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CONTENTS

Cholera

Cholera was confirmed in an adult patient admitted to hospital with acute watery diarrhea and dehydration in Mussina, Limpopo Province, on 10 March 2013. *Vibrio cholerae* 01 serotype Inaba was confirmed by conventional culture and the presence of the cholera enterotoxin gene was demonstrated by molecular techniques. The organism was sensitive to ciprofloxacin and doxycycline *in vitro*. The patient responded well to intensive fluid therapy and made an uneventful recovery. The provincial Communicable Diseases Control Directorate responded very promptly. The patient was a 25-year-old Zimbabwean national who had been in Zimbabwe days before he got sick. He returned to South Africa on 8 March 2013. He started feeling sick on 9 March 2013.

There needs to be vigilance for further imported cases and introduction of *Vibrio cholera* into informal water supplies by infected persons. Asymptomatic cases are very typical of *Vibrio cholerae* El Tor. The last outbreak of cholera in South Africa was in 2009. It started in Limpopo and Mpumalanga provinces, and later spread to all the provinces in South Africa, resulting in 12 741 cases and 69 deaths. This outbreak followed on the large outbreak in Zimbabwe.

Aggressive rehydration therapy in the severely dehydrated patient with intravenous Ringer's lactate according to standard protocols for cholera remains the mainstay of treatment and is the most important lifesaving measure. Antibiotic treatment should be used only in those patients who have signs of severe dehydration. Antibiotics have NOT been shown to affect final clinical outcome, but may shorten the length of time the patient has diarrhoea and decrease volume of stool, thus decreasing the volume of fluids required for rehydration. Signs of severe dehydration indicating a requirement for intravenous therapy include: lethargy/decreased level of consciousness, sunken dry eyes, absent tears, very dry mouth, poor drinking, reduced skin turgor (skin pinch subsides slowly). All provinces in South Africa need to remain on high alert to ensure early detection of cases and prevention of transmission. All suspected cases should be immediately notified and investigated.

Stool or rectal swab samples should be sent in transport medium and a specific request made to the laboratory for cholera testing. When a cholera patient has been identified, it is essential to inform local populations of hygienic measures they can take, in order to reduce the likelihood of a local outbreak. These measures would also be appropriate for travellers to Zimbabwe and include:

- Always use clean/disinfected water for drinking, food preparation and washing of utensils.
- Where safety of water is not known, water can be made safe for use by boiling water vigorously for 3 minutes and then allowing it to cool. Water should then be stored in a suitable, clean container with a lid. Alternatively, mix 1 teaspoon or capful of household bleach with 20 -25 litres of water and let it stand for at least 2 hours (preferably overnight). Bottled water may not always be safe. Only use bottled water from a reliable source and only if the bottles are properly sealed.
- Wash hands with clean/disinfected water before and after handling food, and after using the bathroom.
- Human waste should be disposed of in a manner that does not contaminate water sources.
- Store food under hygienic conditions.

Note that raw water sources (rivers, dams etc.) should not be regarded as safe for consumption. Even if *Vibrio cholerae* O1 is not isolated from the water, faecal contamination is an indication that

water is not safe for human consumption. Current laboratory methods are not sensitive enough to reliably identify the absence of *Vibrio cholerae* in water.

Source: Limpopo Communicable Diseases Directorate, NHLS Polokwane, Centre for Enteric Diseases and Division of Public Health Surveillance and Response, NICD-NHLS.

Rabies

Lagos bat virus infection was confirmed in an adult male *Epomophorus wahlbergi* fruit bat (or Wahlberg's epauletted fruit bat) in the Scottburgh surrounds in KwaZulu-Natal Province (Fig. 1). The animal dropped from his roost, which was located in a thatched lapa on a private property. The bat appeared dead and was picked up by the household's children, who brought it to their mother. The animal was however still alive but had abnormal behaviour including showing no sign of fear and not struggling to free itself. The animal was collected by a member of the KwaZulu-Natal Bat Interest Group (http://www.batskzn.co.za) who attempted to rescue the animal. The animal's health however deteriorated rapidly, including losing use of hind legs, anorexia and "opaque" look in his eyes. The animal died shortly thereafter. The animal was submitted for testing which revealed the presence of lyssavirus antigen in a brain specimen when tested with the rabies direct fluorescence antibody test (NICD/NHLS). The brain material was also RT-PCR positive and upon sequencing revealed the presence of Lagos bat virus RNA in the sample (Prof Wanda Markotter, University of Pretoria). The human contacts received rabies post-exposure prophylaxis, based on their respective exposure histories and prior rabies vaccination history.

