Immunity & Vaccination

Overview

The human immune system protects the body against infections and diseases by distinguishing self from pathogens. Immunity can be built naturally through exposure or artificially through vaccines. World Health Organization (WHO) describes vaccination as "a simple, safe and effective way of protecting you against harmful diseases" by prompting your immune system to build resistance before exposure.

Vaccination programs have produced major global health gains—for example, near-eradication of smallpox, large reductions in measles, polio, and diphtheria. Immunisation plays a key role in achieving the Sustainable Development Goals relating to health.

[Source: WHO Vaccines & Immunization Topics]

Causes / Risk Factors for Poor Immunity & Under-Vaccination

Factors that reduce immunity or hinder effective vaccination include:

- Immunodeficiency from illnesses (e.g., HIV, cancer), medications, or ageing
- Malnutrition, micronutrient deficiencies, and chronic disease
- Gaps in immunisation coverage due to poor access, logistic issues, vaccine hesitancy, or conflict zones
- Low herd-immunity in communities leads to higher risk of outbreaks (Herd immunity refers to a sufficient portion of a population being immune, reducing spread)

Recognising these risk factors helps public health programmes focus on vulnerable groups (infants, older adults, immunocompromised).

Symptoms / Warning Signs

Since immunity is a system rather than a single disease, there are no specific early symptoms of "low immunity" that are universal. However, warning signs may include:

- Frequent or recurrent infections (respiratory, gastrointestinal) beyond usual
- Poor response to vaccines (measured by antibody levels in clinical settings)
- In outbreaks of vaccine-preventable disease (e.g., measles, whooping cough), unvaccinated or under-vaccinated populations experience higher rates of illness

Additionally, symptoms of vaccine-preventable diseases (fever, rash, cough, paralysis) are the consequences of insufficient immunity or unvaccinated status.

Prevention / Lifestyle

Improving immunity and vaccination coverage includes:

- Ensuring timely routine immunisations as per national schedules (infants, children, adolescents, adults). WHO emphasises full coverage of recommended vaccines
- Adopting a healthy lifestyle to support immune function: balanced diet, adequate sleep, physical activity, avoiding smoking, controlling chronic disease
- Community-level strategies such as vaccine-campaigns, outreach in remote areas, education about vaccine safety & benefits. Public health emphasis is on both supply (availability) and demand (community trust)

Screening / Diagnosis

Although there is no routine "screening test for immunity" for the general public, relevant practices include:

- Checking immunisation records to ensure vaccines are up to date
- In certain clinical settings (e.g., before travel, immunocompromised patients), serologic antibody testing may be used to confirm immunity (e.g., for hepatitis B, measles)
- Outbreak surveillance and monitoring of vaccine-preventable diseases serve as population-level "screening" of coverage gaps

Management / Public Health Perspective

From a public health viewpoint:

- The WHO's Global Vaccine Action Plan (GVAP) and Immunisation Agenda 2030 set targets for vaccine coverage, equity, and innovation
- Community outbreaks are managed by reinforcing vaccination campaigns, contact tracing, and targeted immunisation
- Research continues into new vaccines (e.g., for malaria, HIV), improved adjuvants, and combination vaccines
- Addressing vaccine hesitancy, supply chain issues, cold-chain logistics especially in low- and middle-income countries remains a core part of global strategies

Successful immunisation programmes reduce disease burden, healthcare costs, and help build resilient health systems.

Summary Points

- Vaccination builds targeted immunity and protects individuals and communities
- Healthy lifestyle supports immune function, though vaccines are the key tool for many diseases
- Public health programmes must address both access and trust to achieve high coverage
- Monitoring and innovation are ongoing in vaccine science and delivery