



SHORT COMMUNICATION

Global Infectious Diseases between January and March 2024: Periodic Analysis

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Abstract

In recent years, humanity has faced formidable challenges posed by infectious diseases. For example, previously controlled infectious diseases have undergone resurgences, while ongoing pathogen mutations have given rise to drug-resistant strains. These developments, coupled with changes in natural and societal factors, have contributed to the emergence of new infectious diseases. Spring is a season prone to infectious diseases, with common examples including influenza, measles, smallpox, and dengue fever. These diseases are primarily transmitted through respiratory droplets, airborne transmission, and close contact. To gain insight into the global distribution of infectious diseases we analyzed data from the Global Epidemic Information Monitoring System, which was developed by Shusi Technology, from January to March 2024.

Key words: Infectious disease, Influenza, Dengue, Cholera, Insect-borne infectious diseases

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INTRODUCTION

The global challenge of infectious diseases persists and is propelled by increased population mobility driven by economic globalization [1-3]. Formerly driven by factors, such as warfare and colonialism, global population movements are now largely steered by economic globalization, thereby accelerating the global transmission of infectious diseases. Over recent decades, while advances in medical technology and healthcare systems have led to reductions in overall incidence rates, infectious diseases continue to pose a profound burden in low- and middle-income countries. Furthermore, seasonal outbreaks and the emergence of new pathogens further exacerbate this challenge, facilitated by heightened population mobility. Consequently, infectious diseases persist as a significant challenge, necessitating sustained attention and the

implementation of effective measures to safeguard human health and well-being.

To comprehensively examine the global distribution of infectious diseases from January to March 2024 we utilized the Shusi Tech Global Epidemic Information Monitoring System (Fig 1). Our analysis uncovered notable trends across various infectious diseases, including influenza, dengue fever, monkeypox, cholera, measles, insect-borne infectious diseases, and sporadic infectious diseases. By scrutinizing data from diverse regions and disease categories, we better understand the current landscape of infectious diseases, which will facilitate proactive measures to mitigate the impact on public health.

INFLUENZA

Influenza virus infection is a formidable challenge facing global public health. The annual incidence and mortality rates

