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Division of the National Health Laboratory Service

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CONTENTS

1 ZOONOTIC AND VECTOR-BORNE DISEASES

a Zoonosis survey in Mpumalanga Province

Zoonotic agents account for more than 60% of emerging human pathogens. Despite this, zoonoses remain largely neglected. Epidemiologists and public health programmes have poor knowledge of disease burden, clinicians rarely consider zoonoses in their differential diagnoses and laboratory diagnostics are often limited. Presently, the NICD is conducting a zoonosis survey in Hluvukani, a small village near the Kruger National Park in the Bushbuckridge Municipality, Mpumalanga Province, in order to understand the burden of these diseases in South African rural communities.

The Hluvukani project fits into the broader Mnisi Community One Health Programme, an initiative established by the University of Pretoria Veterinary Department, Mnisi Tradiational Authority, SANParks and the Mpumalanga Provincial Government. The Mnisi community covers an area of 86 km^2 with 69 km bordering proclaimed conservation areas. The population of around 80 000 people are mostly pastroculturists who generate their livelihood from livestock farming. Hluvukani village (Figure 1) covers about 8 km^2 and has approximately 9 000 residents. Hluvukani Clinic, a community health care (CHC) centre, serves the health needs of the greater Mnisi community. Tinstwalo Hospital is the closest referral centre.

Adult patients with acute febrile illness presenting to Hluvukani CHC are offered enrolment into the study. Participants complete a questionnaire related to exposure to disease vectors, and blood specimens (acute and convalescent) are screened for a selected panel of bacterial and viral zoonotic conditions at the Centre for Emerging and Zoonotic Diseases (CEZD) at the NICD.

Between September 2014 and June 2015, 43 participants were enrolled in the study. Thirty-four (80%) of cases tested demonstrated prior exposure (IgG positive) to *Rickettsia* species (the cause of tick bite fever), and 5 cases demonstrated IgM positivity against *Rickettsia conorii*. Background seroprevalence (IgG positive) of 10-20% was found for Sindbis and West Nile viruses. Four of 31 participants tested (13%) were IgG positive for *Coxiella burnetii*, the cause of Q-Fever. Amongst 30 patients tested, two were diagnosed with chikungunya infection. One case of 30 (3%) tested was positive for prior exposure to Rift Valley fever virus.

High seroprevalence of antibodies against *Rickettsia* species (the causative agent of tick bite fever) has been shown in several previous South African studies. Most rickettsial infections are subclinical. When symptomatic, persons with tick bite fever complain of malaise, fever, headache and myalgia. An eschar at the site of a tick bite is often present. Patients with tick bite fever respond well to doxycycline treatment.

In South Africa, chikungunya is primarily diagnosed in travellers returning from other endemic locations including the Indian Ocean islands, India and several sub-Sahara African countries. However, previous studies have shown the presence of chikungunya virus in *Aedes furcifer* mosquitoes in South Africa. Chikungunya presents as an acute febrile illness with debilitating myalgia and arthralgia which may persist for weeks to months to years.

Q fever is distributed almost ubiquitously across the globe and is most commonly associated with livestock such as cattle and goats. It has also been reported from a variety of ticks, birds and rodents. Infection in humans is often asymptomatic, but patients may report acute fever with headache and myalgia. Rare cases may progress with pneumonia, meningoencephalitis, myocarditis, pericarditis or fatal hepatitis.

No evidence of previous or current brucellosis has been found amongst participants. However, there is an active vaccination programme for livestock in the Hluvukani area that may explain this finding.

Enrolment in the study is ongoing. However these early findings suggest that zoonoses, particularly tick bite fever, need to be considered in the investigation of febrile adult patients presenting for care in rural areas of South Africa.

