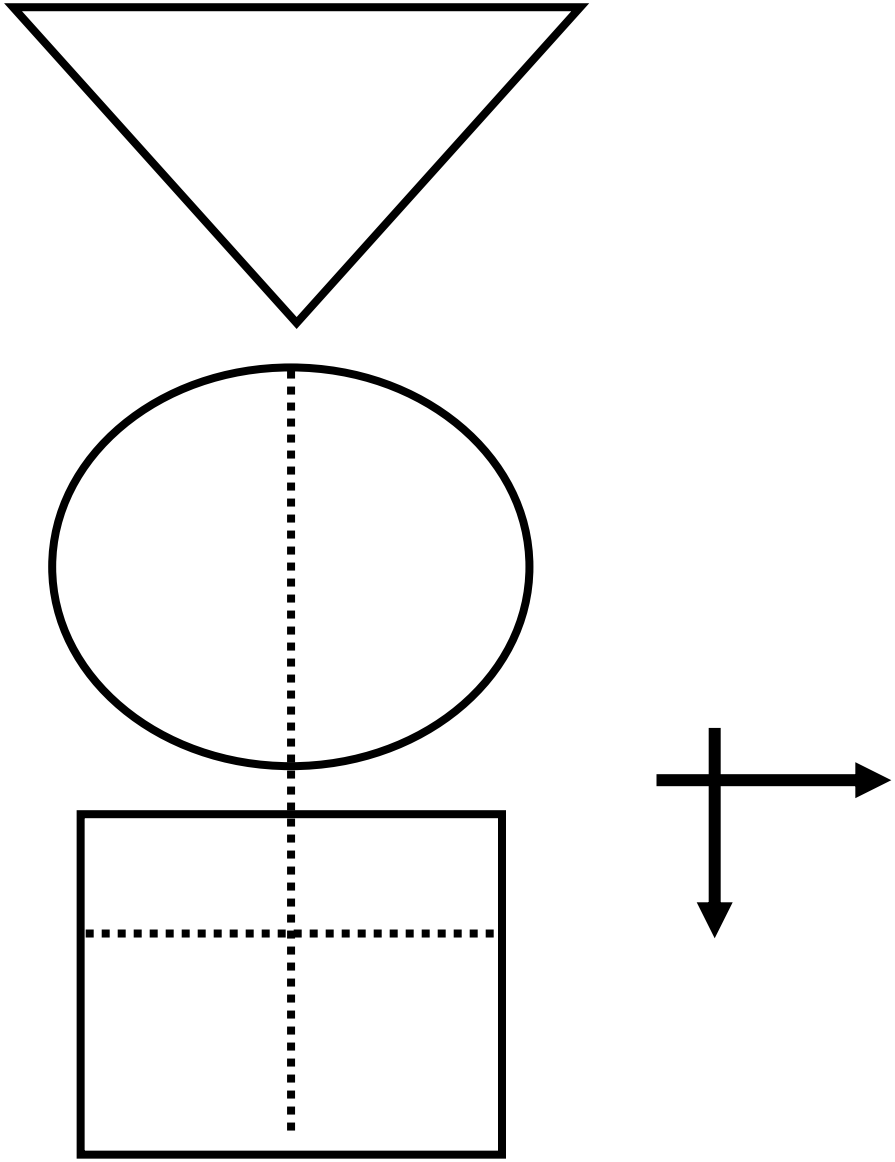
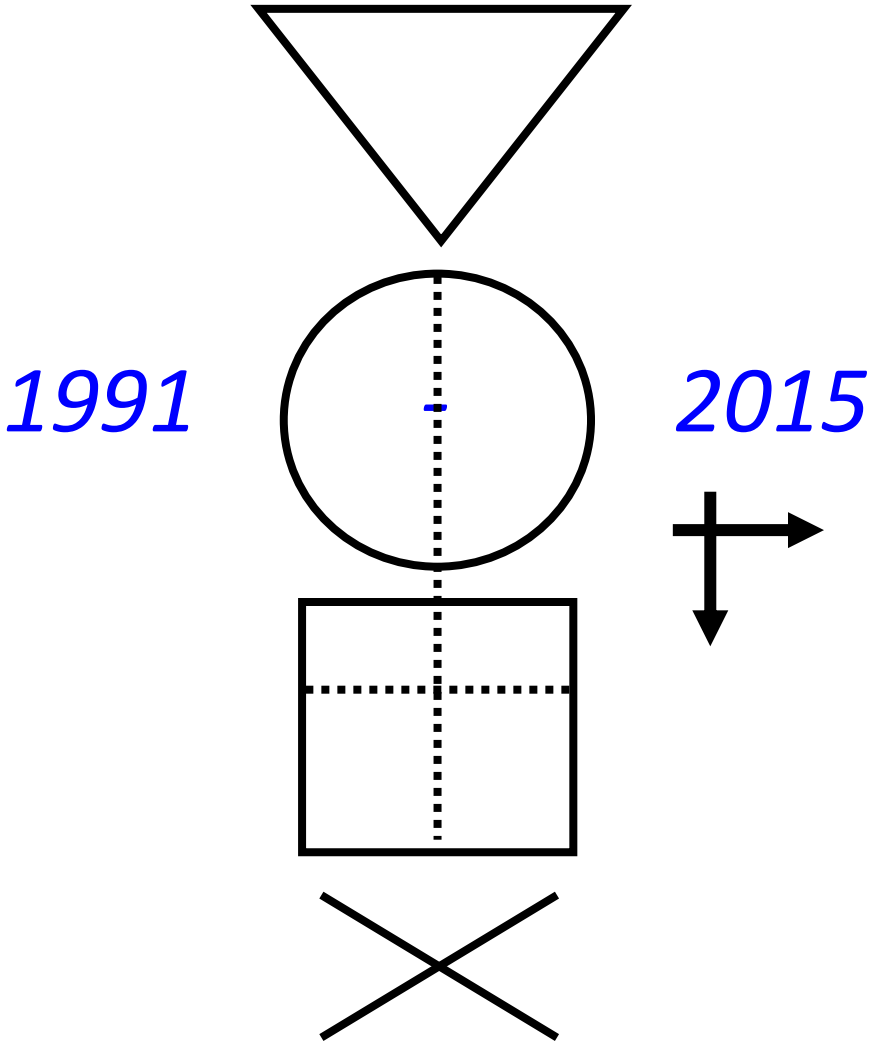
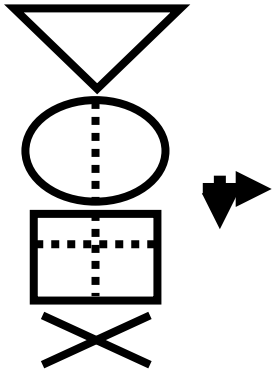


GATE:
Graphic Appraisal Tool for Epidemiology



1 picture, 2 formulas & 3 acronyms



GATE:

Graphic Appraisal Tool for Epidemiology

Graphic Architectural Tool for Epidemiology

Graphic Approach To Epidemiology

making epidemiology accessible


4th year medical students 1991

Jerry Morris

$$\text{epidemiology} = \frac{\text{numerator}}{\text{denominator}}$$

In: Uses of Epidemiology 1957

presentation outline

GATE is a framework for:

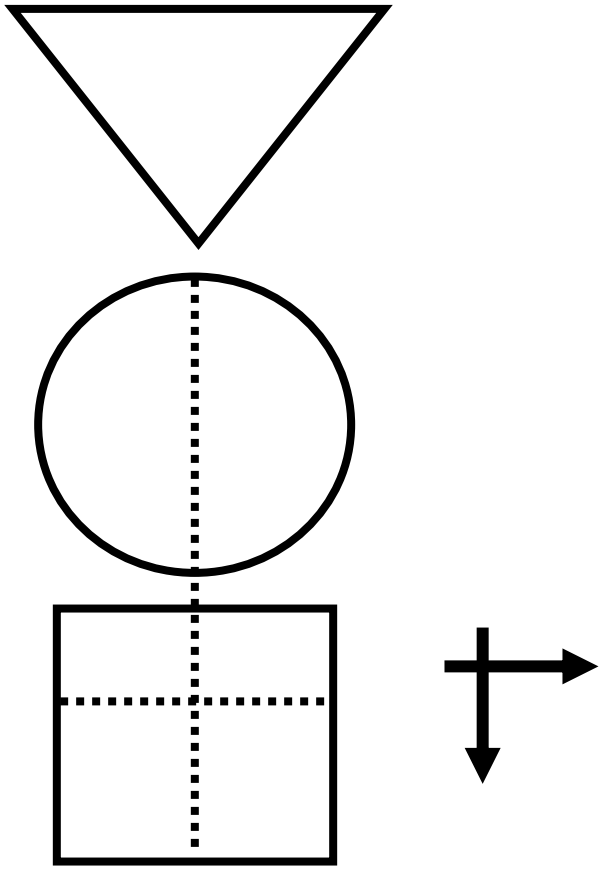
1. study design
2. study analysis
3. study error
4. practicing EBM

