

Evidence-Based Medicine

Speaker : Yu-Xuan Lin
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進學のEBM

Two fundamental questions...

- What is the purpose of medicine?
- How do I decide what to do?



*You have to know where you're going before
deciding how to get there...*

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What is the purpose of medicine?



- Patient care
- Public health
- Research

➤ *Improving the quality of
patients' lives...*

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*What is
"Evidence-Based Medicine?"*

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Evidence based medicine is...

- Tracking down the best external evidence with which to answer our clinical questions...

Evidence-based medicine is the conscientious explicit and judicious use of current best evidence in making decisions about the care of individual patients.

J Trauma Acute Care Surg. 2013 Dec;75(6):927-35.



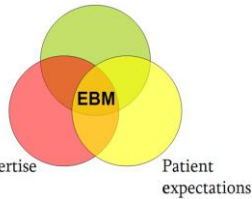
進學のEBM

引用一位哈佛醫學院院長對畢業生的一段演講：“恭喜各位同學順利畢業，但是我有二個壞消息要告訴大家：第一個是你們現在所學的知識，有三分之一在五年後會變成過時的，甚至是錯誤的；第二個是，到底是哪三分之一，需要靠大家去發現。

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Introduction Evidence Based Medicine

- Evidence-based medicine is the integration of **best research evidence** with **clinical expertise** and **patient values**. (Sackett et al., 2000)
- ✓ Evidence-based medicine, EBM
- ✓ Evidence-based nursing, EBN
- ✓ Evidence-based Health Care, EBHC
- ✓ Evidence-based ?, EB?



The core mechanisms in EBM include the following four steps

- Formulate a clear clinical question from a patient's problem.
- Search the literature for relevant clinical articles.
- Evaluate (critically appraise) the evidence for its validity and usefulness.
- Implement useful findings in clinical practice.

Clinics in Dermatology (2010) 28, 553-557



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How to ask clinical question you can answer ?

P.I.C.O. Model for Clinical Questions		
P	Patient, Population, or Problem	How would I describe a group of patients similar to mine?
I	Intervention, Prognostic Factor, or Exposure	Which main intervention, prognostic factor, or exposure am I considering?
C	Comparison or Intervention (if appropriate)	What is the main alternative to compare with the intervention?
O	Outcome you would like to measure or achieve	What can I hope to accomplish, measure, improve, or affect?
	What type of question are you asking?	Diagnosis, Etiology/Harm, Therapy, Prognosis, Prevention
	Type of study you want to find	What would be the best study design/methodology?



100年

• 我有一位65歲阿姨最近要去美國看她剛出生沒多久的孫子，這是她第一次坐飛機長途飛行，因此她很高興，到處詢問長途飛行的注意事項，她找到雜誌上一篇有關的報導，其中提到穿彈性襪可以預防長途飛行產生腿部靜脈栓塞，因此她打電話問我她要不要買來穿？

101年度院內EBM競賽 臨床情境2

25歲男性病人，沒有任何過去病史。昨天開始覺得上腹部不舒服，自行服用胃藥後症狀沒有緩解。兩天持續性右下腹疼痛、噁心、嘔吐、沒有食慾。醫師到急診處診，血液檢查有白血球增加，會診一般外科醫師後，因為懷疑急性闌尾炎(acute appendicitis)，建議開刀手術治療。

病人請求是否可以進一步做腹部超音波檢查以確診？再問因為一週前後他結婚，擔心開刀後假期較長，婚期必須延開，詢問可否不開刀或用內視鏡開刀以縮短假期。

如果你(妳)是病人家屬，請問你的建議為何？

2014年，台北成德醫院「陳」醫師與陳，除了引起大眾對醫生能力質疑外，也引起大眾對於「自製成藥」的關注。陳醫師，今年6歲，國立小學，出現一些情況也引起不為人知的人議論與同學相處的情況。課堂上常常只專注於自己有興趣的事物，對老師的教學也常常沒有反應。一開始陳醫師以為是單純的適應不良，後來連老師的課都不上了，進了兒童心理科諮詢。仔細詢問起來，陳醫師從小多項能力的發展包括：社交、主動、語言能力會遲些比同齡小朋友。後來經醫師診斷陳醫師屬於手寫障礙症(DSM-IV)的定義為抄寫速度嚴重遲緩(autism spectrum disorder, ASD)，對於陳醫師的說法，醫師與陳醫師心，醫師與醫師並沒有需要什麼治療「一定是怎麼了」醫師與醫師有做了諮詢發現一些治療與醫師對於陳醫師的學習性出血量、嗜睡、噁心、嘔吐、體重增加...等，陳醫師與陳醫師不想讓小陳吃藥，後來陳醫師在網路上找到一些新聞，說說全部治療陳醫師的小陳也年長些，醫師與醫師，陳醫師這不可不問了除了醫療治療以外，她還有在醫師與醫師的治療可以治療陳醫師可以嗎？有沒有什麼食物可以幫助改善陳醫師的情況？陳醫師與醫師醫師的說法，對於陳醫師的溝通能力、親子關係、學習成果、醫師與醫師都不好了自製成藥？

