

Volume 12

Number 45

7 November 2002

CDR WEEKLY



NEWS

ENTERIC

RESPIRATORY

IMMUNISATION

HIV/STIs

BACTERAEMIA

ZOONOSES

TRAVEL HEALTH

PRIMARY CARE

DIARY

BACK ISSUES

SEARCH

Main stories this week:

Salmonella *Enteritidis* in England and Wales: increases in unusual phage types in 2002

Malaria in Afghanistan

Respiratory

Laboratory reports of respiratory infections made to CDSC from PHLS and NHS laboratories in England and Wales:

Reports of influenza infection made to CDSC, by week of report, weeks 40 -44/02

Respiratory viral detections by age group, data for weeks 40-44/02

Respiratory viral detections by age group, data for weeks 40-44/02

Laboratory reports of infections associated with atypical pneumonia, by week of report, weeks 40-44/02

Reports of legionnaires' disease (pneumonic and non-pneumonic*) cases in England and Wales, by week of report, weeks 36/-44/02

Zoonoses

Common animal associated infections, England and Wales: laboratory reports, weeks 40-44/02

Common imported infections, England and Wales: laboratory reports, weeks 40-44/02

Travel

Viral diseases transmitted by mosquitoes

Published by: PHLS
Communicable
Disease Surveillance
Centre

Best viewed at a screen resolution of 800 x 600 pixels

If you have any comments or encounter any problems with this website, please contact cdr@phls.org.uk

- NEWS
- ENTERIC
- RESPIRATORY
- IMMUNISATION
- HIV/STIs
- BACTERAEMIA
- ZOONOSES
- TRAVEL HEALTH
- PRIMARY CARE
- DIARY
- BACK ISSUES
- SEARCH

News

Last updated: 7 November 2002
Next update due: 14 November 2002

Contents

[Salmonella *Enteritidis* in England and Wales: increases in unusual phage types in 2002](#)

[Malaria in Afghanistan](#)

Salmonella *Enteritidis* in England and Wales: increases in unusual phage types in 2002

Although *Salmonella*. *Enteritidis* phage type 4, which was responsible for the major epidemic during the late 1980s and early 1990s (1), has continued to decline, there have been increases in a number of the more unusual phage types of *Salmonella* *Enteritidis* (2). Isolates of *S. Enteritidis* PT 6a, 13a, and 14b confirmed by the PHLS Laboratory of Enteric Pathogens (LEP) have all increased (table 1).

Table 1 Isolates of *Salmonella* *Enteritidis* confirmed by PHLS Laboratory of Enteric Pathogens: 1 January to 22 October 2001 and 2002

Phage type	Total	
	2001 (acquired abroad)	2002 (acquired abroad)
1	1357 (443)	1258 (358)
3	22 (9)	109 (21)
4	4196 (601)	3037 (279)
5c	338 (93)	117 (30)
6	802 (78)	702 (75)
6a	499 (102)	715 (100)
8	301 (65)	289 (42)
13a	49 (13)	68 (19)
14b	300 (132)	504 (150)
21	242 (43)	544 (92)

During recent outbreak investigations (3,4) a total of 1181 imported eggs has been examined by the London Food, Water and Environmental Microbiology Laboratory in pooled samples of six whole eggs. Thirteen samples were positive for *Salmonella* sp. and the LEP has confirmed isolates of *S. Enteritidis* PT 5c, 6, 6a, 13a, 14b, and 58. Contamination of egg contents as well as the shell has been demonstrated. Phage type 58 is newly designated and the first clinical case has also been confirmed.

Fifteen preliminary reports of outbreaks of *S. Enteritidis* with dates of onset during September and October 2002 have been reported to CDSC so far. The causative organisms are *S. Enteritidis* PT1 (two

outbreaks), *S. Enteritidis* PT3 (two outbreaks), *S. Enteritidis* PT4 (three outbreaks), *S. Enteritidis* PT6 (two outbreaks), *S. Enteritidis* PT6a and *S. Enteritidis* PT1 (one outbreak), *S. Enteritidis* PT8 (one outbreak), *S. Enteritidis* PT14b (one outbreak with three distinct clusters), and *S. Enteritidis* PT21 (three outbreaks). Consultants in communicable disease control are requested to inform the PHLS Communicable Disease Surveillance Centre as soon as they start to investigate a local outbreak of *S. Enteritidis*. Please contact Sarah O'Brien (020 8200 6868 ext 4422; email gisection@phls.org.uk), or Bob Adak (ext 4451).

