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Division of the National Health Laboratory Service

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1 INTERNATIONAL OUTBREAKS OF IMPORTANCE TO SOUTH AFRICAN TRAVELLERS AND HEALTHCARE WORKERS

a Ebola virus disease (EVD) outbreaks: situation update

Following the WHO Ebola Response Roadmap classification, countries reporting EVD cases associated with the outbreak that originated in West Africa fall into two categories: those with widespread and intense transmission, and those with (or that have had) an initial case or cases, or with localised transmission.

1. Countries with widespread and intense transmission

Guinea, Liberia and Sierra Leone continue to report new cases and deaths. The incidence of new cases continues to increase in Sierra Leone, whilst the incidence of new cases in Guinea and Liberia is stable at present. Cumulative numbers of cases, deaths are shown in Table 1.

Table 1. Number of Ebola virus disease cases and deaths in Guinea, Liberia and Sierra Leone as at 16 November 2014

Country	Total cases (laboratory-confirmed, probable and suspected)	Total deaths	Case fatality rate	Number of cases among healthcare workers
Guinea	1 971	1 192	60%	95
Liberia	7 069	2 964	42%	341
Sierra Leone	6 073	1 250	21%	132
Totals	**15 113**	**5 406**	**36%**	**568**

2. Countries with an initial case or cases, or with localised transmission

Five countries have reported a case or cases imported from Guinea/Liberia/Sierra Leone: Mali, Nigeria, Senegal, Spain, and the United States of America (Table 2). Senegal reported a single imported case with no further transmission, whilst the other four countries reported additional cases following localised transmission. Nigeria and Senegal have completed the required 42-day follow up since their last reported cases and their outbreaks have been declared over.

Table 2. Number of Ebola virus disease cases and deaths in countries with imported cases or localised transmission as at 16 November 2014

Country	Outbreak status	Total cases (laboratory-confirmed, probable and suspected)	Number of cases among healthcare workers	Total deaths
Senegal	Declared over on 17 October 2014	1	0	0
Nigeria	Declared over on 19 October 2014	20	11	8
Spain	Follow-up period not yet completed	1	1	0
United States of America	Follow-up period not yet completed	4	3	1
Mali	First case reported on 24 October 2014	6	2	5

EVD outbreak in the Democratic Republic of the Congo

This outbreak is unrelated to the outbreak that originated in West Africa. This is the seventh confirmed EVD outbreak in DRC, close to where the virus was first identified in 1976 in Yambuku near the Ebola River. As at 11 November 2014, a cumulative total of 66 EVD cases (38 confirmed, 28 probable) including eight among healthcare workers have been reported. A total of 49 deaths (CFR 74%) were reported in the outbreak. The outbreak is expected to be declared over within the next few days.

Situation in South Africa

As at 18 November 2014 there have been no cases of Ebola virus disease in South Africa associated with the current outbreaks in West Africa and DRC. There are no suspected cases of EVD in South Africa at present.

Of continual concern is the possibility of imported EVD cases. The suspected EVD case definition and risk assessment of suspected EVD cases can be accessed on the NICD website (www.nicd.ac.za). Testing for viral haemorrhagic fever viruses (including Ebola virus) in South Africa is only available at the NICD. EVD testing is neither warranted nor useful for persons that are not suffering from a clinical illness compatible with EVD, even in the event of compatible travel histories. The tests cannot be used to determine if the patient has been exposed to the virus and may develop the disease later.

Requests for testing (with a detailed clinical, travel and exposure history) should be directed to the NICD Hotline at 082 883 9920 (a 24-hour service, for healthcare professionals only).

EVD situation updates are regularly posted on the NICD website (www.nicd.ac.za). Further information on EVD for healthcare professionals and the general public are also available on the website.

Source: Division of Public Health Surveillance and Response and Centre for Emerging and Zoonotic Diseases, NICD-NHLS

2 ZOONOTIC AND VECTOR-BORNE DISEASES

a Update on Crimean-Congo haemorrhagic fever (CCHF)

The NICD has recorded five laboratory-confirmed cases of Crimean-Congo haemorrhagic fever (CCHF) in 2014 to date, of which two were fatal. Two of the cases have been confirmed recently.

