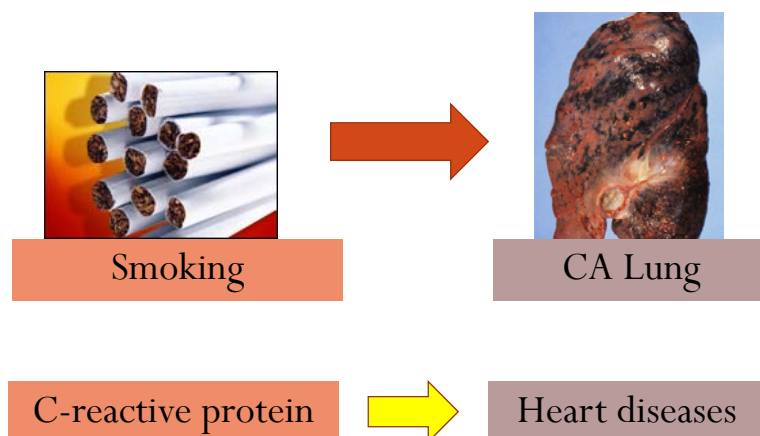
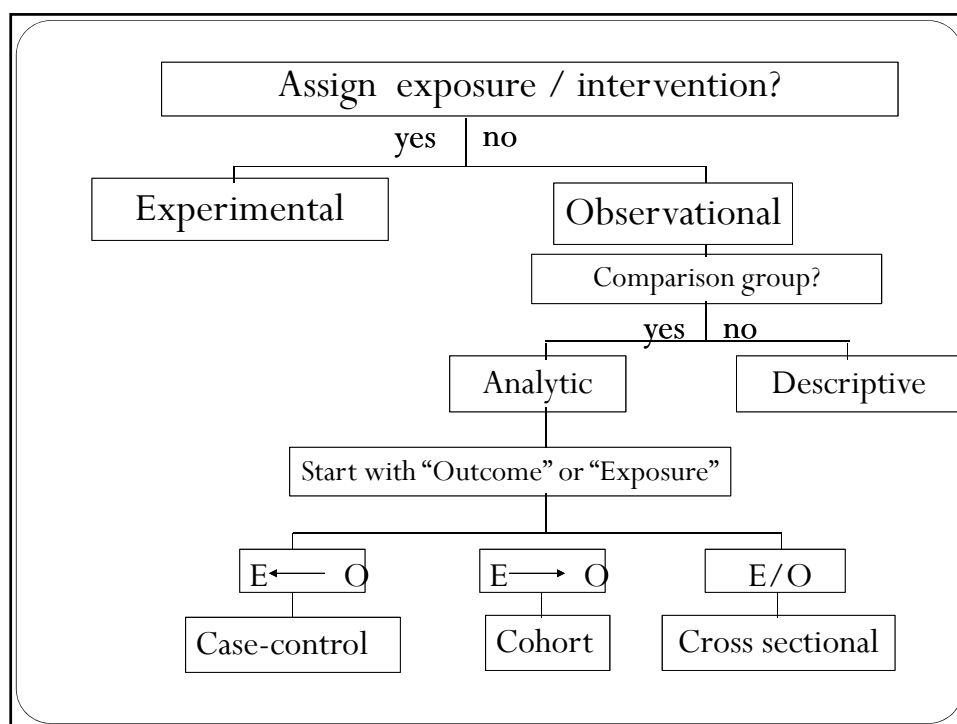


