quality of *our* research
- 2) Address the end user
  - Improve *clinicians* ability to identify bad research

Campbell DT. Factors relevant to the validity of experiments in social settings. *Psychol Bull* 1957;54:297-312.

Sackett DL, Gent M. Controversy in counting and attributing events inclinal trials. *N Engl J Med* 1979;301:1410-2.

Altman DG. Randomisation. Essential for reducing bias. *BMJ* 1991;302:1481-2.

Schulz KF. Subverting randomization in controlled trials. *JAMA* 1995;274:1456-8.

# 1) Addressing the source (researcher).

---

# 1) Addressing the source (researcher).

---

In 1993 a group of methodologists met to discuss how the overall quality of research could be improved. This meeting led to:

# 1) Addressing the source (researcher).

---

In 1993 a group of methodologists met to discuss how the overall quality of research could be improved. This meeting led to:

- The publication of a comprehensive 21 item checklist to improve researcher's reporting of key information necessary to evaluate the internal and external validity of an RCT (the CONSORT statement).

Begg et al. Improving the quality of reporting of randomized controlled trials: The CONSORT Statement. JAMA 1996;278(8):637-639.

# 1) Addressing the source (researcher).

---

In 1993 a group of methodologists met to discuss how the overall quality of research could be improved. This meeting led to:

- The publication of a comprehensive 21 item checklist to improve researcher's reporting of key information necessary to evaluate the internal and external validity of an RCT (the CONSORT statement).
- Endorsement of the CONSORT checklist by Editors of major medical journals (NEJM, JAMA, Lancet plus many others) with an aim to require adherence to the CONSORT statement for publication in these journals!

Begg et al. Improving the quality of reporting of randomized controlled trials: The CONSORT Statement. JAMA 1996;278(8):637-639.

[www.consort-statement.org/about-consort/endorsement](http://www.consort-statement.org/about-consort/endorsement)

## 2) Addressing the end user (clinician).

---



## 2) Addressing the end user (clinician).

---

In addition to proposing that all future clinicians would need to be taught how to conduct “efficient literature searches”,

## 2) Addressing the end user (clinician).

---

In addition to proposing that all future clinicians would need to be taught how to conduct “efficient literature searches”, the EBM Working Group also proposed that future clinicians should be taught “the application of formal rules of evidence in appraising the clinical literature”.

Evidence-Based Medicine Working Group. Evidence-Based Medicine A New Approach to Teaching the Practice of Medicine. *JAMA* 1992;268(17):2420-2425.

## 2) Addressing the end user (clinician).

---

In addition to proposing that all future clinicians would need to be taught how to conduct “**efficient literature searches**”, the EBM Working Group also proposed that future clinicians should be taught “**the application of formal rules of evidence in appraising the clinical literature**”.

The EBM Working Group published a series of ‘Users’ Guides’ to help clinicians understand the medical literature and **critical appraisal** was born! These original Users’ Guides were published in JAMA and are now available from a number of other sources.

Evidence-Based Medicine Working Group. Evidence-Based Medicine A New Approach to Teaching the Practice of Medicine. *JAMA* 1992;268(17):2420-2425.

<https://web.archive.org/web/20051231064848/http://www.cche.net/usersguides/main.asp>

## 2) Addressing the end user (clinician).

---

In addition to proposing that all future clinicians would need to be taught how to conduct “**efficient literature searches**”, the EBM Working Group also proposed that future clinicians should be taught “**the application of formal rules of evidence in appraising the clinical literature**”.

The EBM Working Group published a series of ‘Users’ Guides’ to help clinicians understand the medical literature and **critical appraisal** was born! These original Users’ Guides were published in JAMA and are now available from a number of other sources.

Evidence-Based Medicine Working Group. Evidence-Based Medicine A New Approach to Teaching the Practice of Medicine. *JAMA* 1992;268(17):2420-2425.

 <https://web.archive.org/web/20051231064848/http://www.cche.net/usersguides/main.asp> 



# Purpose of these EBM vs. Research sessions.

---

## Purpose of these EBM vs. Research sessions.

---

To identify and highlight key resources developed to address research quality issues at the source (the researcher) and for the end user (the clinician).

## Purpose of these EBM vs. Research sessions.

---

- To identify and highlight key resources developed to address research quality issues at the source (the researcher) and for the end user (the clinician).
- To compare and contrast these two different types of resources with an aim to understand, as researchers, how we can use each different type of resource to improve the quality and impact of our studies.

# Purpose of these EBM vs. Research sessions.

---

To identify and highlight key resources developed to address research quality issues at the source (the researcher) and for the end user (the clinician).

To compare and contrast these two different types of resources with an aim to understand, as researchers, how we can use each different type of resource to improve the quality and impact of our studies.

Three planned sessions on 'EBM vs. Research':

- 1) Diagnostic tests
- 2) Systematic reviews and meta-analyses
- 3) Randomised controlled trials



# Purpose of these EBM vs. Research sessions.

---

To identify and highlight key resources developed to address research quality issues at the source (the researcher) and for the end user (the clinician).

To compare and contrast these two different types of resources with an aim to understand, as researchers, how we can use each different type of resource to improve the quality and impact of our studies.

Three planned sessions on 'EBM vs. Research':

- 1) Diagnostic tests
- 2) Systematic reviews and meta-analyses**
- 3) Randomised controlled trials

# EBM vs. Research Session 2:

---



# EBM vs. Research Session 2:

hierarchy of evidence - Google Search


google.com/search?q=hierarchy+of+evidence&source=lnms&tbn=isch&sa=X&ved=2ahUKewjY8-zOj4AhUhn2MGHUsyD4IQ\_AUoAXoECAIQAw&biw=1840&bih=885&dpr=1

Google hierarchy of evidence

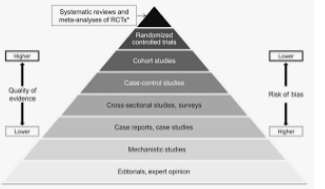
Q All Images Videos Books News More Tools

nursing research qualitative research pyramid systematic review literature review quantitative research medicine evidence based practice nice

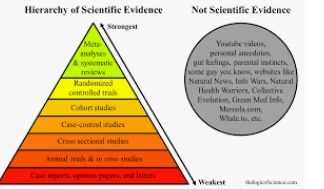
**Hierarchy of evidence - Physio-pedia**  
physio-pedia.com




**Hierarchy of evidence pyramid. The ...**  
researchgate.net



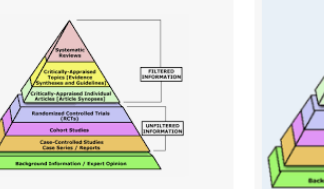
**Hierarchy of Scientific Evidence**  
design robust ...  
thelogicofscience.com




**Evidence-Based Practices Based ...**  
r1learning.com




**The Evidence-Based Medicine Pyramid ...**  
s4be.cochrane.org



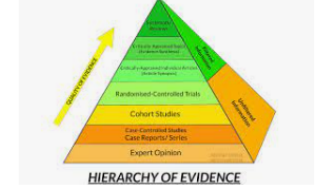
**Hierarchies of Evidence - CJ Blunt**  
cjbunt.com



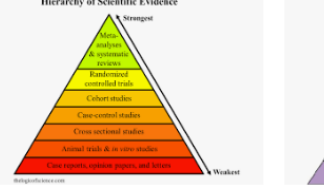
**Evidence-based ...**  
flexiblelearning.auckland.ac.nz




**Medicowesome: Hierarchy Of Evidence**  
medicowesome.com




**Hierarchy of Evidence.png ...**  
commons.wikimedia.org



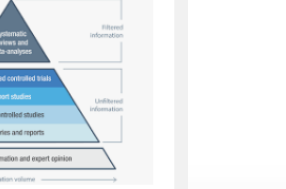
**The crumbling of the pyramid of ...**  
blogs.bmj.com



**traditional hierarchy of evidence-based ...**  
researchgate.net



**Levels of Evidence in Medical Research**  
openmd.com



**Levels of Evidence**

Level	Study Type	Quality
1	Systematic review, Meta-analysis, Randomized Controlled Trial	Excellent
2	Randomized Controlled Trial	Good
3	Case Control Studies	Fair
4	Case Report or Case Series	Poor
5	Narrative Reviews, Expert Opinions, Editorials	Poor

**Effectiveness**

Excellent	Systematic review Multi-center studies
Good	RCT Observational studies
Fair	Descriptive studies with diagnostic results Before and after studies Non-randomized controlled trials
Poor	Descriptive studies Case studies Expert opinion Studies of poor methodological quality

**Appropriateness**

Excellent	Systematic review Multi-center studies
Good	RCT Observational studies
Fair	Descriptive studies Before and after studies Non-randomized controlled trials
Poor	Descriptive studies Case studies Expert opinion Studies of poor methodological quality

**Feasibility**

Excellent	Systematic review Multi-center studies
Good	RCT Observational studies
Fair	Descriptive studies Before and after studies Non-randomized controlled trials
Poor	Descriptive studies Case studies Expert opinion Studies of poor methodological quality

**Levels of Evidence**

Level	Study Type	Quality
1	Systematic review, Meta-analysis, Randomized Controlled Trial	Excellent
2	Randomized Controlled Trial	Good
3	Case Control Studies	Fair
4	Case Report or Case Series	Poor
5	Narrative Reviews, Expert Opinions, Editorials	Poor

**Summaries**

Systematic Reviews	Meta-analysis	Randomized Controlled Trial
Syntheses	Syntheses	Syntheses
Studies	Studies	Studies

# EBM vs. Research Session 2:

---



# EBM vs. Research Session 2: Systematic Reviews & MAs

---





# EBM vs. Research Session 2: Systematic Reviews & MAs

---

**A systematic review** is “a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

A **systematic review** is “a review of the evidence on a **clearly formulated question** that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.



