



SHORT COMMUNICATION

Global Infectious Diseases in October 2022: Monthly Analysis

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Abstract

Infectious diseases continue to pose a major threat to worldwide public health. Infections by Coronavirus Disease 2019 have eased but continue to negatively affect international economic development. The situation of other infectious diseases, such as monkeypox and mosquito-borne diseases, became stable in October. Monitoring epidemic situation of infectious diseases can provide rapid insight into global transmission trends and assist in predicting epidemic situations. Visualizations and analyses summarizing the past few weeks of global data on major infectious diseases are provided.

Key words: Infectious disease, COVID-19, Transmission

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Received: November 20 2022

Revised: November 22 2022

Accepted: November 23 2022

Published Online: December 7 2022

INTRODUCTION

Globally, severe outbreaks of infectious diseases, including Coronavirus Disease 2019 (COVID-19), have plagued the 21st century, destroying people's lives and livelihoods [1]. In addition to epidemic prevention measures, vaccines, and specific remedies, regional and case monitoring are essential to comprehensively control infectious diseases. Climate and regional factors greatly affect the spread of infectious diseases. As winter approaches, respiratory infections become more common. COVID-19 and influenza are significantly more likely to outbreak synchronously in winter, particularly with the onset of the flu season. Globally, BA.5.2 is the dominant strain of the Omicron variant. Other contagious diseases, such as monkeypox, remain prevalent worldwide.

Therefore, reviewing infectious disease data regularly is crucial to monitor potential changes in transmission rates and modes. Analyzing epidemiological data can increase understanding of how epidemics spread and their speed of spread. A summary of the major infectious diseases

worldwide, on the basis of the Shusi Tech's Global Epidemic Information Monitoring System, is presented in this article. (Fig 1).

COVID-19

Globally, more than 10 million new cases and more than 30,000 deaths were reported between September 24 and October 24 (Fig 2). According to statistics, the cases in the Americas have yet to be effectively controlled. In contrast, other regions are seeing a leveling off of case increases with respect to the previous month [2]. In China, Xinjiang and Guangdong showed continual increases in cases with respect to the prior month. The highest numbers of confirmed cases and asymptomatic infections were found in Inner Mongolia in early October, possibly because of travel associated with National Day. The Tibetan region showed a clear decreasing trend after effective control in mid-October.

Monkeypox

According to the WHO, the monkeypox epidemic has affected primarily European

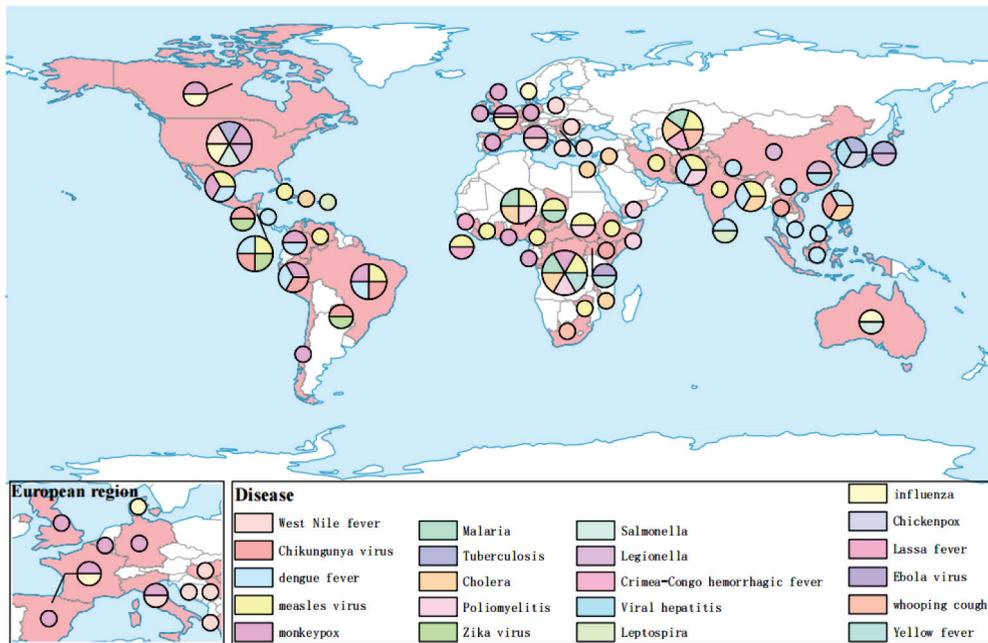


FIGURE 1 | Worldwide distribution of infectious diseases in the October 2022.

countries and U.S.A as of October 2022. As shown in Table 1, the number of new infections decreased this month with respect to the previous 2 months. Because monkeypox has been responded to and treated effectively in many countries, it has been controlled in most epidemic areas. However, vigilance is necessary in case another epidemic occurs.

