Brighton and Sussex
Library and Knowledge Service

Critical appraisal on the go

BSUH Inter-professional Education & Knowledge Conference
#IEKCon18

AEB, 28 September 2018

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Children's and Women's Services Directorates

Brighton and Sussex NHS Library and Knowledge Service is part of
Brighton and Sussex University Hospitals NHS Trust

Critical appraisal – a definition

A process of assessing the validity, reliability and applicability of evidence

Validity – degree to which a study is likely to be true and free from bias (internal/external)

Reliability – would you get the same results if you repeatedly carried out the research?

Applicability – how well would the results apply to your own clinical practice?

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The appraisal framework in 4 steps

- **Step 1**
  Identify the clinical question, topic or general subject area

- **Step 2**
  Discuss the research methodology / design

- **Step 3**
  Summarise the outcomes / results

- **Step 4**
  Draw points from the discussion / conclusions

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The framework: Step 1

Identify the clinical question, topic or general subject area

✓ Why? ***Introduction***

- Assess whether the **research question** was clear, sensible and relevant to your clinical situation (PICO, PECOT)

GATE – a Graphic Appraisal Tool for Epidemiological studies

https://blogs.bmj.com/ce/2015/11/12/gate-a-graphic-appraisal-tool-for-epidemiological-studies/

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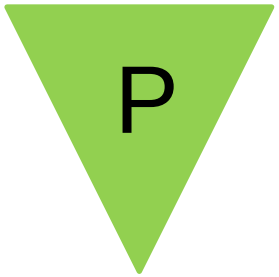
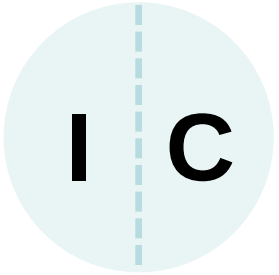
GATE tool for epidemiological studies

Selection



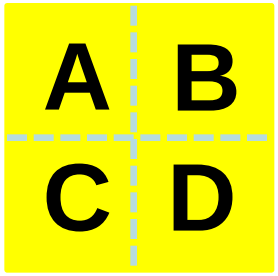
Patient / Population

Allocation



Intervention / Exposure, Control

Outcome



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Outcome (Time)

Jackson R, et al. The GATE frame: critical appraisal with pictures. *Evid Based Med*. 2006 Apr;11(2):35-8. https://ebm.bmj.com/content/11/2/35

The framework: Step 2

Discuss the research methodology/design

✓ How? ***Methods***

- Assess whether the most appropriate (and strongest possible) **study design** was used

  OCEBM Study designs

  https://www.cebm.net/2014/04/study-designs/

- Identify opportunities for **bias** in the research method and judge whether these weaken the research conclusions

