

### The Current Status of Epidemiology, Diagnosis, Treatment and Vaccine Development of Rift Valley Fever

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#### Abstract

Rift Valley fever (RVF) is an ecologically complex emerging zoonotic, arboviral disease transmitted by a broad spectrum of mosquito species to animals (domestic and wild ruminants and camels), causing high rates of neonatal mortality and abortion. Human infections result in a wide variety of clinical outcomes, ranging from self-limiting febrile illness to life-threatening hemorrhagic diseases and miscarriages. Since its discovery in Kenya in 1930, RVF has caused many outbreaks in the African continent, Indian Ocean, and Middle East, with major impacts on human and animal health and severe recurring economic losses. Currently, therapeutics and vaccines are unavailable for humans. Therefore, RVF is considered a high-priority pathogen according to the WHO R&D Blueprint. The WHO R&D Blueprint focuses on and catalyzes international efforts to ensure the coordinated development of medical countermeasures. In this article, we summarized relevant information on international RVF epidemics, pathogenesis and clinical manifestations, diagnosis, the status of therapeutics and vaccine development, and identifies knowledge gaps in the challenges of preventing and controlling RVF, which can provide references for future epidemic prevention policies.

**Keywords:** Rift Valley fever, arboviral disease, zoonotic infectious disease

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Weekly Data of Notifiable Inases (by week of diagnosis)

Case diagnosis year		Week 16★		Week 1-16			
Classification	Disease Diagnosed	2023	2022	2023		2022	
				Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
Category II	Acute Flaccid Paralysis	1	0	15	0	8	0
	Acute Viral Hepatitis type A	1	3	32	1	84	0
	Amoebiasis	3	5	81	33	63	18
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	1	0	4	4	0	0
	Cholera	0	0	0	0	0	0
	Dengue Fever	4	0	34	34	0	0
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus syndrome	0	0	2	0	1	0
	Malaria	0	1	1	1	2	2
	Measles	0	0	1	1	0	0
	Meningococcal Meningitis	0	0	0	0	0	0
	Paratyphoid Fever	1	0	3	0	0	0
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	0	0	0	0
	Shigellosis	3	3	18	6	28	0
	Typhoid fever	1	0	1	1	1	0
	West Nile Fever	0	0	0	0	0	0
Zika virus infection	0	0	0	0	0	0	
Mpox	13	-	44	5	-	-	
Category III	Acute Viral Hepatitis type B	5	1	44	2	39	0
	Acute Viral Hepatitis type C	15	14	179	0	153	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	0	0	4	1	4	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	5	0	0	0
	Haemophilus Influenza type b Infection	0	0	0	0	1	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionnaires' Disease	4	3	77	1	108	0
	Mumps	4	1	79	2	71	0
	Neonatal Tetanus	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	0
Tetanus	1	0	3	0	1	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	3	0	16	0	10	0
	Endemic Typhus Fever	0	2	3	0	2	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	22	0	90	2	0	0
	Invasive Pneumococcal Disease	9	9	101	1	59	0
	Leptospirosis	1	1	11	0	12	0
	Listeriosis	9	3	68	0	39	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	0	0	5	0	0	0
	Q Fever	0	0	1	0	2	0
	Scrub Typhus	1	2	29	0	37	0
Toxoplasmosis	2	0	10	0	11	0	
Tularemia	0	0	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus Infections	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Severe Pneumonia with Novel Pathogens	4	21,317	1,367,199	18,082	38,594	7,936
	Severe Pneumonia with Novel Pathogens (with complications)	680	-	3,108	13	-	-
Yellow Fever	0	0	0	0	0	0	

1. ★ The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.  
 2. MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.  
 3. Numbers of mumps and tetanus cases are summed up by the week of report.  
 4. Since June 23, 2022, "Mpox" has been listed as a Notifiable Infectious Disease.  
 5. Since March 20, 2023, "Severe Pneumonia with Novel Pathogens" has been adjusted to be notifiable only for complications.

## Suspected Clusters

- Thirty-eight clusters related to Upper respiratory tract infection (20), Diarrhea (12), Tuberculosis (3) and Enterovirus (3) were reported during week 16.

## Imported Infectious Diseases

- There were 14 imported cases from at least 7 countries/areas during week 16.
  - Severe Pneumonia with Novel Pathogens (with complications):** 6 cases from USA (3), Japan (1), China (1) and Germany (1).
  - Dengue Fever:** 4 cases from Indonesia (3) and Malaysia (1).
  - Chikungunya Fever:** 1 case from Paraguay.
  - Shigellosis:** 1 case from Indonesia.
  - Amoebiasis:** 1 case from Indonesia.
  - Typhoid fever:** 1 case from Indonesia.
- During week 1–16, there were 18,190 imported cases of notifiable diseases. The top three were Severe Pneumonia with Novel Pathogens (18,082), Dengue Fever (34) and Amoebiasis (33).
- During week 1–16, imported cases of notifiable diseases were from at least 45 countries/areas. The top three were China (3,153), Japan (708) and Korea (180).

## Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens (with complications):** The epidemic slightly increases.
- **Mpox:** Cases with unknown sources of infection are still emerging, raising the risk of domestic transmission.
- **Influenza:** The epidemic gradually increases.
- **Enterovirus:** The epidemic is raising.

