UNIVERSITY COLLEGE HOSPITAL

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EPIDEMIOLOGY AND DISEASES CONTROL

300 LEVEL

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1. Define epidemiology and explain its main objectives.

Epidemiology is the study of how diseases and health-related conditions are distributed in populations and the factors that influence or determine this distribution.

Main objectives:

Identify the cause of diseases and

risk factors.

Determine the extent of disease in the population.

Study the natural history and prognosis of disease.

Evaluate preventive and therapeutic measures.

Provide a foundation for public policy and health planning.

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2. Differentiate between descriptive and analytical epidemiology, providing one example of each.

Descriptive epidemiology focuses on the who, what, when, and where of disease patterns.

Example: Studying the number of COVID-19 cases by age group and

location in 2020.

Analytical epidemiology investigates the how and why diseases occur, often testing hypotheses.

Example: A study examining whether smokers are at higher risk of lung cancer than non-smokers.

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3. Discuss the components of the epidemiologic triangle and how they interact in the spread of an infectious disease.

The epidemiologic triangle consists of:

Agent: The cause of the disease (e.g., bacteria, virus).

Host: The organism (usually a human

or animal) that harbors the disease.

Environment: External factors that affect the agent and the opportunity for disease transmission (e.g., climate, sanitation).

Interaction Example: In malaria:

The agent is the Plasmodium parasite.

The host is a human.

The environment includes standing water that supports mosquito breeding (the vector that transmits the parasite).

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4. Explain the concept of 'determinants' in epidemiology and give two examples of biological and environmental determinants.

Determinants are factors that influence the occurrence of health-related events.

Biological determinants:

Genetics (e.g., family history of breast cancer)

Immune status (e.g., immunocompromised individuals more vulnerable to infections)

Environmental determinants:

Air pollution (linked to respiratory diseases)

Contaminated water sources (linked to cholera)

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5. Describe the three levels of prevention in public health, and provide a real-life example for each.

1. Primary prevention: Prevents disease before it occurs.

Example: Vaccination against measles.

2. Secondary prevention: Detects disease early to reduce severity.

Example: Mammography for early detection of breast cancer.

3. Tertiary prevention: Reduces the impact of an ongoing illness.

Example: Rehabilitation for stroke patients.

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6. How did John Snow contribute to the development of modern epidemiology? Describe the method he used during the cholera outbreak.

John Snow is considered the father of modern epidemiology.

During the 1854 cholera outbreak in London:

He mapped cholera cases and identified a cluster around the Broad Street water pump.

He hypothesized that contaminated water, not "bad air" (miasma), was spreading cholera.

After removing the pump handle, cholera cases dropped — supporting his hypothesis.

His use of mapping and observational data was a foundational epidemiological method.

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7. Compare and contrast incidence and prevalence. Why is it important to understand both when studying a disease like diabetes?

Incidence: The number of new cases of a disease in a population over a

specific time period.

Prevalence: The total number of existing cases (new and old) at a specific point or over a period of time.

Importance in diabetes:

Incidence helps identify risk factors and evaluate prevention.

Prevalence helps assess the burden on the healthcare system and plan

resources.

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8. What are the common types of epidemiological study designs, and how does a cohort study differ from a case-control study?

Common study designs:

Cross-sectional

Case-control

Cohort

Randomized controlled trials (RCTs)

Cohort study:

Follows a group over time to see who develops the disease.

Measures incidence and relative risk.

Typically prospective.

Case-control study:

Compares people with the disease (cases) to those without (controls).

Looks backward to assess exposure.

Measures odds ratio.

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9. Define and differentiate between relative risk (RR) and odds ratio (OR), including when each is typically used.

Relative Risk (RR): The ratio of the probability of an event occurring in the exposed group versus the unexposed group.

Used in cohort studies.

Odds Ratio (OR): The odds that cases were exposed compared to the odds that controls were exposed.

Used in case-control studies.

Difference: RR gives a direct measure of risk, while OR approximates risk when disease is rare.

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10. Explain the role of epidemiological surveillance in managing public health. How can it help during an emerging epidemic?

Epidemiological surveillance is the continuous, systematic collection, analysis, and interpretation of health data.

Roles in public health:

Detecting outbreaks early

Monitoring disease trends

Informing control measures and resource allocation

Evaluating intervention effectiveness

During an emerging epidemic:

Helps identify initial cases and track spread

Supports contact tracing and containment

Guides vaccination or quarantine strategies
