# STUDY DESIGNS

Phunlerd Piyaraj, MD., MHS., PhD.

# Objectives

**By the end of this section, you will be able to:**

- Describe the major types of descriptive studies and their primary uses
- Describe the major types of analytic studies and their purposes

© 2009, Johns Hopkins University. All rights reserved.

# Definition of Epidemiology

- **The study of the *distribution* and *determinants* of health-related states or events in specified *populations* and the applications of this study to control of health problem (*Last, 1998*)**
- **Greek roots**
  - *epi* = (what is) upon
  - *demos* = the population
  - *logy* = study of

# Type of Studies

The study of the *distribu*
events in specified *popu*
control of health problem (*Last*

Different methods are used in an epidemiological Investigation

## DESCRIPTIVE

(*distribution*)

- Time, Place, Person
- Identify and classify diseased individual

## ANALYTIC

(*determinants*)

- Causes, Risk Factors
- Test specific hypotheses
- Generate new hypotheses

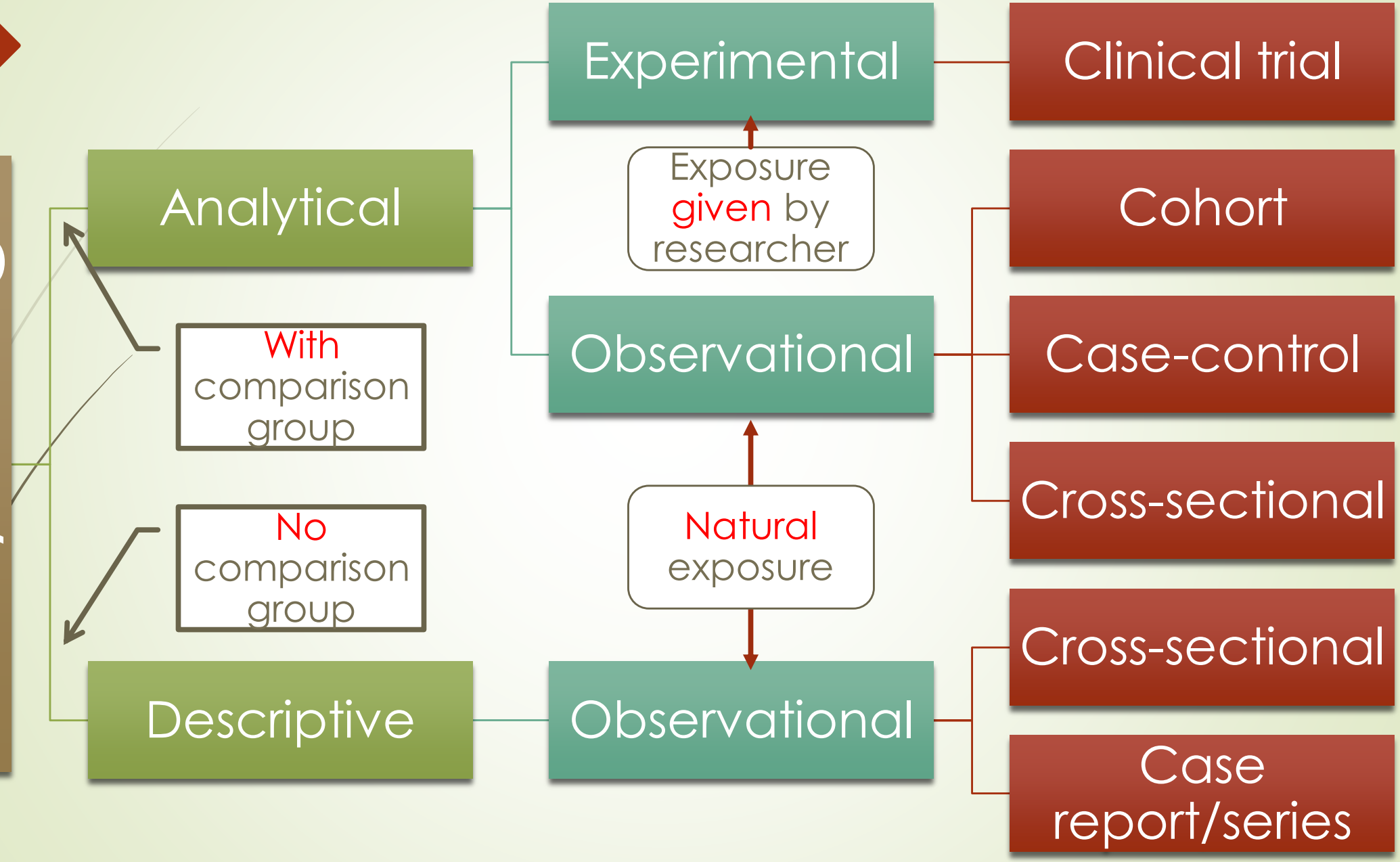
*Source: Introduction to basic epidemiology and principles of statistics for tropical disease control; CDC, 2002

# Types of Studies

| Study Designs | |
|---|---|
| Descriptive | Analytical |
| To study distribution | To study determinants |
| Time, Place, Person | Causes, Risk Factors |

*Source: Introduction to basic epidemiology and principles of statistics for tropical disease control; CDC, 2002

# Study design



# HIERARCHY OF EPIDEMIOLOGICAL STUDIES

- Clinical Trial

Experimental

- Cohort
- Cross-sectional / Case control

Observational

- Cross-sectional
- Case series / Case report

Descriptive

Quality

# The 2 Steps Of Research Questions : Measurements

QUALITY

| Type | Cross-sectional | Case-control | Cohort |
|---|---|---|---|
| 1. Size | Prevalence | Prevalence | Incidence |
| 2. Association | Prevalence rate ratio | Odds ratio | Incidence rate ratio |

# Types of Studies

| Study Designs | |
|---|---|
| Descriptive | Analytical |
| To study distribution | To study determinants |
| Time, Place, Person | Causes, Risk Factors |

*Source: Introduction to basic epidemiology and principles of statistics for tropical disease control; CDC, 2002

# Descriptive Study

Describe only Cases

# Descriptive studies

- Studies that describe the patterns of disease occurrence by time, place, and person
- Allow planners and administrators to allocate resources efficiently
- Used for hypothesis generation
  - Often providing first important clues about etiology

# Types of Descriptive Studies

## CASE REPORT & CASE SERIES

- Description of an outcome or the condition of one or more person with a similar diagnosis
- Provide an important link between clinical medicine and epidemiology
- Useful for generating hypotheses and examining new diseases
- **Cannot make conclusion about etiology or risk factors**

*Source: Introduction to basic epidemiology and principles of statistics for tropical disease control; CDC, 2002

# Descriptive Studies

## ADVANTAGES

- Allows for the description of
  - new disease processes
  - outcomes associated with rare diseases

## DISADVANTAGES

- Impossible to determine disease frequency
- Cannot establish causality between exposures or risk factors and disease outcome

# Case report

Oncol Lett. 2014 Oct;8(4):1635-1637. Epub 2014 Jul 24.

## Secretory breast carcinoma in a 12-year-old girl: A case report.

Wang YQ[1], Wang Y[2], Zhang JH[3], Li YF[4], Li HM[5], Wang L[5], Yao Y[6].

Author information

**Abstract**

Secretory breast carcinoma (SBC) is a rare tumor that was originally described in children and adolescent women, with a characteristic morphology and controversy regarding the choice of treatment. This unusual breast cancer subtype generally has a favorable prognosis, although several cases have been described in adults with increased tumor aggressiveness and a risk of metastases. Surgery is considered the most appropriate treatment for this pathology. The present study describes the case of a 12-year-old female who presented with a painless lump in the left breast, and subsequently underwent a biopsy of the sentinel lymph node and a partial resection of the left breast (breast-conserving therapy). Periodic follow-up examinations after completion of the surgical and chemotherapeutic treatment have shown no evidence of either local regression or distant metastases and, one year later, the patient remains free of the disease. This study suggests that local excision with sentinel lymph node mapping may be a suitable therapeutic approach for children with SBC.

**KEYWORDS:** a biopsy of the sentinel lymph node; breast-conserving therapy; juvenile/secretory breast cancer; triple-negative carcinoma

PMID: 25202382 [PubMed] PMCID: PMC4156222 Free PMC Article

# Case series

Breast Dis. 2014 Sep 29. [Epub ahead of print]

## Unusual findings in the male breast patient: A case series.

Arleo EK[1], Eisen C[2].

Author information

**Abstract**

In this case series, we present the history and imaging of several male patients with breast complaints. Given the rise in men presenting with breast cancer, from 1 in 100,000 in the 1970s to 1.5 in 100,000 in 2012 [1,2], these cases presented here together provide the useful reminder that a comprehensive clinical history and focal physical examination is critical when assessing the symptomatic male (as well as female) patient with a breast complaint.

**KEYWORDS:** Male breast pathology; fibromatosis; gynecomastia; varices

PMID: 25267371 [PubMed - as supplied by publisher]

# Types of Studies

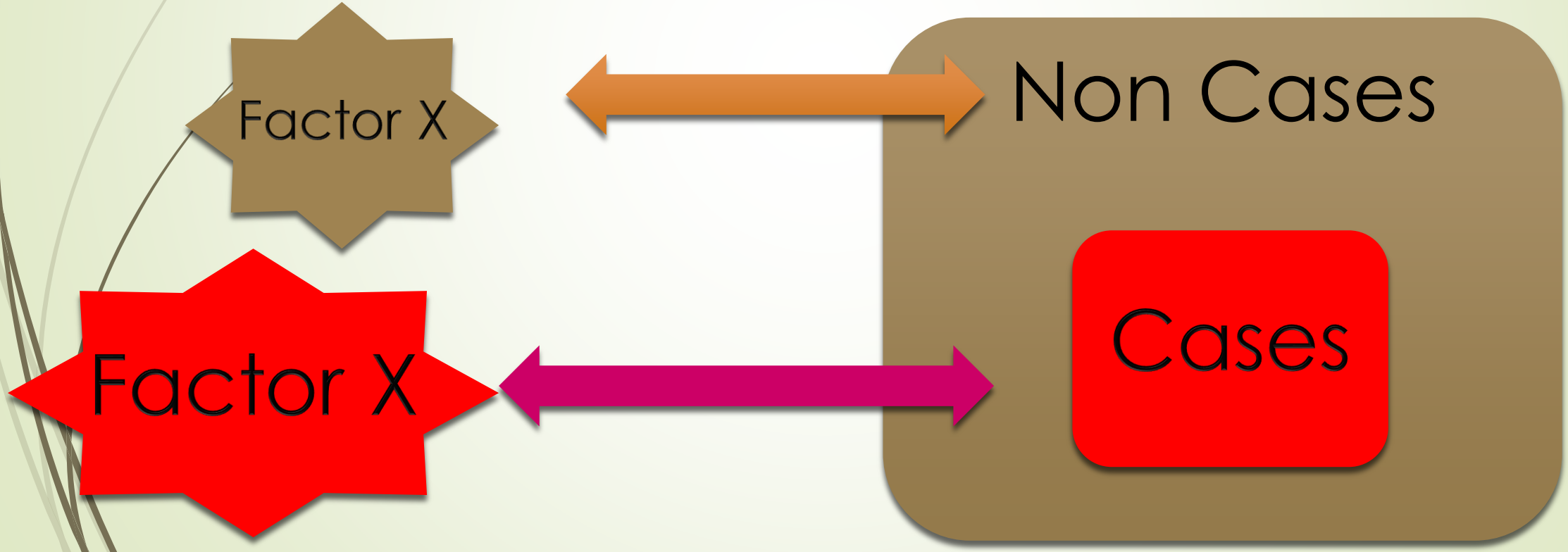
| Study Designs | |
|---|---|
| Descriptive | Analytical |
| To study distribution | To study determinants |
| Time, Place, Person | Causes, Risk Factors |

