



## ***REVIEW ARTICLE***

### **An Update on Emerging Infectious Diseases– A Global Public Health Threat**

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#### **Introduction**

Over the last decades there has been a rise of diseases caused by newly identified and previously unknown infectious agents, leading to global public health threat. In 1992 the Institute of Medicine (IOM), USA, published a report on emerging and re-emerging infections and the problem was finally given its due attention.<sup>1</sup>

#### **Factors associated with emergence of infectious diseases**

IOM in its report in 1992 identified various factors that contributed to the emergence of newer infections. To this list several others were added in 2003. All these factors may be grouped under four broad domains and are ultimately related to the three components of the epidemiological triad, which converge to result in emergence of diseases. The domains are:<sup>1,2</sup>

1. Genetic and biological factors;
2. Physical environmental factors;
3. Ecological factors; and
4. Social, political, and economic factors.

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**Table 1: Factors responsible for emergence of infectious diseases**

<b>Agent</b>	<b>Host</b>	<b>Environment</b>
-Genetic/microbial adaptation/ change -Polymicrobial diseases	-Human susceptibility to infection -International travel and commerce -Human demographics and behaviour -Intent to harm (bioterrorism) -Occupational exposures -Inappropriate use of antibiotics	-Climate and weather -Changing ecosystems -Economic development and land use -Technology and industry -Poverty and social inequality - Lack/breakdown of public health services - Animal population - War and famine - Lack of political will

### Major emerging infectious diseases in the world

Of the EIDs identified about 60% were caused by zoonotic pathogens, and 23% were vector borne diseases. According to Jones the predicted emerging disease hotspots due to zoonotic diseases and vector borne pathogens are more concentrated in lower latitude developing countries.<sup>3</sup>

**Table 2: Major etiologic agents causing infectious diseases newly identified in the last four decades 199 2011**

<b>Year</b>	<b>Agent</b>	<b>Disease</b>
1973	Rotavirus	Major cause of infantile diarrhoea worldwide
1975	Parvovirus B19	Fifth disease; Aplastic crisis in chronic haemolytic anaemia
1976	Cryptosporidium parvum	Acute enterocolitis
1977	Ebola virus	Ebola hemorrhagic fever
1977	Legionella pneumophila	Legionnaires' disease
1977	Hantaan virus	Hemorrhagic fever with renal syndrome
1977	Campylobacter species	Enteric pathogens distributed globally
1980	Human T-cell lymphotropic virus-I (HTLV-I)	T-cell lymphoma—leukaemia
1981	Staphylococcus toxin	Toxic Shock Syndrome associated with tampon use
1982	Escherichia coli O157:H7	Hemorrhagic colitis; hemolytic uremic syndrome
1982	Human T-cell lymphotropic virus-II	Hairy cell leukaemia

	(HTLV-II)	
1982	Borreliaburgdorferi	Lyme disease
1983	Human immunodeficiency virus	Acquired immunodeficiency syndrome
1983	Helicobacter pylori	Gastric ulcers
1985	Enterocytozoonbieneusi	Microsporidiosis diarrhea
1986	Cyclosporacayatanensis	Diarrhoea
1988	Hepatitis E	Hepatitis
1988	Human herpesvirus-6 (HPV-6)	Roseolasubitum
1989	Ehrlichia chaffeensis	Human ehrlichiosis
1989	Hepatitis C	Parenterally transmitted non-A, non-B hepatitis
1991	Guanarito virus	Venezuelan hemorrhagic fever
1991	Encephalitozoonhellem	.....
1991	New species of Babesia	Babesiosis haemolytic disease
1992	Vibrio cholerae O139	New strain associated with epidemic cholera
1992	Bartonella Rochalimaeahenselae	Cat-scratch disease; bacillary angiomatosis
1993	Hantavirus isolates	Hantavirus cardiopulmonary syndrome (HCPS)
1993	Encephalitozooncunculi	.....
1994	Sabiá virus	Brazilian hemorrhagic feve
1994	Yersinia Pestis	Plague
1995	Ebola virus	Ebola haemorrhagic fever
1995	Human herpes virus-8 (HHV-8)	Kaposi's sarcoma
1996	New variant Australian bat lyssavirus	Crutzfield Jacob disease
1997	H5N1 Influenza virus	Avian Influenza
1997	Methicillin-Resistant Staphylococcus Aureus (MRSA)	Skin infections
1998	Nipah virus	Viral encephalitis
1999	West Nile virus	Encephalitis
2000	Rift valley fever virus	Rift valley fever
2001	Bacillus anthraxis	Anthrax
2002	Vancomycin-Resistant Staphylococcus Aureus (VRSA)	Skin infections
2003	Corona virus	Severe Acute Respiratory Syndrome
2004	Influenza A H5N1	Avian Influenza
2006	XDR-TB	Tuberculosis
2009	Influenza A H1N1	Pandemic A (H1N1) 2009 Influenza
2010	Gram-negative Enterobacteriaceae with resistance to carbapenem	Multi drug resistant bacterial infection

	conferred by New Delhi metallo-beta-lactamase 1 (NDM-1)	
2011	ArtemisininResistant Malaria	Malaria
2012	GII.4 Sydney (norovirus)	Acute gastroenteritis
2012	Middle East respiratory syndrome coronavirus (MERS-CoV)	Middle East respiratory syndrome
2013	Influenza A H7N9H7N9	Avian Influenza
2014	Hepnivirus	Acute Encephalitis Syndrome & Meningitis
2014	NovelThogotovirus	Febrile Illness

### Strategies for prevention and control of emerging infectious diseases International action<sup>4-6</sup>

- Institute of Medicine, Centre for Disease Control (CDC), Atlanta USA, European Centre for Disease Prevention and Control (ECDC), WHO South –East Asian Region formulated the strategic multi annual programme (SMP) for building up the core public health functions, which are:

1. Surveillance
2. Scientific advice
3. Preparedness and response
4. Health communication

Presently ECDC has proposed shifting its focus from SMP to Disease Specific Programme (DSP).

### National action<sup>7-10</sup>

Steps have been taken to address this threat in India too by Indian Council of Medical Research (ICMR), Integrated Disease Surveillance Project (IDSP) National Centre for Disease Control (NCDC). These are:

- Increased funding in communicable diseases with focus on research for emerging infectious diseases.
- A system of surveillance, the IDSP, has been initiated by the Government of India in 1997–1998, for control of emerging infections.
- The Government of India has upgraded the NCDC and enhanced its capability to respond to Public Health Emergencies of International

### Publications<sup>11-13</sup>

Concern.

Several international and national publications give updates regarding this problem. These are:

- Weekly Epidemiological Record by WHO
- Emerging Infectious Diseases by CDC
- CD Alert by NCDC

## Conclusion

There is currently a serious global threat to public health because of emerging infectious diseases. Consorted efforts must be made by international health agencies and all governments, to contain this problem.

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