1 ZOONOTIC AND VECTOR-BORNE DISEASES

a Update on rabies in Gauteng Province

Since mid-August 2016 to date, cases of rabies in jackals and a single cat were reported in Muldersdrift and Randfontein, Gauteng Province (data source: Agriculture Research Council - Onderstepoort Veterinary Institute). Efforts to vaccinate pets and cattle in the province have been on-going in response to the outbreak. No human cases of rabies have been associated with this outbreak, although several exposures have been reported. Post-exposure prophylaxis for rabies is safe and effective to prevent rabies virus infection after potential exposures.

To date a total of two human cases of rabies has been confirmed in South Africa. These cases were reported from KwaZulu-Natal and Free State provinces.

Source: Centre for Emerging and Zoonotic Diseases, Division of Public Health Surveillance and Response, NICD-NHLS (januszp@nicd.ac.za); Animal Health Directorate, Department of Agriculture, Western Cape Government (lesleyvh@elsenburg.com).

The geographic distribution of Zika virus (ZIKV) continues to expand, with most recent cases reported from the southern United States, South-East Asia and Western Pacific Islands. Since late July 2016, local mosquito-borne ZIKV transmission has been reported in Miami, Florida (USA). Autochthonous ZIKV transmission may also be occurring in South-East Asia—in Indonesia, Thailand, Philippines and Vietnam. It remains unclear whether Zika cases reported in Singapore are a result of re-introduction of ZIKV from South America or constitute re-emergence of endemic virus. Malaysia re-

Source: Centre for Emerging and Zoonotic Diseases, NICD-NHLS; (januszp@nicd.ac.za)

d Brucellosis: case report and request for increased clinician awareness

In early September 2016, the NICD was alerted to a possible case of brucellosis. A 40-year-old male tested positive for IgM against *Brucella* species with a high antibody titre. In early August, the patient developed myalgia, arthralgia, headaches and extreme fatigue, even on performing ordinary household tasks, and night sweats. On visiting his GP, a number of tests were done including serology for Epstein-Barr virus, typhoid (Widal test), *Chlamydia*, cytomegalovirus, *Toxoplasma* and *Brucella* species. All were negative except for IgM antibodies to *Brucella* spp (IgG antibodies were not detected). On further questioning, the patient reported no contact with cows, horses, goats or animal products. His dogs tested negative for brucellosis. He had travelled to China in May and early June, and had eaten and drunk local food including milk.

Brucella abortus (cattle), *B. melitensis* (sheep, goats), *B. suis* (pigs) and *B. canis* (dogs) usually affect animals but human infection may occur following direct contact with infected animals or their aborted foetuses, or contaminated animal products such as milk and cheese.

Although brucellosis is a controlled disease through State Veterinary Services, infection with *B. abortus* is increasingly prevalent amongst South African cattle herds in South Africa (Figure 1). Brucellosis in humans typically presents with non-specific symptoms including fatigue, myalgias, arthralgias and fever. Diagnosis is usually through isolation of the organism on blood culture, although a rising titre of antibodies against *Brucella* species is highly suggestive. Treatment is with oral doxycycline and rifampicin for six weeks, with or without intramuscular daily aminoglycoside for two weeks.

Source: Division of Public Health, Surveillance and Response NICD/NHLS; Directorate Animal Health, Department of Agriculture, Forestries and Fisheries

