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

Communicable Diseases Communiqué

MARCH 2016, Vol. 15(3)

CONTENTS

1 ZOONOTIC AND VECTOR-BORNE DISEASES

a Rabies

The National Bioproducts Institute, the sole manufacturer and provider of rabies immunoglobulin (RIG) has informed provincial and national departments of health that RIG (Rabigam®) is currently in critical short supply, and that there will only be limited stocks for the next 4-6 months. Rabigam® is derived from pooled human plasma, sourced from healthy donors with a high titre of antibodies to the rabies virus. A shortfall in the availability of suitable plasma has reduced the quantity of product which could be manufactured. The National Department of Health has issued an advisory for rationalising the use of human RIG. Clinicians are urged to adhere to the current guidelines for administration of rabies post-exposure prophylaxis (PEP) and withhold RIG when it is not indicated. Provinces are requested to: 1) identify a rabies expert within the province, to whom all queries regarding the administration of RIG can be directed; 2) enlist the help of provincial pharmacists to monitor stock of RIG within the province on a weekly basis so as to redirect stocks as required. Clinical enquiries regarding administration of RIG can be directed to the NICD Hotline at 082-883-9920.

Thus far in 2016, only a single case of human rabies has been confirmed in South Africa. The case was reported from KwaZulu-Natal Province and involved a 16-year-old boy who was bitten by a domestic cat. The rabies strain was later biotyped as a canid biotype. Although domestic cats may contract and transmit the rabies virus to humans and other mammals, they are not considered a reservoir species of rabies. Since 1983 only ten reported human rabies cases have been associated with exposures to domestic cats. In South Africa, canid biotype rabies virus circulates in domestic dogs, jackals and bat-eared foxes, while viverid biotype circulates in certain species of mongoose. The majority of human cases of rabies are caused by canid biotype rabies virus, and linked with exposure to rabid dogs. Human rabies following exposure to wildlife contacts is very uncommon. Vaccination of domestic dogs and cats is required by law and provides an indirect measure of protecting humans against the disease.

In the last communiqué (February 2016), rabies infection was confirmed in a domestic cat on a plot bordering on the Roodeplaat Dam and Nature Reserve in the City of Tshwane, about 30 km from the centre of the city. Sequencing of the virus confirmed that it is a 'canid' biotype. The source of the rabies infection is unknown but a ring vaccination campaign was conducted in the area, and approximately 350 pets were vaccinated, with the aim of limiting the spread of any undiagnosed rabies in the area.

A concerning exposure to rabies took place in Durban in February 2016 when a family adopted a puppy from the SPCA. Within a few days after adoption, the puppy became very ill and displayed behavioural changes. It was euthanased and subsequently diagnosed with rabies. Unfortunately two family members had been bitten by the puppy. They are currently receiving post-exposure prophylaxis. The person who donated the puppy to the SPCA was traced and assessed for risk of exposure to rabies. Rabies vaccination is licenced for puppies aged 3 months and older, and unfortunately the SPCA had no way of knowing that this puppy was incubating rabies at the time it was adopted.

For more information about rabies and how to prevent the disease in humans please visit www.nicd.ac.za

Erratum: Rabies (February 2016)

It was incorrectly reported that no human rabies cases were reported for 2016. This information is incorrect as a single case of human rabies was reported from KwaZulu-Natal Province (as mentioned in this edition).

Source: Centre for Emerging and Zoonotic Diseases, and Division of Public Health, Surveillance and Response, NICD-NHLS; (cezd@nicd.ac.za); Onderstepoort Veterinary Institute

b Crimean-Congo haemorrhagic fever

Since the first report of Crimean-Congo haemorrhagic fever (CCHF) in 1981, 200 laboratory-confirmed cases have been documented in South Africa - an average of 5-6 cases per year. Cases of CCHF have been reported from all nine provinces, but the majority are from the Northern Cape and Free State provinces. More than two-thirds of the cases reported exposures to *Hyalomma* ticks ('bontpoot' ticks). Transmission of the virus may also occur through contact with infected animal tissues and blood. The typical clinical manifestation includes sudden onset of fever, headache, myalgia, dizziness, neck pain and stiffness, backache, sore eyes and photophobia. Persons may report nausea, vomiting, diarrhoea, abdominal pain and sore throat in the early phase of illness. The infected person may experience mood alterations, confusion and delirium. Hepatitis with raised transaminase enzymes is a marked feature with CCHF. A petechial rash is common and bleeding from organs and orifices may occur secondary to low platelet count. The mortality rate in South African cases is around 30%. Specialized testing, available at National Institute for Communicable Diseases in South Africa is required to confirm a diagnosis of CCHF (see www.nicd.ac.za).