1. Wall PG, Ward LR. *Epidemiology of Salmonella enterica serovar Enteritidis phage type 4 in England and Wales*. In: Saeed AM, Gast RK, Potter ME, Wall PG, editors. *Salmonella enterica serovar Enteritidis in humans and animals: epidemiology, pathogenesis and control*. 1999. Iowa: Iowa State University Press, 1999. p 19-25.
2. PHLS. Up and coming "new types" of Salmonella in England and Wales. *Commun Dis Rep CDR Wkly* [serial online] 2002 [cited 7 November 2002]; **12** (28): enteric. Available at <http://www.phls.org.uk/publications/cdr/archive02/entericarchive02.html#nsalm>
3. PHLS. National outbreak of Salmonella Enteritidis PT 14b: update. *Commun Dis Rep CDR Wkly* [serial online] 2002 [cited 7 November 2002]; **12** (28): news. Available at www.phls.co.uk/publications/cdr/archive02/News/news4302.html#salmupdate
4. PHLS. Nosocomial outbreak of Salmonella Enteritidis PT 6a (Nx, CpL). *Commun Dis Rep CDR Wkly* [serial online] 2002 [cited 7 November 2002]; **12** (28): news. Available at www.phls.co.uk/publications/cdr/archive02/News/news4302.html#salmupdate

Malaria in Afghanistan

An outbreak of malaria has been confirmed in the sub-district of Kharkane, in the Western Afghan province of Badghis (1). According to preliminary results, 90% of the cases are *Plasmodium falciparum*, although throughout the country, usually between 80 and 90% of malaria cases are *Plasmodium vivax* (2). It is not known how many cases are included in this particular outbreak.

Six cases of malaria, two *Pl. falciparum* and four *Pl. vivax* were reported in troops who had been deployed in Afghanistan earlier in 2002 (3). The cases presented while they were still in Afghanistan. In this current outbreak, it is the local population that is mainly at risk, but there are still a small number of British troops and a large number of civilian aid workers in the region. The transmission season should also be ending which will reduce the risk considerably.

Health professionals should be reminded to continue to consider malaria in United Kingdom (UK) service personnel and civilian aid workers who present to any health care institution with fever, flu-like illness or any other unexplained symptoms. *Pl. vivax* can have a long incubation period of between six and 11 months, and cases may still present in the UK or, if on leave, elsewhere in the world. Those patients who have already experienced a primary infection may also relapse. *Pl. falciparum* is more likely to present sooner after return to the UK.

1. Médecins San Frontières. *Outbreak of malaria in Afghan province of Badghis*. 18 October 2002 [online] Available from: <http://www.msf.org/countries/page.cfm?articleid=AFC14CAA-5407-4FB2-943B98E1FA299741>
 2. WHO. *EMRO roll back malaria* [online]. World Health Organization Regional Office for the Eastern Mediterranean, Cairo. Available at <http://208.48.48.190/rbm/countriesactivities.html>
 3. CDSC. Malaria in military personnel returning from Afghanistan. *Commun Dis Rep Wkly* [serial online] 2002 [cited 6 November 2002]; **12** (27): news. Available at: <http://www.phls.co.uk/publications/cdr/archive02/News/news2702.html#malaria>
-



NEWS

ENTERIC

RESPIRATORY

IMMUNISATION

HIV/STIs

BACTERAEMIA

ZOOSES

TRAVEL HEALTH

PRIMARY CARE

DIARY

BACK ISSUES

SEARCH

Respiratory

Last updated: 7 November 2002
Next update due: 5 December 2002

Contents

[Changes to reporting of respiratory infections in *CDR Weekly*](#)

[Current levels of respiratory infections remain low](#)

[Laboratory reports of respiratory infections made to CDSC from PHLS and NHS laboratories in England and Wales](#)

Changes to reporting of respiratory infections in *CDR Weekly*

The way in which respiratory infections are represented in the *CDR Weekly* has been revised to coincide with the start of the 2002-03 influenza season. Reports of respiratory infections made to CDSC from PHLS and NHS laboratories in England and Wales are now presented in tabular format to provide a more informative summary of the data. Additional comment will be provided, where appropriate.