*Source: Introduction to basic epidemiology and principles of statistics for tropical disease control; CDC, 2002

# Analytical Study

Describe Cases and Non cases

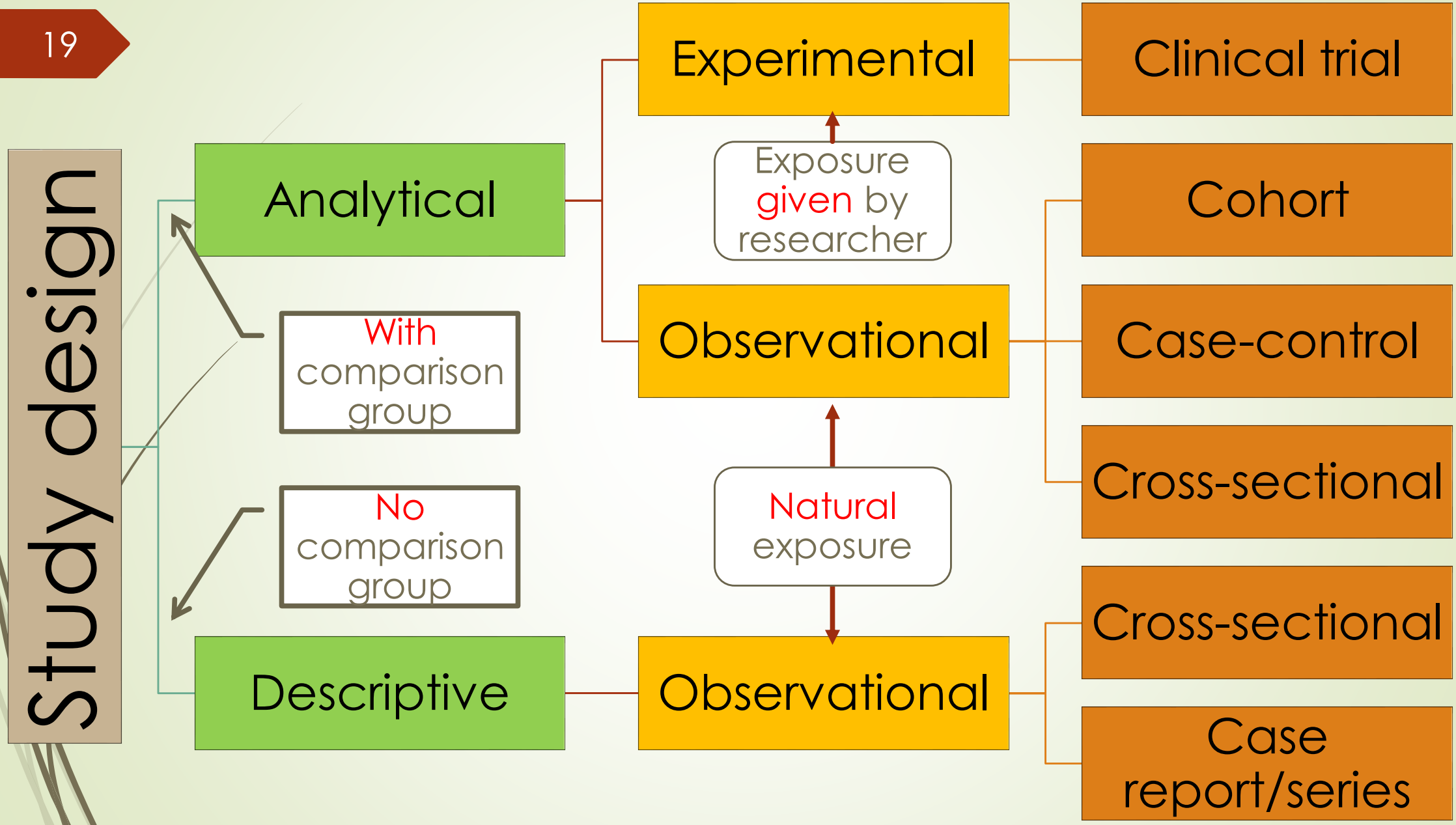
Study factors associated with the problem



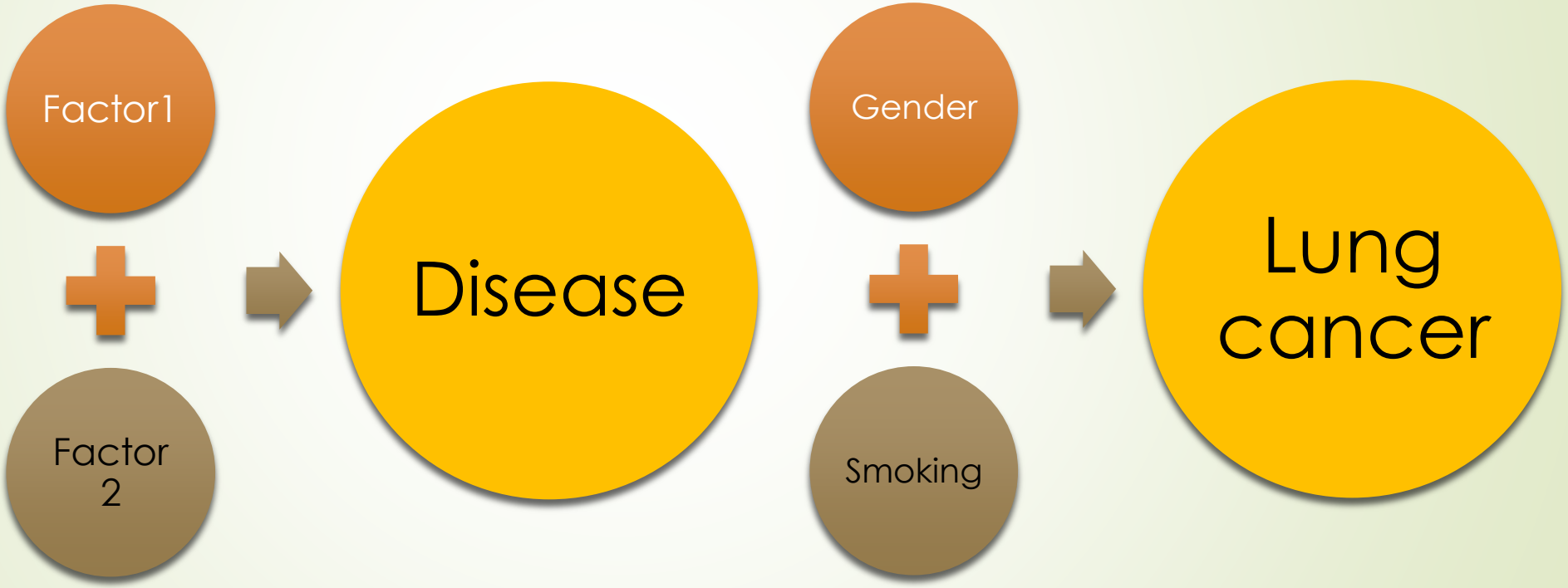
# Analytic Studies

- Test hypotheses concerning the relationship between a suspected risk factor and an outcome
- Measure the magnitude of the association effect, and its statistical significance
- Implies a comparison among two or more groups
- Two main types
  - Observational and Experimental

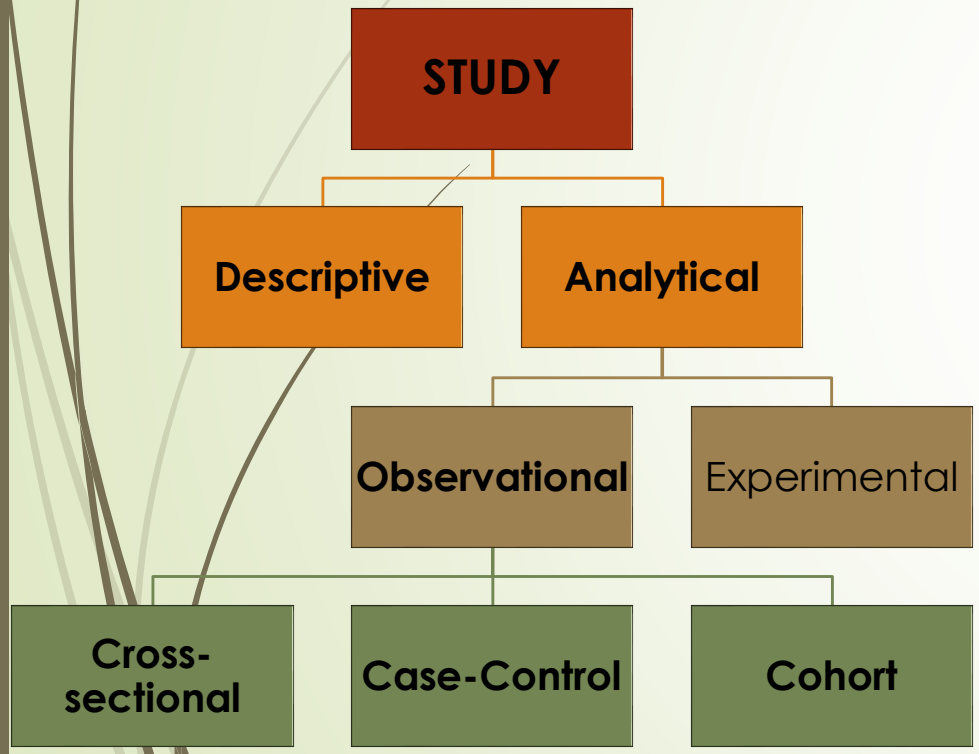
*Source: Introduction to basic epidemiology and principles of statistics for tropical disease control; CDC, 2002