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

c An update on Zika virus

Zika virus (ZIKV) is a mosquito-borne pathogen in the flavivirus genus (Flaviviridae), related to other agents of public health importance such as yellow fever, West Nile and dengue viruses. The virus was isolated for the first time from a sentinel monkey in Uganda in 1947 and from *Aedes africanus* mosquitoes the following year, but only recognized as a human pathogen for the first time in 1964. The virus remained confined to the equatorial belt of Africa and Asia, until 2007 when it caused an outbreak on Yap Island in the Pacific Ocean followed by a rapid expansion throughout other islands in the Pacific Ocean. In 2014 ZIKV reached South and Central America and spread explosively. As of 9 March 2016, a total of 52 countries worldwide has reported local transmission of Zika virus since 1 January 2007. The most drastic expansion of transmission occurred from January 2015 onwards, with 41 of the 52 countries reporting transmission in this period, with the Philippines being the most recently affected country. Five of the listed countries are no longer experiencing active transmission while three countries reported locally-acquired infection not related to mosquito transmission, most likely through sexual transmission. In the Americas alone 31 countries have now reported Zika virus active transmission. In Brazil estimation of ZIKV infections ranged from 500 000 to 1.5 million in 2015.

The risk of ZIKV infection to the general South African population is low. Active transmission of the virus has never been detected inSouth Africa. At the time of publication, three imported cases (one confirmed, two probable) have been detected in the country. Zika virus infection was confirmed by RT-PCR in a Colombian visitor to South Africa as reported in the Communiqué, February 2016. Two probable cases of ZIKV infection were diagnosed in twins from Barbados visiting South Africa for several weeks. ZIKV could not be detected by RT-PCR in the two patients, but serological testing (IgM and neutralization assay) revealed the presence of anti-ZIKV reactive antibodies. Serological testing of paired blood samples from these patients is ongoing at NICD. Due to heightened awareness by the public, a total of 28 suspected Zika cases has been investigated by CEZD, of which 6 cases involved pregnant women that travelled recently to affected areas.

Due to increasing case numbers of microcephaly and neurological disorders likely associated with ZIKV infections, the WHO declared this situation as a public health emergency of international concern on 1 February 2016 and this was reiterated at a second meeting of the WHO Emergency Committee on 8 March 2016. Brazil and French Polynesia are the only countries to report an increase in these neonatal malformations following Zika virus introduction and transmission, but similar conditions are under investigation in Colombia. Two cases of neonatal malformations linked to a travel history in Brazil have been reported from the USA and Slovenia. Nine countries have also reported an increase in the incidence of Guillain-Barré syndrome (GBS) in the presence of ZIKV active transmission. There is mounting evidence in the scientific

literature of the role of Zika virus in microcephaly and neurological disorders, supported by well-executed case and cohort studies (see references below). The public health emergency of international concern declaration by WHO calls for a more co-ordinated effort to improve surveillance, mosquito control programs and fast-track the development of diagnostic assays, vaccines and antiviral therapeutics for ZIKV, and to investigate the causality of the observed disorders.

Clinical diagnosis of ZIKV disease is complicated due to the non-specific clinical presentation and similarity with other arboviral infections. About 80% of human infections are asymptomatic. Symptoms of ZIKV infection include low-grade fever (37.8-38.5 °C), maculopapular rash, arthralgia (specifically involving the small joints of the hands and feet) and conjunctivitis. Laboratory diagnosis of acute ZIKV infection can be achieved through virus isolation in mice or tissue culture, and molecular testing by ZIKV specific RT-PCR. The required specimen type for ZIKV laboratory diagnosis is clotted blood or serum. Due to the co-circulation of ZIKV, chikungunya and dengue and their common mosquito vector, as well as similar clinical presentation, differential diagnosis is essential when investigating suspected Zika cases. It is highly advisable that all suspected Zika cases also be subjected to testing for chikungunya and dengue. In acute cases, where a patient travelled recently (<14 days) to an affected area and blood was collected within 5 days of onset of compatible symptoms, the patient should be tested by virus-specific RT-PCRs for ZIKV, dengue and chikungunya. Due to transient viremia, acute cases negative by these RT-PCR assays, and convalescent cases (blood collected more than 5 days after disease onset) should be subjected to serological testing. Serological investigation of suspected Zika cases should therefore include IgM ELISA testing for antibodies to ZIKV, dengue and chikungunya. Positive results on either of these IgM assays are followed by virus-specific neutralization assays or plaque-reduction neutralization assays for confirmation. Cases submitted for laboratory investigation should have an epidemiological link to current ZIKV outbreaks—which implies a recent travel history to an affected country or sexual contact with a male who has travelled to one of the affected countries and presented with possible ZIKV disease. Physicians submitting specimens from suspected Zika cases to NICD should therefore clearly request RT-PCR and/or serological testing for all three viruses to enable proper investigation.