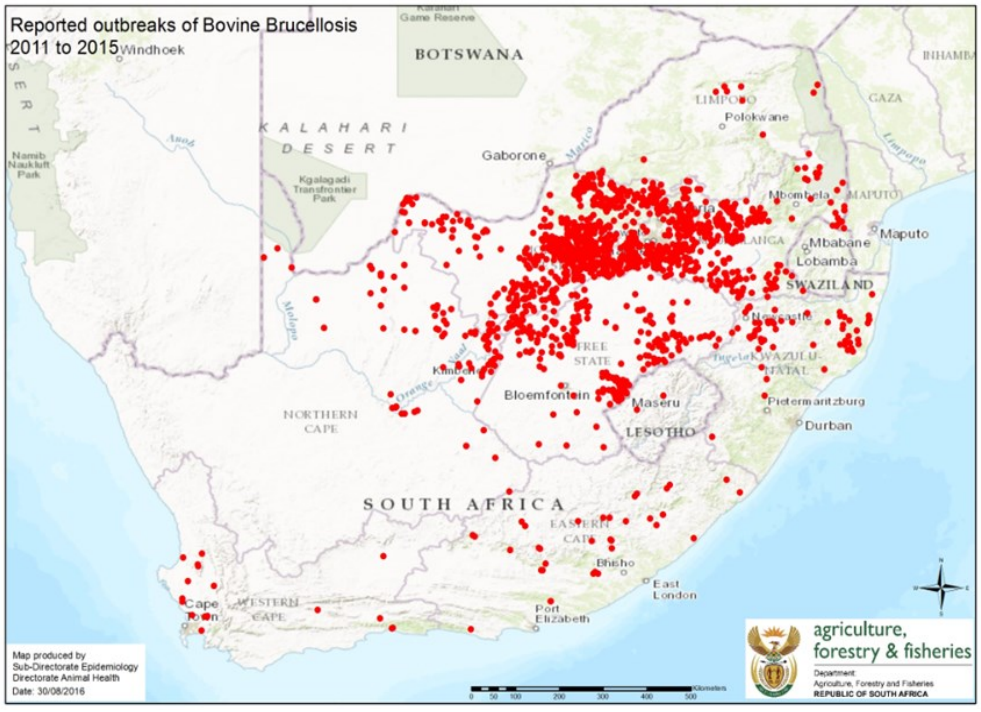

Figure 1. Outbreaks of bovine brucellosis reported to the Directorate Animal Health, Department of Agriculture, Forestries and Fisheries, 2011-2016. Each red dot represents the location of an infected herd as determined by serological testing of herd animals.

2 VACCINE-PREVENTABLE DISEASES

a Measles—a need to heighten surveillance

There has been an increase in measles cases detected from 01 July until 16 September 2016. Nine measles IgM-positive cases were detected, of which eight were from Gauteng and one from Northern Cape. The patients were from the following districts: City of Johannesburg Metro (4 cases), City of Tshwane Metro (1 case), Ekurhuleni District (3 cases), ZF Mgcawu District, Northern Cape (1 case). Cases were amongst both adults and children. This increase more than doubles the number of cases identified in the first 6 months of 2016 (Figure 2), and may represent a risk of an outbreak. Heightened awareness is required for patients with rash illness.

- All patients of any age with fever, rash and one or more of the following: cough, runny nose (coryza) and red eyes (conjunctivitis) should have a blood specimen (serum) collected and sent to the NICD Centre for Vaccines and Immunology for measles IgM testing. Measles diagnosis cannot be confirmed without a laboratory diagnosis.
- All patients who have blood testing for measles, and who meet the case definition for rash-based surveillance (fever, rash and one or more of the following: cough, coryza and conjunctivitis), should be notified to the Department of Health through completion of a measles case investigation form.
- Clinicians should closely scrutinize road to health cards of children admitted to hospital for any reason and should ensure measles vaccination is up to date in all children 6 months and older.
- For older children and adults who may have missed vaccination, it is never too late to catch up measles vaccination.

Source: Centre for Vaccines and Immunology, NICD-NHLS; (melindas@nicd.ac.za)

