



ROHINI COLLEGE OF ENGINEERING AND TECHNOLOGY

AUTONOMOUS INSTITUTION

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DEPARTMENT OF BIOMEDICAL ENGINEERING

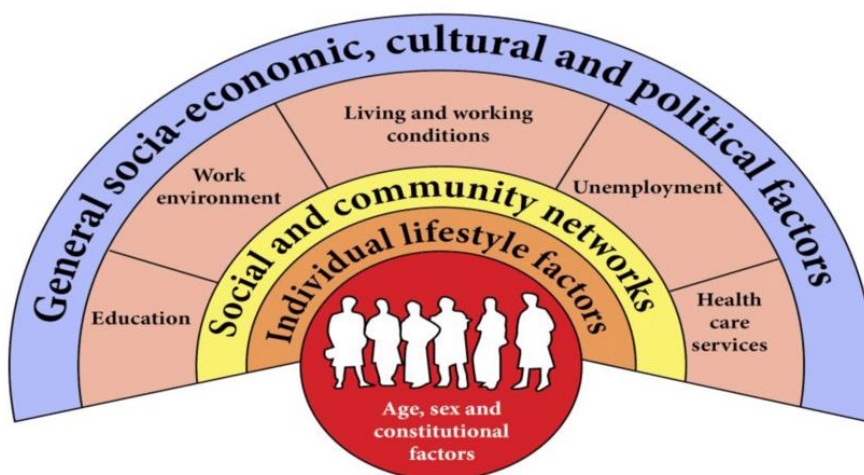
VII Semester

OBT357 BIOTECHNOLOGY IN HEALTH CARE

UNIT- I PUBLIC HEALTH

1.6 Determinants of Health

The determinants of health are the broad range of factors that influence an individual's or population's health status. These factors extend beyond medical care and biology, encompassing social, economic, environmental, and behavioral conditions. Understanding these determinants is central to public health, as they shape health outcomes and inequities at a population level. Below is a concise overview of the key determinants of health, connecting to the unique features of public health discussed previously.



Determinants of Health

1. Social and Economic Factors

- ❖ **Income and Socioeconomic Status:** Higher income and social status are linked to better health outcomes due to access to resources like nutritious food, safe housing, and healthcare.

- Example: Low-income communities may face higher rates of chronic diseases like diabetes due to limited access to healthy foods.
- ❖ **Education:** Higher education levels correlate with better health literacy and healthier behaviors.
 - Example: Educated individuals are more likely to seek preventive care like vaccinations.
- ❖ **Employment and Working Conditions:** Safe, stable jobs with fair wages promote physical and mental health.
 - Example: Hazardous work environments (e.g., exposure to toxins) increase occupational health risks.
- ❖ **Social Support Networks:** Strong community and family support improves mental health and resilience.
 - Example: Social isolation is linked to higher rates of depression and mortality.
- ❖ **Connection to Public Health:** Public health's focus on equity addresses these social determinants through policies like universal healthcare or community programs.

2. Physical Environment

- ❖ **Housing and Neighborhood:** Safe, clean housing and neighborhoods reduce health risks like asthma (from poor air quality) or injuries.
 - Example: Lead paint in older homes increases childhood lead poisoning rates.
- ❖ **Access to Clean Water and Sanitation:** Essential for preventing waterborne diseases.
 - Example: Cholera outbreaks are linked to contaminated water sources.
- ❖ **Air Quality and Climate:** Pollution and climate change (e.g., heatwaves) impact respiratory and cardiovascular health.
 - Example: Urban air pollution increases asthma rates in children.
- ❖ **Connection to Public Health:** Public health's environmental focus (e.g., One Health approach) drives interventions like air quality regulations or climate adaptation strategies.

