

SHORT COMMUNICATION



Global Infectious Diseases from April-June 2024: Periodic Analysis

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Abstract

Infectious diseases pose a huge threat to human health. Human infectious diseases, especially infections originating from zoonotic or vector-borne sources, are an important global challenge. With the rising number of humans that engage in international travel, infectious disease outbreaks can spread rapidly across continents and borders worldwide. It is therefore important to monitor the transmission of infectious disease efficiently to prevent epidemics. We obtained surveillance data from the Shusi Tech Global Epidemic Information Monitoring System and comprehensively analyzed the timing and location of outbreaks in infected populations from April-June 2024.

Keywords: Infectious disease, Dengue, Cholera, Mumps, MPOX

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INTRODUCTION

Infectious diseases have emerged and circulated worldwide since the development of civilizations and global commerce throughout human history. Indeed, the spread of infectious diseases is not limited to national borders [1]. The communicable disease burden worldwide is surprisingly high due to respiratory pathogens with airborne transmission. The worldwide pandemic of COVID-19 demonstrated the necessity of studying respiratory infectious diseases and the airborne transmission regularity.

Various infectious diseases, such as malaria and dengue, are always affected by climate change. The number of microbota in spring and summer is greater compared to autumn and winter. Effective prevention and control of infectious diseases depends on a thorough understanding of the entire infectious process. Maintaining regular surveillance is

essential for reducing the spread of infectious diseases and managing treatment.

To maximize visualization of the region and pattern of infectious diseases development, we utilized the Shusi Tech Global Epidemic Information Monitoring System to conduct a systematic and comprehensive analysis of global infectious diseases from April-June 2024. (Fig 1).

DENGUE

Warm climate favors mosquitoes capable of transmitting arboviruses. The increase in vectors, such as mosquitoes, might lead to a heavier spread of infectious diseases. For example, dengue fever is considered the most important virus transmitted by mosquitoes globally.

According to WHO data, several countries around the world experienced dengue outbreaks from April-June 2024. Topping the list of dengue outbreaks was Afghanistan, which reported approximately 4,412,392 cumulative suspected

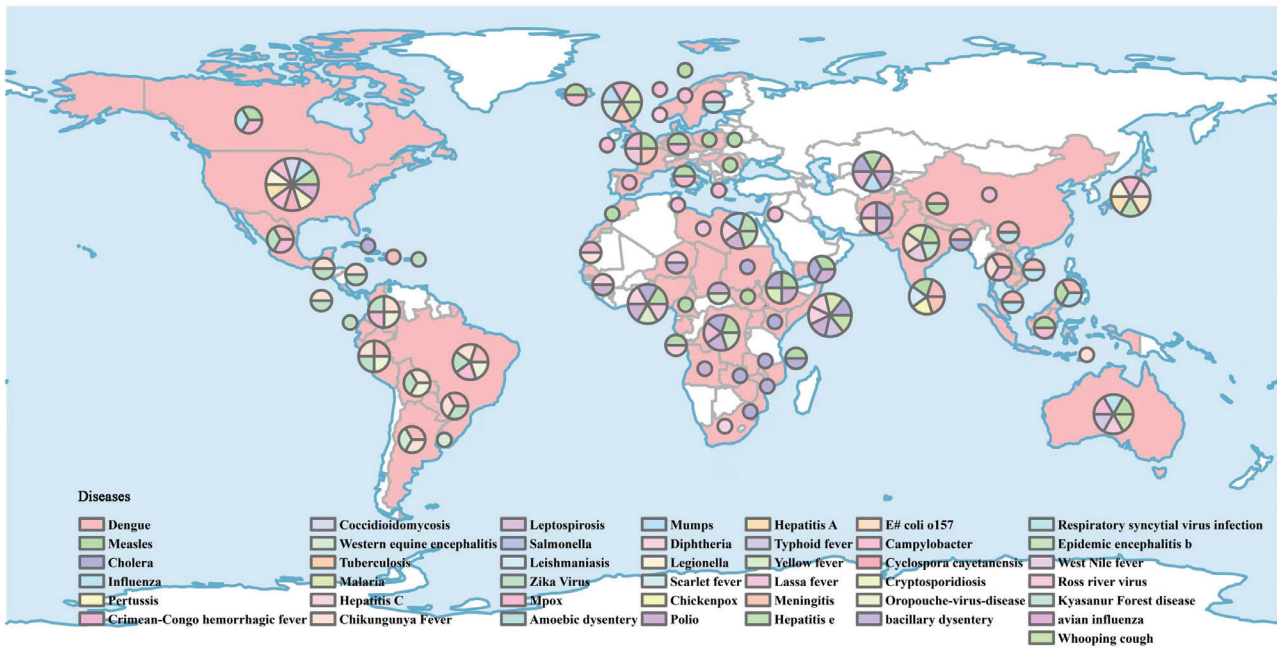


FIGURE 1 | Worldwide distribution of infectious diseases from April-June 2024.

