TYPES OF RESEARCH

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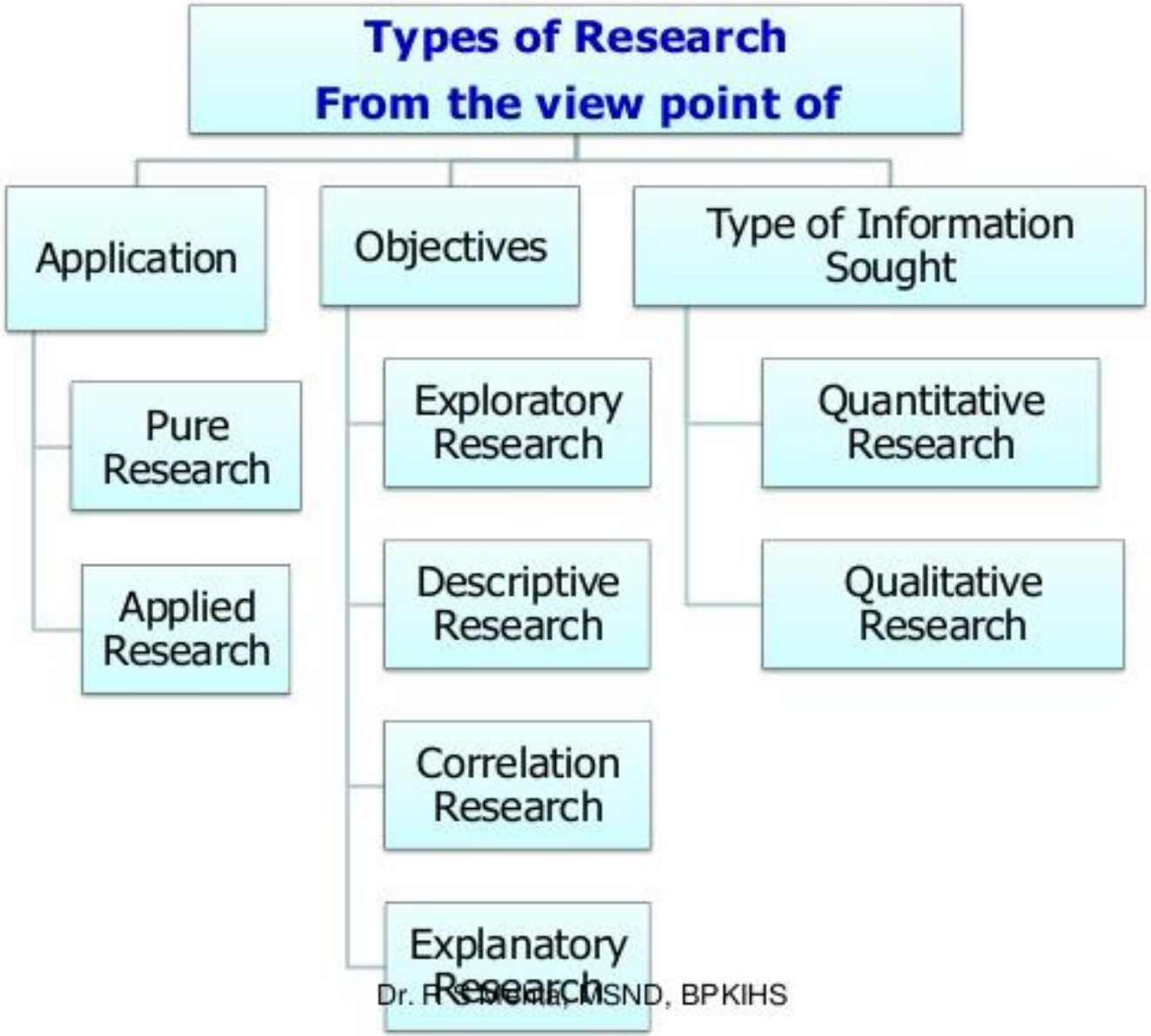
OBJECTIVES

- Classification of research
- Discuss Research Design

TYPES OF RESEARCH

- Research can be broadly classified into three basic categories;

