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Emerging infectious diseases and their impact on emergency medical services: Role of emergency and paramedic

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***Abstract*---Background:** Emerging infectious diseases (EIDs) pose significant threats to global health due to their potential for widespread outbreaks and severe impacts on public health systems. These diseases can emerge from zoonotic sources, environmental changes, or resistance to antibiotics. Approximately 15% of human pathogens are considered to be emerging, reflecting their critical role in public health. **Aim:** This review aims to evaluate the impact of emerging infectious diseases on emergency medical services, with a focus on the role of zoonotic diseases, vector-borne infections, and the application of advanced surveillance technologies in managing these threats. **Methods:** A comparative review of literature and data sources, including global surveillance systems and recent outbreak case studies, was conducted to assess the impact of EIDs on emergency medical services. The study also examines the effectiveness of the One Health approach and the role of advanced technologies in disease monitoring. **Results:** Emerging infectious diseases, including zoonotic and vector-borne infections, have significantly impacted emergency medical services by increasing the demand for urgent care and resource allocation. Advances in surveillance technologies, such as molecular diagnostics and digital platforms, have improved early detection and response capabilities. The One Health approach has demonstrated effectiveness in addressing the interconnectedness of human, animal, and environmental health. **Conclusion:** The increasing frequency and complexity of emerging infectious diseases underscore the need for robust emergency medical services and integrated surveillance systems. Enhanced collaboration between health organizations, advanced diagnostic tools, and a comprehensive One Health strategy are crucial for effective management and response to EIDs.

***Keywords*---**Emerging infectious diseases, zoonotic diseases, vector-borne diseases, One Health, surveillance technologies, emergency medical services.

Introduction

Infectious disorders that are either newly discovered within a population or that have existed in the past but are significantly increasing in frequency or geographic spread are referred to as emerging infectious diseases (EIDs). In essence, these illnesses can arise from the adaptation or evolution of already existing organisms, the dispersal of previously identified infections to new areas or populations, the emergence of previously unknown infections in areas experiencing environmental changes, or the resurgence of older infections as a result of antibiotic resistance or shortcomings in public health systems.[1, 2] Roughly 15% of all human pathogens are emerging illnesses, according to the 10th International Conference on EIDs [3]. The interplay between newly emerging infections and other infectious or noninfectious disorders is a crucial matter. A large number of EIDs are zoonotic, meaning that the infectious agent first develops in an animal host before occasionally spreading to humans. Moreover,

food, vectors, or the air can all spread EIDs. An EID needs to be introduced into a susceptible community, have the ability to spread from person to person, and be able to cause illness in order to become established [4].

In contrast to other medical conditions affecting humans, infectious diseases are erratic and have the capacity to cause extensive worldwide outbreaks. Even though they are communicable, many of these illnesses can provide immunity after they heal, and some can even be eradicated if treated with vaccinations. Another important consideration is the interaction between human activity and natural settings.5. EIDs' main threat to public health and international stability is their effect on human populations, which can lead to pandemics and epidemics [5, 6]. Notwithstanding developments in vaccinations, therapies, and diagnostic techniques, the introduction of novel infectious diseases is unavoidable. Nonetheless, attempts to identify and control these illnesses have become more challenging due to increased connection and international travel. Notable instances of newly emerging illnesses in the contemporary era include severe respiratory syndrome, pandemics like the 2009 H1N1 influenza, and the human immunodeficiency virus (HIV/AIDS). The quality of life for those who are afflicted as well as their communities has been significantly impacted by these diseases, which have had significant social and economic repercussions. It's important to comprehend the different types of infectious diseases, such as those that are steadily endemic, those that are periodically reemerging, and newly emerging diseases [5, 6].