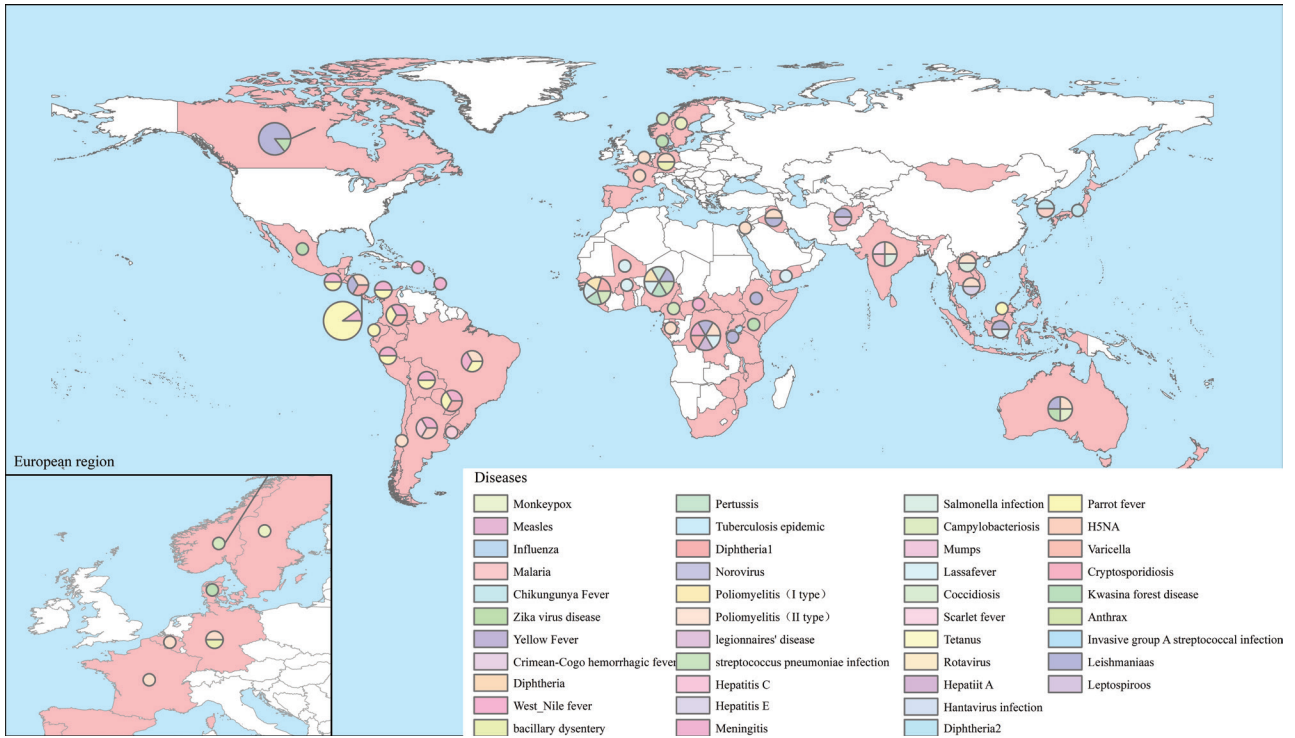


FIGURE 1 | Worldwide distribution of infectious diseases from January to March 2024.

have reached significant levels [4,5]. Authoritative statistics indicate that influenza contributes to an estimated 290,000–650,000 deaths worldwide annually due to respiratory-related illnesses [6]. Notably, in high-income countries, influenza is one of the leading diseases affecting individuals of all age groups [7].

In the past 3 months (January to March 2024), confirmed cases of influenza have demonstrated a significant

decline overall, primarily concentrated in the US, Canada, Australia, and Spain (Fig 2A). Among these nations affected by influenza, the US has reported the highest incidence, with a notable 98,943 cases, followed by Canada and Australia with 19,352 and 19,123 cases, respectively (Fig 2B). The total number of new cases reported from January to March 2024 is approximately 150,000 cases, with January contributing the largest percentage (65%).

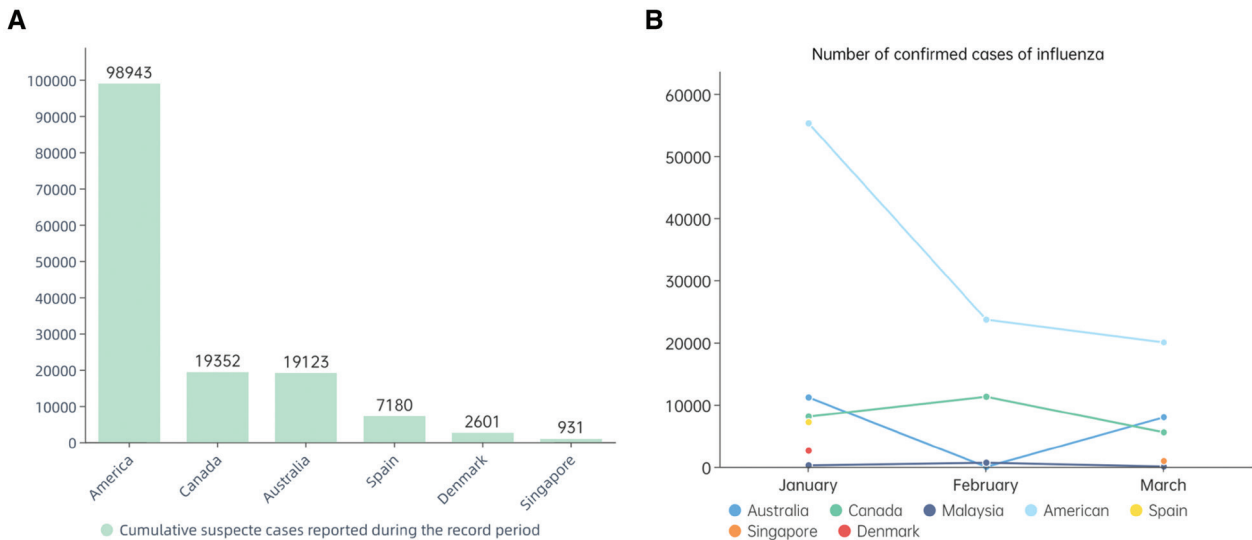


FIGURE 2 | Statistics of new influenza cases from January to March 2024. A. The top 6 countries or regions with the number of cumulative suspected influenza cases. B. Number of confirmed cases of influenza virus infection per month from January to March 2024.

