

Travel-related diseases: Forgotten but Not gone

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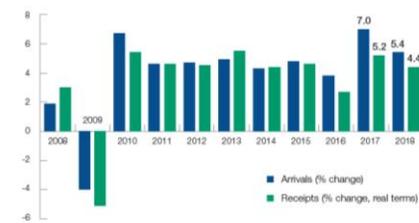
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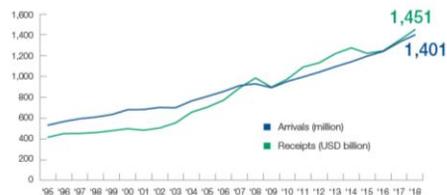
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TRAVELERS' TREND: 2018 International tourism – 9th consecutive year of sustained growth

Tourism has seen continued expansion over time, despite occasional shocks, demonstrating the sector's strength and resilience



International tourist arrivals and tourism receipts (% change)
Source: World Tourism Organization (UNWTO), July 2019.



International tourist arrivals (million) and tourism receipts (USD billion)
Source: World Tourism Organization (UNWTO), July 2019.



Map of international tourist arrivals (million) and tourism receipts (USD billion)
Source: World Tourism Organization (UNWTO), July 2019.

World Tourism Organization (UNWTO) 2019

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Travel-related illness

Communicable diseases

- Food and water borne infections, vector-borne infections, air-borne infections, STDs,

Other clinical conditions

- Barotrauma • Jet lag • Motion sickness • Thrombosis or embolism • Altitude sickness • Frostbite and hypothermia • Respiratory distress associated with humidity, pollution • Sunburn, heat exhaustion, and sunstroke • Injuries and violence

Psychological and psychosocial issues

- Acute stress reactions • Culture shock or adaptation
- Psychological sequelae of travel or living abroad

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Travel-related communicable diseases assessment

- **Epidemiology**
- **Immunization and chemoprophylaxis**
- **Diseases contracted during travel**
vectors, person-to-person contact, ingestion of food and water, bites and stings, water and environment contact
- **Underlying diseases**

The body of knowledge for the practice of travel medicine. Decatur, GA: International Society of Travel Medicine; 2017.

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Estimated disease frequency of 100 000 travelers to a developing country for 1 month

50 000 will develop some health problem

8000 will see a physician

5000 will be confined to bed

1100 will be incapacitated in their work

300 will be admitted to hospital

50 will be air evacuated

1 will die

3 most common groups of illnesses in returned international travelers

- **Gastrointestinal disorders (34%)**
- **Fever (23%)**
- **Dermatologic disorders (20%)**

Med Clin N Am 2016; 100: 393–409, J Gen Fam Med. 2017;18:52–55.

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Common infectious diseases with risks to international travelers

Diarrhea	Dengue
Malaria	Tuberculosis
Leishmaniasis	Leptospirosis
Rabies	Poliomyelitis
Schistosomiasis	Yellow Fever
Meningococcal meningitis	Measles
Japanese Encephalitis	Ebola

J Gen Fam Med. 2017;18:52–55.

