



# ***EVIDENCE-BASED MEDICINE***

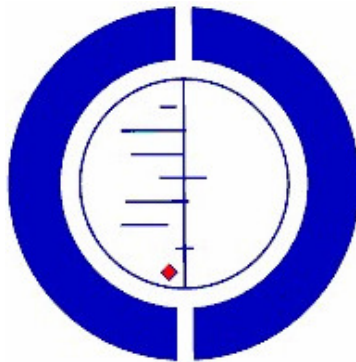
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## **KONSEP**

- ***Evidence-based medicine:***
  - ***“the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett, 1997)***
- ***Evidence + clinical skills***
  - Aplikatif
  - Tidak kadaluwarsa
  - ***Reduce HARM on patients***

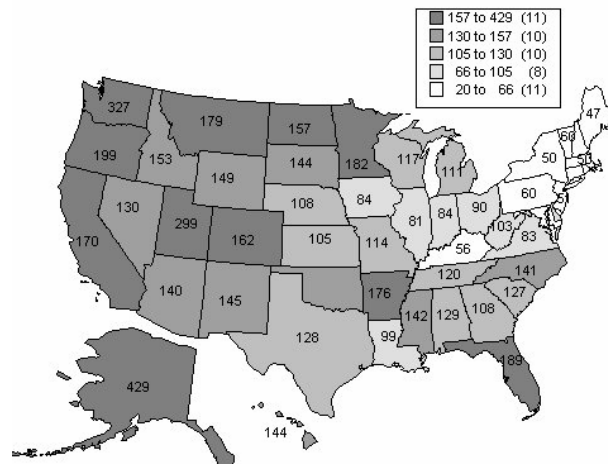
## KONSEP

- **Mengapa kita perlu mengadopsi EBM?**
  - *Practice without the best evidence*
  - *The failure of common sense*
  - *Variation in current practice*
  - *Difficulty in managing medical information*
  - *Knowledge declines over time*









*post hoc ergo propter hoc*

- ❖ Saya menggoyangkan pohon, dan sebuah kelapa jatuh ke kepala saya. Hmm... Mungkin menggoyangkan pohon menyebabkan kelapa jatuh ke kepala saya! Lebih baik lain kali jangan menggoyangkan pohon ini tanpa berhati-hati kalau-kalau ada kelapa yang jatuh...
- ❖ Saya memberi pasien saya yang terkena bronkhitis terapi antibiotika selama 4-5 hari, dan 3 hari kemudian dia merasa lebih sehat. Hmm.. Mungkin memberi pasien ini antibiotiklah yang membuat pasien ini merasa lebih sehat! Kalau begitu saya akan memberi semua pasien saya yang terkena bronkhitis terapi antibiotik...



The rate of radical prostatectomy per 100,000 male Medicare beneficiaries, adjusted for age and race (Lu-Yao, 1993)

$$\text{Usefulness of medical information} = \frac{\text{Relevance} \times \text{validity}}{\text{Work}}$$