cases of dengue, followed by Brazil with >2,600,000 cases. Additionally, the incidence of dengue outbreaks in Mexico should not be overlooked as well during the past 3 months (Fig 2).

MPOX

Monkeypox has become a major public health issue worldwide [2] that frequently occurs in Africa. Monkeypox was mainly concentrated in the Democratic Republic of Congo and Brazil from April-June 2024 (Fig 3).

Cholera

Throughout underdeveloped and developing countries, cholera continues to cause morbidity and mortality. The

cumulative suspected cases of cholera concentrated in Afghanistan and Pakistan with cumulative deaths reported in Comoros rising rapidly as well over the past 3 months (Fig 4).

INFLUENZA

The incidence of influenza mainly centered in Australia and the United States. The cumulative suspected cases of influenza in the United States have decreased but still rank first in the last 3 months compared to other countries (Fig 5).

MEASLES

Measles still rages across many African countries despite increased vaccination coverage. An efficient strategy to

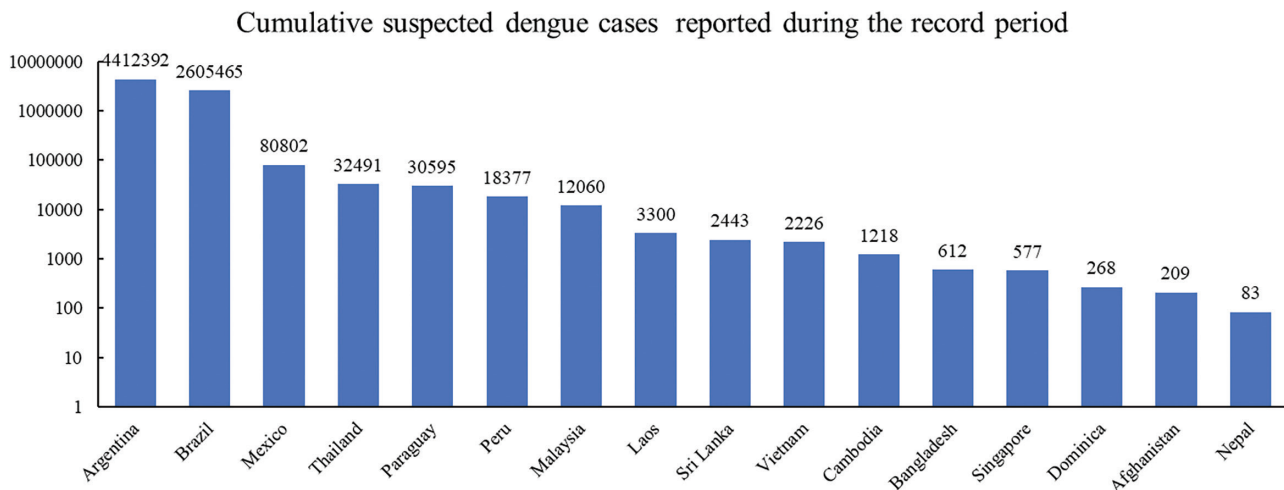


FIGURE 2 | Statistics of cumulative suspected cases of dengue from April-June 2024.