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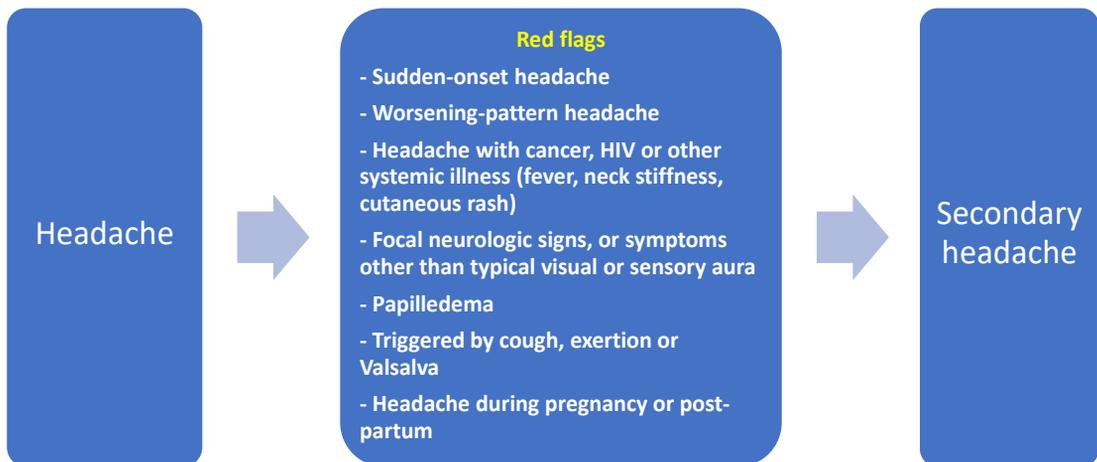
Infectious diseases acquired by international travellers visiting the USA

Reported during travel	Reported after travel
<ul style="list-style-type: none"> • Skin and soft tissue infection 14% • Acute gastrointestinal illnesses 7% • Pneumonia 7% 	<ul style="list-style-type: none"> • Respiratory infections including ILI, URI, influenza and pneumonia 17% • Arthropod bite/sting 15% (tick bites 47%) • Acute gastrointestinal illnesses 4% • Skin and soft tissue infections 4%

Journal of Travel Medicine, 2018, 1–7 doi: 10.1093/jtm/tay053

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Fever with headache

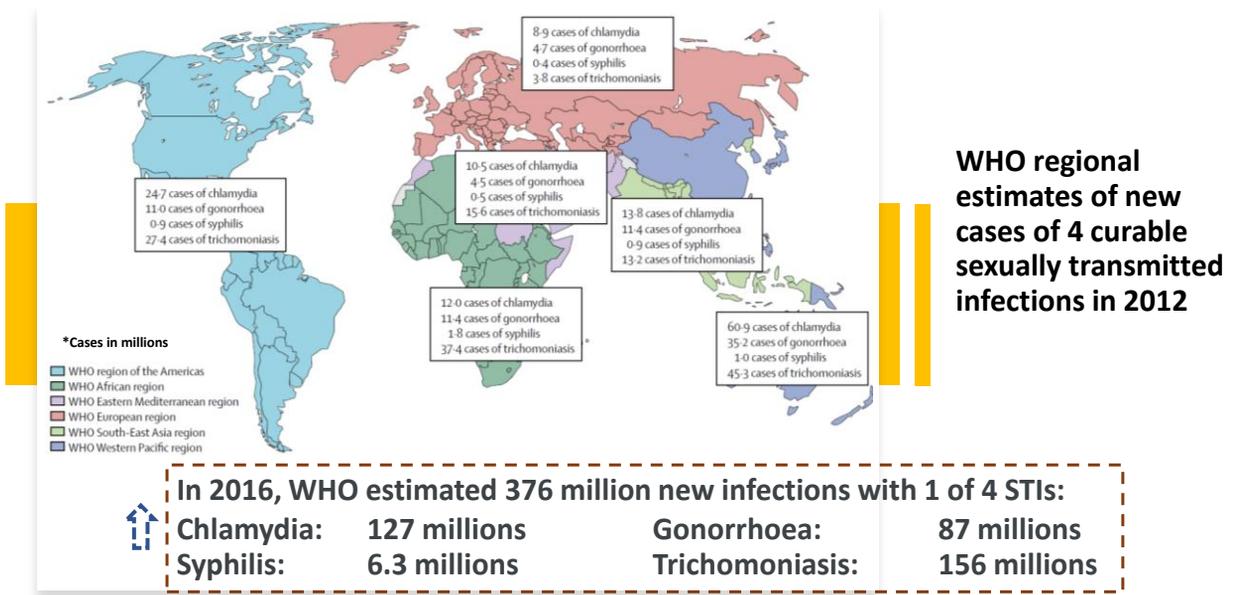


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Infectious causes of subacute meningitis