Rabies can be caused by infection with any member of the *Lyssavirus* genus. Currently twelve lyssavirus species and two putative species have been reported as members of the genus. The most concerning lyssavirus from a public health point of view in South Africa remains the classic rabies virus which is mostly associated with domestic dogs, as also found elsewhere in the developing world.[1] Classic rabies virus has not been reported from any bat species in South Africa, or Africa, but is commonly found in insectivorous bats in the Americas (www.cdc.gov). Three so-called rabies-related lyssaviruses have been reported from South Africa. Duvenhage virus has been associated with 3 human cases since the 1970s, two from South Africa (in 1970 and 2006 respectively) and one case from Kenya in 2007. The epidemiology of the disease remains obscure but it is most likely linked to an insectivorous bat host. Mokola virus has been reported from a variety of animals including dogs, cats and shrews but there have been no human cases. As with Duvenhage virus, the epidemiology of this disease also remains largely obscure and the natural reservoir of the virus remains to be determined.

Lagos bat virus are more frequently reported from fruit-eating bats with most cases described from the KwaZulu-Natal Province since the early 1980s (most likely due to bias in surveillance for rabies in the province opposed to other South African provinces)[2] and no human cases reporetd to date. Nevertheless bats remain an uncommon source of rabies in South Africa and as mentioned before, almost all human cases reported in South Africa are associated with exposure to domestic dogs. Bats are ecologically important animals and several species of bats are found on the Red Data list (www.iucnredlist.org). Bats should only be handled when absolutely necessary and are preferably avoided. When sick or injured bats are encountered handle them only with thick gloves to ensure that no bites, scratches are incurred. Contact your local veterinarian, bat interest group or FreeMe Wildlife Rehabilitation Centre (www.freemewildlife.org.za) immediately. If contact with a bat has occurred, medical intervention must be sought immediately. Such cases should be handled as category III rabies exposures, and receive both a full schedule of rabies vaccination and rabies immunoglobulin (applied in the deltoid muscle that was not used for vaccine administration, or at the wound site if apparent). Bat bites or scratches might be negligible or unnoticed due to the size of some of the bat species, and therefore if it is not clear if there was direct physical contact (for example waking up at night and finding a bat in the bedroom) then prophylaxis should preferable be given.

Reference

1. Weyer et al. Human rabies in South Africa, 1983-2007. Virus Research 2011; 155 (1): 283-290

Source: Centre for Emerging and Zoonotic Diseases, NICD-NHLS.

Figure 1. Wahlberg's epauletted fruit bats.

Travel-associated malaria update

Travelers and healthcare workers are reminded that South Africa is in the peak malaria transmission season, which in southern Africa extends from September to May each year. It is important that those who are travelling to risk areas during the upcoming holidays take effective precautions against malaria. Many people travel to other African countries during the Easter holiday season, so healthcare workers must obtain a thorough travel history and include malaria in the differential diagnosis of any febrile illness in such cases. African countries where malaria is endemic (either in parts/ all of the country) include: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (DRC), Congo (Brazzaville), Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mayotte, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Principe, Senegal, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

Travelers are urged to take malaria prophylaxis as prescribed by a medical doctor when visiting malaria risk areas. Current malaria chemoprophylaxis recommendations for travel in southern Africa include three options: mefloquine, doxycycline or atovaquone-proguanil (Malanil®). In addition they should take appropriate preventive measures to reduce mosquito bites including: wearing long sleeves and trousers from dusk to dawn, using insect repellents (containing DEET), staying indoors after dusk, using insecticide-treated bed nets, and keeping windows and doors closed or screened.