UNSW  
SYDNEY





# EBM vs. Research Session 2: Systematic Reviews & MAs

---

A **systematic review** is “a review of the evidence on a **clearly formulated question** that uses systematic and explicit methods to **identify**, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

A **systematic review** is “a review of the evidence on a **clearly formulated question** that uses systematic and explicit methods to **identify, select** and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

A **systematic review** is “a review of the evidence on a **clearly formulated question** that uses systematic and explicit methods to **identify, select** and **critically appraise** relevant primary research, and to extract and analyze data from the studies that are included in the review.”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

- A systematic review** is “a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”
- A narrative review** identifies a few studies that describe a problem of interest. Narrative reviews have no predetermined research question or specified search strategy, only a topic of interest.

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

- A systematic review** is “a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”
- A narrative review** identifies a few studies that describe a problem of interest. Narrative reviews have no predetermined research question or specified search strategy, only a topic of interest. (e.g. the Introduction of your thesis)

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

**A systematic review** is “a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

**A narrative review** identifies a few studies that describe a problem of interest. Narrative reviews have no predetermined research question or specified search strategy, only a topic of interest. (e.g. the Introduction of your thesis)

“The absence of objective and systematic selection criteria in review method substantially results in a number of methodological shortcomings leading to clear bias of the author's interpretation and conclusions...”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

**A systematic review** is “a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

**A narrative review** identifies a few studies that describe a problem of interest. Narrative reviews have no predetermined research question or specified search strategy, only a topic of interest. (e.g. the Introduction of your thesis)

“The absence of objective and systematic selection criteria in review method substantially results in a number of methodological shortcomings leading to clear bias of the author's interpretation and conclusions... **Hence, narrative reviews may be evidence-based, but they are not truly useful as scientific evidence.**”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.



UNSW  
SYDNEY







# EBM vs. Research Session 2:

hierarchy of evidence - Google S x +

google.com/search?q=hierarchy+of+evidence&source=lnms&tbn=isch&sa=X&ved=2ahUKEwjY8-z-oJz4AhUhn2MGHUsyDl4Q\_AUoAXoECAIQAw&biw=1840&bih=885&dpr=1

Google hierarchy of evidence

Q All Images Videos Books News More Tools

nursing research qualitative research pyramid systematic review literature review quantitative research medicine evidence based practice nice

None of these hierarchies contain 'narrative review' as an accepted 'level of evidence'.

Hierarchy of evidence - Physio-pedia physio-pedia.com

Hierarchy of evidence - Pyramid The ...

design robust ...

Evidence-Based Practices Based ...

The Evidence-Based Medicine Pyramid ...

Hierarchies of Evidence - CU Blunt

Evidence-based ... flexiblelearning.auckland.ac.nz

Medicowesome: Hierarchy Of Evidence medicowesome.com

File:Hierarchy of Evidence.png ... commons.wikimedia.org

The crumbling of the pyramid of ... blogs.bmj.com

traditional hierarchy of evidence-based ... researchgate.net

Levels of Evidence in Medical Research openmd.com

Systematic Reviews  
Randomized Control Trials  
Cohort Studies  
Case Control Studies  
Case Series & Case Reports  
Editorials & Expert Opinion

1. Systematic review  
2. Randomized controlled trial  
3. Cohort study  
4. Case-control study  
5. Case series  
6. Cross-sectional study  
7. Expert opinion

Systematic review  
Randomized controlled trial  
Cohort study  
Case-control study  
Case series  
Cross-sectional study  
Expert opinion

	Effectiveness	Appropriateness	Feasibility
Excellent	• Systematic review • Multi-center studies	• Systematic review • Multi-center studies	• Systematic review • Multi-center studies
Good	• RCT • Observational studies	• RCT • Observational studies	• RCT • Observational studies
Fair	• Descriptive studies with dramatic results • Before and after studies • Non-randomized controlled trials	• Descriptive studies • Action research • Before and after studies • Focus groups	• Descriptive studies • Action research • Before and after studies • Focus groups
Poor	• Descriptive studies • Case studies • Expert opinion • Studies of poor methodological quality	• Expert opinion • Case studies • Studies of poor methodological quality	• Expert opinion • Case studies • Studies of poor methodological quality

Levels of Evidence

1. Clinical Practice Guidelines  
2. Systematic Review  
3. Randomized Controlled Trial  
4. Cohort Study  
5. Case Control Study  
6. Case Report or Case Series  
7. Narrative Reviews, Expert Opinions, Editorials  
8. Animal and Laboratory Studies

Secondary, pre-appraised, or filtered Studies

Primary Studies

No design

Not involved w/ humans

Systematic Review  
Randomized Controlled Trial  
Cohort Study  
Case Control Study  
Case Report or Case Series  
Narrative Reviews, Expert Opinions, Editorials  
Animal and Laboratory Studies

1. Systematic Review  
2. Randomized Controlled Trial  
3. Cohort Study  
4. Case Control Study  
5. Case Report or Case Series  
6. Narrative Reviews, Expert Opinions, Editorials  
7. Animal and Laboratory Studies

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

**A systematic review** is “a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

**A narrative review** identifies a few studies that describe a problem of interest. Narrative reviews have no predetermined research question or specified search strategy, only a topic of interest. (e.g. the Introduction of your thesis)

“The absence of objective and systematic selection criteria in review method substantially results in a number of methodological shortcomings leading to clear bias of the author's interpretation and conclusions... **Hence, narrative reviews may be evidence-based, but they are not truly useful as scientific evidence.**”

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

**A systematic review** is “a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review.”

**A narrative review** identifies a few studies that describe a problem of interest. Narrative reviews have no predetermined research question or specified search strategy, only a topic of interest. (e.g. the Introduction of your thesis)

“The absence of objective and systematic selection criteria in review method substantially results in a number of methodological shortcomings leading to clear bias of the author's interpretation and conclusions... **Hence, narrative reviews may be evidence-based, but they are not truly useful as scientific evidence.**”

*“It doesn't matter what I believe. It only matters what I can prove.”*

Undertaking Systematic Reviews of Research on Effectiveness. CRD's Guidance for those Carrying Out or Commissioning Reviews. CRD Report Number 4 (2nd Edition). NHS Centre for Reviews and Dissemination, University of York. March 2001.

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

For the researcher:

For the clinician:

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

For the researcher:

Inspired by the CONSORT statement for reporting randomised controlled trials, the **PRISMA statement** was published in 2009 “to provide reporting guidance for systematic reviews that reflects advances in methods to identify, select, appraise and synthesise studies.”

For the clinician:

Page MJ et al. The **P**referred **R**eporting **I**tems for **S**ystematic reviews and **M**eta-**A**nalyses 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

**For the researcher:**

Inspired by the CONSORT statement for reporting randomised controlled trials, the PRISMA statement was published in 2009 “to provide reporting guidance for systematic reviews that reflects advances in methods to identify, select, appraise and synthesise studies.”

**For the clinician:**

The EBM Users' Guide, for clinicians who want to identify useful overviews was published in 1994.

Page MJ et al. The Preferred Reporting Items for Systematic reviews and Meta-Analyses 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. *JAMA* 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

PRISMA 2020 statement reports a 27-item checklist designed to help systematic reviewers transparently report why and how their review was done and what was found.

Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

PRISMA 2020 statement reports a 27-item checklist designed to help systematic reviewers transparently report why and how their review was done and what was found.