Zoonotic Diseases:

Zoonotic illnesses, which account for 61% of all infectious agents that affect humans, are infections that are transferred directly from animals to people or through contaminated food, drink, or environmental sources [7, 8]. These illnesses can be categorized into five categories according to how easily they can spread among people: diseases that exclusively transmit among animals (stage 1), diseases that fully adapt to become human pathogens (stage 5). The evolutionary phases by which animal pathogens transform into human diseases are depicted in **Figure 1** [9]. Protecting the population against both local and foreign health risks is the responsibility of the National Center for Emerging and Zoonotic Infectious Diseases (NCEZID). Their comprehensive mission encompasses a wide range of issues, including infections caused by food and waterborne illnesses, infections linked to healthcare, pathogens resistant to antibiotics, life-threatening illnesses like anthrax and Ebola, illnesses affecting immigrants, refugees, and travelers, and infections spread by animals or insect vectors like fleas, ticks, and mosquitoes [10]. The complex interrelationships among humans, animals, and the environment facilitate the spread of illnesses, hence presenting serious risks to global socioeconomic stability and public health. The frequency of zoonotic diseases is influenced by human contact with animals and animal encounters in unfamiliar areas. Zoonotic illnesses include salmonella, which is contracted from poultry, and Lyme disease, which is carried by ticks. These persistent dangers are highlighted by recent salmonella outbreaks connected to chicken, shell eggs, raw turkey products, and even pet guinea pigs.

Emerging Zoonotic Diseases:

Emerging infectious diseases (EIDs) are monitored through a variety of sophisticated surveillance systems, which aim to detect, track, and respond to outbreaks. Central to this process are national and international reporting mechanisms. Countries maintain robust surveillance programs that collect and analyze data on disease incidence, which is then shared with global organizations such as the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC). These organizations maintain databases that track global patterns of emerging diseases, allowing for the early identification of potential outbreaks. In addition to traditional reporting systems, the use of advanced technologies plays a critical role in tracking EIDs. Innovations in molecular diagnostics, including genomic sequencing, enable the rapid identification of new pathogens and allow researchers to monitor their evolution and spread. Digital surveillance tools, such as web-based platforms and social media analytics, further enhance the ability to track disease trends in real-time. For example, platforms like HealthMap and ProMED use algorithms to scan various data sources, including news reports and social media, to detect and map disease outbreaks. Collaboration between international health organizations, governments, and academic institutions is also crucial for tracking EIDs. Networks such as the Global Outbreak Alert and Response Network (GOARN) facilitate information sharing and coordination of response efforts. Additionally, global health initiatives, such as the Global Health Security Agenda (GHSA), focus on strengthening surveillance systems and improving preparedness for EIDs. These efforts ensure that emerging diseases are tracked systematically, allowing for timely interventions to prevent widespread transmission.