Healthcare workers throughout the country should maintain a high index of suspicion for malaria in febrile patients post-travel to a malaria risk area, as well as in patients with unexplained fever, even in the absence of a travel history. According to national guidelines, artemether-lumefantrine (Coartem®) is first-line treatment for uncomplicated falciparum malaria (except in children <6 months of age and in the first trimester of pregnancy). Alternatively, quinine plus either doxycycline or clindamycin can be used. Quinine plus clindamycin is the treatment of choice in uncomplicated malaria cases for those in the first trimester of pregnancy and in children ≤ 5kg. Intravenous quinine should be used for cases of severe malaria. Where avail-able, intravenous artesunate should be used for non-pregnant adults with severe malaria. For detailed information on the prevention, clinical presentation, diagnosis and management of malaria cases, as well as the South African malaria risk areas, see the Department of Health's Guidelines for the Prevention of Malaria and the Guidelines for the Treatment of Malaria in South Africa on: http://www.doh.gov.za/docs/policy/2011/malaria_treatment.pdf and http://www.doh.gov.za/docs/policy/2011/malaria_prevention.pdf

Source: Division of Public Health Surveillance and Response, NICD-NHLS

Influenza

Based on data from the National Institute for Communicable Diseases (NICD) influenza surveillance programmes, the influenza season generally starts in the April to June period.
Influenza vaccine is currently available in local clinics and private pharmacies. Since it takes about two weeks after vaccination for antibodies to develop in the body and provide protection against influenza virus infection, it is recommended that people be vaccinated as soon as vaccine becomes available to ensure that as many people as possible are protected before influenza season starts.

Recommended composition of influenza virus vaccine for use in the 2013 southern hemisphere influenza season
The WHO has recommended that trivalent vaccines for use in the 2013 southern hemisphere influenza season contain the following:

- an A/California/7/2009 (H1N1)pdm09-like virus
- an A/Victoria/361/2011 (H3N2)-like virus
- a B/Wisconsin/1/2010-like virus

Recommendations available at: http://www.who.int/influenza/vaccines/virus/recommendations/2013_south/en/index.html

Persons to whom influenza vaccines should be administered

- Persons (adults or children) who are at high risk for influenza and its complications because of underlying medical conditions and who are receiving regular medical care for conditions such as chronic pulmonary and cardiac diseases, chronic renal diseases, diabetes mellitus and similar metabolic disorders; individuals who are immuno-suppressed (including HIV-infected persons with CD4 counts >100 cells/µl); and individuals who are morbidly obese (BMI ≥40 kg/m^2).
- Pregnant women – irrespective of the stage of pregnancy
- Residents of old-age homes, chronic care and rehabilitation institutions
- Children on long-term aspirin therapy
- Medical and nursing staff responsible for the care of high-risk cases
- Adults and children who are family contacts of high-risk cases
- All persons aged >65 years
- Any persons wishing to protect themselves from the risk of contracting influenza, especially in industrial settings, where large-scale absenteeism could cause significant economic losses.

Detailed recommendations on target groups, dosages and contraindications for the 2013 influenza vaccine can be accessed in the South African Medical Journal Vol. 103(2) available at: http://www.samj.org.za/index.php/samj/article/view/6435/4855

Influenza Surveillance update
In the first nine weeks of 2013, 47 specimens were received from Viral Watch sites: 36 were taken at the time of entry into South Africa from abroad, 10 from sites in Gauteng, four from the Eastern Cape and one each from Limpopo, Mpumalanga and the Western Cape. No influenza isolates were detected from patients without a travel history. Influenza A (H1N1)pdm09 was detected in 13 patients arriving in South Africa from abroad.
In this time period, 556 patients admitted with severe respiratory illness (SARI) were tested at the 5 sentinel sites. Influenza B was detected in one patient from the North West Province.

Source: Centre for Respiratory Diseases and Meningitis, NICD-NHLS

Transplant-associated microsporidiosis, Cape Town

Starting in late November 2012, microsporidiosis was diagnosed in three patients in Cape Town academic hospitals. All were renal transplant patients on antirejection therapy.

Patient 1 was a 48-year-old male from the Eastern Cape Province, transplanted with a sibling-donated kidney at Groote Schuur Hospital in May 2012. He was transferred back to East London in June. In September 2012 cytomegalovirus infection was diagnosed and he was treated with valacyclovir. A renal biopsy showed fungal spores and features of rejection. Aortic valve vegetations were seen on echocardiography and he was treated for bacterial and fungal endocarditis. The patient was transferred to Groote Schuur Hospital in early November 2012. An *E. coli* ESBL was cultured from the urine and he was put on ertapenem. A renal biopsy showed granulomas with possible fungal spores, morphologically identified as microsporidia. He was started on albendazole, and was also treated for a *Clostridium difficile* infection with metronidazole. Urine was sent to NICD for confirmation of microsporidiosis.