1. Application research,
2. objective based research
3. Inquiry mode research


Types of Research
From the view point of
Application
Objectives
Type of Information Sought
Pure Research
Applied Research
Exploratory Research
Descriptive Research
Correlation Research
Explanatory Research
Quantitative Research
Qualitative Research

1.APPLICATION RESEARCH

- These may be grouped into 2 main categories;
  1. **fundamental (pure) Research**
     - Its research for its own sake with no immediate or future application.
     - This research develops theories and formulates generalization. For example, most research in mathematics also keeps describing behavioral patterns that can be viewed as basic or pure research. The results of basic research are the fodder that add to knowledge and are the basis of applied research.
  2. **applied research.**
     - It is aimed at providing solutions to specific problems in health or business.
     - Applied research provides solutions that lead to policy formulation, better understanding and management of a phenomena or problem.
     - Applied research is research targeted to solve specific problems

2.OBJECTIVE BASED RESEARCH

- Research can also be classified based on the objectives such as
  a) Descriptive,
  b) Correlational,
  c) Explanatory or
  d) Exploratory.

a) Descriptive studies

- They portray the characteristics of the problem, phenomena, event, individual or population.
- These include surveys and fact finding missions where the researcher has little control on the variables but reports what is actually happening at the site at that time.

b) Correlational studies

- They attempt to determine the interdependence between a phenomena or problem to another.
- Correlational studies are a type of research often used in psychology as a preliminary way to gather information about a topic or in situations where performing an experiment is not possible.
- The correlational method involves looking at relationships between two or more variables.

c) Explanatory studies:

- They attempt to determine how and why a problem or relationship between phenomena exists
- Explanatory Research is conducted for a problem that was not well researched before, demands priorities, generates operational definitions and provides a better-researched model.
- Explanatory research is actually a type of research design that focuses on explaining the aspects of your study

d) Exploratory studies

- Exploratory research is "the preliminary research to clarify the exact nature of the problem to be solved." It is used to ensure additional research is taken into consideration during an experiment as well as determining research priorities, collecting data and honing in on certain subjects which may be difficult to take note of without exploratory research
- It intends to gain understanding, familiarity or insight on an unknown phenomena or problem. It includes feasibility and pilot studies.

3. INQUIRY MODE

- Research can also be classified according to the methods used in gathering data.
- These include
  a) structured methods
  b) unstructured methods

a) structured approach (Quantitative Research)

- This research process is predetermined. Therefore objectives, design, methods and tools are preset and administered; hence it is inflexible.
- These researches generally determine and measure the extent and variation in the problem.
- For example, how many people presented with severe vomiting?

b)Unstructured approach (qualitative research):

- It observes the phenomena or problem without preset or predetermined criteria.
- It is more flexible but can only measure the nature of the phenomena or problem without quantifying it.
- For example, describe the peoples' opinion concerning severe vomiting outbreak.

RESEARCH DESIGN

Definition

Elements of Research Design

Classification of Research Design

Research Design

- A research design is a step-by-step approach used by a researcher to conduct a scientific study.
- It includes various methods and techniques to conduct research so that a research problem can be handled efficiently
- A researcher has a series of questions that he needs to find answers by conducting research.

Research Design

- Research method provides a logical sequence to conduct experiments so that all questions can be assessed in proper order.