In particular, the table detailing influenza reports table 1, now provides information regarding the method of detection of reports received. This allows direct comparison with data presented in the *PHLS Weekly Influenza Report*, published on the PHLS web site every Wednesday during the influenza season. Additionally, table 3 reports respiratory viral infections by age group.

As previously, data are reported by week that the report was received by CDSC. Data now only include specimens that were taken since 1 October 2002, (*ie*, specimens taken during the current season), to eliminate some of the anomalies that have occurred due to late reporting.

To coincide with the revision of reporting respiratory infections, the format of atypical pneumonia reporting has also been updated. Table 4 now provides information on infections associated with atypical pneumonia, and table 5 gives further information on legionella infections.

Current levels of respiratory infections remain low

Levels of influenza activity continue to remain at low levels, with GP consultations for week 44 (week ending 3 November) at 11 per 100 000 population. This figure remains within the range of baseline activity (<50/100 000 population). To date there has been one influenza virus detected by the virus reference laboratory, ERNVL. This was from a hospitalised child in central England, and has been characterised as influenza A (H1N2).

Laboratory reports of *Mycoplasma pneumoniae* received by CDSC have increased over recent weeks, although most of these relate to specimens taken some time ago. Reports by week of specimen taken suggest that levels remain low within the range expected for the time of year. Levels of respiratory syncytial virus (RSV) also remain low at this time.

Further information can be found on the influenza section of the website:
http://www.phls.co.uk/topics_az/influenza/flu.htm

Laboratory reports of respiratory infections made to CDSC from PHLS and NHS laboratories in England and Wales

Data are recorded by week of report, but include only specimens taken since 10 October 2002 (*ie*, recent specimens)

Table 1 Reports of influenza infection made to CDSC, by week of report, weeks 40-44/02

Week	40/02	41/02	42/02	43/02	44/02	Total
Week ending	06/10/2002	13/10/2002	20/10/2002	27/10/2002	03/11/2002	
Influenza A	-	-	-	-	-	-
Isolation	-	-	-	-	-	-
DIF	-	-	-	-	-	-
Four-fold rise in paired sera	-	-	1	-	-	1
PCR	-	-	-	-	-	-
Other	-	-	-	-	3	3
Influenza B	-	-	-	-	-	-
Isolation	-	-	-	-	-	-
DIF	-	-	-	-	-	-
Four-fold rise in paired sera	-	-	-	-	1	1
PCR	-	-	-	-	-	-
Other	-	-	-	-	-	-
Influenza (untyped)	-	-	-	-	-	-
Isolation	-	-	-	-	-	-
DIF	-	-	-	-	-	-
Four-fold rise in paired sera	-	-	-	-	-	-
PCR	-	-	-	-	-	-
Other	-	-	-	-	-	-

DIF = Direct Immunofluorescence.

'Other' = 'Antibody detection - Single high titre' or 'method not specified'

Table 2 Respiratory viral detections by any method (culture, direct immunofluorescence, PCR, four-fold rise in paired sera, single high serology titre), by week of report), weeks 40 - 44/02

Week	40	41	42	43	44	Total
Week ending	06/10/2002	13/10/2002	20/10/2002	27/10/2002	03/11/2002	
Adenovirus*	-	-	6	3	13	22
Coronavirus	-	-	-	-	-	-
Parainfluenza **	-	-	3	1	1	5
Rhinovirus	-	1	-	-	3	4
Respiratory Syncytial Virus (RSV)	1	11	35	15	77	139

*Respiratory samples only. Excludes diagnoses made by electron microscopy (EM)