Patient 2 was a 13-year-old girl at Red Cross Hospital who received a cadaveric renal transplant in August 2012. Her course was complicated by severe acute rejection, steroid-induced raised intraocular pressure and glucose intolerance, macrophage activation syndrome, recurrent *Klebsiella pneumoniae* ESBL urinary tract infection, cytomegalovirus reactivation, gastritis, hypertension, and anaemia. She was admitted in mid-December 2012 because of fever, vomiting, and diarrhoea. Renal biopsy showed histological evidence of microsporidial infection and this was confirmed in urine sent to NICD. She was started on albendazole.

Patient 3 was another 13-year-old female at Red Cross Hospital who received the other kidney from the donor at the same time. She had had a pyrexia of unknown origin since late September 2012. A renal biopsy in mid-December 2012 revealed diffuse infiltration with microsporidia and she was started on albendazole. Urine was sent to NICD for confirmation of microsporidiosis. The patient also had multiple complications related to transplantation and antirejection therapy: macrophage activation syndrome, hypertension, glaucoma, anaemia, hearing loss, resistant *Pseudomonas* sp. urinary tract infection, long-line sepsis and cytomegalovirus reactivation. Repeat urine specimens continue to be positive for microsporidia.

PCR and sequencing of small subunit rRNA gene segments showed that all three patients were infected with *Encephalitozoon cuniculi*. Electron microscopy of the parasites in urine concentrates and biopsy material showed the characteristic ultrastructure of this species. Microsporidia are widespread pathogens of insects, fish, mammals, reptiles and amphibians.[1] *Encephalitozoon cuniculi* is a well-known cause of disease in rabbits and dogs. In humans microsporidia are regarded as opportunistic parasites in HIV-infected and other immunocompromised patients. AIDS-associated microsporidial diarrhoea was first described in South Africa in 1998.[2] *Enterocytozoon bineusi* and *Encephalitozoon* (formerly *Septata*) *intestinalis* are mostly responsible for diarrhoea in HIV-positive patients, but *Encephalitozoon* species are more likely to cause disseminated infections. An early case of presumed *Encephalitozoon intestinalis* infection in a renal transplant patient was described in Cape Town in 2001.[3] There is a very limited selection of treatment options for human microsporidiosis. Albendazole is effective against *Encephalitozoon cuniculi*, but long-term therapy may be necessary. Regarding possible nosocomial transmission, viable spores survive in the environment for at least a month, but most common disinfectants will make them non-infectious. A good standard of hospital environmental hygiene should therefore prevent cross-infections.[4]

References

1. Franzen C. Microsporidia: a review of 150 years of research. Open Parasitology Journal 2008; 2: 1-34.
2. Dini LA, Frean JA, Pendle S, Sacks L. First report of microsporidiosis in South Africa. South African Medical Journal 1998; 88: 62.
3. Latib MA, Pascoe MD, Duffield MS, Kahn D. Microsporidiosis in the graft of a renal transplant recipient. Transplant International 2001; 14: 274-7.
4. 4. Weiss LM, Schwartz DA. Microsporidiosis. In: Gurrant RL, Walker DH, Weller PF (Eds). *Tropical Infectious Diseases*, 2nd Ed., 2006. Philadelphia: Elsevier Churchill Livingstone, pp. 1126-1140.

Source: Departments of Nephrology, Infectious Diseases, Paediatrics, and Transplant Surgery, Groote Schuur and Red Cross Children's hospitals and University of Cape Town; Centres for Opportunistic, Tropical and Hospital Infection, and Emerging and Zoonotic Diseases, NICD

Carbapenemases in South Africa

In 2009, there was alarm about the report of NDM-1 *Klebsiella pneumonia* isolated from Swedish patient, who travelled to New Delhi and acquired urinary tract infection. Since then, carbapenemase-resistant Enterobacteriaceae (CRE) have been observed worldwide, and from 2011 in South Africa. Carbapenemases in Enterobacteriaceae are mostly plasmid encoded which largely explains their common association with other resistance markers and their multidrug resistance patterns. Types of CRE vary between countries, and might be associated with historical/cultural relationships and exchange of populations with other countries of high prevalence. Cross-border transfer of patients, travel, medical tourism and refugees might also play an important role. The epidemiology of carbapenemases is described in Table 1. The Antimicrobial Resistance Reference Laboratory (AMRRL) of the Centre for Opportunistic, Tropical and Hospital Infections (COTHI) at NICD has been a referral laboratory for molecular confirmation of CRE since 2011.