For example, the PRISMA statement lists elements that must be reported in the Title, Abstract, Introduction, Methods, Results, Discussion and Acknowledgements.



# EBM vs. Research Session 2: Systematic Reviews & MAs

PRISMA 2020 statement reports a 27-item checklist designed to help systematic reviewers transparently report why and how their review was done and what was found.

For example, the PRISMA statement lists elements that must be reported in the Title, Abstract, Introduction, Methods, Results, Discussion and Acknowledgements.

Examples of recommended reporting items include:

## Introduction

3. Identify the rationale for the review in the context of existing knowledge
4. Provide an explicit statement of the objectives(s) or question(s) the review addresses

Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71

# EBM vs. Research Session 2: Systematic Reviews & MAs

PRISMA 2020 statement reports a 27-item checklist designed to help systematic reviewers transparently report why and how their review was done and what was found.

For example, the PRISMA statement lists elements that must be reported in the Title, Abstract, Introduction, Methods, Results, Discussion and Acknowledgements.

Examples of recommended reporting items include:

## Introduction

3. Identify the rationale for the review in the context of existing knowledge
4. Provide an explicit statement of the objectives(s) or question(s) the review addresses

## Methods

6. Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies.
11. Specify the methods used to assess risk of bias in the included studies.

Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71

# EBM vs. Research Session 2: Systematic Reviews & MAs

PRISMA 2020 statement reports a 27-item checklist designed to help systematic reviewers transparently report why and how their review was done and what was found.

For example, the PRISMA statement lists elements that must be reported in the Title, Abstract, Introduction, Methods, Results, Discussion and Acknowledgements.

Examples of recommended reporting items include:

## Introduction

3. Identify the rationale for the review in the context of existing knowledge
4. Provide an explicit statement of the objectives(s) or question(s) the review addresses

## Methods

6. Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies.
11. Specify the methods used to assess risk of bias in the included studies.

## Results

- 16b. Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.

Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

The EBM Users' Guide has 6 questions that can determine whether the study is valid and therefore trustworthy:

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371



UNSW  
SYDNEY



## **EBM** vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

The EBM Users' Guide has 6 questions that can determine whether the study is valid and therefore trustworthy:

1. Did the overview address a focused clinical question?

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

## **EBM** vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

The EBM Users' Guide has 6 questions that can determine whether the study is valid and therefore trustworthy:

1. Did the overview address a focused clinical question?
2. Were the criteria used to select articles for inclusion appropriate?

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

The EBM Users' Guide has 6 questions that can determine whether the study is valid and therefore trustworthy:

1. Did the overview address a focused clinical question?
2. Were the criteria used to select articles for inclusion appropriate?
3. Is it unlikely that important, relevant studies were missed?

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

The EBM Users' Guide has 6 questions that can determine whether the study is valid and therefore trustworthy:

1. Did the overview address a focused clinical question?
2. Were the criteria used to select articles for inclusion appropriate?
3. Is it unlikely that important, relevant studies were missed?
4. Was the validity of the included studies appraised?

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

The EBM Users' Guide has 6 questions that can determine whether the study is valid and therefore trustworthy:

1. Did the overview address a focused clinical question?
2. Were the criteria used to select articles for inclusion appropriate?
3. Is it unlikely that important, relevant studies were missed?
4. Was the validity of the included studies appraised?
5. Were assessments of studies reproducible?
6. Were the results similar from study to study?

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

The aim of the EBM Users' Guide for clinicians is to help them determine if they can use a systematic review to help support clinical decisions.

The EBM Users' Guide has 6 questions that can determine whether the study is valid and therefore trustworthy:

1. Did the overview address a focused clinical question?
2. Were the criteria used to select articles for inclusion appropriate?
3. Is it unlikely that important, relevant studies were missed?
- 4. Was the validity of the included studies appraised?**
5. Were assessments of studies reproducible?
6. Were the results similar from study to study?

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

Table 1.—Users' Guides for How to Use Review Articles

## Are the results of the study valid?

### Primary guides:

Did the overview address a focused clinical question?

Were the criteria used to select articles for inclusion appropriate?

### Secondary guides:

Is it unlikely that important, relevant studies were missed?

Was the validity of the included studies appraised?

Were assessments of studies reproducible?

Were the results similar from study to study?

## What are the results?

What are the overall results of the review?

How precise were the results?

## Will the results help me in caring for my patients?

Can the results be applied to my patient care?

Were all clinically important outcomes considered?

Are the benefits worth the harms and costs?

Many overviews address a number of questions. For example, a review article or a chapter from a textbook might include sections on the etiology, diagnosis, prognosis, treatment, and prevention of asthma. While such broad re-

Table 2.—Guides for Selecting Articles That Are Most Likely to Provide Valid Results\*

## Therapy

- Was the assignment of patients to treatments randomized?
- Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?

## Diagnosis

- Was there an independent, blind comparison with a reference standard?
- Did the patient sample include an appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?

## Harm

- Were there clearly identified comparison groups that were similar with respect to important determinants of outcome, other than the one of interest?
- Were outcomes and exposures measured in the same way in the groups being compared?

## Prognosis

- Was there a representative and well-defined sample of patients at a similar point in the course of disease?
- Was follow-up sufficiently long and complete?

\*From Oxman et al.<sup>3</sup>

published studies that might have been missed (including studies that are in press or not yet indexed or referenced). The second is so they can identify unpublished studies. Although the inclusion of unpublished studies is controversial,<sup>15</sup> their omission increases the chances of “publication bias”—a higher likelihood for studies with positive results to be published<sup>16-19</sup> and the attendant risk for the review to overestimate efficacy or adverse effects.

If investigators include unpublished studies in an overview, they should obtain full written reports and appraise the validity of both published and unpublished studies; they may also use statistical techniques to explore the possibility of publication bias.<sup>20</sup> Overviews based on a small number of small studies with weakly positive effects are the most susceptible to publication bias.

**Was the Validity of the Included Studies Appraised?**—Even if a review

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

Table 1.—Users' Guides for How to Use Review Articles

## Are the results of the study valid?

### Primary guides:

Did the overview address a focused clinical question?

Were the criteria used to select articles for inclusion appropriate?

### Secondary guides:

Is it unlikely that important, relevant studies were missed?

Was the validity of the included studies appraised?

Were assessments of studies reproducible?

Were the results similar from study to study?

## What are the results?

What are the overall results of the review?

How precise were the results?

## Will the results help me in caring for my patients?

Can the results be applied to my patient care?

Were all clinically important outcomes considered?

Are the benefits worth the harms and costs?

Many overviews address a number of questions. For example, a review article or a chapter from a textbook might include sections on the etiology, diagnosis, prognosis, treatment, and prevention of asthma. While such broad re-

Table 2.—Guides for Selecting Articles That Are Most Likely to Provide Valid Results\*

## Therapy

- Was the assignment of patients to treatments randomized?
- Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?

## Diagnosis

- Was there an independent, blind comparison with a reference standard?
- Did the patient sample include an appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?

## Harm

- Were there clearly identified comparison groups that were similar with respect to important determinants of outcome, other than the one of interest?
- Were outcomes and exposures measured in the same way in the groups being compared?

## Prognosis

- Was there a representative and well-defined sample of patients at a similar point in the course of disease?
- Was follow-up sufficiently long and complete?

\*From Oxman et al.<sup>3</sup>

published studies that might have been missed (including studies that are in press or not yet indexed or referenced). The second is so they can identify unpublished studies. Although the inclusion of unpublished studies is controversial,<sup>15</sup> their omission increases the chances of “publication bias”—a higher likelihood for studies with positive results to be published<sup>16-19</sup> and the attendant risk for the review to overestimate efficacy or adverse effects.

If investigators include unpublished studies in an overview, they should obtain full written reports and appraise the validity of both published and unpublished studies; they may also use statistical techniques to explore the possibility of publication bias.<sup>20</sup> Overviews based on a small number of small studies with weakly positive effects are the most susceptible to publication bias.

**Was the Validity of the Included Studies Appraised?**—Even if a review

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371



# EBM vs. Research Session 2: Systematic Reviews & MAs

Table 1.—Users' Guides for How to Use Review Articles

## Are the results of the study valid?

### Primary guides:

Did the overview address a focused clinical question?

Were the criteria used to select articles for inclusion appropriate?

### Secondary guides:

Is it unlikely that important, relevant studies were missed?

Was the validity of the included studies appraised?

Were assessments of studies reproducible?

Were the results similar from study to study?

## What are the results?

What are the overall results of the review?

How precise were the results?

## Will the results help me in caring for my patients?

Can the results be applied to my patient care?