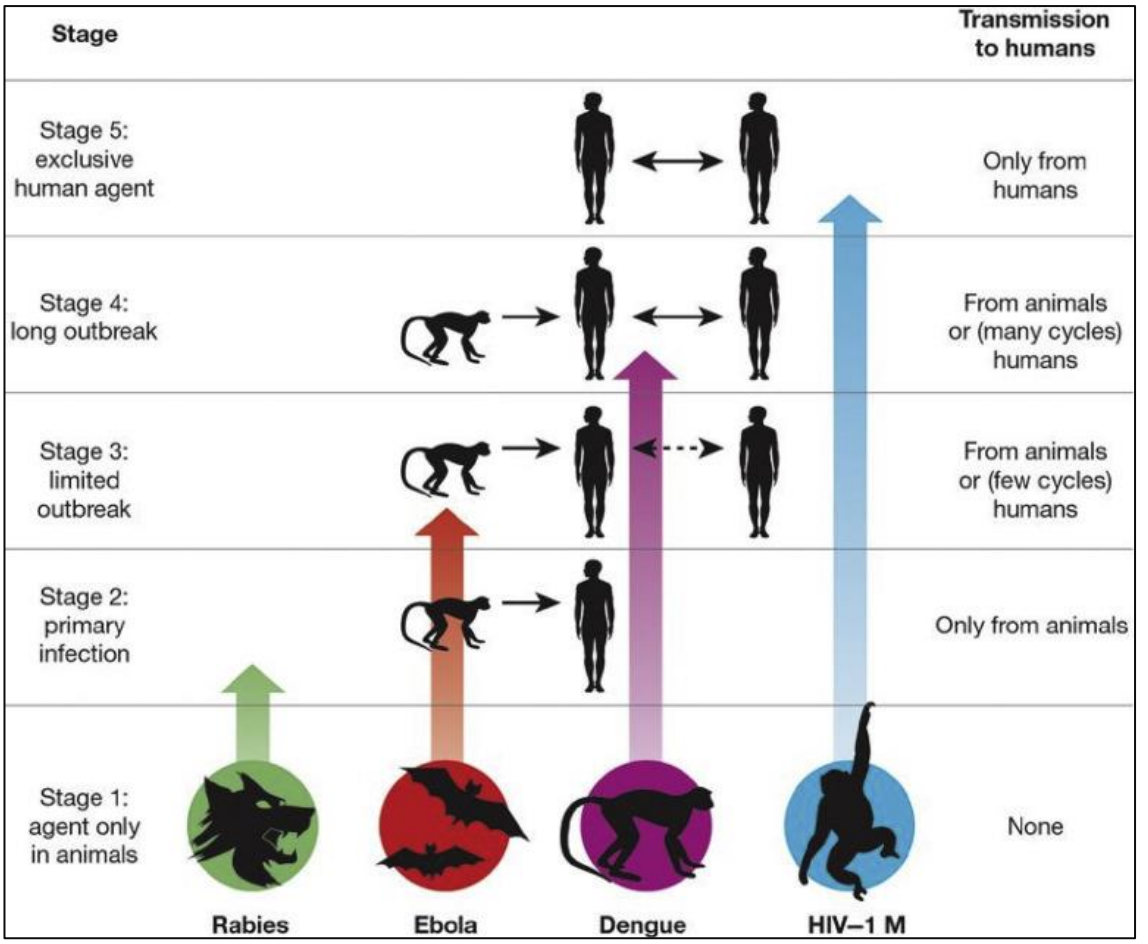

Figure 1: Zoonotic Infections

One-health Strategy:

The One Health concept, initiated in 2006, represents a multidisciplinary effort aimed at improving health outcomes for humans, animals, and the environment on both local and global levels.11 The Centers for Disease Control and Prevention (CDC) utilizes the One Health framework by collaborating with healthcare professionals, veterinarians, ecologists, and other experts to monitor and manage public health threats, while gaining insights into how diseases spread across populations, animals, and ecosystems.12 Nurses have significant potential to apply the One Health approach in patient and community education, particularly in rural and agricultural settings. For instance, they can participate in interprofessional teams to educate young people in rural areas about preventing zoonotic diseases. One Health teams also collaborate with organizations like 4-H and Future Farmers of America to deliver such education. Additionally, they work to raise awareness among the general public about illnesses that can be transmitted from pets, such as Salmonella infections.

Vector Borne Emerging Infectious Diseases:

Vectors, including blood-feeding insects and ticks, are key in transmitting pathogens between hosts, making them significant contributors to global mortality and morbidity [13]. In the United States, common pathogens transmitted by ticks and mosquitoes include Lyme disease, Rocky Mountain spotted fever, West Nile virus, dengue, and Zika virus. These vector-borne diseases represent an increasing public health issue both nationally and globally. Although local and state health departments track these diseases, there is a pressing need for national improvements in surveillance, diagnostics, reporting, vector control, and vaccine development [13]. Mosquito-transmitted emerging infectious diseases (EIDs) can spread within the United States due to the presence of specific vectors, while global travel and immigration can introduce these infections, facilitating local transmission [14]. Among the mosquito-borne viruses of concern are Zika virus, yellow fever, chikungunya virus, and dengue virus [8, 14, 15, 16, 17].

Yellow fever is endemic in sub-Saharan Africa, Central and South America, and the Caribbean, affecting 47 countries. In the United States, all cases of yellow fever have been imported by unimmunized travelers returning from endemic areas. Due to inadequate surveillance, the true incidence of yellow fever remains unclear. It is a zoonotic infection transmitted by mosquitoes, particularly the Aedes aegypti species, and has the potential to spread rapidly via international travelers. The virus is primarily transmitted through mosquito bites, after feeding on infected primates (both human and nonhuman), and can be transmitted to other primates. Infected individuals are viremic shortly before the onset of fever and for up to five days afterward. Yellow fever has three transmission cycles: jungle (sylvatic), intermediate (savannah), and urban, with the urban cycle involving transmission primarily between humans and mosquitoes. A viremic human who was infected in the jungle or savannah brings the virus into urban settings [14]. The clinical presentation of yellow fever includes a wide spectrum of symptoms, ranging from asymptomatic cases to severe disease. The early symptoms mimic flu-like conditions such as fever, malaise, myalgia, headache, and vomiting, followed by a bimodal disease course where fever returns after 24 hours, leading to complications such as hepatitis, jaundice, renal failure, hemorrhage, and shock. Among those who develop severe disease, 30%–60% succumb to the illness. Diagnosis relies on laboratory testing, clinical symptoms, and travel history, though it can be challenging in the early stages due to the overlap with diseases like malaria and other flaviviruses. Currently, there is no specific antiviral treatment for yellow fever; care is supportive and symptomatic. The WHO recommends mass vaccination during outbreaks as a critical intervention, although global shortages of the yellow fever vaccine pose a challenge. Vector control and mosquito bite prevention are essential for disease prevention, and vaccination is recommended for travelers and residents in endemic areas [14].

