NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
Division of the National Health Laboratory Service

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CONTENTS

1 ZOONOTIC AND VECTOR-BORNE DISEASES

a Rabies post-exposure prophylaxis in previously-immunised persons

A veterinary surgeon in Mpumalanga Province was bitten by a dog that was later proven to be infected with rabies. The vet consulted the NICD for advice regarding post-exposure prophylaxis. The vet had received a 3-dose rabies vaccination schedule some years prior to the event, and a booster one week prior to being bitten as part of World Rabies Day activities

Rabies pre-exposure prophylaxis (PrEP) is recommended for persons who are at continual or frequent risk of exposure to rabies virus infection. This includes persons who are at risk due to their occupations, such as veterinary practitioners and their practice staff, veterinary officials, animal welfare organisation staff, and laboratory personnel. PrEP is increasingly being prescribed for travellers to high-risk countries. The vaccination schedule for PrEP is shown in Table 1 below.

In addition to PrEP, routine monitoring of rabies virus neutralising antibodies (RVNA) of personnel at risk of exposure is recommended. Monitoring may be every 6 months or 2 years depending on occupational risk of rabies exposure. Boosters should be administered if RVNA titre falls below 0.5 IU/ml (or equivalent titre depending on local test used). RVNA titres can be determined at least 14 days after the third dose of the PrEP regimen (day 28). Periodic boosters are recommended as an extra precaution for individuals whose occupation puts them at continual risk of exposure. Booster vaccination results in a faster immunologic response when compared to immune response after primary vaccination, and a booster injection at 1 year provides long-term sero-conversion.

If routine RVNA monitoring is unavailable, booster immunisation against rabies should take place intermittently, the frequency of which has been somewhat arbitrarily determined. Recommendations range from an annual booster, to boosting every 3 to 5 years.

In line with current guidelines, the vet in the encounter above, was advised to have a single dose of rabies vaccine into the deltoid muscle on each of day 0 and day 3. No rabies immunoglobulin is required for persons who have been previously vaccinated, as circulating antibody levels are sufficiently high to neutralise rabies virus. This vet was fortunate enough to have received a booster a week prior to the incident, and his antibody levels at the time of the bite were measured and found to be adequate

References: WHO | Current strategies for human rabies pre and post-exposure prophylaxis.

http://www.who.int/rabies/human/WHO_strategy_prepost_exposure/en/.

Accessed October 15, 2015.

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

Table 1. Recommended rabies pre-and post-exposure prophylactic immunisation schedule.

Pre-exposure prophylaxis			**Post-exposure prophylaxis** *for previously immunised persons*		
Day of administration of rabies vaccine	**Site and mode of administration**	**Dose**	**Day of administration of rabies vaccine**	**Site and mode of administration**	**Dose**
0*	Deltoid muscle, intramuscular	As specified by vaccine manufacturer	**0#**	Deltoid muscle, intramuscular	As specified by vaccine manufacturer
7			**3**		
21 or 28			**Rabies immune-globulin**	Not required	
Booster	Every 3-5 years, depending on antibody levels				

*Day 0 is the date on which vaccination commences

#Day 0 is the day on which rabies exposure occurred. Previously immunised persons who do not present on the day of exposure should still receive two doses of rabies vaccine, day 0 being day of presentation.

b Leptospirosis outbreak update

As reported in the previous edition of the Communiqué, the NICD was requested by the Department of Correctional Services (DCS) to assist with the investigation and management of leptospirosis that had been identified in two awaiting-trial prisoners in a facility in the Western Cape Province. The DCS made a decision to close the affected building in the facility in order to ensure that the rat infestation that lead to the outbreak was properly addressed. The NICD Outbreak Response Unit and Centre for Emerging and Zoonotic Diseases advised the DCS that symptom screening for leptospirosis be undertaken amongst all prisoners, with immediate referral for investigation amongst those who are jaundiced, and that prisoners with non-specific symptoms have blood taken for leptospirosis PCR, and IgM antibody testing, and be treated empirically with doxycycline. Presently, screening is ongoing. A number of prisoners have been tested for leptospirosis, and a single additional case of leptospirosis has been identified, bringing to 3 the total number of cases.