**includes parainfluenza types 1, 2, 3, 4 and untyped

Table 3 Respiratory viral detections by age group, weeks 40- 44/02

Age group (years)	<1 year	1-4 years	5-14 years	15-44 years	45-64 years	65+ years	Unknown	Total
Adenovirus*	2	1	–	16	3	–	–	22
Coronavirus	–	–	–	–	–	–	–	0
Influenza A	–	–	–	1	3	–	–	4
Influenza B	–	–	–	–	1	–	–	1
Parainfluenza**	5	–	–	–	–	–	–	5
Rhinovirus	4	–	–	–	–	–	–	4
Respiratory Syncytial Virus (RSV)	9	100	23	1	1	–	1	139

*Respiratory samples only. Excludes diagnoses made by electron microscopy (EM)

**includes parainfluenza types 1, 2, 3, 4 and untyped

Table 4 Laboratory reports of infections associated with atypical pneumonia by week of report, weeks 40- 44/02

Week	40/02	41/02	42/02	43/02	44/02	Total
Week ending	06/10/2002	13/10/2002	20/10/2002	27/10/2002	03/11/2002	
Coxiella burnettii	–	–	–	–	1	1
respiratory Chlamydia sp.*	–	–	2	–	–	2
Mycoplasma pneumoniae	–	4	10	16	21	51
Legionella sp.	8	10	11	12	21	62

*includes Chlamydia psittaci, Chlamydia pneumoniae and Chlamydia sp detected from blood, serum and respiratory specimens

Table 5a Reports of legionnaires' disease (pneumonic and non-pneumonic*) cases in England and Wales, by week of report, weeks 36 - 39/02

Week	36/02	k 37/02	38/02	39/02	Total
Week ending	06/10/2002	13/10/02	20/10/2002	27/10/2002	
Nosocomial	–	–	1	–	1
Community	4	4 (1)	2	3	13 (1)
Travel abroad	3 (1)	–	4	3	10 (1)
Travel UK	2	–	–	–	2
Total	9 (1)	4 (1)	7	6	26 (2)
Male	9	3	5	6	23
Female	1	2	2	0	5

Twenty-six cases were reported with pneumonia and two with non-pneumonic illness. Twenty-three were males aged between 29 and 77 years and five females aged between 44 and 69 years. One case, a 63 year old male, died. Thirteen cases were associated with travel: Greece (2), United States (2), Belgium (1), England (1), France (1), Italy (1), Portugal (1), Romania (1), Russia (1), Scotland (1), Spain (1), and Fourteen cases, 12 males aged between 29 and 77 years and F 52y and F 58y had community acquired infection. Of the community acquired cases three males aged between 40 and 57 years were associated with an outbreak in Essex, a F 52y is associated with an outbreak in Trent. One probable community acquired case was reported in the North West.

Table 5b Reports of Legionnaires' disease (pneumonic and non-pneumonic*) cases in England and Wales, by week of report, weeks 40/ - 44/02

Week	40/02	41/02	42/02	43/02	44/02	Total
Week ending	06/10/20	13/10/02	20/10/20	27/10/20	03/11/20	
Nosocomial	–	1	1	–	–	2
Community	1	7	4	5	10 (1)	27 (1)
Travel abroad	6	1	6	6	9 (1)	28 (1)
Travel UK	1	1	–	1	–	3
Total	8	10	11	12	19(2)	60 (2)
Male	6	6	7	7	11	37
Female	2	4	4	5	8 (2)	23 (2)

* non-pneumonic cases in brackets

Sixty cases were reported with pneumonia and two with non-pneumonic illness. Thirty-seven were males aged between 31 and 84 years and twenty-five females aged between 24 and 82 years. Five cases died: three males aged between 51 and 82 years and F 75y and F 82y.

Thirty-two cases were associated with travel: Turkey (5), England (3), Spain (3), France (2), Belgium (1), Bulgaria (1), Croatia (1), Germany (1), Greece (1), Italy (2), Jamaica (1), Portugal (1), and Syria (1). Nine cases travelled to more than one country: Austria, Belgium, France, and Germany (6), France and Spain (1), France and Switzerland (1), Turkey and Egypt (1). Six cases were associated with an outbreak in Belgium. Twenty-eight cases, nineteen males aged between 31 and 82 years and nine females aged between 36 and 82 years had community acquired infection. Ten were associated with community outbreaks (West Midlands 4, Nottingham 4, and Cumbria 2). Two cases, one male and one female, acquired infection in hospital.