Table 1. Geographical distribution and molecular epidemiology of the main carbapenemases

Type of carbapenemases	Geographical spread	Molecular epidemiology
NDM	*K. pneumoniae* and *E. coli* in India Imported to UK firstly and other countries via patients with travel (hospitalization) in India. There have been a cases of cross-infections. In South Africa since 2011.	Widespread in Enterobacteriaceae. Diverse strain type in UK. Plasmid spread among strains and species is more important than clonal spread among patients.
VIM	Scattered globally, endemic in south Europe (Greece)	Plasmid spread among strains is more important than clonal spread of producer strains.
IMP	Scattered worldwide; no clear associations	Mostly plasmid spread.
KPC	USA since 1999. Prevalent worldwide.	Plasmid spread from mostly among *K. pneumoniae*, occasionally to other Enterobacteriaceae.
OXA-48	Widespread *K. pneumoniae* in Mideast, Africa, Europe.	Mixture of plasmid and clone spread.
GES	GES enzymes have been identified worldwide, with reports from Greece, France, Portugal, South Africa, French Guiana, Brazil, Argentina, Korea, and Japan	The genes encoding the GES family of enzymes are located in integrons on plasmids and were initially classified as extended-spectrum -lactamases. Their hydrolysis spectrum was expanded in 2001 to include imipenem, with the report of GES-2 in a clinical isolate of *P. aeruginosa* from South Africa.

The Light Cycler 480 (Roche Applied Science, Germany) instrument is used for the real-time polymerase chain reaction (PCR). Primers and probes that are used have reference to CDC recommendation. AMRRL analyzed a total of 191 isolates, the majority from hospitalized patients, 7 from environmental isolates. Sixty-two CREs were confirmed (Figure 1). These isolates were referred from public and private hospitals. In conclusion, this number does not represent the national prevalence of CREs, but it is a warning of emerging resistance that threatens to produce an epidemic of CREs. Public health authorities should be advised about the need for national surveillance, management of outbreaks, and guidance for control of CREs, and should consider making significant CRE infection a notifiable disease.

Source: Centre for Opportunistic, Tropical and Hospital Infection, NICD-NHLS.

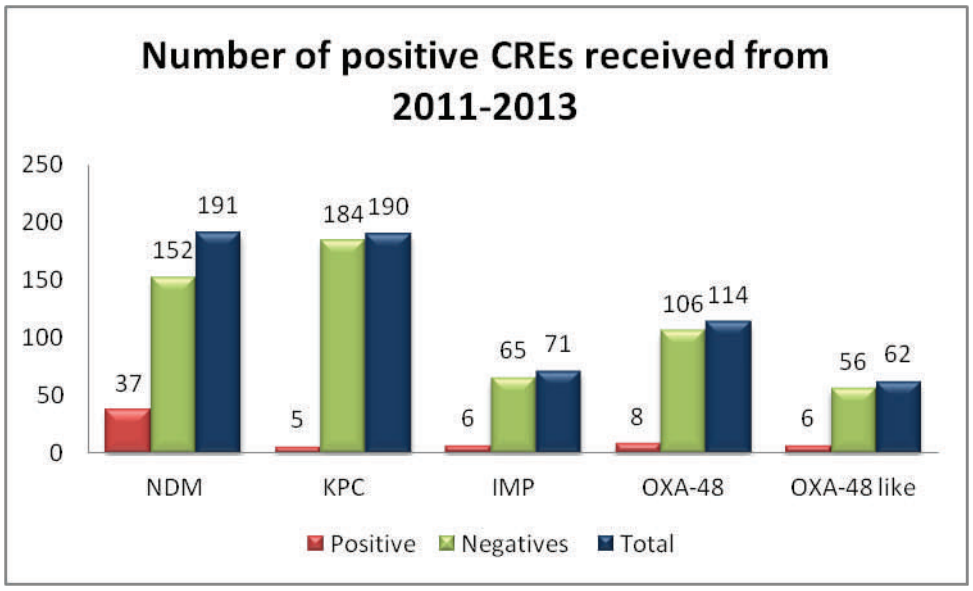

Figure 1. Results of carbapenemase testing on 191 referred isolates, NICD, 2011-2013

