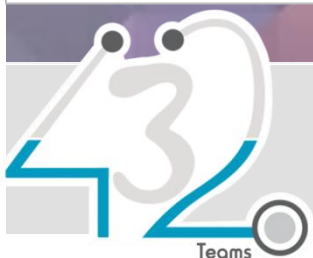## 3 Epidemiological Triads

Objectives

By the end of this lecture students will be able to:

1. Explain epidemiologic triads as a model of study of disease causation.
2. Describe importance of studying epidemiologic triads and its implications for public health.

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Purpose of studying causal models

- Studying how **different factors** can lead to **ill health** is important to generate knowledge to help prevent and control diseases.

- The classic epidemiological triangles or triads help understanding the relation between a disease and the agent causing the disease.

Epidemiological Triads:

Descriptive Epidemiology Triad:	Analytical Epidemiology Triad:
• person • Place • Time	• Agent • Host • Environment

1.Descriptive Epidemiology:

Descriptive epidemiology is a necessary antecedent of analytic epidemiology

To undertake an analytic epidemiologic study you must first:

- Know where to look
- Know what to control for
- Be able to formulate hypotheses compatible with laboratory evidence.

Person	Place	Time
• Age • Gender • Marital status • Ethnicity/Race • Behavior / life-style factors • Socio-economic status • -Education • -Occupation • -Income	• Geographically restricted or widespread (pandemic)? • Relation to water or food supply (clusters: multiple / one) • Residence (rural, urban, sub-urban) • Weather (temperature, humidity) • Natural / political	• Changing or stable? • Seasonal variation. • Clustered (epidemic) or evenly distributed (endemic)? • Point source or propagated.

Natural/political: eg: the disease is limited to a certain country.

Point source: eg: At this specific point they all ate from the same source(food-borne ,outbreaks)

Time Trends

- Point source e.g. food-borne outbreaks), in terms of hours / days
- Seasonal - cyclicity (e.g. common cold, influenza), in terms of months
- Propogative (e.g. water borne epidemics), in terms of weeks / months
- Secular (e.g. morbidity / mortality of non-communicable diseases), in terms of years *eg:Cancer
- Cluster in time / place

2. Analytical Epidemiologic Triad

- This model comprises a susceptible host (the person at risk for the disease), a disease agent (the proximate cause), and an environmental context for the interaction between host and agent.

Thus, development of disease is a combination of events:
- A harmful agent
- A susceptible host
- An appropriate environment

A. Agents

-Biological (micro-organisms)

- Physical (temperature, radiation, trauma, others)

-Chemical (acids, alkalis, poisons, tobacco, medications / drugs, others)

-Environmental (nutrients in diet, allergens, others)

-Nutritional (under- or over-nutrition)

-Psychological experiences

B. Host Factors

- Host factors are **intrinsic** factors that influence an individual's exposure, susceptibility, or response to a causative agent. These include:

- **Genetic** endowment

- **Immunologic** state

- **Personal behavior** (life-style factors): diet, tobacco use, exercise, etc

- **Personal characteristics** (described before, under "person"), including: age, gender, socio-economic status, etc.
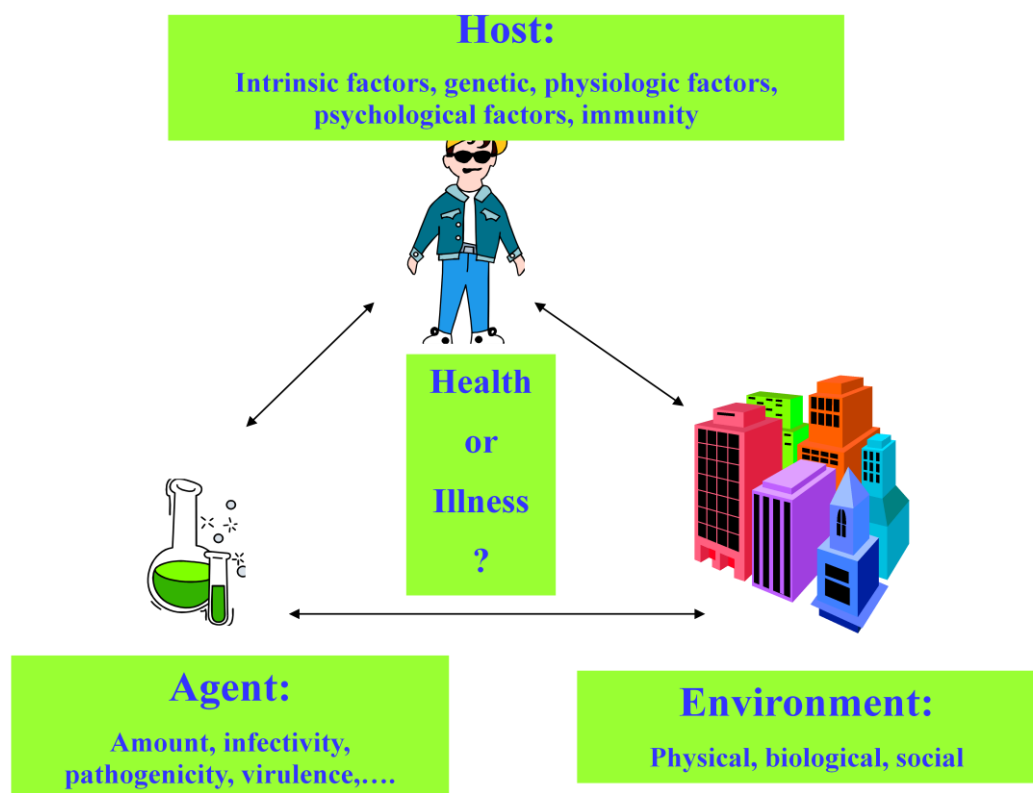
C. Environment

Environmental factors are **extrinsic** factors which affect the agent and the opportunity for exposure. These include:

- Physical factors: e.g. geology, climate (temperature, humidity, rain, etc)
- Biological factors: e.g. insects that transmit an agent
- Socioeconomic factors: e.g. crowding, sanitation, and the availability of health services

Phenomena which bring the host and agent together: vector, vehicle, reservoir, etc

Summary

- *Agent factors* include infectious microorganisms, e.g. virus, bacterium, parasite, or other agents.

  - They may be *necessary* but not always *sufficient* alone to cause disease.

- *Host factors* are intrinsic factors that influence an individual's exposure, susceptibility, or response to a causative agent

- *Environmental factors* are extrinsic factors which affect the agent and the opportunity for exposure.

Host:
Intrinsic factors, genetic, physiologic factors, psychological factors, immunity

Health
or
Illness
?

Agent:
Amount, infectivity, pathogenicity, virulence,….

Environment:
Physical, biological, social

MCQS

Q1: What are the components of the analytical Epidemiologic Triad model :

A. Frequency, distribution and determinants

B. Host, agent and environment

C. Person, place, time

D. Mortality, fertility and migration

Answer B

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Community medicine team leader :

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If you find any Mistakes please contact me:

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