Despite the decreasing trend in influenza cases, maintaining vigilance remains paramount. Individuals exhibiting symptoms, such as fever or cough, are strongly advised to wear masks. This precautionary measure is crucial given the persistent global threat posed by influenza virus infections, which continue to impact public health on a significant scale.

DENGUE

Dengue fever is an acute infectious disease caused by the dengue virus, which is primarily transmitted through mosquito bites [8]. With the acceleration of global climate change and urbanization, breeding grounds and dissemination of mosquitoes have expanded, making the spread of dengue fever increasingly facile. Dengue fever has emerged as a progressively serious global health issue [9]. According to the World Health Organization (WHO), the global incidence of dengue has risen sharply from 505,430 cases in 2000 to 5.2 million cases in 2019 [10]. Between January and March 2024 Brazil, Argentina, Peru, the Philippines, Colombia, and Paraguay have reported tens of thousands of cases of dengue fever (Fig 3). Brazil has recorded the highest number of fatalities (n=561). As the incidence of dengue fever continues to rise, the implementation of effective preventative and control measures becomes increasingly critical. Enhanced surveillance and management of mosquito breeding sites, along with heightened public awareness and implementation of preventative measures against dengue fever, represent pivotal steps in addressing this pressing global health challenge.

MONKEYPOX

Monkeypox, caused by the monkeypox virus, is a member of the *Orthopoxvirus* genus in the family Poxviridae

[11]. From January to March 2024 the data suggests a significant spread of monkeypox across multiple continents, with varying degrees of confirmation and mortality rates (Table 1). Geographic regions, such as Brazil and Spain, show high numbers of both suspected and confirmed cases, indicating more extensive outbreaks. Some countries, such as Mexico and Brazil, have reported deaths (n=34 and 16, respectively), while other countries, despite high numbers of suspected cases, have reported fewer or no deaths. The death counts, while generally low compared to the number of cases, are nonetheless present, indicating that the disease has had fatal outcomes in some instances.

CHOLERA

Cholera is an acute diarrheal illness caused by infection of the intestine with the bacterium, *Vibrio cholerae* [12]. Some geographic regions report a very high number of suspected cholera cases, with Afghanistan, Zambia, and Zimbabwe showing particularly large numbers (n >10,000 cases; Fig 4A). Zambia, in particular, has the second-highest number of cases (n=18,139) and the highest number of deaths (n=577). The Fig 4A outlines the seven nations with the highest number of new cholera cases reported in the first quarter of 2024 (Fig 4A). New cholera cases in Afghanistan, Zambia, and the Congo saw a decrease in February, then a substantial increase in March (Fig 4B).

MEASLES

Measles, an important cause of deaths among young children globally, spreads through direct contact with nasal or throat secretions of infected individuals or through aerosol transmission when an infected person coughs or sneezes