2015 HQLC Topic



第十七屆醫療品質獎 實證醫學論文數量暨評分項目

項目(組名)	的份	
PICO的實與準 10%	1.清楚描述病人(族群)及疾病	5 4 3 2 1
	2.清楚描述主要(其他)介入處方或暴露因素	5 4 3 2 1
	3.明確指出結果或系統的測量指標	5 4 3 2 1
文獻搜尋的方法與分析 30%	1.關鍵字使用合適	5 4 3 2 1
	2.清楚的敘述檢索策略	5 4 3 2 1
	3.利用各種檢索功能提高搜尋效率	5 4 3 2 1
	4.清楚地描述挑選文獻的理由	5 4 3 2 1
嚴格的文獻評核 35%	1.明確使用文獻評核指南工具	5 4 3 2 1
	2.正確且嚴謹的評核「效度」(validity)	5 4 3 2 1
	3.正確且嚴謹的評核「效度」(importance)	5 4 3 2 1
證據之臨床應用 20%	1.是否考慮將成本效益	5 4 3 2 1
	2.描述不同臨床決策對醫療品質的影響	5 4 3 2 1
現場表現 5%	1.報告內容系統分明、前後連貫	5 4 3 2 1
	2.圖表文字清楚簡明、易於理解	5 4 3 2 1
加分項目 2%	1.圖表的呈現手法創新	2 1 0

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Search for the Best Evidence

5S EBM Resources (非關證據強度)

1. Systems
2. Summaries
3. Synopses
4. Syntheses
5. Studies

Pre-filtered Secondary
Primary

UpToDate
Trip
PubMed
The Cochrane Collaboration
airiti Library 華藝線上圖書館

Model from: Haysen, R. B. (2006). Of studies, synopses, summaries, and systems: the "5S" evidence of submission services for evidence-based health care decisions. *ACJ Hospital Libr. 14*(3), A3.

Ann Intern Med.2009;151:JC3-2

Search for the Background

Classification of atrial septal defects (ASDs), and clinical features and diagnosis of isolated ASDs in children

說明疾病
好發族群
常見病因與危險因子
目前治療方式

Search for the Best Evidence

Search for the Best Evidence

More than 23,000 medical journals
"the literature"

Cochrane
PubMed
EMBASE

Ask experts
Smaller journals
Unpublished research

How to choose the right format for your research?

➢ Here are some tips to help you choose the right format for your research

- ✓ **Know** that the types of publications are different fields.
Example :
-social sciences > Empirical study
- ✓ **Remember** that not all journals publish all types of articles.
- ✓ **Look** at the journal's author guidelines for details about the types of articles accepted.
- ✓ **Speak** to your supervisors or senior colleagues for advice.

Study Type of Evidence Level

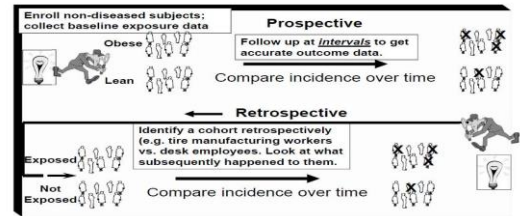
Type of question	Suggested best type of study
Therapy	RCT > Cohort > case control > case series
Diagnosis	Prospective, blind comparison to a gold standard
Etiology/Harm	Cohort > case control > case series
Prognosis	Cohort study > case control > case series
Prevention	RCT > Cohort > case control > case series
Clinical Exam	Prospective, blind comparison to a gold standard
Cost	Economic analysis



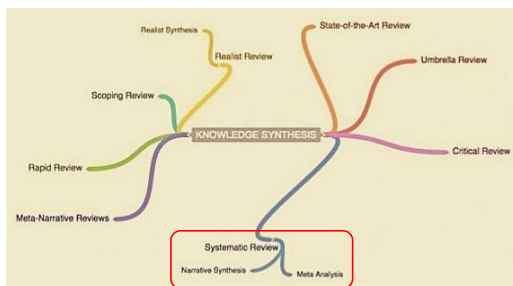
Definition of Cohort Study

- ✓ More clearly established temporal sequence between exposure and disease.