Source: Centre for Emerging and Zoonotic Diseases, Division of Public Health Surveillance and Response, NICD-NHLS; Mnisi Project, Faculty of Veterinary Science, University of Pretoria

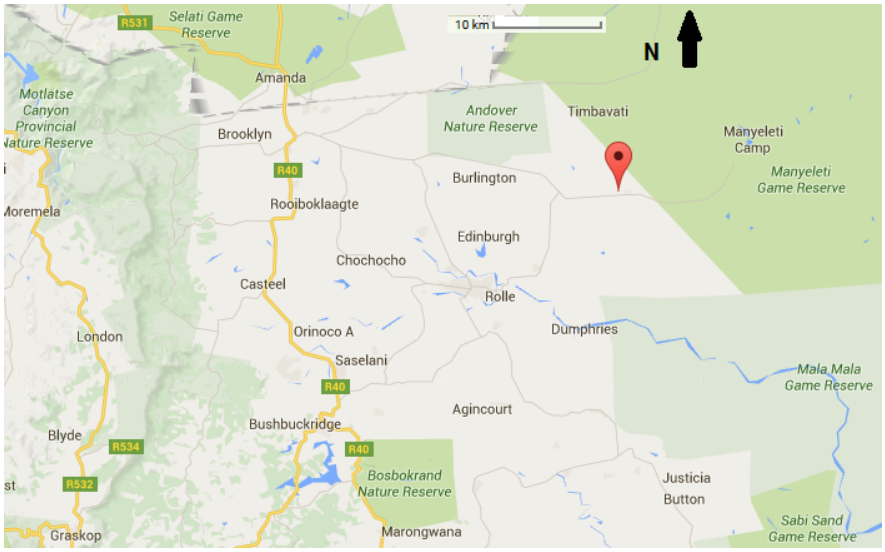

Figure 1. A screenshot from Google Maps indicating the location of Hluvukani village (red drop point) in Mpumalanga Province, Bushbuckridge District

b Urogenital schistosomiasis and HIV infection

Schistosomiasis is a parasitic infection of humans caused by *Schistosoma mansoni* and *S. haematobium.* Approxiamtely 90% of the worldwide burden of schistosomiasis is found in Africa. Both species of *Schistosoma* occur in South Africa, however *S. haematobium* is more widely distributed and more prevalent. About 4 million South African children are estimated to be at risk, but the number of people infected is not known.

Urogenital schistosomiasis is a plausible risk factor for HIV acquisition and transmission in both sexes, and could enhance HIV disease progression. The biological basis for this hypothesis lies in the local mucosal disruption and inflammation brought about by urogenital schistosomiasis, and immunological mechanisms that hasten progression of HIV disease. Local mucosal disruption occurs through chronic inflammation in the tissue of the pelvic organs including the urinary bladder, lower ureters, cervix, vagina, prostate, and seminal vesicles. In females, there is damage to the epithelium with mucosa oedema, erosions, and ulcerations. The schistosome eggs elicit a local immune response, with accumulation of inflammatory cells that express CD4+ T-cell receptors, similar to sexually transmitted infections that lead to genital ulceration (syphilis and herpes simplex virus). Chronic schistosomiasis alters immune function and may increase susceptibility to HIV. Schistosomiasis results in preferential stimulation of Th2-type response, and CD4+ T-cells with this phenotype are more susceptible to infection and destruction by HIV. During infection with *Schistosoma* species, there is concomitant downregulation of the Th1-type response, important in initial control of HIV infection. In *S. mansoni* infections, monocytes and CD4+ T-cells have also been shown to display high densities of chemokine co-receptors for HIV, and these levels decreased after praziquantel treatment. Schistosomiasis raises viral loads as the upregulated chemokine co-receptors also promote cell-to-cell spread of HIV after initial infection. Praziquantel treatment may therefore slow progression of HIV disease.

In addition to biological evidence, epidemiological and treatment studies also suggest a relationship between schistosomiasis and HIV. Studies in Zimbabwe and Tanzania (>1000 subjects in total) showed significant associations between the diseases. Effect of praziquantel treatment of *S. mansoni* showed variable effects on HIV viral loads, but these studies were mostly observational, not controlled trials with control groups and randomisation. One randomised trial of praziquantel treatment of *S. mansoni* in HIV-positive subjects showed smaller increases in viral load compared to those in whom treatment was delayed, but this study was not blinded, so follow-up bias was possible. Appropriate longitudinal studies involving anti-schistosomal treatment integrated with HIV prevention interventions are required to confirm a causal relationship.