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

c Tick bite fever

A 47-year-old Free State woman presented to a private hospital with a two-day history of progressively worsening flu-like symptoms and fever. She lived on a smallholding, and had regular contact with animals. On admission she was noted to be pyrexial with a temperature of 38.8°C, and to have a fine papular rash that began on her chest, and spread to the rest of the body but not on the palms and soles. She had no evidence of tick bites, nor an eschar, nor lymphadenitis. There was no neck stiffness nor signs suggestive of meningitis. Blood tests revealed a haemoglobin of 11 g/dl, platelets of 45 x 10^9/l. Both ALT and AST results were above 200 IU/l. She became delirious and hypotensive, and was admitted to an intensive care unit (ICU) for inotropic support. In ICU she was treated initially with levofloxacin 400 mg twice daily. Blood cultures were negative. Blood was submitted to the NICD Centre for Emerging and Zoonotic Diseases (CEZD). Tests for viral haemorrhagic fever, including Crimean-Congo haemorrhagic fever (CCHF) were negative. Rickettsial PCR was however positive. Doxycycline 100 mg twice daily was added with good response.

African tick bite fever in South Africa is thought to be mainly caused by *Rickettsia africae*, and transmitted by the African Bont or *Amblyomma ticks (such as A. hebraeum* and *A. variegatum)* (Figure 1) that feed on a variety of wild and domestic animals. *Rickettsia conorii*, the causative agent of Mediterranean spotted fever, also occurs in South Africa, but is thought to have a limited distribution in urban and peri-urban areas and is associated with *Rhipicephalus sanguines* ticks. Most cases of tick bite fever are mild and patients respond well to antibiotic treatment with doxycycline. Diagnosis is often made on clinical grounds on the basis of the presence of an eschar in a patient with an acute febrile illness. Serological testing is only useful after the first week of illness. PCR for Rickettsia on a swab from the eschar would seem to be a useful and sensitive test for confirmation. Severe cases of tick bite fever are more unusual, but formal surveillance data is not available to support the assumption. In 2014, the NICD reported four fatal tick bite fever cases diagnosed in patients with suspected CCHF. Also notable in the case reported here, is the absence of an eschar. In a case series of 10 severe rickettsial infections diagnosed by the CEZD between 2012-14, seven of eight with a comprehensive history presented with an eschar. Is important to consider that eschars may be undetected and tick bites behind the hairline for example may be difficult to find.

Reference: Kemp, A., Msimang, V., Weyer, J., Paweska, J. Crimean-Congo haemorrhagic fever and tick bite fever in South Africa, 2012-2014. Communicable Diseases Surveillance Bulletin 2014:12(3); 60-65.

Figure 1. *Amblyomma hebraeum* also known as the African 'Bont Tick', an example of a tick known to transmit *Rickettsia africae*, responsible for African tick bite fever (Photograph courtesy of Professor Bob Swanepoel)

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

2 TB

a Bedaquiline: the first new drug in decades to treat TB is now available in South Africa

For the first time in 40 years a new anti-tuberculosis drug with a novel mechanism of action has become available. Bedaquiline (BDQ) is a di-arylquinoline antimycobacterial drug and specifically inhibits mycobacterial adenosine triphosphate synthase. Clinical data has consistently shown faster mycobacterial sputum clearance in patients on BDQ than those on a background regimen. In one study at the end of an 8-week period, 48% were culture converted compared with 9% in those on placebo. The follow-up study showed a median time to sputum-culture conversion that was significantly shorter in the BDQ group than in the placebo group (83 days vs. 125 days; P<0.001). However, there was an imbalance in mortality between the 2 groups. Although it was difficult to biologically prove causality, it was sufficient enough to cause concern.

Based on these findings and following a risk-benefit review, BDQ received accelerated approval in December 2012 by the United States (US) Food and Drug Administration (FDA). As part of the Bedaquiline Clinical Access Programme (BCAP), approval was granted by the Medicines Control Council (MCC) of South Africa for a national programme to treat XDR- TB or pre-XDR TB patients (defined as MDR-TB with additional resistance to either a fluoroquinolone or a second-line injectable medicine) with BDQ in December 2012. This allowed pre -XDR or XDR-TB patients with limited treatment options safe access to this drug prior to registration.