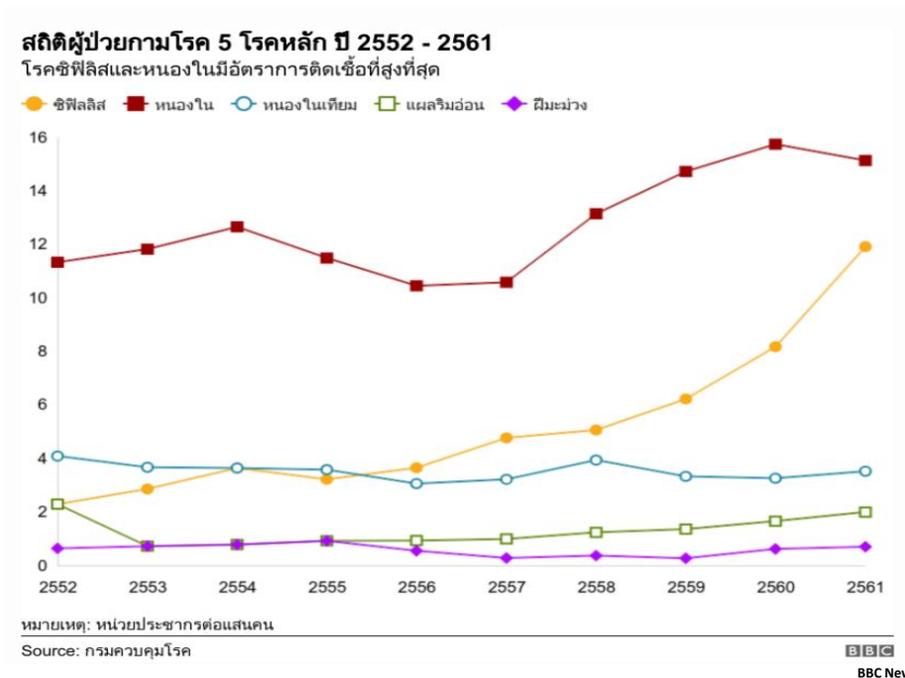
Non-immunocompromized no travel history	Travel history in tropical countries	Patients with immunocompromized status
Bacteria	Bacteria	Bacteria
<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i>	<i>Mycobacterium tuberculosis</i>
<i>Treponema pallidum</i>	<i>Treponema pallidum</i>	Viruses
Parameningeal infectious focus	Leptospira	Cytomegalovirus
Viruses	Rickettsia	HIV
Mollaret-meningitis (HSV II)	Fungi	Fungi
Measle	<i>Cryptococcus neoformans</i>	<i>Cryptococcus neoformans</i>
	Helminths	Protozoa
	<i>Angiostrongylus cantonensis</i>	<i>Acanthamoeba spp</i>
	<i>Cysticercus cellulosae</i>	

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Lancet Infect Dis 2017; 17: e235–79, WHO Website

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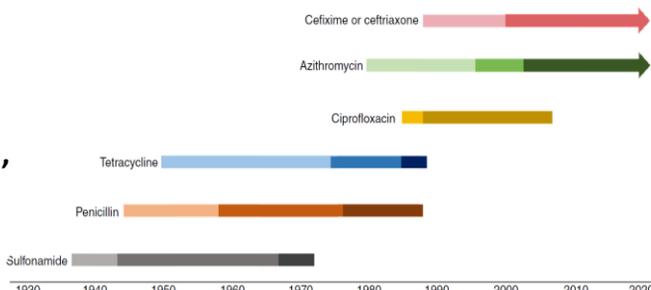
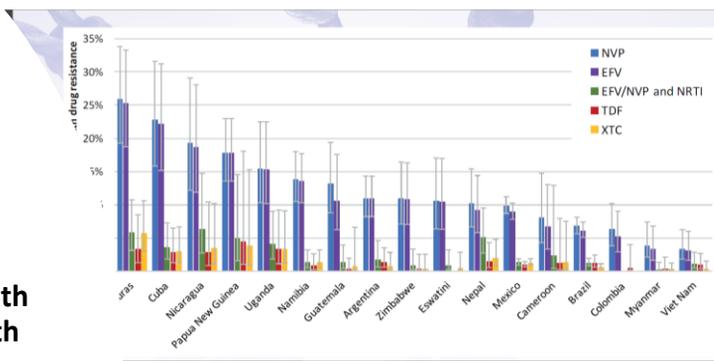
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Sexually transmitted infections and Travel