Using Epidemiology to Identify the Cause of Disease: Cohort study

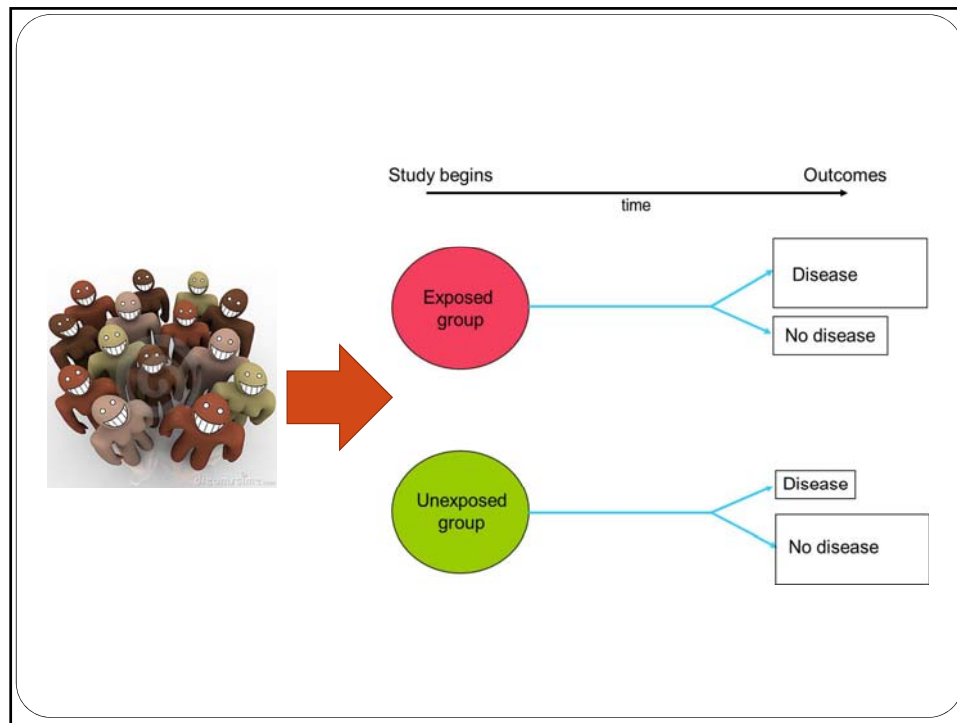
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PhD.(Clinical Epidemiology)
Pediatrics, Pediatric Cardiology
Emergency Medicine, Pediatric Emergency Medicine
Ramathibodi Hospital, Mahidol University

What is the risk factor of disease





Cohort study



Criteria for cohort study

1. Do not have the outcome at the time that study started
2. F/U time should be sufficient for the outcome to be expressed
3. Members of the cohort should be observed over the full period of F/U