### Weekly Data of Notifiable Inases (by week of diagnosis)

Case diagnosis year		Week 17★		Week 1-17			
Classification	Disease Diagnosed	2023	2022	2023		2022	
				Total cases★	Imported cases	Total cases★	Imported cases
Category I	Plague	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0
	SARS	0	0	0	0	0	0
	Smallpox	0	0	0	0	0	0
Category II	Acute Flaccid Paralysis	0	0	15	0	8	0
	Acute Viral Hepatitis type A	2	4	34	1	88	0
	Amoebiasis	7	3	88	34	66	19
	Anthrax	0	0	0	0	0	0
	Chikungunya Fever	0	0	4	4	0	0
	Cholera	0	0	0	0	0	0
	Dengue Fever	3	0	37	37	0	0
	Diphtheria	0	0	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0	0	0
	Hantavirus syndrome	0	0	2	0	1	0
	Malaria	0	0	1	1	2	2
	Measles	0	0	1	1	0	0
	Meningococcal Meningitis	0	0	0	0	0	0
	Paratyphoid Fever	0	0	3	0	0	0
	Poliomyelitis	0	0	0	0	0	0
	Rubella	0	0	0	0	0	0
	Shigellosis	0	0	18	6	28	0
	Typhoid fever	0	0	1	1	1	0
West Nile Fever	0	0	0	0	0	0	
Zika virus infection	0	0	0	0	0	0	
Mpox	14	-	58	5	-	-	
Category III	Acute Viral Hepatitis type B	3	0	47	2	39	0
	Acute Viral Hepatitis type C	8	6	187	0	159	1
	Acute Viral Hepatitis type D	0	0	0	0	0	0
	Acute Viral Hepatitis type E	2	2	6	1	6	0
	Congenital Syphilis	0	0	0	0	0	0
	Congenital Rubella Syndrome	0	0	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	0	5	0	0	0
	Haemophilus Influenza type b Infection	0	0	0	0	1	0
	Japanese Encephalitis	0	0	0	0	0	0
	Legionnaires' Disease	9	2	85	1	110	0
	Mumps	9	2	88	2	73	0
	Neonatal Tetanus	0	0	0	0	0	0
Pertussis	0	0	0	0	0	0	
Tetanus	0	0	3	0	1	0	
Category IV	Botulism	0	0	0	0	0	0
	Brucellosis	0	0	0	0	0	0
	Complicated Varicella	0	0	16	0	10	0
	Endemic Typhus Fever	0	0	3	0	2	0
	Herpesvirus B Infection	0	0	0	0	0	0
	Influenza Case with Severe Complications	16	0	106	2	0	0
	Invasive Pneumococcal Disease	3	4	104	1	63	0
	Leptospirosis	0	2	11	0	14	0
	Listeriosis	4	2	72	1	41	0
	Lyme Disease	0	0	0	0	1	1
	Melioidosis	0	1	5	0	1	0
	Q Fever	0	0	1	0	2	0
	Scrub Typhus	1	4	30	0	41	0
Toxoplasmosis	1	0	11	1	11	0	
Tularemia	0	0	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0	0	0
	Lassa Fever	0	0	0	0	0	0
	Marburg Hemorrhagic Fever	0	0	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus Infections	0	0	0	0	0	0
	Novel Influenza A Virus Infections	0	0	0	0	0	0
	Rift Valley Fever	0	0	0	0	0	0
	Severe Pneumonia with Novel Pathogens	1	77,210	1,367,200	18,082	115,804	8,949
Severe Pneumonia with Novel Pathogens (with complications)	793	-	3,901	17	-	-	
Yellow Fever	0	0	0	0	0	0	

1. ★The weekly and cumulative total numbers include indigenous and imported cases of notifiable infectious diseases.
2. MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen's Disease and Creutzfeldt-Jakob Disease are excluded from the table.
3. Numbers of mumps and tetanus cases are summed up by the week of report.
4. Since June 23, 2022, "Mpox" has been listed as a Notifiable Infectious Disease.
5. Since March 20, 2023, "Severe Pneumonia with Novel Pathogens" has been adjusted to be notifiable only for complications.

## Suspected Clusters

- Fifty-two clusters related to Upper respiratory tract infection (19), Enterovirus (13), Diarrhea (11), Tuberculosis (7) and Varicella (2) were reported during week 17.

## Imported Infectious Diseases

- There were 9 imported cases from at least 7 countries/areas during week 17.
  - **Severe Pneumonia with Novel Pathogens (with complications):** 4 cases from Japan (1), Korea (1), the Philippines (1) and China (1).
  - **Dengue Fever:** 3 cases from Thailand (1), Malaysia (1) and Indonesia (1).
  - **Toxoplasmosis:** 1 case from Malaysia.
  - **Listeriosis:** 1 case from China.
- During week 1–17, there were 18,200 imported cases of notifiable diseases. The top three were Severe Pneumonia with Novel Pathogens (18,082), Dengue Fever (37) and Amoebiasis (34).
- During week 1–17, imported cases of notifiable diseases were from at least 45 countries/areas. The top three were China (3,155), Japan (709) and Korea (181).

## Summary of Epidemic

- **Severe Pneumonia with Novel Pathogens (with complications):** The epidemic increases.
- **Mpox:** The risk of epidemic transmission remains.
- **Influenza:** The epidemic is rising.
- **Enterovirus:** The epidemic is on the rise and is expected to reach the epidemic threshold as early as next week.

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