Were all clinically important outcomes considered?

Are the benefits worth the harms and costs?

Many overviews address a number of questions. For example, a review article or a chapter from a textbook might include sections on the etiology, diagnosis, prognosis, treatment, and prevention of asthma. While such broad re-

Table 2.—Guides for Selecting Articles That Are Most Likely to Provide Valid Results\*

## Therapy

- Was the assignment of patients to treatments randomized?
- Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?

## Diagnosis

- Was there an independent, blind comparison with a reference standard?
- Did the patient sample include an appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?

## Harm

- Were there clearly identified comparison groups that were similar with respect to important determinants of outcome, other than the one of interest?
- Were outcomes and exposures measured in the same way in the groups being compared?

## Prognosis

- Was there a representative and well-defined sample of patients at a similar point in the course of disease?
- Was follow-up sufficiently long and complete?

\*From Oxman et al.<sup>3</sup>

published studies that might have been missed (including studies that are in press or not yet indexed or referenced). The second is so they can identify unpublished studies. Although the inclusion of unpublished studies is controversial,<sup>15</sup> their omission increases the chances of “publication bias”—a higher likelihood for studies with positive results to be published<sup>16-19</sup> and the attendant risk for the review to overestimate efficacy or adverse effects.

If investigators include unpublished studies in an overview, they should obtain full written reports and appraise the validity of both published and unpublished studies; they may also use statistical techniques to explore the possibility of publication bias.<sup>20</sup> Overviews based on a small number of small studies with weakly positive effects are the most susceptible to publication bias.

**Was the Validity of the Included Studies Appraised?**—Even if a review

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

Table 1.—Users' Guides for How to Use Review Articles

## Are the results of the study valid?

### Primary guides:

Did the overview address a focused clinical question?

Were the criteria used to select articles for inclusion appropriate?

### Secondary guides:

Is it unlikely that important, relevant studies were missed?

Was the validity of the included studies appraised?

Were assessments of studies reproducible?

Were the results similar from study to study?

## What are the results?

What are the overall results of the review?

How precise were the results?

## Will the results help me in caring for my patients?

Can the results be applied to my patient care?

Were all clinically important outcomes considered?

Are the benefits worth the harms and costs?

Many overviews address a number of questions. For example, a review article or a chapter from a textbook might include sections on the etiology, diagnosis, prognosis, treatment, and prevention of asthma. While such broad re-

Table 2.—Guides for Selecting Articles That Are Most Likely to Provide Valid Results\*

## Therapy

- Was the assignment of patients to treatments randomized?
- Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?

## Diagnosis

- Was there an independent, blind comparison with a reference standard?
- Did the patient sample include an appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?

## Harm

- Were there clearly identified comparison groups that were similar with respect to important determinants of outcome, other than the one of interest?
- Were outcomes and exposures measured in the same way in the groups being compared?

## Prognosis

- Was there a representative and well-defined sample of patients at a similar point in the course of disease?
- Was follow-up sufficiently long and complete?

\*From Oxman et al.<sup>3</sup>

published studies that might have been missed (including studies that are in press or not yet indexed or referenced). The second is so they can identify unpublished studies. Although the inclusion of unpublished studies is controversial,<sup>15</sup> their omission increases the chances of “publication bias”—a higher likelihood for studies with positive results to be published<sup>16-19</sup> and the attendant risk for the review to overestimate efficacy or adverse effects.

If investigators include unpublished studies in an overview, they should obtain full written reports and appraise the validity of both published and unpublished studies; they may also use statistical techniques to explore the possibility of publication bias.<sup>20</sup> Overviews based on a small number of small studies with weakly positive effects are the most susceptible to publication bias.

**Was the Validity of the Included Studies Appraised?**—Even if a review

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

Table 1.—Users' Guides for How to Use Review Articles

## Are the results of the study valid?

### Primary guides:

Did the overview address a focused clinical question?

Were the criteria used to select articles for inclusion appropriate?

### Secondary guides:

Is it unlikely that important, relevant studies were missed?

Was the validity of the included studies appraised?

Were assessments of studies reproducible?

Were the results similar from study to study?

## What are the results?

What are the overall results of the review?

How precise were the results?

## Will the results help me in caring for my patients?

Can the results be applied to my patient care?

Were all clinically important outcomes considered?

Are the benefits worth the harms and costs?

Many overviews address a number of questions. For example, a review article or a chapter from a textbook might include sections on the etiology, diagnosis, prognosis, treatment, and prevention of asthma. While such broad re-

Table 2.—Guides for Selecting Articles That Are Most Likely to Provide Valid Results\*

<b>Therapy</b>	<ul style="list-style-type: none"> <li>Was the assignment of patients to treatments randomized?</li> <li>Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?</li> </ul>
<b>Diagnosis</b>	<ul style="list-style-type: none"> <li>Was there an independent, blind comparison with a reference standard?</li> <li>Did the patient sample include an appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?</li> </ul>
<b>Harm</b>	<ul style="list-style-type: none"> <li>Were there clearly identified comparison groups that were similar with respect to important determinants of outcome, other than the one of interest?</li> <li>Were outcomes and exposures measured in the same way in the groups being compared?</li> </ul>
<b>Prognosis</b>	<ul style="list-style-type: none"> <li>Was there a representative and well-defined sample of patients at a similar point in the course of disease?</li> <li>Was follow-up sufficiently long and complete?</li> </ul>

\*From Oxman et al.<sup>3</sup>

published studies that might have been missed (including studies that are in press or not yet indexed or referenced). The second is so they can identify unpublished studies. Although the inclusion of unpublished studies is controversial,<sup>15</sup> their omission increases the chances of “publication bias”—a higher likelihood for studies with positive results to be published<sup>16-19</sup> and the attendant risk for the review to overestimate efficacy or adverse effects.

If investigators include unpublished studies in an overview, they should obtain full written reports and appraise the validity of both published and unpublished studies; they may also use statistical techniques to explore the possibility of publication bias.<sup>20</sup> Overviews based on a small number of small studies with weakly positive effects are the most susceptible to publication bias.

**Was the Validity of the Included Studies Appraised?**—Even if a review

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371



## EBM vs. Res

Table 1.—Users' Guides for How to Use Articles

**Are the results of the study valid?**  
 Primary guides:  
 Did the overview address a focus question?  
 Were the criteria used to select articles appropriate?  
 Secondary guides:  
 Is it unlikely that important, relevant studies were missed?  
 Was the validity of the included studies assessed?  
 Were assessments of studies representative?  
 Were the results similar from studies?

**What are the results?**  
 What are the overall results of the review?  
 How precise were the results?

**Will the results help me in caring for my patient?**  
 Can the results be applied to my patient?  
 Were all clinically important outcomes assessed?  
 Are the benefits worth the harms and costs?

Many overviews address a focus question. For example, a review or a chapter from a textbook include sections on the etiology, diagnosis, prognosis, treatment, and prevention of asthma. While such

Oxman AD et al. Users' Guides to the Medical Literature. JAMA 1994;272(17):1367-1371

Table 2. – Guides for Selecting Articles That Are Most Likely to Provide Valid Results\*

Therapy	<ul style="list-style-type: none"> <li>Was the assignment of patients to treatments randomized?</li> <li>Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?</li> </ul>
Diagnosis	<ul style="list-style-type: none"> <li>Was there an independent, blind comparison with a reference standard?</li> <li>Did the patient sample include and appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?</li> </ul>
Harm	<ul style="list-style-type: none"> <li>Were there clearly identified comparison groups that were similar with respect to important determinants of outcome, other than the one of interest?</li> <li>Were outcomes and exposures measured in the same way in the groups being compared?</li> </ul>
Prognosis	<ul style="list-style-type: none"> <li>Was there a representative and well-defined sample of patients at the similar point in the course of the disease?</li> <li>Was follow-up sufficiently long and complete?</li> </ul>

## Reviews & MAs

studies that might have been excluded studies that are in yet indexed or referenced). This is so they can identify unpublished studies. Although the inclusion of unpublished studies is controversial, their omission increases the "publication bias"—a higher proportion of studies with positive results published<sup>16-19</sup> and the attention to the review to overestimate adverse effects.

Investigators include unpublished studies in an overview, they should obtain written reports and appraise them of both published and unpublished studies; they may also use statistical techniques to explore the possibility of publication bias.<sup>20</sup> Overviews of a small number of small studies may overstate weakly positive effects are the most vulnerable to publication bias.