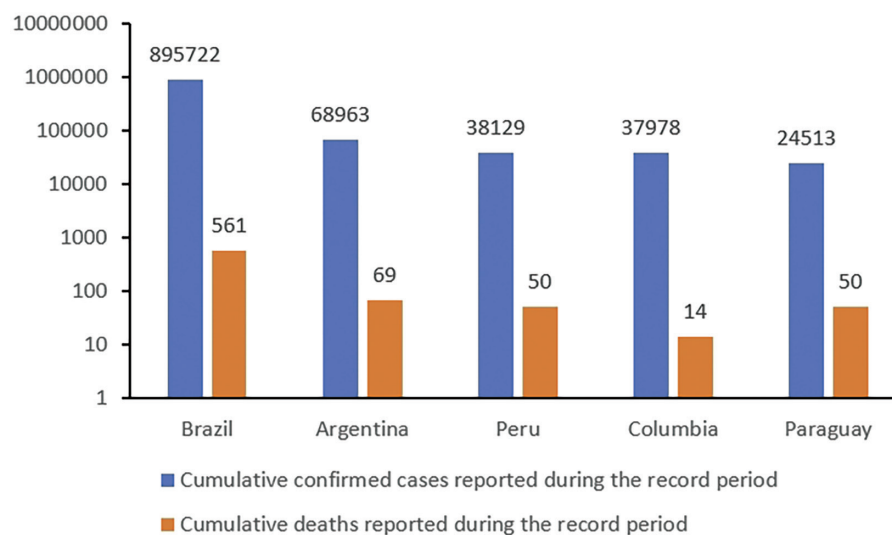


FIGURE 3 | Statistics of new dengue cases from January to March 2024. Brazil, Argentina, Peru, Columbia, and Paraguay are the top 5 countries reporting new dengue cases from January to March 2024.

TABLE 1 | Worldwide monkeypox cases reported between January and March 2024.

Record period	Location	Cumulative suspected cases (confirmed cases) reported during the record period	Cumulative deaths reported during the record period	Data source
01/01/2022-31/01/2024	Australia	341		WHO
01/01/2022-27/01/2024	America	114		U.S. CDC
01/01/2024-29/02/2024	Brazil	10967	16	WHO
06/05/2023-29/02/2024	Britain	3892		U. K. Health Security Agency
01/01/2022-31/01/2024	Belgium	803	2	WHO
05/02/2024	Cambodia	(1)		ProMED-mail
13/12/2023-05/02/2024		(5)		
15/02/2024		(1)		
13/12/2023-15/02/2024		(12)		
01/01/2022-31/01/2024	Chile	(1449)	3	WHO
01/01/2024-29/02/2024	Democratic Republic of Congo	1605	2	WHO
01/01/2024-31/01/2024	England	(7)	0	Health and Safety Executive
01/01/2024-29/02/2024	France	4195		WHO
01/01/2024-29/02/2024	Germany	3816		WHO
24/05/2022-13/02/2024	Ghana	138	5	WHO Regional Office for Africa
06/09/2022-29/02/2024	Hong Kong, China	(58)	0	Hong Kong Centre for Health Protection, China
01/01/2024-29/01/2024		3		
29/02/2024		1		
15/02/2024		(1)	0	
01/01/2022-18/02/2024	Indonesia	(83)	0	Who Regional Office for South-East Asia
01/01/2024-09/01/2024	Israel	5 (5)		Xinhuanet
01/01/2024-28/01/2024	Japan	3		Japan National Institute of Infectious Diseases
29/01/2024-11/02/2024		(3)	0	Ministry of Health, Labour, and Welfare
23/07/2022-13/02/2024	Liberia	119 (7)		WHO Regional Office for Africa
01/01/2024-29/02/2024	Mexico	4081	34	WHO
01/01/2022-31/01/2024	Netherlands	1292	0	WHO
01/01/2024-29/02/2024	New Zealand	1299		WHO
01/01/2024-29/02/2024	Nigeria	843	9	WHO
01/01/2022-31/01/2024	Spain	(7786)	3	WHO
01/01/2024-29/02/2024		7898	3	
01/01/2022-12/01/2024	Swiss	563		European Union CDC
01/01/2022-12/01/2024	Switzerland	(563)	0	WHO
24/06/2022-05/03/2024	Taiwan, China	363		Taiwan Disease Control Agency, China
01/01/2022-18/02/2024	Thailand	(729)	0	Who Regional Office for South-East Asia
01/01/2024-29/02/2024		743		WHO
21/01/2024-27/01/2024	U.S.	(21)	0	U.S. CDC
01/01/2024-09/02/2024		(114)	0	