Dengue

As shown in Table 2, the dengue virus spread mainly in Southeast Asia and America in October 2022, and the number of newly reported infections decreased with respect to the prior month. Dengue virus is likely to spread more slowly after this month as mosquito-borne diseases decrease with the cooler weather.

Measles

The measles virus is spreading rapidly in African, South Asian, and American populations. In developing countries, measles is a major epidemic because of a lack of vaccination. Table 3 shows the global measles outbreak report as of the past month.

Malaria

According to Table 4, Nigeria, Congo, and Chad reported most of the malaria cases in the past month. More than 2 million new cases of infection were reported in Congo last month, whereas Nigeria and Chad reported 70 thousand and 80 thousand cases, respectively.

Zika virus and Chikungunya virus

Zika virus spreads in the same region as the Chikungunya virus (including El Salvador, Guatemala, and Brazil). Brazil

reported the most cases of these two viruses. Because these two viruses do not have a specific drug or vaccine available, attention should be paid to their epidemics from May to November of each year. Tables 5 and 6 summarize last month's Zika and Chikungunya virus reports.

Cholera

As of October 2022, Lebanon has faced a new cholera epidemic as shown in Table 7. Cholera infections increased to a greater extent than observed last month, and most cases were concentrated in Congo, Somalia, Nigeria, and Afghanistan.

Influenza

The high mutability and infectivity of the influenza virus have caused many outbreaks worldwide. As shown in Table 8, influenza infection rates increased in the U.S.A. and Canada in October 2022. The influenza epidemic should be monitored over the next few months to prevent a major outbreak.

Poliomyelitis

According to the Global polio website, poliomyelitis/poliovirus type 1 (WPV1) has spread mainly in African countries, including Mozambique, Pakistan, Yemen, the Central African Republic, Somalia Nigeria, and Congo. Notably, circulating vaccine-derived poliovirus type 1 (cVDPV1) and circulating vaccine-derived poliovirus type 2 (cVDPV2) outbreaks in Congo and a cVDPV2 outbreak in Yemen occurred. More details are shown in Table 9.

Other infectious diseases

Over the past month, some continents or countries have reported sporadic spread of Lassa fever, viral hepatitis,