1 picture, 2 formulas & 3 acronyms

1

GATE: a framework for study design

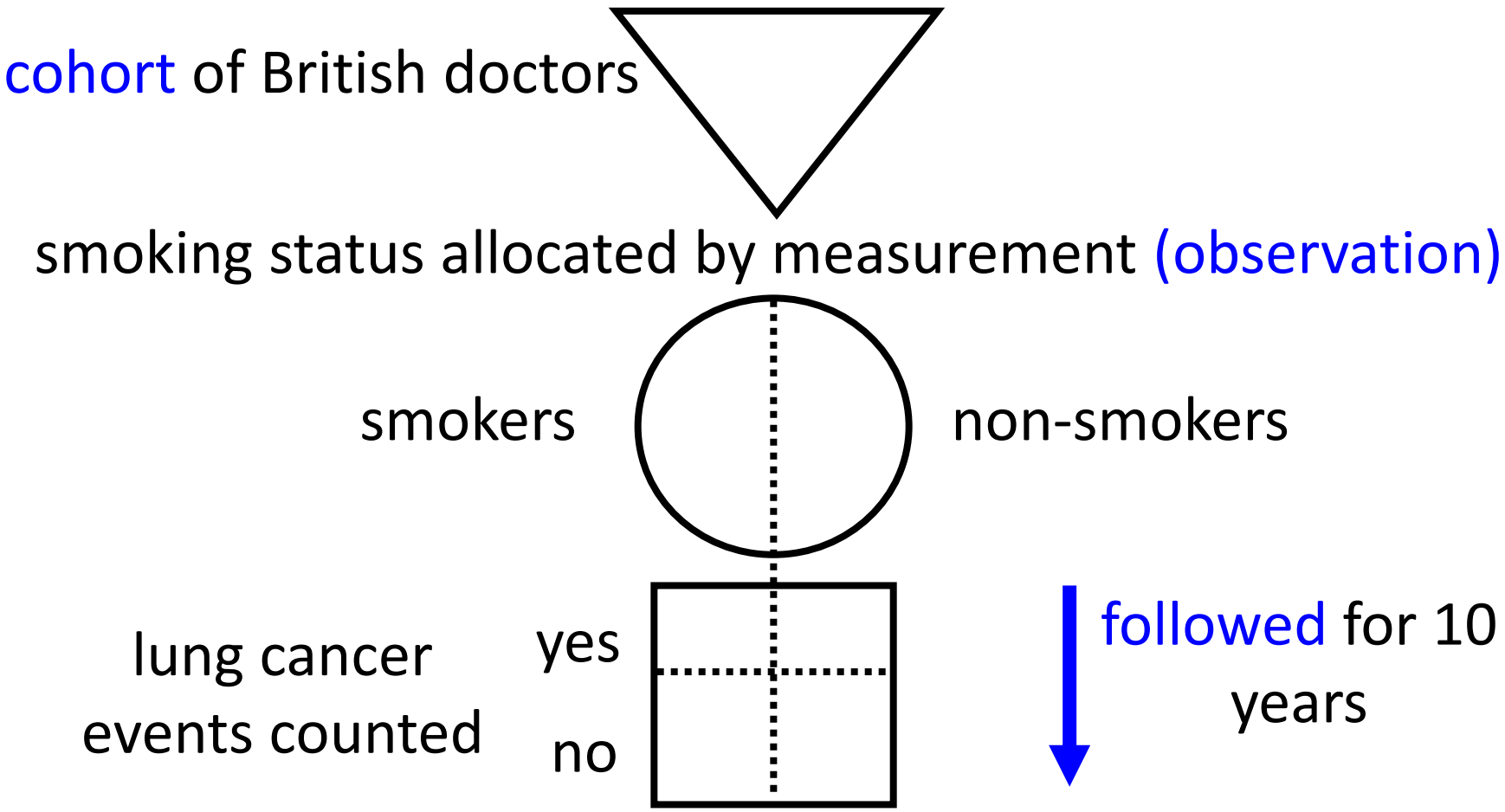
1 picture



every epidemiological study can be hung on the GATE frame

*1 **picture**, 2 formulas & 3 acronyms*

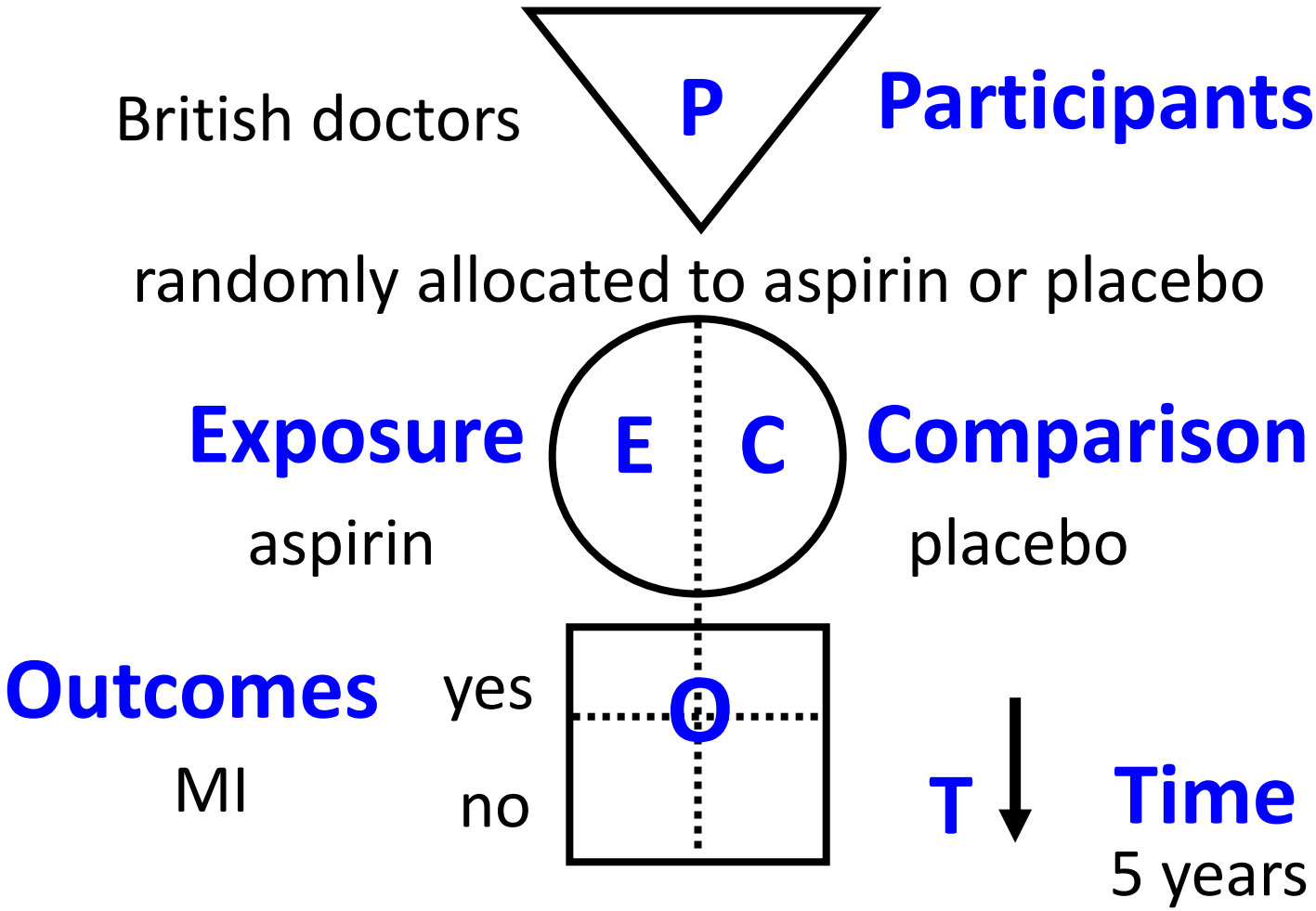
1 picture: GATE frame



cohort / longitudinal / follow-up study

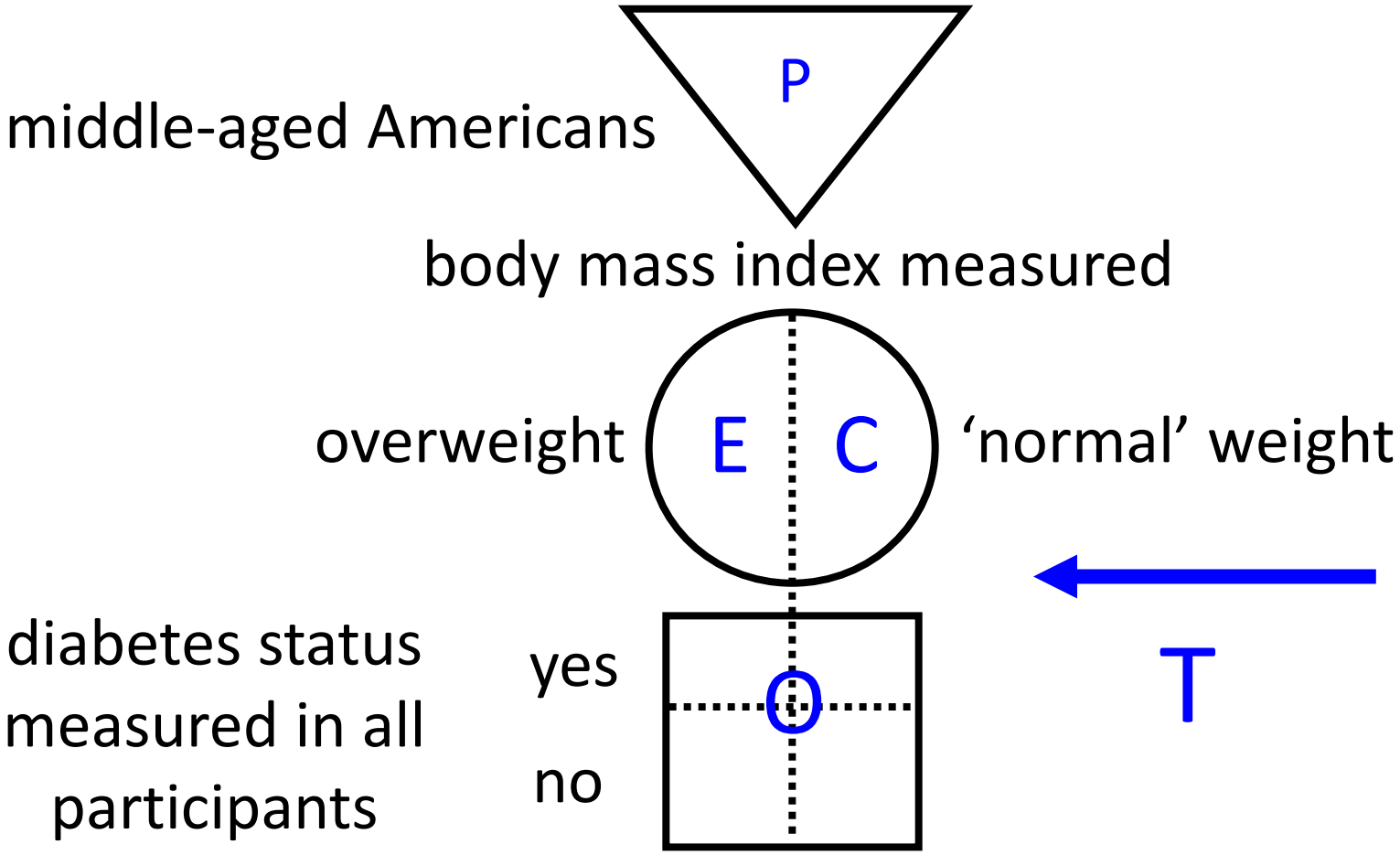
*1 **picture**, 2 formulas & 3 acronyms*

1st acronym: PECOT

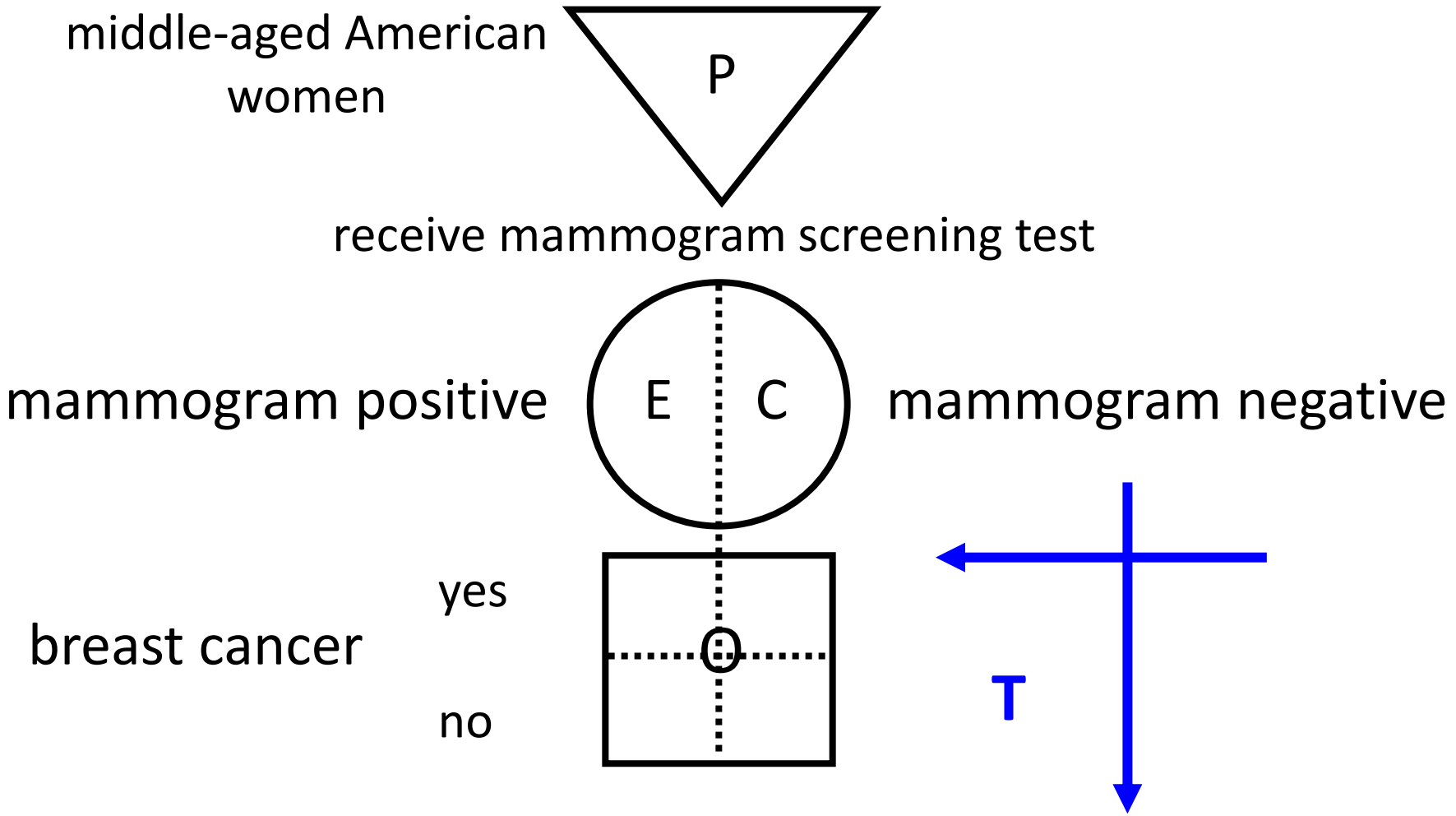


randomised controlled trial

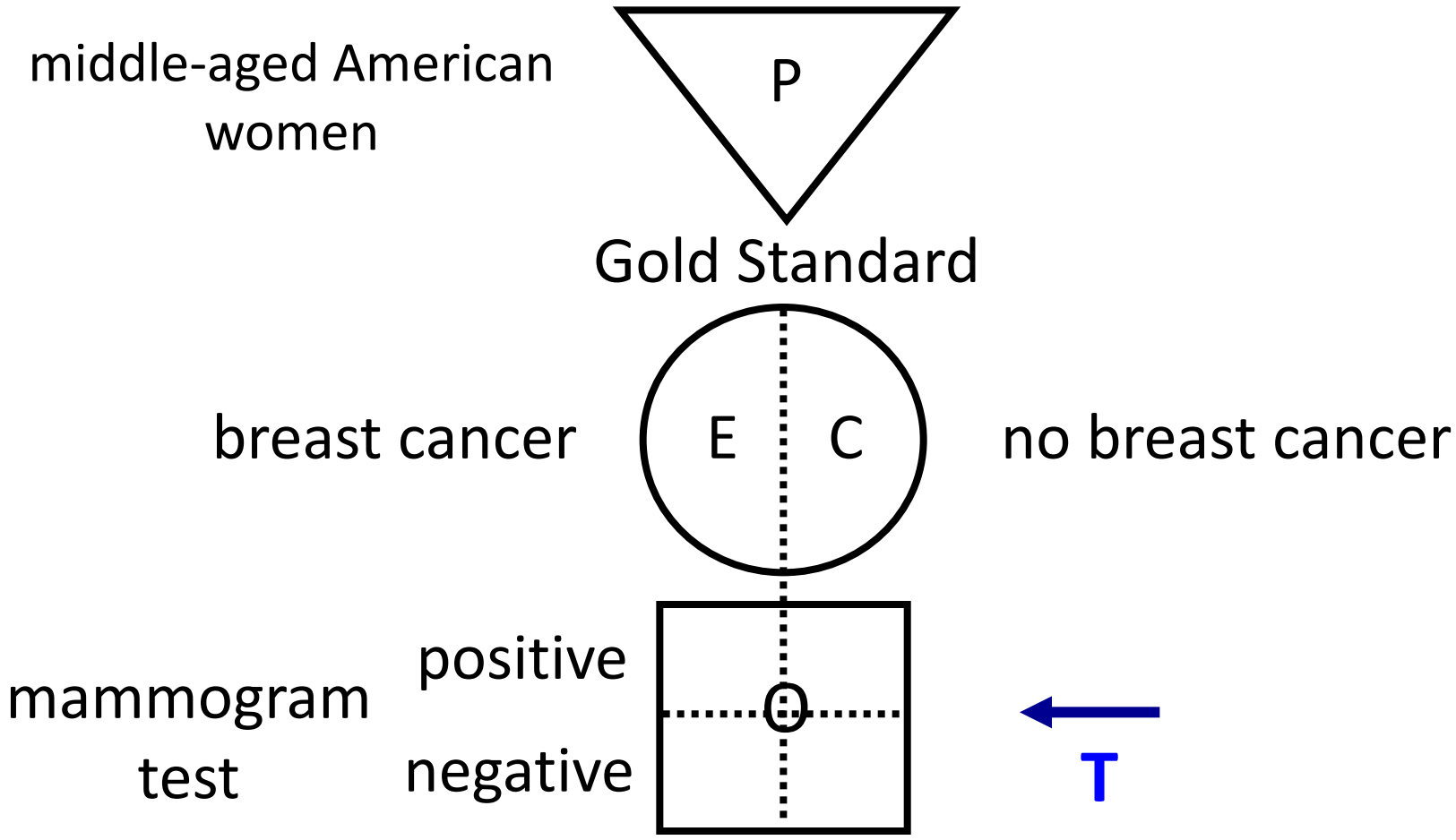
1 picture, 2 formulas & 3 ***acronyms***