Further reading

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Kjetland EF, Leutscher PDC, Ndhlovu PD. A review of female genital schistosomiasis. Trends Parasitol 2012; 28 (2): 58-65; abstract available at http://www.ncbi.nlm.nih.gov/pubmed/22245065

Mbabazi PS, Andan O, Fitzgerald DW, Chitsulo L, Engels D, *et al*. Examining the relationship between urogenital schistosomiasis and HIV Infection. PLoS Negl Trop Dis 2011; 5(12): e1396. doi:10.1371/journal.pntd.0001396

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

2 TB AND HIV

a Investigation of a cluster of DR-TB cases in Mpumalanga Province

In October 2015, the NICD Centre for TB (CTB) received a notification that a clinic in Mpumalanga had experienced a 6-fold increase in the number of drug-resistant TB (DR-TB) cases in September 2015 compared with previous months, with 15 cases being reported in total. Outbreak Response Unit (ORU) and CTB conducted a desk-top review prior to a field visit to ascertain the reason for the increase. The objectives of the desk-top review were to describe patients identified with DR-TB; to understand background rates of DR-TB in the area; to understand genetic relatedness of TB through evaluation of line-probe assay results, and to make recommendations related to further investigation.

Of 15 patients, 7 (47%) were male, with mean age 46 years (8-72 yrs). Time of diagnosis of DR-TB is presented in Figure 2. The geographical locations of the patients' place of residence as per the laboratory information system were plotted on GIS software. All patients were located within a 35 km radius of each other, but none lived in the same village. Of the 15 patients, 14 had confirmed DR-TB. Of the 14 with confirmed DR-TB, all but one patient was diagnosed with line probe assay without an Xpert MTB/RIF (GXP) test done on sputum as the first-line diagnostic test. Review of line probe assay results revealed at least 6 different genetic mutation patterns amongst 15 patients (Figure 3). Review of all Xpert MTB/RIF results, and culture/line probe assay for the district revealed no year-on-year increase in the number of DR-TB cases identified in the district or sub-district as a whole.

Following this review, ORU and CTB interpreted that there was no evidence of an outbreak based on available molecular and epidemiological evidence. Rather, the evidence suggested multiple co-transmission events of unrelated strains of DR-TB. The desk-top review methodology is limited in scope as complete genome sequences or other molecular typing methodologies are not used. Furthermore, interview with patients is not possible. ORU and CTB made the following recommendations: 1) A site visit to the district and clinic be undertaken to establish diagnostic recording and reporting procedures; 2) interviews with patients be done to evaluate potential epidemiological linkages and health seeking behaviour; 3) Further molecular investigations be done on patient isolates.

This preliminary investigation has highlighted the need for proactive monitoring of TB burden at the lower levels of health delivery for early signals of change (such as an unusual increase in the number of cases). It also shows that routine data can provide a rich and powerful source of information. The use of line probe assay proved a valuable aid to defining potential genetic relatedness. In this instance, the line probe assay together with sputum culture detected cases of drug resistance that were missed by the GXP. This confirms the importance of inclusion of culture and line probe assay in the TB diagnostic the algorithm. Further investigation will be undertaken to conclude the investigation in partnership with the provincial teams.