Chikungunya virus, endemic to Africa and Asia, is an arbovirus transmitted by mosquitoes, similar to yellow fever, Zika, and dengue viruses. Recent outbreaks have occurred in Europe and the Americas, including the United States. The disease affects both adults and children, with up to 28% of cases being

asymptomatic. After an incubation period of 3–7 days, chikungunya presents with a sudden onset of high fever lasting up to two weeks, accompanied by severe joint pain and a transient skin rash, primarily on the trunk and extremities. Relapses may occur 2–3 months after the initial infection, with older adults, individuals with comorbidities, and neonates exposed intrapartum being at higher risk for atypical or severe disease manifestations, including neurologic complications and vesiculobullous lesions. The differential diagnosis includes dengue fever, malaria, leptospirosis, group A streptococcus, rubella, measles, and parvovirus infections. Laboratory testing, combined with a patient's clinical history, is used for diagnosis, with testing in the United States conducted by the CDC. As with yellow fever, there is no specific antiviral treatment for chikungunya, and care is mainly supportive, focusing on symptom management [16]. Preventing mosquito bites and vector control remain the primary strategies for controlling the spread of chikungunya, as there is no licensed vaccine for this virus, although the WHO is currently evaluating several candidates [16].

Dengue virus is another globally prevalent arbovirus, endemic in more than 120 countries, including Southeast Asia, the Western Pacific, Latin America, the Caribbean, and some regions of Africa, the Middle East, and the United States. Globally, 3.9 billion people are at risk of contracting dengue, and in 2016, major outbreaks affected both children and adults, with the United States experiencing epidemics in Texas and Hawaii [16]. The virus is primarily transmitted by mosquitoes of the Aedes genus, particularly Aedes aegypti, and there are four distinct viral serotypes, all of which belong to the Flavivirus genus. The clinical manifestations of dengue range from mild cases, characterized by fever, nausea, vomiting, rash, and myalgias, to severe dengue, which can cause plasma leakage, severe bleeding, and organ failure. Diagnosis is confirmed through viral antigen or nucleic acid detection and serology, though it can be challenging to distinguish from infections like Zika and chikungunya. While there is no specific antiviral agent for dengue, fluid therapy and supportive care are used in management. Prevention strategies include eliminating stagnant water sources, using insecticides, and ensuring that individuals infected with dengue are protected from further mosquito bites to prevent the spread of the virus. A tetravalent vaccine has been approved in some countries, and vector surveillance and control are critical for reducing transmission [16].

Factors Contribute to Emergence of Outbreaks:

Between 1940 and 2004, a total of 335 emerging infectious disease (EID) events were identified, with the majority (60.3%) originating from wild animal reservoirs, and about 20% being transmitted to humans from these animal hosts through disease vectors like ticks and mosquitoes [18]. Moving forward to 2008 and beyond, the discovery of severe fever with thrombocytopenia syndrome virus (SFTSV) and Middle East respiratory syndrome coronavirus (MERS-CoV), along with unusual outbreaks of Zika virus, yellow fever, and Ebola, underscored the critical role of demographic shifts, global travel and trade, and potential climate change in driving these EID outbreaks [2, 19]. Several interconnected biological, social, and environmental factors are recognized as contributing drivers, including microbial adaptation and genetic changes, susceptibility to infections, population density increases, poverty and social inequalities, environmental

stress due to farmland expansion, globalization of the food market, environmental contamination, and climate change. Other contributing factors include population growth, disease spread in healthcare facilities, an aging population, international travel, expanding vector habitats (due to warming temperatures), drug resistance, public health breakdowns, and the potential for intentional biological attacks.