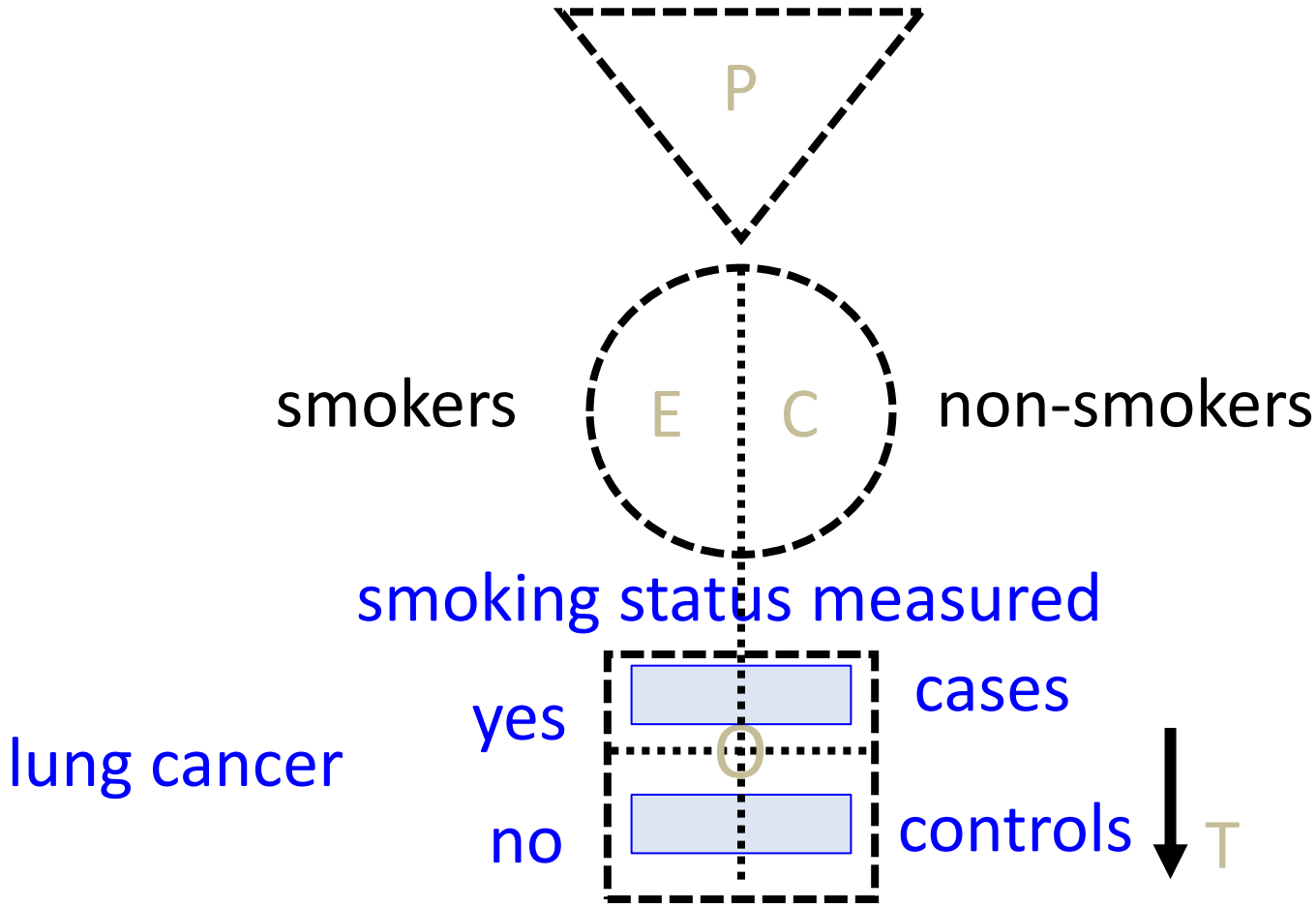
cross-sectional (prevalence) study



diagnostic test (prediction) study



diagnostic (test accuracy) study



case-control study

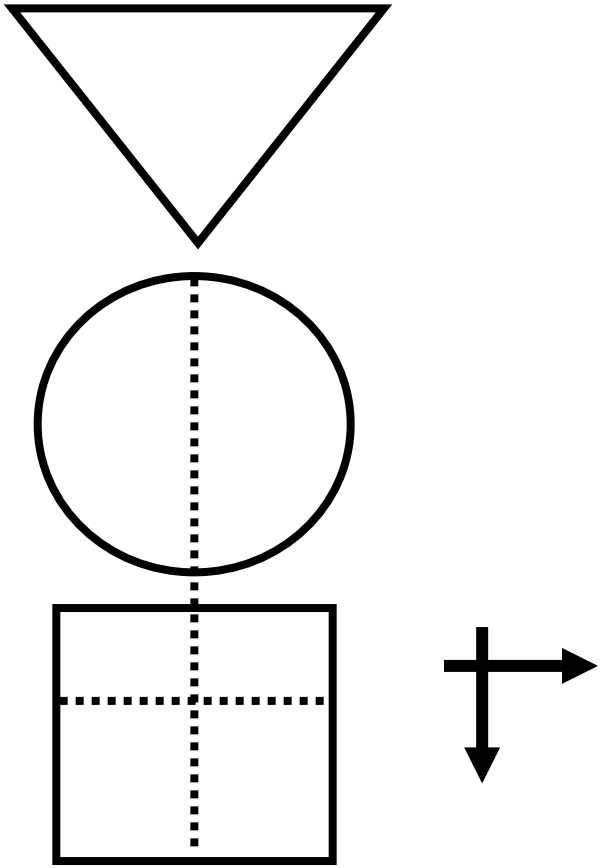
(all nested in virtual cohort studies)

£100

2

GATE: a framework for study analysis:

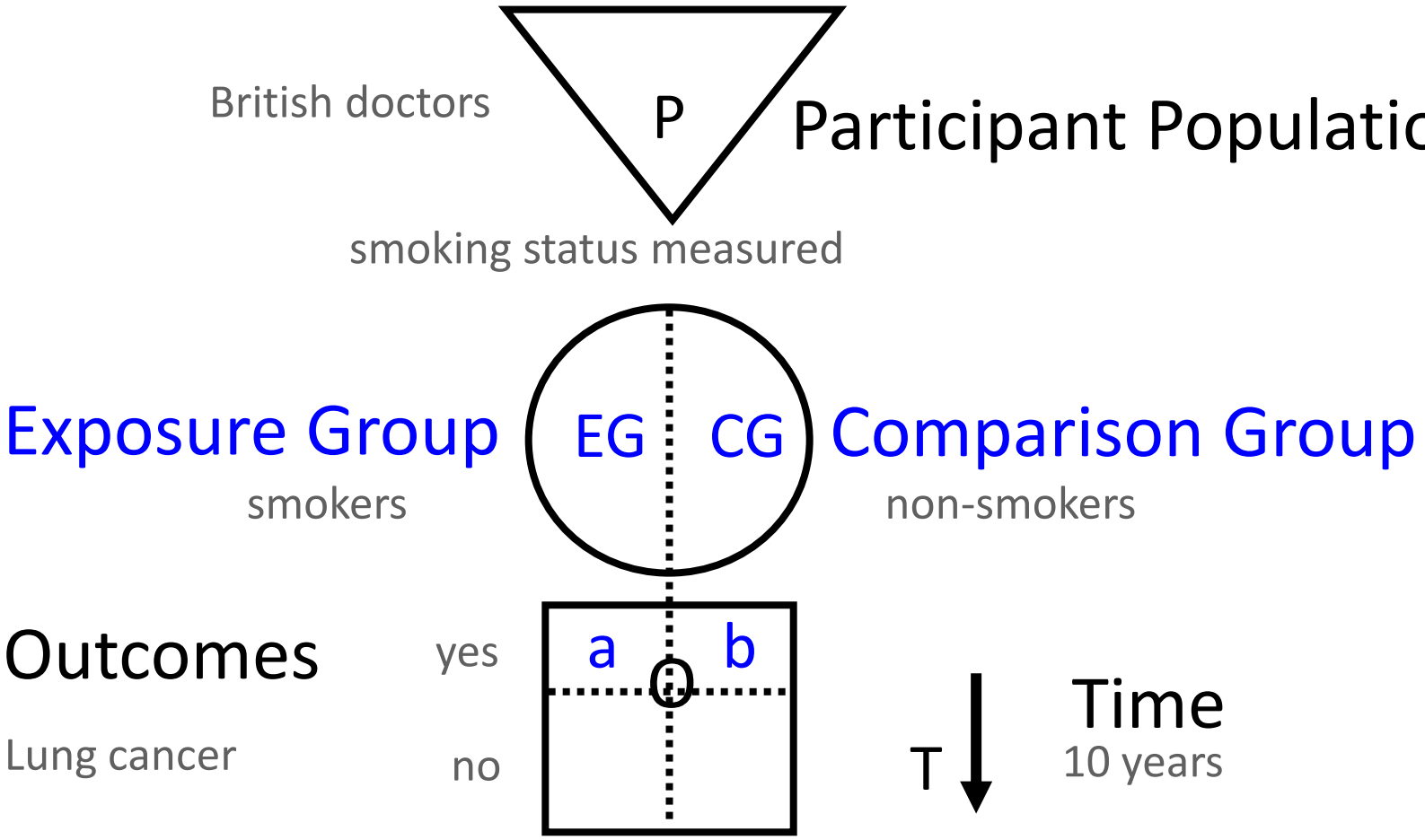
1st formula: occurrence = outcomes ÷ population