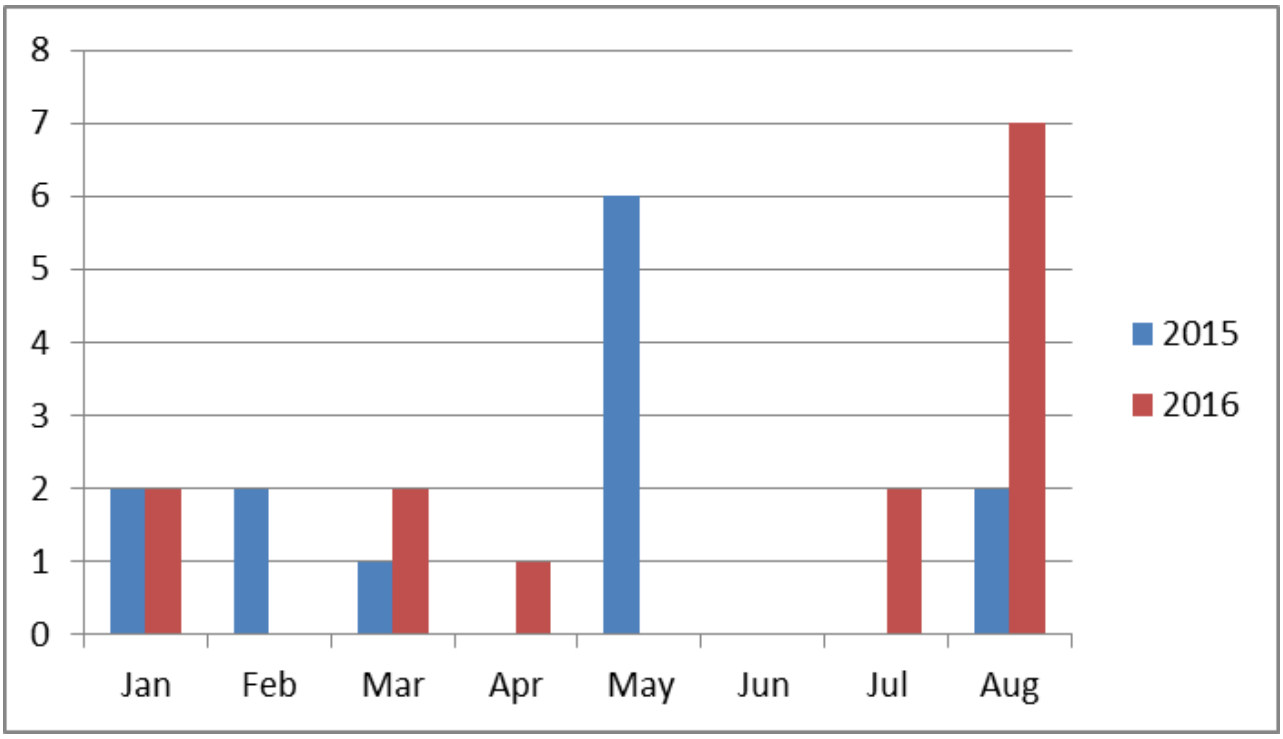

Figure 2. Measles cases (IgM positive) detected in South Africa and confirmed by NICD Centre for Vaccines and Immunology, January to August 2015-16, by month of symptom onset.

3 SEASONAL DISEASES

a The influenza season, South Africa, 2016

The 2016 influenza season which started in week 19 (the week starting 09 May 2016), is ongoing (Figure 3).

At any time during the season, one of the three usual influenza strains (A(H1N1), A(H3N2) and B) may be more common. The 2016 influenza season started with influenza B accounting for the majority of detections until week 28 (week ending 17 July) when the circulation of influenza A(H3N2) and A (H1N1)pdm09 started to increase.

Influenza A(H1N1)pdm09 previously known as 'swine flu' has been circulating as expected each season since 2009. This strain behaves similarly to other seasonal influenza strains in terms of transmission and clinical presentation following infection. Identification of patients with this strain of influenza during the influenza season is to be expected and there are no specific public health interventions required for patients or contacts infected with influenza A(H1N1)pdm09. There is also no difference in severity of illness or response to treatment. Routine laboratory testing of persons with suspected influenza-like illness is not required.

Source: Centre for Respiratory Diseases and Meningitis, NICD-NHLS; (cherylc@nicd.ac.za)