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

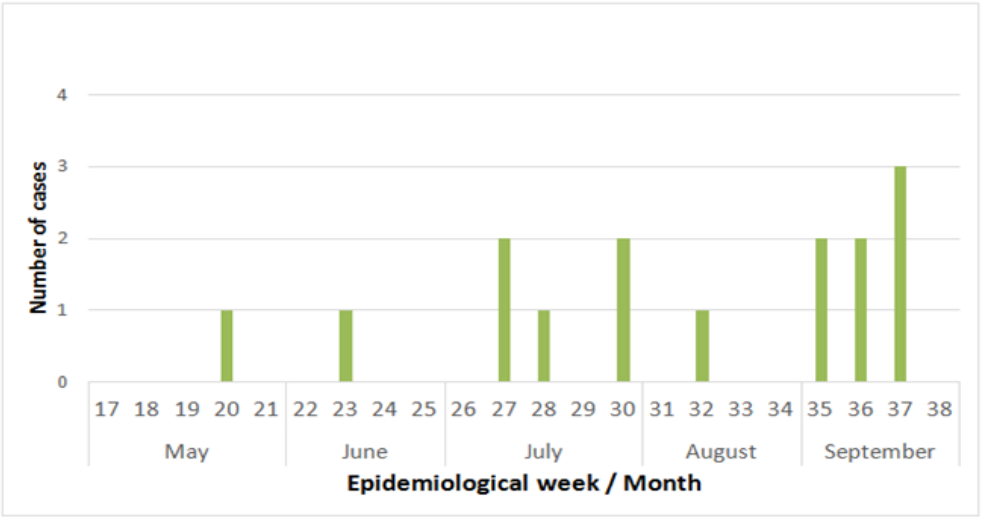

Figure 2. Epidemiological curve showing the number of cases of drug-resistant TB diagnosed at a primary health clinic in Mpumalanga, each epidemiological week from May to September 2015.

Patient #	Rifampicin	Rif mutation description	Isoniazid	INH mutation description
1	Resistant	rpoBWTmut3	Resistant	inhA WT absent
5	Resistant	NA	Resistant	NA
8	Resistant	rpoBWTmut2A	Resistant	katGmut1
10	Resistant	rpoBWTmut2A	Resistant	katGmut1
11	Resistant	rpoBWTmut3	Resistant	katGmut1
13	Resistant	rpoBWTmut3	Resistant	katGmut1
2	Resistant	NA	Sensitive	NA
3	Resistant	rpoBWTmut3	Sensitive	none
4	Resistant	NA	Sensitive	none
6	Resistant	rpoBWTmut2A	Sensitive	none
12	Resistant	rpoBWTmut3	UN (inhA absent, katG WT)	None
9	Resistant	rpoBWTmut1	UN (inhA absent)	katGmut1
15	Sensitive	none	Resistant	katGmut1
14	NA	NA	NA	NA
7	NA	NA	NA	NA

Figure 3. Results of line-probe assay (MTBDRplus, Hains Lifescience) amongst 15 patients with DR-TB diagnosed by a clinic in Mpumalanga, May-September 2015. Red colour indicates confirmed multi-drug-resistant TB (MDR-TB); orange indicates rifampicin mono-resistant TB; blue indicates probable MDR-TB but genotype uncertain; purple indicates isoniazid mono-resistant TB. NA=not available; UN=test uninterpretable.

b Prevention of HIV mother to child transmission: a South African success story

Prevention of mother to child transmission (PMTCT) includes prevention of transmission of HIV from mother to infant and linkage of HIV-infected infants to appropriate treatment and care. Both require early infant diagnosis (EID) of HIV to monitor mother to child transmission (MTCT) and diagnose HIV infection early in life. Prior to the 2004 national rollout of antiretroviral treatment in the public sector, HIV PCR testing was reserved for a small minority of infants who were enrolled in clinical trials or abandoned in children's homes, and less than 1000 HIV PCR tests were performed per annum in three National Health Laboratory Service (NHLS) laboratories in the country.

HIV PCR testing for 6-week-old infants born to HIV infected mothers was made available in the public sector in 2004. In 2005, the introduction of HIV PCR testing on dried blood spots (DBS), obtained predominantly by heel-prick, increased accessibility to HIV PCR testing by shifting 6-week testing from hospitals to primary health care clinics. This shift required simultaneous development of training materials, training of health care workers, design and procurement of DBS sampling packs, research and development for high throughput processing of DBS in a routine diagnostic laboratory, and set up of a further seven NHLS laboratories capable of performing HIV PCR testing. The massive scale-up of clinical and laboratory capacity over the past decade has enabled a national EID program in which ±400 000 HIV PCR tests are currently processed per annum, amounting to a >80% testing coverage of HIV exposed infants (data not shown).

HIV PCR data extracted from the NHLS Corporate Data Warehouse (CDW) has allowed monitoring of EID by distributing monthly reports at facility, district, provincial and national level.[1] Together with the District Health Information System, this data has been used by the Department of Health to monitor the efficacy of the PMTCT program. Figure 4 demonstrates the increase in HIV PCR testing that occurred between 2004 and 2014 in <2 -month-old infants, the number of HIV PCR-positive tests and the decreasing percentage positivity, as calculated from NHLS CDW data. The South African PMTCT Evaluation surveys conducted between 2010 and 2012 to assess the early MTCT at 6 weeks of age, measured very similar rates to those obtained by the NHLS CDW data for all three years. In 2014, data extracted from the NHLS CDW demonstrated that there has been a further decrease in early

MTCT with a total of 4 078 HIV PCR-positive results for infants <2 months of age despite an increase in HIV PCR tests performed within this age group. These results suggest an early MTCT rate of 1.8% and successful achievement of the South African National Strategic Plan target of <2% by 2015.