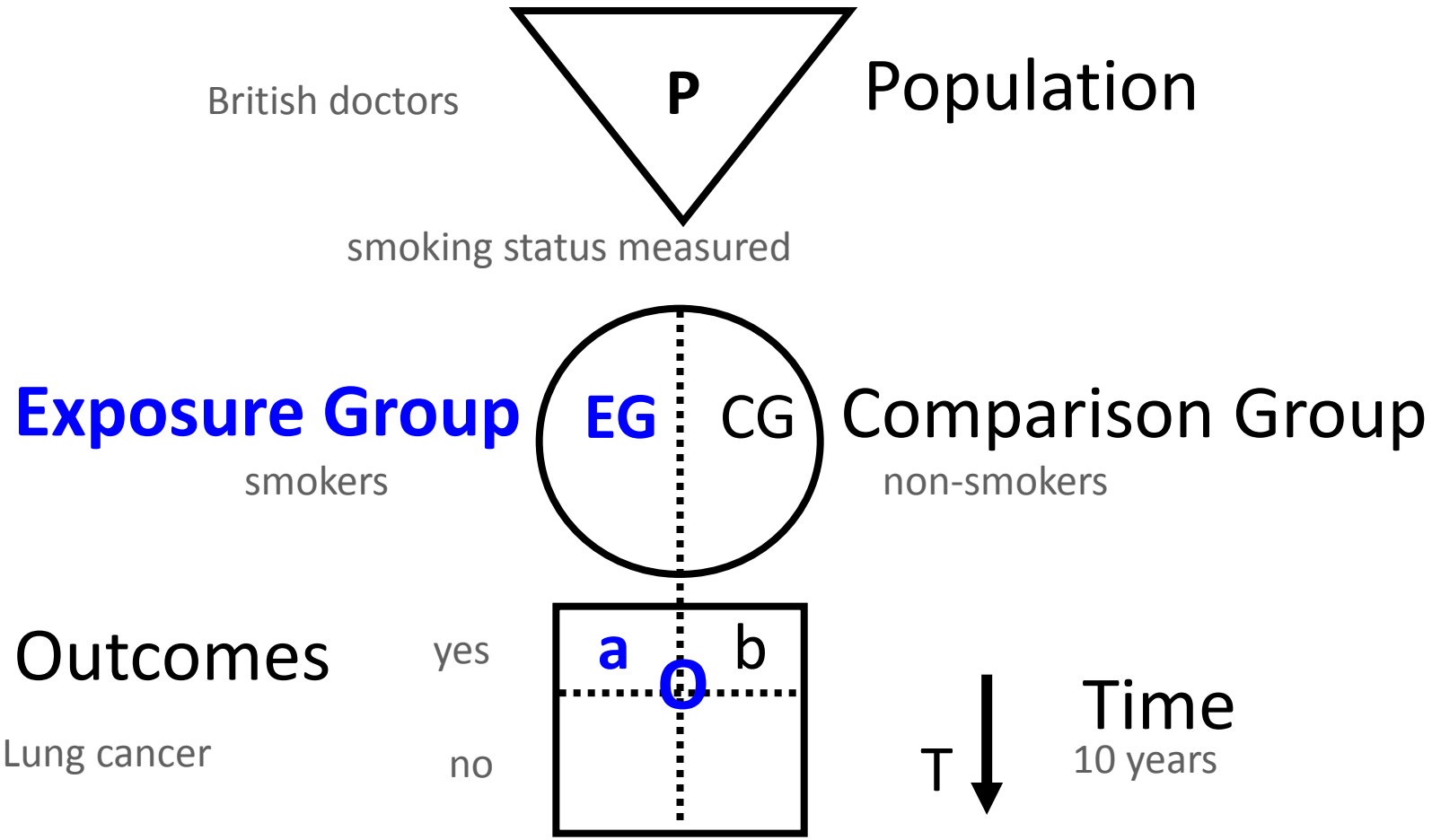


the numbers in epidemiological studies can be hung on the GATE frame

1 picture, 2 ***formulas*** *& 3 acronyms*

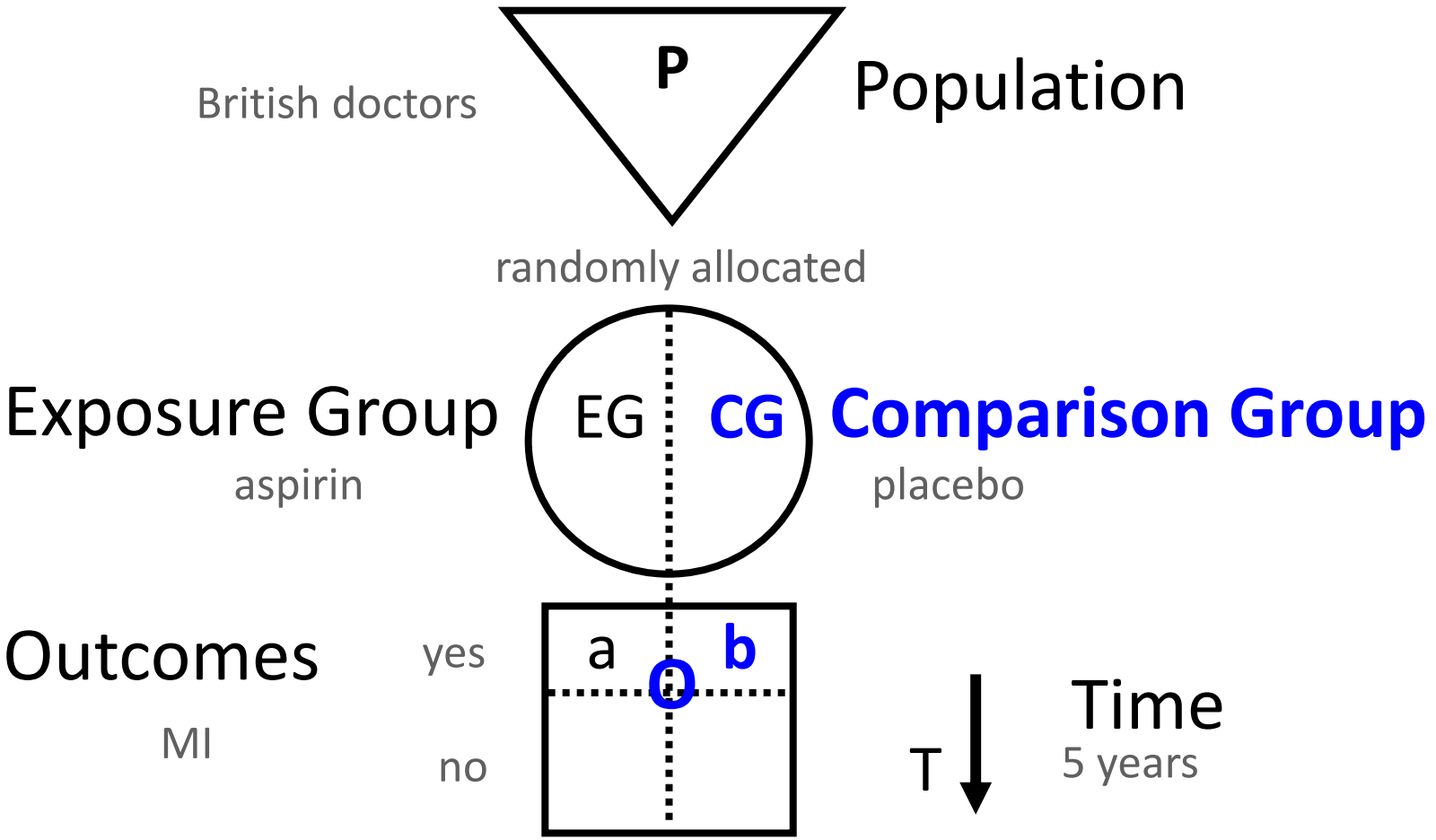
1st formula: occurrence of outcomes = number of outcomes ÷ number in population/group





Exposure Group Occurrence (EGO) = a÷EG

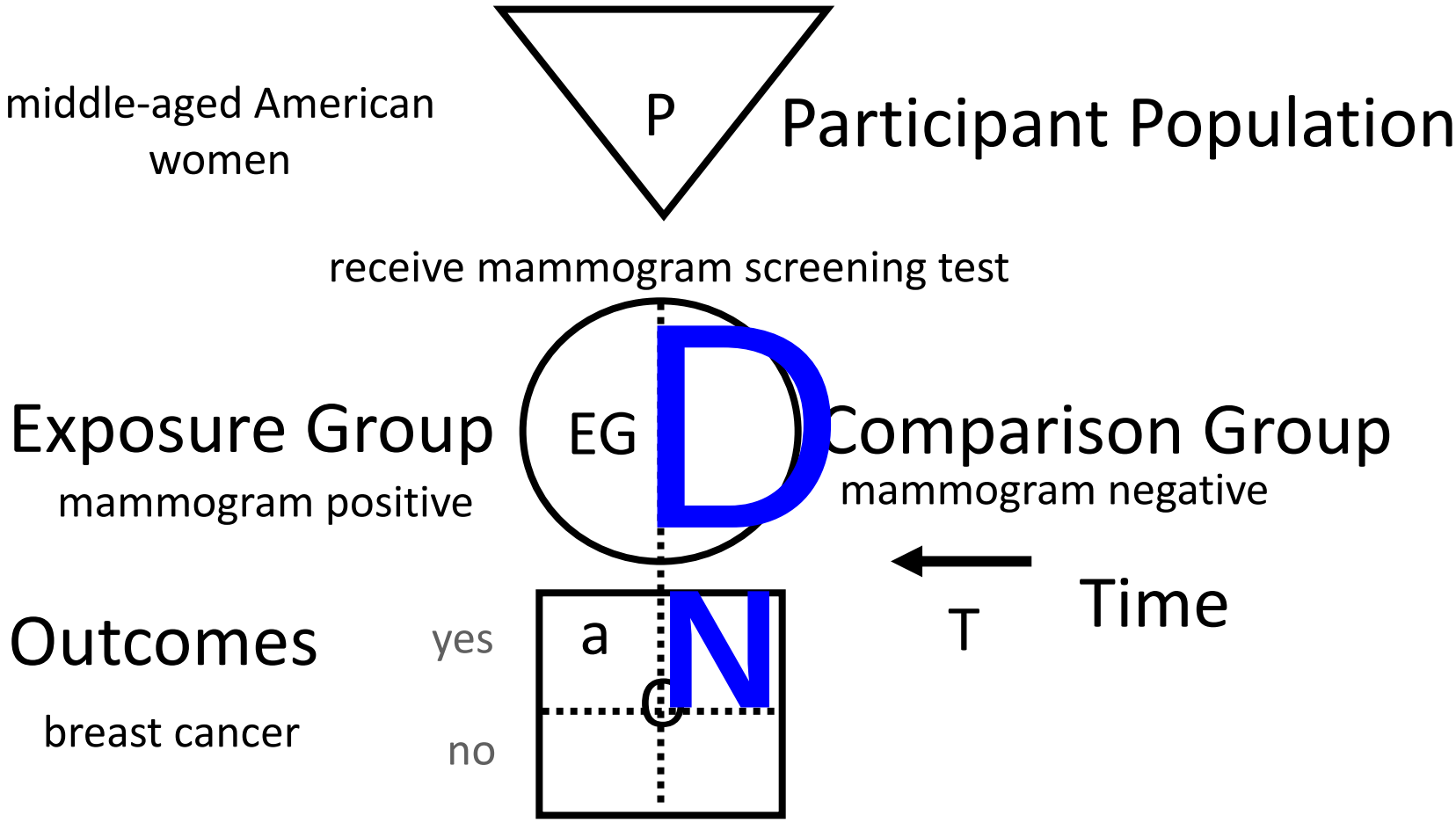
= number of outcomes (a) ÷ number in exposed population (EG)



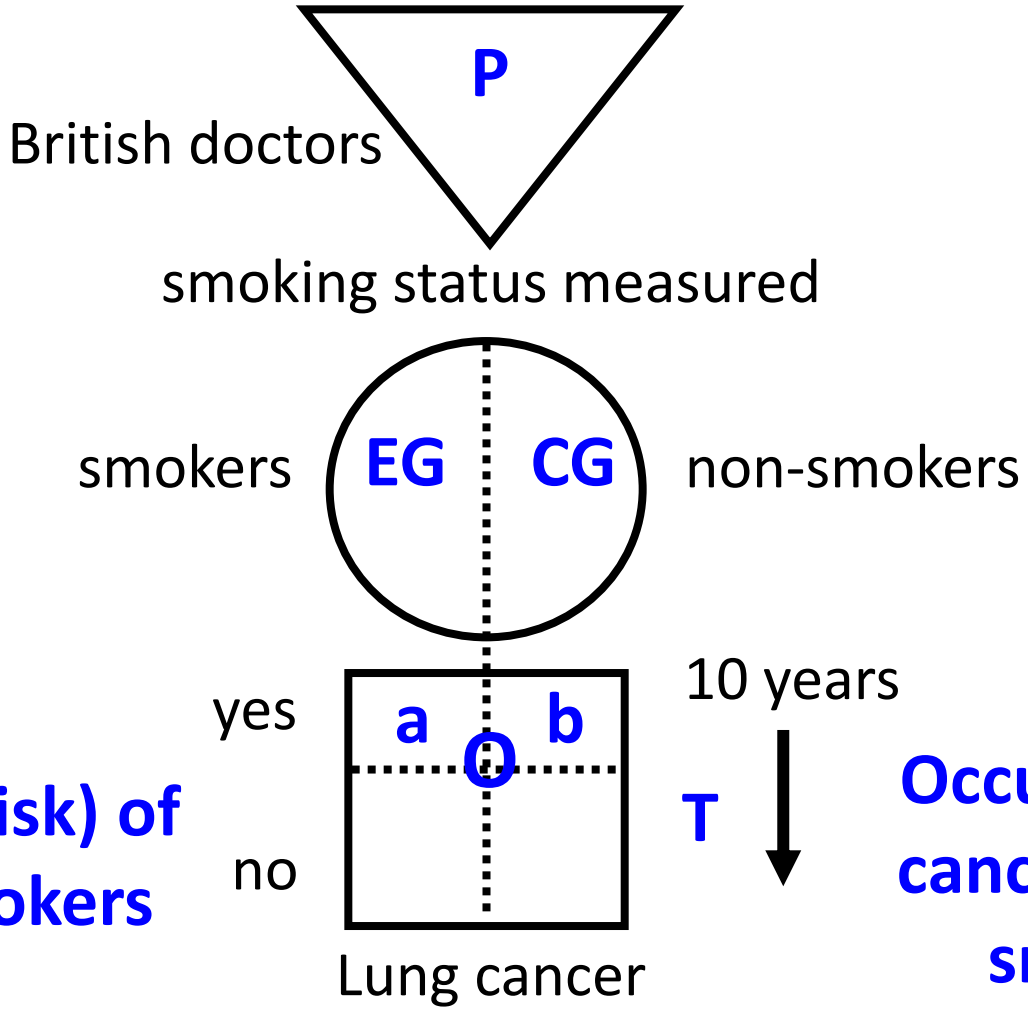
Comparison Group Occurrence (CGO) = b÷CG

= number of outcomes (b) ÷ number in comparison population (CG)