The highest health risk posed by ZIKV is to the unborn of pregnant women travelling to ZIKV affected areas, and possibly the unborn of pregnant woman who have sexual contact with male partners who are infected with ZIKV. On the 8th of February 2016, the South African Department of Health issued a travel advisory recommending that pregnant women avoid travelling to affected areas or if travel is essential, that they should protect themselves against mosquito bites. In addition, the NDoH Environmental and Port Health department are taking steps to reduce the risk of translocation of infected mosquitoes from ZIKV affected countries, including 1) continued mosquito monitoring of arriving aircraft and increased mosquito surveillance to ensure that aircraft are sprayed with insecticide; 2) assessment of ship sanitation to identify possible vector breeding areas and whether steps have been taken to minimize insect breeding, as well as physical inspection of ships for presence of mosquito vectors; 3) continued thermal scanning of all travellers at ports of entry; 4) referral of travellers with compatible symptoms at points of entry to a health care facility for further management; 5) increased monitoring of imported used tyre casings; 6) increased health education and awareness of travellers about ZIKV disease.

Further reading related to Zika virus disease and association with microcephaly

1. Brasil P *et al.* Zika virus infection in pregnant women in Rio de Janeiro - Preliminary Report. N Engl J Med. 2016 Mar 4. [Epub ahead of print]
2. Meaney-Delman D, *et al.* MMWR Morb Mortal Wkly Rep. 2016 Mar 4;65(8):211-4. Zika virus infection Among U.S. pregnant travellers - August 2015-February 2016.
3. Kleber de Oliveira W *et al.* Increase in reported prevalence of microcephaly in infants born to women living in areas with confirmed Zika virus transmission during the first trimester of pregnancy - Brazil, 2015. MMWR Morb Mortal Wkly Rep. 2016 Mar 11;65(9):242-7.
4. Miranda-Filho Dde B *et al.* Initial description of the presumed congenital Zika syndrome. Am J Public Health. 2016 Apr;106 (4):598-600.
5. Tang H *et al.* Zika Virus infects human cortical neural progenitors and attenuates their growth. Cell Stem Cell. 2016 Mar 3. pii: S1934-5909(16)00106-5.
6. Calvet G *et al.* Detection and sequencing of Zika virus from amniotic fluid of fetuses with microcephaly in Brazil: a case study. Lancet Infect Dis. 2016 Feb 17. pii: S1473-3099(16 00095-5.

Related websites:
www.nicd.ac.za
www.cdc.gov/zika/
www.who.int/mediacentre/factsheets/zika/en/

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

d Diagnosing infections caused by dengue, chikungunya and zika virus — the '*Aedes* trio'

Dengue (DENV) and Zika viruses (ZIKV) are not transmitted in South Africa because the mosquito vector of these viruses has a limited range in South Africa with highest densities in parts of northern Limpopo, and northern KwaZulu-Natal provinces. It is also not well understood if the African subtype of *Aedes aegypti* does not support the lifecycle of these viruses, and further, the African subtype preferentially feed on animals, thus reducing the risk to South Africans. Chikungunya (CHIKV) is also transmitted by *Aedes aegypti* mosquitoes, and is endemic the far North-Eastern parts of Limpopo Province South Africa, but cases were last recorded in the 1970s. However, these viruses have recently experienced a massive expansion in range globally, and a number of returning travellers to South Africa have presented with illnesses clinically compatible with these infections. The distribution of these viral infections across the globe reflects the distribution of *Aedes* mosquitoes – a geographical band encompassing the tropics in the Americas, Africa, Asia and the Pacific islands (Figure 1).

While DENV and ZIKV are flaviviruses, and chikungunya is an alphavirus, all three present with similar clinical symptoms, namely fever, headache, myalgia, arthralgia or arthritis, and rash. Dengue is associated with moderate retro-orbital pain. Mild bleeding secondary to lowered platelets may occur with DENV infection, and has been reported in isolated cases of ZIKV infection. However, almost all cases of DENV, CHIK and ZIKV in adults are self-limited. Only DENV infection may progress to a severe life-threatening forms -dengue haemorrhagic fever and dengue shock syndrome. If DENV infection does progress, symptoms and signs commence after defervesence, and include lethargy, persistent vomiting, hypotension, abdominal pain with hepatomegaly, mucosal bleeding, elevated haematocrit and low platelets.

