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Commentary

Levels and Factors Affecting Biological Hazards

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DESCRIPTION

Natural risks include severe and harsh weather, as well as climatic events. Despite the fact that disasters can strike everywhere on the earth, some places are more vulnerable to specific hazards than others. Natural hazards become disasters when they destroy people's lives and livelihoods. Geological hazards, hydrological hazards, meteorological hazards, and biological hazards are the four broad categories of natural hazards. Earthquakes, landslides, debris flow flooding, problem soils, rock and volcanic hazards, snow avalanches, and sand blasting are all examples of geologic hazards. Flooding and related phenomena such as landslides and river scour are examples of hydrologic risks. Extreme temperatures, heat waves, cold spells, hurricanes, tornadoes, droughts, and severe storms are all examples of meteorological risks [1].

A number of pollutants, including bacterial and viral diseases, can pose a biological threat. Mycotoxins, which are chemical pollutants produced by these organisms, are used to classify fungal contamination. Biological hazards that are frequently evaluated under the Animal Food Contaminants programme include *Salmonella*, *Listeria monocytogenes*, and pathogenic *Escherichia coli* bacteria. Hepatitis A virus, Norwalk virus, and Rotavirus are among the most dangerous biological viruses. When animals eat contaminated food, these microorganisms may pose a threat to their health [2].

Biological hazard symbol design

A red or white-coloured background is employed behind a black biohazard image once integrated with a DANGER sign, label or paragraph.

An orange or white-coloured background is employed behind a black biohazard image once integrated with a WARNING sign, label or paragraph.

A yellow or white-coloured background is employed behind a black biohazard image once integrated with a CAUTION sign, label or paragraph.

An inexperienced or white-coloured background is employed behind a black biohazard image once integrated with a NOTICE sign, label or paragraph [3].

Levels of biohazard

The Centers for Disease Control and Prevention (CDC) classify diseases into four degrees of biohazard, with Level 1 being the lowest danger and Level 4 being the most. BSL (Biosafety Level) 1-4, or P1 through P4 for short is a classification system for laboratories and other facilities (Pathogen or Protection Level)[4].

Biohazard level 1: *Bacillus subtilis*, *Canine hepatitis*, *Escherichia coli*, and varicella (chickenpox), as well as various cell cultures and non-infectious bacteria, are all considered biohazards at Level 1.

Biohazard level 2: Bacteria and viruses that cause only mild disease in humans or are difficult to contract *via* aerosol in a lab setting, such as hepatitis A, B, and C, some influenza A strains, Human respiratory syncytial virus, Lyme disease, salmonella, mumps, measles, scrapie, dengue fever, and HIV. Biosafety Level 2 standards and procedures can be used to safely do routine diagnostic work with clinical specimens.

Biohazard level 3: Anthrax, West Nile virus, Venezuelan equine encephalitis, SARS coronavirus, MERS coronavirus, SARS-CoV-2, Influenza A H5N1, hantaviruses, tuberculosis, typhus, Rift Valley fever, Rocky Mountain spotted fever, yellow fever, and malaria are examples of bacteria and viruses that can cause severe to fatal disease in humans but for which vaccines or other treatments are available [5].

Biohazard level 4: Viruses that cause severe to fatal disease in humans and for which there are no vaccinations or other therapies, such as Bolivian hemorrhagic fever, Marburg virus, Ebola virus, Lassa fever virus, Crimean-Congo hemorrhagic fever, and other hemorrhagic diseases, as well as the Nipah virus.

Factors affecting biohazard

- Modes of transmission
- Contact (direct/indirect, zoonotic)
- Vector-borne, airborne

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- Infectious dose (infective dose)
- Number of microorganism
- Viability and virulence of agent
- Viability - Ability to replicate
- Virulence Ability to cause disease
- Host susceptibility
- Skin disorders, immune system, vaccination
- Allergy, infection of fetus, work practices

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