A 48-year-old farmer from a small farming settlement in Middelpos (Namakwa district), located halfway between Sutherland and Calvinia in the Northern Cape Province, presented on the 13th November 2014 with fever, rigors and arthralgia, followed by diarrhoea and vomiting one week after shearing sheep on his farm. He was initially treated with antibiotics and symptomatically. On 15 November, he was confused, fainted and was referred to a local hospital for intravenous fluids. His condition deteriorated rapidly and he was referred to a Cape Town hospital. The patient was isolated as CCHF was suspected on the basis of possible history of exposure to either ticks or infected sheep blood together with hypotension, encephalopathy and bleeding from venepuncture sites, bruising and oliguria, and profound thrombocytopenia (Platelets=$10x10^9$/L) and a marked increase in transaminases (ALT=1662 IU/L; AST=4403 IU/L). CCHF was confirmed by PCR on 19th of November 2014. CCHF IgG or IgM antibodies were not detected. The patient died on 19 November.

The second recently confirmed case is a 44-year-old farmer from Van Wyksvlei in Northern Cape Province who reported a 'bontpoot' tick bite before falling ill in mid-October 2014. He presented with acute onset of fever and myalgia; initial blood results revealed thrombocytopenia, marginally raised transaminases and leukopenia. The diagnosis was confirmed by RT-PCR on two successive blood samples. The patient has recovered.

South Africa, and in particular the more arid parts of the inland plateau, is an endemic region for this haemorrhagic fever, and numerous sporadic cases are confirmed almost every year. The five cases reported this year originated from the Free State (n=1) and Northern Cape (n=4) provinces. Their administrative boundaries include the central part of SA, and historically the majority of the cases are from the two aforementioned provinces. The first CCHF case this year occurred in January, the next two cases in September, and the fourth and fifth case in October and November respectively. CCHF in South Africa usually occurs during the summer months when tick vectors, including those transmitting CCHF (so-called 'bontpoot' ticks, *Hyalomma* spp.), are more active. Common clinical and pathological features observed in the patients included myalgia and fever, thrombocytopenia and elevated transaminases. Haemorrhagic manifestations were noted in three of the five patients with confirmed CCHF this year. All cases were associated with farming exposure, which is a known occupational risk for tick-borne disease in general due to tick infestation of livestock. Humans acquire CCHF virus infection from a tick bite, squashing of infected ticks, or from contact with infected blood or other tissues of livestock. Serologic evidence of CCHF exposure is very high in livestock herds in the interior of the country, but no morbidity and economic loss is observed in livestock as a result of CCHF infection. In contrast, people infected with CCHF usually suffer illness - but it is not known to what extent the disease (particularly cases without classical haemorrhagic manifestations) goes unnoticed. The average mortality rate for CCHF in South Africa is 30%. Serological evidence of human infection with CCHF is uncommon, despite the widespread and high prevalence of CCHF virus antibodies amongst sheep, cattle and hares throughout South Africa.

Source: Centre for Emerging and Zoonotic Diseases; and Division of Public Health Surveillance and Response, NICD-NHLS; Mediclinic Vergelegen, Somerset West; Department of Health Communicable Disease Control, Western Cape and Northern Cape Province

b Malaria

An increase in both local (from malaria-endemic areas in South Africa) and imported (from other malaria-endemic countries) cases can be expected over the upcoming holiday season, as the malaria season in southern Africa is from September to May each year. There should be a high index of suspicion for malaria as the cause of acute febrile illness in all residents of areas with local transmission, and in all returning travellers from these areas. Diagnostic tests for malaria should be done urgently since prompt and appropriate management is critical to improving patient outcomes. Delays in diagnosis, misdiagnosis (most commonly as influenza), and delayed treatment are

the most common factors associated with adverse outcomes.

The majority of travel-related malaria is seen in persons returning to South Africa from Mozambique. This is a reflection of the large numbers of visitors to Mozambique, and also of the significant malaria risk in Mozambique (particularly in areas north of Maputo) at this time of the year. Malaria is endemic in three South African provinces: Limpopo, Mpumalanga, and north-eastern KwaZulu-Natal. Travellers to malaria-endemic areas within South Africa or other malaria-endemic countries in southern Africa (notably Mozambique) need to take appropriate preventative measures. Mefloquine (Lariam®, Mefliam®), doxycycline, and atovaquone-proguanil (Malanil®) are recommended chemoprophylactic agents for southern Africa where chemoprophylaxis is indicated, and the choice of agent needs to be individualised. For advice on preventive measures, access the following link: http://www.doh.gov.za/docs/policy/2011/malaria_prevention.pdf.