Epidemiology = Numerator ÷ Denominator

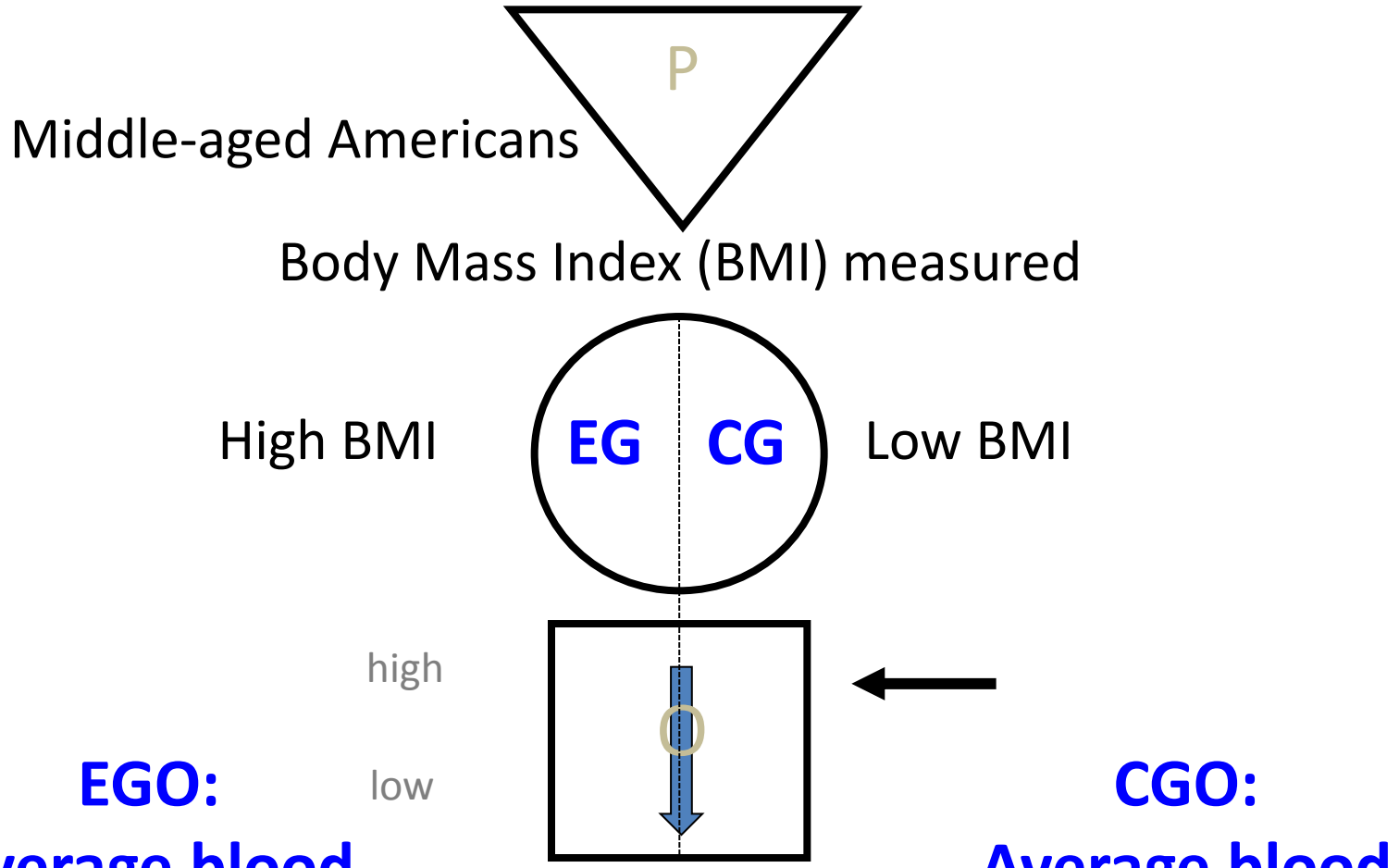


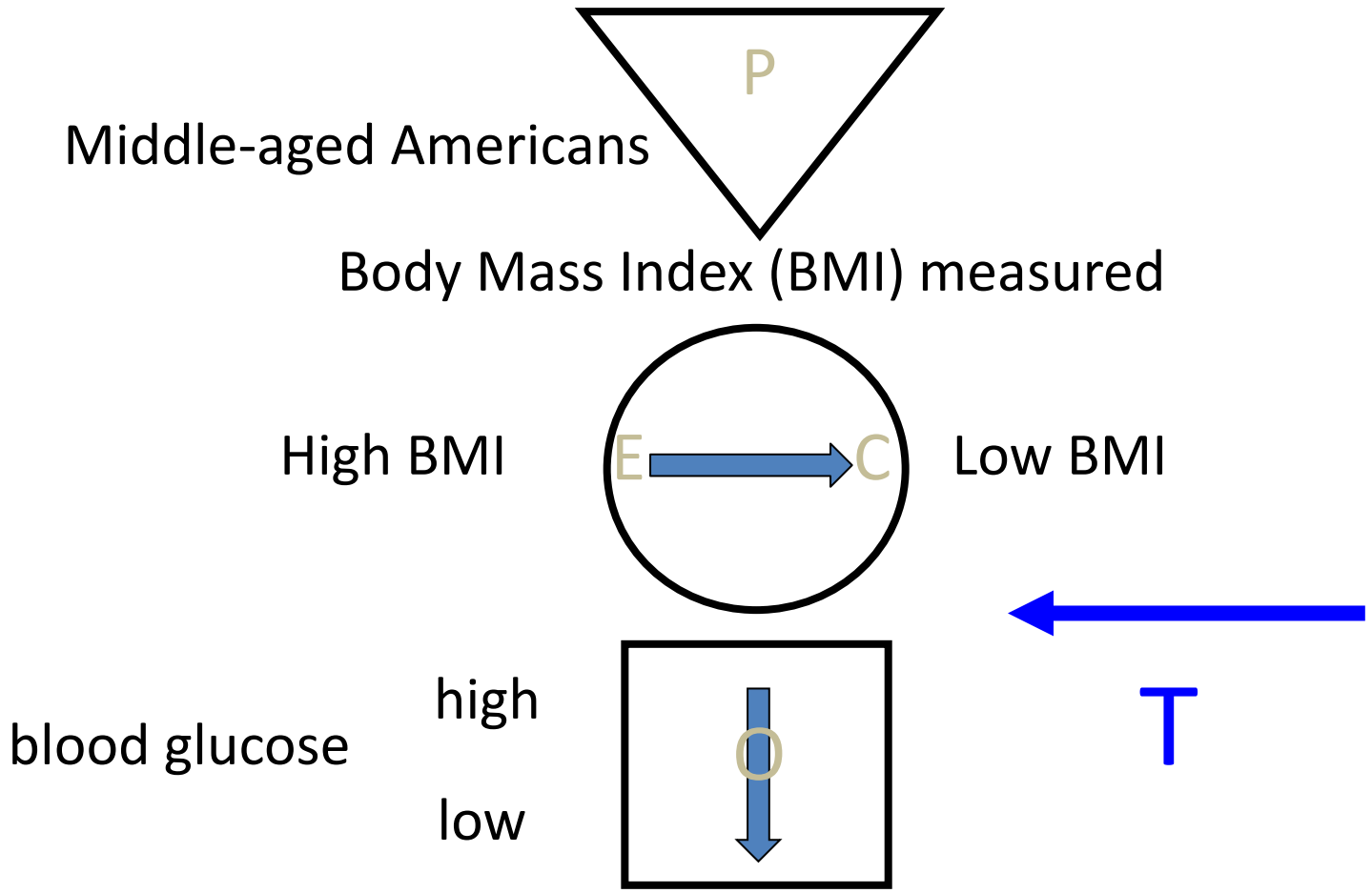
*the goal of all epidemiological studies is to calculate **EGO and CGO***



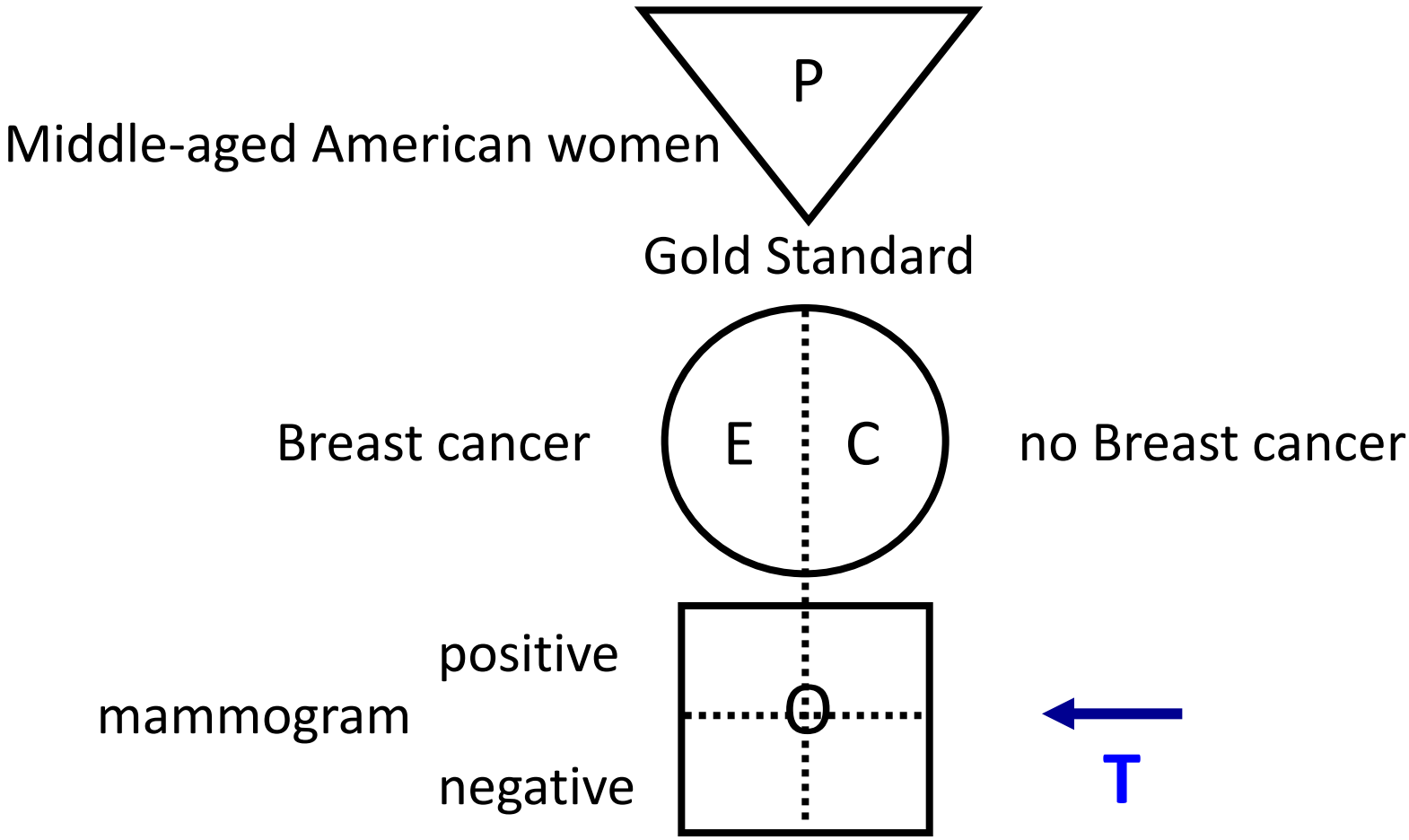
EGO: Occurrence (risk) of cancer in smokers

CGO: Occurrence of cancer in non-smokers


P
Middle-aged Americans
Body Mass Index (BMI) measured
High BMI
EG
CG
Low BMI
high
low
O
EGO:
Average blood glucose in EG
CGO:
Average blood glucose in CG



cross-sectional study with numerical measures



EGO:
likelihood of a positive mammogram if breast cancer

CGO:
likelihood of a positive mammogram if no breast cancer

1st formula:
occurrence = outcomes ÷ population

its all about EGO and CGO

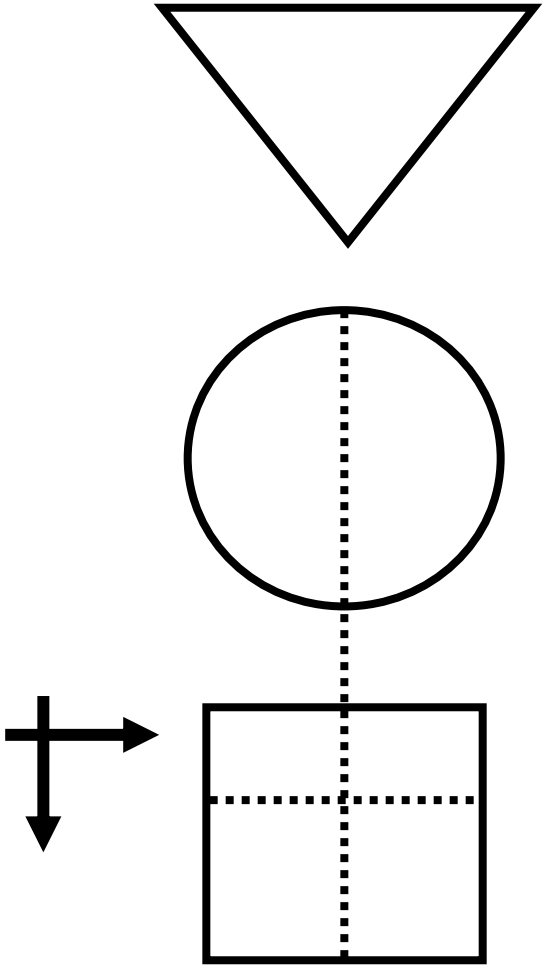
- EGO ÷ CGO = Relative Risk (RR)
- EGO – CGO = Risk Difference (RD)

measures of occurrence: risk; rate; likelihood; probability; average; incidence; prevalence

3

GATE: framework for nonrandom error

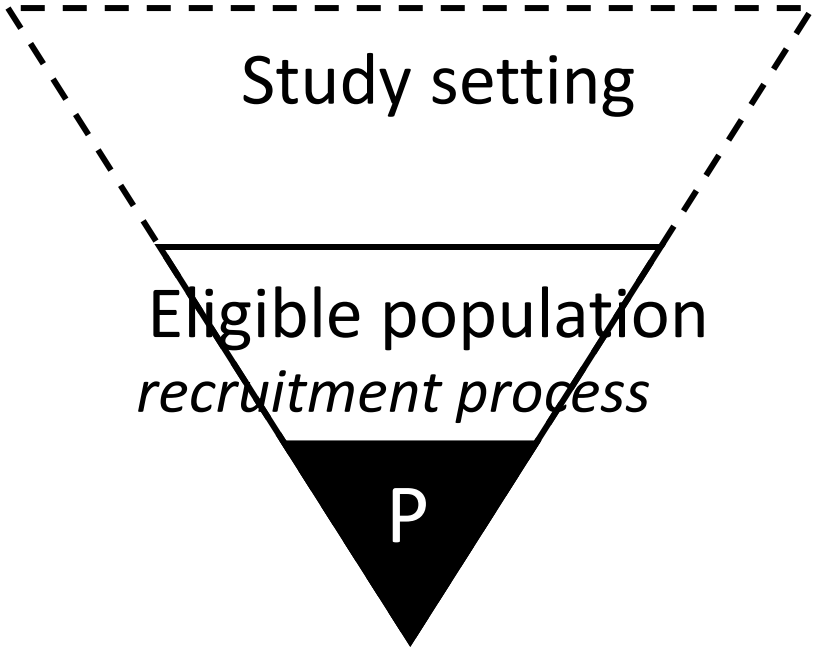
2nd acronym: RAMBOMAN



Measurements

ANalyses

1 picture, 2 formulas & 3 ***acronyms***



RAMBOMAN

Recruitment of participants

'who** are the findings **applicable to?'

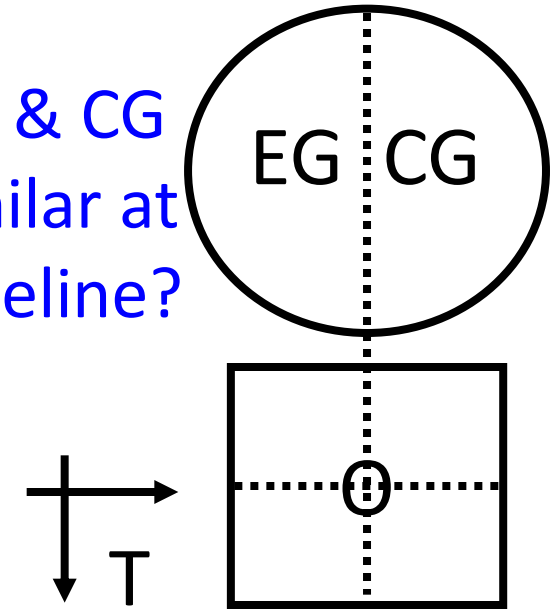
R**A**MBOMAN: '*were participants well **Allocated** to exposure & comparison groups?*'

was **Allocation** to EG & CG successful?