Laboratory testing is able to differentiate DENV, CHICKV and ZIKV infections. During the first five days of illness, RT-PCR to directly detect DENV, CHIKV or ZIKV nucleic acid, or viral culture using in -vitro cell lines or animal inoculation should be performed on serum from suspected cases. After the initial phase of infection, viraemia ceases, and PCR testing or viral culture is not helpful. Thereafter, serum should be evaluated for anti-CHIKV, anti-ZIKV and anti-DENV IgG and IgM antibodies by immunoassay and/or virus neutralisation test. If initial results are negative for IgG and IgM, and these viruses are still suspected, serum taken two or more weeks after illness onset should be retested for IgG and IgM antibodies. While RT-PCR is specific for DENV, CHIKV and ZIKV, there may be a serological cross-reaction between DENV and ZIKV, as both viruses are flaviviruses and share some molecular antigenic epitopes. Convalescent sera is essential in differentiating ZIKV from DENV, and accurate diagnostics for these two viruses require parallel testing. Please contact the NICD should you require further information on cezd@nicd.ac.za or petrusv@nicd.ac.za or call the NICD hotline at 082 -883-9920. A useful resource to assist with differentiating CHIKV and DENV may be found at: http://www.cdc.gov/dengue/resources/

Source: Centre for Emerging and Zoonotic Diseases, and Division of Public Health, Surveillance and Response, NICD-NHLS; (cezd@nicd.ac.za)

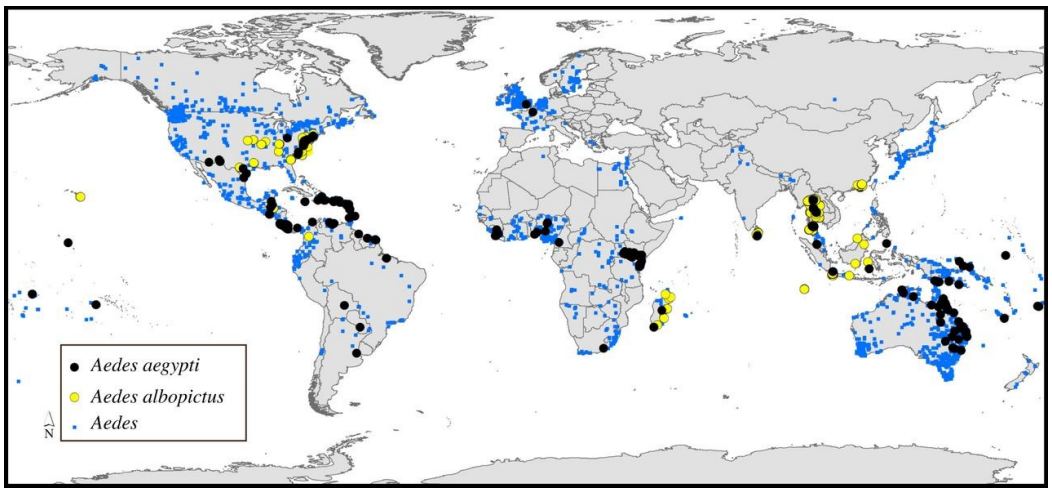

Figure 1. Summary of primary occurrence data available globally for *Aedes* mosquitoes in general (blue) and *Aedes aegypti* (black) and *Aedes albopictus (*yellow). (From Campbell *et al*. Climate change influences on global distributions of dengue and chikungunya virus vectors, Phil Trans R Soc B. 16 Feb 2015.)

e A case of leptospirosis in Mpumalanga Province

A recent case of leptospirosis was reported from the Mpumalanga Province, involving a 49-year-old previously healthy male, who was admitted to ICU of a private hospital following a week of flu-like symptoms, with a massive pericardial effusion and bilateral pleural effusions that required drainage. Blood results revealed a raised white cell count (17.69 x 10^9/L), raised CRP (277mg/L), and deranged liver functions (total bilirubin 52 mmol/L; conjugated bilirubin 32 mmol/L; ALT 75 IU/L; AST 63 IU/L.) TB PCR and bacterial culture of pleural and pericardial fluid were negative. His effusions were drained with a pericardial window and bilateral intercostal drains, and he was given intravenous meropenem and supportive treatment. However, two weeks after discharge, he presented again to the hospital with ongoing fever. On readmission he was again found to have a pleural effusion, and further elevated transaminases (ALT 184 IU/L; AST 116 IU/L). IgM antibodies to *Leptospira* species were found to be present. In response to the diagnosis of leptospirosis, he was treated with intravenous ceftriaxone. His clinical condition improved. He was discharged without further complications, and remains well, although weak.