Since October 2014, Sirturo (bedaquiline, BDQ) from Janssen Pharmaceutica, has been registered in South Africa for use in HIV-negative or HIV-infected, ART-naïve patients 18 years or older who have laboratory-confirmed MDR-TB. Additionally, the World Health Organization (WHO) has issued guidance on the treatment of MDR-TB with bedaquiline. The South African National Department of Health has developed a new draft policy framework for the introduction of new drugs and drug regimens for the management of drug-resistant TB in South Africa.

Surveillance for early detection of BDQ resistance is advised by the WHO and is incorporated into the South African policy framework. BDQ's action on mycobacterial ATP synthase is inhibited with mutations in the *atpE* gene. At this stage, the occurrence of this mutation is very low. Presently, definitive criteria for resistance have not been determined. However, all patient isolates with MIC values above 0.25 ug/ml and those with a 4-fold increase from baseline will be evaluated for the possibility of drug resistance.

The Centre for Tuberculosis incorporating the National TB Reference Laboratory at the National Institute for Communicable Diseases has recently participated in a multicentre project to validate test methodologies for BDQ resistance surveillance. Surveillance has now initiated on patients who have been started on BDQ treatment, submitting sputum samples at baseline, week 8 and week 24 for BDQ minimal inhibitory concentration (MIC) determination. To date, no isolates with an MIC >0.25 ug/ml have been identified.

The introduction of new drugs for TB treatment has been long overdue. However, the judicious use of BDQ following licensing is paramount, and practitioners are advised to consult the NDoH policy for introduction of new drugs once publically available (for an update contact NdjekO@health.gov.za or naziri@nicd.ac.za). BDQ and other new drugs soon to be introduced (including delaminid) are expected to change the dismal patient outcomes for drug-resistant TB.

Source: Centre for Tuberculosis, NICD-NHLS

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

a Preparing for Middle East respiratory syndrome coronavirus (MERS-CoV)

The Middle East respiratory syndrome (MERS) is an emerging infectious disease caused by the MERS coronavirus (MERS-CoV). It was first reported in Saudi Arabia in 2012. Since September 2012 and as of 12 October 2015, WHO has been notified of a total of 1 595 laboratory-confirmed cases of human infection with MERS-CoV, including 571 related deaths. To date all the cases reported from outside the Middle East have either had a recent travel history to the Middle East or could be linked to a chain of transmission originating from a case with a travel history to the Middle East. Of the 26 countries that have reported cases, Saudi Arabia has reported the highest number of cases to date.

There is currently no vaccine or specific antiviral treatment available, so early identification of cases, prevention of spread and care of potential cases plays a key role in containment. To date, most cases and outbreaks have resulted from human-to-human transmission in health care settings and prompt response by healthcare practitioners has resulted in containment of the spread. Because this is an emerging disease a lot is still not known about the disease regarding transmission.

Although no cases have been identified in South Africa, health systems and clinicians should be prepared for the importation of cases from other countries. In this regard, heath care practitioners are encouraged to always be on the alert for possible cases. Guidelines for MERS case finding are available on the NICD website: http://www.nicd.ac.za.

The following key points are useful reminders for clinicians:

1. Keep up to date with the latest information about signs and symptoms, diagnostic testing, and case definitions for MERS
2. Be on alert for patients who meet the case definition for patient under investigation (Table 2 below)
3. Collect the relevant history, including travel history or contact with a sick person who had travelled to areas where MERS cases have been reported
4. Be familiar with procedures for your facility on how to triage, isolate, manage and report potential cases.
5. Follow appropriate infection-control measures while managing all patients with symptoms of acute respiratory infection and whenever specimens are collected from patients under investigation.
    a. Droplet precautions should be added to the standard precautions when providing care to patients with symptoms of acute respiratory infection;
    b. Airborne disease protection and eye protection should be added when caring for probable or confirmed cases of MERS-CoV infection.
6. Understand the procedures for submission of samples for investigations. Contact NICD hotline at +27 82 883 9920 to discuss suspected cases before collecting samples.