Study design
Analytical
With comparison group
No comparison group
Descriptive
Experimental
Exposure given by researcher
Observational
Natural exposure
Observational
Clinical trial
Cohort
Case-control
Cross-sectional
Cross-sectional
Case report/series

# Using epidemiology to identify the cause of disease

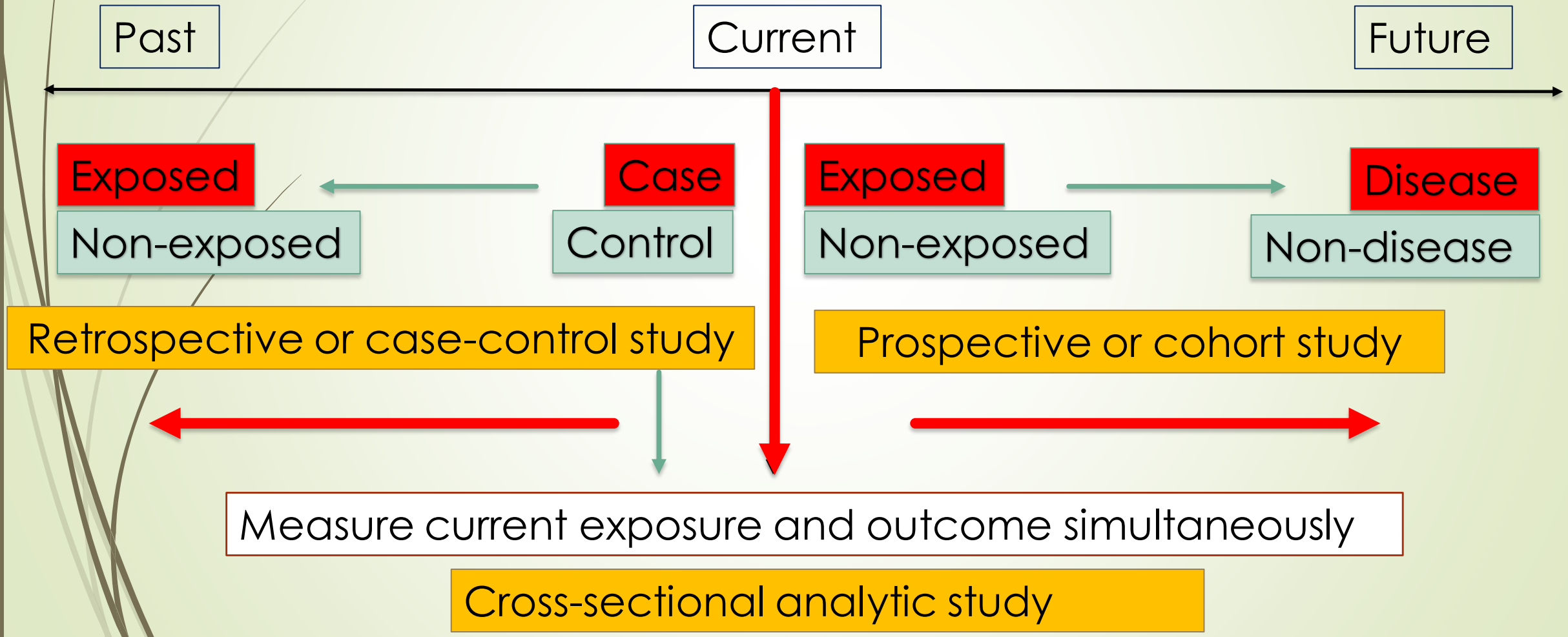


# Types of Observational Studies




- Most analytic studies fall in this category
- No human intervention involved in assigning study groups
  - Simply observes the relationship between exposure and disease
- Subject to many potential biases
  - Careful design and analysis may help minimize biases
- Three main types
  - Cross-sectional, Case-Control and Cohort

# Analytical studies design by time sequence



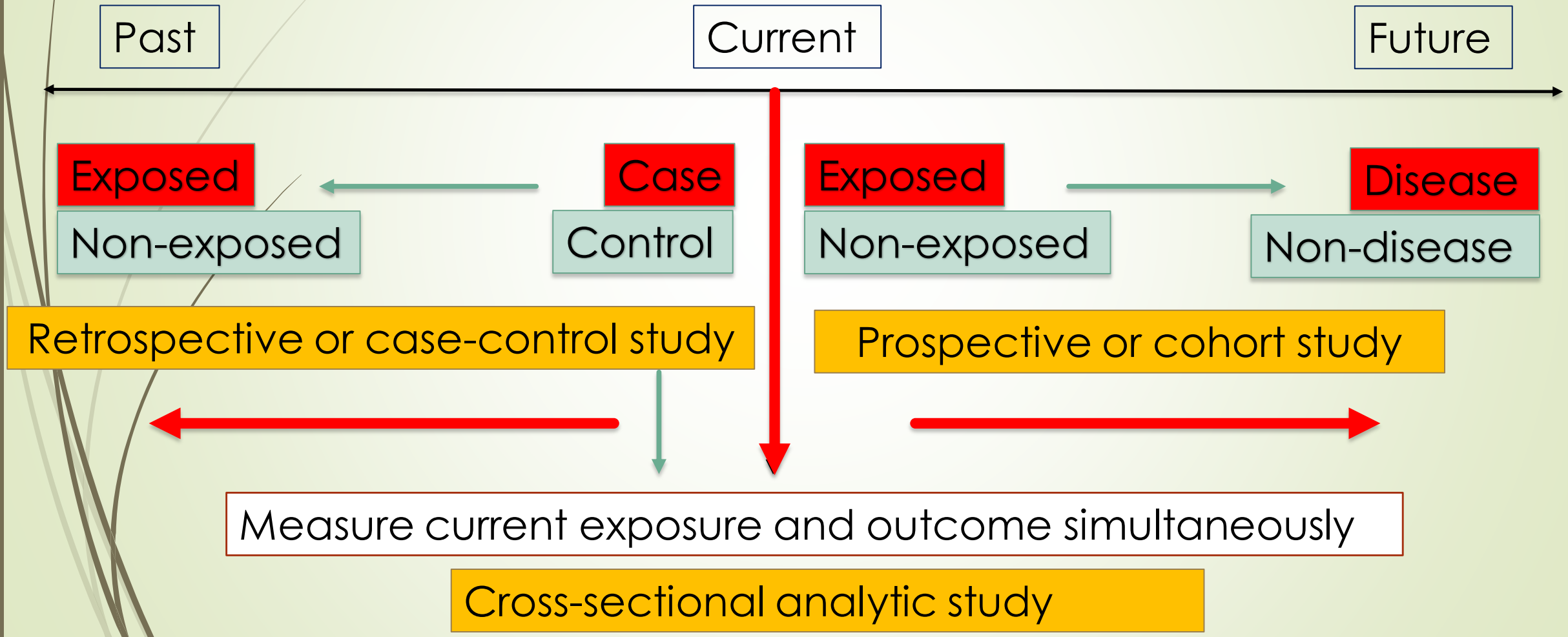
# Cross-sectional Studies

- The most frequent use and easiest step to find an association
- Examine the relationship between a disease and other variables of interest they exist in a population at a given time
  - Describe characteristics or behaviors within a study population (Malaria prevalence, vaccine coverage)
  - Used to examine potential risk factors (How those who receive vaccination differ from those who do not)
- Analyze results from a survey
- No information on the temporal sequence of cause and effect
  - Assess both exposure and disease at the same time

# Purposes of Cross-sectional Studies

- To assess the burden of disease in a population and to assess the need for health services
- To compare the prevalence of disease in different populations
- To examine trends in disease prevalence or severity over time
- Not recommended for:
  - Study of rare diseases
  - Diseases with a short duration
  - Study of rare exposure

# Analytical studies design by time sequence



Aust N Z J Public Health. 2009 Oct;33(5):437-41. doi: 10.1111/j.1753-6405.2009.00425.x.

# Prevalence and impact of musculoskeletal disorders in New Zealand nurses, postal workers and office workers.

Harcombe H[1], McBride D, Derrett S, Gray A.

Author information

## Abstract

**OBJECTIVES:** To describe the prevalence, characteristics and impact of musculoskeletal disorders (MSDs) in New Zealand nurses, postal workers and office workers.

**METHODS:** A postal survey asked participants about MSDs, (low back, neck, shoulder, elbow, wrist/hand or knee pain lasting longer than one day), and demographic, physical and psychosocial factors. Nurses were randomly selected from the Nursing Council database, postal workers from their employer's database and office workers from the 2005 electoral roll.

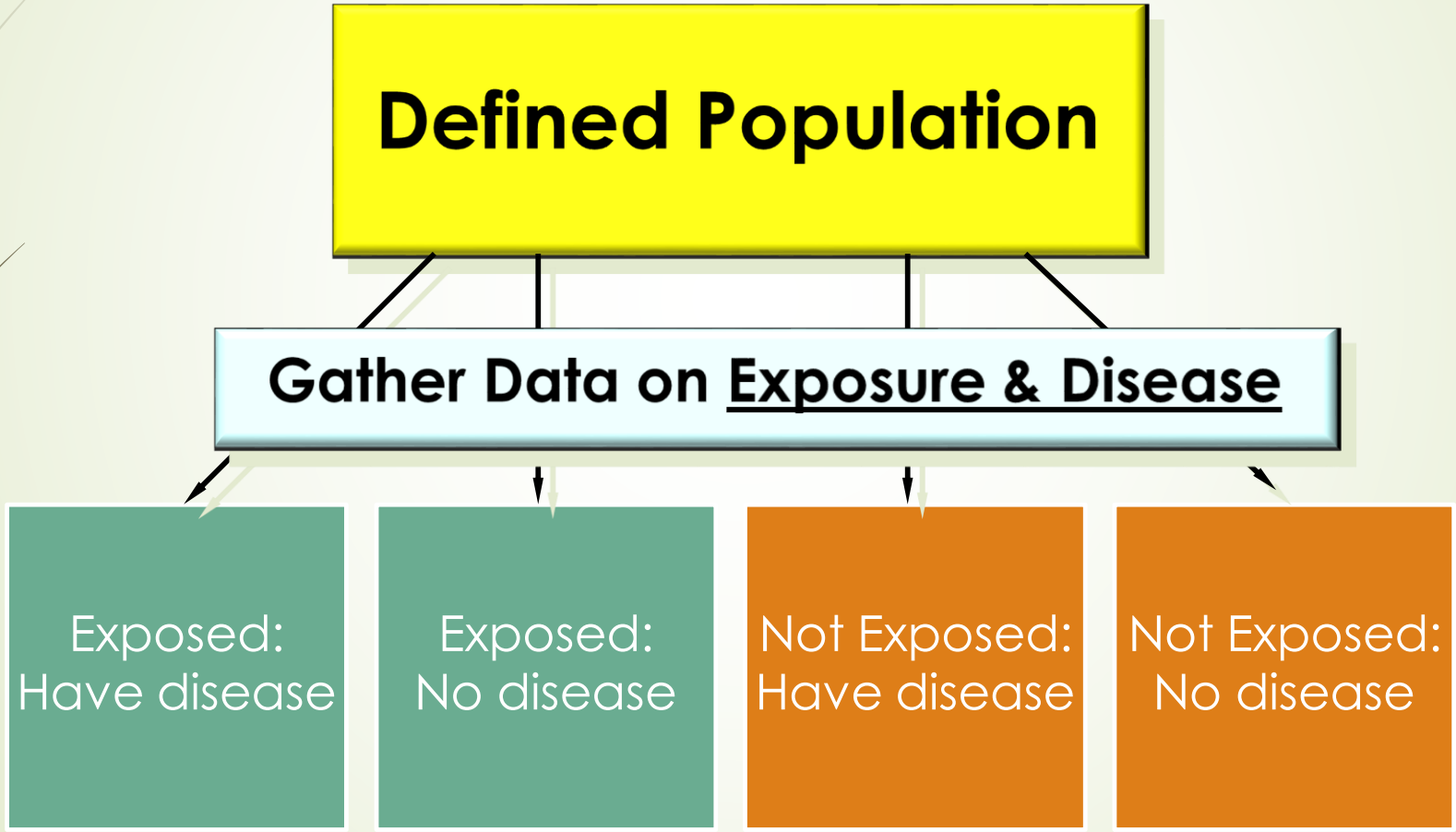
**RESULTS:** The response rate of potentially eligible participants was 58% (n=443). Participants were aged 20-59 years; 86% were female. Over the 12 months prior to the survey 88% of respondents had at least one MSD lasting longer than a day and 72% reported an MSD present for at least seven days. Of the 1,003 MSDs reported, 18% required time off work and 24% required modified work duties. In the month prior to the survey 17% of MSDs made functional tasks difficult or impossible. Low back, neck and shoulder pain prevalence did not differ by occupation. Postal workers had the highest prevalence of elbow and wrist/hand pain; nurses of knee pain.