On further questioning following the diagnosis of leptospirosis, no apparent exposure to rodent urine was identified. The patient is an owner of an urban security company and his work is mostly office-based. He does not participate in any adventure sports and did not report any social or employment activities that would place him at greater exposure to animal and/or waste products.

This case of leptospirosis with massive pericardial effusion and bilateral pleural effusions is unusual. The usual pulmonary manifestations of leptospirosis include haemoptysis secondary to systemic vasculitis or acute respiratory distress syndrome. Typically this presentation occurs in conjunction with highly deranged liver and renal functions that, in the absence of aggressive supportive therapy may lead to multi-organ failure and even death. However, varying degrees of pleural effusion are described in a number of case series of leptospirosis. Cardiac manifestations of leptospirosis include cardiomegaly, and arrhythmias secondary to a myocarditis.

Leptospirosis is a zoonosis present in many regions of the world. The global burden is estimated at approximately 1.03 million cases annually, that result in a total of 2.90 million DALYs (Disability Adjusted Life Years) lost per annum. Over 80% of cases are found in the tropical regions of South and South-East Asia, Western Pacific, Central and South America and Africa. In South Africa, reported cases are observed sporadically with the most recently described cases published through the NICD Communique in June and September 2015.

Leptospira species are maintained in the environment through kidney infection of many wild and domestic reservoir animals including rodents. Transmission to humans is a chance occurrence, commonly as a result of a person coming into contact with urine of animals that have been infected with the bacteria, either directly or indirectly (wet soil or waste contaminated with leptospires). In the majority of cases, leptospirosis is a self-limiting illness, typically manifesting with non-specific fever and malaise. However a small proportion of cases may lead to multi-organ involvement failure. Clinical presentation includes an acute febrile illness with headache, myalgia, anuria or oliguria, jaundice, cough, haemoptysis, haemorrhages, cardiac arrhythmias or skin rash. Confirmatory lab investigations include a positive test for antibodies such as an IgM ELISA, positive blood culture or culture of clinical specimen (such as sputum and urine.) PCR detection of *Leptospira* species may be positive within the first week of illness. Early treatment improves clinical outcomes.

Further reading

1. Gulati, S and Gulati, A. Pulmonary manifestations of leptospirosis. 2012, Lung India: Official Organ of Indian Chest Society, pp. 347 - 353.
2. Matos, ED, *et al*. Chest radiograph abnormalities in patients hospitalized with leptospirosis in the city of Salvador, Bahia, Brazil. 2001, Brazil Journal of Infectious Disease, pp. 73-77.
3. Torgerson, Paul R, Hagan, Jose E and Costa, Frederico. Global burden of leptospirosis estimated in terms of Disability Adjusted Life Years. 10, 2015, PLOS Neglected Tropical Disease, Vol. 9.

Source: Division of Public Health, Surveillance and Response, NICD-NHLS; (outbreak@nicd.ac.za)

2 SEASONAL DISEASES

a The impact of drought on the 2015/6 malaria season

For the months January and February, substantially fewer malaria cases and deaths were reported in 2016, compared with the same period in 2015 (Figure 2), with 64% and 90% reductions, respectively.

The severe drought in the region is probably the main contributor to the year-to-year drop in numbers of cases. There has been a two-thirds reduction in the reported case mortality rate in the period, from 1.2% in 2015 to 0.38% in 2016, but this aspect can only be fully assessed when the whole season is reviewed. The proportion of locally-acquired malaria dropped from 51% in 2015 to 21% in 2016, while the share of imported cases increased from 46% in 2015 to 72% in 2016. These changes probably reflect drought impact but meaningful analysis of the relative contributions of local versus imported cases will likewise have to wait until the malaria season is over. There is likely to be an increase in the numbers of malaria cases in March and April because of recent widespread rainfall, and travel over Easter and other upcoming public and school holidays. Healthcare workers should ensure that they inform prospective travellers to malaria transmission areas about the danger of malaria, and about measures to reduce the risk, such as prevention of mosquito bites (covering up exposed skin after dusk; antimosquito repellents, coils, mats, sprays, bednet and clothing impregnation); and appropriate chemoprophylaxis. See NICD website (http://www.nicd.ac.za/?page=malaria_fact_sheet&id=181) for more information and the malaria risk map for South Africa.