  OCEBM Catalogue of bias

  https://catalogofbias.org/biases/

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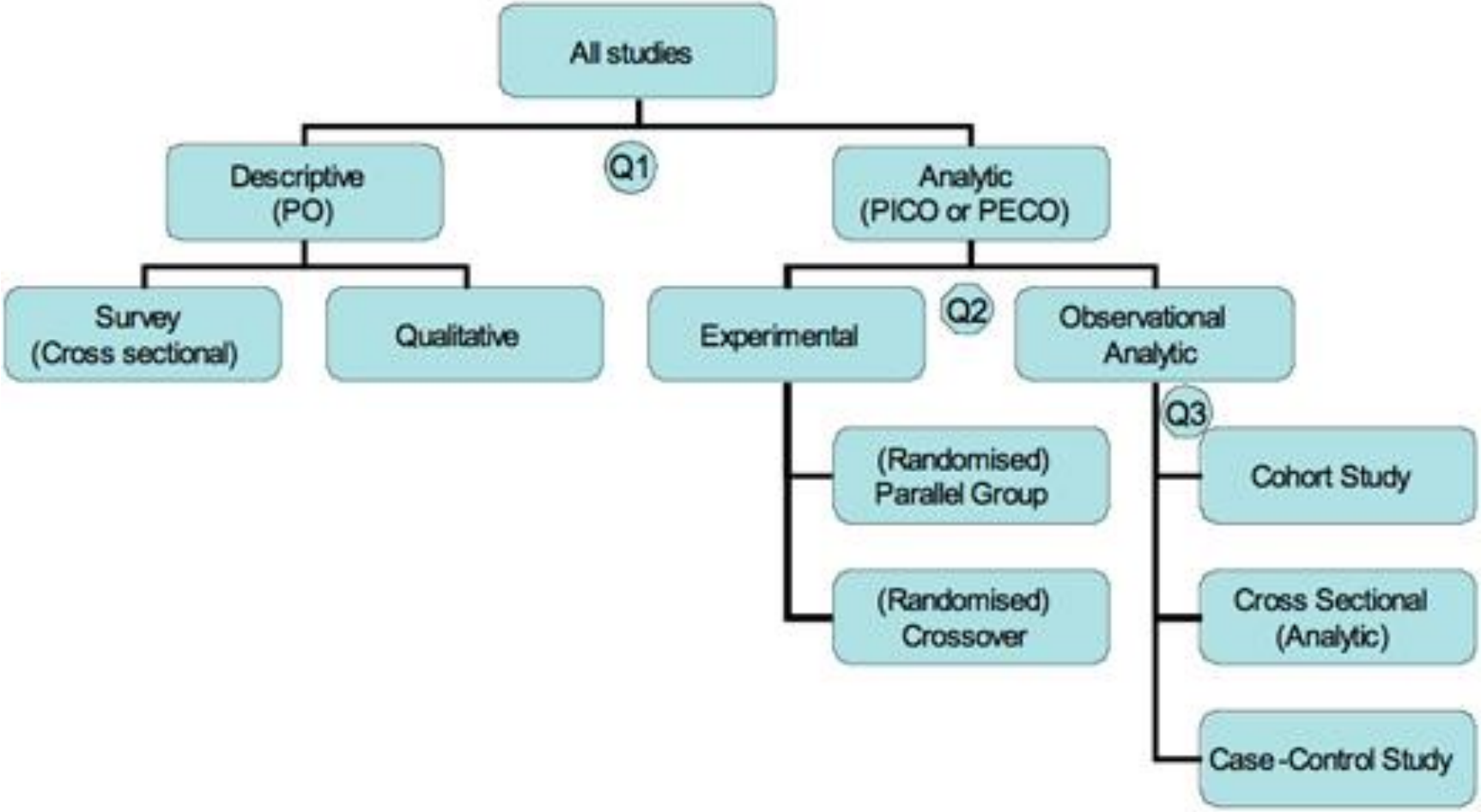
Study designs overview



From: https://www.cebm.net/2014/04/study-designs/

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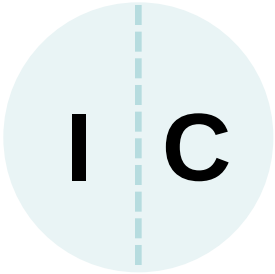
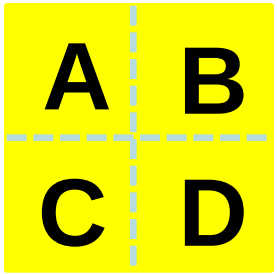
RAMBOMAN –areas of potential bias

Selection

Allocation



Outcome



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Recruitment

Allocation

Maintenance

Blind

Objective

Measurement

ANalyses

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The framework: Step 3

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Summarise the outcomes / results

✓ What? ***Results***

- Interpret the **statistics** to see if they support the conclusions drawn from the research

Statistics for:

- Description [mean, median, mode, Standard Deviation]
- Probability [Absolute risk, Relative risk, Risk ratio, Hazard ratio, Odds ratio]
- Validity [Confidence Interval, p-value (alpha), Power (beta)]

GATE CATs (Critically Appraised Topics)

https://www.fmhs.auckland.ac.nz/en/soph/about/our-departments/epidemiology-and-biostatistics/research/epiq/2015-evidence-based-practice-and-cats.html

The “two by two” table

Outcome

A	B	+
C	D	-

- Exposure Event Rate = a ÷ (a + b)
- Control Event Rate = c ÷ (c + d)

		Disease status		Totals
		positive	negative	
Exposure to risk factor or intervention	positive	a	b	a+b
	negative	c	d	c+d
	Totals	a+c	b+d	a+b+c+d