Whereas early MTCT has dramatically reduced from >20% in 2004 to <2% in 2015, challenges remain. The introduction of birth-testing in the new national consolidated guidelines of June 2015, although proving successful in assisting the earlier detection of in-utero infection, requires new operational and monitoring tools to enhance the timely identification, tracing and linkage into care of infected newborn infants. Furthermore, the high rate of HIV infection in young sexually active women and teenage pregnancies poses a continued challenge for the elimination of mother to child transmission. Indeed, the success of South Africa's PMTCT program is all the more remarkable considering the consistently high maternal HIV seroprevalence, which has remained >29% for the decade following the national rollout of antiretroviral treatment.[3] This underscores the need for novel PMTCT strategies to address primary HIV prevention effectively, especially among women of childbearing age, and the prevention of unintended pregnancies among women living with HIV.

References:

1. Sherman GG, Lilian RR, Bhardwaj S, Candy S, Barron P. Laboratory information system data demonstrate successful implementation of the prevention of mother-to-child transmission programme in South Africa South African Medical Journal 2014;104 (3 Suppl 1):235–238.
2. South African National Department of Health. National Consolidated Guidelines for the prevention of mother-to-child transmission of HIV (PMTCT) and the management of HIV in children, adolescents and adults. Pretoria: National Department of Health, 2015.
3. Shisana O, Rehle T, Simbayi LC, Zuma K, Jooste S, Labadarios D, *et al*. South African national HIV prevalence, incidence and behaviour survey, 2012. Cape Town: HSRC Press; 2014.