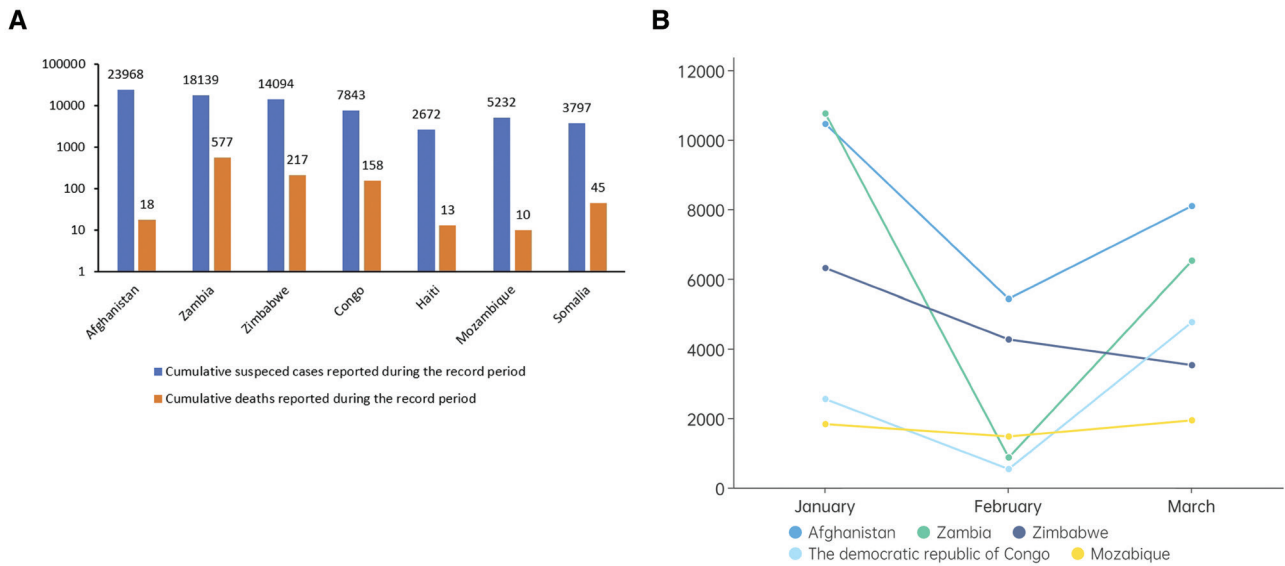


FIGURE 4 | New cholera cases from January to March 2024. A. The top 7 countries or regions with the number of cumulative confirmed dengue cases and deaths (January to March 2024). B. Changes in the number of suspected cases of cholera infection per month from January to March 2024. Afghanistan, Zambia, Zimbabwe, Congo, Haiti, Mozambique, and Somalia reported the highest number of cholera cases during the period from January to March 2024.

The global prevalence of insect-borne infectious diseases

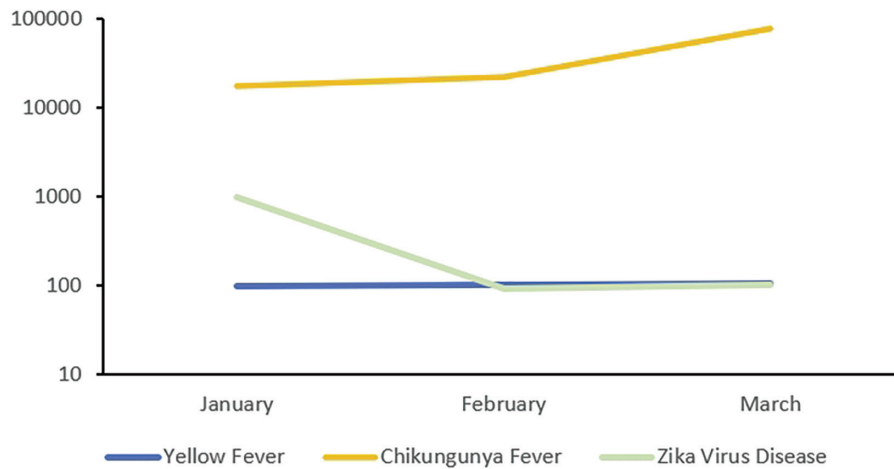


FIGURE 5 | Suspected cases of three kinds of arbo-borne infectious diseases from January to March 2024, including yellow fever, Chikungunya fever, and Zika virus infection.

