



WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
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YELLOW FEVER

Notification list in Sri Lanka for communicable disease surveillance has two broad groups of diseases known as group A diseases and group B diseases. Group A diseases are cholera, plague and yellow fever. Group A diseases should be notified to the head of the institute, Medical Officer of Health of that area, Regional Epidemiologist, Regional Director of Health Services, Epidemiology Unit, Deputy Director General (Public Health) and the Director General Of Health Services as quickly as possible using telephone, telegram, fax or email by the treating medical officer. In addition to that routine notification using H544 should also be carried out. It is the responsibility of Ministry of Health to notify the group A diseases to World Health Organization to initiate preventive actions globally since these diseases can cause pandemics within a short period of time causing severe morbidity and mortality.

Though cases of yellow fever are not seen in Sri Lanka it is important to do the surveillance because the vector for this disease, *Aedes* mosquitoes are abundant in Sri Lanka. Therefore, country is vulnerable to suffer another devastating communicable disease spread by *Aedes* mosquito apart from dengue and chickengunya. Following is a comprehensive account on yellow fever.

Yellow fever is an acute viral hemorrhagic disease. The virus is a 40 to 50 nm enveloped RNA virus with positive sense of the Flaviviridae family. The yellow fever virus is transmitted by the bite of female mosquitoes and is found in tropical and subtropical areas in South America and Africa, but not in Asia. The only known hosts of the virus are primates and several species of mosquito. The origin of the disease is most likely to be Africa, from where it was introduced to South America through the slave trade in the 16th century. Since the 17th century, several major epidemics of the disease have been recorded in the Americas, Africa and Europe. In the 19th century, yellow fever was deemed one of the most dangerous infectious diseases.

Signs and symptoms

Once contracted, the virus incubates in the body for

3 to 6 days, followed by infection that can occur in one or two phases. The first, "acute", phase usually causes fever, muscle pain with prominent backache, headache, shivers, loss of appetite, and nausea or vomiting. Most patients improve and their symptoms disappear after 3 to 4 days.

However, 15% of patients enter a second, more toxic phase within 24 hours of the initial remission. High fever returns and several body systems are affected. The patient rapidly develops jaundice and complains of abdominal pain with vomiting. Bleeding can occur from the mouth, nose, eyes or stomach. Once this happens, blood appears in the vomit and faeces. Kidney function deteriorates. Half of the patients who enter the toxic phase die within 10 to 14 days, the rest recover without significant organ damage.

Yellow fever is difficult to diagnose, especially during the early stages. It can be confused with malaria, typhoid, dengue, hepatitis and other diseases, as well as poisoning. Blood tests can detect yellow fever antibodies produced in response to the infection. Several other techniques are used to identify the virus in blood specimens or liver tissue collected after death. These tests require highly trained laboratory staff and specialized equipment and materials.

Populations at risk

Forty-five endemic countries in Africa and Latin America, with a combined population of over 900 million, are at risk. In Africa, an estimated 508 million people live in 32 countries at risk. The remaining population at risk are in 13 countries in Latin America, with Bolivia, Brazil, Colombia, Ecuador and Peru at greatest risk.

There are an estimated 200,000 cases of yellow fever (causing 30,000 deaths) worldwide each year. Small numbers of imported cases occur in countries free of yellow fever.

Although the disease has never been reported in Asia, the region is at risk because the conditions required for transmission are present there.

Contents	Page
1. Article : Yellow Fever	1
2. Surveillance of vaccine preventable diseases & AFP (22 nd –28 th May 2010)	3
3. Summary of newly introduced notifiable diseases (22 nd –28 th May 2010)	3
4. Summary of selected notifiable diseases reported (22 nd –28 th May 2010)	4

WEEKLY EPIDEMIOLOGICAL REPORT SRI LANKA - 2010

Transmission

The yellow fever virus is an *arbovirus* of the *flavivirus* genus, and the mosquito is the primary vector. It carries the virus from one host to another, primarily between monkeys, from monkeys to humans, and from Human to human.