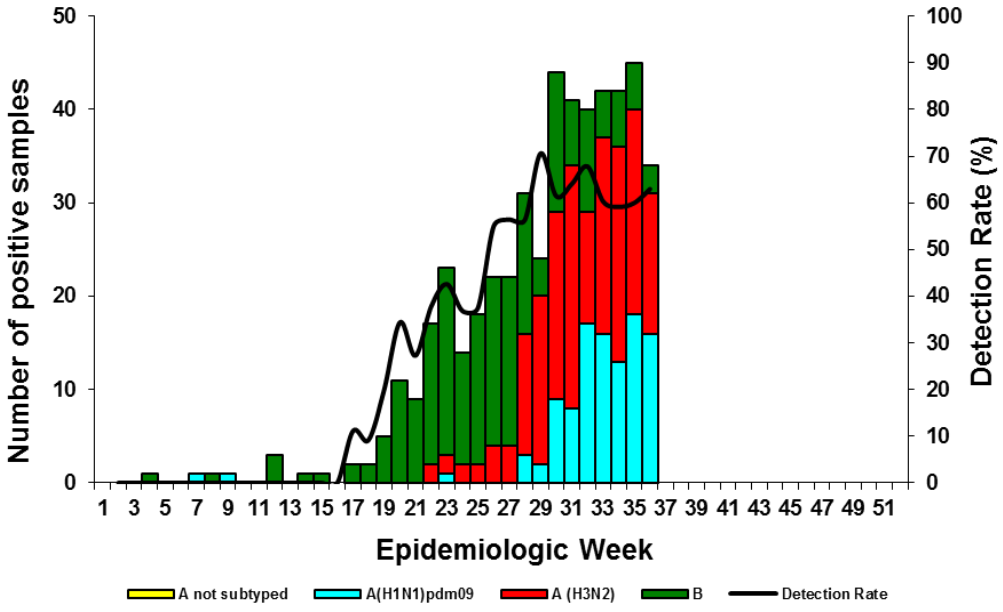

Figure 3. Number of influenza types and subtypes and detection rate by week, influenza–like illness surveillance, Viral Watch, 2016

b The rotavirus season, 2016

The 2016 rotavirus season began in week 28 (11 Jul) and is currently ongoing. Detection rates in July and August have ranged between 40% and 63% (Figure 4). The majority of rotavirus-positive cases in August originated from Mpumalanga (19/39; 49%), KwaZulu-Natal (8/39; 21%) and Gauteng (7/39; 18%) provinces.

The 2016 rotavirus season started much later than the 2015 season (week 28 compared to week 20; 11 May). The 2015 rotavirus season ended in week 39 (27 September).

For epidemiological weeks 1-35, the numbers of stools testing positive for rotavirus continues to be lower in 2016 (16.6%; 94/566) compared to 2015 (22.4%; 142/634).

Source: Centre for Enteric Diseases, NICD-NHLS; (nicolap@nicd.ac.za)

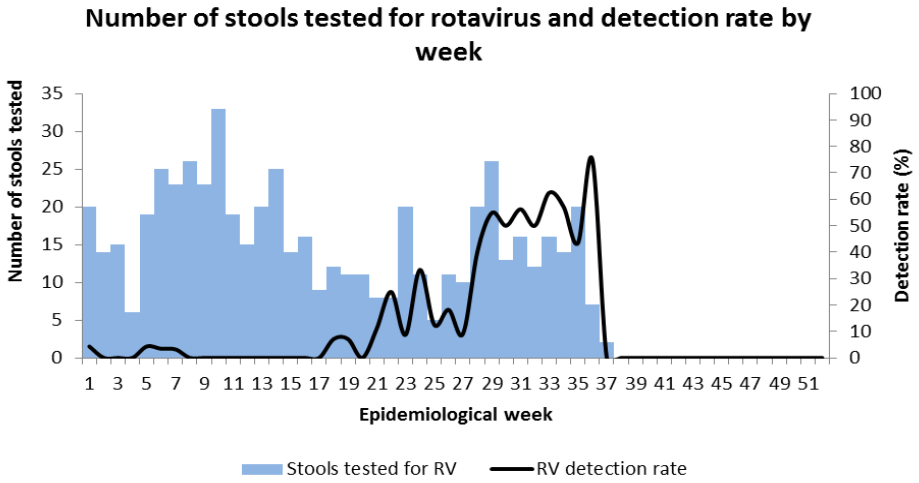

Figure 4.
The rotavirus detection rate and the numbers of specimens tested by week for 10 sentinel surveillance sites in South Africa.

c Malaria: update on elimination campaign

Malaria is endemic to three of South Africa's nine provinces, with local transmission restricted to the low-altitude border regions of Limpopo, Mpumalanga and KwaZulu-Natal provinces. However, substantial numbers of imported cases are reported from non-endemic areas, particularly Gauteng Province.