Source: Centre for HIV and STI, NICD-NHLS

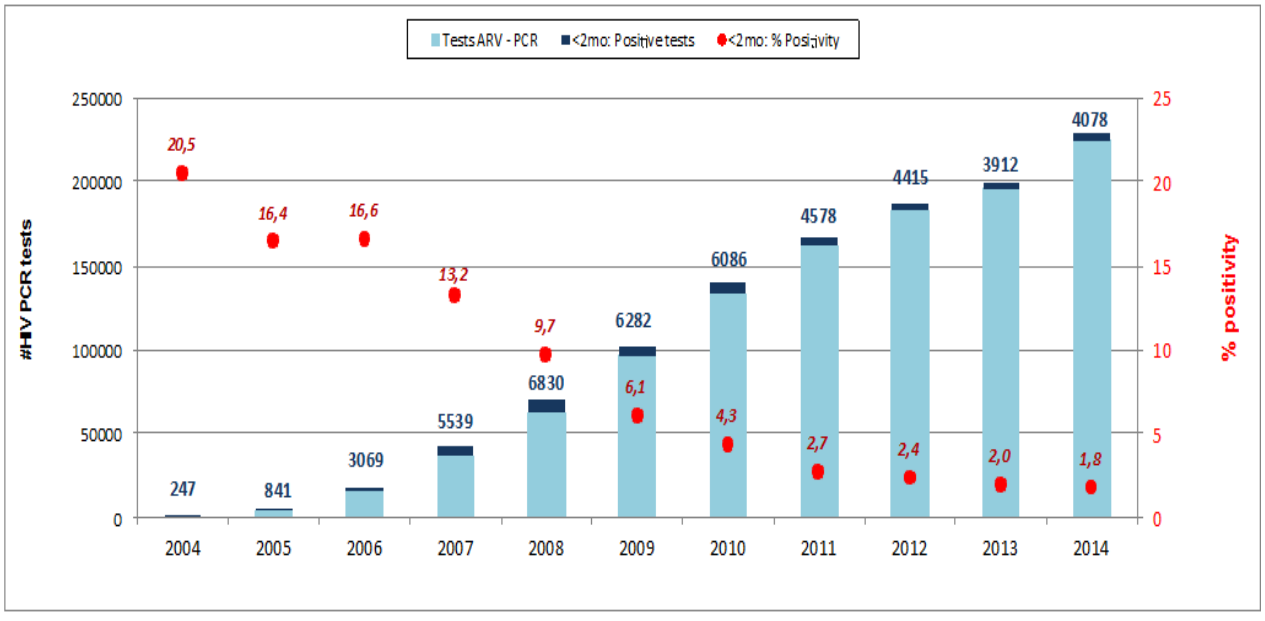

Figure 4. HIV-exposed infants accessing HIV PCR tests at <2 months of age 2004 - 2014

3 SEASONAL DISEASES

a Enteroviral meningo-encephalitis outbreak in Tshwane — an update

We provide an update on the enteroviral meningo-encephalitis outbreak in Tshwane, initially reported in the November 2015 Communique. Since the last report only a few additional cases have been reported from this area. Of 21 cases initially reported, the NICD obtained residual cerebrospinal fluid specimens from 14. Of these, 11 tested positive for enterovirus by PCR. Further genotypic analysis revealed that 3 were echovirus type 6, 1 was echovirus type 11 and 1 was Coxsackie A9 virus. The remaining 6 could not be typed due to low viral load.

In view of the multiple enterovirus strains identified by the NICD and data from other countries to show that enteroviruses cause seasonal increases during summer months, it is possible that the reported cases may be part of a normal seasonal increase, rather than an outbreak due to a single causative agent. There is limited baseline data in South Africa to allow comparison of annual reported cases or incidence rates of viral meningitis. It is well documented in the literature that cases of viral meningitis increase during dry summer seasons and then decrease in winter.

In addition to engaging actively with hospitals and laboratories to document and investigate new cases, the NICD will be instituting routine surveillance for viral meningitis going forward. Human-to-human transmission of enteroviruses occurs via the faecal-to-oral route as a result of poor hygiene practices. Children younger than 5 years of age are most susceptible. Most cases are self-limited and the overall mortality rate is extremely low. The most effective way to prevent the spread of these viruses is through proper hand washing and good general hygiene practices. No public health action is required and people who are close contacts of viral meningitis patients do not need prophylactic antibiotic treatment.

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

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

a Ebola virus disease (EVD) outbreak

There has been a re-emergence of EVD in Liberia after the country was declared Ebola free for the second time on 3 September 2015. In the week ending 22 November 2015, three laboratory-confirmed EVD cases, all from the same family, were reported. The first case-patient was a 15-year-old male who presented at a hospital in Monrovia on 17 November, tested positive for EVD on 19 November and died on 23 November 2015. Subsequently, two of his family members (younger brother and father) were also confirmed as having EVD. The two family members have since recovered and both tested negative twice for Ebola virus on 3 December 2015. However, 165 associated contacts are being monitored of whom 15 are considered high-risk.

In Guinea, no new laboratory-confirmed EVD cases were reported since 29 October 2015. The last laboratory-confirmed EVD case in Guinea tested negative twice for Ebola virus on 16 November 2015. In both Sierra Leone and Guinea, the 90-day enhanced surveillance period is currently underway. As at 6 December 2015, a cumulative total of 28 601 cases (laboratory-confirmed, probable and suspected) including 11 300 deaths with a case fatality rate of 40% has been reported in Guinea, Liberia and Sierra Leone. A summary of case numbers and deaths reported is shown in Table 1.

Following reports that Ebola virus can persist in semen for months after recovery, a modelling study was conducted to estimate the number of men who recovered from EVD (in Guinea, Liberia and Sierra Leone) possibly to have Ebola virus RNA present in semen (Reference). In this study, a fitted negative binomial distribution model by method of maximum likehood was used. Their results indicate that the

number of men with detectable Ebola virus RNA in semen at present remains low and is on the decline. It is estimated that in January 2016, the number of Ebola virus semen-positive individuals will be 73 as compared to 2 255 in January 2015. Nonetheless, promotion of sexual health and EVD surveillance remain crucial and should be continued as a single incident could lead to another widespread and intense transmission of EVD.

Situation in South Africa

As at 9 December 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. The risk of Ebola being introduced into South Africa still remains low. However a high index of suspicion is always necessary given the history of viral haemorrhagic fever in West Africa.