Severe Acute Respiratory Infections associated with a novel coronavirus

See update on cases and deaths in "Beyond our Borders" column below.

The routes of transmission to humans have not yet been determined. In three instances, infections occurred in clusters. Recent information from a family cluster in the United Kingdom suggests that human to human transmission does occur. Human-to-human may also have occurred in two instances in the Middle East. Although there is evidence of human to human transmission, the risk of sustained human-to-human transmission appears to be very low. The source of the virus, its geographic extent and the spectrum of illness are still being investigated. Genetic sequencing to date suggests that the virus is closely related to coronaviruses detected in bats.

Testing for the presence of the novel coronavirus should be considered in patients meeting **ALL** of the criteria listed below:

- A person with an acute respiratory infection, which may include fever (≥ 38°C) and cough; AND
- suspicion of pulmonary parenchymal disease (e.g. pneumonia or Acute Respiratory Distress Syndrome (ARDS)) based on clinical or radiological evidence of consolidation; AND
- travel to or residence in an area where infection with novel coronavirus has recently been reported or where transmission could have occurred (currently Arabian Peninsula or neighbouring countries); AND
- not already explained by any other infection or aetiology, including all clinically indicated tests for community-acquired pneumonia according to local management guidelines.

For detailed guidelines on case definitions for testing for the novel coronavirus as well as information on **who to contact for advice on testing for novel coronavirus please visit the NICD webpage** http://www.nicd.ac.za/?page=alerts&id=5&rid=211

Source: Centre for Respiratory Diseases and Meningitis, NICD-NHLS

BEYOND OUR BORDERS: INFECTIOUS DISEASE RISKS FOR TRAVELLERS

The 'beyond our borders' column focuses on selected and current international diseases that may affect South Africans travelling abroad.

Disease & Countries	Comments	Advice to travellers
Novel coronavirus United Kingdom	As of 26 March 2013, a total of 17 laboratory-confirmed cases has been reported to the World Health Organization, with 10 deaths giving a case fatality rate of 59%. 3 cases of novel coronavirus were confirmed in February 2013 in United Kingdom residents, 2 of whom had no travel history. The 2 cases who had not travelled appear to have acquired their infection from contact with a family member who had travelled to Saudi Arabia and Pakistan.	Coronaviruses are a large family of viruses that cause a wide range of illnesses in humans, from the common cold to SARS. Viruses of this family also cause a number of animal diseases. In the cases reported to date, infection with novel coronavirus has manifested as an acute febrile respiratory infection (presenting as a pneumonia or acute respiratory distress syndrome). Investigations are ongoing with regards to the likely source of infection, route of exposure, and possibility of further human-to-human transmission of the virus.