- Risk of having sexual intercourse with a new partner abroad (25-40%), with 36-50% of this being unprotected



- HIV acquisition risk, novel STIs and sexually transmitted enteric infection, and multidrug-resistant STIs



WHO 2019 HIV Drug Resistance Report, Brazilian J Microbiol 2017; 48: 617-28, Curr Opin Infect Dis 2019, 32:56-62.

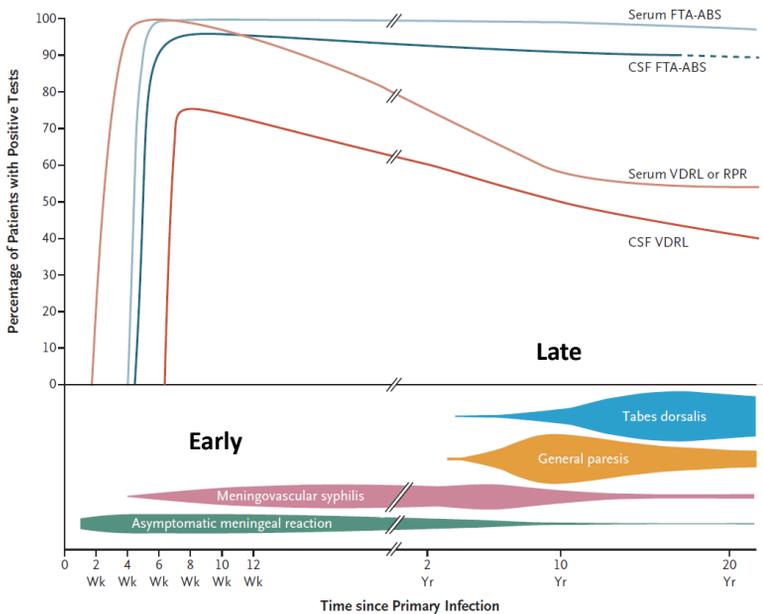
- Evolution of *Neisseria gonorrhoeae* resistance to antimicrobials. Color changes indicate events that impacted the lev

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Neurosyphilis

- 1.8% among persons with early syphilis
- More common in patient with HIV-coinfection

N Engl J Med 2019;381:1358-63.



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Stages of Neurosyphilis According to Clinical Features

Stage	Clinical feature	Laboratory testing
Early		
Asymptomatic early neurosyphilis	Asymptomatic, with pleocytosis developing weeks after infection	Serum and CSF VDRL: Reactive
Syphilitic meningitis	Headache, meningismus, photophobia, cranial nerve palsies (including optic or auditory neuropathies), confusion, lethargy, seizures; symptoms occur weeks or months after infection	Serum and CSF VDRL: Reactive CSF FTA-ABS: Reactive CSF WBC count 10–400/mm ³
Early or late		
Meningovascular syphilis	Stroke, cranial-nerve palsies, meningismus, meningomyelitis with progressive myelopathy, including sphincter dysfunction	Serum and CSF VDRL: Reactive CSF WBC 5–100/mm ³

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Stages of Neurosyphilis According to Clinical Features