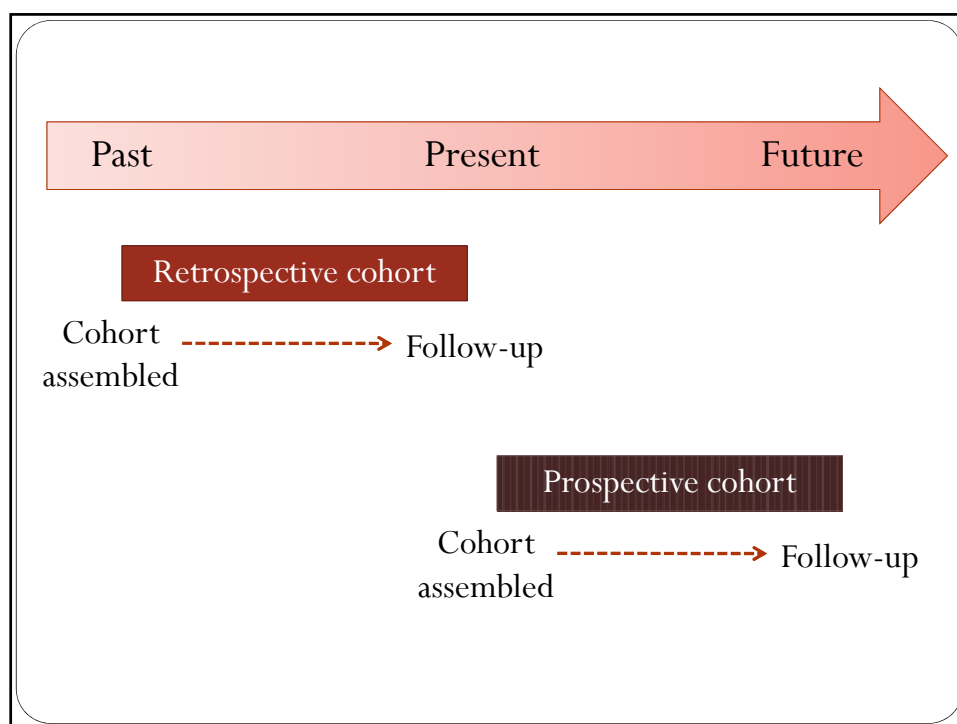
Framingham study



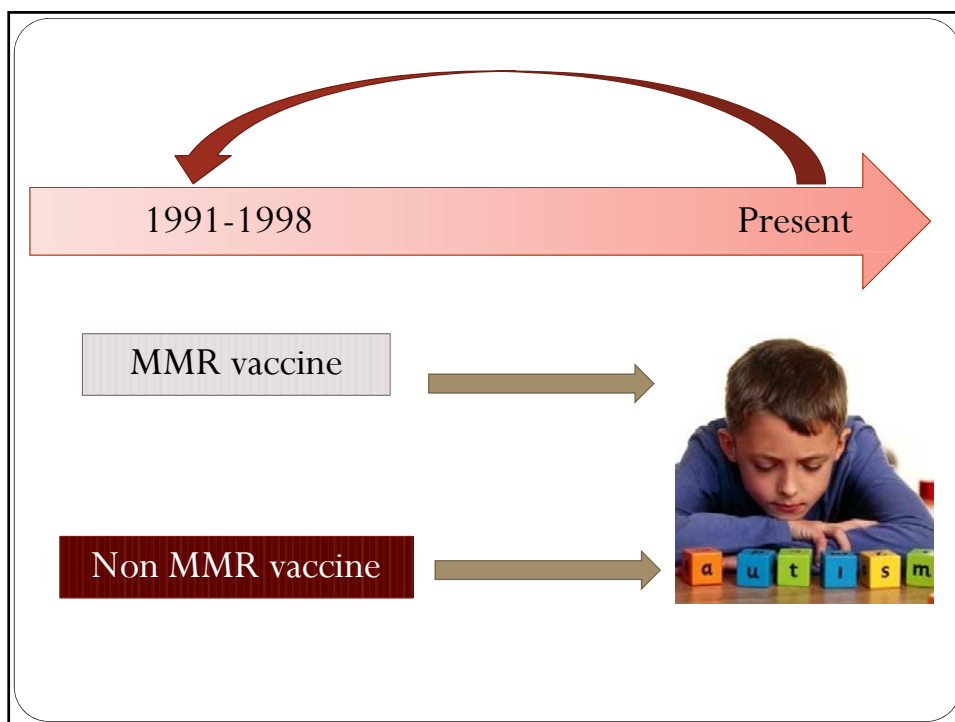
- Begun in 1949
- Identified factors associated with CHD
- 5,209 men and women, aged 30-59
- Study ran for 30 years
- Continues with Framingham Offspring study

Types of cohort study

- Prospective cohort study
- Retrospective cohort or historical cohort study

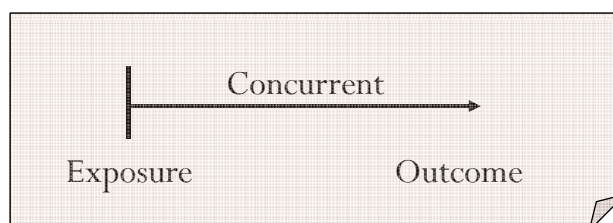


Retrospective or historical cohort study



Advantage

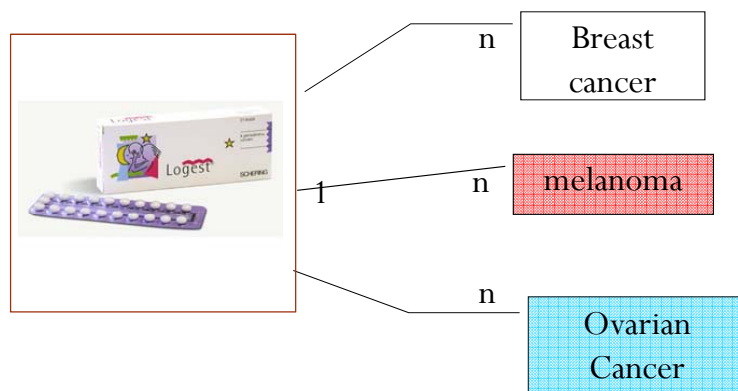
- Temporal sequence



- Rare exposure; occupational setting

Advantage

- Can assess the relationship between exposure and many diseases

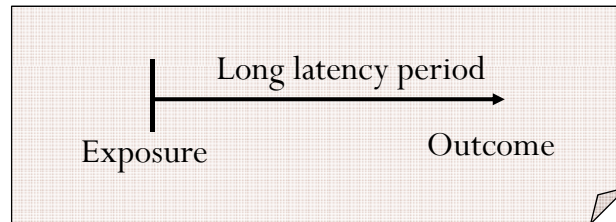


Disadvantages

- Cannot be used for rare disease



Disadvantage



- Time – consuming
- Expensive/Budget loss
- Loss F/U

Selection of exposed population

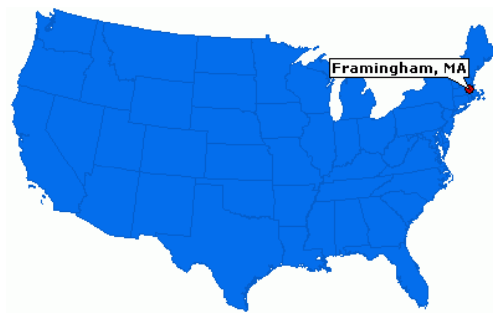
- Common or Rare exposure?