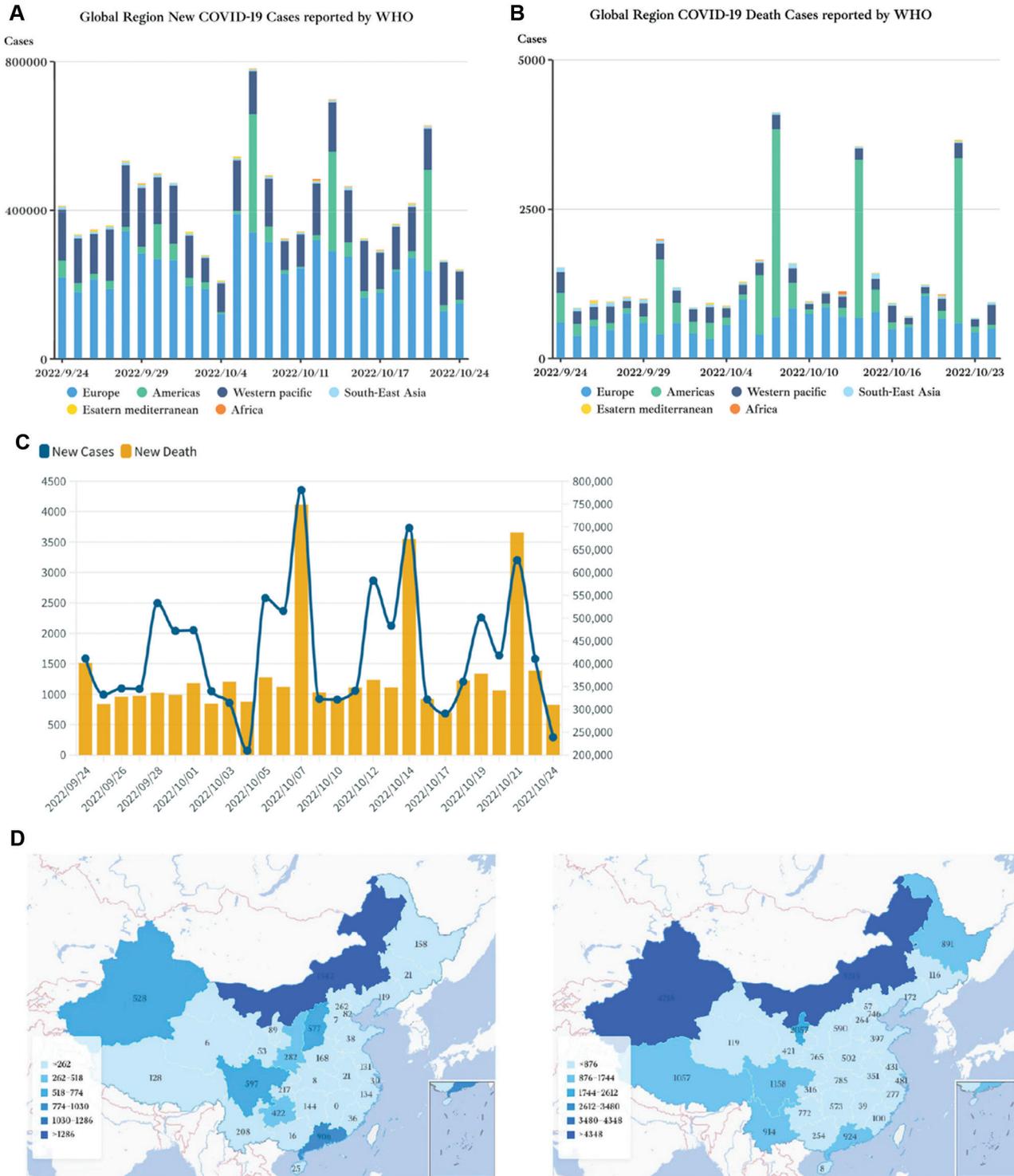


FIGURE 2 | Continued

yellow fever, and West Nile fever (Table 10). Notably, the Ebola virus arrived in Uganda this month.

CONCLUSION

Since October, SARS-CoV-2 infections and mortality rates have decreased worldwide. Owing to its extreme immune escape, COVID-19 remains a threat to the older

and immunocompromised people, despite to higher vaccination coverage [3]. Influenza places a major burden on society and the health care system [4]. Influenza and novel coronaviruses present very similar clinical symptoms. SARS-CoV-2 is not detectable by real-time reverse transcription PCR in early infection stage, particularly if patients test positive for influenza [5,6]. In Canada and