Several different species of the *Aedes* and *Haemogogus* mosquitoes transmit the virus. The mosquitoes either breed around houses (domestic), in the jungle (wild) or in both habitats (semi-domestic). There are three types of transmission cycles.

- **Sylvatic (or jungle) yellow fever:** In tropical rainforests, yellow fever occurs in monkeys that are infected by wild mosquitoes. The infected monkeys then pass the virus to other mosquitoes that feed on them. The infected mosquitoes bite humans entering the forest, resulting in occasional cases of yellow fever. The majority of infections occur in young men working in the forest.
- **Intermediate yellow fever:** In humid or semi-humid parts of Africa, small-scale epidemics occur. Semi-domestic mosquitoes (that breed in the wild and around households) infect both monkeys and humans. Increased contact between people and infected mosquitoes leads to transmission. Many separate villages in an area can suffer cases simultaneously. This is the most common type of outbreak in Africa. An outbreak can become a more severe epidemic if the infection is carried into an area populated with both domestic mosquitoes and unvaccinated people.
- **Urban yellow fever:** Large epidemics occur when infected people introduce the virus into densely populated areas with a high number of non-immune people and *Aedes* mosquitoes. Infected mosquitoes transmit the virus from person to person.

Treatment

There is no specific treatment for yellow fever, only supportive care to treat dehydration and fever. Associated bacterial infections can be treated with antibiotics. Supportive care may improve outcomes for seriously ill patients, but it is rarely available in poorer areas.

Prevention

1. Vaccination

Vaccination is the single most important measure for preventing yellow fever. In high risk areas where vaccination coverage is low, prompt recognition and control of outbreaks through immunization is critical to prevent epidemics. To prevent outbreaks throughout affected regions, vaccination coverage must reach at least 60% to 80% of a population at risk. Few countries in Africa currently have this level of coverage.

Preventive vaccination can be offered through routine infant immunization and one-time mass campaigns to increase vaccination coverage in countries at risk, as well as for travelers to yellow fever endemic area. WHO strongly recommends routine yellow fever vaccination for children in areas at risk for the disease.

The yellow fever vaccine is safe and affordable, providing effective immunity against yellow fever within one week for 95% of those vaccinated. A single dose provides protection for 30–35 years or more, and probably for life. Serious side effects are extremely rare. Serious adverse events have been reported rarely following immunization in a few endemic areas and among vaccinated travelers (e.g. in Brazil, Australia, the United States, Peru and Togo). Scientists are investigating the causes.

The risk of death from yellow fever is far greater than the risks related to the vaccine.

People who should not be vaccinated include:

- Children aged less than 9 months for routine immunization (or less than 6 months during an epidemic);
- Pregnant women, during a yellow fever outbreak when the risk of infection is high;
- People with severe allergies to egg protein; and
- People with severe immunodeficiency due to symptomatic HIV/AIDS or other causes, or in the presence of a thymus disorder.
- Travelers, particularly those arriving to Asia from Africa or Latin America must have a certificate of yellow fever vaccination. If there are medical grounds for not getting vaccinated, International Health Regulations state that this must be certified by the appropriate authorities.

2. Mosquito control

Mosquito control is vital until vaccination takes effect. The risk of yellow fever transmission in urban areas can be reduced by **eliminating potential mosquito breeding sites and applying insecticides to water** where they develop in their earliest stages. **Application of spray insecticides to kill adult mosquitoes** during urban epidemics, combined with emergency vaccination campaigns, can reduce or halt yellow fever transmission, "buying time" for vaccinated populations to build immunity.

Historically, mosquito control campaigns successfully eliminated *Aedes aegypti*, the urban yellow fever vector, from most mainland countries of central and South America. However, this mosquito species has re-colonized urban areas in the region and poses a renewed risk of urban yellow fever. Mosquito control programmes targeting wild mosquitoes in forested areas are not practical for preventing jungle (or sylvatic) yellow fever transmission.