A key example of the influence of these drivers is the influenza virus, which frequently alters its genetic makeup. When these changes are significant, human immune systems struggle to adapt, and pandemics can result. The risk of such genetic changes and human infections increases when humans live in close proximity to agricultural animals, such as chickens, ducks, and pigs, which are natural hosts for the influenza virus. For instance, Avian H5N1 influenza (bird flu), though deadly, is limited to transmission via direct contact with infected birds and does not spread between humans. In contrast, the H1N1 influenza virus, which originated from swine, caused a global pandemic in 2009, largely facilitated by human activities, especially air travel [4].

Human behavior is also a significant contributor to the spread of infectious diseases, as demonstrated by HIV. One leading hypothesis suggests that humans were initially infected with HIV through close contact with chimpanzees, potentially during bushmeat hunting, in isolated areas of Africa. The virus spread internationally through air travel, and behaviors such as intravenous drug use, sexual transmission, and the transfer of blood products accelerated the rapid spread of the disease before it was fully identified [4]. The influence of climate change on the spread of infectious diseases is evident in the case of chikungunya, a virus transmitted by mosquitoes originally confined to tropical regions around the Indian Ocean. In 2007, over 200 residents of an Italian town experienced an outbreak of this disease, which has since spread across all continents [4]. Healthcare providers must also consider demographic shifts, particularly the aging population, which increases the risk of infections and hospitalizations, further compounding vulnerability. The emerging fungal species *Candida auris* has been identified as a significant threat within healthcare settings, causing outbreaks associated with high mortality, particularly in patients with underlying comorbidities [2, 20].

Classification of Zoonotic Threats:

To aid in the prioritization of emerging pathogen threats to the United States, the National Institute of Allergy and Infectious Diseases (NIAID) categorizes these threats into three distinct categories. This categorization is conducted in collaboration with federal partners, such as the US Department of Homeland Security and the Centers for Disease Control and Prevention (CDC) [21].

Category A pathogens are considered the highest risk to national security and public health due to their ease of dissemination, high mortality rates, and significant potential for causing public panic and social disruption. Special measures are required for public health preparedness for these agents. Priority pathogens in Category A include *Bacillus anthracis* (anthrax), *Clostridium botulinum* toxin (botulism), *Yersinia pestis* (plague), *Variola major* (smallpox) and other related pox viruses, *Francisella tularensis* (tularemia), and various viral

hemorrhagic fevers such as Arenaviruses, Bunyaviruses, Flaviviruses, and Filoviruses.

Category B pathogens are the second highest priority. These agents are moderately easy to disseminate, result in moderate morbidity and low mortality, and require specific enhancements for diagnostic capacity and disease surveillance. Select pathogens in this category include *Burkholderia pseudomallei* (melioidosis), *Coxiella burnetii* (Q fever), *Brucella* species (brucellosis), ricin toxin, *Staphylococcus enterotoxin B*, typhus fever caused by *Rickettsia prowazekii*, as well as various foodborne and waterborne pathogens including bacteria (e.g., *E. coli*, *Shigella*, *Salmonella*, *Campylobacter*), viruses (e.g., hepatitis A), protozoa (e.g., *Cryptosporidium parvum*, *Giardia lamblia*), fungi, and mosquito-borne viruses like West Nile, yellow fever, chikungunya, and Zika.

Category C pathogens are the third highest priority and include emerging pathogens that could be engineered for mass dissemination in the future. These pathogens are characterized by their availability, ease of production and dissemination, and potential for high morbidity and mortality. Select pathogens in Category C include Nipah and Hendra viruses, additional hantaviruses, tick-borne hemorrhagic fever viruses (Bunyaviruses, Flaviviruses), tick-borne encephalitis complex flaviviruses, tuberculosis (including drug-resistant forms), influenza virus, other rickettsias, rabies virus, and Severe Acute Respiratory Syndrome-associated Coronavirus (SARS-CoV).

NIAID continuously updates its list of emerging and reemerging diseases and pathogens. Over the past five years, more than twelve new diseases and pathogens have been recognized, including *Bordetella pertussis*, enterovirus 68, hepatitis C and E, poliovirus, and rubeola.