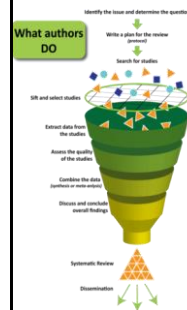
In prospective cohort studies conception, design, & enrollment occur before anyone develops the outcome.



Type of review



Type of review articles-Systematic reviews



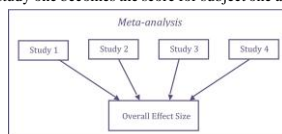
- ✓ Are more structured and rigorous than literature reviews.
- ✓ Address a clearly formulated question about the literature reviewed.
- ✓ Include reviews of published studies as well as gray literature (unpublished studies, reports, dissertations, conference papers and abstracts, governmental research, ongoing clinical trials.. .etc.

Definition of Meta-analysis

Meta-analysis is a **quantitative** approach for **systematically combining** results of **previous research** to arrive at **conclusions** about the body of research.

- Quantitative : numbers
- Systematic : methodical
- Combining : putting together
- Previous research : what's already done
- Conclusions : new knowledge

In a Meta-analysis, each study becomes a subject in the new study. Therefore, the mean of study one becomes the score for subject one and so on.

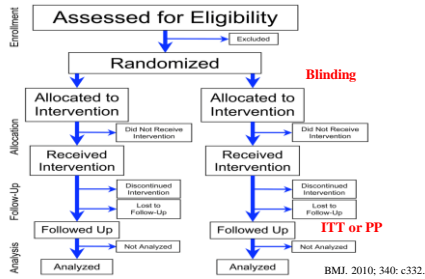


Narrative reviews, systematic reviews and Meta-Analysis

- ✓ Narrative Reviews : traditional expert review subjective, **no formal rules in selecting studies, no standard statistical methods for combing studies.**
- ✓ Systematic Review : review in which there is a **comprehensive search for relevant studies** on a specific topic and those identified are then appraised and synthesized according to a **predetermined and explicit method**
- ✓ Meta-Analysis : systematic review that **employs statistical methods** (a quantitative summary) to combine and summarize the results of several studies.

Definition of Randomized controlled trial

RCT are quantitative, comparative, controlled experiments in which investigators study two or more interventions in a series of individuals who receive them in random order.

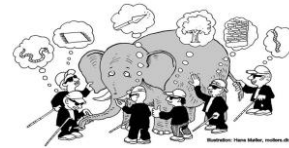


The RCT is one of the simplest and most powerful tools in clinical research.

What is a blinded study?

➤ This approach avoids bias because when people know what they are taking, it might change the way they react.

- In a single blinded study, the patient does not know which arm of the protocol they have been assigned to.
- Double blinded studies are those studies where neither the patient or the research physician know whether the patient is receiving the actual study drug or standard drug.



What is Bias?

Any trend in the collection, analysis, interpretation, publication or review of data that can lead to conclusions that are systematically different from the truth. Last, 2001

A process at any state of inference tending to produce results that depart systematically from the true values. Fletcher et al, 1988

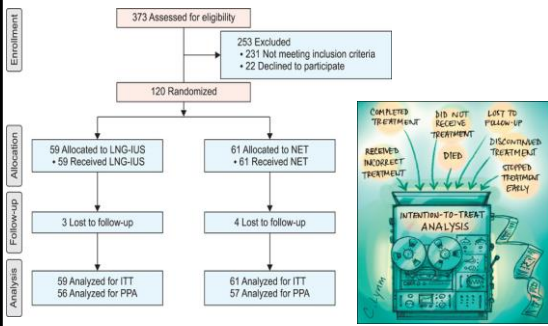
Systematic error in design or conduct of a study. Szklo et al, 2000

Bias

- ✓ Selection bias
- ✓ Performance bias
- ✓ Attrition bias
- ✓ Detection bias



Intention to treat (ITT) analysis and Per-protocol (PP) analysis



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Critically Appraise the Evidence