Healthcare workers, especially those in non-endemic areas, must ensure that any case of malaria is notified. The South African national guidelines recommend the use of artemether–lumefantrine (Coartem®) or quinine plus doxycycline/clindamycin for uncomplicated falciparum malaria. Severe falciparum malaria is treated using quinine plus doxycycline/clindamycin or intravenous artesunate where available. An initial loading dose of 20 mg/kg of quinine is required for all cases of severe malaria to rapidly reach a therapeutic level. Chloroquine and sulphadoxine-pyrimethamine are not to be used in the treatment of falciparum malaria due to high-level resistance. Non-falciparum malarial infections are less common in sub-Saharan Africa; artemether-lumefantrine or quinine as above can be used for treatment of acute non-falciparum malarial illness. Chloroquine should only be used if there is reliable laboratory confirmation of non-falciparum species. The addition of primaquine to the above initial treatment is indicated for *Plasmodium ovale* or *P. vivax* infections to prevent relapse. The South African malaria treatment guidelines can be accessed through the following link: http://www.doh.gov.za/docs/policy/2011/malaria_treatment.pdf

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

c Rabies

A case of probable human rabies was reported in October 2014. A 52-year-old man was attacked by his neighbour's dogs in Shayandima (in the Tshilidzini surrounds, Limpopo Province) at the end of September 2014. He sustained category 3 wounds on his legs and hands. He consulted a nearby clinic where he received wound treatment and a first dose of rabies vaccine. He was then referred to a clinic nearer his home for follow-up rabies vaccine doses. It is unknown if he ever received rabies immunoglobulin (RIG). He reportedly became ill about a week and a half after the attack. He was admitted to Tshilidzini Hospital on 25 October 2014 (about a month after the exposure), after presenting with agitation and confusion, and died a day later. The treating doctor made a preliminary diagnosis of rabies based on the patient's clinical presentation. An ante-mortem blood sample was submitted for rabies diagnostic testing, and anti-rabies virus antibodies (IgG and IgM) were detected by indirect immunofluoresence testing. Unfortunately, no other samples (ante- or post-mortem) were available for testing, hence the case could not be confirmed and has been classified as probable.

A total of five laboratory-confirmed cases of human rabies has been reported in South Africa for 2014 to date (including one case acquired in Angola). In addition, five probable cases (including the case reported here) were also identified. Probable cases are defined as cases with a clinical and outcome history compatible with a diagnosis of rabies and a history of dog/animal exposure in the absence of supporting laboratory findings. All the cases reported here followed attacks by dogs, and occurred in Limpopo (n=3), Eastern Cape (n=3), Mpumalanga (n=2) and North West (n=1) provinces. The case that was acquired in Angola was also linked to a dog bite. The dogs involving the bite incidents were all unknown to the respective victims, and without a known owner in most cases. Brain samples of only two dogs responsible for the implicated exposures in the ten cases were submitted for testing, and both were positive for rabies antigen. Low awareness of the necessity to consider rabies post-exposure prophylaxis (PEP) after dog bites and scratches remains a widespread obstacle to preventing rabies deaths. Seven of the victims did not seek or receive rabies PEP following the exposures. Three of the patients did not receive rabies immunoglobulin

(critical to administer in category 3 exposures). A total of six of the rabies deaths reported here involved young children.

Various hotspots for rabies in South Africa are currently of particular concern. Limpopo Province, in particular the northern district of Vhembe, reported the re-emergence of rabies in 2006 and human cases of the disease have been reported annually since. The Eastern Cape, Free State and Mpumalanga provinces report few human cases despite evidence of resurgence of animal rabies in certain districts within these provinces in recent years. Poor reporting of human rabies cases in these provinces may be attributed to poor awareness of the disease which leads to mis- and under-diagnosis. KwaZulu-Natal was historically known as the province with the greatest burden of dog rabies, and consequently human rabies, in South Africa; however, due to intensified vaccination programs in dogs since 2009 the number of dog rabies cases is dwindling and no human cases have been reported in the past 15 months.

Health professionals can get clinical advice from the NICD hotline; more information (as well as information for the general public) is available on the NICD website: www.nicd.ac.za.