**CONCLUSIONS:** The high prevalence of MSDs among these workers indicates that they are indeed in 'at risk' occupations. In each occupational group MSDs encompass a range of anatomical sites, however the overall pattern of MSDs differs by occupation. MSDs have a significant impact on activities at work and home.

**IMPLICATIONS:** Primary and secondary prevention strategies should encompass a range of anatomical sites and specifically target different occupational groups.

PMID: 19811479 [PubMed - indexed for MEDLINE]

# A Survey on musculoskeletal disorder



# Limitations of Cross-sectional Studies

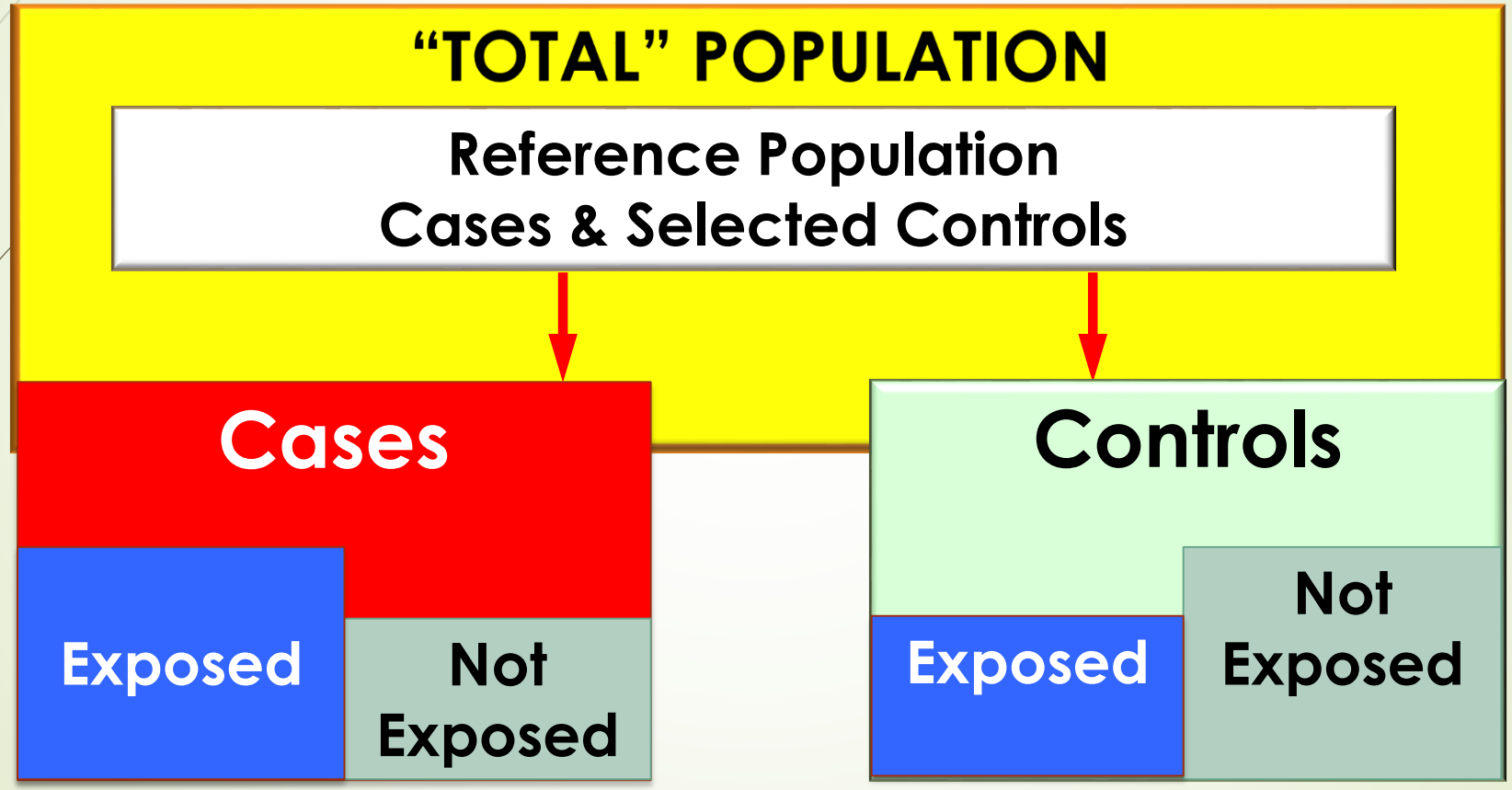
- You are dealing with a Prevalence !! Not an Incidence !!
- Using prevalence rate ratio may not represent the true relative risk
- The results of cross-sectional study may therefore be used only to postulate a hypothesis of an association
- Case-control or cohort studies may be required to confirm the association

# Case-Control Studies

- The subjects are selected on the basis of whether they do (cases) or do not (controls) have a particular disease under study.
- The groups are compared with respect to the proportion having a *history of an exposure* or characteristic of interest.*
- Proceed conceptually form outcome to exposure
  - Start with group of affected (cases) and not affected (controls)
  - Then information about previous exposures is obtained for cases and controls
  - Then the frequency of exposure is compared for the two groups

Source: Epidemiology in Medicine

# Study Population



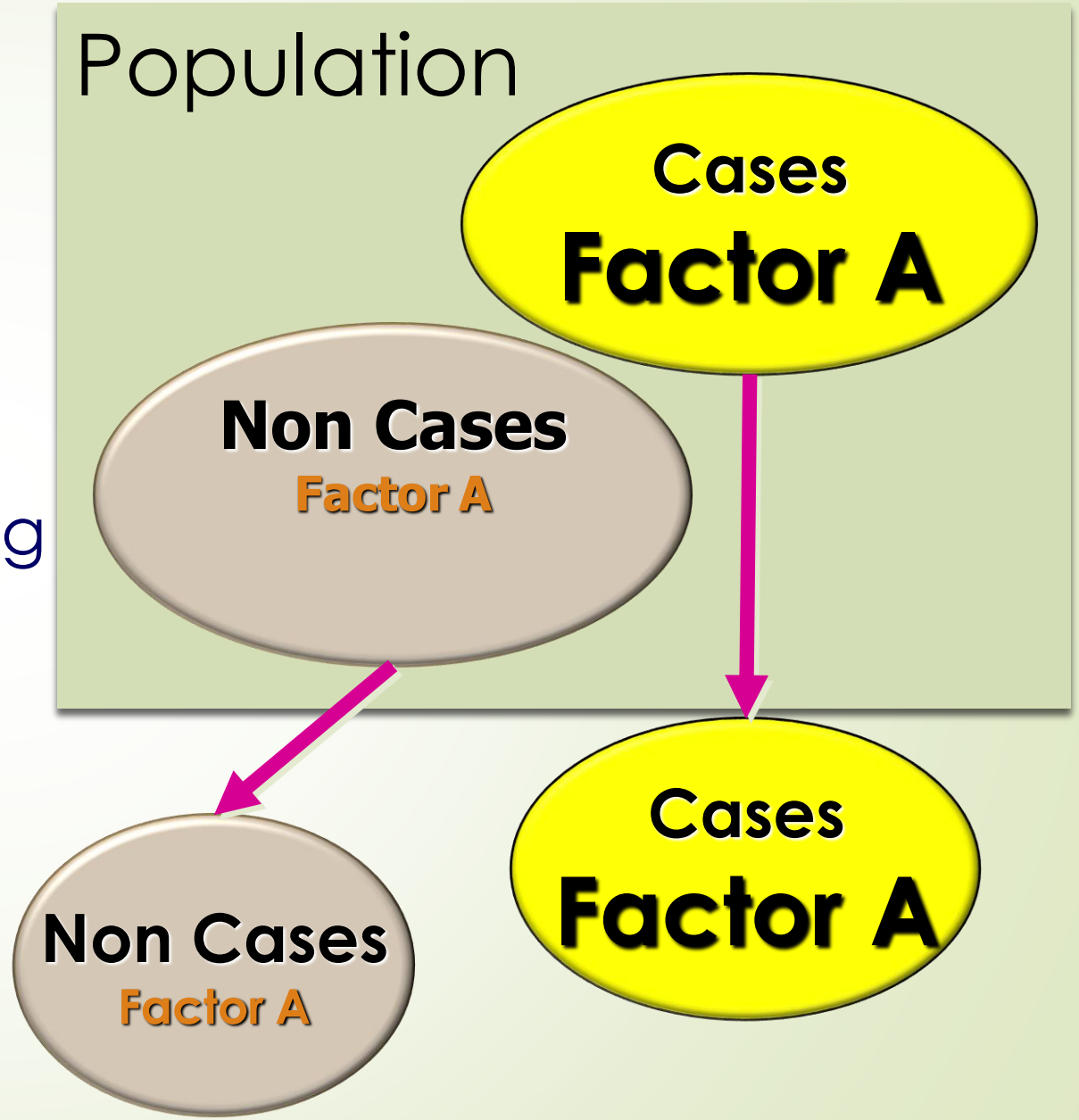
Starting with "Cases" identification

Then selecting a group of "Controls"