**Validity of the Included Studies Praised?**—Even if a review

JAMA 1994;272(17):1367-



UNSW  
SYDNEY



## EBM vs. Res

Table 1.—Users' Guides for How to Articles

<b>Are the results of the study valid?</b>
Primary guides:
Did the overview address a focus question?
Were the criteria used to select articles appropriate?
Secondary guides:
Is it unlikely that important, relevant studies were missed?
Was the validity of the included studies assessed?
Were assessments of studies representative?
Were the results similar from studies?
<b>What are the results?</b>
What are the overall results of the review?
How precise were the results?
<b>Will the results help me in caring for patients?</b>
Can the results be applied to my patients?
Were all clinically important outcomes included?
Are the benefits worth the harms and costs?

Many overviews address a range of questions. For example, a review or a chapter from a textbook might include sections on the etiology, diagnosis, prognosis, treatment, and prevention of asthma. While such

Oxman AD et al. Users' Guides to the Medical Literature. JAMA 1994;272(17):1367-1371

Table 2. – Guides for Selecting Articles That Are Most Likely to Provide Valid Results\*

<b>Therapy</b>	<ul style="list-style-type: none"> <li>Was the assignment of patients to treatments randomized?</li> <li>Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?</li> </ul>
<b>Diagnosis</b>	<ul style="list-style-type: none"> <li>Was there an independent, blind comparison with a reference standard?</li> <li>Did the patient sample include and appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?</li> </ul>
<b>Harm</b>	<ul style="list-style-type: none"> <li>Were there clearly identified comparison groups that were similar with respect to important determinants of outcome, other than the one of interest?</li> <li>Were outcomes and exposures measured in the same way in the groups being compared?</li> </ul>
<b>Prognosis</b>	<ul style="list-style-type: none"> <li>Was there a representative and well-defined sample of patients at the similar point in the course of the disease?</li> <li>Was follow-up sufficiently long and complete?</li> </ul>

## Reviews & MAs

studies that might have been including studies that are in yet indexed or referenced). is so they can identify unpublished studies. Although the inclusion of unpublished studies is controversial, their omission increases the "publication bias"—a higher proportion of studies with positive results are published<sup>16-19</sup> and the attention to the review to overestimate adverse effects.

Investigators include unpublished studies in an overview, they should obtain written reports and appraise them of both published and unpublished studies; they may also use statistical techniques to explore the possibility of publication bias.<sup>20</sup> Overviews of a small number of small studies may be particularly susceptible to publication bias.

**Validity of the Included Studies Praised?**—Even if a review

JAMA 1994;272(17):1367-

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

According to the EBM Users' Guide, there are four main types of systematic reviews:

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371



UNSW  
SYDNEY



# EBM vs. Research Session 2: Systematic Reviews & MAs

---

According to the EBM Users' Guide, there are four main types of systematic reviews:

Therapy (RCTs):

Diagnosis (dx tests):

Harm (observational studies):

Prognosis (observational studies):

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

According to the EBM Users' Guide, there are four main types of systematic reviews:

For researchers:

Therapy (RCTs):

Diagnosis (dx tests):

Harm (observational studies):

Prognosis (observational studies):

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. JAMA 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

According to the EBM Users' Guide, there are four main types of systematic reviews:

Therapy (RCTs):

Diagnosis (dx tests):

Harm (observational studies):

Prognosis (observational studies):

For researchers:

Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. *JAMA* 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

According to the EBM Users' Guide, there are four main types of systematic reviews:

Therapy (RCTs):

For researchers:

Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71

Diagnosis (dx tests):

McInnes MDF et al. Preferred Reporting Items for a Systematic Review and Meta-analysis of Diagnostic Test Accuracy Studies: The PRISMA-DTA Statement. *JAMA* 2018;319(4):388-396

Harm (observational studies):

Prognosis (observational studies):

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. *JAMA* 1994;272(17):1367-1371

# EBM vs. Research Session 2: Systematic Reviews & MAs

---

According to the EBM Users' Guide, there are four main types of systematic reviews:

**Therapy (RCTs):**

**For researchers:**

Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71

**Diagnosis (dx tests):**

McInnes MDF et al. Preferred Reporting Items for a Systematic Review and Meta-analysis of Diagnostic Test Accuracy Studies: The PRISMA-DTA Statement. *JAMA* 2018;319(4):388-396

**Harm (observational studies):**

Stroup DF et al. Meta-analysis of observational studies in epidemiology (MOOSE): A proposal for reporting. *JAMA* 2000;283(15):2008-2012

**Prognosis (observational studies):** Stroup DF et al. Meta-analysis of observational studies in epidemiology (MOOSE): A proposal for reporting. *JAMA* 2000;283(15):2008-2012

Oxman AD et al. Users' Guides to the Medical Literature VI: How to use an overview. *JAMA* 1994;272(17):1367-1371



# EBM vs. Research Session 2: Applied example

---



UNSW  
SYDNEY



# EBM vs. Research Session 2: Applied example

---

JAMA Ophthalmology | Review

## Appraising the Quality of Systematic Reviews for Age-Related Macular Degeneration Interventions A Systematic Review

Laura E. Downie, PhD; Eve Makrai, BSc (Optom); Yokim Bonggotgetsakul, BSc; Lucy J. Dirito, BSc;  
Kresimir Kristo, BSc; Minh-An N. Pham, BSc; Mina You, B-BMed; Karin Verspoor, PhD; Michael J. Pianta, PhD

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 136(9):1051-1061.



UNSW  
SYDNEY



# EBM vs. Research Session 2: Applied example

---

JAMA Ophthalmology | Review

## Appraising the Quality of Systematic Reviews for Age-Related Macular Degeneration Interventions A Systematic Review

Laura E. Downie, PhD; Eve Makrai, BSc (Optom); Yokim Bonggotgetsakul, BSc; Lucy J. Dirito, BSc;  
Kresimir Kristo, BSc; Minh-An N. Pham, BSc; Mina You, B-BMed; Karin Verspoor, PhD; Michael J. Pianta, PhD

**Author Affiliations:** Department of Optometry and Vision Sciences, University of Melbourne, Parkville, Victoria, Australia (Downie, Makrai, Bonggotgetsakul, Dirito, Kristo, Pham, You, Pianta); School of Computing and Information Systems, University of Melbourne, Parkville, Victoria, Australia (Verspoor).

**Corresponding Author:** Laura E. Downie, PhD, Department of Optometry and Vision Sciences, University of Melbourne, Alice Hoy Building, Parkville, Victoria, Australia 3010 (ldownie@unimelb.edu.au).

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 136(9):1051-1061.



UNSW  
SYDNEY



## EBM vs. Research Session 2: Applied example

---

The primary aim of this systematic review was to investigate the methodological quality of systematic reviews of AMD intervention studies published in peer-reviewed journals and to evaluate their use for guiding evidence-based care.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 336(9):1051-1061.



UNSW  
SYDNEY



## EBM vs. Research Session 2: Applied example

---

The primary aim of this systematic review was to investigate the methodological quality of systematic reviews of AMD intervention studies published in peer-reviewed journals and to evaluate their use for guiding evidence-based care.

Comprehensive searches to identify all relevant studies were performed using Ovid MEDLINE, Embase, PubMed, and the Cochrane Systematic Review Library. Reference lists of retrieved papers were reviewed and PROSPERO was scanned for ongoing studies.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 136(9):1051-1061.



UNSW  
SYDNEY



## EBM vs. Research Session 2: Applied example

---

The primary aim of this systematic review was to investigate the methodological quality of systematic reviews of AMD intervention studies published in peer-reviewed journals and to evaluate their use for guiding evidence-based care.

Comprehensive searches to identify all relevant studies were performed using **Ovid MEDLINE**, Embase, PubMed, and the Cochrane Systematic Review Library. Reference lists of retrieved papers were reviewed and PROSPERO was scanned for ongoing studies.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 136(9):1051-1061.



UNSW  
SYDNEY



## EBM vs. Research Session 2: Applied example

---

The primary aim of this systematic review was to investigate the methodological quality of systematic reviews of AMD intervention studies published in peer-reviewed journals and to evaluate their use for guiding evidence-based care.

Comprehensive searches to identify all relevant studies were performed using **Ovid MEDLINE**, **Embase**, PubMed, and the Cochrane Systematic Review Library. Reference lists of retrieved papers were reviewed and PROSPERO was scanned for ongoing studies.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 319(10):1051-1061.



UNSW  
SYDNEY



## EBM vs. Research Session 2: Applied example

---

The primary aim of this systematic review was to investigate the methodological quality of systematic reviews of AMD intervention studies published in peer-reviewed journals and to evaluate their use for guiding evidence-based care.