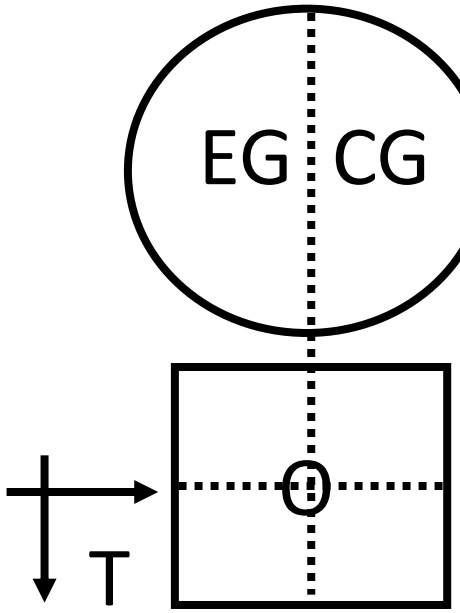
RCT: allocated by **randomisation** (e.g to drugs)

Cohort: allocated **by measurement** (e.g. smoking)

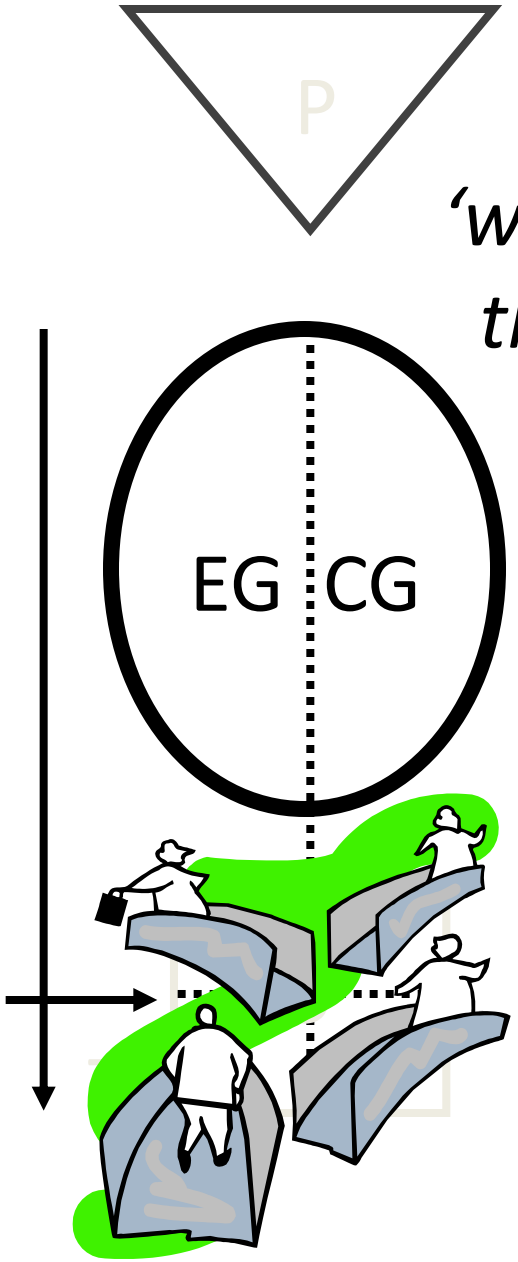
EG & CG similar at baseline?



E & C measures accurate?



RA**M**BOMAN

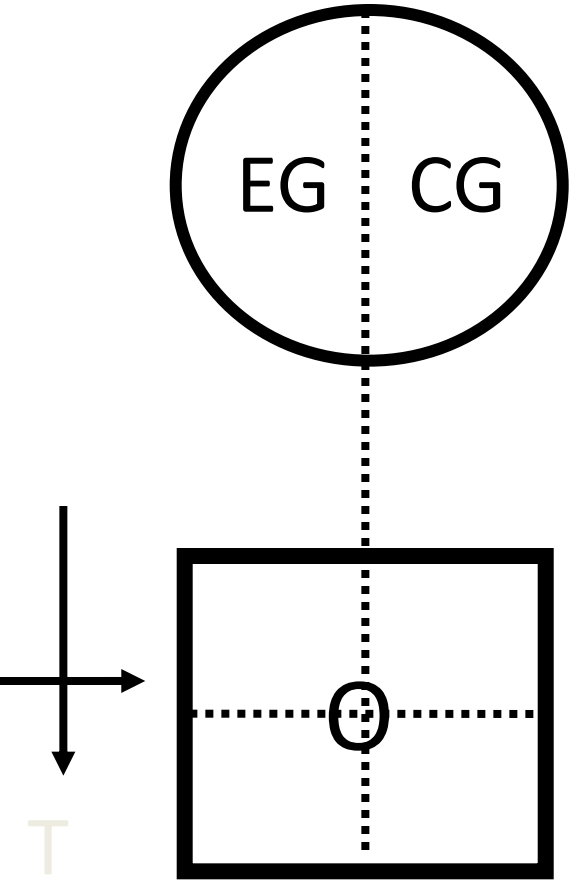


*'were Participants well **Maintained** in the groups they were allocated to?'*

completeness of follow-up
compliance
contamination
co-interventions

RAM**B**O**M**AN

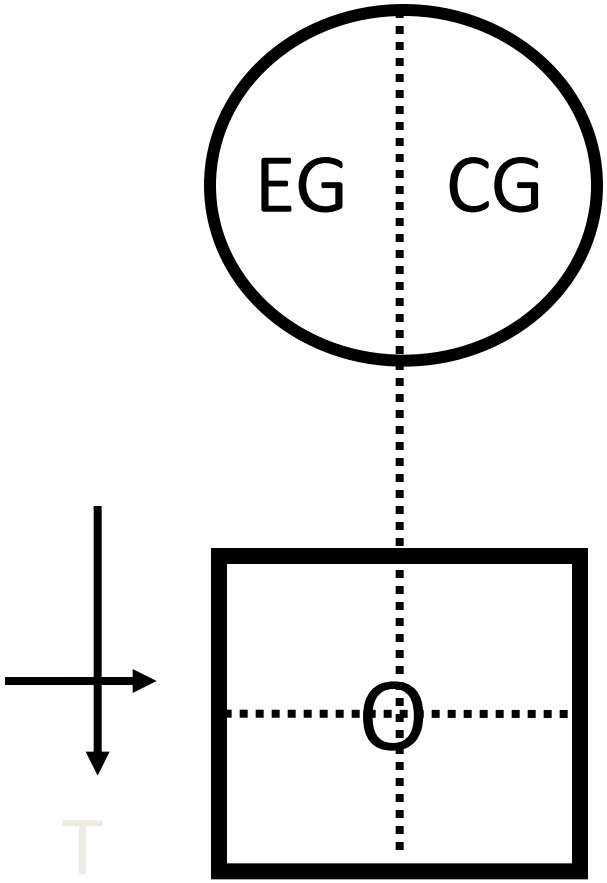
*'were **outcomes** well **Measured**?'*



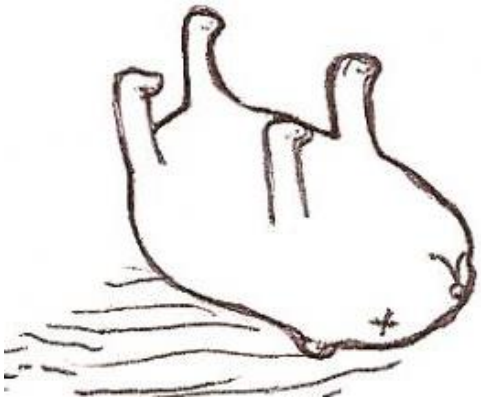
were they measured **Blind** to whether participant was in EG or CG ?

RAMB**OM**AN

*'were **outcomes** well **Measured**?'*

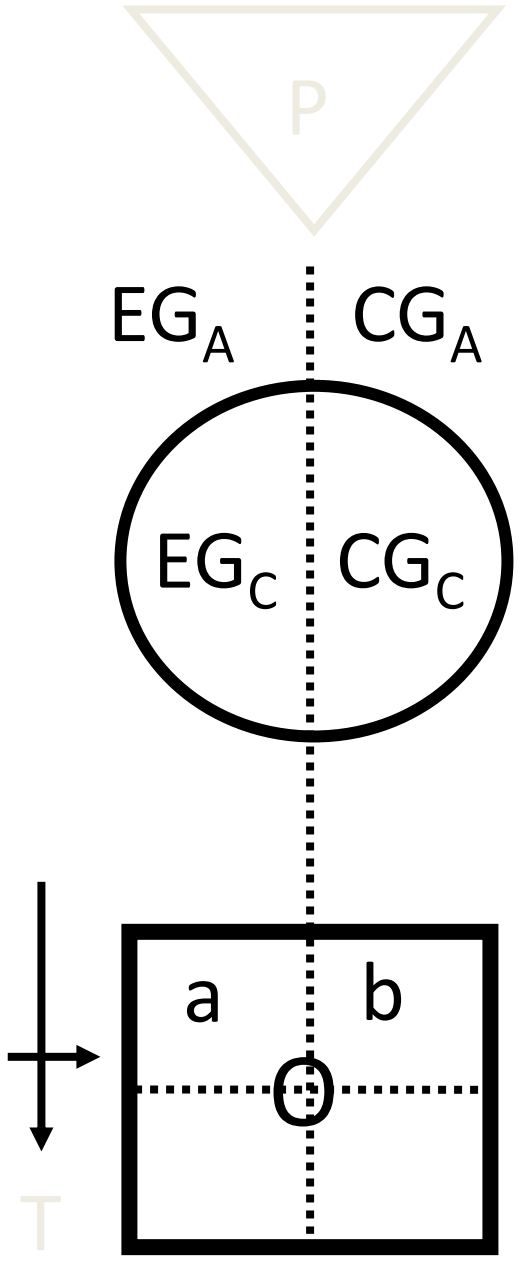


were they measured **Objectively**?



RAMBOM**AN**

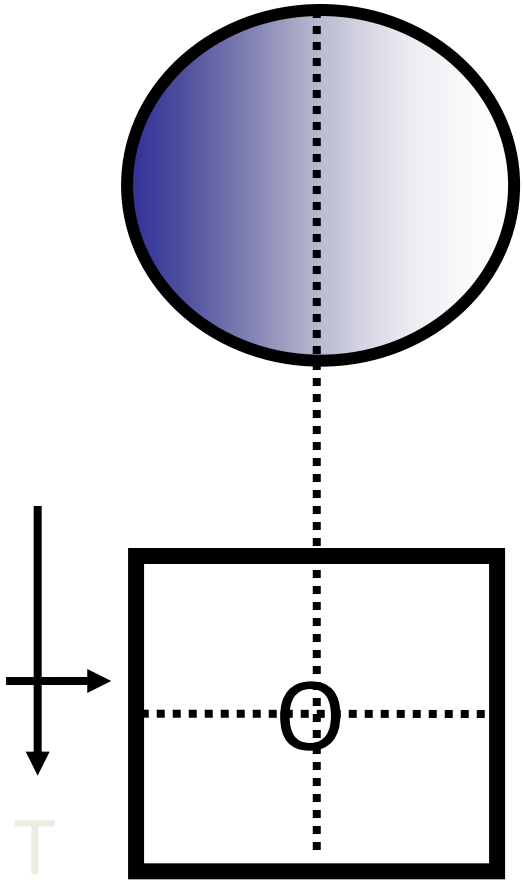
*'were the **ANalyses** done well?'*



If RCT were **Intention To Treat (ITT)** analyses done?

RAMBOM**AN**

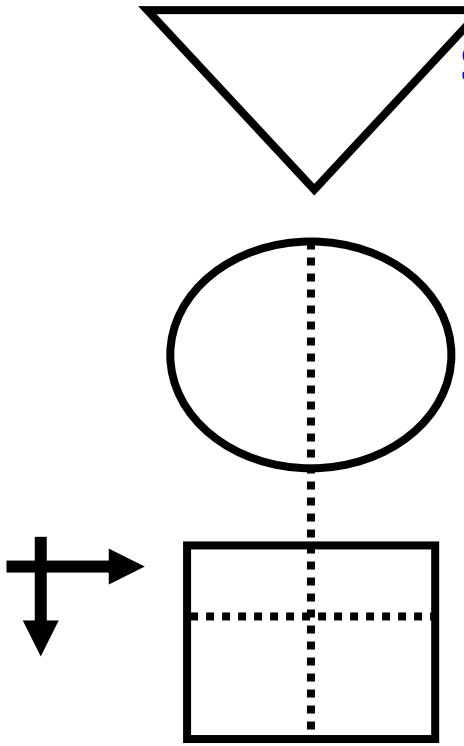
*'were the **ANalyses** done well?'*



adjustment for baseline differences / confounding?