South Africa committed itself to halting local malaria transmission within its borders by 2018. Objectives of the elimination strategy are to strengthen passive and active surveillance, improve capacity to coordinate and implement malaria interventions, appropriately educate the population about malaria, and reduce the human malaria parasite reservoir. The mainstay of malaria control continues to be indoor residual insecticide spraying to reduce mosquito vector density in transmission areas, while larviciding is conducted in some breeding sites.

Cellular phone-based reporting of malaria cases (MalariaConnect), implemented over the recent malaria season to speed up malaria case investigation and response, has reduced malaria case notification time from a national average of six days for paper-based reporting to one day for MalariaConnect, with 86% of such reports reaching provincial health departments within 24 hours (data from Malaria Directorate, National Department of Health). Compared with 2015, there has been a 21% reduction in the number of notified cases in 2016 for the same reporting period (July and August) (Figure 5), probably related to the present drought. In the coming malaria season there will be increased scrutiny of identified foci of transmission, with active case finding using sensitive molecular methods to detect submicroscopic parasite carriers, and enhanced vector surveillance and control.

Source: Centre for Opportunistic, Tropical and Hospital Infections, NICD-NHLS; Malaria Control Programme, National Department of Health

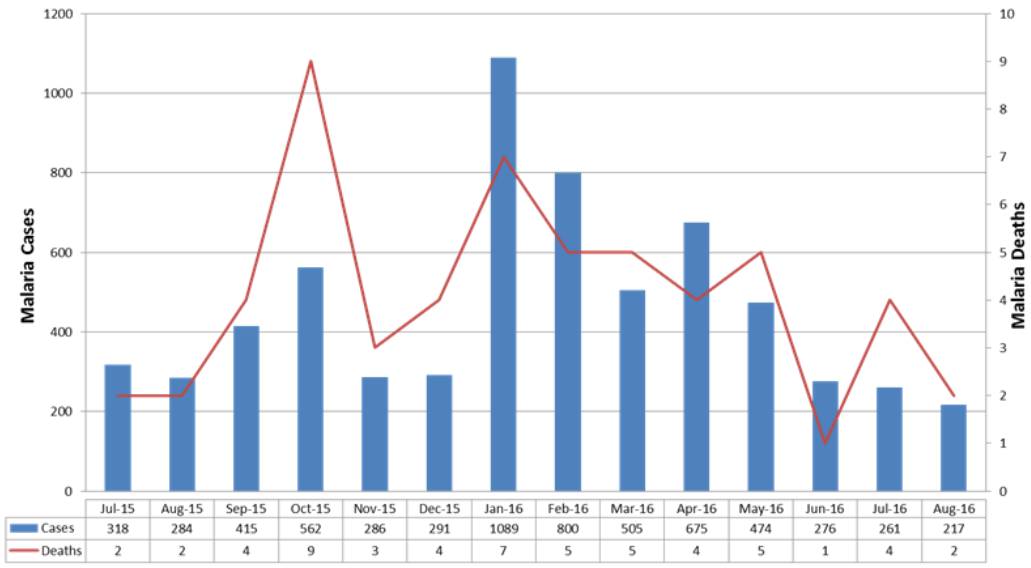

Figure 5.
Malaria cases (blue bars) and deaths (red line) by month of the year from July 2015 until August 2016. data courtesy Malaria Control Programme, National Department of Health

4 ENTERIC DISEASES

a Two clusters of typhoid fever cases identified in City of Cape Town

As part of ongoing surveillance, the NICD/NHLS, Provincial and City of Cape Town Communicable Diseases Co-ordinators have identified two separate clusters of typhoid cases in the City.

The first involves an extended family residing in the Southern sub-District. An 8-year-old girl diagnosed with appendicitis was transferred to Red Cross Children's Hospital from Victoria Hospital for surgery. A blood culture taken post-appendicectomy grew *Salmonella enterica* serotype Typhi (*Salmonella* Typhi). Her 14-year-old cousin was admitted to a district hospital in early August 2016: his blood culture grew *Salmonella* Typhi. A home visit identified 23 family members or contacts staying together in one apartment and sharing one bathroom. Investigations identified three asymptomatic carriers and two additional culture-positive cases of typhoid in the family. All persons were provided with appropriate treatment (ciprofloxacin 500-750 mg po bd for 7 days) and follow-up care. Health promotion activities were conducted by environmental health practitioners.