Selection of exposed population

Common exposure & common disease

- ability to complete and accurate information



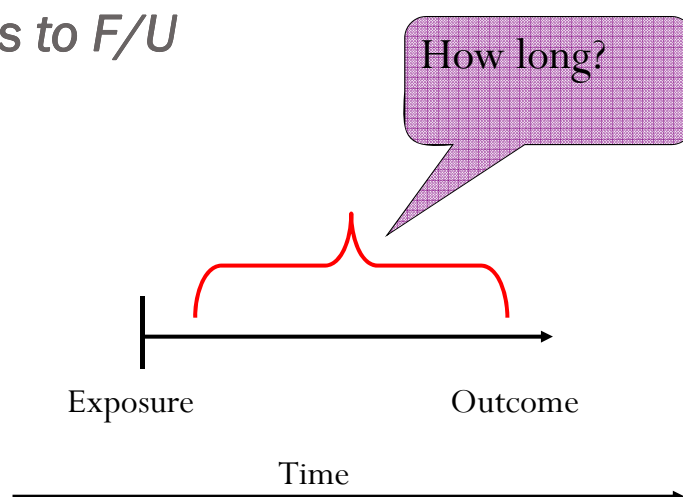
Source of information

1. Preexisting record
2. Interview, questionnaire
3. Direct physical exam
4. Laboratory

Source of outcome data

1. Death certificate
2. Periodic health examination
3. Physician record, hospital discharge

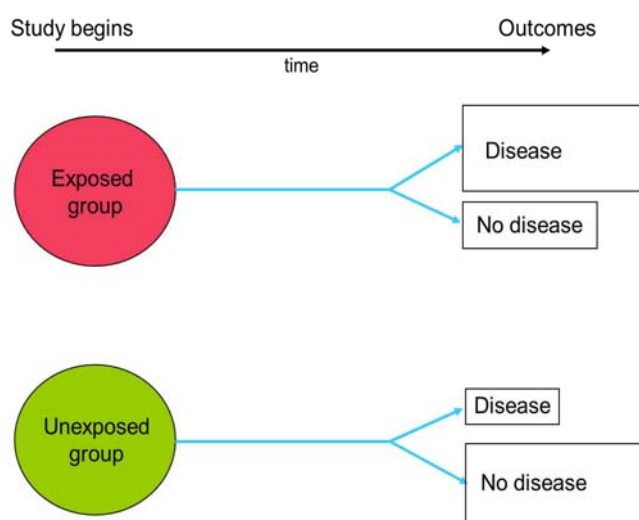
Loss to F/U



- Outpatient record
- Town's resident list
- Military records
- Employment records
- Small amount of Loss F/U
- Loss F/U equally between expose and non expose

Way to express and compare risk

Incidence rate or risk of developing disease



	Develop disease	Not develop disease	Incidence Rate
Exposed	a	b	$\frac{a}{a+b}$
Non exposed	c	d	$\frac{c}{c+d}$

	Developed lung CA	Not developed Lung CA	Incidence Rate
Smoked	100	900	0.10
Non-smoked	10	990	0.01

Measures of effects in Cohort Study

- Risk difference
- Relative risk

Risk difference

- Incidence rate_{Expose} – incidence rate_{Non-expose}
- Incidence rate_{smoking} – incidence rate_{Non-smoking}

	Developed lung CA	Not developed Lung CA	Incidence Rate
Smoked	100	900	0.10
Non-smoked	10	990	0.01

- Risk difference = $0.1 - 0.01 = 0.09 = 9\%$

Relative risk

- The **ratio** of the incidence rate between exposed and non-exposed
- $RR = \frac{\text{incidence in exposed}}{\text{incidence in non-exposed}}$

	Developed lung CA	Not developed Lung CA	Incidence Rate
Smoked	100	900	0.10
Non-smoked	10	990	0.01

- **Relative risk = $0.1/0.01 = 10$**

Interpreting Relative Risk

$$IR_{Ex} = IR_{non}$$



$$RR = 1$$

(no association)

$$IR_{Ex} > IR_{non}$$



$$RR > 1$$

(risk effect)

$$IR_{Ex} < IR_{non}$$



$$RR < 1$$

(protective effect)