GATE: random error: ***2nd formula:***

random error = 95% confidence interval



sample from a population

EGO ± 95% CI

CGO ± 95% CI

There is about a 95% chance that the true value in the underlying population lies within the 95% CI (assuming no non-random error)

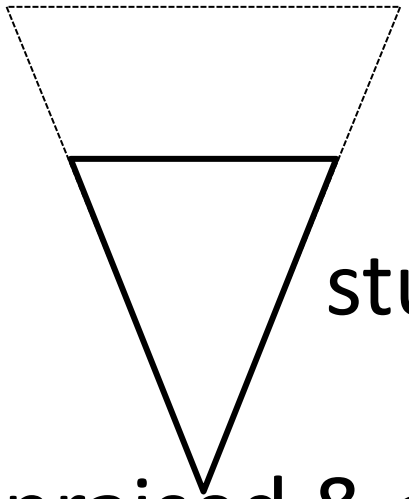
1 picture, 2 ***formulas*** *& 3 acronyms*

GATE: a framework for error in systematic reviews & meta-analyses:

3rd acronym: FAITH

1 picture, 2 formulas & 3 ***acronyms***

systematic review: a study of studies

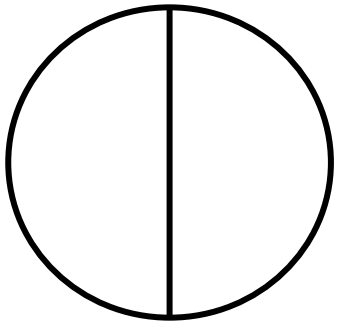


study sources

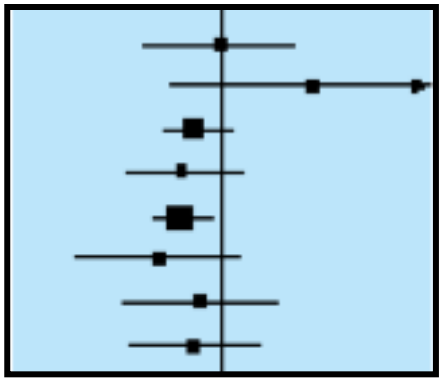
studies screened

studies appraised & allocated:

included



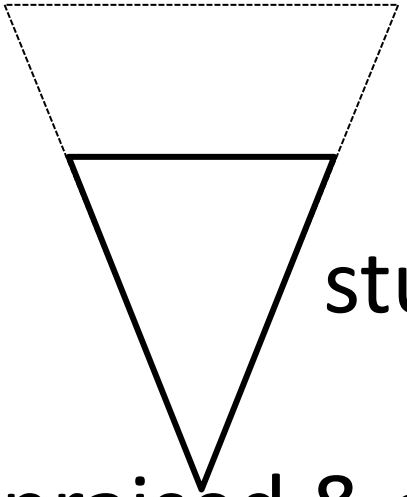
excluded



studies summarised & pooled if homogeneous

critical appraisal of SR: FAITH

Find



study sources

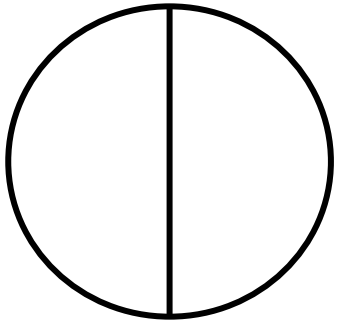
studies screened

Appraise

studies appraised & allocated:

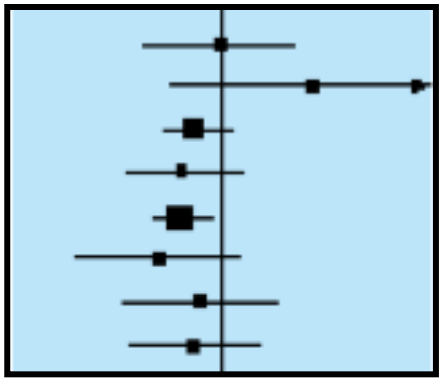
Include

included



excluded

Total



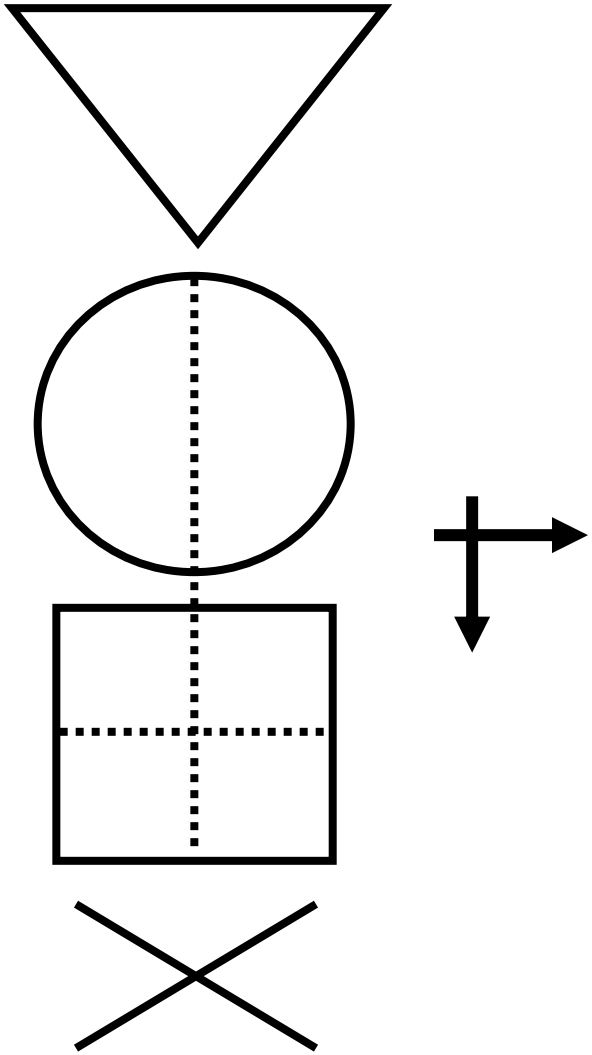
studies summarised & pooled if homogeneous

Heterogeneity?

*1 picture, 2 **formulas** & 3 acronyms*

4

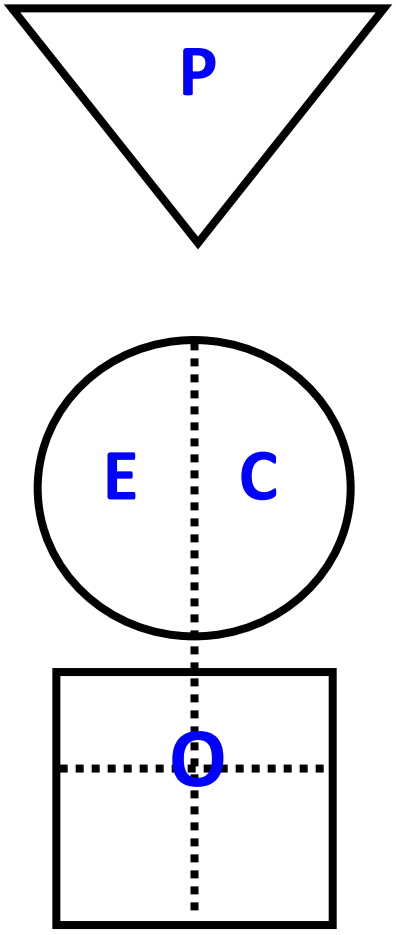
GATE: framework for the 4 steps of EBP



the steps of EBP:

1. Ask
2. Acquire
3. Appraise
4. Apply & Act

EBP Step 1: **ASK** - turn your question into a focused 5-part PECOT question



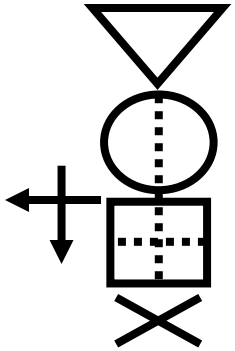
1. Participants

2. Exposure

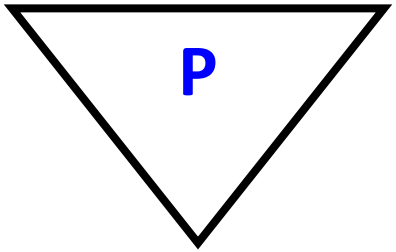
3. Comparison

4. Outcomes

5. Time

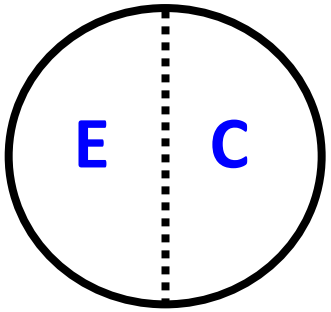


EBP Step 2: **ACQUIRE** the evidence – use **PECOT** to help choose search terms



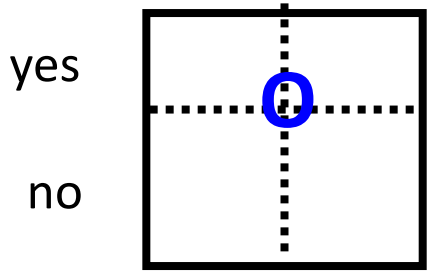
Participants

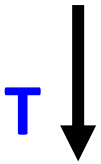
Exposure



Comparison

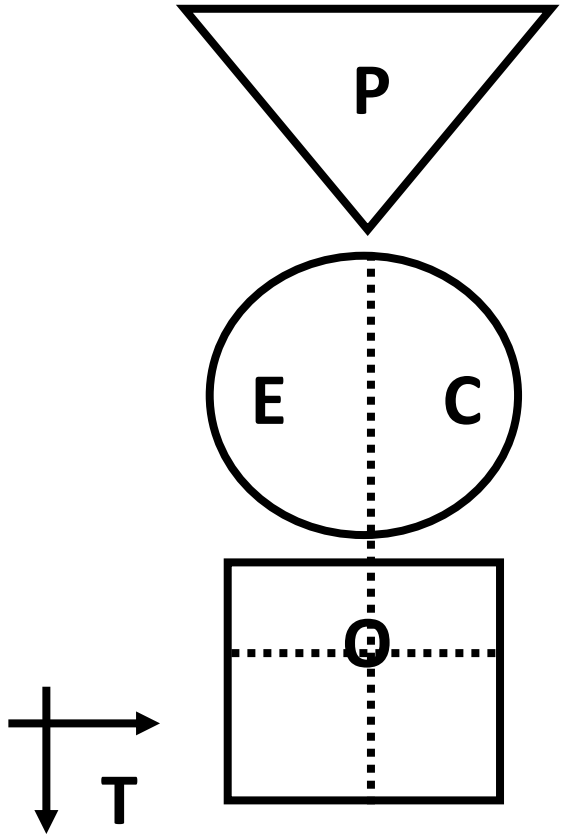
Outcomes





Time

EBP Step 3: **APPRAISE** the evidence – with the picture, acronyms & formulas



Recruitment

Allocation

Maintenance

blind

objective

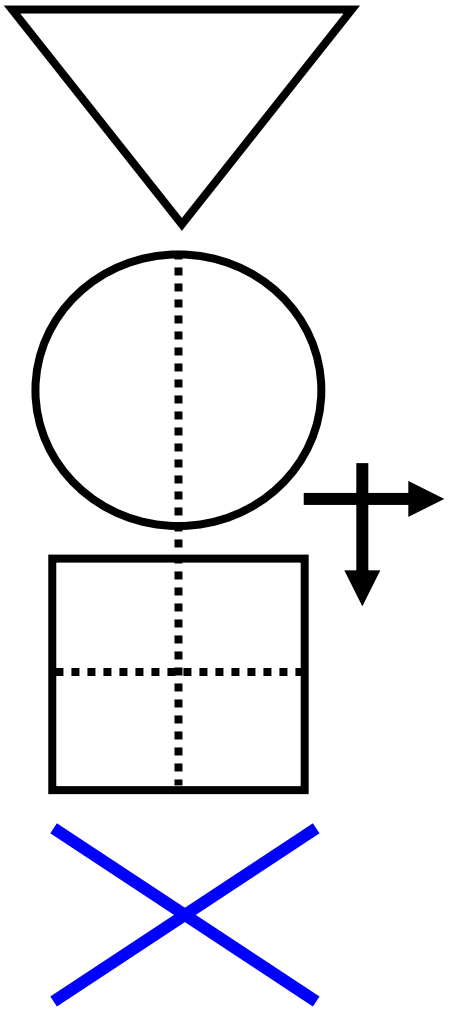
Measurements

ANalyses

Occurrence = outcomes ÷ population

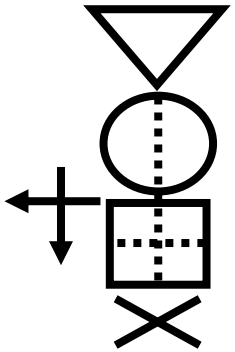
Random error = 95% Confidence Interval

APPLY the evidence by AMALGAMATING the relevant information & making an evidence-based decision:' **the X-factor**




SONY
PlayStation
START
ANALOG

X-factor: making evidence-based decisions



person

family

community

practitioner

epidemiological evidence

values & preferences

system features

economic

legal

political

patient's clinical circumstances

social

psychological

pathophysiology

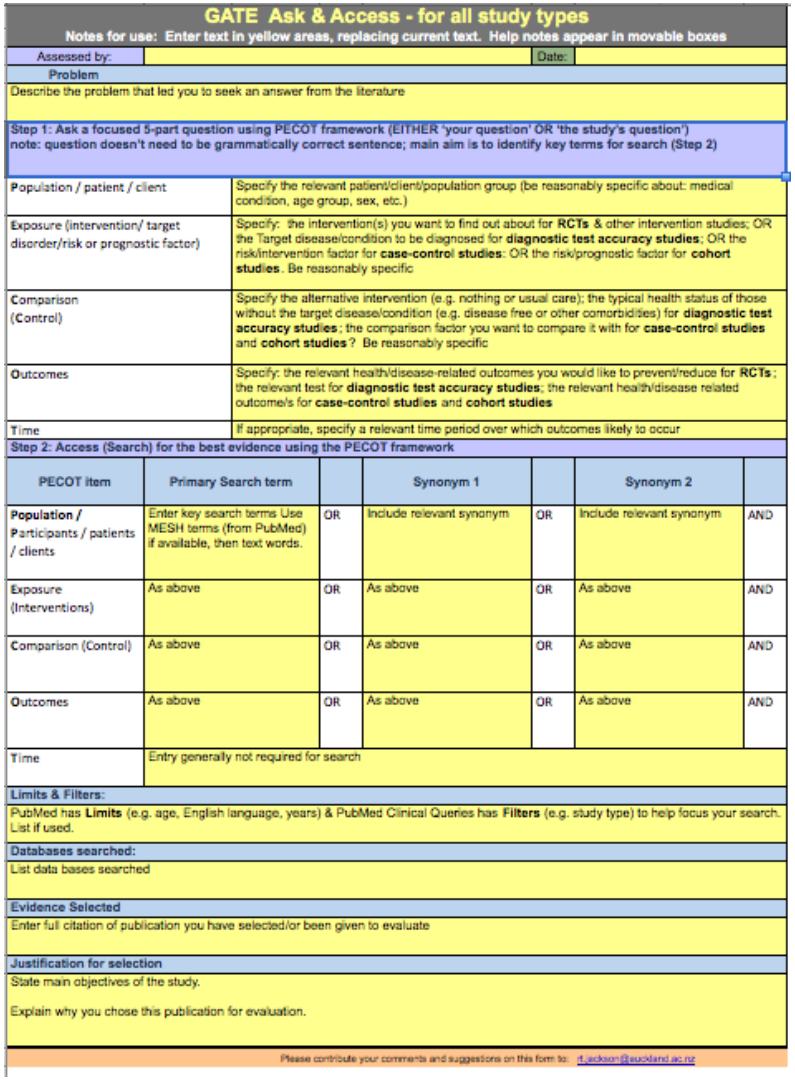
Practitioner eXpertise: 'putting it all together' - the art of practice