In the second week of September, two additional cases of typhoid were diagnosed in a different sub-district of Cape Town, in an area where typhoid cases had been identified between October 2015 and April 2016. The cases identified in September were found to be related to cases identified during January to March 2016 on molecular typing, suggesting that there is a common source. Further investigations are ongoing.

Molecular epidemiological work conducted by the Centre for Enteric Diseases, NICD has established that the two recent clusters are related to the prevailing South African clone, but are not linked to each other. The first cluster is a 'point source' outbreak. It is not yet clear if the cases in the second cluster have a common source. The NHLS, NICD, Provincial and City officials are engaged in ongoing investigation, follow-up and management of cases.

Source: Centre for Enteric Diseases, NICD-NHLS; (karenk@nicd.ac.za)

5 SURVEILLANCE FOR ANTIMICROBIAL RESISTANCE

a Update on carbapenemase-producing Enterobacteriaceae

The Centre for Opportunistic, Tropical and Hospital Infections (COTHI) at the NICD has been testing referred isolates of suspected carbapenemase-producing Enterobacteriaceae (CPE) for the presence of selected carbapenemases. CPE have become a threat to healthcare and patient safety worldwide by compromising empiric antibiotic therapeutic choices and increasing morbidity, hospital costs and the risk of death. We receive clinically significant isolates from all specimen types, based on antimicrobial susceptibility testing criteria, for molecular confirmation. For August 2016, a total of 88 Enterobacteriaceae isolates was received. Sixty isolates were screened, 43 of which expressed carbapenemases. One isolate expressed two carbapenemases (Table 1). The majority of the screened isolates were *Klebsiella pneumoniae* (38) followed by *Enterobacter cloacae* (13).

It is important to note that these figures do not represent the current burden of CPEs in South Africa. However our data reveal the presence of carbapenemases in Enterobacteriaceae isolates from all specimen types, nationally. As a first step CPE surveillance is required to determine the extent of the problem in order to restrain the emergence and spread of resistance. The AMRL-CC is currently running a surveillance programme at national sentinel sites for CPE infections in patients with bacteraemia, which provides representative data. These significant data will inform public health policy and highlight priorities for action. Controlling the spread and limiting the impact of CPEs in South Africa requires 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 AMRL-CC, NICD/NHLS. Please telephone (011) 555 0342/44 or email: olgap@nicd.ac.za; for queries or further information.

Source: Centre for Opportunistic, Tropical, and Hospital Infections, NICD-NHLS; (olgap@nicd.ac.za)

Table 1. Enterobacteriaceae by CPE enzyme type, AMRL-CC, COTHI, NICD, August 2016 and January-July 2016

Organism	NDM		OXA-48 & Variants		GES		VIM	
	Jan-Jul 2016	Aug 2016	Jan-Jul 2016	Aug 2016	Jan-Jul 2016	Aug 2016	Jan-Jul 2016	Aug 2016
Enterobacter cloacae	25	2	30	2	2	-	2	-
Escherichia coli	7	-	51	2	-	-	-	-
Klebsiella pneumoniae	196	14	279	12	8	5	13	1
Serratia marcescens	23	3	21	-	3	-	1	-
Klebsiella oxytoca	1	1	3	1	-	-	-	-
Providencia rettgeri	13	1	1	-	-	-	-	-
Total	**265**	**21**	**385**	**17**	**13**	**5**	**16**	**1**

NDM: New Delhi metallo-beta-lactamase; **OXA**: oxacillinase; **GES**: Guiana extended-spectrum beta-lactamase; **VIM**: Verona integron-encoded metallo-beta-lactamase.

6 BEYOND OUR BORDERS

The 'Beyond our Borders' column focuses on selected and current international diseases that may affect South Africans travelling abroad. Numbers correspond to Figure 6 on page 9.