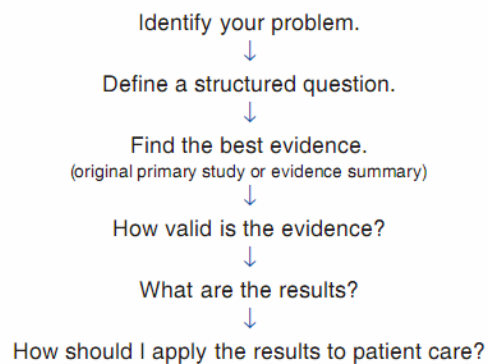
Information source	Relevance	Validity	Work	Usefulness				
Evidence-based textbook	High	High	Low	<b>High</b>				
Systematic review (evidence-based)	High	High	Low	<b>High</b>				
<a href="#">Portable summary of systematic reviews</a> (InfoRetriever) 	High	High	Low	<b>High</b>				
POEMs based resources: <a href="#">Journal of Family Practice</a>  <a href="#">POEMs feature</a>  and <a href="#">Evidence-Based Practice newsletter</a> 	High	High	Low	<b>High</b>				
Internet in 10 years	High	High	Low	Practice guidelines (evidence-based)	Mod	High	Low	<b>High-mod</b>
Drug reference book (PDR)	High	Mod	Low	<a href="#">Cochrane Database of Systematic reviews</a>	Mod-High	High	Mod-High	<b>High-mod</b>
<a href="#">ACP Journal Club</a>  <a href="#">Evidence-Based Medicine</a> 	Moderate	High	Low	Standard textbook	High	Low	Low	<b>Mod</b>
Colleagues	High	Mod	Low	Standard journal review	High	Mod	Low	<b>Mod</b>
				Free medical newspapers	High	Low	Low	<b>Mod</b>
				CME lectures	Mod	Mod	Low	<b>Mod</b>
				CME small groups	High	Mod	Mod	<b>Mod</b>
				Consensus statements	Mod	Mod	Low	<b>Mod</b>
				Practice guidelines (consensus)	Mod	Mod	Low	<b>Mod</b>
				Online searching	Mod	High	High	<b>Mod</b>
				Journal articles	Low	High	High	<b>Low</b>
				Drug advertising	Mod	Low	Low	<b>Low</b>
				Drug company representatives	High	Low	Low	<b>Low</b>
				Mass media	Low	Low	Low	<b>Low</b>
				Internet now	Low	Low	High	<b>Low</b>



## KONSEP

- **POEM** = *Patient Oriented Evidence that Matters*
    - addresses a clinical problem or clinical question that primary care physicians will encounter in their practice
    - uses patient-oriented outcomes (symptom severity, symptom duration, mortality, hospital length of stay, cost, healing rate, complications)
    - has the potential to change our practice if the results are valid and applicable
  - **DOE** = *Disease-Oriented Evidence*
    - common in the medical literature
    - often brought to our attention by pharmaceutical representatives
    - often misleading and generally should be considered premature.
- *When POEMs exist, forget the DOEs.*

### Using the Medical Literature to Provide Optimal Patient Care



## KONSEP

- **5 langkah dalam EBM:**
  - *Asking answerable questions*
  - *Searching for the evidence*
  - *Critically appraising the evidence for its validity and relevance*
  - *Making a decision*
  - *Evaluating your performance*

## *Asking Answerable Questions*

### **PICO**

- ***Patient/Population:*** identifikasi karakteristik klinis pasien yang mempengaruhi masalah dan relevan dengan praktek
- ***Intervention:*** deskripsi tentang obat/tindakan (terapi), tes atau program skrining (diagnosis), paparan pada sebuah agen penyebab/faktor risiko (etiologi)
- ***Comparison:*** alternatif dari *intervention*
- ***Outcome***

## Asking Answerable Questions

- **Model PICO bisa dilakukan untuk membuat pertanyaan dalam hal:**
  - Etiologi
  - Diagnosis
  - Prognosis
  - Terapi
  - Pencegahan
  - *Cost-effectiveness*
  - *Quality of life*

## Searching for the Evidence

- Oxford Centre for Evidence-based Medicine - Levels of Evidence
  - 1a: Systematic reviews (with homogeneity) of randomized controlled trials
  - 1a-: Systematic review of randomized trials displaying worrisome heterogeneity
  - 1b: Individual randomized controlled trials (with narrow confidence interval)
  - 1b-: Individual randomized controlled trials (with a wide confidence interval)
  - 1c: All or none randomized controlled trials
  - 2a: Systematic reviews (with homogeneity) of cohort studies
  - 2a-: Systematic reviews of cohort studies displaying worrisome heterogeneity
  - 2b: Individual cohort study or low quality randomized controlled trials (<80% follow-up)
  - 2b-: Individual cohort study or low quality randomized controlled trials (<80% follow-up / wide confidence interval)
  - 2c: 'Outcomes' Research; ecological studies
  - 3a: Systematic review (with homogeneity) of case-control studies
  - 3a-: Systematic review of case-control studies with worrisome heterogeneity
  - 3b: Individual case-control study
  - 4: Case-series (and poor quality cohort and case-control studies)
  - 5: Expert opinion without explicit critical appraisal, or based on physiology, bench research or 'first principles'