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

3 FOOD- AND WATER-BORNE DISEASES

Food-borne disease outbreak, North West Province

In October 2014, a suspected outbreak of foodborne disease affecting learners from a local school in Koster (Bojanala district, North West Province) was reported. The North West Provincial Department of Health initiated an investigation in collaboration with the South African Field Epidemiology and Laboratory Training Programme (SA-FELTP), in order to determine the possible source of the infection, the extent and magnitude of the outbreak, and guide control and preventive measures.

Approximately 279 learners fell ill after eating a meal prepared by the school feeding scheme on 24 October 2014. A total of 174 cases presented to various local healthcare facilities from 24-27 October 2014; nine required hospital admission. All recovered uneventfully and were discharged home. One additional case, a 4-year-old child, died at home before being taken to hospital. Presenting symptoms included diarrhoea (in some cases dysentery), nausea, vomiting, fever, and abdominal cramps. A total of eleven stool specimens was

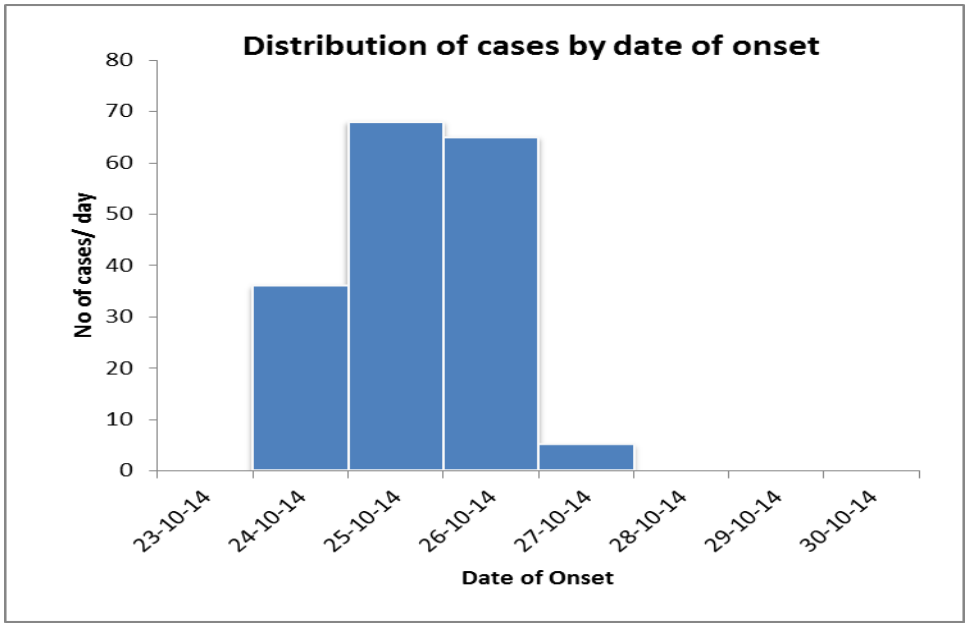

Figure 1. Epidemic curve of cases by date of onset, *Salmonella* Heidelberg foodborne disease outbreak, Koster, October 2014

collected from symptomatic learners. Stool specimens were also collected from the three food handlers who prepare meals for the school feeding scheme. Food (cooked samp and beans, milk) and water samples from various sampling points within the school were also collected. All the specimens (clinical and environmental) were submitted to the NHLS Infection Control Services Laboratory in Johannesburg for testing. S*almonella* spp. was identified in thirteen stool specimens as well as food samples (samp and beans), and was further identified as *Salmonella* Heidelberg at the Centre for Enteric Diseases Bacteriology (CEDb) Laboratory of the NICD. The stool specimen of the food handler who was absent (and had not consumed the meal) tested negative for Salmonella. No pathogens were identified in the water or milk samples.

An epidemic curve of cases by date of onset of illness is shown in Figure 1. It illustrates a sharp rise in the number of cases from 24 October followed by a sudden drop in case numbers on 27 October, suggesting a common point source of infection. The food was consumed at 12:00 on 24 October 2014; the index cases reported symptoms a few hours later. The last cases presented on 27 October 2014. These timelines indicate a maximum incubation period of 72 hours which correlates with the incubation period for non-typhoidal *Salmonella* spp. (6 to 72 hours) which was isolated in all stool specimens tested, and from food samples (samp and beans).