Common Zoonotic Infections:

Candida auris, *Elizabethkingia anopheles*, the Lone Star tick, and avian influenza H7N2 share a common trait: they are among the newest emerging infectious diseases in the United States. Additionally, the plasmid-borne colistin resistance gene, mcr-1, which confers resistance to colistin, may contribute to the spread of pan-resistant gram-negative bacteria [20, 22].

Candida auris was first identified in 2009 from ear drainage of a patient in Japan. This multidrug-resistant fungal pathogen has spread internationally, notably affecting New York and New Jersey, leading to outbreaks in healthcare settings [20, 23, 24]. Clinical manifestations of *C. auris* include invasive infections with a high mortality rate, particularly in patients with severe underlying conditions and indwelling devices. In New York, from 2013 to 2017, 65% of infected individuals had respiratory insufficiency. Most patients had received antibiotics within 14 days prior to the initial culture for *C. auris*. Diagnosing *C. auris* can be challenging due to potential misidentification as other yeast species. The CDC advises using specific testing methods when encountering certain yeast strains, such as *Candida haemulonii*. High-risk adults, especially those with recent healthcare exposure in affected regions, should be monitored closely. Management guidelines recommend that cases be reported to local health

departments, with most strains resistant to azoles but susceptible to echinocandin antifungals. Preventive measures include having a response plan in place and identifying high-risk patients, particularly those with recent international healthcare exposure [25].

Elizabethkingia anopheles was discovered in 1959 by Elizabeth King and is found in soil, river water, and reservoirs, but it rarely causes illness. Since 2004, there has been a notable increase in cases among hospitalized patients, with outbreaks reported in Wisconsin, Michigan, and Illinois. Over 63 patients have been confirmed, with 20 deaths. This pathogen primarily affects immunocompromised individuals, those over 65, and those with comorbid conditions. Symptoms include fever, shortness of breath, and cellulitis, which may resemble an acute viral syndrome. Blood cultures are necessary for diagnosis, but distinguishing *E. anopheles* from *Elizabethkingia meningoseptica* can be difficult. Immediate antibiotic treatment is crucial, as the bacteria are resistant to many antibiotics, though combination therapies including fluoroquinolones, minocycline, rifampin, and trimethoprim/sulfamethoxazole have been effective in managing outbreaks. Preventive measures include contact precautions to limit disease transmission, given that the exact transmission mode remains unclear [20, 27, 28].

Lone Star Tick (Amblyomma americanum)

The Lone Star tick, found primarily in the southeastern, south-central, and eastern United States, has seen increased distribution and numbers over the past three decades [20]. Unlike ticks that cause Lyme disease, the Lone Star tick does not cause Lyme disease, though it can cause rashes similar to Lyme disease. Disease hosts include wild white-tailed deer and ground-dwelling birds. The tick feeds on humans and various animals, and can be brought home on pets. It is a vector for several diseases, including Ehrlichia (causing human ehrlichiosis), heartland virus, tularemia, and southern tick-associated rash illness. It may also be a vector for the Bourbon virus.

Clinical manifestations usually occur within 7 days of a tick bite and include an erythematous rash, fatigue, fever, headache, joint and muscle pain. The rash is typically smaller and circular with central clearing compared to Lyme disease. Heartland virus infections present with fever, fatigue, nausea, diarrhea, and anorexia, and do not respond to doxycycline, while Bourbon virus infections can be fatal, particularly in immunocompromised adults. Management includes symptomatic treatment with topical corticosteroids and doxycycline. Prevention involves avoiding tick habitats, using insect repellent, wearing protective clothing, and removing leaf debris. The introduction of fire ants is also recommended as a natural tick control measure [30, 31].

Zoonotic Flu Viruses

Influenza viruses are categorized into types A, B, C, and D, with type A being capable of infecting both humans and animals. Emerging influenza A viruses with human-to-human transmission potential can lead to pandemics. Persistent threats include avian influenza strains like H7N9, H5N1, and H5N6, and swine

influenza viruses like H1N1, H1N2, and H3N2. Avian influenza A (H7N2) is notable for infecting humans in contact with domestic animals. Although its pathogenicity is low and human transmission risk is minimal, it remains a concern. Influenza in cats can spread similarly to human flu, with symptoms including coughing, runny nose, and fever.