## *Searching for the Evidence*

- ***U.S. Preventive Services Task Force - Levels of Evidence***
  - *Level I: Evidence obtained from at least one properly designed randomized controlled trial.*
  - *Level II-1: Evidence obtained from well-designed controlled trials without randomization.*
  - *Level II-2: Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one center or research group.*
  - *Level II-3: Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled trials might also be regarded as this type of evidence.*
  - *Level III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.*

## *Critical Appraisal*

- **3 isu penting:**
  - **Bagaimana validitasnya?**
  - **Apakah hasilnya penting?**
  - **Apakah relevan dengan praktek?**



## Critical Appraisal

- **Validitas:**

- Apakah masalah penelitiannya didefinisikan dengan jelas? (ingat PICO)
- Apakah pasien dirandomisasi terhadap perlakuan dan apakah cara randomisasinya dijelaskan dengan rinci?
- Apakah subyek penelitian di-*blinding*?
- Apakah randomisasi menghasilkan kelompok-kelompok yang serupa pada awal studi?
- Apakah semua pasien diperhitungkan dalam analisis? Apakah ada analisis “*intention-to-treat*”?
- Apakah seluruh kelompok dilakukan perlakuan yang sama sejak awal sampai selesai penelitian?

### Five Groups That Should, if Possible, Be Blind to Treatment Assignment

Patients	To avoid placebo effects
Clinicians	To prevent differential administration of therapies that affect the outcome of interest (cointervention)
Data collectors	To prevent bias in data collection
Adjudicators of outcome	To prevent bias in decisions about whether or not a patient has had an outcome of interest
Data analysts	To avoid bias in decisions regarding data analysis

## Critical Appraisal

- **Hasil:**
  - **Seberapa besar efek terapinya?**
    - ARR, RRR, NNT, RR
  - **Seberapa ketepatan estimasi efek terapinya? (95% CI)**

The 2 × 2 Table

Exposure	Outcome	
	Yes	No
Yes	<i>a</i>	<i>b</i>
No	<i>c</i>	<i>d</i>

$$\text{Relative risk} = \frac{a/(a+b)}{c/(c+d)}$$

$$\text{Relative risk reduction} = \frac{c/(c+d) - a/(a+b)}{c/(c+d)}$$

$$\text{Risk difference}^a = \frac{c}{c+d} - \frac{a}{a+b}$$

Number needed to treat = 100/(risk difference expressed as %)

$$\text{Odds ratio} = \frac{a/b}{c/d} = \frac{ad}{cb}$$

<sup>a</sup>Also known as the absolute risk reduction.

**Results From a Randomized Trial of Endoscopic Sclerotherapy as Compared With Endoscopic Ligation for Bleeding Esophageal Varices<sup>a</sup>**

Exposure	Outcome		Total
	Death	Survival	
Ligation	18	46	64
Sclerotherapy	29	36	65

**Hitunglah:**

- ARR
- RRR
- NNT
- RR

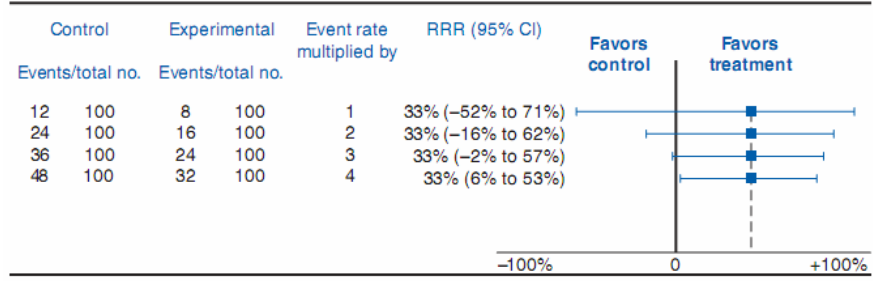
**Confidence Intervals Around the Relative Risk Reduction for the Hypothetical Results of 5 Successively Larger Trials**