Identify "exposure" status among both cases and controls

Compare the exposure status between the 2 groups

Calculate ODDS RATIO



# Selecting Controls (cont.)

- Multiple controls can be used to help add statistical power when cases are unduly difficult to obtain
- Using more than one control group lends credibility to the results
- More than 4 controls for a case is usually not cost-efficient

# Measure of association: Odds Ratio

**Odds Ratio**

$$=(A/C)/(B/D)$$

$$= \frac{AD}{BC}$$

| | Case | Control |
|---|---|---|
| Exposed | A | B |
| Not Exposed | C | D |

# Odds Ratio (Relative Odds)

- Case-control study
  - Do not have incidence in exposed & incidence in non exposed ⇒ Cannot calculate the RR directly
- Odds Ratio (OR) is alternative measure of association

# Case - control study analysis

- Odds : event / non-event
- A six-sided die , odds of rolling a "3" is 1/5
- Odds ratio : indirect approximation of risk
- Always over estimate the relative risk

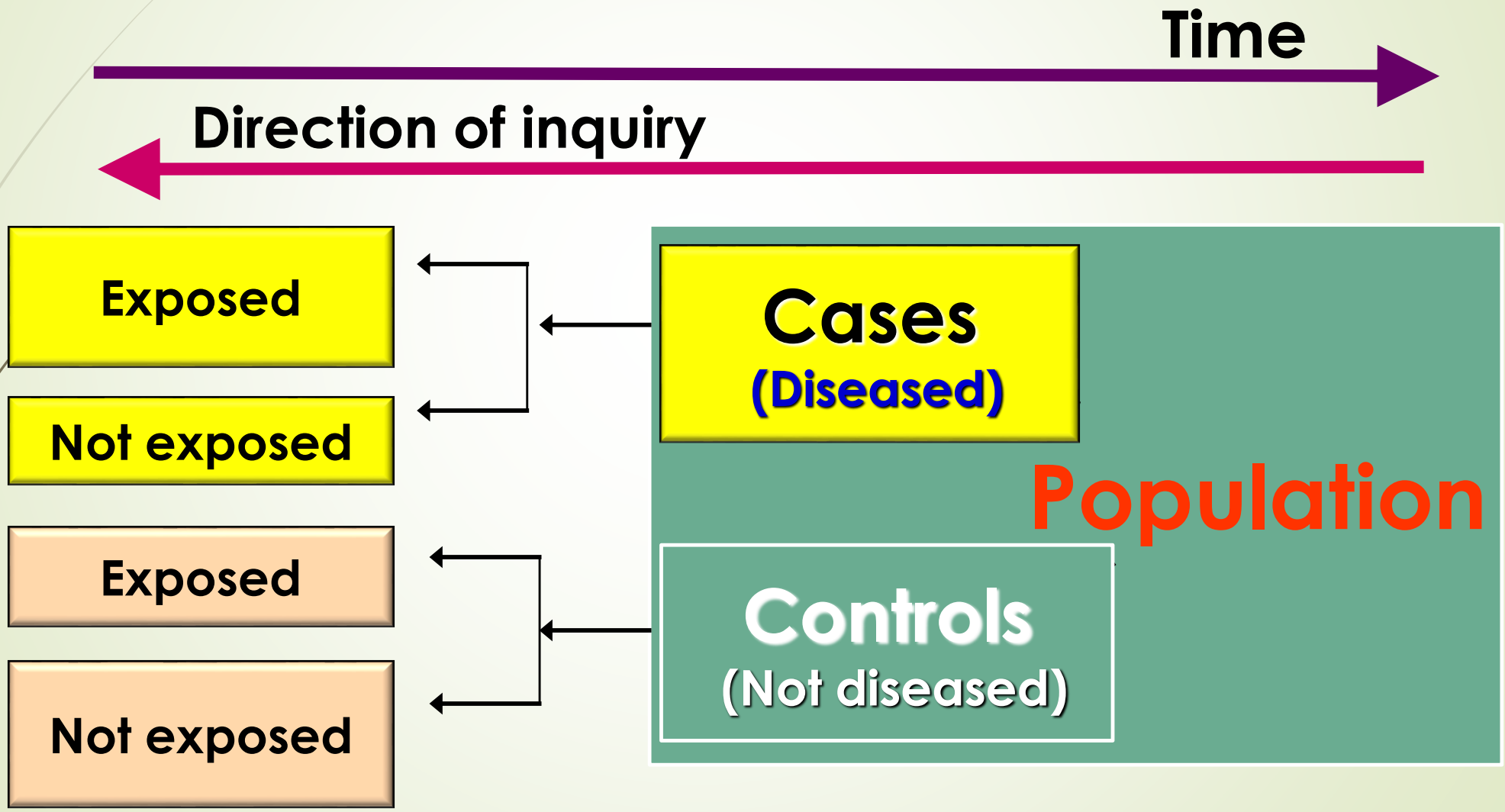
don't "directly" know groups' exposures ;
can not measure risk directly

# Case-Control Study

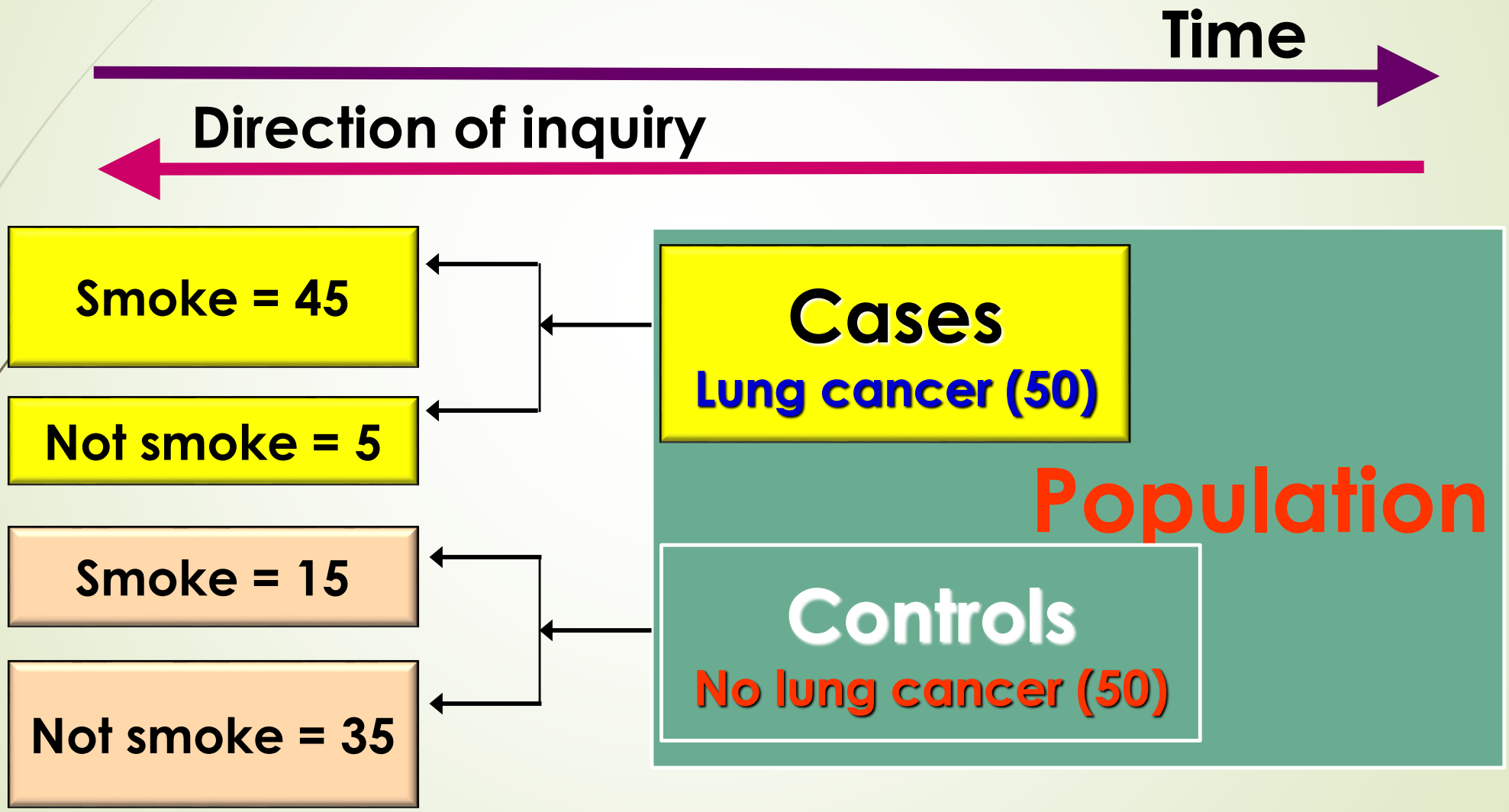
- 50 Cases of Lung Cancer (CA Lung)
- 50 Non lung cancer patients
- Find an association Smoking *VS* CA Lung

| ID | Age | Sex | Case or Control | Smoke |
|---|---|---|---|---|
| 1 | 18 | M | Case | Yes |
| 2 | 36 | M | Control | No |
| 3 | 50 | F | Case | Yes |
| 4 | 41 | M | Control | Yes |
| . | . | . | . | . |

# Design of Case Control Study



# Design of Case Control Study



# Measure of association: Odds Ratio

| | CA Lung | No CA |
|---|---|---|
| Smoke | 45 | 15 |
| Not smoke | 5 | 35 |

- Odds of Smoking among CA Lung cases = 45/5 = 9
- Odds of Smoking among Control = 15/35 = 0.43
- Odds ratio = (45/5) /(15/35) = (45x35) / (5x15) = 21
- Those who smoked were 21 *times more likely* to develop lung cancer than those who did not smoke

| | OR<1 | OR=1 | OR>1 |
|---|---|---|---|
| Odds comparison between cases and controls | Odds of exposure for cases are less than the odds of exposure for controls | Odds of exposure are equal among cases and controls | Odds of exposure for cases are greater than the odds of exposure for controls |
| Exposure as a risk factor for the disease? | Exposure reduces disease risk (Protective factor) | Particular exposure is not a risk factor | Exposure increases disease risk (Risk factor) |

# Case-Controls : Advantages

- Permit the study of rare diseases
- Permit the study of diseases with long latency between exposure and manifestation
- Can be launched and conducted over relatively short time periods
- Relatively inexpensive as compared to cohort studies
- Can study multiple potential causes of disease

# Case-Controls : Disadvantages

- Information on exposure and past history is primarily based on interview and may be subject to recall bias
- Validation of information on exposure is difficult, or incomplete, or even impossible
- By definition, concerned with one disease only
- Cannot usually provide information on incidence rates of disease
- Choice of appropriate control group may be difficult
- Methodology may be hard to comprehend for non-epidemiologists and correct interpretation of results may be difficult

Asian Pac J Cancer Prev. 2014;15(18):7879-84.