Source: Centre for Hospital, Opportunistic and Tropical Infections (COTHI), NICD-NHLS (johnf@nicd.ac.za). Gauteng Provincial Department of Health, and Malaria Directorate, National Department of Health.

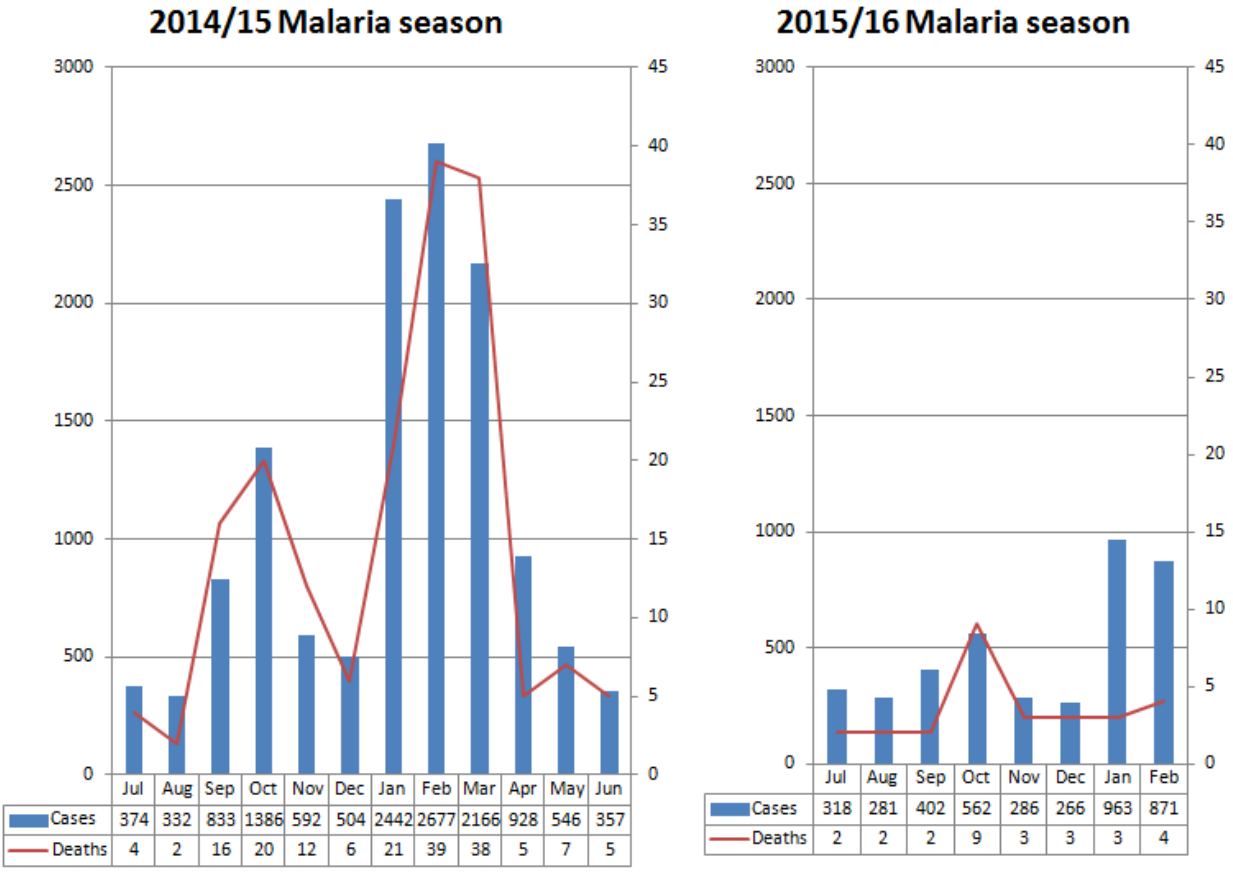

Figure 2. A comparison of 2014/15 and 2015/16 malaria seasons in South Africa showing the reported numbers of cases and deaths (data courtesy the Malaria directorate, National Department of Health)

b Preparations for the 2016 influenza season

The influenza season in South Africa, which usually begins between the last week of April and the first week of July, has not yet commenced. As is usual however, surveillance programmes run by the NICD have detected sporadic cases. In the first nine weeks of 2016, 39 specimens have been received from Viral Watch sites of which 3 yielded evidence of influenza. Influenza A(H1N1)pdm09 was detected in a patient who had visited a game reserve, and influenza B in two patients, one of whom was an adult female whose husband had returned from travelling abroad with influenza-like symptoms. During the same period, specimens from 171 patients were received from two influenza-like illness (ILI) surveillance sites. Influenza A(H3N2) was detected in one specimen from an adult patient and influenza B from a four-year-old. Both these patients had no travel history or known contact with people who had travelled to areas where influenza is currently circulating. Between 01 January and 03 March, specimens from 520 patients with severe respiratory illness admitted at the 6 pneumonia surveillance sentinel sites were tested for influenza. Influenza B was detected in the specimens of four patients.