[13]. Between January and March 2024, the Democratic Republic of Congo reported the highest number of cases with approximately 20,050 deaths. Comparing this data with that from September to December 2023, some countries, such as Afghanistan and Ethiopia, have observed a decrease in measles cases, while other countries, like Britain, have experienced an increase.

INSECT-BORNE INFECTIOUS DISEASES

Insect-borne infectious diseases, also known as vector-borne diseases, are infections transmitted by the bite

of infected arthropod species, such as mosquitoes, ticks, and fleas [14]. During the period from January to March 2024, yellow fever and Zika virus infections had a relatively stable prevalence, Chikungunya fever surged in February followed by a steep decline in March (Fig 5). Chikungunya fever appears to have a significant number of cases in some regions, with Brazil showing a high number of both suspected and confirmed cases. The data suggest that while Chikungunya and Zika virus infections have widespread transmission, yellow fever, although less widespread, is more severe given the number of deaths (Table 2).

TABLE 2 | Worldwide insect-borne infectious diseases cases reported between January and March 2024.

Record period	Location	Cumulative suspected cases (confirmed cases) reported during the record period	Cumulative deaths reported during the record period	Data source
Chikungunya fever				
21/01/2024-27/01/2024	U.S.	(2)	0	U.S. CDC
01/01/2024-03/02/2024	Argentina	(89)	0	Who Regional Office for the Americas
01/01/2024-09/03/2024		216		
01/01/2024-02/03/2024	Barbados	1923		WHO Regional Office for the Americas
01/01/2024-27/01/2024	Bolivia	60		WHO Regional Office for the Americas
01/01/2024-24/02/2024		126		
01/01/2024-27/01/2024	Brazil	14189 (11128)	3	Who Regional Office for the Americas
28/01/2024-10/02/2024		20580 (16779)	1	Who Regional Office for the Americas
01/01/2024-24/02/2024		56154 (43096)	10	Who Regional Office for the Americas
01/01/2024-16/03/2024		111437 (81133)	36	WHO Regional Office for the Americas
01/01/2024-27/01/2024	Brazilian	14189 (11128)	3	WHO Regional Office for the Americas
01/01/2024-24/02/2024		56154 (43096)	10	
01/01/2024-04/03/2024	Central African Republic	708 (9)	2	Africa CDC
01/01/2024-27/01/2024	Columbia	13		WHO Regional Office for the Americas
01/01/2024-27/01/2024		13	0	
01/01/2024-10/02/2024		16	0	
01/01/2024-09/03/2024		17		
01/01/2024-17/02/2024	Costa Rica	4 (1)	0	Who Regional Office for the Americas
01/01/2024-09/03/2024		6		
01/01/2024-04/03/2024	Democratic Republic of Congo	46 (14)		Africa CDC
01/01/2024-17/02/2024	El Salvador	5		WHO Regional Office for the Americas
01/01/2024-24/02/2024	Guatemala	2	0	Who Regional Office for the Americas
01/01/2024-09/03/2024		10		
01/01/2024-13/01/2024	Paraguay	973 (3)		WHO Regional Office for the Americas
14/01/2024-10/02/2024		1302	0	
01/01/2024-10/02/2024		2275 (24)	0	
01/01/2024-09/03/2024		2395 (25)		
01/01/2024-17/02/2024	Peru	10 (2)	1	Who Regional Office for the Americas
01/01/2024-24/02/2024		15 (4)	1	
01/01/2024-02/03/2024		17 (5)	1	
01/01/2024-24/02/2024	Peru	15 (4)	1	WHO Regional Office for the Americas
01/01/2024-07/01/2024	Senegal	7		Africa CDC
01/01/2024-17/02/2024	Salvador	5	0	Who Regional Office for the Americas
Zika virus disease				
07/01/2024-01/01/2024	Mali	10		Africa CDC
01/01/2024-03/01/2024	Thailand	19		ProMED-mail
01/01/2024-24/02/2024	Bolivia	65		WHO Regional Office for the Americas
01/01/2024-27/01/2024		27		