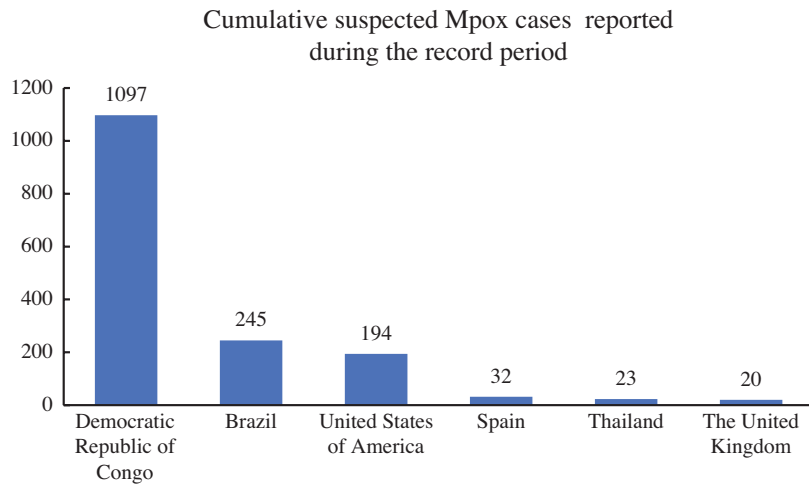


FIGURE 3 | Statistics of cumulative suspected cases of MPOX from April-June 2024.

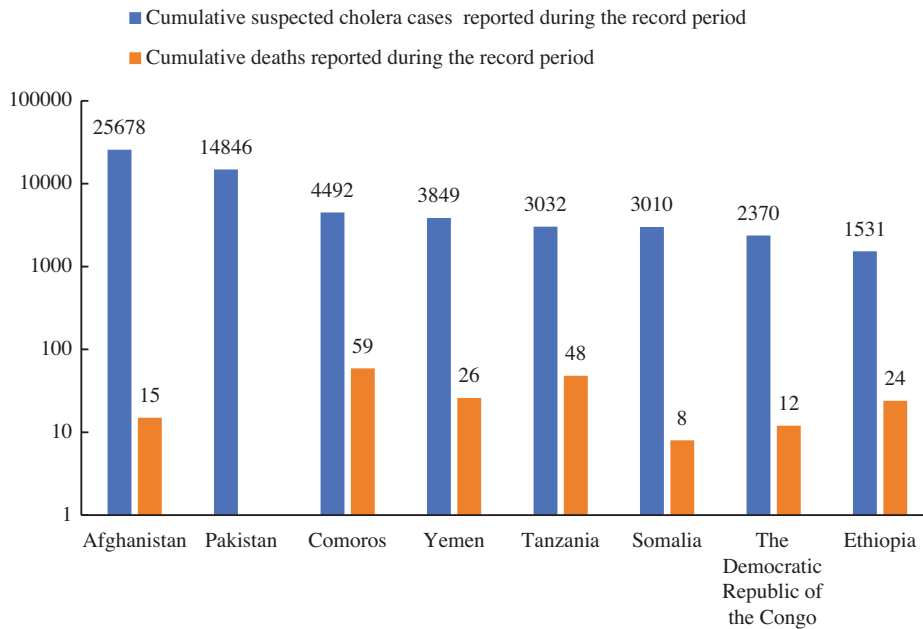


FIGURE 4 | Statistics of cumulative suspected cases of cholera from April-June 2024.

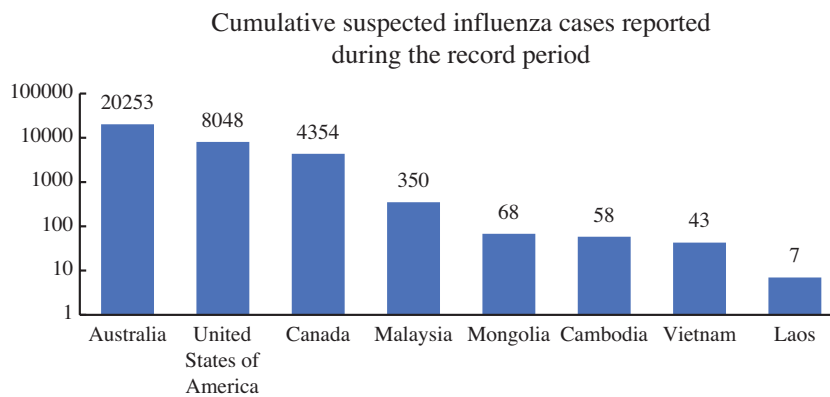


FIGURE 5 | Statistics of cumulative suspected cases of influenza from April-June 2024.

TABLE 1 | Worldwide measles cases reported from April-June 2024.