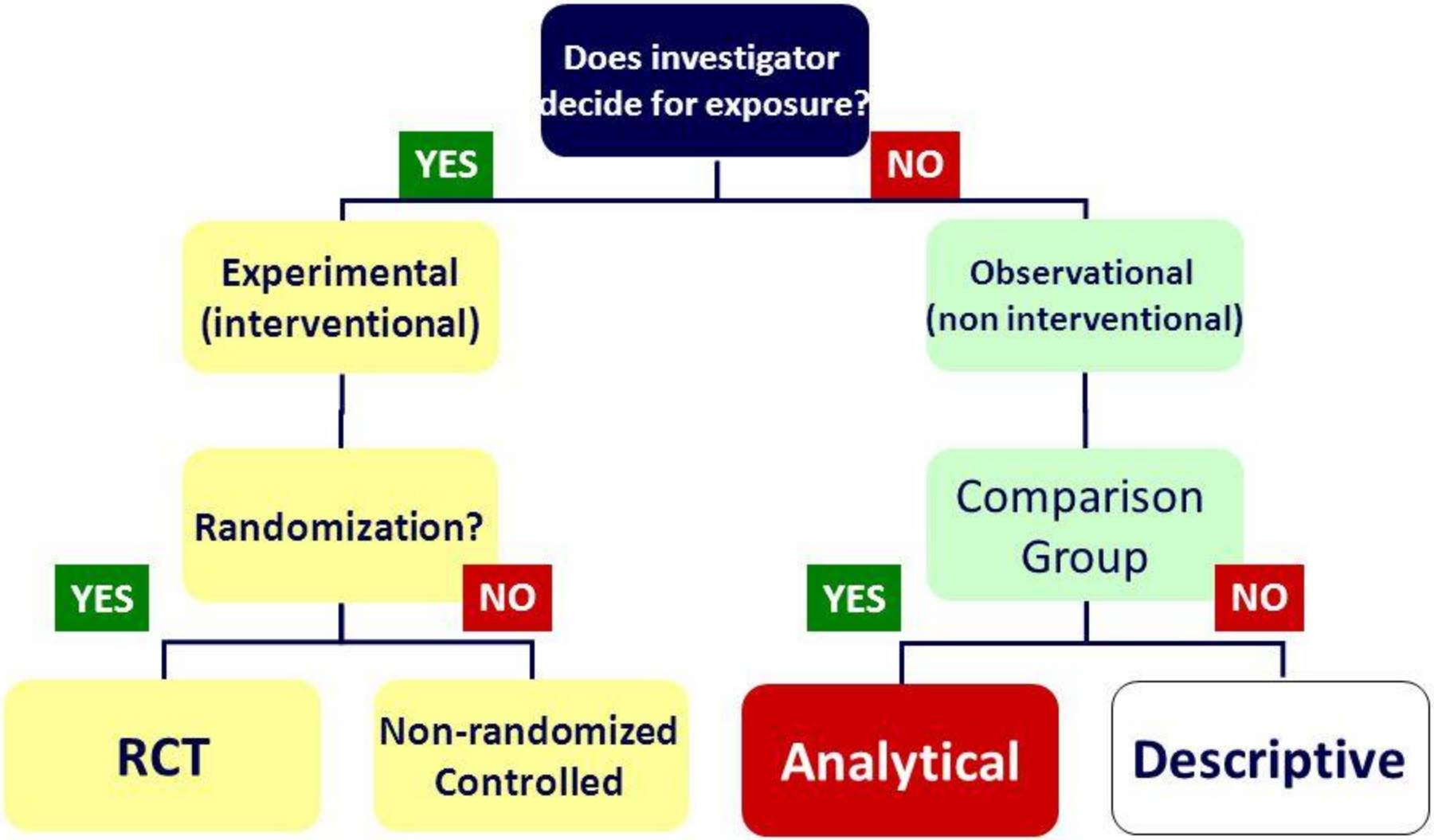
- An impactful research design makes sure the least bias in the data collected and increases trust in analyzed research information.

- A research design which leaves the least margin of errors can be considered the best research design

Important elements of Research Design

1. Selection of precise purpose statement of research design.
2. Various techniques to be executed to collect details for research.
3. Methods opted for the analysis of collected data.
4. Types of research methodology opted.
5. Possible objections for research.
6. Settings required for research.
7. Timeline for the research study.
8. Techniques and methods to measure analysis.

Study Designs



4 Key characteristics of Research Design

a) **Neutrality**

b) **Reliability**

c) **Validity**

d) **Generalization**

Neutrality

- The results collected in research should be free from bias and neutral.

- Discuss and get evaluated your conclusion with experienced multiple individuals and consider those who agree with your research's results.

Reliability

- Research design should be able to ensure the standards results by indicating how research questions can be formed because a researcher will always want the same results every time, he performs an experiment.