# Intake of freshwater fish and associated Fatty acids and risk of breast cancer.

Gao CM[1], Ding JH, Li SP, Liu YT, Tang JH, Tajima K.

Author information

## Abstract

To investigate the association between intake of freshwater fish and their fatty acids and the risk of breast cancer in Chinese women, we conducted a case-control study with 669 cases and 682 population-based controls in Jiangsu Province of China. A structured questionnaire was used to elicit detailed information. Unconditional logistic regression analysis was performed to calculate odds ratios (ORs) and 95% confidence intervals (CIs). Total freshwater fish intake was linked to decrease in the adjusted OR for breast cancer, but without dose-dependence. Analyses by freshwater fish species showed that consumption of black carp and silver carp was inversely related to breast cancer risk, with adjusted-ORs for the highest intake category of black carp (≥500g/month) of 0.54 (95%CI=0.33-0.92; P trend<0.002) and for silver carp (≥1000g/month) of 0.19 (95%CI=0.11-0.33; P trend<0.001). In contrast, consumption of crucian carp was positively related to breast cancer risk, with an adjusted OR for the highest intake category (≥1000g/month) of 6.09 (95%CI=3.04-12.2; P trend<0.001). Moderate intakes of SFA, PUFA, n3-PUFA and n6-PUFA from freshwater fish may decrease the risk of breast cancer among premenopausal women. The findings of this study suggest that intake of freshwater fish and their fatty acids may modify risk of breast cancer, and that different species of freshwater fish could have a different actions on breast cancer risk. Future epidemiologic studies are needed to know the effects of freshwater fish intake on breast cancer risk and the cause of these effects.

PMID: 25292081 [PubMed - in process] Free full text

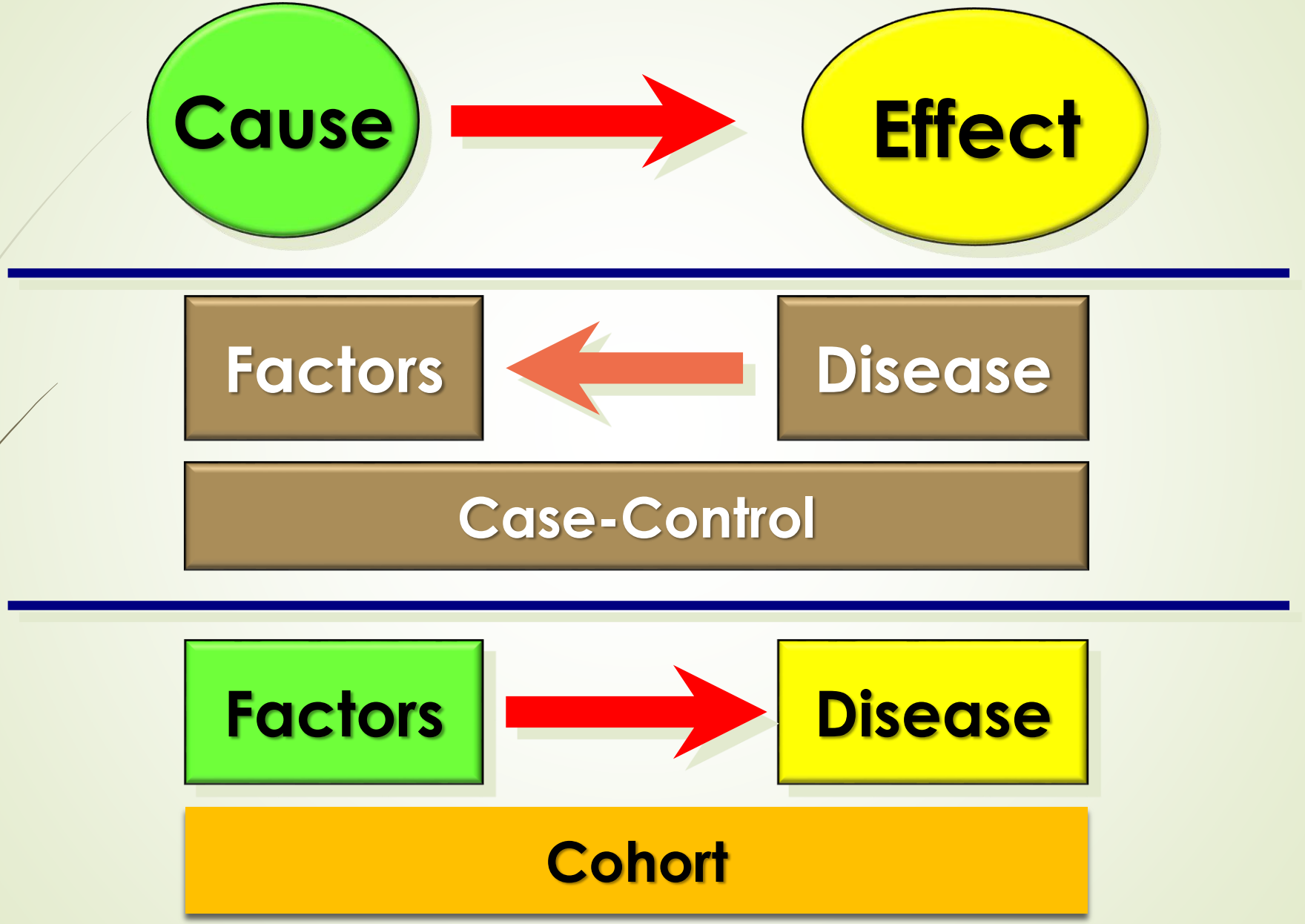
# Cohort Study

"COHORT"
**in Epidemiology**
**A group of persons who are followed over time**

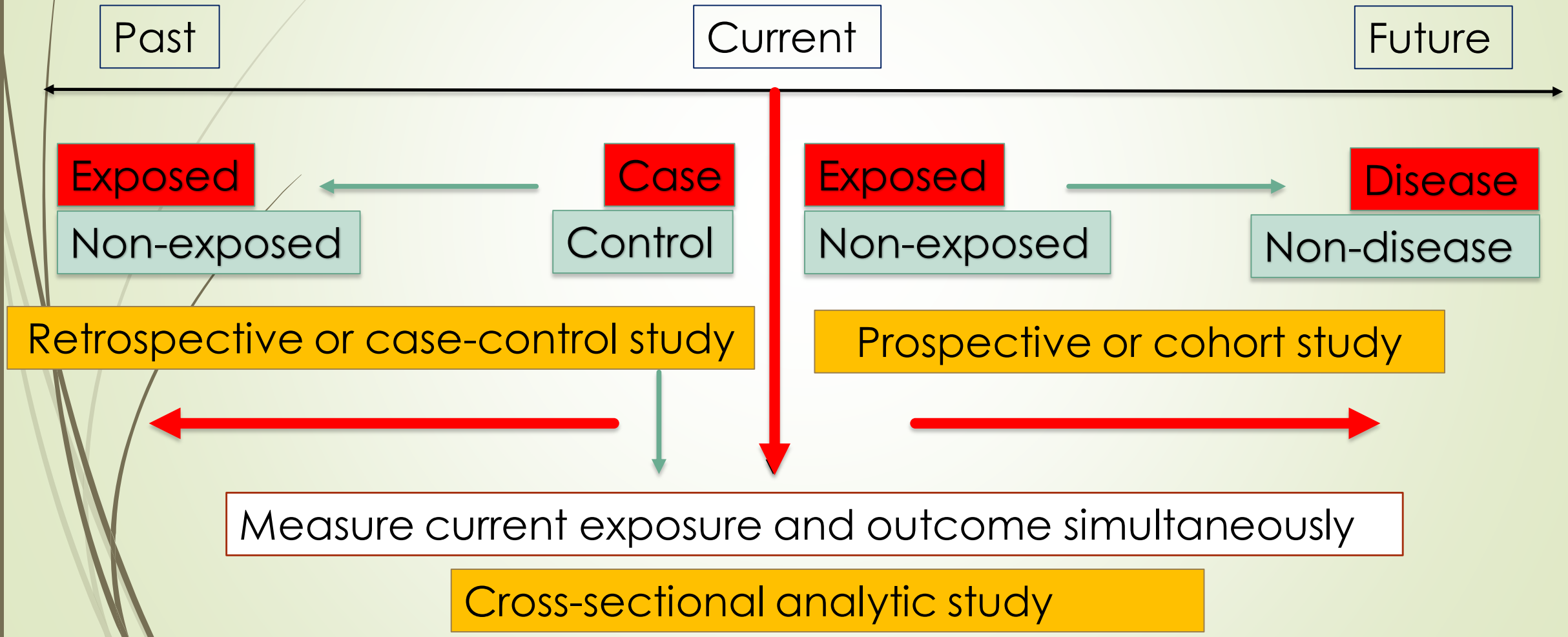
- The most powerful observational study for identifying an association of risk factors and a disease
- Size of problem = incidence (new cases)
- The most time consuming
- The most expensive

