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DEPARTMENT OF BIOMEDICAL ENGINEERING
VII Semester
OBT357 BIOTECHNOLOGY IN HEALTH CARE
UNIT- I PUBLIC HEALTH

1.7 Indicators of health

❒ Health indicators are measurable markers used to assess the health status, outcomes, and determinants of health for individuals or populations.

❒ They are critical tools in public health for monitoring trends, evaluating interventions, and guiding policy decisions.

❒ These indicators align with public health's unique features, such as its population-based, prevention-focused, and equity-driven approach, as well as its emphasis on social and environmental determinants.

❒ They serve as crucial tools in public health to:

❖ **Measure health status:** Provide a snapshot of the current health of a population.

❖ **Identify health needs:** Highlight areas where interventions are required.

❖ **Compare communities:** Allow for comparisons of health across different geographic areas, demographic groups, or over time.

❖ **Plan health resources:** Inform resource allocation and strategic planning for health services.

❖ **Evaluate interventions:** Assess the effectiveness and impact of public health programs and policies.

❖ **Highlight disparities:** Reveal inequalities in health outcomes among different population subgroups.

Types of Health Indicators:

Category	Description	Examples
1. Mortality Indicators	Measure death rates to assess disease impact and public health standards.	Crude Death Rate, Infant Mortality Rate, MMR, U5MR
2. Morbidity Indicators	Show the extent of illness or disease in a population.	Incidence Rate, Prevalence Rate, DALYs
3. Nutritional Indicators	Reflect the nutritional status of a population.	Stunting, Wasting, BMI, Anemia prevalence
4. Health Service Indicators	Assess the availability, accessibility, and use of health services.	Immunization coverage, doctor-population ratio
5. Socioeconomic Indicators	Measure social and economic conditions affecting health.	Literacy rate, per capita income, housing quality
6. Environmental Indicators	Indicate the state of environmental conditions influencing health.	Air/water quality index, sanitation coverage
7. Reproductive Health Indicators	Monitor maternal and child health.	Antenatal care coverage, skilled birth attendance
8. Composite Indicators	Combine multiple health aspects into a single index.	Human Development Index (HDI), Quality of Life Index

Important health indicators, grouped by category, based on established health frameworks:

1. Physical Health Indicators

❖ **Body Mass Index (BMI)**: Measures body fat based on height and weight (normal range: 18.5–24.9 kg/m²). Deviations may indicate underweight, overweight, or obesity.

❖ **Blood Pressure**: Normal range is around 120/80 mmHg. High (≥130/80 mmHg) or low blood pressure can signal cardiovascular risks.

❖ **Heart Rate**: Resting heart rate typically ranges from 60–100 beats per minute. Abnormal rates may indicate cardiovascular or other issues.

❖ **Cholesterol Levels**: Total cholesterol should be <200 mg/dL, with balanced HDL (>40 mg/dL men, >50 mg/dL women) and LDL (<100 mg/dL) levels.

❖ **Blood Glucose Levels**: Fasting glucose of 70–99 mg/dL is normal. Higher levels may indicate prediabetes or diabetes.

❖ **Physical Fitness**: Metrics like aerobic capacity (VO2 max), muscle strength, or flexibility reflect physical health.

❖ **Disease Prevalence**: Absence or presence of chronic conditions (e.g., diabetes, cancer, heart disease) or infectious diseases.

❖ **Life Expectancy**: Average years a person is expected to live, influenced by genetics, lifestyle, and healthcare access.

❖ **Mortality Rates**: Age-specific or cause-specific death rates (e.g., infant mortality, cardiovascular mortality).

2. Mental Health Indicators

❖ **Mood and Emotional Stability**: Frequency of anxiety, depression, or mood swings, often assessed via validated scales (e.g., PHQ-9 for depression).

❖ **Cognitive Function**: Memory, attention, and problem-solving abilities, measured through tests like the Mini-Mental State Examination (MMSE).

❖ **Stress Levels**: Cortisol levels or self-reported stress via tools like the Perceived Stress Scale (PSS).

❖ **Sleep Quality**: Duration (7–9 hours for adults) and quality of sleep, as poor sleep is linked to mental and physical health issues.

❖ **Suicide Rates**: A population-level indicator of mental health crises.

3. Social and Behavioral Health Indicators

❖ **Social Connectivity**: Strength of social networks, relationships, or community engagement, which impacts mental and physical health.

❖ **Substance Use**: Levels of tobacco, alcohol, or drug consumption. For example, excessive alcohol (>14 drinks/week for men, >7 for women) is a risk factor.

❖ **Physical Activity**: Adults should aim for ≥150 minutes of moderate aerobic activity weekly, per WHO guidelines.

❖ **Nutrition**: Diet quality, including intake of fruits, vegetables, whole grains, and avoidance of processed foods or excessive sugar/sodium.

❖ **Healthcare Access**: Frequency of medical check-ups, vaccinations, or screenings (e.g., mammograms, colonoscopies).

4. Population-Level Health Indicators

❖ **Infant Mortality Rate**: Deaths per 1,000 live births, reflecting healthcare quality and maternal health.

❖ **Maternal Health**: Rates of maternal mortality or complications during pregnancy.

❖ **Disease Incidence/Prevalence**: New cases or total cases of specific diseases (e.g., HIV, tuberculosis) in a population.

❖ **Health Equity**: Disparities in health outcomes across socioeconomic, racial, or geographic groups.

❖ **Environmental Factors**: Access to clean water, air quality, or exposure to pollutants, which impact community health.

5. Functional Health Indicators

❖ **Activities of Daily Living (ADL)**: Ability to perform tasks like bathing, dressing, or eating independently.

❖ **Mobility**: Ease of movement, assessed through gait speed or balance tests.

❖ **Pain Levels**: Chronic or acute pain, measured via self-reports or pain scales.

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