Stage	Clinical feature	Laboratory testing
Late		
General paresis	Progressive dementia, psychiatric syndromes, personality change, manic delusions, tremor, dysarthria, Argyll Robertson pupils (<50%)	Serum VDRL: Reactive (>50%) CSF VDRL: Reactive CSF FTA-ABS: Usually reactive Mild, chronic pleocytosis
Tabes dorsalis	Ataxic gait, prominent Romberg's sign, lightning pains in legs and trunk, greatly impaired deep and proprioceptive sensation, Charcot joints, Argyll Robertson pupils in most patients, paraparesis with leg areflexia, sphincter dysfunction	Serum VDRL: Possibly nonreactive CSF VDRL: Reactive CSF FTA-ABS: Usually reactive Mild, chronic pleocytosis

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Treatment of neurosyphilis

- **Preferred**
 - Aqueous penicillin G 3-4 mU IV every 4 hours for 10-14 days
 - Penicillin G procaine 2.4 million units IM daily plus probenecid 500 mg orally four times daily, both for 10 to 14 days
- **If possible, patients allergic to penicillin should be desensitized and treated with IV penicillin**
- **Alternatives**
 - Ceftriaxone 2 g IV daily for 10 to 14 days

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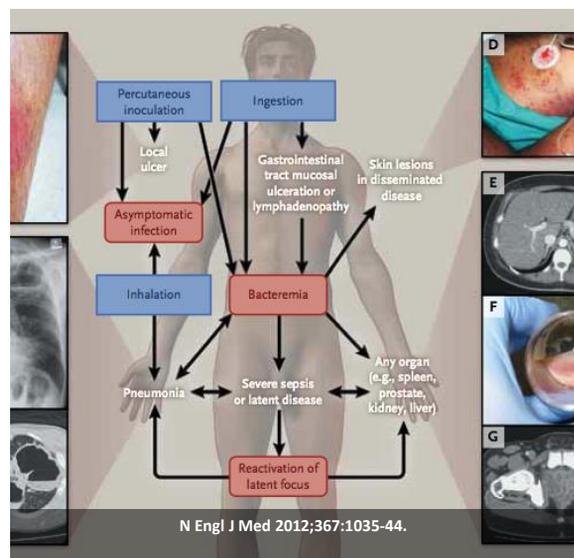
MELIOIDOSIS

The Great Imitator

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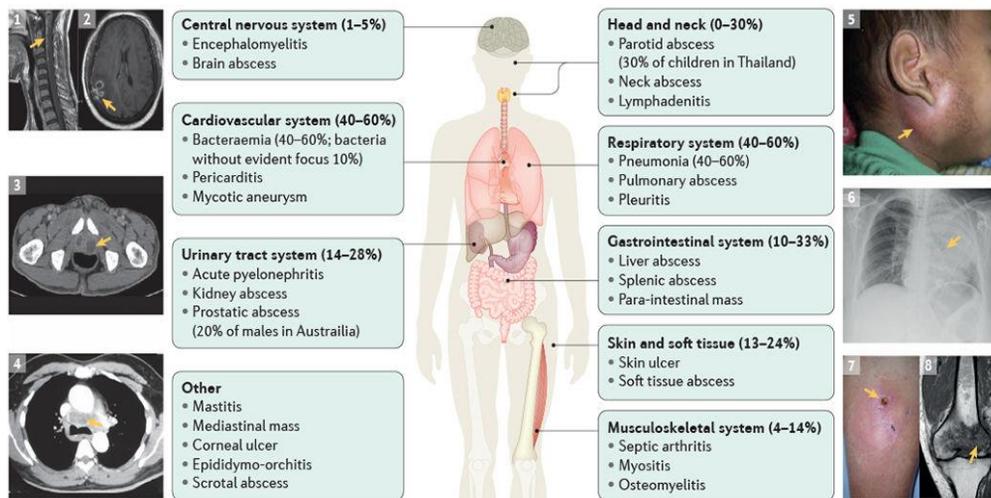
Melioidosis