Validity

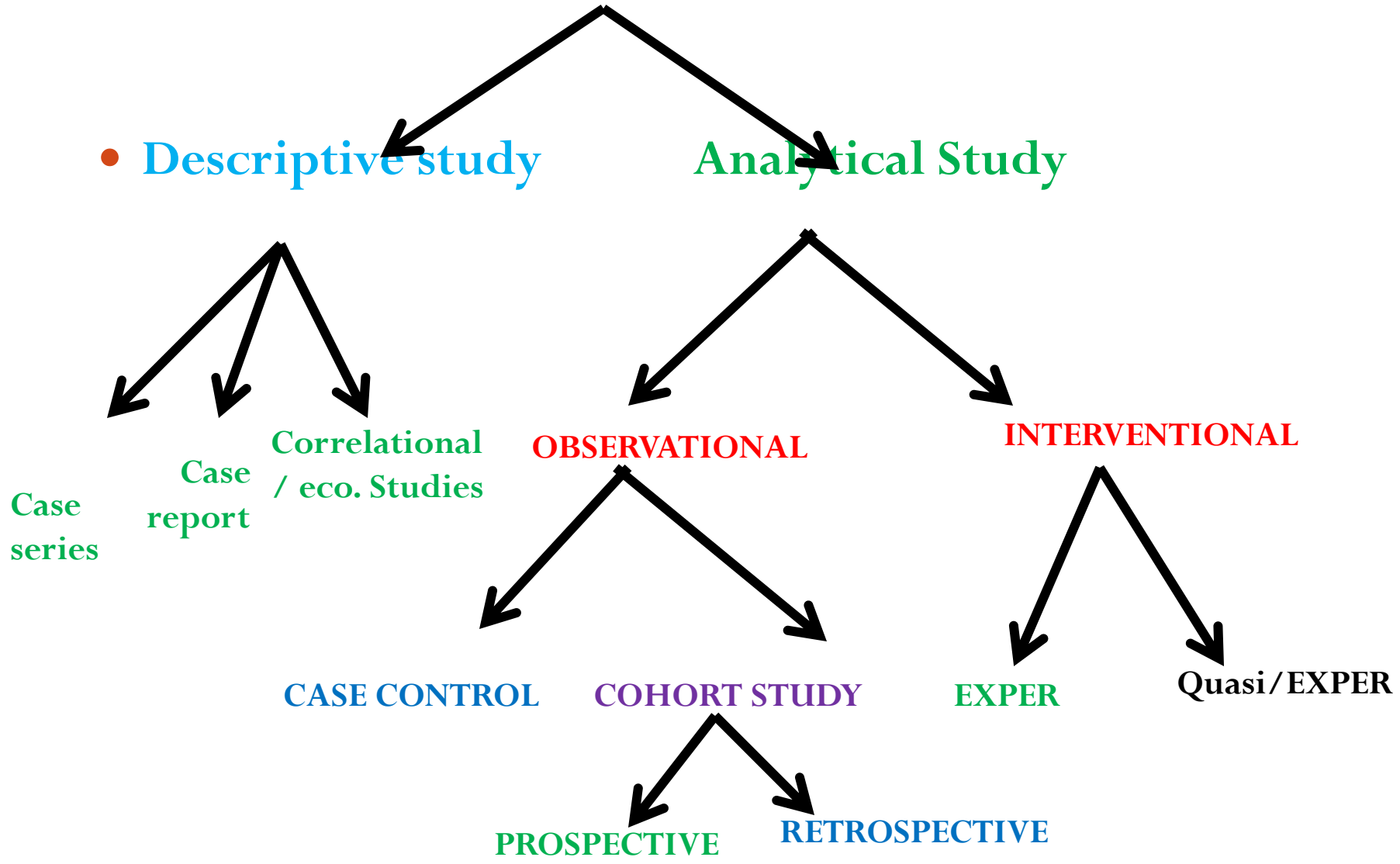
- The validity of a research design is used to calculate the expected results and to estimate the truthfulness of the result.
- In most cases, researchers opt for their own definition when it comes to what is considered valid.
- Therefore, the questionnaire prepared from the research design is considered valid

Generalization

- Generalization is one of the most important key characteristics of research design.