Comprehensive searches to identify all relevant studies were performed using **Ovid MEDLINE, Embase, PubMed**, and the Cochrane Systematic Review Library. Reference lists of retrieved papers were reviewed and PROSPERO was scanned for ongoing studies.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 136(9):1051-1061.



UNSW  
SYDNEY





## EBM vs. Research Session 2: Applied example

---

The primary aim of this systematic review was to investigate the methodological quality of systematic reviews of AMD intervention studies published in peer-reviewed journals and to evaluate their use for guiding evidence-based care.

Comprehensive searches to identify all relevant studies were performed using Ovid MEDLINE, Embase, PubMed, and the Cochrane Systematic Review Library. Reference lists of retrieved papers were reviewed and PROSPERO was scanned for ongoing studies.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 136(9):1051-1061.



UNSW  
SYDNEY



## EBM vs. Research Session 2: Applied example

---

The primary aim of this systematic review was to investigate the methodological quality of systematic reviews of AMD intervention studies published in peer-reviewed journals and to evaluate their use for guiding evidence-based care.

Comprehensive searches to identify all relevant studies were performed using Ovid MEDLINE, Embase, PubMed, and the Cochrane Systematic Review Library. Reference lists of retrieved papers were reviewed and PROSPERO was scanned for ongoing studies.

Methodological quality (risk of bias) was assessed using the AMSTAR tool which addresses 11 distinct items.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. JAMA 2018; 136(9):1051-1061.



UNSW  
SYDNEY



# EBM vs. Research Session 2: Applied example

---

## AMSTAR items:

1. Was an a priori design provided?
2. Was there duplicate study selection and data extraction?
3. Was a comprehensive literature search performed?
4. Was the status of publication (i.e., grey literature) used as an inclusion criterion?
5. Was a list of studies (included and excluded) provided?
6. Were the characteristics of the included studies provided?
7. Was the scientific quality of the included studies assessed and documented?
8. Was the scientific quality of the included studies used appropriately in formulating conclusions?
9. Were the methods used to combine the findings of studies appropriate?
10. Was the likelihood of publication bias assessed?
11. Was the conflict of interest included?

- **AMSTAR itself is not published in a peer-review journal. However, most items are in the EBM Users' Guides or the 2009 PRISMA statement.**

# EBM vs. Research Session 2: Applied example

---

## AMSTAR items:

1. Was an a priori design provided?
2. Was there duplicate study selection and data extraction?
3. Was a comprehensive literature search performed?
4. Was the status of publication (i.e., grey literature) used as an inclusion criterion?
5. Was a list of studies (included and excluded) provided?
6. Were the characteristics of the included studies provided?
7. Was the scientific quality of the included studies assessed and documented?
8. Was the scientific quality of the included studies used appropriately in formulating conclusions?
9. Were the methods used to combine the findings of studies appropriate?
10. Was the likelihood of publication bias assessed?
11. Was the conflict of interest included?

- **AMSTAR itself is not published in a peer-review journal. However, most items are in the EBM Users' Guides or the 2009 PRISMA statement.**

# EBM vs. Research Session 2: Applied example

---

## AMSTAR items:

1. Was an a priori design provided?
2. Was there duplicate study selection and data extraction?
3. Was a comprehensive literature search performed?
4. Was the status of publication (i.e., **grey literature**) used as an inclusion criterion?
5. Was a list of studies (included and excluded) provided?
6. Were the characteristics of the included studies provided?
7. Was the **scientific quality** of the included studies assessed and documented?
8. Was the **scientific quality** of the included studies used appropriately in formulating conclusions?
9. Were the methods used to combine the findings of studies appropriate?
10. Was the likelihood of publication bias assessed?
11. Was the conflict of interest included?

- **AMSTAR itself is not published in a peer-review journal. However, most items are in the EBM Users' Guides or the 2009 PRISMA statement.**

# EBM vs. Research Session 2: Applied example

---

Of 983 citations retrieved, 71 studies were eligible and included.

## EBM vs. Research Session 2: Applied example

---

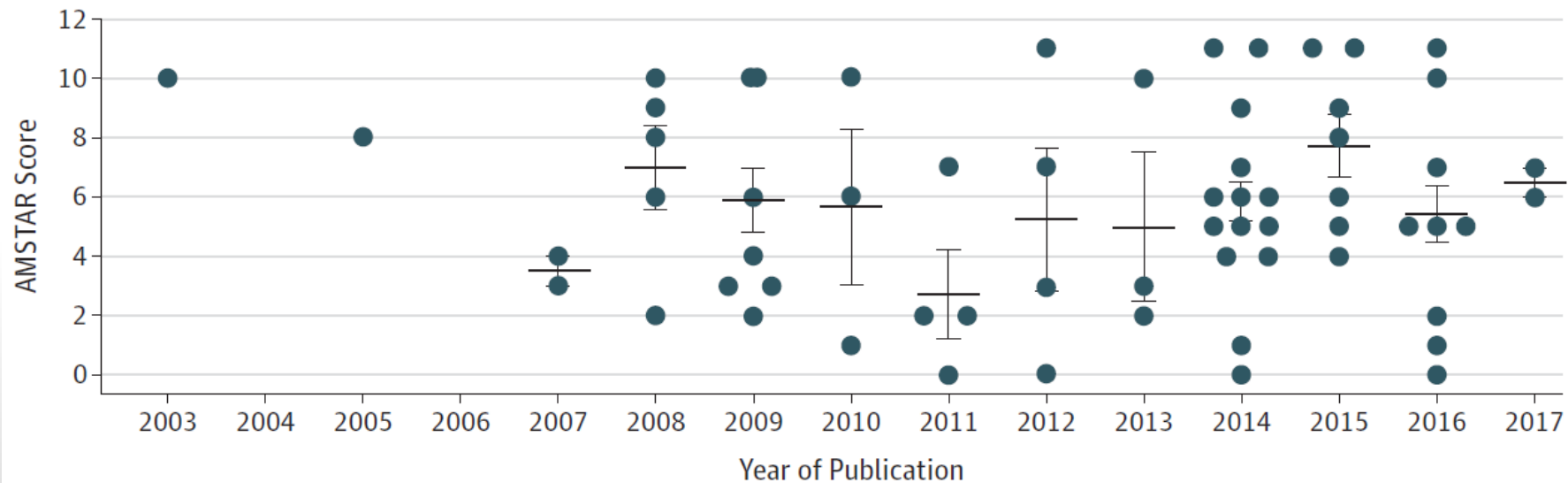
Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