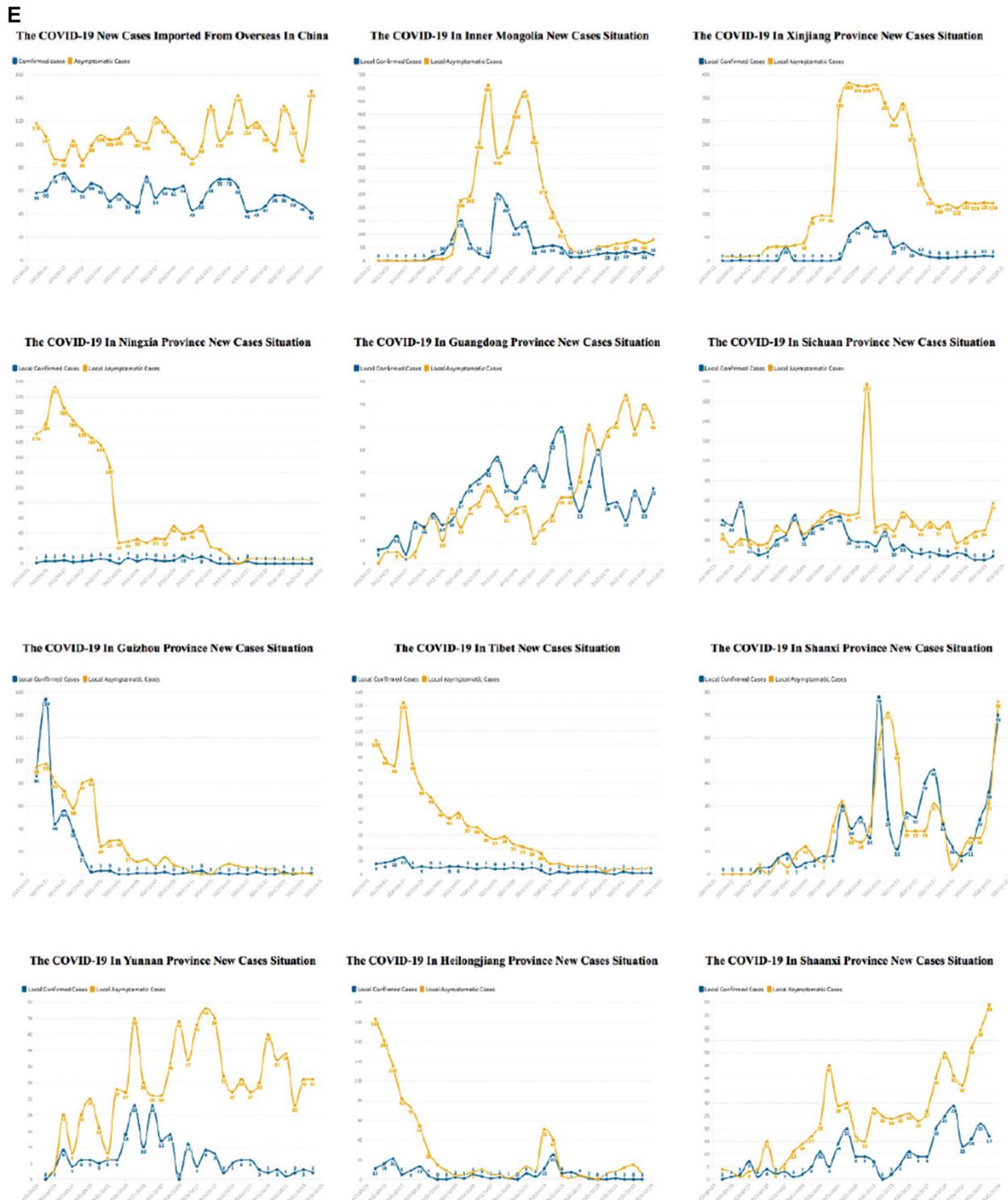


FIGURE 2 | Daily statistics of new confirmed cases worldwide. A-B: New daily confirmed cases and deaths in October worldwide (distribution map of each continent). C: New daily confirmed cases and deaths worldwide (September 24, 2022 to October 24, 2022; data were obtained from the World Health Organization (website: <https://covid19.who.int/>)). D: Map of new COVID-19 cases by province in China, with confirmed cases indicated on the left and asymptomatic cases indicated on the right; the number of cases in Hong Kong, Macau, and Taiwan is not shown in the graph. E: New weekly confirmed cases in selected provinces in China (September 24, 2022 to October 24, 2022; data were obtained from the National Health Commission of the People's Republic of China (website: <http://www.nhc.gov.cn/>)).

TABLE 1 | Monkeypox reported worldwide between 9/24/2022 and 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
19/5–22/9	Belgium	757		ProMED-mail
1/1–14/9	Republic of Congo		10	WHO Regional Office for Africa
1/1–18/9	Democratic Republic of the Congo		3797	
24/5–10/3	Ghana	535		
29/8–4/9	Nigeria	111	815	Nigeria CDC
19/5–12/10	Canada	1411		WHO
17/6–12/10	Chile	1012		
20/5–12/10	Italy	856		
28/5–14/10	Mexico	2147		
18/5–17/10	U.S.A.	27128		
8/6–17/10	Brazil	8621		
19/5–19/10	Spain	7277		
20/5–19/10	France	4084		
6/5–19/10	Britain	3686		
20/5–19/10	Germany	3656		
23/6–19/10	Columbia	3110		
26/6–19/10	Peru	2913		