Disease & Countries	Comments	Advice to travellers
Novel coronavirus (continued) United Kingdom Saudi Arabia Germany (ex United Arab Emirates)	These are the first cases demonstrating human-to-human transmission of the virus. In this cluster, 2 cases have died, and 1 with mild illness has recovered. 3 new cases have been confirmed in residents of Saudi Arabia. A 69 year old man who was admitted to hospital on 10 February 2013 and subsequently died. Then a 39 year old man who developed symptoms on 24 February and has also died. The third case was reported on 23 March as a contact of the 39 year old man. This case developed mild illness and has now recovered. 1 case of novel coronavirus was confirmed in a 73 year old man on 25 March 2013, who had been hospitalised since 10 March in Abu Dhabi, UAE and then transferred to a hospital in Germany 19 March.	The World Health Organization (WHO) does not recommend any travel or trade restrictions related to Saudi Arabia, Qatar, Jordan or other countries in the Arabian peninsula.
Dengue fever Portugal (Madeira)	As of 12 March 2013, 2168 cases of dengue fever have been reported in Madeira, plus 11 in travellers returning to mainland Portugal and 70 in those returning to other European countries. No new laboratory confirmed cases have been reported since 4 February 2013 and the outbreak is considered controlled.	Dengue viruses are transmitted by *Aedes* species mosquitoes, which usually bite during daytime. There are no available vaccines. Symptoms of dengue fever can include fever, headache, joint and muscle pain, rash, nausea and vomiting, and can take two weeks to develop after being bitten. Uncommon fatal complications include dengue haemorrhagic fever and dengue shock syndrome. When travelling to a dengue-risk area, use mosquito repellents containing DEET to avoid being bitten. Wear long-sleeved pants and shirts during the day and stay in well-ventilated (fan/air-conditioned) rooms where possible. Burning mosquito coils at night and sleeping under a mosquito net in a well-ventilated room is also helpful.
Yellow fever Sudan (Darfur) Chad (Goz Beida and Guereda districts)	As of 2 March 2013, a total of 851 suspected cases, including 171 deaths, have been reported. The outbreak has affected mostly Central, North, West and South Darfur. As of 24 February 2013, 2 confirmed cases with 139 suspected cases and 9 deaths in the districts bordering Darfur, Sudan.	Yellow fever is an acute viral haemorrhagic disease transmitted by infected mosquitoes. Symptoms appear after an incubation period of 3 to 6 days. Symptoms include fever, muscle pain with prominent backache, and headache. Most patients improve and their symptoms resolve 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 is accompanied by severe multisystem illness (including icteric hepatitis and haemorrhagic diathesis). There is no specific treatment.

Disease & Countries	Comments	Advice to travellers
Yellow fever **(continued)**		Travellers to at-risk yellow fever areas need to have proof either of yellow fever vaccination or a medical waiver certificate. The vaccine must be received at least 10 days prior to departure. The vaccine is contraindicated in pregnant women, infants <9 months, individuals with egg allergies, and certain immune-suppressed persons. Vaccinated travellers should still take precautionary measures to avoid being bitten by mosquitoes, including use of insect repellents (containing 30-50% DEET), wearing light-coloured clothing, and use of insecticide-treated bed nets.
Hepatitis E South Sudan (Maban Country)	As of 8 March 2013, a total of 6017 cases has been reported with 111 deaths. The outbreak is occurring within all 4 refugee camps in Maban Country in northeast South Sudan (Jamam, Gendrassa, Batil and Doro)	Hepatitis E is a viral infection found worldwide, which causes acute illness with jaundice. The virus is transmitted mainly through the faecal-oral route due to faecal contamination of drinking water. Outbreaks occur in regions with low standards of environmental sanitation. The incubation period is 15-64 days. Up to half of infections may not show signs of jaundice but the highest rates of clinically-evident disease occur in young to middle-aged adults. Hepatitis E virus infection is self-limiting in normal conditions, but pregnant women are at particular risk of severe hepatitis. There is no specific treatment and no vaccine available for control of the infection. This outbreak is focussed in the refugee camps in the northeast of South Sudan. Travellers to this region should be aware of the importance of good hygiene measures and the potential risks associated with local drinking water.
Polio Niger (Tahoua region)	As of 23 February 2013, 1 case of wild poliovirus type 1 was confirmed in Tahoua region. The virus is related to virus originating in Kaduna State, Nigeria.	Polio is a vaccine-preventable virus spread by the faecal-oral route. Many infections will be asymptomatic but a small proportion may develop acute flaccid paralysis, which can lead to permanent paralysis of the limbs or death if respiratory muscles are involved. The infection can be prevented by administration of polio vaccine, either a live oral (OPV) vaccine or injected inactivated vaccine (IPV). The World Health Organization recommends that travellers to and from Niger, and other polio-affected countries (Afghanistan, Pakistan, Nigeria plus neighbouring countries where cases have been reported) should be fully protected by vaccination prior to travel.

Source: Division of Public Health Surveillance and Response, NICD-NHLS.

References and additional reading:

- ProMED-Mail (www.promedmail.org)
- World Health Organization (www.who.int)
- Centers for Disease Control and Prevention (www.cdc.gov)
- Health Protection Agency (www.hpa.org.uk)

Last accessed: 26 March 2013.