The school has two full-time food handlers who maintain the catering service of the school feeding scheme. On 24 October 2014 one of the food handlers reported sick and a friend was requested to assist in her absence. Samp, beans and apples were served for lunch. The substitute food handler took the leftover food home and served her family of five. All family members became ill after consuming the meal and presented to the hospital with symptoms similar to those reported by the cases from the school. One of her children, a 4-year-old, died at home.

The laboratory results and the results of the epidemiological investigation strongly suggest contamination of the food served at the school on 24 October 2014 as the source of infection and cause of the outbreak. Such foodborne disease outbreaks can be prevented by adherence to basic food safety guidelines, including:

- Washing hands with soap and water before handling food, during food preparation and after using the toilet.
- Keeping food preparation areas and equipment properly sanitized and free of insects, pests and animals.
- Separation of raw (poultry, meat and seafood) and cooked foods by using separate utensils and equipment for raw foods and separate raw food containers for storage.
- Cooking food to a temperature of at least 70° C and reheat cooked food thoroughly.
- Storage of food at safe temperatures. Do not leave cooked food at room temperature for >2 hours. Promptly refrigerate all perishable food (<5°C if possible). Keep cooked food hot (60° C) prior to serving.
- Using safe water for cooking and washing vegetables and utensils.

Source: Division of Public Health Surveillance and Response, SA-FELTP, and Centre for Enteric Diseases, NICD-NHLS; Rustenburg Hospital, Charlotte Maxeke Academic Hospital and Johannesburg Infection Control, NHLS; Provincial and District Department of Health Communicable Disease Control, North West Province

4 ANTIMICROBIAL RESISTANCE

Update on carbapenemase-producing Enterobacteriaceae

The Johannesburg and Cape Town Antimicrobial Resistance Reference Laboratories (AMRRL) of the Centre for Opportunistic, Tropical and Hospital Infections (COTHI) at NICD/NHLS have been testing referred isolates of suspected carbapenemase-producing Enterobacteriaceae (CPE) for the presence of selected carbapenemase genes. For October 2014, a total of 52 Enterobacteriaceae isolates was screened, 33 of which were CPE. Most isolates screened were *Klebsiella pneumoniae* (26) followed by *Enterobacter cloacae* (17) (Figure 2).

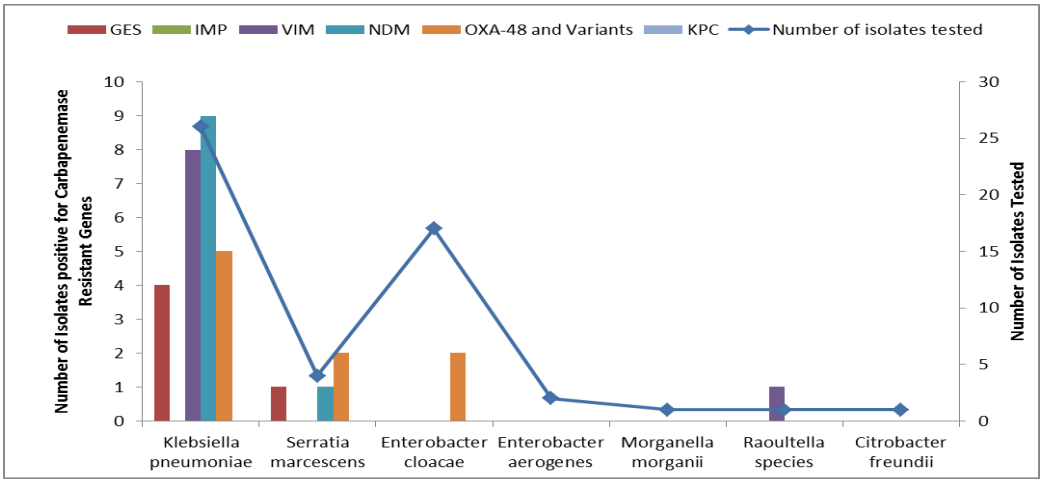

Figure 2. Enterobacteriaceae isolates screened (n=52) and confirmed CPE (n=33) during October 2014 at AMRRL (NICD-NHLS)

Ten NDM-positive isolates were identified (four from private hospitals in KwaZulu-Natal Province and six from public hospitals in Gauteng Province). Nine OXA-48-positive isolates were identified from private hospitals (six from KwaZulu-Natal Province and three from Gauteng Province). Nine VIM-positive isolates were identified (three from the private sector in KwaZulu-Natal Province and six from the public sector in Gauteng Province). Five GES-positive isolates were identified from the private sector (two from Gauteng Province and three from KwaZulu-Natal Province) (Figure 3).