- *Burkholderia pseudomallei*
- Most common cause of community-acquired bacteremic pneumonia in endemic areas
- 60-90% of cases have predisposing conditions
- Risk factors
 - Diabetes mellitus
 - Thalassemia
 - Preexisting renal diseases
 - Chronic liver diseases
 - Immunosuppressive use



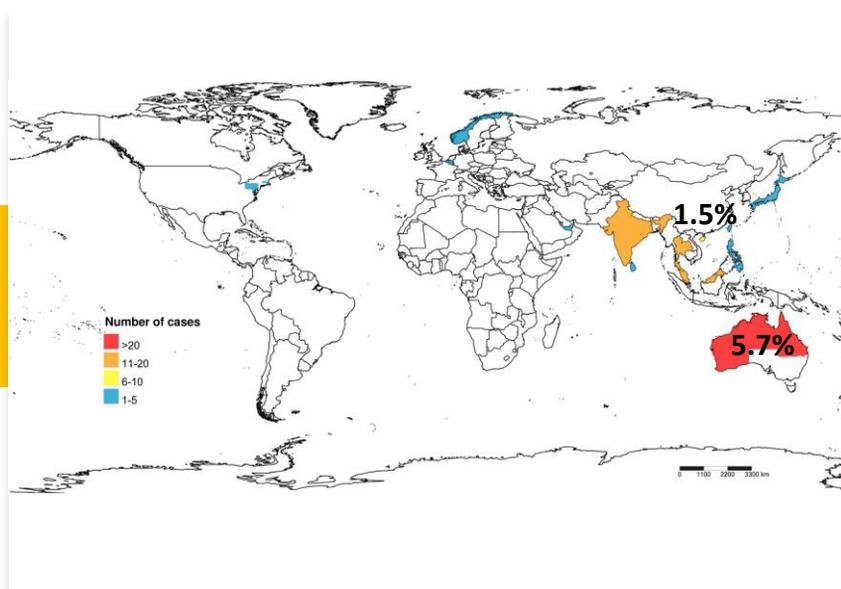
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Clinical manifestation of melioidosis



Nat Rev Dis Primers. ; 4: 17107. doi:10.1038/nrdp.2017.107.

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Reported central nervous system melioidosis: Countries and Regions

Am J Trop Med Hyg 2007; 77(1): 118–120; Am J Trop Med Hyg 2013; 89(3): 535–539; PLoS Negl Trop Dis 2019; 13(4): e0007320.

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Neurological melioidosis

- Systematical review of 120 cases with CNS melioidosis
- Adults (77%) [median age 40 years], Males (70%)
- ≥ 1 risk factors for melioidosis (60%)
- Median duration from clinical onset to diagnosis: 10 days (IQR 5–25)
- Prominent presentations: Fever (82%), headache (54%), unilateral weakness (57%) and **cranial nerve deficits (52%)**
- 2 most common forms: encephalomyelitis (37%), brain abscess (35%)
- 67% of cases had ≥ 1 other neurological organ involvement
- CSF profile mostly showed **mononuclear pleocytosis (64%)**, high protein (93%) and normal glucose (66%)

PLoS Negl Trop Dis 2019; 13(4): e0007320.

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Neurological melioidosis

- Neuroimaging findings in encephalomyelitis and brain abscess patients: rim-enhancing pattern (78%)

Location	%
Frontal lobe	34
Parietal lobe	33
Temporal lobe	13
Occipital lobe	10
Brainstem	34
Cerebellum	23

- Mortality rate: 20%

PLoS Negl Trop Dis 2019; 13(4): e0007320.

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Medical treatment for melioidosis

Initial intensive therapy	Oral eradication therapy	
Ceftazidime	Trimethoprim–sulfamethoxazole (TMP-SMX)	
Meropenem	>60 kg	4 (80/400) x2
Imipenem	40-60 kg	3 (80/400) x2
Cefoperazone-sulbactam	<40 kg	2 (80/400) x2
At least 10-14 days	12-20 weeks	

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