TABLE 2 | Dengue virus reported worldwide between 9/24/2022 and 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
4/9–10/9	El Salvador	337	14325	WHO Regional Office for Africa
1/1–10/9	Philippines		160594	Outbreak News Today
1/1–5/10	Vietnam		236730	
1/1–10/10	Pakistan		41746	
1/1–17/10	Nepal		41743	
1/1–20/9	Laos		25181	
1/9–23/9	Bangladesh	6819	13000	Global Incident Map
7/10		712	20235	Outbreak News Today
25/9–1/10	Malaysia	1460	43544	Malaysia Health Ministry
9/10–15/10	Singapore	378	28938	Singapore Environment Agency
1/10–7/10	Sri Lanka	729	49366	Sri Lanka Health Ministry
28/8–17/9	Brazil	58608	2131615	WHO Regional Office for the Americas
18/9–8/10	Nicaragua	9628	62973	
2/10–8/10	Peru	531	60992	
	Columbia	1424	50688	
25/9–15/10	Afghanistan	185	313	WHO Regional Office for the Eastern Mediterranean
1/1–17/10	Indonesia		94355	ProMED-mail

TABLE 3 | Measles virus reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
4/9–10/9	Mexico	2464	26786	
1/1–10/9	El Salvador		491	WHO Regional Office for the Americas
29/8–25/9	Democratic Republic of the Congo	8614	1125146	U.N. Office for the Coordination of Humanitarian Affairs
1/1–4/9	Central African Republic		1194	WHO Regional Office for Africa
1/1–7/9	Liberia		6726	
1/1–11/9	Chad		2700	
10/4–30/9	Zimbabwe	7394		
1/1–30/9	Ethiopia		9850	
1/1–8/10	Brazil		2769	WHO Regional Office for the Americas
	Mexico		2128	
	Venezuela		1447	
	Cuba		1108	
	Columbia		901	
1/1–10/9	El Salvador		491	
1/1–11/10	India		49577	WHO
	Bangladesh		4569	
	Pakistan		13022	
	Iran		7869	
	Nigeria		26045	
	Cote d'Ivoire		4795	
	Cameroon		2862	

TABLE 4 | Malaria reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
18/9–24/9	Afghanistan	39	1816	WHO Regional Office for the Eastern Mediterranean
29/8–25/9	Nigeria	72985	674055	U.N. Office for the Coordination of Humanitarian Affairs
	Democratic Republic of the Congo	2776274	24721084	
19/9–2/10	Chad	84152	795780	
1/9–30/9	Thailand	130	2050	Thai Health Ministry
1/1–8/10	U.S.A.		1047	U.S. CDC

TABLE 5 | Zika virus reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
2/10–8/10	Paraguay	69	345	Paraguay Health Ministry
1/1–1/10	Guatemala		1563	WHO Regional Office for the Americas
	El Salvador		146	
1/9–30/9	Thailand	17	136	Thai Health Ministry
1/1- 15/9	Brazil		10500	Outbreak News Today

TABLE 6 | Chikungunya virus reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
13/2–18/9	Kenya	291		WHO Regional Office for Africa
1/1–1/10	Paraguay		501	Paraguay Health Ministry
1/1–1/10	Malaysia		649	Malaysia Health Ministry
1/1–9/10	Thailand		673	Outbreak News Today
1/1–17/9	Philippines		501	
28/8–17/9	Brazil	10661	240344	WHO Regional Office for the Americas
1/1–1/10	Guatemala		1435	
	El Salvador		143	
1/1–8/10	Peru		275	

TABLE 7 | Cholera reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
1/1–19/9	Bangladesh		519217	EU CDC
1/1–3/9	Philippines		3430	Philippines Health Ministry
18/9–15/10	Afghanistan	21380		WHO Regional Office for the Eastern Mediterranean
1/1–2/10	Nigeria		10754	Nigeria CDC
29/8–25/9	Democratic Republic of the Congo	1083	10033	U.N. Office for the Coordination of Humanitarian Affairs
29/8–9/10	Somalia	1591	11034	
29/8–17/9	Niger	34		WHO Regional Office for Africa
3/3–7/10	Malawi	4107		
13/1–8/10	Mozambique	3685		
30/9–18/10	Haiti	725		Haiti Health Ministry
25/8–19/10	Syria	908		ProMED-mail
5/10–19/10	Lebanon	169		Lebanon Health Ministry

TABLE 8 | Influenza reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
11/9–8/10	U.S.A.	2144		U.S. CDC
26/9–9/10	Australia	1516	225332	Australia Health Ministry
2/10–15/10	Canada	652		Canada Health Ministry

the United States, influenza cases have been reported to be concentrated and increasing. Some co-infected patients might not have tested positive for SARS-CoV-2 in early stages, thus resulting in the potential for severe outbreak of the disease. In 2022, monkeypox, an orthopoxvirus infectious disease, broke out in the Americas and Europe for the first time. Monkeypox viruses in Europe have been reported to have originated from western Africa [7]. A study by Khani has suggested that brincidofovir and tecovirimat may be effective against monkeypox. The

development of monkeypox-targeted drugs is encouraged, despite genomic sequence conservation of orthopoxviruses [8].