Epidemic preparedness and response

Prompt detection of yellow fever and rapid response through emergency vaccination campaigns are essential for controlling outbreaks. However, underreporting is a concern – the true number of cases is estimated to be up to 250 times what is now being reported.

WHO recommends that every at-risk country have at least one national laboratory where basic yellow fever blood tests can be performed. One confirmed case of yellow fever in an unvaccinated population should be considered an outbreak, and a confirmed case in any context must be fully investigated, particularly in any area where most of the population has been vaccinated. Investigation teams must assess and respond to the outbreak with both emergency measures and longer-term immunization plans.

WHO response

WHO is the Secretariat for the International Coordinating Group for Yellow Fever Vaccine Provision (ICG). The ICG maintains an emergency stockpile of yellow fever vaccines to ensure rapid response to outbreaks in high risk countries.

The Yellow Fever Initiative is a preventive vaccination effort led by WHO and supported by UNICEF and National Governments, with a particular focus on 12 participating African countries where the disease is most prominent. The Initiative recommends including yellow fever vaccines in routine infant immunizations (starting at age 9 months), implementing mass vaccination campaigns in high-risk areas for people in all age groups aged 9 months and older, and maintaining surveillance and outbreak response capacity. The Yellow Fever Initiative is financially supported by the GAVI Alliance, ECHO, Ministries of Health, and country-level partners.

Source by : World Health Organization , Wikipedia

Table 1: Vaccine-preventable Diseases & AFP

22nd - 28th May 2010(21st Week)

Disease	No. of Cases by Province									Number of cases during current week in 2010	Number of cases during same week in 2009	Total number of cases to date in 2010	Total number of cases to date in 2009	Difference between the number of cases to date in 2010 & 2009
	W	C	S	N	E	NW	NC	U	Sab					
Acute Flaccid Paralysis	00	00	00	00	00	00	00	00	00	00	02	34	29	+ 17.2 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Measles	00	00	01	00	00	01	00	00	00	02	03	40	58	- 31.0 %
Tetanus	00	00	00	00	01	00	00	00	00	01	01	10	12	- 16.7 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	00	10	25	- 60.0 %
Tuberculosis	13	07	00	04	09	00	00	13	15	61	118	3546	3608	- 01.7 %

Table 2: Newly Introduced Notifiable Disease

22nd - 28th May 2010(21st Week)

Disease	No. of Cases by Province									Number of cases during current week in 2010	Number of cases during same week in 2009	Total number of cases to date in 2010	Total number of cases to date in 2009	Difference between the number of cases to date in 2010 & 2009
	W	C	S	N	E	NW	NC	U	Sab					
Chickenpox	07	01	08	06	03	05	03	10	05	48	483	1639	8844	- 81.5 %
Meningitis	04 CB=4	07 ML=2 KN=5	04 GL=2 MT=1 HB=1	00	01 TR=1	11 KN=9 PU=2	03 PO=3	00	01 KG=1	31	14	670	416	+ 61.0 %
Mumps	05	01	01	02	03	01	03	00	00	16	16	390	765	- 49.0 %
Leishmaniasis	01 CB=1	00	00	00	00	00	01 AP=1	00	00	02	04	147	399	- 63.1 %

Key to Table 1 & 2

Provinces: W: Western, C: Central, S: Southern, N: North, E: East, NC: North Central, NW: North Western, U: Uva, Sab: Sabaragamuwa.
 DPDHS Divisions: CB: Colombo, GM: Gampaha, KL: Kalutara, KD: Kandy, ML: Matale, NE: Nuwara Eliya, GL: Galle, HB: Hambantota, MT: Matara, JF: Jaffna, KN: Killinochchi, MN: Mannar, VA: Vavuniya, MU: Mullaitivu, BT: Batticaloa, AM: Ampara, TR: Trincomalee, KM: Kalmunai, KR: Kurunegala, PU: Puttalam, AP: Anuradhapura, PO: Polonnaruwa, BD: Badulla, MO: Moneragala, RP: Ratnapura, KG: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps.