- The results obtained from the research should be applicable to a population and not just to a limited sample.

Types of Research design



1.Descriptive studies

- Descriptive studies are concerned with describing disease distribution in terms of TIME, PERSONS and PLACE

- Used by epidemiologists to answer the questions- How, Where, Who, When?

- Information obtained from descriptive studies is useful in public health administration especially for efficient resource allocation

- Descriptive studies are useful for hypothesis generation
- There three main types of descriptive studies:

a) Correlational studies:

b) Case reports

c) Case Series

Correlational studies

- Also called ECOLOGICAL STUDIES. These studies are conducted on entire populations or communities, the measures obtained are then correlated with measures from other populations.

- They describe disease in different populations in relation to characteristics of interest such as age, gender, season, utilization of health service etc.

Advantages of correlational studies

- **Is used as the first step to investigate a possible exposure-disease relationship because they can be done fairly quickly**

- **They are inexpensive to conduct- often use available data.**

Limitations of correlational studies

- **The chief limitation is the inability of such studies to link exposure with disease in particular individuals (ecological fallacy).**

- **Inability to control for the effects of potential confounding factors**

- **Because correlational data represent average exposure levels in the population rather than individual values, it may be difficult to detect nonlinear relationships.**

Case reports and case series

- While correlational studies consider whole populations, case reports and case series describe the experiences of a single patient or a group of patients with a similar diagnosis.

- These studies typically document an unusual medical occurrence and can represent the first clues in the identification of new disease or exposures.

- Case series are a collection of individual case reports which may occur within a short period of time
- They can be used to formulate hypotheses
- They are not capable of proving an association
- They depend on an individual curiosity

Cross-sectional (surveys/prevalence) studies

- In these designs, the exposure and disease status are examined at the same time among individuals in a specified population.
- They give an overview of the health situation of a community at a given point time or a period of time.
- Such data so obtained is of great value to health planners and administration.

Advantages of C/S studies

- Can be done fairly quickly
- Relatively inexpensive
- Uses available data
- Useful in generating hypotheses
- They are easy to perform

Disadvantages of C/S studies

- Temporal sequence of disease can not be ascertained since exposure and disease are assessed at the same time.
- Only chronic diseases may be found
- Cannot be used to confirm or explain etiology of dise

2. Analytical studies

- These studies are concerned with analysing or explaining the etiology phenomenon.These studies answer the question why?
- Two main types exist:

a) Observational

b) Interventional

There are two types of observational studies:

i. Case-control

ii. Cohort

Case control studies

- The design involves selecting cases who have a disease of interest and comparing them with those without the disease (controls) by measuring the exposure levels.
- The design is well suited for studying rare diseases
- CC studies allow evaluation of multiple potential exposures in relation to a single disease.

Advantages of case-control designs

- **Cheap, easy and quick studies**
- **Multiple exposures can be examined**
- **Rare diseases and diseases with long latency can be studied**
- **Suitable when randomization is unethical**

Disadvantages of A CC study

- Case and control selection is challenging
- Subject to bias (selection, recall, misclassification)
- Temporal relationship is not clear
- Multiple outcomes cannot be studied
- If the incidence of exposure is high, it is difficult to show the difference between cases and controls

Cohort (prospective) studies

- **Cohort studies are forward (prospective) studies in which the incidence of disease among groups is defined by exposure status**

- **Two groups are identified, one exposed and the other unexposed.**

- **These are followed up for a specified period of time after which the outcome (disease) is measured and compared among the two groups.**

Cohort studies (Retrospective)

- These studies are regarded as convenient cohort studies.
- It is done when exposure has already occurred and investigators configure an exposure and group.
- They then determine a starting point (retrospectively) in their lives and begin following from then regarding exposure status

- **The DISTINGUISHING FEATURE of a retrospective cohort study is that the investigators conceive the study and begin identifying and enrolling subjects after outcomes have already occurred.**

- **Retrospective cohort studies like this are very efficient for studying rare or unusual exposures, but have many potential problems.**

END