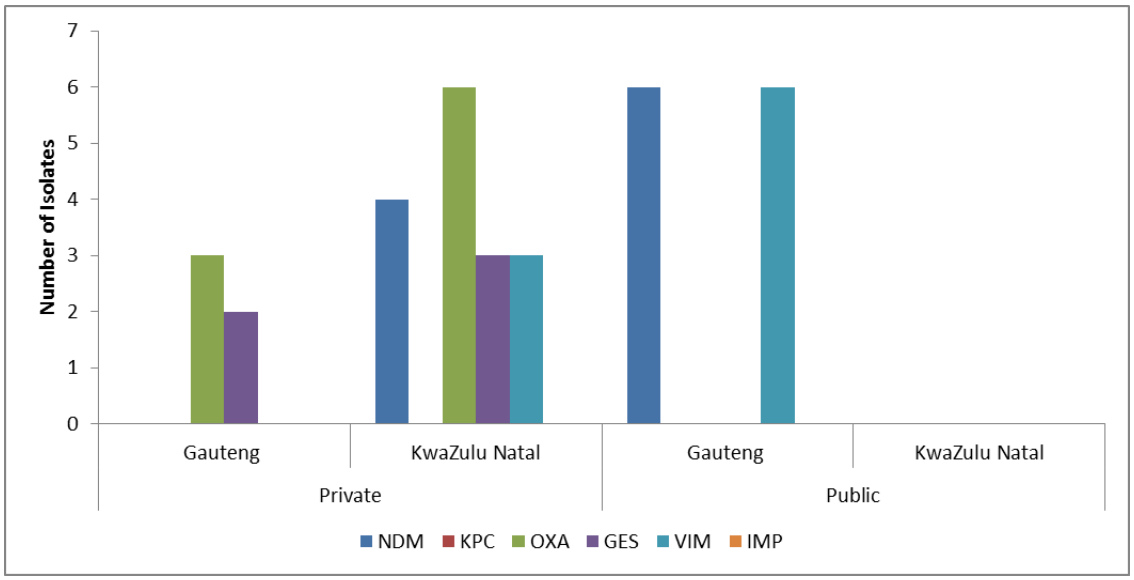

Figure 3. Distribution by province of CPEs (n=33), October 2014

It is important to note that these figures do not represent the current burden of CPEs in South Africa. Given that CPE infections are currently not reportable or notifiable in South Africa, there is no platform for appropriate surveillance reports and consequently no locally representative data is available. This is of major concern, since meaningful data can inform public health policy and highlight priorities for action. Controlling the spread and limiting the impact of CPEs in South Africa will require intensive efforts in both the public and private healthcare sectors going forward. NHLS and private laboratories are encouraged to submit suspected CPE isolates based on antimicrobial susceptibility testing (AST) criteria to the AMRRL, NICD/NHLS. Please telephone (011) 555 0342/44 or email: ashikas@nicd.ac.za; and olgap@nicd.ac.za; for queries or further information. In the Western Cape area, please email: colleen.bamford@nhls.ac.za.

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

6 BEYOND OUR BORDERS

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
1. Vector-borne diseases		
Crimean-Congo haemorrhagic fever Oman	As of 14 October 2014: 6 confirmed cases, 1 death	Crimean-Congo haemorrhagic fever is transmitted to people from ticks and livestock animals. Human-to-human transmission can occur from contact with blood and body fluids of infected persons. Avoid tick bites by wearing long-sleeved shirts, long pants, and light-coloured clothing to deter ticks.
Chikungunya French Polynesia (American Samoa Samoa Tokelau)	As of 03 November 2014: >3000 cases reported with local transmission	Chikungunya is a mosquito-borne viral infection transmitted by *Aedes* spp. mosquitoes, which bite mostly during the day. Travellers should wear long-sleeved shirts and long pants during the day and stay in well-ventilated (fan/air-conditioned) rooms.
North America Mexico USA	As of 07 November 2014: 11 cases , 0 deaths 1627 cases, 0 deaths	
Central America El Salvador Honduras Nicaragua Panama	As of 7 November 2014: 149 cases, 0 deaths 14 cases, 0 deaths 20 cases, 0 deaths 36 cases, 0 deaths	
Caribbean On-going local transmission	As of 07 November 2014: 8869 cases, 115 deaths across 8 Latin Caribbean countries and 1147 cases,0 deaths across 14 Non- Latin Caribbean countries	
Andean Venezuela Colombia Peru	As of 07 October 2014: 398 cases, 0 deaths 364 cases, 0 deaths 7 cases, 0 deaths	
Southern Cone Argentina Brazil Paraguay	As of 07 November 2014: 17 cases, 0 deaths 210 cases, 0 deaths 3 cases, 0 deaths	
France (Montpellier)	As of 21 October 2014: 4 confirmed cases	