Please see page 6 for Table 2 (case definitions for persons requiring investigation for MERS-CoV)

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

Additional resources and information about MERS-CoV:
http://www.who.int/csr/disease/coronavirus_infections/en/index.html
http://www.who.int/csr/bioriskreduction/infection_control/publication/en/
http://apps.who.int/iris/bitstream/10665/174652/1/WHO_MERS_IPC_15.1_eng.pdf?ua=1
CDC website: http://www.cdc.gov/coronavirus/index.html

Table 2. Case definitions for persons requiring investigation for MERS-CoV

Clinical features		Epidemiologic risk
Severe illness Fever (≥38°C) and cough with pneumonia or acute respiratory distress syndrome (ARDS) (based on clinical or radiologic evidence)	*and*	History of travel within 14 days before onset of illness to Arabian Peninsula[1] or in countries where MERS-CoV is known to be circulating or where human infections have recently occurred OR Close contact[2] with a symptomatic traveller who developed fever and acute respiratory illness within 14 days after travelling from countries in or near the Arabian peninsula OR A history of being in a healthcare facility, within 14 days before onset of illness, in a country where hospital-associated MERS-CoV infections have been reported OR The disease is in a cluster[3] that occurs within a 14-day period, without regard to place of residence or history of travel, unless another aetiology has been identified.
Illness of any severity A person with acute respiratory illness of any degree of severity	*and*	within 14 days before onset of illness, had any of the following exposure: Close physical contact[2] with a confirmed or probable case of MERS-CoV infection, while that patient was ill OR A healthcare facility in a country where hospital-associated MERS-CoV infections have been reported e.g. Saudi Arabia.

Footnotes:

[1]Arabian Peninsula and neighbouring countries include: Iraq, Iran, Bahrain, Israel, the West Bank, and Gaza; Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, The United Arab Emirates (UAE) and Yemen.

[2]A close contact is defined as

* being within 2 meters/within the room or care area for a prolonged period of time (e.g. health personnel, household members) while not wearing recommended personal protective equipment (gloves, gowns, N95 mask, eye protection); or
* Having direct contact with infectious secretions (e.g. being coughed on) while not wearing recommended personal protective equipment (gown, gloves, eye protection, N95 mask). Data on close contact is limited, currently brief interactions (e.g. walking by a person, are considered low risk and do not constitute close contact)

[3]A 'cluster' is defined as two or more persons with onset of symptoms within the same 14-day period, and who are associated with a specific setting, such as a classroom, workplace, household, extended family, hospital, other residential institution, military barracks or recreational camp.

b Ebola virus disease (EVD) outbreak

Ebola virus disease (EVD) outbreak: situation update

Three new confirmed cases were reported in Guinea during the week ending 18 October 2015. Amongst the new cases, one was reported from the Conakry, and two from Forecariah. Two cases were not registered contacts. One of the contacts was identified after post-mortem. Following genomic analysis, the case in Conakry was shown to be unrelated to the current chain of transmission in Guinea, and investigations are ongoing to identify the origin. To date, in Guinea 246 contacts are under follow-up and 253 contacts remain untraced. As at 18 October 2015, a cumulative total of 28 476 cases (laboratory-confirmed, probable and suspected) including 11 298 deaths with a case fatality rate of 40% has been reported in Guinea, Liberia and Sierra Leone. In Sierra Leone, no new confirmed EVD cases were reported for the fifth consecutive week. All contacts have completed their 21-day follow-up. However, two high-risk contacts remain untraced.

Furthermore, a case-patient who was reported on 29 December 2014 in the United Kingdom and later recovered was rehospitalised in the United Kingdom on 6 October 2015 after developing late EVD-complications. The patient is reported to be recovering. As at 13 October 2015, 62 close contacts had been identified, of whom 26 have received the rVSV-ZEBOV vaccine. Long-term health complications among those who recovered from EVD have been reported before. A study that was conducted among survivors of the Bundibugyo Ebola virus outbreak that occurred in 2007 in Uganda and their contacts showed that survivors experienced health related problems for more than two years after infection with EVD (Reference). Survivors experienced a wide range of symptoms, including but not limited to hearing loss, fatigue, impotence, severe headaches, blurred vision, joint and muscle pain and mental problems.