3. Behavioral and Lifestyle Factors

- ❖ **Diet and Nutrition:** Healthy eating habits reduce risks of obesity, diabetes, and heart disease.
 - Example: High consumption of processed foods contributes to cardiovascular disease.
- ❖ **Physical Activity:** Regular exercise lowers risks of chronic diseases and improves mental health.
 - Example: Sedentary lifestyles increase obesity rates.
- ❖ **Substance Use:** Smoking, excessive alcohol, or drug use increases risks of cancer, liver disease, and addiction.
 - Example: Tobacco use is a leading cause of preventable deaths globally.
- ❖ **Connection to Public Health:** Public health campaigns (e.g., anti-smoking ads) target behavior change to prevent disease.

4. Biological and Genetic Factors

- ❖ **Genetics:** Inherited traits can predispose individuals to conditions like heart disease or certain cancers.
 - Example: BRCA gene mutations increase breast cancer risk.
- ❖ **Age and Sex:** Health risks vary by age (e.g., elderly are more prone to falls) and sex (e.g., women face pregnancy-related risks).
 - Example: Older adults have higher rates of chronic conditions like arthritis.
- ❖ **Connection to Public Health:** Precision public health uses genetic data to tailor population-level interventions, complementing medical care's individual focus.

5. Health Systems and Access to Care

- ❖ **Access to Healthcare:** Availability, affordability, and quality of healthcare services impact health outcomes.
 - Example: Lack of insurance limits access to preventive screenings, increasing late-stage cancer diagnoses.
- ❖ **Health Infrastructure:** Availability of hospitals, clinics, and trained professionals affects care delivery.

- Example: Rural areas with fewer healthcare facilities face worse health outcomes.

❖ **Connection to Public Health:** Public health advocates for universal health coverage and strengthens health systems to reduce disparities.

6. Cultural and Political Factors

❖ **Cultural Norms:** Beliefs and practices influence health behaviors (e.g., dietary habits or attitudes toward vaccination).

- Example: Cultural stigma may discourage mental health treatment in some communities.

❖ **Policy and Governance:** Laws and policies (e.g., tobacco bans, healthcare funding) shape health environments.

- Example: Sugar taxes reduce consumption of sugary drinks, lowering obesity rates.

❖ **Connection to Public Health:** Public health's policy orientation drives systemic change through advocacy and legislation.

How Determinants Interact

The determinants are interconnected, creating complex health outcomes:

- **Example:** A low-income individual (social factor) living in a polluted urban area (environmental factor) with limited healthcare access (health system factor) may adopt unhealthy coping behaviors like smoking (behavioral factor), increasing their risk of lung disease.
- Public health addresses these interactions holistically, unlike medical care's focus on treating resulting conditions.

Relevance to Public Health's Unique Features

- **Population Focus:** Public health uses determinants to design interventions for entire communities (e.g., improving school lunches to address childhood obesity).
- **Prevention:** Targets root causes like poor housing or unhealthy behaviors to prevent disease.

- **Equity:** Addresses disparities in determinants (e.g., ensuring clean water in underserved areas).
- **Interdisciplinary Approach:** Collaborates across sectors (e.g., urban planning for walkable cities to promote physical activity).
- **Data-Driven:** Uses epidemiological data to identify determinant-driven health trends (e.g., linking air pollution to asthma rates).

Modern Context (2025)

- **Emerging Determinants:** Climate change (e.g., heat-related illnesses), digital access (e.g., telemedicine availability), and misinformation (e.g., vaccine hesitancy on platforms like X) are increasingly significant.
- **Public Health Response:** Leverages technology (e.g., AI for health disparity analysis) and global cooperation (e.g., WHO's climate health initiatives) to address these evolving determinants.

Summary

The determinants of health—social, economic, environmental, behavioral, biological, and systemic—shape health outcomes at individual and population levels. Public health's unique ability to address these determinants through prevention, equity-focused policies, and interdisciplinary collaboration distinguishes it from medical care's individual treatment focus. By targeting root causes, public health reduces disease burden and promotes well-being across populations.