Disease & countries	Comments	Advice to travellers
1. Vector-borne diseases (continue)		
Dengue fever China (Guangdong province) South America (Columbia, Brazil, French Guiana, Guyana, Paraguay, Venezuela)	As of 03 November 2014: > 30 000 cases Ongoing local transmission	Dengue fever (like chikungunya) is a mosquito-borne viral infection transmitted by *Aedes* spp. mosquitoes, which bite mostly during the day. Travellers should wear long-sleeved shirts and long pants during the day and stay in well-ventilated (fan/air-conditioned) rooms.
Marburg Uganda (Mpigi district)	As of 22 October 2014: 1 confirmed case (fatal); all 16 suspected and 26 probable cases are negative for the disease. As of 14 November 2014: all 197 contacts have been followed up. The outbreak has been declared over.	Rousettus aegypti fruit bats are natural hosts of Marburg virus. The virus is spread to people from eating fruit bats and through direct contact with the blood or bodily fluids of an infected person. Regular hand washing should be performed when in direct contact with a sick person.
Lassa fever Nigeria (Oyo state)	As of 28 October 2014: 10 cases	The host of Lassa virus is the multimammate rat of the genus *Mastomys.* The virus is transmitted through direct contact with the rodent's urine, droppings, blood or organs. Lassa virus may also spread from person-to-person through contact with the virus in the blood, tissue, secretions, or excretions of an individual infected with the Lassa virus. Travellers should avoid contact with Mastomys rodents and must ensure good hygiene when caring for sick friends or relatives.
2. Food- and water-borne diseases		
Cholera Ghana (Greater Accra region) Niger (southern regions) Cameroon (northern regions)	As of 10 November 2014: 20 900 cases, 126 deaths As of 31 October 2014: >1 300 cases , 51 deaths As of 31 October 2014: >2 000 cases, 100 deaths	Cholera is an acute diarrhoea illness that causes severe dehydration. Drink lots of safe water (bottled water with an unbroken seal, boiled water or water treated with chlorine tablets). Strict washing of hands with soap and safe water must be practiced. Food must be well-cooked before eating. Peel fruit and vegetables before eating.

Disease & countries	Comments	Advice to travellers
3. Respiratory diseases		
MERS- CoV Saudia Arabia	As of the 14 November 2014: A total number of 805 laboratory confirmed cases and 342 deaths.	Good hygiene and basic infection prevention practices can minimise risk of respiratory infections in travellers: • cough etiquette • avoiding contact with sick people • avoid handling of animals • frequent hand washing with soap and water or the use of an alcohol-based hand rub. Travellers with diabetes, chronic lung disease and immune-compromised states are at risk of infection and should avoid contact with animals if possible. Strict hand washing must be followed after touching animals. Avoid raw camel milk or undercooked camel meat at all times. Travellers should avoid contact with animals and eat food that is fully cooked. Infection control practices such as regular hand washing must be followed to prevent infection.
Legionnaires' disease Portugal (Lisbon)	As of 12 November 2014: 302 confirmed cases, 5 deaths	Legionnaire's disease is caused by legionella bacteria, which are found in water. People become sick with legionnaires' disease and develop pneumonia when they breathe in mist or vapour that has been contaminated with legionella bacteria. Keeping legionella bacteria out of water is the key to prevent infection. Travellers should avoid jacuzzis and whirlpools.

References and additional reading:

ProMED-Mail (www.promedmail.org)
World Health Organization (www.who.int)
Centers for Disease Control and Prevention (www.cdc.gov)
Last accessed: 17 November 2014

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