[Back to top](#)

- NEWS
- ENTERIC
- RESPIRATORY
- IMMUNISATION
- HIV/STIs
- BACTERAEamia
- ZOONOSES
- TRAVEL HEALTH
- PRIMARY CARE
- DIARY
- BACK ISSUES
- SEARCH

Zoonoses

Last updated: 7 November 2002
 Next update due: 5 December 2002

Contents

[Common animal associated infections, England and Wales: laboratory reports, weeks 40-44/02](#)

[Common imported infections, England and Wales: laboratory reports, weeks 40-44/02](#)

[PDF](#)

Common animal associated infections, England and Wales: laboratory reports, weeks 40 - 44/02

Organism	Total reports for weeks 40 - 44		Cumulative totals for weeks 01- 44	
	2002*	2001	2002*	2001
<i>Borrelia burgdorferi</i> *#	62	32	173	252
<i>Leptospira hardjo</i> **###	1	–	3	3
<i>Leptospira icterohaemorrhagiae</i> **###	2	1	6	9
<i>Leptospira other</i> **###	2	1	14	7
<i>Pasteurella haemolytica</i>	–	1	2	4
<i>Pasteurella multocida</i>	23	22	165	242
<i>Pasteurella pneumotropica</i>	2	1	4	4
<i>Pasteurella spp</i>	2	4	46	60
<i>Toxocara canis</i>	1	–	3	–
<i>Toxocara cati</i>	–	–	–	–
<i>Toxocara spp</i>	–	–	–	1
<i>Toxoplasma gondii</i>	3	4	24	26
<i>Toxoplasma spp</i>	2	3	44	46

* provisional data; ** by specimen date; # Lyme Disease Reference Laboratory and CDSC; ### Leptospira Reference Laboratory and CDSC.

Common imported infections, England and Wales: laboratory reports, weeks 40 - 44/02

Organism	Cumulative total reports for weeks 40 - 44		Cumulative totals for weeks 01 - 44	
Arbovirus	–	–	–	–
Dengue virus	–	–	12	–
<i>Ascaris</i> spp	7	15	90	101
Hookworms (unspecified)	4	8	119	47
<i>Leptospira</i> spp	2	1	3	13
<i>Ancylostoma duodenale</i>	–	–	–	–
<i>Necator americanus</i>	–	–	–	–
<i>Hymenolepis diminuta</i>	–	–	–	1
<i>Hymenolepis nana</i>	1	5	20	40
<i>Hymenolepis</i> spp	–	–	–	–
<i>Schistosoma haematobium</i>	2	11	36	47
<i>Schistosoma intercalatum</i>	–	–	–	–
<i>Schistosoma mansoni</i>	–	5	17	16
<i>Schistosoma</i> spp	1	2	17	30
<i>Strongyloides stercoralis</i>	1	4	12	25
<i>Strongyloides</i> spp	1	–	3	2

* Provisional data

NEWS

ENTERIC

RESPIRATORY

IMMUNISATION

HIV/STIs

BACTERAEMIA

ZOOSES

TRAVEL HEALTH

PRIMARY CARE

DIARY

BACK ISSUES

SEARCH

Travel health

Last updated: 3 October 2002
Next update due: 7 November 2002

[Click here for links to travel health websites](#)

PDF

Viral diseases transmitted by mosquitoes

Introduction

Travellers are increasingly visiting more remote destinations, especially in the tropical parts of the world, where they will come into contact with mosquitoes and other arthropods that spread disease. Globally, malaria is the most important mosquito-borne disease affecting humans. It is responsible for over 1 million deaths worldwide every year. Travellers to countries endemic for malaria and their health advisers usually recognise the importance of taking some form of chemoprophylaxis against malaria.

Travellers and health professionals may not, however, be so aware of other diseases that can also be spread by mosquitoes and other arthropods, and which can be associated with great morbidity and sometimes death. This article highlights some of these less common, but serious diseases, and the protective measures to be taken against them. Particularly attention is paid to viruses transmitted by mosquitoes, which are called arboviruses. There are over 100 arboviruses that can produce disease in humans. Ticks, sand flies or midges can also transmit some of them, but mosquitoes are the main vectors for the majority.