This summer, several countries experienced serious outbreaks of mosquito-borne diseases. The most severe epidemics occurred in Southeast Asia and the Americas. Researchers are developing various genetic modification technologies to limit the survival of mosquito vector [9]. Meanwhile, vaccines against mosquito-borne viruses are continually being developed [10,11].

TABLE 9 | Poliomyelitis reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
14/9–20/9	Mozambique	1 (WPV1)		Global polio website
28/9–4/10	Mozambique	4 (1 WPV1 and 3 cVDPV1)		
30/9	Pakistan	1 (WPV1)		
21/9–4/10	Yemen	18 (cVDPV2)		
12/10–18/10	Yemen	5 (cVDPV2)		
28/9–4/10	Central African Republic	3 (cVDPV2)		
28/9–4/10	Somalia	1 (cVDPV2)		
5/10–11/10	Nigeria	3 (cVDPV2)		
14/9–18/10	Democratic Republic of the Congo	68 (44 cVDPV2 and 24 cVDPV1)		

TABLE 10 | Sporadic infectious diseases reported worldwide from 9/24/2022 to 10/23/2022.

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
Salmonella				
11/9–15/10	U.S.A.	1575	36397	U.S. CDC
5/9–18/9	Australia	265	7586	Australia Health Ministry
2/10–8/10	Singapore	27	1060	Singapore Health Ministry
Legionella				
11/9–8/10	Taiwan, China	25	252	Taiwan Disease Control Agency
25/9–1/10	U.S.A.	48	4248	U.S. CDC
9/10–15/10	Hong Kong, China	4	69	Hong Kong Health Protection Center
3/10–9/10	Japan	227	1694	Japan National Institute of Infectious Diseases
Crimea-Congo hemorrhagic fever				
1/1–15/10	Afghanistan		360	WHO Regional Office for the Eastern Mediterranean
Viral hepatitis				
11/9–8/10	Taiwan, China	39	362	Taiwan Disease Control Agency
01/9–31/9	Thailand	392	3820	Thai Health Ministry
9/10–15/10	Korea	80	6718	Korea CDC
Leptospira				
10/9–7/10	Sri Lanka	364	4368	Sri Lanka Health Ministry
01/9–31/9	Thailand	487	1992	Thai Health Ministry
1/1–10/10	Puerto Rico		226	Outbreak News Today
Chickenpox				
11/9–15/10	Korea	509	14113	Korea CDC
01/9–31/9	Thailand	1398	9152	Thai Health Ministry
Lassa fever				
10/8–26/9	Guinea	19		WHO Regional Office for Africa
1/1–18/9	Liberia	117		
12/9–9/10	Nigeria	221	6883	Nigeria CDC

TABLE 10 | Continued

Occurrence (In 2022)	Location	Number newly reported during the day	Cumulative cases during the year	Data source
Ebola virus				
20/9–22/10	Uganda	75		Outbreak News Today
Whooping cough				
1/1–15/9	South Africa		147	Outbreak News Today
1/1–8/10	Afghanistan		757	WHO Regional Office for the Eastern Mediterranean
Yellow fever				
1/1–11/9	Democratic Republic of the Congo		734	U.N. Office for the Coordination of Humanitarian Affairs
1/2–4/10	Uganda	398		WHO Regional Office for Africa
Tuberculosis				
1/9–31/9	Korea	580	6394	Korea CDC
12/9–9/10	Japan	773	11166	Japan National Institute of Infectious Diseases
11/9–15/10	U.S.A.	367	3888	U.S. CDC
West Nile fever				
25/8–21/9	Hungary	12		EU CDC
28/7–5/10	Romania	47		
15/9–12/10	Greece	45		
1/1–18/10	U.S.A.		766	
22/9–19/10	Italy	100		
15/9–19/10	Serbia	64		

ACKNOWLEDGEMENTS

Shiping He, Dayong Gu, and Qun Su conceived and designed the project. Yi Luo and YinFu Sun collected data and wrote the manuscript. Wenjin Yu, Jiazhen Zou produced the figures. Shiping He revised the manuscript. Dayong Gu supervised the study. This research was supported by the Guangdong Science and Technology Foundation (No. 2021A1515220084).

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