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)

Reference: Eggo R, Watson C, Camacho A, Kucharski A, Funk S, Edmunds W. Duration of Ebola virus RNA persistence in semen of survivors: population-level estimates and projections. Euro Surveill. 2015;20(48):pii=30083.
DOI: http://dx.doi.org/10.2807/1560-7917.ES.2015.20.48.30083
http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=21326

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

Table 1. Number of Ebola virus disease cases and deaths in Guinea, Liberia and Sierra Leone (as at 6 December 2015)

Country	Total cases (laboratory-confirmed, probable and suspected)	Total deaths	Case fatality rate	Number of cases among healthcare workers (number of deaths)
Guinea	3 804	2 536	67%	196 (100)
Sierra Leone	14 122	3 955	28%	307 (221*)
Liberia (as at 9 May)	10 666	4 806	45%	378 (192)
Liberia (from 29 June)	9	3	33%	
Totals	**28 601**	**11 300**	**40%**	**881 (513)**

Source: World Health Organization: Ebola outbreak - Ebola situation report of 9 December 2015 (www.who.int); *Data as at 17 February

5 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 November 2015, a total of 103 Enterobacteriaceae isolates were received. Ninety-four carbapenem-resistant isolates were screened, 75 of which were CPE isolates (Table 2 and Table 3). Majority of the CPE isolates were *Klebsiella pneumoniae* (41) followed by *Escherichia coli* (13) and *Serratia marcescens* (7).

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.

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

Table 2. Enterobacteriaceae by CPE enzyme type, AMRL-CC, COTHI, NICD, 2015

Organism	NDM		OXA-48		VIM	
	Nov-15	Jan-Oct 2015	Nov-15	Jan-Oct 2015	Nov-15	Jan-Oct 2015
Klebsiella pneumoniae	21	227	19	86	3	29
Enterobacter cloacae	3	14	1	10	-	4
Serratia marcescens	6	33	1	5	-	2
Providentia rettgeri	2	18	-	26	-	-
Escherichia coli	1	9	12	26	-	2
Citrobacter freundii	3	11	-	-	-	-
Klebsiella oxytoca	-	9	1	2	1	3
Other Enterobacteriaceae	2	8	1	-	1	1
Total	**38**	**329**	**35**	**155**	**5**	**41**

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

Table 3. Enterobacteriaceae isolates by specimen type and province, AMRL-CC, COTHI, NICD, 2015

Organism	GP	KZN	WC	FS	EC	Unk	Total Nov 2015	Total Jan-Oct 2015
Klebsiella pneumoniae	**27**	**5**	**3**	**4**	**3**	**8**	**50**	**389**
Sterile	**14**	**3**	**3**	**1**	**3**	**2**	**26**	206
Non-sterile	6	1	-	3	-	2	12	103
Unknown	7	1	-	-	-	4	12	80
Enterobacter cloacae	**7**		**1**	**-**	**-**	**4**	**12**	**81**
Sterile	5	-	1	-	-	1	-	46
Non-sterile	2	-	-	-	-	1	-	23
Unknown	-	-	-	-	-	2	-	12
Escherichia coli	**15**	**-**	**-**	**-**	**-**	**-**	**15**	**49**
Sterile	14	-	-	-	-	-	-	24
Non-sterile	-	-	-	-	-	-	-	20
Unknown	1	-	-	-	-	-	-	5
Serratia marcescens	-		-	-	1	6	**7**	**40**
Sterile	-	-	-	-	1	-	-	8
Non-sterile	-	-	-	-	-	-	-	3
Unknown	-	-	-	-	-	6	-	29
Klebsiella oxytocoa	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**17**
Sterile	1	-	-	-	-	-	-	12
Non-sterile	-	-	-	-	-	-	-	1
Unknown	-	-	-	-	-	-	-	4
Citrobacter freundii	**2**	**-**	**-**	**-**	**-**	**1**	**3**	**13**
Sterile	2	-	-	-	-	1	-	7
Non-sterile	-	-	-	-	-	-	-	2
Unknown	-	-	-	-		-	-	4
Other Enterobacteri-aceae	3	2	-	-	-	1	**6**	**67**
Sterile	2	-	-	-	-	-	-	29
Non-sterile	-	-	-	-	-	-	-	16
Unknown	1	2	-	-	-	1	-	22
Total Jan-Oct 2015	**308**	**122**	**11**	**27**	**78**	**101**	**94**	**656**

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 5 on page 12.