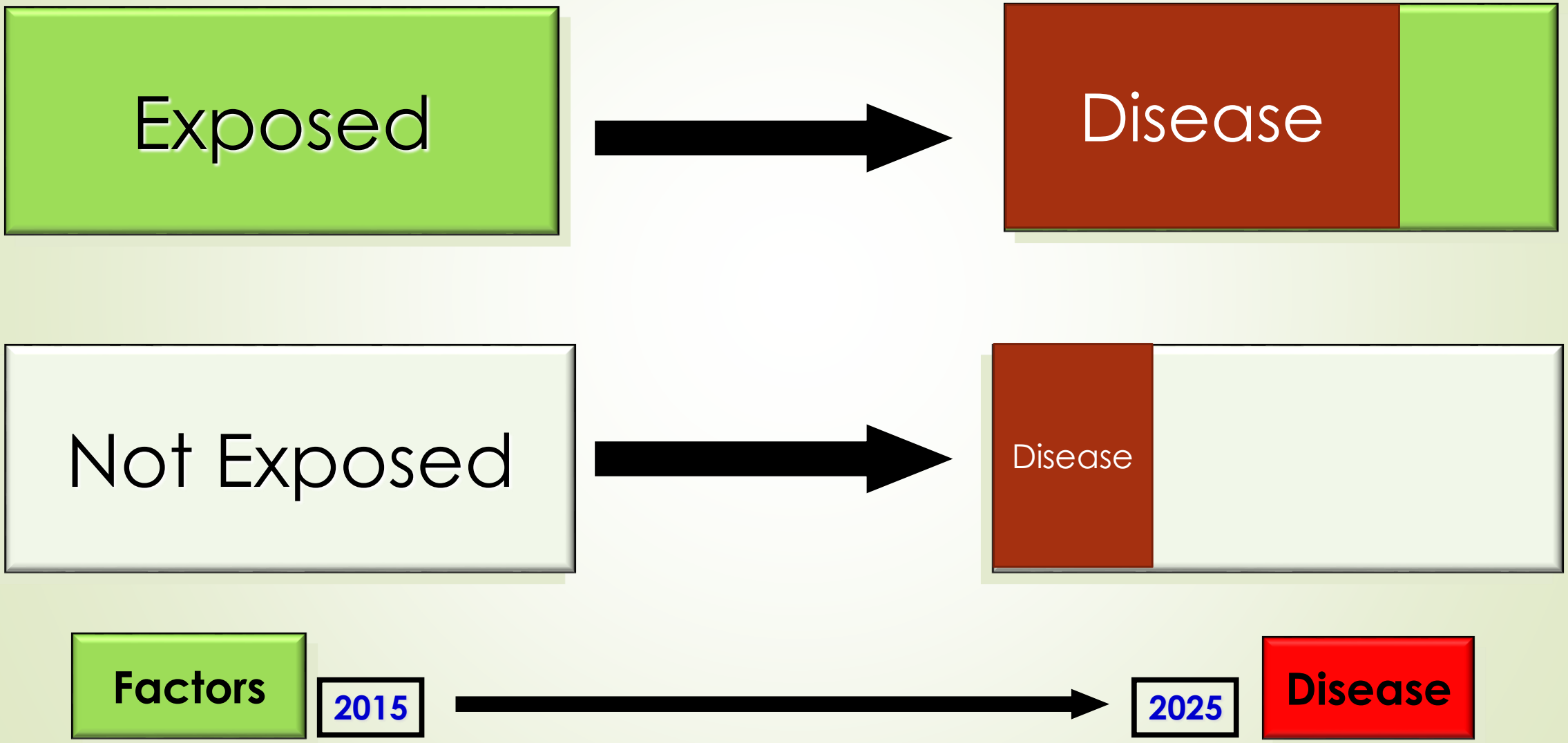
# Cohort Study

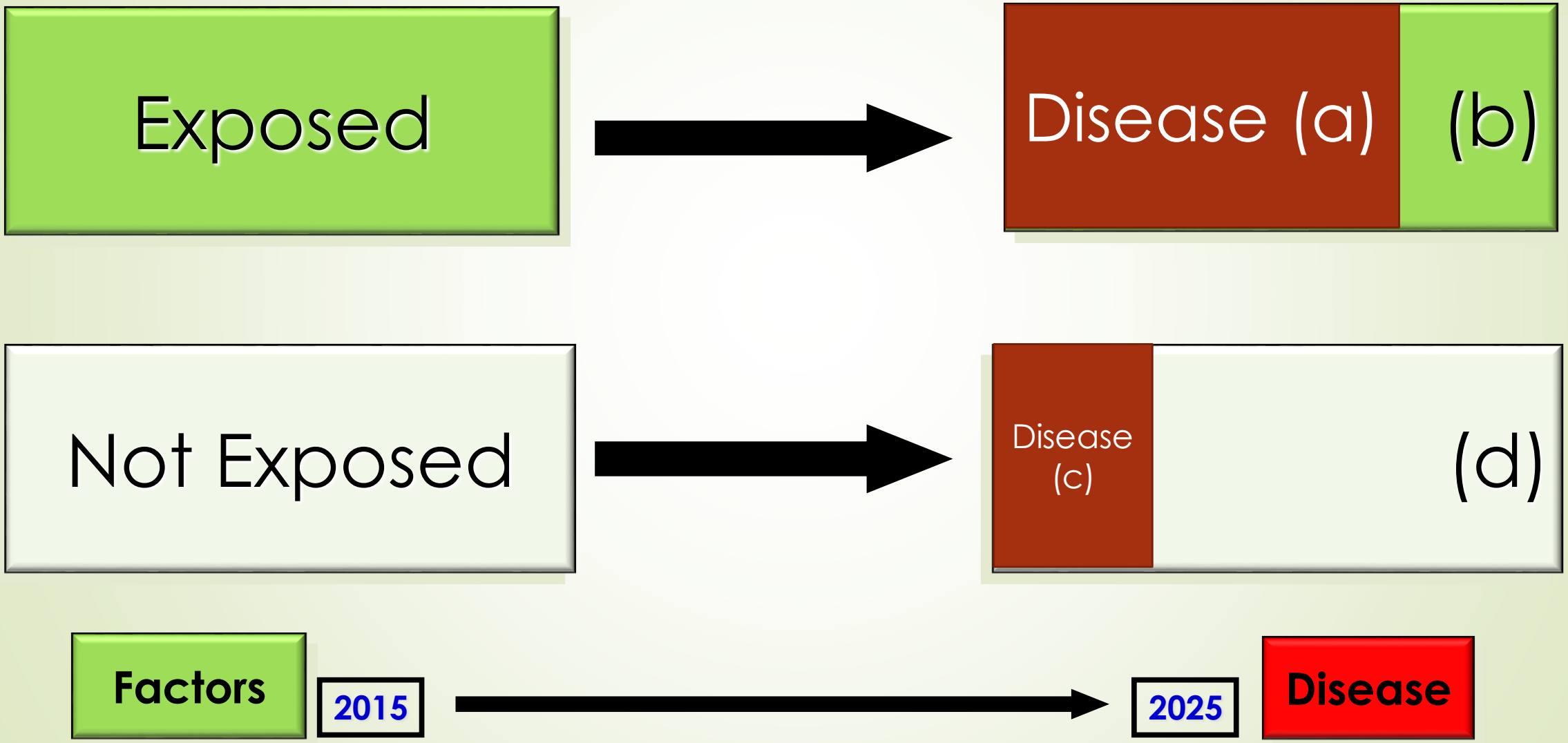
- Start with a group of people without the disease
- Then divide people on the basis of the exposure to a suspected risk factor
- Follow the "whole group" for a period of time
- Then asses the disease occurrence outcome

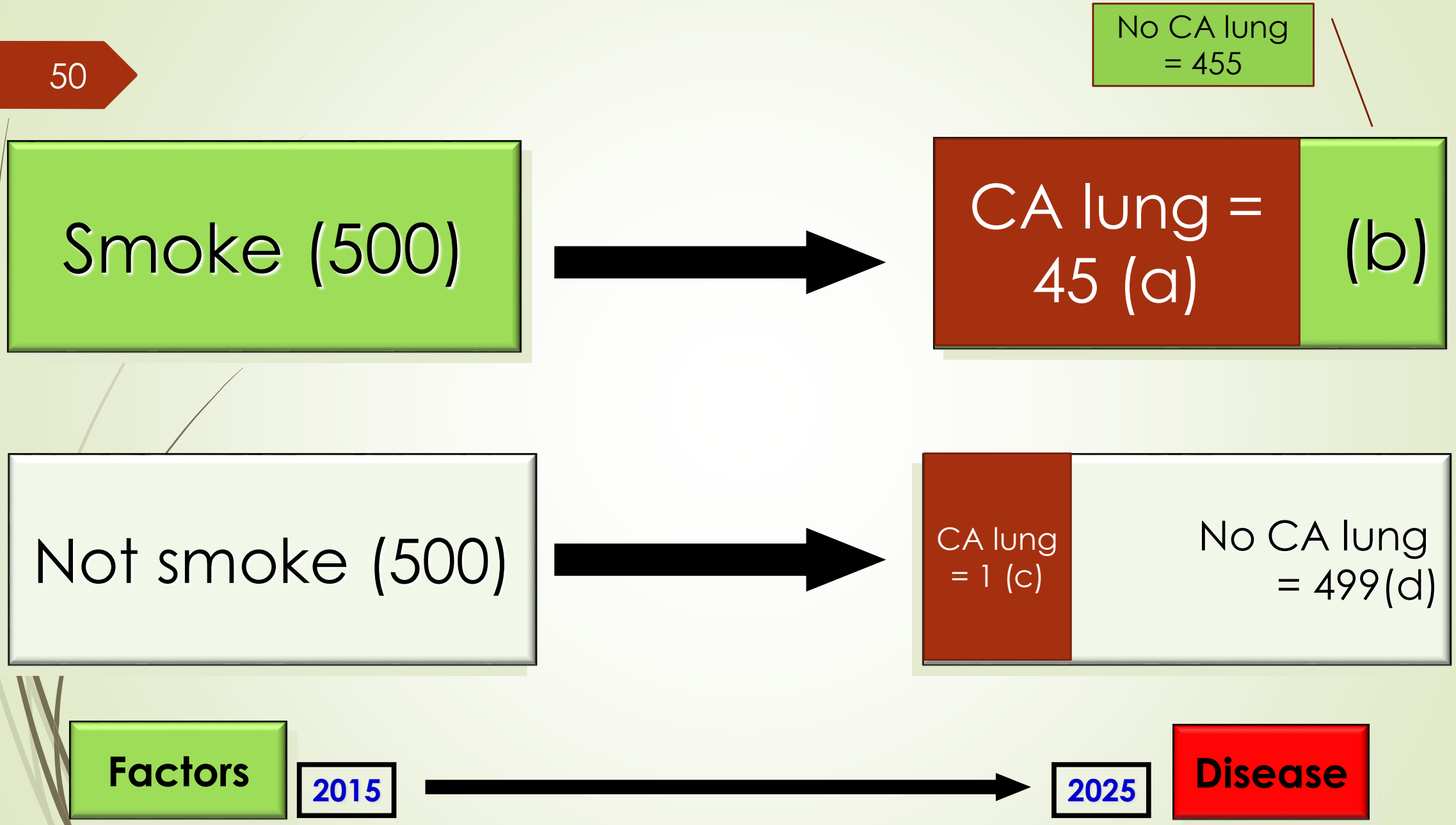

Cause
Effect
Factors
Disease
Case-Control
Factors
Disease
Cohort

# Analytical studies design by time sequence




Exposed
Disease
Not Exposed
Disease
Factors
2015
2025
Disease


Exposed
Disease (a)
(b)
Not Exposed
Disease (c)
(d)
Factors
2015
2025
Disease


No CA lung = 455
Smoke (500)
CA lung = 45 (a)
(b)
Not smoke (500)
CA lung = 1 (c)
No CA lung = 499(d)
Factors
2015
2025
Disease

# Relative Risk

| | CA Lung | No CA | |
|---|---|---|---|
| Smoke | A | B | A+B |
| Not smoke | C | D | C+D |

$$\text{Relative Risk} = \frac{A/A+B}{C/C+D}$$

| | CA Lung | No CA | |
|---|---|---|---|
| Smoke | 45 | 455 | 500 |
| Not smoke | 1 | 499 | 500 |

- Incidence of Smoker who develop Lung Cancer = 45 /500
- Incidence of Non -Smoker who develop Lung Cancer = 1 /500
- Relative Risk of smoking for Lung Cancer = $\frac{45/500}{1/500}$ = 45
- **Those who smoked were *45 times more likely* to get lung cancer**

# Interpretation of relative risk (RR)

- Relative Risk of smoking for CA Lung = 45
- Those who smoked were 45 times more likely to develop lung cancer than those who did not smoke.