Record period	Location	Cumulative suspected cases (confirmed cases) reported during the record period	Cumulative deaths reported during the record period	Data source
1/1/2024-20/4/2024	Afghanistan	18744		WHO Regional Office for the Eastern Mediterranean
21/04/2024-27/04/2024		1569	4	
28/04/2024-04/05/2024		1530	2	
12/05/2024-18/05/2024		1681	6	
19/05/2024-25/05/2024		1723		
26/05/2024-01/06/2024		1780		
09/06/2024-15/06/2024		1548	6	
1/1/2024-28/4/2024	Burkina Faso	8315	39	African Center for Disease Control and Prevention
29/04/2024-12/05/2024		913 (362)		
25/05/2024-01/06/2024		170		
01/06/2024-09/06/2024		134		
01/01/2024-06/04/2024	Chad	3630 (64)	11	African Center for Disease Control and Prevention
06/04/2024-27/04/2024		405	4	
27/04/2024-12/05/2024		518	7	
25/05/2024-01/06/2024		207		
15/06/2024-22/06/2024		114		
01/01/2024-12/05/2024	Burundi	7642	99	African Center for Disease Control and Prevention
04/05/2024-12/05/2024		786		
15/06/2024-22/06/2024		979	11	
01/01/2024-20/04/2024	Canada	65		Public Health Agency of Canada
21/04/2024-27/04/2024		5		
12/05/2024-18/05/2024		1		
06/04/2024-12/05/2024	Cameroon	204 (109)	17	African Center for Disease Control and Prevention
18/05/2024-22/06/2024		408 (204)		
01/01/2024-19/04/2024	Democratic Republic of Congo	37304	909	African Center for Disease Control and Prevention
20/04/2024-12/05/2024		5643	84	
18/05/2024-09/06/2024		321		
15/06/2024-22/06/2024		2152	74	
01/01/2024-26/04/2024	Ethiopia	18353	142	African Center for Disease Control and Prevention
27/04/2024-12/05/2024		2227	30	

TABLE 1 | (continued)

Record period	Location	Cumulative suspected cases (confirmed cases) reported during the record period	Cumulative deaths reported during the record period	Data source
18/05/2024-01/06/2024		336		
01/01/2024-10/05/2024	Austria	419		European Union Centers for Disease Control and Prevention
01/06/2024-11/06/2024		446		
01/01/2024-03/05/2024	Morocco	4661 (1526)	10	African Center for Disease Control and Prevention
04/05/2024-12/05/2024		438 (159)	1	
15/06/2024-22/06/2024		365 (131)		
24/02/2024-12/05/2024	Nigeria	5103 (2376)	31	African Center for Disease Control and Prevention
27/04/2024-30/05/2024	United States of America	18		The United States Centers for Disease Control and Prevention
31/05/2024-16/06/2024	United States of America	5		
01/01/2024-14/05/2024	France	86		European Union Centers for Disease Control and Prevention
01/01/2024-05/05/2024	Hungary	15		European Union Centers for Disease Control and Prevention
01/01/2024-14/05/2024	Denmark	14		European Union Centers for Disease Control and Prevention
01/01/2024-12/05/2024	Romania	14879	15	European Union Centers for Disease Control and Prevention
01/01/2024-14/05/2024	Germany	274		European Union Centers for Disease Control and Prevention
01/01/2024-30/04/2024	Poland	128		European Union Centers for Disease Control and Prevention
01/01/2024-13/05/2024	Ireland	26		European Union Centers for Disease Control and Prevention
30/03/2024-12/05/2024	Gabon	31		African Center for Disease Control and Prevention
01/01/2024-12/05/2024		137		
01/01/2024-10/06/2024	Malaysia	2008		European Union Centers for Disease Control and Prevention
15/06/2024-22/06/2024	Mauritania	67 (2)		African Center for Disease Control and Prevention
01/01/2024-10/06/2024	Nepal	133		European Union Centers for Disease Control and Prevention
01/01/2024-10/06/2024	Sri Lanka	158		European Union Centers for Disease Control and Prevention
01/01/2024-28/04/2024	Uganda	817		The African Regional Office of WHO
01/01/2024-10/06/2024	Yemen	7307		European Union Centers for Disease Control and Prevention
01/01/2024-15/05/2024	Italy	348		European Union Centers for Disease Control and Prevention
01/01/2024-10/06/2024	India	13618		European Union Centers for Disease Control and Prevention
01/01/2024-10/06/2024	Indonesia	1392		European Union Centers for Disease Control and Prevention

eliminate measles includes strengthening surveillance. According to the collected measles incidence data from April–June 2024, the cumulative suspected cases were mainly located in Afghanistan and the Democratic Republic of Congo. The highest number of confirmed cases was reported from Burkina Faso with 362 cases between 29 April and 5 December 2024 (Table 1). Cutting off contact with patients and their families is the key to preventing measles. It is also necessary to be in good health and receive the measles vaccine on time.