1. Avian influenza (HPAI H5N1) – Middle East

As of 26 September 2016, a risk assessment was done to provide an estimate of the likelihood of introduction of H5N1 HPAI from recently infected countries (Lebanon and Iraq) to other countries in the Middle East region and neighbouring territories as a result of the movement of live poultry (both legal and illegal), poultry-related products and the migration of wild birds. The preliminary assessment based on the available information and uncertainties associated indicate that the risk of introduction of H5N1 HPAI for each of the nine regional and neighbouring countries or territories varies and is as follows:

- High: Iran (Islamic Republic of), Israel, Jordan, the Syrian Arab Republic and Turkey,
- Medium: Gaza Strip, Kuwait, Saudi Arabia and The West Bank,
- Low: Armenia, Azerbaijan and Georgia,
- Negligible: Cyprus.

2. MERS-CoV- Saudi Arabia

As of 26 September 2016, there has been a total of 1456 laboratory-confirmed cases, 610 deaths [reported case fatality rate 41.9%] 841 recoveries, and 4 currently active cases

3. West Nile virus- USA

On 22 September 2016, a horse in Kentucky State tested positive for West Nile virus. The horse is reported to be in a stable condition. This is the 3rd equine WNV case confirmed in the commonwealth in 2016.

4. Crimean-Congo haemorrhagic fever– in Pakistan and in Spain

On 17 September 2016, a case of Crimean-Congo haemorrhagic fever (CCHF) was confirmed in Chak Gabol, Rajanpur, Punjab province, Pakistan. The patient is stable and in isolation. On 21 September 2016, a Spanish nurse who contracted CCHF while caring for a man who died from the virus, in the 1st non-imported case reported in western Europe, was discharged from hospital.

5. Rift Valley fever- Niger

As of 26 September 2016, there were 21 fatal cases of Rift Valley fever in Western Niger. There

has been a total of 52 infected people in Niger's western region of Tahoua.

6. Ebola update- Guinea, Liberia, Ivory Coast
On 15 September 2016, the Ivory Coast reopened its borders with Guinea and Liberia. On 16 September 2016, the Liberian government began implementing a national semen testing and counseling program for male Ebola survivors. Persistence of Ebola virus in semen of survivors of Ebola virus disease was documented before the 2014 outbreak in West Africa; however, the duration of viral persistence continues to exceed previous estimates. To prevent sexual transmission of Ebola, semen-testing services have been established in Liberia, Sierra Leone, and Guinea. On 12 September 2016, the Johnson & Johnson group announced that the World Health Organization would review Ebola vaccine regimen for emergency use assessment and listing.

7. Lassa fever- Nigeria
As of 26 September 2016, there have been more than 273 cases with 149 fatalities from different parts of Nigeria. There have been 165 cases and 89 deaths confirmed through laboratory testing (case fatality rate 53.9%). The cases were reported from 23 states. There have been 10 health care workers who have been infected with Lassa virus, of whom 2 have died. Of these 10 cases, 4 were nosocomial infections.

8. Malaria- Sri Lanka
On 5 September 2016, the WHO certified Sri Lanka as a malaria-free island. Sri-Lanka has not had locally transmitted cases for the past 3 years. It is the second country in the WHO South-East Asia Region to eliminate malaria after Maldives.

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

Figure 6. Current outbreaks that may have implications for travellers. Number correspond to text above. The red dot is the approximate location of the outbreak or event

7 PHOTOQUIZ

September Photoquiz (right). This 3-year-old girl presented with a fever of 39.5°C, a morbilliform rash, conjunctivitis and a runny nose. What is your differential diagnosis? How would you manage this situation further? Please send an email to kerriganm@nicd.ac.za with the words 'September Photoquiz' in the subject line.

August Photoquiz (left) This 4 year-old girl presented with fever, generalised malaise, and painful blisters in the mouth, palms of both hands, soles of the feet, and some blisters on her knees. Her rash and symptoms are typical of **hand, foot and mouth disease** which is caused by a number of enteroviruses including coxsackie and echoviruses. This condition is common in children, and often causes 'outbreaks' in crèches. Symptoms start 3-7 days after exposure, and last 7-10 days. Transmission is through droplets from the mouth, or indirectly through contaminated fomites. Prevention is through handwashing and good hygiene. The condition is self-limited. Complications are rare. Picture courtesy http://www.medicinenet.com/image-collection/hand-foot-and-mouth_disease_on_foot_picture/picture.htm.