Question	Step 1 (Level 1)	Step 2 (Level 2)	Step 3 (Level 3)	Step 4 (Level 4)	Step 5 (Level 5)
How common is the problem?	Local and current random sample survey (or census).	Systematic review of surveys that also moves to test diagnostic accuracy**	Local non-random sample**	Case series**	n/a
Is this diagnostic monitoring test accurate?	Systematic review of cross-sectional studies with consistently applied reference standard and blinding.	Diagnostic cross-sectional studies with consistently applied reference standard and blinding.	Non-randomized studies, or studies without consistently applied reference standards**	Case-control studies, or poor or non-independent reference standard**	Mechanism-based case series**
What will happen if we do not add a therapy?	Systematic review of inception cohort studies.	Inception cohort studies.	Cohort study or control arm of randomized trial**	Case-series or case-control studies, or poor quality prognostic cohort study**	n/a
Does this intervention help?	Systematic review of randomized trials or n-of-1 trials.	Randomized trial or exceptionally rigorous cohort study**	Non-randomized controlled cohort/follow-up study**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based studies, or historically controlled studies**
What are the COMMON harms?	Systematic review of randomized trials, systematic review of medical case-control studies, or case-control study with the patient you are asking the question about, or cohort study.	Randomized controlled trial with systematic review.	Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient)**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based studies, or historically controlled studies**
What are the RARE harms?	Systematic review of randomized trials or n-of-1 trials.	Randomized trial or exceptionally rigorous study with systematic review.	n/a**	n/a**	n/a**
WHY does it affect the worthwhile?	Systematic review of randomized trials.	Randomized trial with systematic review.	n/a**	n/a**	n/a**

* Level may be graded down on the basis of study quality, imprecision, indirectness (study PICED does not match questions PICED), because of inconsistency between studies, or because the absolute effect size is very small. Level may be graded up if there is a large or very large effect size.

** As always, a systematic review is generally better than an individual study.

How to cite the Levels of Evidence Table
 OCEBM Levels of Evidence Working Group. "The Oxford 2011 Levels of Evidence." Oxford Centre for Evidence-Based Medicine. <http://www.cebm.ox.ac.uk/index.aspx?toc=563>
 OCEBM Levels of Evidence Working Group - Jeremy Hackett, Sam Chalmers (James Lind Library), Paul Glasziou, Trish Greenhalgh, Carl Heneghan, Alessandro Liberati, Ivan McPherson, Bob Phillips, Hazel Thornton, Olive Vandford and Mary Waples

牛津實證醫學中心證據等級表 2011 (翻譯 by EGRD Office)

臨床問題	證據等級 A	證據等級 B	證據等級 C	證據等級 D
此臨床問題有多常見?	隨機調查的隨機樣本對綜合當地隨機樣本的系統性回顧**	區域性非隨機樣本調查**	病例系列研究**	n/a
診斷或監測工具是否準確?	系統性回顧的橫斷面研究，具有 consistently applied reference standard and blinding.	非隨機性研究，或沒有 consistently applied reference standard 的研究**	病例系列研究**	n/a
如果不治療會有什麼後果?	系統性回顧的 inception cohort studies.	cohort study or control arm of randomized trial**	case-series or case-control studies, or poor quality prognostic cohort study**	n/a
這項介入治療有效嗎?	系統性回顧的 randomized trials, systematic review of medical case-control studies, or case-control study with the patient you are asking the question about, or cohort study.	randomized trial or exceptionally rigorous cohort study**	non-randomized controlled cohort/follow-up study**	case-series, case-control studies, or historically controlled studies**
介入治療的常見害處?	系統性回顧的 randomized trials, systematic review of medical case-control studies, or case-control study with the patient you are asking the question about, or cohort study.	randomized controlled trial with systematic review.	non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient)**	case-series, case-control studies, or historically controlled studies**
介入治療的罕見害處?	系統性回顧的 randomized trials or n-of-1 trials.	randomized trial or exceptionally rigorous study with systematic review.	n/a**	n/a**
為什麼這項治療值得做?	系統性回顧的 randomized trials.	randomized trial with systematic review.	n/a**	n/a**

* 此研究的質量、不精確、不直接、不一致、間接性、研究 PICED 不匹配問題 PICED、由於研究之間的不一致性、或因為絕對效應大小非常小。等級可能因存在大或非常大的效應大小而提高。

** 如常，系統性回顧通常比個別研究更好。

如何引用證據等級表
 OCEBM Levels of Evidence Working Group. "The Oxford 2011 Levels of Evidence." Oxford Centre for Evidence-Based Medicine. <http://www.cebm.ox.ac.uk/index.aspx?toc=563>
 OCEBM Levels of Evidence Working Group - Jeremy Hackett, Sam Chalmers (James Lind Library), Paul Glasziou, Trish Greenhalgh, Carl Heneghan, Alessandro Liberati, Ivan McPherson, Bob Phillips, Hazel Thornton, Olive Vandford and Mary Waples



For further reading and referents...

台灣實證醫學學會 | TEBMA

UK CLEARINGHOUSE

BestHealth

UpToDate



Characteristics of Clinical Trail

➤ Usually medical or clinical studies on human volunteers, these investigations follow a pre-determined research protocol.

Can be of two broad types :

- Observational** (investigators observe the participants)
- Interventional** (participants receive specific treatments or interventions)