## EBM vs. Research Session 2: Applied example

Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

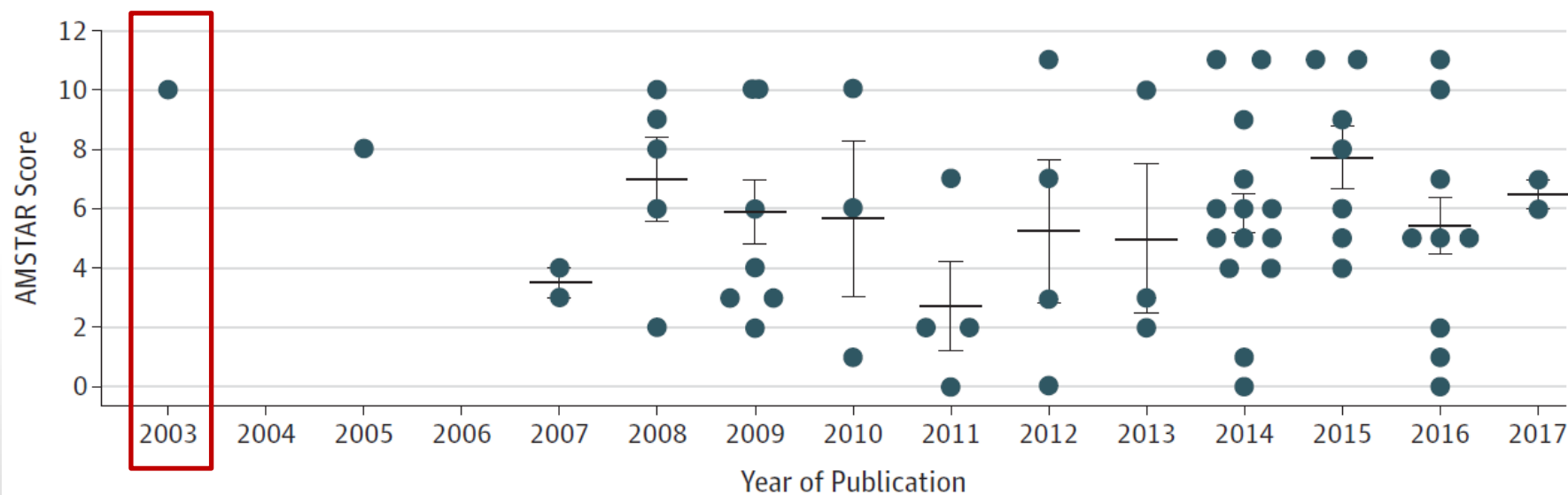




## EBM vs. Research Session 2: Applied example

Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

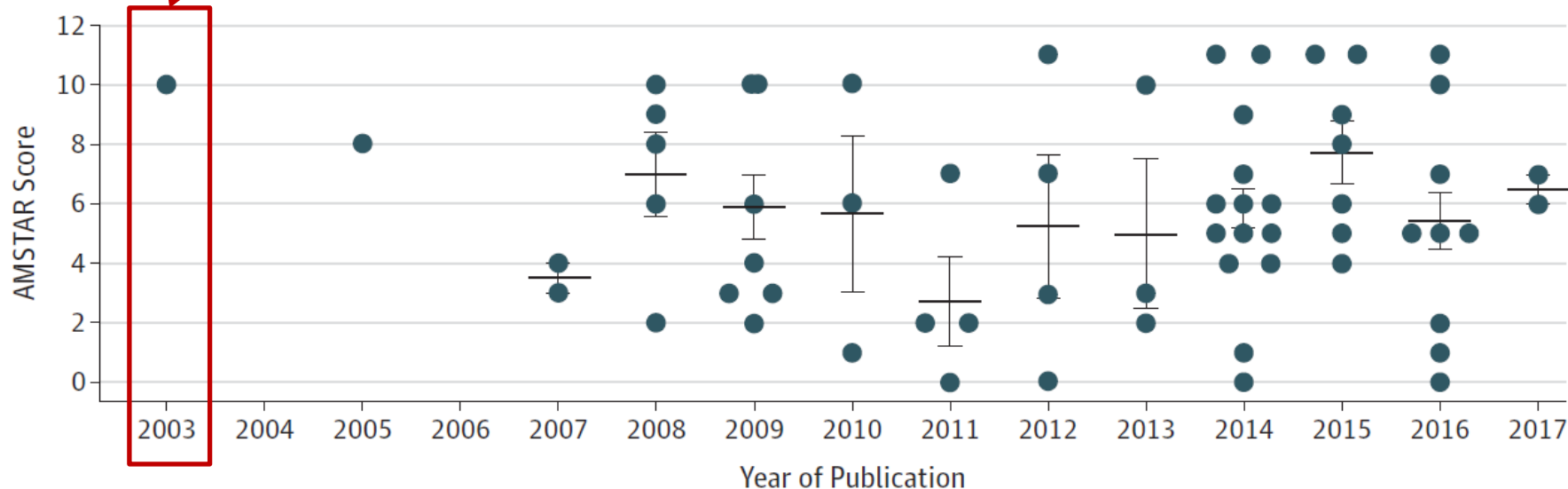


## EBM vs. Research Session 2: Applied example

Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

EBM Users' Guide for appraising systematic reviews published in 1994. It only took us 9 years to get our first systematic review!!!

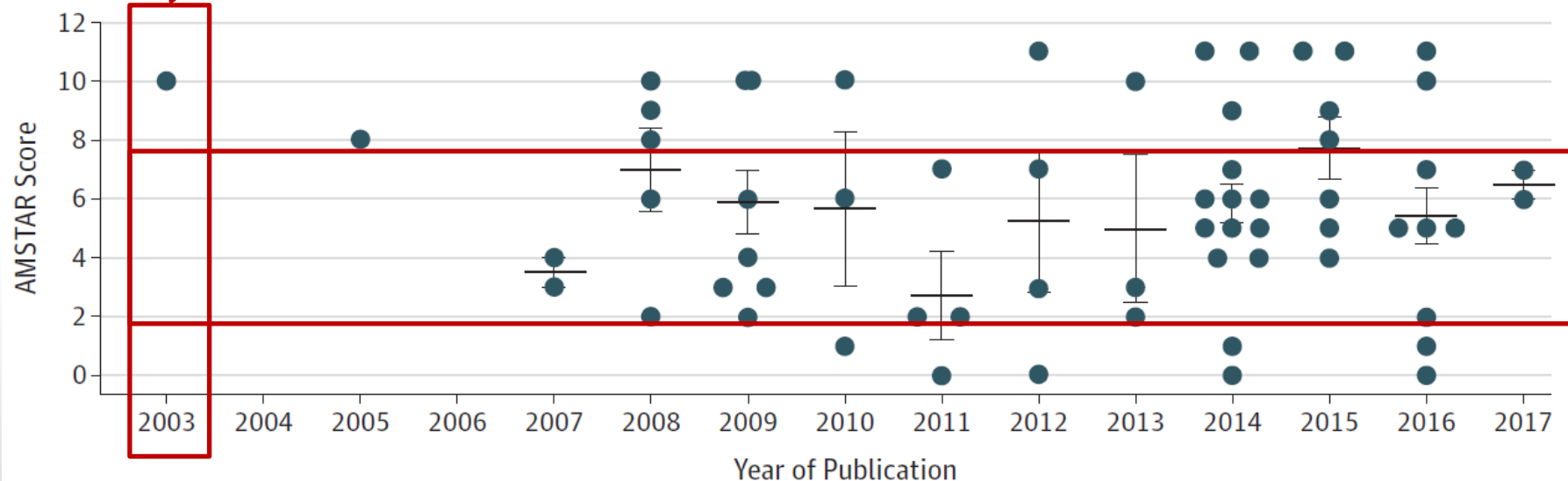


## EBM vs. Research Session 2: Applied example

Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

EBM Users' Guide for appraising systematic reviews published in 1994. It only took us 9 years to get our first systematic review!!!



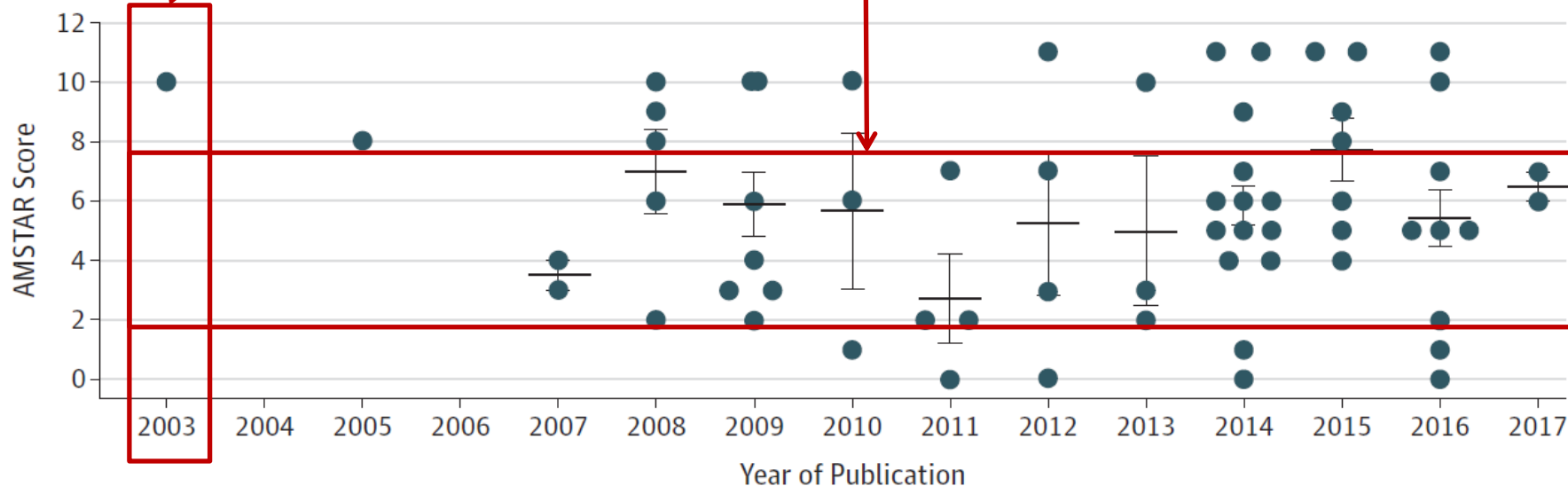
## EBM vs. Research Session 2: Applied example

Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

EBM Users' Guide for appraising systematic reviews published in 1994. It only took us 9 years to get our first systematic review!!!

Quality is not improving over time!