Control Event Rate	Treatment Event Rate	Relative Risk, %	Relative Risk Reduction (RRR), %	Intuitive Confidence Interval, %	Calculated 95% Confidence Interval Around the RRR, %
2/4	1/4	50	50	-50 to 90	-174 to 92
10/20	5/20	50	50	-20 to 90	-14 to 79.5
20/40	10/40	50	50	0 to 90	9.5 to 73.4
50/100	25/100	50	50	20 to 80	26.8 to 66.4
500/1000	250/1000	50	50	40 to 60	43.5 to 55.9

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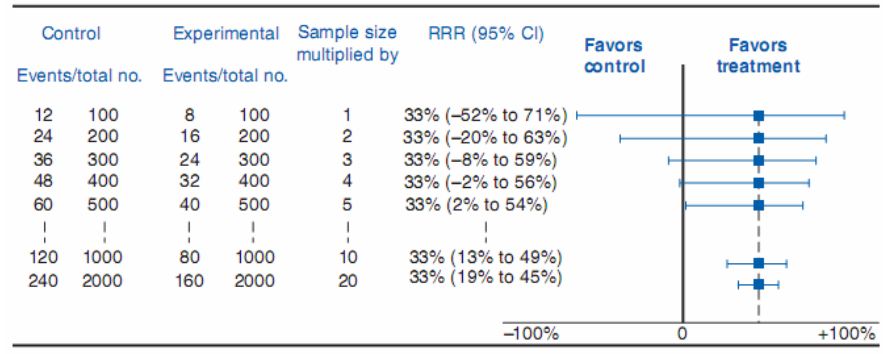


### Event Rate and the Width of the Confidence Interval (With a Constant Sample Size)



Abbreviations: CI, confidence interval; RRR, relative risk reduction.

### Sample Size and the Width of the Confidence Interval (Assuming Constant Event Rate)



Abbreviations: CI, confidence interval; RRR, relative risk reduction.



## Critical Appraisal

- **Relevansi:**
  - Apakah pasien dalam studi serupa dengan pasien saya?
  - Apakah semua *outcome* klinis yang penting sudah dipertimbangkan?
  - Apakah manfaat terapi sebanding dengan *harm* dan biaya?



## Critical Appraisal

- *Substitute/surrogate outcomes:*
  - Bronkodilator menghasilkan peningkatan kecil tetapi bermakna pada *forced expired volume* pasien dengan COPD
  - Vasodilator meningkatkan *cardiac output* pada pasien gagal jantung
  - Obat hipolipidemik memperbaiki profil lipid

## Critical Appraisal

- **Patient-important outcomes**
  - **Bronkodilator menurunkan sesak nafas selama aktivitas sehari-hari**
  - **Vasodilator mencegah MRS karena gagal jantung**
  - **Obat hipolipidemik menurunkan risiko infark miokard**

### Considerations in the Decision to Treat 2 Patients With Myocardial Infarction With Tissue Plasminogen Activator or Streptokinase

	Risk of Death 1 Year After MI With Streptokinase (CER)	Risk With tPA (EER) (ARR = CER - EER)	Number Needed to Treat (100/ARR When ARR Is Expressed as a Percentage)
40-Year-old man with small MI	2%	1.86% (0.24% or 0.0024)	417
70-Year-old man with large MI and heart failure	40%	35.2% (4.8% or 0.048)	21

Abbreviations: ARR, absolute risk reduction; CER, control event rate; EER, experimental event rate; tPA, tissue plasminogen activator; MI, myocardial infarction.