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The “two by two” table calculations

	Formula
Control Event Rate (CER) outcome event rate in control group	CER = c/(c+d)
Experimental Event Rate (EER) outcome event rate in experimental group	EER = a/(a+b)
Absolute Risk Reduction (ARR)	CER - EER
Relative Risk (RR)	EER/CER
Relative Risk Reduction (RRR)	(CER – EER)/CER or ARR/CER
Numbers Needed to Treat (NNT) / Harm (NNH)	1/ARR = 1/(CER – EER)
Odds of cases in exposed	a/b
Odds of cases in non exposed	c/d
Odds Ratio (OR)	(a/b)/(c/d) = ad/bc

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The framework: Step 4

Draw points from the discussion / conclusions

✓ Meaning ***Discussion***

- Assess whether you can **apply** the research to your own clinical setting

Critical appraisal tools from
the Critical Appraisal Skills Programme (CASP)
http://www.casp-uk.net/

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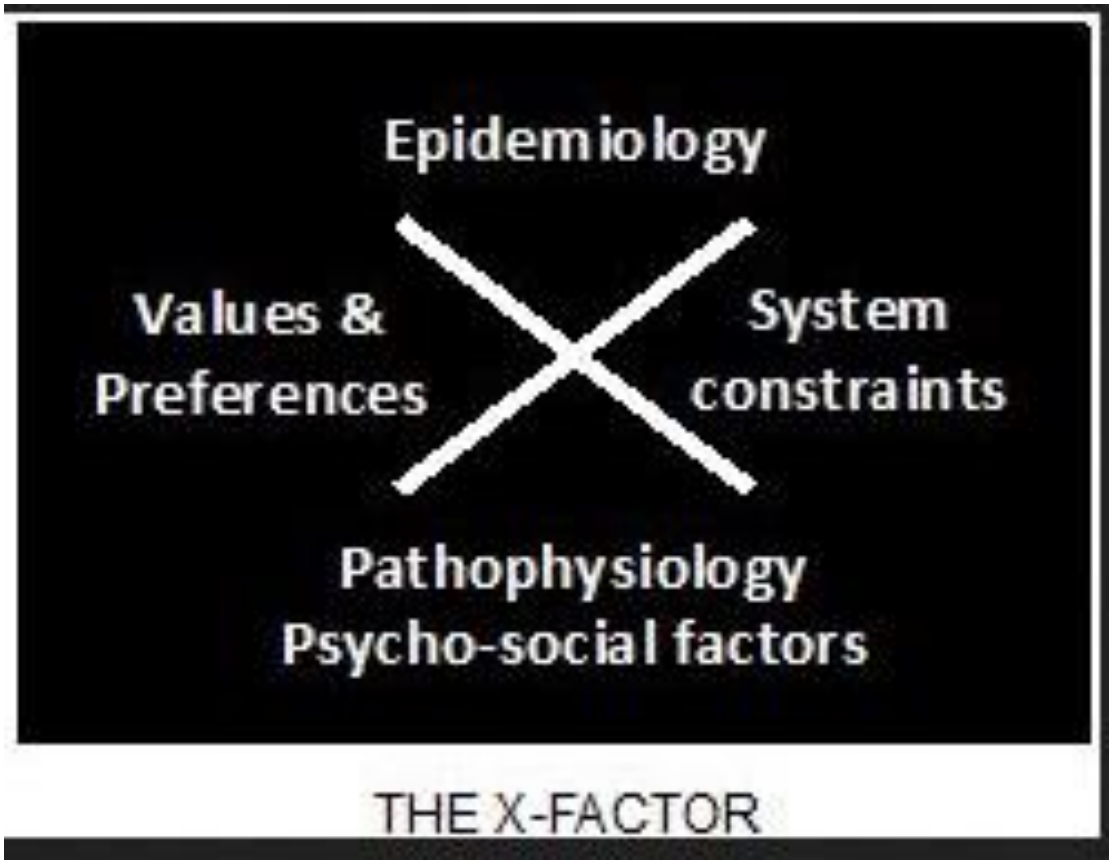
The X-factor of applicability



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Questions?

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