As at 16 October 2015 there have been no EVD cases in South Africa associated with the current outbreaks in West Africa. In addition, there are no suspected cases of EVD in South Africa at present. A total of 40 persons has been tested for EVD, of whom 32 are South Africans. All tested negative for EVD. The risk of Ebola being introduced into South Africa still remains low. However a high index of suspicion is necessary given on-going EVD transmission in West Africa.

Enhanced surveillance for EVD

As part of the enhanced surveillance to prevent the importation of Ebola into South Africa, the Department of Health (DoH) activated the National Health Operations Centre (NATHOC) to coordinate EVD preparedness and response plans and activities. Travellers to Guinea and Sierra Leone should request prior permission from the NATHOC. However, travellers to Liberia are no longer required to apply for this permission. A written response is provided to each applicant informing them of the outcome of their request. For all travel related queries contact the NATHOC surveillance desk at: Tel: +27(0) 12 395 9636/7 or email NATHOC1@health.gov.za / NATHOC2@health.gov.za or Fax: +27(0) 86 662 0166

Laboratory testing

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.

Health care professional should direct any requests for testing to the NICD hotline, and provide 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)

Reference: Clark DV., et al. Long-term sequelae after Ebola virus disease in Bundibugyo, Uganda: a retrospective cohort study. Lancet Infect Dis. 2015 Aug;15(8):905-12. doi: 10.1016/S1473-3099(15) 70152-0. Epub 2015 Apr 21.

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

Table 3. Number of Ebola virus disease cases and deaths in Guinea, Liberia and Sierra Leone (as at 18 October 2015)

Country	Total cases (laboratory-confirmed, probable and suspected)	Total deaths	Case fatality rate	Number of cases among healthcare workers (Number of deaths)
Guinea	3 803	2 535	67%	196 (100)
Sierra Leone	14 001	3 955	28%	307 (221)
Liberia (as at 9 May)	10 666	4 806	45%	378 (192)
Liberia (from 29 June)	6	2	33%	
Totals	**28 476**	**11 298**	**40%**	**881 (513)**

Source: World Health Organization Global Alert and Response: Ebola situation report of 21 October 2015 (www.who.int)

c Yellow fever: South African vaccination requirements

Yellow fever is an acute viral haemorrhagic disease that is caused by the yellow fever virus (an arbovirus). The virus is transmitted via various species of *Aedes* and *Haemogogus* spp. mosquitoes. The virus is endemic in the tropical areas of South America and Africa.

Travellers to and from areas where there is a risk of yellow fever require a valid yellow fever certificate. In May 2014, the WHO revised the vaccination requirements for yellow fever, by amending Annex 7 of the International Health Regulations, to say that '*the period of protection afforded by yellow fever vaccination, and the term of validity of the certificate will change from 10 years to the duration of the life of the person* vaccinated'. The WHO indicated that these changes may be applied immediately, although they come into force in June 2016.

Certain countries, including South Africa have accepted these amendments with immediate effect. However, not all countries have adopted the WHO resolution.

Travellers who intend visiting countries where yellow fever vaccination is required are advised to seek advice regarding current yellow fever vaccination requirements for countries. If uncertain, and the travellers' yellow fever vaccination was given over 10 years ago, it may be advisable to receive a yellow fever booster. For further information, please go to http://www.who.int/ith/updates/20140605/en/

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

4 SURVEILLANCE FOR ANTIMICROBIAL RESISTANCE

a Update on carbapenemase-producing *Enterobacteriaceae*

The Johannesburg Antimicrobial Resistance Laboratory and Culture Collection (AMRL-CC) of the Centre for Opportunistic, Tropical and Hospital Infections (COTHI) at the NICD have been testing referred isolates of suspected carbapenemase-producing Enterobacteriaceae (CPE) for the presence of selected carbapenemase genes. 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. CPE surveillance is required to determine the extent of the problem as a first step in order to restrain the emergence and spread of CPE. For September 2015, a total of 62 Enterobacteriaceae isolates were received. Fifty-six carbapenem-resistant isolates were screened, 45 of which were CPE isolates (Table 4 and Table 5). The majority of the isolates were *Klebsiella pneumoniae* (36) followed by *Serratia marcescens* (5).