Which arboviruses are potentially important to travellers?

The most important diseases transmitted by mosquitoes are in the Flaviviridae or Togaviridae families. These types of viruses are important to travellers for various reasons: they can produce severe illness, they are difficult to diagnose often with similar symptoms, there are no specific treatments available for these diseases, and may result in post-viral syndromes.

Travellers may also be infected without being aware, which raises the possibility of local transmission in the UK on their return. This possibility is, however, limited for various reasons. Although the mosquito vectors for some arboviruses are present in the UK, the population density is relatively low. The mosquitoes that are present in the UK, may have different biting habits to those in areas where arboviruses are endemic, ie some prefer biting birds, while some prefer humans or other mammals. The specific bird or animal hosts may not be present in the UK. The cooler UK climate also has a negative effect on breeding cycles and transmission rates and different human behavioural patterns may also be factor.

Flaviviridae

Most of the viruses of concern to travellers are in the genus *Flavivirus*. These include dengue virus, yellow fever virus, and the Japanese encephalitis group of viruses, which includes Japanese encephalitis virus, West Nile virus, Kunjin virus (which is a sub-type of West Nile virus), Murray Valley encephalitis virus, and St Louis encephalitis virus.

Dengue virus and Yellow fever have both been dealt with in previous articles in this series. For further information click on the links.

Dengue fever and travel

[Published 7 March 2002, Vol. 12 No. 10](#)

Yellow fever and travel

[Published 4 April 2002, Vol.12 No. 14](#)

Dengue fever – an increasing threat to UK travellers?

Japanese Encephalitis Group

Japanese Encephalitis Virus

Japanese Encephalitis Virus (JEV) is endemic across south east Asia, where it is the leading cause of viral encephalitis. Approximately 30,000 to 50,000 cases occur each year (1). It is, however, a very rare occurrence in travellers; one report documents 24 cases in Western travellers between 1978 and 1992 (2). Since then, there have been a few sporadic cases documented. Between 1994 and 1995, there were two cases documented in travellers to Bali, one in a Swedish woman who recovered and the other in a Danish man who died. There have been no known cases in travellers to Bali since then (3). There have been two known cases in UK residents. The first was a case in 1982 in a woman aged 35 years who had been living and working in Hong Kong for 22 years, she was diagnosed as having Japanese B encephalitis and recovered. She died four months later after respiratory and cardiac complications (4). In 1994, there was a case of Japanese encephalitis confirmed in a woman aged 21 years who had been to Thailand and spent two weeks on a beach resort and three days trekking with the hill tribes in northern Thailand. She recovered fully after four months (5). In both of these cases, the vaccination status is unknown, although it is assumed they were both unvaccinated.

Clinical Features

After an incubation period of between five and 15 days, many infections are asymptomatic or very mild, with fever and headache. A more severe infection has a rapid onset of headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially in infants) and spastic (but rarely flaccid) paralysis. Of severe infections, approximately 30% result in death and a further 50% can go on to develop neurological sequelae.

Transmission

Birds are the natural host for JEV – it is transmitted to domestic pigs (the amplifying host) by the bite of the *Culex* spp mosquito. In turn, more mosquitoes are infected, which can then transmit the virus to humans. This species most commonly breeds in rice fields so those who are working in or visiting farming areas of south east Asia are most at risk of being infected.

West Nile Virus

West Nile virus (WNV) was first isolated from a woman with a fever in 1937 in the West Nile district of Uganda (6). It is endemic in Africa, the Middle East, Central and South Europe, and parts of Asia, and has recently emerged in the United States (US) and Canada. Recent outbreaks have also occurred in Algeria, Morocco, Tunisia, in military personnel in the Democratic Republic of Congo, Israel, Russia, and in horses in France. Human cases have occurred in France as well as equine cases in 1962. (7) There are no known cases of transmission in the UK (8).

The recent and ongoing outbreak in the US and Canada has brought public health attention back to West Nile virus. More surveillance is required to assess exactly whether there is a threat of indigenous transmission in the UK. Travellers to endemic areas (now including North America) should, however, be aware of this disease and take steps to prevent themselves being infected by avoiding mosquito bites. Moreover, health professionals should also consider West Nile virus as a differential diagnosis in travellers presenting to healthcare facilities with encephalitis or viral meningitis.

