

Editorial

Emerging Infectious Diseases: Threats to Human Health and Global Stability

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Introduction

For centuries, famine and war have been considered the two most significant obstacles to human survival and advancement. Epidemics of new and old infectious diseases periodically appear against a background of ongoing established infections, considerably intensifying the global burden of infections. Well before the discovery of causative infectious agents, the inevitable but unpredictable emergence of new infectious diseases was recognized.

Examples of Newly Emerging Infectious Diseases

The most salient modern example of an emerging infectious disease is HIV/AIDS, which likely emerged a century ago after multiple independent events. Other examples of disease emergences^{1,2} include SARS, which emerged from bats and spread into humans first by person-to-person transmission in confined spaces, then within hospitals, and finally by human movement between international air hubs. Nipah virus also emerged from bats and caused an epizootic in herds of intensively bred pigs, which served as the animal reservoir from which the virus was passed on to humans. The 2009 H1N1 pandemic influenza virus emerged from pigs as well, but only after complex exchanges of human, swine, and avian influenza genes³. H5N1 influenza emerged from wild birds to cause epizootics that amplified virus transmission in domestic poultry, precipitating dead-end viral transmission to poultry-exposed humans.

Examples of Reemerging Infectious Diseases

Most of the important reemerging infectious disease agents first appeared long ago, but have survived and persisted by adapting to changing human populations and to environments that humans have altered. Dengue virus and West Nile virus (WNV), distantly related flaviviruses, serve as good examples. Emergences of disease caused by community- and hospital-acquired *Clostridium difficile* and methicillin-resistant *Staphylococcus aureus* (MRSA) have been driven by increased and/or inappropriate use of antibiotics, and some hospital-acquired organisms such as MRSA have now moved into community transmission³.

Will We Ever Eliminate Emerging Infectious Diseases?

While it has become possible to eradicate certain infectious diseases (smallpox and the veterinary disease rinderpest), and to significantly control many others (dracunculiasis, measles, and polio, among others), it seems unlikely that we will eliminate most emerging infectious diseases in the foreseeable future⁴.

EIs can be expected to remain a considerable challenge for the foreseeable future. We appear to be entering a new era in which several important emerging, reemerging, and stable infectious diseases are becoming better controlled (e.g., hepatitis B, rabies, *Haemophilus influenzae* type B, and even to some extent, HIV/AIDS). However, our success in stopping the many new emerging diseases that will inevitably appear

is not assured. We have many tools including preparedness plans and stockpiles of drugs and vaccines. But each new disease brings unique challenges, forcing us to continually adapt to ever-shifting threats. The battle against emerging infectious diseases is a continual process; winning does not mean stamping out every last disease, but rather getting out ahead of the next one.

References

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