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 AMRL-CC, NICD/NHLS. Please telephone (011) 555 0342/44 or email olgap@nicd.ac.za for queries or further information.

A sub-study investigating molecular epidemiology of CPE isolates from the Eastern Cape

Twenty-five *E. cloacae* isolates from January 2013 to April 2014 from 24 patients at five hospitals in the Eastern Cape were investigated using multilocus sequence typing (MLST), pulsed-field gel electrophoresis (PFGE) and MALDI-TOF mass spectrometry data. Eighteen (72%) isolates harboured either one of the following genes: bla_{IMP}, bla_{VIM} or bla_{OXA-48}. Fifteen isolates were positive for bla_{IMP} which is presently a rare gene amongst South African isolates. Figure 2 shows the geographic and temporal relationship between strains. Of concern is the possibility that these highly resistant organisms may not only be transmitted from patient to patient within hospitals, but may also be transmitted at an institutional level from hospital to hospital. These findings point to the need for strict adherence to infection control, and vigilance when transferring or accepting patients between hospitals.

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

Table 4. Enterobacteriaceae by CPE enzyme type, AMRL-CC, COTHI, NICD, 2015

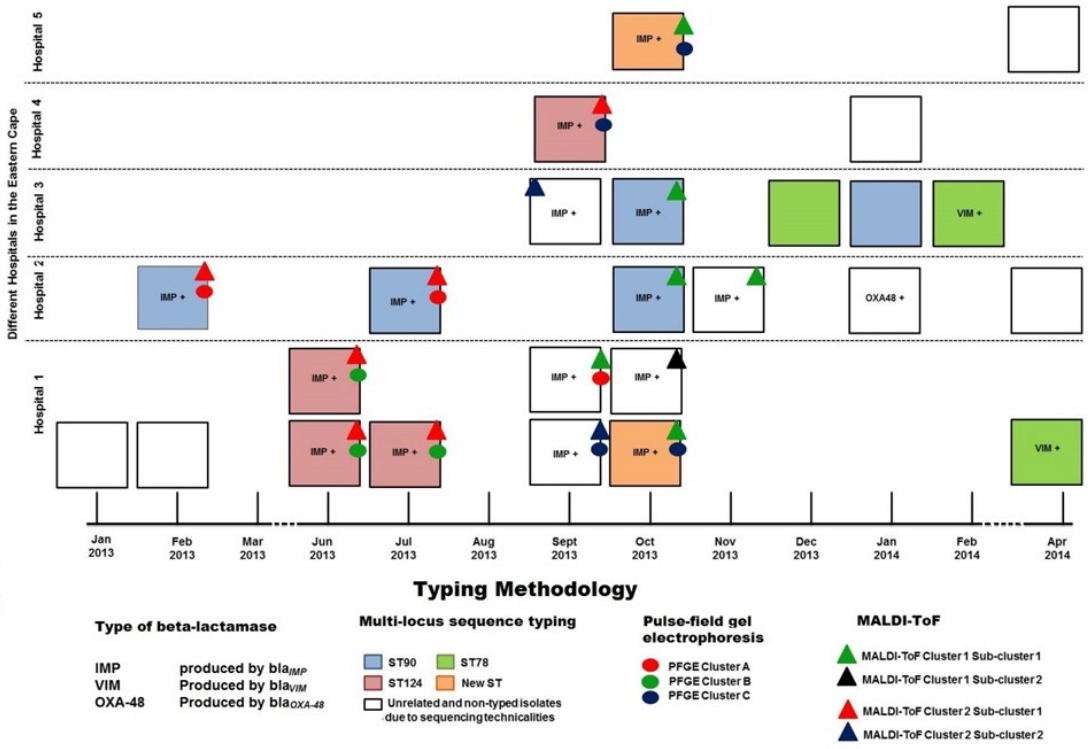
Organism	NDM		OXA-48		VIM	
	Sep-15	Jan-Aug 2015	Sep-15	Jan-Aug 2015	Sep-15	Jan-Aug 2015
Klebsiella pneumoniae	27	172	8	57		26
Enterobacter cloacae	1	11	1	7		4
Serratia marcescens	4	27	1	4		2
Providentia rettgeri	1	17				
E. coli		8	2	24		2
Citrobacter freundii		10				
Other Enterobacteri-aceae		9		2		3
Total	**33**	**255**	**12**	**94**	**0**	**37**