1. Middle East respiratory syndrome coronavirus (MERS-CoV): Saudi Arabia

Three new cases of MERS-CoV were reported between 2 and 27 Nov 2015 in the Kingdom of Saudi Arabia, including 2 deaths.

Until more is understood about MERS-CoV, people with diabetes, renal failure and chronic lung disease and immunocompromised persons are considered to be at high risk of severe disease from MERS-CoV infection. These people should avoid close contact with animals, particularly camels, and limit their exposure to health care facilities in Saudi Arabia where MERS-CoV infection has been reported.

There are no travel or trade restrictions to the Arabic peninsula, but travellers should be aware of MERS-CoV in affected countries. General hygiene measures, such as regular hand washing should be adhered to. People should avoid drinking raw camel milk or camel urine, or eating meat that has not been properly cooked.

2. Dengue: Malaysia

According to the World Health Organization, there were 2,286 cases of dengue reported in Malaysia from October 18-24, 2015. Travellers to Malaysia should protect themselves against mosquito bites to avoid getting dengue.

3. *Plasmodium knowlesi* malaria: Temburong National Park, Brunei

Two cases of *Plasmodium knowlesi* malaria were reported on 20 November 2015 at Temburong National Park, Brunei. None of the patients received malaria prophylaxis.

Although malaria prophylaxis for travellers is not routinely recommend, the recent report in suggests careful review of the current status of the disease in Brunei. Travellers should take regular precautionary measures to prevent mosquito bites.

4. Pertussis: Australia

More than 1 200 cases of pertussis were reported across western Sydney during 2015, with 200 cases reported in October 2015 alone. Regular immunization is recommended to prevent whooping cough, with all children receiving immunisation in high school; however, immunity fades over time, and booster shots are often needed for adults. Travellers should keep their pertussis immunisation up to date and discuss a booster shot with their travel health provider prior to departure to Australia.

5. Zika Virus: Colombia and Brazil

Zika virus has been reported in high numbers from Colombia and Brazil. Other central and southern American countries fear the emergence of Zika, which is spread through *Aedes* mosquitoes. The mosquito vector is abundant in the Americas, and is actively transmitting dengue and chikungunya viruses.

Disease presents as fever, rash, joint pain and non-purulent conjunctivitis, similarly to chikungunya and dengue, though it is usually less severe. Zika virus infections were observed to be associated with cases of microcephaly and Guillain-Barre syndrome. If this is confirmed, Zika virus infections can no longer be considered as a benign febrile infection. Travellers are advised to avoid mosquito bites.

6. Measles: Democratic Republic of Congo

The World Health Organization continues to report measles cases from Katanga province, DRC. Over 30 000 cases have been reported since January 2015, and 428 children have died. Travellers are advised to ensure that they have received measles vaccine as a child, or to receive a booster.

7. Cholera: Tanzania, Mozambique

Over 10 412 cases and 159 deaths due to cholera have been reported from Tanzania. The WHO is assisting Tanzania with containment and treatment efforts. The majority of cases (44%) have occurred in Dar Es Salaam, but outlying provinces including Zanzibar (over 500 cases) have also been affected. Travellers are advised to observe appropriate hygiene measures. Cases of cholera continue to be reported from the northern provinces of

Mozambique. Over 800 cases have been reported, and 5 persons have died.

8. Updated country requirements for yellow fever vaccination.

Following the WHO declaration that yellow fever vaccine may be considered to have life-long efficacy, certain countries have conformed, while others continue to require booster vaccinations after 10 years. Travellers should check with the destination country's embassy or consulate before departure to confirm yellow fever vaccination requirements.

Source: Division of Public Health Surveillance and Response

References and additional reading:
ProMED-Mail (www.promedmail.org)

Figure 5. Current outbreaks that may have implications for travellers. Numbers correspond to text above. The red dot is the approximate location of the outbreak or event.