TABLE 2 | (continued)

Record period	Location	Cumulative suspected cases (confirmed cases) reported during the record period	Cumulative deaths reported during the record period	Data source
01/01/2024-03/02/2024	Costa Rica	6	0	Who Regional Office for the Americas
01/01/2024-17/02/2024		9	0	
01/01/2024-09/03/2024		7		
01/01/2024-20/01/2024	Brazil	127 (5)	0	Who Regional Office for the Americas
21/01/2024-03/02/2024		736 (43)	0	
01/01/2024-27/01/2024	Columbia	33	0	Who Regional Office for the Americas
01/01/2024-10/02/2024		45	0	
01/01/2024-09/03/2024		59		
01/01/2024-24/02/2024	Guatemala	1	0	Who Regional Office for the Americas
01/01/2024-09/03/2024		6		
01/01/2024-20/01/2024	Peru	3		WHO Regional Office for the Americas
01/01/2024-24/02/2024		5	0	
01/01/2024-09/03/2024		7		
01/01/2024-02/03/2024	Ecuador	18		WHO Regional Office for the Americas
01/01/2024-09/03/2024	El Salvador	19		WHO Regional Office for the Americas
01/01/2024-16/03/2024	Paraguay	78		WHO Regional Office for the Americas
01/01/2024-24/02/2024	Puerto Rico	3		WHO Regional Office for the Americas
Yellow fever				
06/01/2024-29/01/2024	South Sudan	30 (1)	6	Africa CDC
10/02/2024-17/02/2024		14 (1)	0	
06/01/2024-17/02/2024		64 (3)	6	
01/01/2024-24/03/2024		87 (3)	6	
27/01/2024-10/02/2024	The Republic of Congo	(11)	0	
01/01/2024-19/03/2024	Colombia	3	3	U. N. Office for the Coordination of Humanitarian Affairs
27/01/2024-10/02/2024	Gabon	(3)	0	African CDC
01/01/2024-24/03/2024		28		
01/01/2024-31/01/2024	Nigeria	189		Nigeria CDC
01/01/2024-19/03/2024	Peru	2	1	U. N. Office for the Coordination of Humanitarian Affairs

SPORADIC INFECTIOUS DISEASES

Sporadic infectious diseases, while not as prevalent as endemic or epidemic diseases, pose their own unique challenges to healthcare systems and require vigilance and readiness to respond when they do occur. In addition to the diseases mentioned above, other global infectious diseases that occurred in the first quarter of 2024 are listed in S1 Table, including polio, Western equine encephalitis, Zika virus infection, Legionnaires' disease, *Streptococcus pneumoniae* infection, hepatitis C, hepatitis E, Crimean-Congo hemorrhagic fever, meningitis, *Salmonella* infection, campylobacteriosis, mumps, Lassa fever, pertussis, bacillary dysentery, tuberculosis

epidemic, coccidiosis, scarlet fever, yellow fever, amebic dysentery, West Nile fever, tetanus, norovirus, rotavirus, mite-borne typhus fever, invasive group A streptococcal infection, Hantavirus infection, Shiga toxin-producing *Escherichia coli* infection, diphtheria, parrot fever, human infection with highly pathogenic avian influenza, Ross River virus disease, varicella, anthrax, cryptosporidiosis, and malaria.

CONCLUSION

In the past 3 decades, >40 previously unidentified infectious diseases have emerged globally. This emergence, coupled with accelerated urbanization, advancing transportation

networks, climate change, and global population aging, has led to the rapid spread and increased recurrence of infectious diseases worldwide. Consequently, these phenomena pose a significant threat to public health and safety, while profoundly impacting economic and social development.

As a result, the effective prevention and control of newly emerging infectious diseases have become pressing imperatives for humanity. Simultaneously, bolstering research efforts aimed at preventing and treating emerging infectious diseases remains an ongoing pursuit within the medical domain, encapsulated by the adage, “with greater knowledge comes greater challenges.” It is an unequivocal responsibility for healthcare practitioners to diligently explore timely and efficacious methods and strategies for preventing and treating newly emerging infectious diseases.

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CONFLICTS OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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