Clinical manifestations can range from mild upper respiratory tract infections to severe pneumonia, sepsis, and death. High-risk individuals include young children, the elderly, pregnant women, those with chronic health conditions, and the immunocompromised. Diagnosis is confirmed through laboratory tests, with molecular methods like reverse transcription polymerase chain reaction being more reliable than rapid diagnostic tests. Management includes antiviral drugs (e.g., neuraminidase inhibitors) within 48 hours of symptom onset, along with symptomatic treatment. Prevention includes controlling animal sources, surveillance, personal protective measures, and avoiding contact with poultry farms in outbreak areas. Travelers should report respiratory symptoms if they have visited affected regions [33, 34, 35].

MCR Genes (Mobilized Colistin Resistance)

The mcr-1 gene, identified in 2015, causes resistance to colistin, a "last-resort" antibiotic used for multi-drug-resistant bacterial infections. The gene is located on plasmids, which can transfer between bacteria, potentially spreading resistance. The mcr-1 gene was first identified in China and has since been detected in the United States in *Escherichia coli* and pigs. Although the immediate threat is not widespread, the potential for mcr-1 to spread to other bacteria raises serious concerns about antibiotic resistance. The CDC is tracking mcr-1 and has developed rapid tests to detect it in clinical laboratories [36, 37, 38-39].

Role of Paramedics, Nurses, Emergency Team:

Emergency paramedics are often the first responders to individuals exhibiting symptoms of emerging infectious diseases (EIDs). Their role begins with the initial assessment of the patient's symptoms and medical history, paying particular attention to recent travel or exposure to potentially infectious environments. They are responsible for implementing infection control measures, including standard and contact precautions, to prevent the spread of the infection to other patients and healthcare staff. Ensuring timely transport of patients to appropriate healthcare facilities is also crucial, as paramedics provide initial treatment and stabilization during transport. Furthermore, paramedics play a key role in communication by relaying critical information about the patient's condition and potential EID risk to the receiving healthcare facilities, enabling them to prepare and respond effectively.

Emergency physicians are central to the diagnosis and management of emerging infectious diseases. Their responsibilities encompass conducting thorough assessments and ordering the appropriate diagnostic tests to accurately diagnose EIDs. Based on current evidence and best practices, they formulate and implement treatment plans. Coordination with public health authorities, specialists, and other healthcare professionals is essential for managing EID

cases effectively. In addition to diagnosis and treatment, emergency physicians provide guidance on preventive measures such as vaccinations and screenings and educate both patients and the community about EIDs. They also ensure the use of up-to-date resources and protocols, staying informed about global and local disease trends to effectively address EIDs.

Healthcare professionals understand that emerging infectious diseases (EIDs) are both inevitable and unpredictable. It is crucial for nurses to work closely with interprofessional teams, patients, and communities to stay alert to unusual symptoms and pursue appropriate diagnostic tests. The European Society of Clinical Microbiology and Infectious Diseases Emerging Infections Task Force Expert Panel notes that mathematical models have not been successful in predicting outbreaks. Being well-informed about emerging infections enhances the clinician's ability to consider these conditions in differential diagnoses and apply best practices based on evidence-based resources. Additionally, following recommended self-care practices, including vaccinations, is essential. Screening migrants from countries with high disease prevalence can be a key preventive measure and can be cost-effective. Vaccination programs should focus on high-risk populations, ensuring resources are allocated efficiently. Effective integration of migrants into local health systems and collaboration with public health facilities are vital for accurate disease diagnosis and management. Nurses' specialized skills improve their capacity to detect EIDs and promote community health. Detailed travel histories should be part of every patient assessment. The perceptive clinician connects patient histories to identify the early signs of EIDs. Staying updated on EIDs relevant to both local and global contexts and accessing timely resources, such as those from the World Health Organization (WHO) and the CDC, is essential for nurses.