10th South East Asia Regional Scientific Meeting of the International Epidemiological Association
23rd - 26th May 2010

Colombo, Sri Lanka

Theme

"Epidemiological Methods in Evidence Based Healthcare"

Visit <http://www.episea2010.com>

Table 4: Selected notifiable diseases reported by Medical Officers of Health
22nd - 28th May 2010(21st Week)

DPDHS Division	Dengue Fever / DHF*		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Returns Received
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
Colombo	85	1910	5	84	0	7	0	31	4	21	16	265	0	3	0	27	0	1	77
Gampaha	24	1844	3	25	0	11	0	19	0	8	1	172	0	4	1	42	0	3	27
Kalutara	64	656	4	70	0	8	2	9	0	65	3	154	0	1	2	16	0	1	67
Kandy	38	661	2	140	0	1	0	14	0	2	2	39	1	74	0	27	0	1	74
Matale	10	360	2	191	0	1	0	11	0	66	1	48	0	4	0	24	0	0	83
Nuwara	6	73	14	150	0	0	3	58	0	81	2	14	0	36	0	23	0	0	69
Galle	19	381	10	105	0	4	0	0	0	9	1	36	0	3	0	6	0	3	84
Hambant	5	322	0	22	0	3	0	1	0	6	0	27	2	46	0	4	0	0	45
Matara	5	174	8	70	2	3	0	2	0	39	14	163	1	70	0	10	0	0	94
Jaffna	10	2071	3	83	0	1	1	332	0	5	0	1	1	99	0	36	0	2	33
Kili-	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Mannar	0	88	0	19	0	0	0	29	1	9	0	0	0	0	0	12	0	0	60
Vavuniya	2	487	1	18	0	2	0	26	0	7	0	1	0	1	0	10	0	1	50
Mullaitivu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Batticaloa	12	1015	5	556	0	2	0	15	0	25	2	7	0	1	0	3	0	1	64
Ampara	1	73	0	31	0	1	0	5	0	6	0	23	0	0	0	9	0	0	0
Trincomal	3	742	0	71	10	7	0	3	0	8	0	8	0	8	0	12	0	1	40
Kurunega	19	586	12	122	0	9	0	14	0	6	9	177	1	24	1	53	0	2	55
Puttalam	7	562	1	30	0	4	0	36	0	124	0	54	0	0	1	13	0	0	78
Anuradha	5	746	0	30	0	2	0	4	0	24	2	38	1	20	1	26	0	3	53
Polonnar	18	211	1	30	0	1	0	2	0	7	1	40	0	1	1	18	0	0	71
Badulla	10	299	5	79	0	1	1	51	0	13	2	32	0	41	1	45	0	0	13
Monaraga	8	255	2	90	0	1	0	21	0	4	0	26	0	29	1	52	0	1	55
Ratnapur	56	951	5	183	0	4	0	9	0	22	3	186	0	30	4	51	1	2	44
Kegalle	5	401	3	52	0	4	0	25	0	18	1	99	0	7	1	40	0	0	36
Kalmunai	2	463	6	99	0	1	0	5	0	0	0	0	0	0	0	7	0	1	38
SRI LANKA	414	15332	92	1851	03	78	07	723	05	575	60	1610	07	502	14	556	01	23	55

Source: Weekly Returns of Communicable Diseases WRCD).

*Dengue Fever / DHF refers to Dengue Fever / Dengue Haemorrhagic Fever.

**Timely refers to returns received on or before 28th May, 2010 Total number of reporting units =311. Number of reporting units data provided for the current week: 175

A = Cases reported during the current week. B = Cumulative cases for the year.

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