Clinical Features

After an incubation period of between three and 15 days, many infections in humans are asymptomatic or a mild flu-like illness. Of those infected, 1% will develop severe symptoms of acute encephalitis, aseptic meningitis or rarely, Guillain-Barré syndrome. Those aged over 50 years are more at risk of severe illness, the greatest proportion of deaths having been reported in this age group.

Transmission

As in JEV, birds are the natural host for WNV, and they also play a part in amplifying the virus, as the mosquitoes that transmit WNV tend to be feed on birds. They sometimes, however, bite mammals including humans, resulting in human infection. Mammals, particularly horses and humans, are incidental hosts, ie they do not amplify the virus at a level high enough for mosquitoes to transmit to

other animals or humans.

Kunjin virus (KUN) is a subtype of WNV – it was named after one of the Aboriginal clans living near the Mitchell River in north Queensland, Australia, where it was first isolated (9). It has only been known to cause human disease in northern Western Australia and the Northern Territory, and some parts of Malaysia, but has been found in mosquitoes and birds in some parts of Africa. It has similar clinical presentation to WNV and to another flaviviral encephalitis, Murray Valley Encephalitis (MVE) virus, but is generally less severe. MVE was also first isolated in Australia in 1917 and is endemic in northwest Australia and has caused epidemics in the southeast. KUN and MVE are both transmitted by the *Culex* spp of mosquito; water birds and feral pigs are the principle hosts (10) .

St. Louis Encephalitis (SLE) virus was first isolated from humans in St Louis, Missouri, US in 1933 during an outbreak that affected 1095 people (11). This virus has been the most important single cause of viral encephalitis and the most prevalent arthropod-borne disease for many years in the US. This has, however, been overshadowed by WNV over the last three years. There have no known cases of SLE in British travellers to the US.

Togaviridae

This family of viruses includes the genus alphavirus. There are some viruses of this genus that are worth mentioning as they are prevalent in areas visited by UK tourists. Again, it is rare for travellers to be infected by these viruses but certain groups of travellers may be at a low risk. The most important of these are Ross River virus (RR) virus, Barmah Forest (BF) virus, Chikungunya virus, Eastern Equine Encephalitis (EEE) virus, Western Equine Encephalitis (WEE) virus, and Venezuelan Equine Encephalitis (VEE) virus.

Ross River virus, Barmah Forest virus and Chikungunya virus.

RR virus is the causative agent of epidemic polyarthritis. It was first isolated in Australia from *Aedes vigilax* mosquitoes in 1963 and later from an epidemic polyarthritis patient (12). Major outbreaks have occurred in many parts of Australia, mainly between January and May. It spread to Fiji in 1979 and to other Pacific islands, including American Samoa, where there were 15,000 cases in 1979/80. Barmah Forest virus occurs in northern parts of Australia, and Chikungunya virus is found in Africa, India, south east Asia, and the Philippines Islands.

Travellers

There was one case Ross River fever documented in a German traveller aged 57 years to the south Pacific in 1999 (13). In 1997, there was also a case of Ross River fever reported to CDSC in a male, aged 57 years but the travel history was not known. Ross River virus does not occur in the UK.

Clinical Features

The main symptoms of all three viruses are a self-limiting febrile illness characterised by arthralgia or arthritis, which may last for days or months; a rash may follow after one to 10 days. Asymptomatic infection can occur, especially in children. Adult females are the most susceptible to epidemic polyarthritis.

Transmission

It is transmitted by *Aedes* spp and some species of *Culex* spp mosquito; the reservoir for this and many other alphaviruses is unknown.

Other alphaviruses

Eastern Equine Encephalitis (EEE) virus, Western Equine Encephalitis (WEE) virus and Venezuelan Equine Encephalitis (VEE) virus as their names suggest, can cause encephalitis, sometimes with neurological sequelae similar to Japanese encephalitis. Disease is dependent on individual susceptibility. They can cause severe illness in infants but the elderly are more at risk from EEE. All of these viruses occur in the US, Canada, and parts of South America. It is not known if these viruses have affected travellers.