# Cohort Study

**Comparison between**

**"a group of persons *with* a factor -- Exposed"**

**VS**

**"a group of persons *without* the factor -- Non-exposed"**

# Measurement of Associations

- Cross-sectional → **Point Prevalence Rate Ratio**
- Case-Control → **Odds Ratio**
- Cohort → **Relative Risk**

Occup Med (Lond). 2014 Aug 22. pii: kqu117. [Epub ahead of print]

# Musculoskeletal disorders among nurses compared with two other occupational groups.

Harcombe H[1], Herbison GP[2], McBride D[2], Derrett S[3].

Author information

## Abstract

**BACKGROUND:** There is a high incidence of low back pain (LBP) among nurses. However, few longitudinal studies have investigated musculoskeletal disorders (MSDs) at other anatomical sites in nurses.

**AIMS:** To describe the cumulative incidence and persistence/recurrence of MSDs of the low back, neck, shoulder, elbow, wrist/hand and knee among New Zealand nurses, to investigate the impact of MSDs on work and functional tasks and to compare findings for nurses with those in postal workers and office workers.

**METHODS:** Participants completed a postal survey at baseline and again 1 year later. Information was collected about MSDs in the previous 1 month and 12 months and about the ability to attend work, undertake work duties and perform functional tasks.

**RESULTS:** Among nurses, the low back was the site with the highest cumulative incidence and highest prevalence of persistent/recurrent, work-disabling and functional-task-disabling pain. Work-disabling LBP was more prevalent among nurses and postal workers than office workers ($P < 0.001$). Nurses had a substantial prevalence of work-disabling shoulder pain (10%) and functional-task-disabling knee (19%) and wrist/hand pain (16%). With the exception of the elbow, each occupational group had a high prevalence of persistent/recurrent MSDs at all anatomical sites.

**CONCLUSIONS:** LBP continues to have a substantial impact among nurses. Other less commonly considered MSDs, such as shoulder, wrist/hand and knee pain, also made work or functional tasks difficult, suggesting that primary and secondary prevention efforts should consider MSDs at other anatomical sites as well as the low back.

© The Author 2014. Published by Oxford University Press on behalf of the Society of Occupational Medicine. All rights reserved. For Permissions, please email: journals.permissions@oup.com.

**KEYWORDS:** Incidence; longitudinal studies; musculoskeletal pain; nurses; occupational disease; occupational exposure; office workers; pain; postal workers.

PMID: 25149117 [PubMed - as supplied by publisher]

# Experimental Studies

- The person conducting the study randomizes the subject into exposed and unexposed groups and follows them over time to compare their rates of disease development.
  - Ex. May include trails of the efficacy of a new drug compared with the efficacy of the drug currently in use

# Experimental Studies

- Randomization helps ensure comparability of the group and avoids many of the biases inherent in non-experimental studies
  - Considered as a widely accepted “gold-standard”

# Randomized Control Trials (RCT)

BMC Womens Health. 2014 Oct 15;14(1):125. [Epub ahead of print]

**Interventions to reduce postpartum stress in first-time mothers: a randomized-controlled trial.**

Osman H, Saliba M, Chaaya M, Naasan G.

**Abstract**

**BACKGROUND:** The postpartum period can be a challenging time particularly for first-time mothers. This study aimed to assess two different interventions designed to reduce stress in the postpartum among first-time mothers.

**METHODS:** Healthy first-time mothers with healthy newborns were recruited from hospitals in Beirut, Lebanon after delivery. The two interventions were a 20-minute film addressing common stressors in the postpartum period and a 24-hour telephone support hotline. Participants were randomized to one of four study arms to receive either the postpartum support film, the hotline service, both interventions, or a music CD (control). Participants were interviewed at eight to twelve weeks postpartum for assessment of levels of stress as measured by the Cohen Perceived Stress Scale (PSS-10).

**RESULTS:** Of the 632 eligible women, 552 (88%) agreed to participate in the study. Of those, 452 (82%) completed the study. Mean PSS-10 scores of mothers who received the film alone (15.76) or the film with the hotline service (15.86) were significantly lower than that of the control group (18.93) (p-value <0.01). Among mothers who received the hotline service alone mean PSS-10 score (16.98) was also significantly lower than that of the control group (p-value <0.05).

**CONCLUSIONS:** Both our postpartum support film and the 24-hour telephone hotline service reduced stress in the postpartum period in first-time mothers. These simple interventions can be easily implemented and could have an important impact on the mental wellbeing of new mothers.Trial registration: The trial was registered with clinicaltrials.gov (identifier # NCT00857051) on March 5, 2009.

PMID: 25315167 [PubMed - as supplied by publisher] Free full text

# Experimental Studies: Limitations

- Expensive
- Not suitable for the study of rare disease outcomes
- Take a long time to perform
- Complex problem of ethics
- Not feasible

# References


- Gordis, L. 2000. Epidemiology, 2nd ed., Philadelphia: W.B. Saunders.
- Last, M. et. al. 2001. Dictionary of Epidemiology, 4th ed., New York; Oxford University Press.
- Hennekens, H. H., et. al. 1987, Epidemiology in Medicine, Boston: Little, Brown.

# Thank you

# แบบทดสอบ

1 การศึกษาดังต่อไปนี้ดำเนินการวิจัยโดยใช้ study design ชนิดใด

2 การศึกษาดังกล่าววัดขนาดของปัญหาด้วยอะไร (Prevalence or Incidence)

3 การศึกษานี้ใช้อะไรเป็นการวัดขนาดของความสัมพันธ์ของปัจจัยเสี่ยงและปัญหา (Prevalence Ratio/Odds Ratio/Relative Risk)

Occup Med (Lond). 2014 Aug 22. pii: kqu117. [Epub ahead of print]

# Musculoskeletal disorders among nurses compared with two other occupational groups.

Harcombe H[1], Herbison GP[2], McBride D[2], Derrett S[3].

Author information

## Abstract

**BACKGROUND:** There is a high incidence of low back pain (LBP) among nurses. However, few longitudinal studies have investigated musculoskeletal disorders (MSDs) at other anatomical sites in nurses.

**AIMS:** To describe the cumulative incidence and persistence/recurrence of MSDs of the low back, neck, shoulder, elbow, wrist/hand and knee among New Zealand nurses, to investigate the impact of MSDs on work and functional tasks and to compare findings for nurses with those in postal workers and office workers.

**METHODS:** Participants completed a postal survey at baseline and again 1 year later. Information was collected about MSDs in the previous 1 month and 12 months and about the ability to attend work, undertake work duties and perform functional tasks.

**RESULTS:** Among nurses, the low back was the site with the highest cumulative incidence and highest prevalence of persistent/recurrent, work-disabling and functional-task-disabling pain. Work-disabling LBP was more prevalent among nurses and postal workers than office workers ($P < 0.001$). Nurses had a substantial prevalence of work-disabling shoulder pain (10%) and functional-task-disabling knee (19%) and wrist/hand pain (16%). With the exception of the elbow, each occupational group had a high prevalence of persistent/recurrent MSDs at all anatomical sites.

**CONCLUSIONS:** LBP continues to have a substantial impact among nurses. Other less commonly considered MSDs, such as shoulder, wrist/hand and knee pain, also made work or functional tasks difficult, suggesting that primary and secondary prevention efforts should consider MSDs at other anatomical sites as well as the low back.

© The Author 2014. Published by Oxford University Press on behalf of the Society of Occupational Medicine. All rights reserved. For Permissions, please email: journals.permissions@oup.com.

**KEYWORDS:** Incidence; longitudinal studies; musculoskeletal pain; nurses; occupational disease; occupational exposure; office workers; pain; postal workers.

PMID: 25149117 [PubMed - as supplied by publisher]

# แบบทดสอบ

1 การศึกษาดังต่อไปนี้ดำเนินการวิจัยโดยใช้ study design ชนิดใด

2 การศึกษาดังกล่าววัดขนาดของปัญหาด้วยอะไร (Prevalence or Incidence)

3 การศึกษานี้ใช้อะไรเป็นการวัดขนาดของความสัมพันธ์ของปัจจัยเสี่ยงและปัญหา (Prevalence Ratio/Odds Ratio/Relative Risk)

Aust N Z J Public Health. 2009 Oct;33(5):437-41. doi: 10.1111/j.1753-6405.2009.00425.x

# Prevalence and impact of musculoskeletal disorders in New Zealand nurses, postal workers and office workers.

Harcombe H[1], McBride D, Derrett S, Gray A.

Author information

## Abstract

**OBJECTIVES:** To describe the prevalence, characteristics and impact of musculoskeletal disorders (MSDs) in New Zealand nurses, postal workers and office workers.

**METHODS:** A postal survey asked participants about MSDs, (low back, neck, shoulder, elbow, wrist/hand or knee pain lasting longer than one day), and demographic, physical and psychosocial factors. Nurses were randomly selected from the Nursing Council database, postal workers from their employer's database and office workers from the 2005 electoral roll.

**RESULTS:** The response rate of potentially eligible participants was 58% (n=443). Participants were aged 20-59 years; 86% were female. Over the 12 months prior to the survey 88% of respondents had at least one MSD lasting longer than a day and 72% reported an MSD present for at least seven days. Of the 1,003 MSDs reported, 18% required time off work and 24% required modified work duties. In the month prior to the survey 17% of MSDs made functional tasks difficult or impossible. Low back, neck and shoulder pain prevalence did not differ by occupation. Postal workers had the highest prevalence of elbow and wrist/hand pain; nurses of knee pain.

**CONCLUSIONS:** The high prevalence of MSDs among these workers indicates that they are indeed in 'at risk' occupations. In each occupational group MSDs encompass a range of anatomical sites, however the overall pattern of MSDs differs by occupation. MSDs have a significant impact on activities at work and home.

**IMPLICATIONS:** Primary and secondary prevention strategies should encompass a range of anatomical sites and specifically target different occupational groups.

PMID: 19811479 [PubMed - indexed for MEDLINE]