Mumps

The parotitis virus (MuV) causes mumps, which is also known as infectious parotitis or epidemic parotitis, and commonly infects children and adolescents. A seasonal pattern was observed in the incidence of mumps in various geographic areas, with peaks in the late spring and early summer. The cumulative suspected cases of mumps have occurred in Britain and South Korea, and occasionally in Taiwan and Singapore in the past 3 months (Table 2).

SPORADIC INFECTIOUS DISEASES

The incidence of other infectious diseases occurred sporadically as previously reported. Pertussis, commonly

referred to as whooping cough, is an infection caused by the gram-negative coccobacillus, *Bordetella pertussis*. Despite high vaccine coverage, various countries have experienced a resurgence of pertussis over recent decades even though the global pertussis incidence is still declining. In the past 3 months the incidence of pertussis was primarily located in Britain and South Korea (S1 Table).

Legionnaires' disease (LD) is an infection caused by *Legionella* spp. The most common *Legionella* spp. that are human pathogens are *L. micdadei*, *L. bozemanii*, and *L. longbeachae*. The United States and Europe have reported an increase in *Legionella* infections in recent years. We found that Hong Kong, especially Taiwan, China, have experienced a small scale of LD outbreaks in the last 3 months (S1 Table).

CONCLUSION

Spring and summer are the peak seasons of infectious disease outbreaks. With the rise in temperatures, some mosquito-borne and intestinal infectious diseases enter the high incidence season. Countries will be vulnerable to viral invasion or exposure to infectious disease epidemics if attention is not paid to exercising regularly and strengthening self-protection.

TABLE 2 | Worldwide mumps cases reported from April–June 2024.

Record period	Location	Cumulative suspected cases (confirmed cases) reported during the record period	Cumulative deaths reported during the record period	Data source
1/1/2024–20/4/2024	Afghanistan	18744	94	WHO Regional Office for the Eastern Mediterranean
06/05/2024–12/05/2024	Britain	74		British Health and Safety Agency
15/04/2024–21/04/2024		93		
29/04/2024–05/05/2024		88		
27/05/2024–02/06/2024		66	2713	
03/06/2024–09/06/2024		84	2817	
1/1/2024–28/4/2024	Burkina Faso	8315	39	Africa Disease Control
1/1/2024–28/4/2024	Chad	4035	11	Africa Disease Control
28/04/2024–04/05/2024	Singapore	6		Singapore Ministry of Health
26/05/2024–01/06/2024		6	115	
02/06/2024–08/06/2024		6	121	
09/06/2024–15/06/2024		8	129	
05/05/2024–11/05/2024	South Korea	185		South Korea Center for Disease Control and Prevention
12/05/2024–18/05/2024		188		
02/06/2024–08/06/2024		99	3059	
09/06/2024–15/06/2024		178	3384	
21/04/2024–27/04/2024	Taiwan, China	3		Taiwan, China Centers for Disease Control and Prevention
26/05/2024–01/06/2024		9	170	
09/06/2024–15/06/2024		6	184	

Insect-borne diseases, such as dengue fever, which have been heavily affected by the climate, have seen large-scale outbreaks in parts of the world. The global epidemic caused by the novel coronavirus JN. 1 variant strain has passed its peak and dropped to a low level. We should be vigilant for infectious disease epidemics and implement precautions in advance, especially before travel. Monitoring and taking effective therapeutic measures for protecting individuals is also essential. In addition, maintaining a healthy lifestyle is good for improving our immunity, which will also play an important role in protecting us from infectious diseases.

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CONFLICT OF INTEREST STATEMENT

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

REFERENCES

1. Mercer A. Protection against severe infectious disease in the past. *Pathog Glob Health*. 2021;115(3):151-167.
2. Lu J, Xing H, Wang C, Tang M, Wu C, Ye F, et al. Mpox (formerly monkeypox): pathogenesis, prevention, and treatment. *Signal Transduct Target Ther*. 2023;8(1):458.