In 2015, the flu season started in week 16 (ending 19 April), peaked in week 23 (ending 7 June) and ended in week 37 (ending 13 September). In past years the season has started as late as the first week of July. Data from 2015 indicated that the predominant circulating influenza subtype was influenza A(H1N1)pdm09, followed by influenza A (H3N2). The vaccine for the Southern hemisphere in 2016 will contain an A/California/7/2009 (H1N1) pdm09-like virus, A/Hong Kong/4801/2014 (H3N2)-like virus and B Brisbane/60/2008-like virus. Vaccination is the most effective strategy to prevent influenza. It is recommended that health care practitioners discuss the benefits of influenza vaccination with their patients, especially among those who are at increased risk for severe influenza -associated complications, and to advise them to get vaccinated as soon as the vaccine becomes available. Influenza vaccine for the 2016 season is expected to be available at healthcare facilities by the end of March 2016.

Because it takes approximately two weeks after vaccination for protective antibodies to develop, it is recommended that persons receive the influenza vaccine as soon as it becomes available to ensure that as many people as possible are protected before influenza season starts. Detailed recommendations on target groups, dosages and contraindications for the 2016 can be accessed in the February issue of the South African Medical Journal: available at http://www.samj.org.za/index.php/samj/article/view/10586.

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

c Meningococcal disease: an unusual clustering of endemic disease at a tertiary institution

A 20-year-old student was admitted to a North-West Province hospital following a one-day history of flu-like symptoms, nausea and headache. On admission, she was in shock, and had a purpuric rash. A diagnosis of meningococcal septicaemia was made. Unfortunately, she deteriorated rapidly and died 6 hours after admission. She was a resident on the campus of the institution.

Post-exposure chemoprophylaxis was given to attending medical staff, her immediate family, all 250 students living in the same residence and to selected individuals from another residence with whom she had had close contact. The NICD identified *Neisseria meningitidis* serogroup C from polymerase chain reaction (PCR) testing performed on a blood specimen, after no bacterial growth was detected from the blood after prolonged incubation.

The above disease episode occurred 8 months after a 19-year-old first-year student died from meningococcal disease, also caused by serogroup C, in a different residence, at the same campus and institution.

According to the South African National Guidelines on Meningococcal Disease (www.doh.gov.za) these cases would not constitute an institutional outbreak, which requires at least 3 cases to occur within a 3-month period, or 2 cases within a 4-week period. However, an investigation should be done into this unusual clustering of endemic disease. Should a cluster/outbreak occur in an institution, chemoprophylaxis to close contacts is warranted and vaccination may also be considered to extend additional protection to an identifiable population

considered at risk. Should the outbreak involve a broader community within the institution, vaccination should be offered to this wider group, as mass chemoprophylaxis has not been shown to be effective in this setting.

Meningococcal disease is endemic in South Africa with seasonal peaks in the winter to spring months (Figure 3). Disease incidence tends to wax and wane following a 10- to 15-year cycle. Currently South Africa is at a low ebb in the cycle with an incidence of 0.3 cases per 100 000 population in 2015 following the last peak in 2006 of 1.4 cases per 100 000.

Clinicians should have a high index of suspicion for meningococcal disease in patients presenting with fever and non-specific symptoms. Disease progresses rapidly and intravenous antibiotics (penicillin or ceftriaxone) should be given without delay. Confirmed and/or suspected cases of meningococcal disease should be notified telephonically to the provincial Communicable Disease Control Coordinator (National CDCC 012 395 8096) to ensure appropriate case counting and contact tracing for prophylaxis.