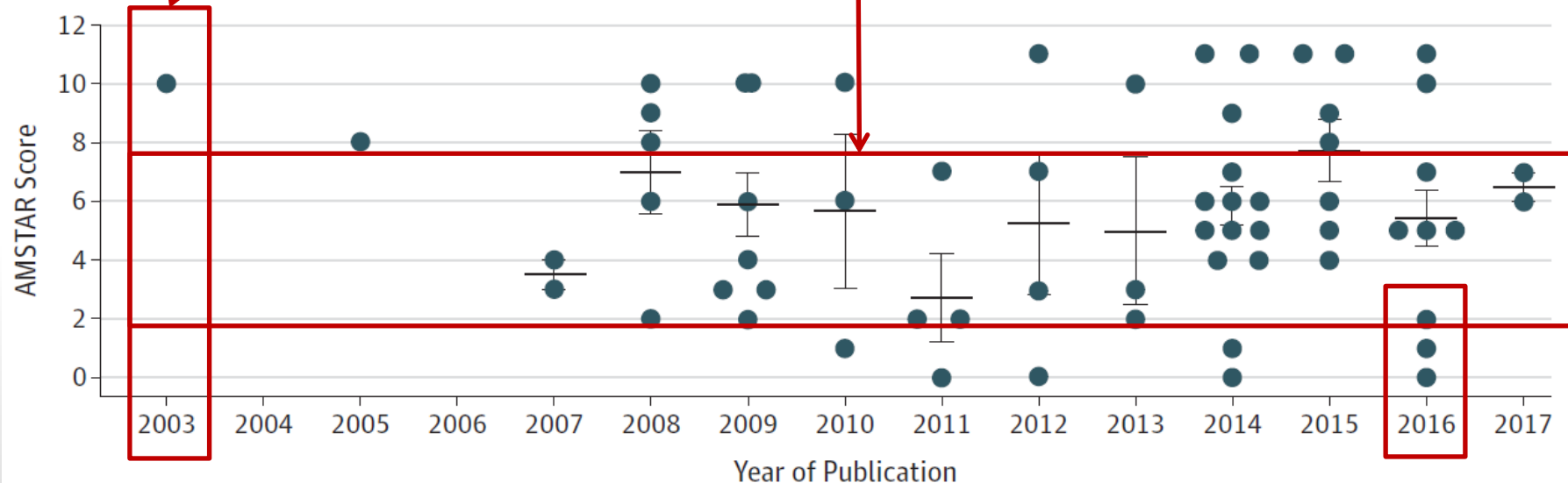
## EBM vs. Research Session 2: Applied example

Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

EBM Users' Guide for appraising systematic reviews published in 1994. It only took us 9 years to get our first systematic review!!!

Quality is not improving over time!



## EBM vs. Research Session 2: Applied example

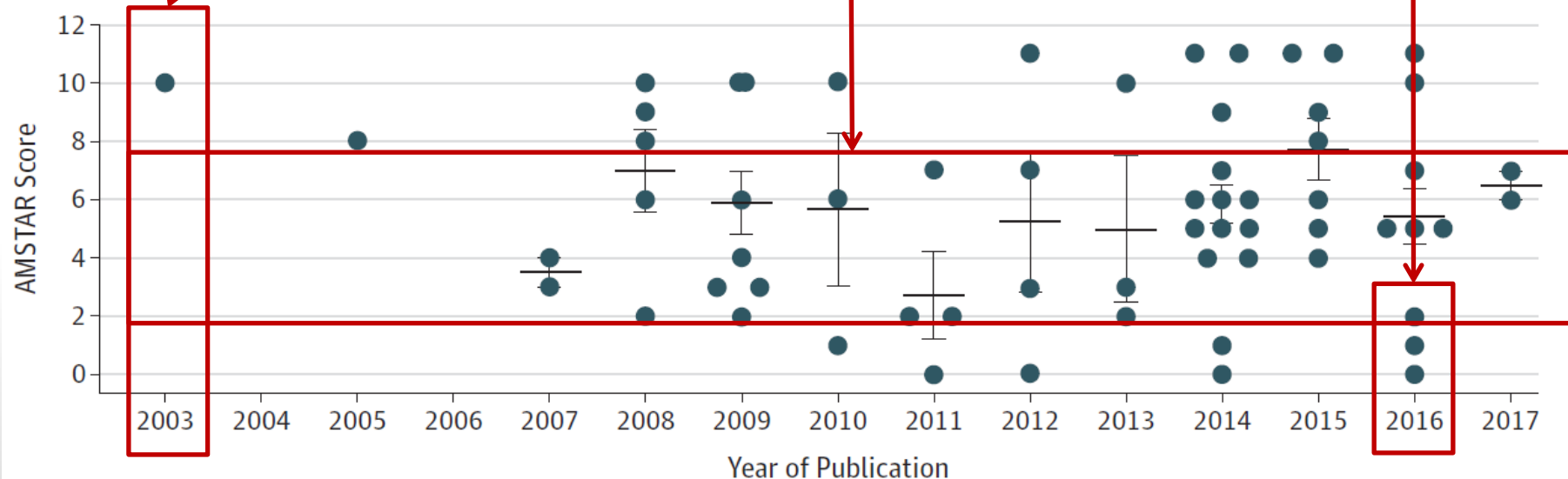
Of 983 citations retrieved, 71 studies were eligible and included.

Mean AMSTAR score was 5.8 out of 11.

EBM Users' Guide for appraising systematic reviews published in 1994. It only took us 9 years to get our first systematic review!!!

Quality is not improving over time!

Still a lot of *very shonky* ones!



# Summary

---

# Summary

---

**It is crucially important to be able to distinguish between systematic reviews and narrative reviews.**



# Summary

---

It is crucially important to be able to distinguish between systematic reviews and narrative reviews.

- Narrative reviews are “not truly useful as scientific evidence” and therefore do not constitute a formal level of evidence.
- Systematic reviews generate new knowledge that can guide clinical decision making and are viewed as top-level evidence.

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.

# Summary

---

It is crucially important to be able to distinguish between systematic reviews and narrative reviews.

- Narrative reviews are “not truly useful as scientific evidence” and therefore do not constitute a formal level of evidence.
- Systematic reviews generate new knowledge that can guide clinical decision making and are viewed as top-level evidence.

Not all publications claiming to be systematic reviews are properly conducted.

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. *JAMA* 2018; 136(9):1051-1061.



UNSW  
SYDNEY



# Summary

---

It is crucially important to be able to distinguish between systematic reviews and narrative reviews.

- Narrative reviews are “not truly useful as scientific evidence” and therefore do not constitute a formal level of evidence.
- Systematic reviews generate new knowledge that can guide clinical decision making and are viewed as top-level evidence.

Not all publications claiming to be systematic reviews are properly conducted.

The EBM Users' Guide, published in 1994, helps clinicians identify unbiased and clinically useful systematic reviews (all four types!).

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. *JAMA* 2018; 136(9):1051-1061.



UNSW  
SYDNEY



# Summary

---

It is crucially important to be able to distinguish between systematic reviews and narrative reviews.

- Narrative reviews are “**not truly useful as scientific evidence**” and therefore do not constitute a formal level of evidence.
- Systematic reviews **generate new knowledge that can guide clinical decision making** and are viewed as top-level evidence.

Not all publications claiming to be systematic reviews are properly conducted.

The EBM Users' Guide, published in 1994, helps clinicians identify unbiased and clinically useful systematic reviews (all four types!).

Guidance statements (PRISMA, PRISMA-DTA, MOOSE etc) published for researchers help guide the conduct and reporting of systematic reviews so that clinician end-users can more easily identify transparent and objective evidence to support clinical decisions.

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. *JAMA* 2018; 136(9):1051-1061.



UNSW  
SYDNEY



# Summary

---

It is crucially important to be able to distinguish between systematic reviews and narrative reviews.

- Narrative reviews are “**not truly useful as scientific evidence**” and therefore do not constitute a formal level of evidence.
- Systematic reviews **generate new knowledge that can guide clinical decision making** and are viewed as top-level evidence.

Not all publications claiming to be systematic reviews are properly conducted.

The EBM Users' Guide, published in 1994, helps clinicians identify unbiased and clinically useful systematic reviews (all four types!).

Guidance statements (PRISMA, PRISMA-DTA, MOOSE etc) published for researchers help guide the conduct and reporting of systematic reviews so that clinician end-users can more easily identify transparent and objective evidence to support clinical decisions.

*Thank you for your time!*

Chi-Un Pae. Why systematic review rather than narrative review? *Psychiatry Investig* 2015;12(3):417-419.

Downie et al. Appraising the quality of systematic reviews for age-related macular degeneration interventions: A systematic review. *JAMA* 2018; 136(9):1051-1061.



UNSW  
SYDNEY