Clinical expertise in the era of evidence-based medicine and patient choice. EBM 2002;736-8 (March/April)

GATE critically appraised topic (CATs) forms

find these at:
www.epiq.co.nz

GATE CAT – 4-sheet workbook (in Excel) sheet 1: GATE-Ask & Acquire



GATE Ask & Access - for all study types

Notes for use: Enter text in yellow areas, replacing current text. Help notes appear in movable boxes

Assessed by:		Date:	

Problem

Describe the problem that led you to seek an answer from the literature

Step 1: Ask a focused 5-part question using PECOT framework (EITHER 'your question' OR 'the study's question')
note: question doesn't need to be grammatically correct sentence; main aim is to identify key terms for search (Step 2)

Population / patient / client	Specify the relevant patient/client/population group (be reasonably specific about: medical condition, age group, sex, etc.)
Exposure (intervention/ target disorder/risk or prognostic factor)	Specify: the intervention(s) you want to find out about for **RCTs** & other intervention studies; OR the Target disease/condition to be diagnosed for **diagnostic test accuracy studies**; OR the risk/intervention factor for **case-control studies**: OR the risk/prognostic factor for **cohort studies**. Be reasonably specific
Comparison (Control)	Specify the alternative intervention (e.g. nothing or usual care); the typical health status of those without the target disease/condition (e.g. disease free or other comorbidities) for **diagnostic test accuracy studies**; the comparison factor you want to compare it with for **case-control studies** and **cohort studies**? Be reasonably specific
Outcomes	Specify: the relevant health/disease-related outcomes you would like to prevent/reduce for **RCTs**; the relevant test for **diagnostic test accuracy studies**; the relevant health/disease related outcome/s for **case-control studies** and **cohort studies**
Time	If appropriate, specify a relevant time period over which outcomes likely to occur

Step 2: Access (Search) for the best evidence using the PECOT framework

PECOT item	Primary Search term		Synonym 1		Synonym 2	
Population / Participants / patients / clients	Enter key search terms Use MESH terms (from PubMed) if available, then text words.	OR	Include relevant synonym	OR	Include relevant synonym	AND
Exposure (Interventions)	As above	OR	As above	OR	As above	AND
Comparison (Control)	As above	OR	As above	OR	As above	AND
Outcomes	As above	OR	As above	OR	As above	AND
Time	Entry generally not required for search					

Limits & Filters:

PubMed has **Limits** (e.g. age, English language, years) & PubMed Clinical Queries has **Filters** (e.g. study type) to help focus your search. List if used.

Databases searched:

List data bases searched

Evidence Selected

Enter full citation of publication you have selected/or been given to evaluate

Justification for selection

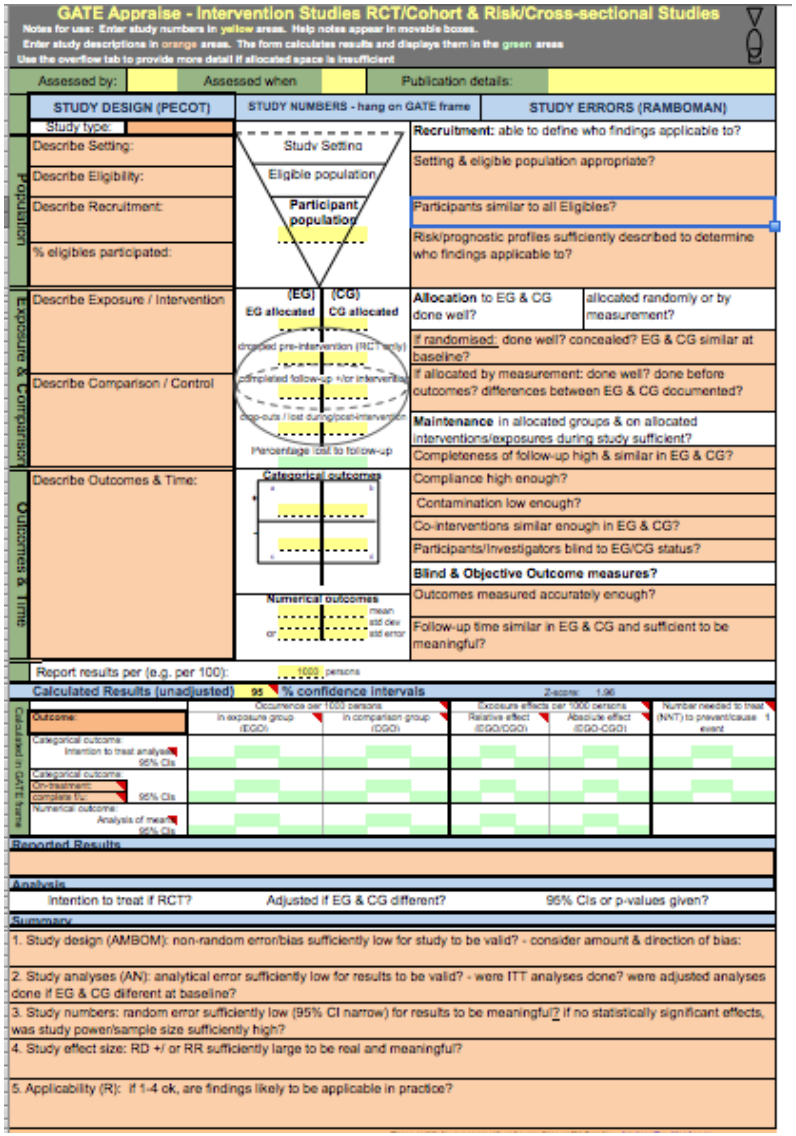
State main objectives of the study.

Explain why you chose this publication for evaluation.

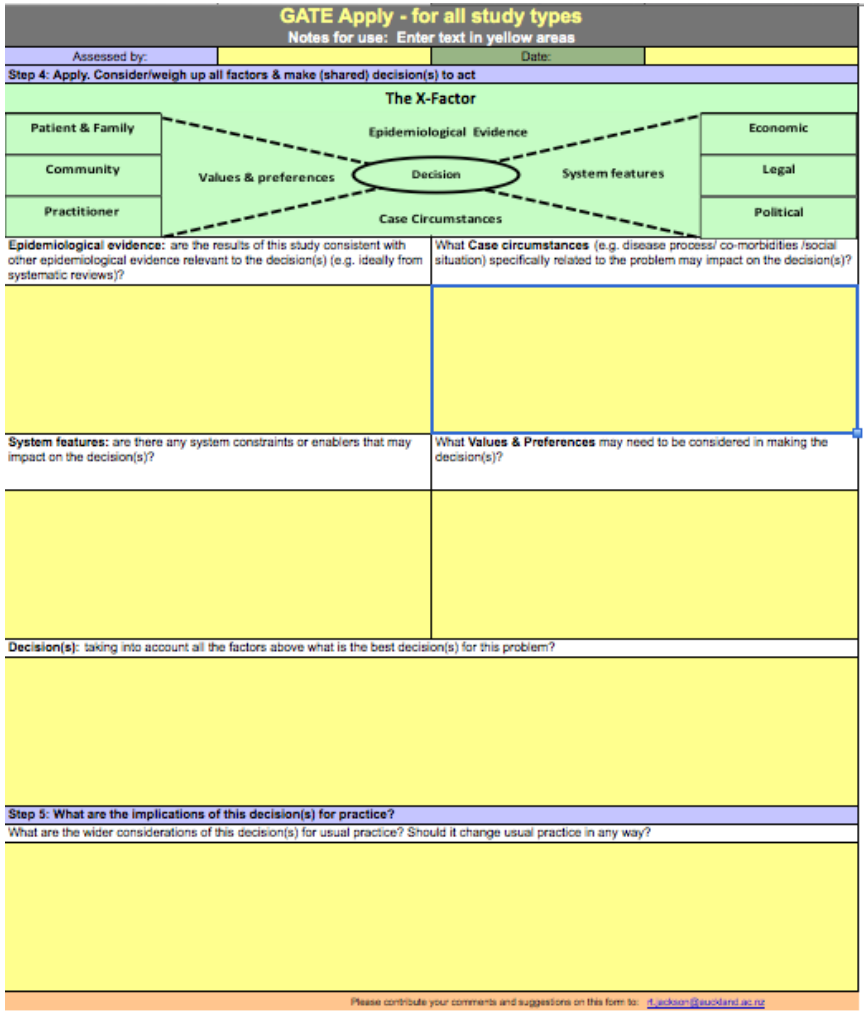
Please contribute your comments and suggestions on this form to: r.jackson@auckland.ac.nz

GATE CAT – 3-sheet workbook (in Excel)

sheet 2: GATE-Appraise (with calculator)



GATE CAT – 3-sheet workbook (in Excel)
sheet 3: GATE-Apply



GATE Apply - for all study types

Notes for use: Enter text in yellow areas

Assessed by:	Date:

Step 4: Apply. Consider/weigh up all factors & make (shared) decision(s) to act

The X-Factor

Patient & Family	Epidemiological Evidence	Economic
Community	Values & preferences / Decision / System features	Legal
Practitioner	Case Circumstances	Political

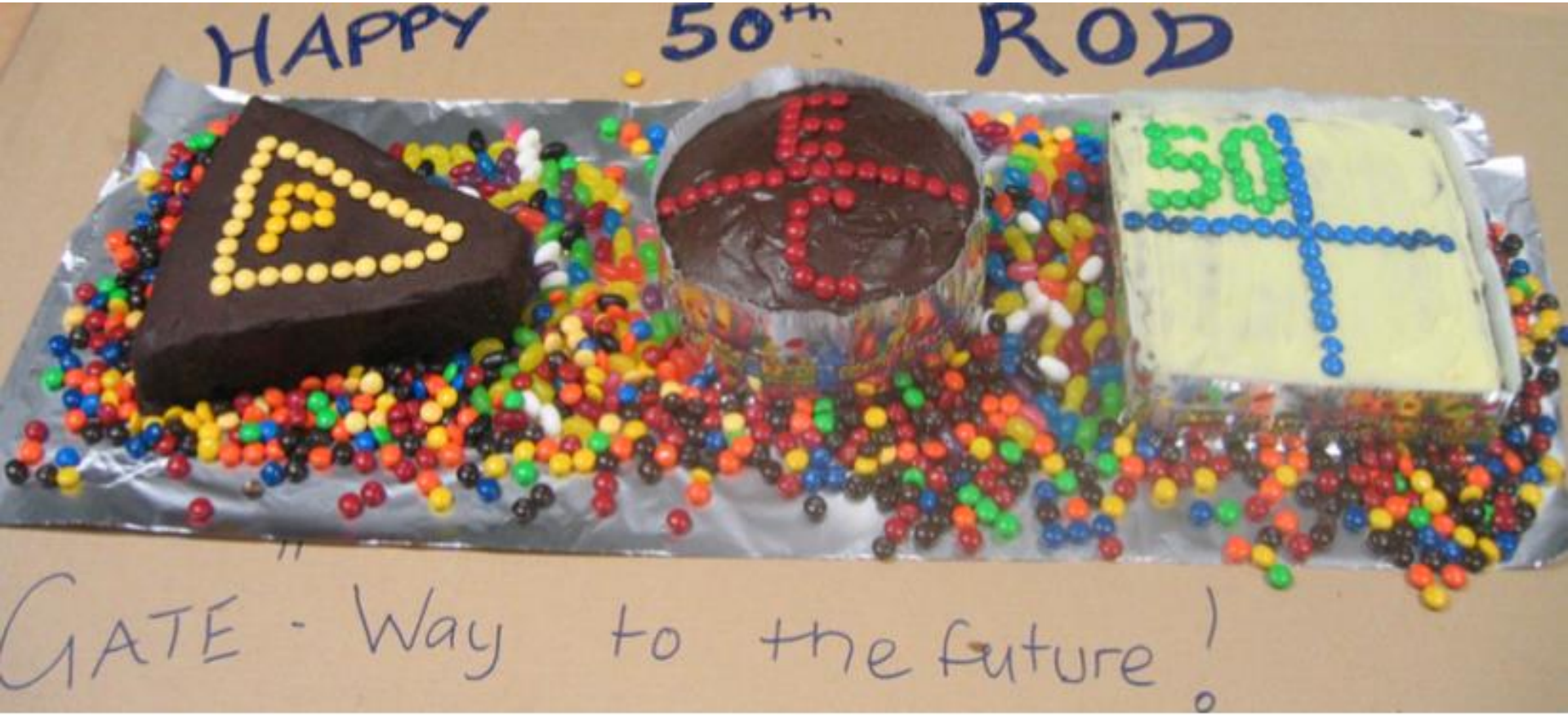
Epidemiological evidence: are the results of this study consistent with other epidemiological evidence relevant to the decision(s) (e.g. ideally from systematic reviews)?	What **Case circumstances** (e.g. disease process/ co-morbidities /social situation) specifically related to the problem may impact on the decision(s)?
System features: are there any system constraints or enablers that may impact on the decision(s)?	What **Values & Preferences** may need to be considered in making the decision(s)?

Decision(s): taking into account all the factors above what is the best decision(s) for this problem?

Step 5: What are the implications of this decision(s) for practice?

What are the wider considerations of this decision(s) for usual practice? Should it change usual practice in any way?

Please contribute your comments and suggestions on this form to: r.jackson@auckland.ac.nz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50
GATE - Way to the future!