Prevention

Most of the diseases mentioned in this article are not vaccine-preventable. There are vaccines for yellow

fever (14) and JE, which are very effective. There are two unlicensed vaccines available in the UK for JE on a named-patient basis. At present vaccination against JE is considered for those who will be visiting endemic areas during the transmission season for longer periods of a month or more or for those who are visiting areas with current epidemic activity. For the majority of these diseases, however, avoidance of mosquito bites is the only way to reduce the risk of infection in areas where these diseases are prevalent.

Reduction of Mosquito bites

It is important to know that different species of mosquito have different peak biting times. For example, the *Anopheles* mosquito (which transmits malaria) and the *Culex* spp (which transmits many encephalitides) bite at night; the *Aedes* spp (which transmits dengue and yellow fever) tend to bite during the day, particularly late afternoon and early morning.

1. Centers for Disease Control and Prevention. *Japanese encephalitis fact sheet* [online] [cited 6 November 2002]. Atlanta, USA: CDC, 2001. Available online at <<http://www.cdc.gov/ncidod/dvbid/jencephalitis/facts.htm>>
2. Centers for Disease Control and Prevention. Inactivated Japanese encephalitis virus vaccine: recommendations of the advisory committee on immunization practices (ACIP). *MMWR Morb Mortal Wkly Rep* 1993; **42** (RR-1): 6
3. Shlim D R, Solomon T. Japanese encephalitis vaccine for travellers: exploring the limits of risk. *Clin Infect Dis* 2002; **35**: 183-8
4. Rose MR, Hughes SM, Gatus BJ. A case of Japanese B encephalitis imported into the United Kingdom *J Infect* 1983; **6**: 261-5.
5. Burdon JT, Stanley PJ, Lloyd G, Jones NC. A case of Japanese encephalitis. *J Infect* 1994; **28**: 175-9
6. Smithburn KC, Hughes TP, Burke AW, Paul JH. A neurotropic virus isolated from the blood of a native of Uganda. *Am J Trop Med and Hyg* 1940; **20**: 471-92
7. Murgue B, Zeller H, Deubel V. The ecology and epidemiology of West Nile virus in Africa, Europe and Asia. *Curr Top Microbiol Immunol* 2002; **267**:195-221.
8. Crook PD, Crowcroft NS, Brown DWG. West Nile Virus and the threat to the UK. *Commun Dis Public Health* 2002; **5** (2): 138-43
9. Charles PGP, Leydon J, O'Grady KA, Speed BR. A case of Kunjin virus encephalitis in a traveller returning from the Northern Territory. *Commun Dis Intell* 2001; **25**(3): 155-60
10. Russell RC, Dwyer DE. Arboviruses associated with human disease in Australia. *Microbes Infect* 2000; **2**: 1693-704
11. Monath PM. *Flaviviruses (Yellow Fever, Dengue, Dengue Haemorrhagic Fever, Japanese Encephalitis, St. Louis Encephalitis, Tick-borne Encephalitis)*. In: Mandell GL, Bennett JE, Dolin R, editors. *Principles and Practice of Infectious Diseases*. 4th ed. New York: Churchill Livingstone, 1995. p. 1465-73.
12. Sammels LM, Coelen RJ, Lindsay MD, MacKenzie JS. Geographic distribution and evolution of Ross River Virus in Australia and the Pacific Islands. *Virology* 1995; **212**: 20-9
13. Proll S, Dobler G, Pfeffer M, Jelinek T, Nothdurft HD, Loscher T. Persistent arthralgias in Ross River Virus disease after travel to the South Pacific. *Dtsch Med Wochenschr* 1999; **124** (24): 759-62
14. PHLS. Yellow fever and travel. *Commun Dis Rep CDR Wkly* 2002; 12 (15): travel. Available at <http://www.phls.co.uk/publications/cdr/PDFfiles/2002/cdr1402.pdf>
15. Lea G and Leese J, editors. *Health information for overseas travel*. 2nd ed. London: The Stationery Office, 2001. Available at <<http://www.archive.official-documents.co.uk/document/doh/hinfo/index.htm>>