Conclusion

Emerging infectious diseases (EIDs) present significant challenges to emergency medical services (EMS) worldwide, impacting public health systems and necessitating effective management strategies. These diseases, often zoonotic or vector-borne, highlight the importance of advanced surveillance and response mechanisms. The increasing frequency of EIDs, driven by factors such as global travel, environmental changes, and microbial evolution, underscores the need for enhanced preparedness and adaptability in EMS. Zoonotic diseases, which are transmitted from animals to humans, account for a substantial proportion of EIDs and often require urgent medical attention due to their potential to cause severe illness and widespread outbreaks. Vector-borne diseases, such as those transmitted by mosquitoes and ticks, add another layer of complexity, given their ability to spread rapidly across regions and contribute to significant public health concerns. The review highlights the effectiveness of modern surveillance systems in detecting and tracking EIDs. Technologies like molecular diagnostics, genomic sequencing, and digital surveillance platforms play a pivotal role in early detection and monitoring of disease trends. These advancements enable timely interventions and improve the overall response to emerging outbreaks. The One Health approach, which integrates human, animal, and environmental health efforts, has proven to be an effective framework in managing EIDs. This multidisciplinary strategy fosters collaboration between healthcare professionals,

veterinarians, and environmental scientists, leading to a more comprehensive understanding of disease dynamics and improved preventive measures. In conclusion, addressing the challenges posed by EIDs requires a multifaceted approach that includes strengthening surveillance systems, enhancing emergency medical response capabilities, and fostering collaborative efforts through the One Health framework. By integrating advanced technologies and maintaining a proactive stance, emergency medical services can better manage the impact of emerging infectious diseases and protect public health on a global scale.

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الأمراض المعدية الناشئة وتأثيرها على خدمات الطوارئ الطبية: دور فرق الطوارئ والإسعاف

الملخص:

الخلفية :تشكل الأمراض المعدية الناشئة تهديدات كبيرة للصحة العالمية نظرًا لإمكانيتها في التسبب في تفشيات واسعة النطاق وتأثيراتها الشديدة على نظم الصحة العامة. يمكن أن تنشأ هذه الأمراض من مصادر حيوانية، أو تغييرات بيئية، أو مقاومة للمضادات الحيوية. يُعتبر حوالي 15% من مسببات الأمراض البشرية أمراضًا ناشئة، مما يعكس دورها الحاسم في الصحة العامة.

الهدف :يهدف هذا الاستعراض إلى تقييم تأثير الأمراض المعدية الناشئة على خدمات الطوارئ الطبية، مع التركيز على دور الأمراض الحيوانية المصدر، والعدوى المنقولة بواسطة الحشرات، وتطبيق تقنيات المراقبة المتقدمة في إدارة هذه التهديدات.

الطرق :تم إجراء مراجعة مقارنة للأدبيات ومصادر البيانات، بما في ذلك نظم المراقبة العالمية ودراسات حالات التفشي الأخيرة، لتقييم تأثير الأمراض المعدية الناشئة على خدمات الطوارئ الطبية. كما يتناول الدراسة فعالية نهج "الصحة الواحدة" ودور التقنيات المتقدمة في مراقبة الأمراض.

النتائج :أثرت الأمراض المعدية الناشئة، بما في ذلك العدوى الحيوانية المصدر والعدوى المنقولة بواسطة الحشرات، بشكل كبير على خدمات الطوارئ الطبية من خلال زيادة الطلب على الرعاية العاجلة وتوزيع الموارد. وقد حسنت التقدمات في تقنيات المراقبة، مثل التشخيص الجزيئي والمنصات الرقمية، من قدرات الكشف المبكر والاستجابة. وقد أثبت نهج "الصحة الواحدة" فعاليته في معالجة الترابط بين الصحة البشرية والحيوانية والبيئية.

الاستنتاج :تؤكد زيادة تكرار وتعقيد الأمراض المعدية الناشئة على الحاجة إلى خدمات طوارئ طبية قوية وأنظمة مراقبة متكاملة. التعاون المعزز بين المنظمات الصحية، والأدوات التشخيصية المتقدمة، واستراتيجية شاملة للصحة الواحدة هي أمور حاسمة لإدارة فعالة واستجابة للأمراض المعدية الناشئة.

الكلمات المفتاحية :الأمراض المعدية الناشئة، الأمراض الحيوانية المصدر، الأمراض المنقولة بواسطة الحشرات، الصحة الواحدة، تقنيات المراقبة، خدمات الطوارئ الطبية.