NDM: New Delhi metallo-beta-lactamase; **OXA**: oxacillinase; **VIM**: verona integron-encoded metallo-beta-lactamase

Table 5. Enterobacteriaceae isolates by specimen type and province, AMRL-CC, COTHI, NICD, 2015

Organism	GP	KZN	WC	FS	EC	Unk	Total Sept	Total Jan-
Klebsiella pneumoniae	**4**	**9**	**2**	**8**	**4**	**3**	**36**	**295**
Sterile	4	8	2	6	2	3	25	166
Non-sterile	2			2	2	1	7	50
Unknown		2				2	4	79
Enterobacter cloacae				**3**	**7**		**10**	**55**
Sterile				1	6		7	32
Non-sterile				2	1		3	9
Unknown								14
E. coli	**3**						**3**	**44**
Sterile	1						1	27
Non-sterile	2						2	12
Unknown								5
Serratia marcescens		**5**					**5**	**33**
Sterile		1					1	7
Non-sterile								1
Unknown		4					4	25
Providencia rettgeri	**1**						**1**	**17**
Sterile	1						1	9
Non-sterile								0
Unknown								8
Citrobacter freundii	**1**						**1**	**11**
Sterile	1						1	5
Non-sterile								1
Unknown								5
Other Enterobacteriaceae								**33**
Sterile								17
Non-sterile								7
Unknown								9
Total Jan-Aug 2015	**254**	**91**	**7**	**7**	**58**	**71**	**45**	**488**

Figure 2. Strain relatedness as indicated by MLST, PFGE and MALDI-ToF Mass spectrometry



5 BEYOND OUR BORDERS

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

Colombia: Zika virus
Colombia's Ministry of Health confirmed that from 16 October 2015, nine locally-acquired cases of Zika virus infection have been reported in the metropolitan area of Cartagena, Bolívar Department. Zika virus had not previously been reported in this country. Zika virus is a flavivirus from the same family as dengue and West Nile viruses. It is transmitted by mosquitoes. Travellers are advised to practice daytime insect precautions.

Pakistan: Crimean-Congo haemorrhagic fever
Twenty-five Congo virus-positive cases were confirmed in Khyber Pakhtunkhwa province, with 11 deaths, Samaa reported Thursday 15 Oct 2015. CCHF virus is endemic in Pakistan. The virus is transmitted by *Hyalomma* spp. ticks or through contact with infected human blood or animal blood and tissues and can cause severe viral haemorrhagic fever outbreaks, with a case fatality rate of 10-40 percent.

USA: Salmonellosis, serotype Poona
An outbreak of diarrhoea due to *Salmonella* Poona is ongoing in the USA. As of 13 Oct 2015, 767 people infected with the outbreak strains of have been reported from 36 states. Among 561 people with available information, 157 (28 percent) report being hospitalized and 4 deaths have been reported. The source of the infection was identified as being cucumbers, originating from Mexico. Cucumbers were recalled on 11th September 2015, but cases continue to be reported.

Philippines: Typhoon Koppu
On 18 October 2015, Typhoon Koppu struck the northern Philippines, causing fatalities and widespread infrastructure damage. Travellers should expect disruption of transportation and basic services, avoid affected areas, and monitor local media.

China: Avian influenza H7N9, human
Raising the alarm for poultry-related livelihoods and public health, Food and Agriculture Organisation of the UN (FAO) warned that a 4th wave of avian influenza H7N9 has commenced on 2 Oct 2015 after Chinese authorities in Zhejiang Province reported the first two human cases since July 2015. On 14 Oct 2015, the WHO was notified of two additional laboratory-confirmed cases. WHO advises that travellers to countries with known outbreaks of avian influenza should avoid poultry farms, or contact with animals in live bird markets, or entering areas where poultry may be slaughtered, or contact with any surfaces that appear to be contaminated with faeces from poultry or other animals.

Source: Division of Public Health Surveillance and Response

References and additional reading:
ProMED-Mail (www.promedmail.org)
World Health Organization (www.who.int)
Centers for Disease Control and Prevention (www.cdc.gov)