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

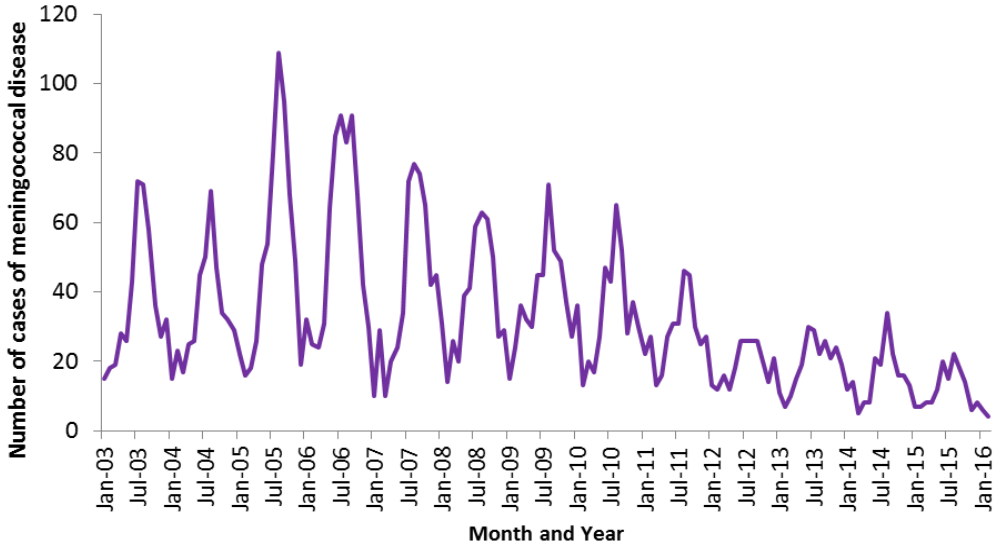

Figure 3.

Number of cases of laboratory-confirmed meningococcal disease in South Africa as reported to NICD by month and year, 2003-2016 (n=5113)

3 RESPIRATORY DISEASES

a Updated NICD diphtheria Guidelines Published

The NICD has published updated recommendations for diphtheria diagnosis, management and public health response, available at www.nicd.ac.za. Diphtheria should be suspected in persons who present with an upper-respiratory tract illness characterised by sore throat, low-grade fever AND an adherent membrane of the nose, pharynx, tonsils, or larynx. All persons with these symptoms should be tested for diphtheria. In addition, following the outbreak in KwaZulu-Natal Province in 2015, all laboratories are requested to screen every throat and nose swab routinely for *Corynebacterium diphtheriae*. Guidance on sample collection and laboratory testing can be accessed at www.nicd.ac.za. From 15 March to 13 June 2015, South Africa responded to a diphtheria outbreak in KwaZulu-Natal Province, which involved 15 diphtheria cases (11 confirmed, 1 probable, 3 possible), of whom four died. This outbreak highlighted the importance of maintaining high level of vigilance among healthcare workers for diphtheria. Suboptimal vaccination coverage rates and waning vaccine-induced immunity results in individuals (adults and children) being or becoming susceptible to diphtheria. For further clinical or laboratory enquiries, please call the NICD hotline 082 883 9920, or Ms Linda de Gouveia 011-555-0327, lindad@nicd.ac.za, or Dr Nicole Wolter 011-555-0352, nicolew@nicd.ac.za.

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

4 TUBERCULOSIS and HIV

a A novel molecular strategy for surveillance of multidrug resistant tuberculosis in high burden settings

In South Africa, transmission of drug-resistant TB (DR-TB) strains is a significant contributor to rising rates of multidrug-resistant tuberculosis (MDR-TB), as opposed to primary drug resistance – the development of drug resistance while on treatment. Hence, disruption of chains of transmission is a key factor in controlling and prevention of DR-TB. Intrinsic to any intervention to prevent transmitted DR-TB is the implementation of an early warning surveillance system to detect genotypic clusters among DR-TB isolates as an indication of transmission in the population. Genotyping of clinical isolates of *M. tuberculosis* has improved our understanding of the epidemiology and patterns of transmission of tuberculosis. Integrating genotyping with surveillance activities provides essential information needed to determine the relative frequency of *M. tuberculosis* strains in specific geographic areas, and the extent of spread of related strains in communities. Routine genotyping forms an important component of TB control programs in many low prevalence settings but is costly and labour intensive for high prevalence settings.

There are currently three main genotyping methods for *M. tuberculosis* including: 1) IS6110-restriction fragment length polymorphism (IS6110-RFLP); 2) spacer oligonucleotide typing (spoligotyping) and 3) mycobacterial interspersed repetitive units-variable number tandem repeats (MIRU-VNTR).

To date, genotyping in South Africa has been primarily used for research purposes in limited geographic areas. The Centre for Tuberculosis (incorporating the National TB Reference Laboratory) at the National Institute for Communicable Diseases (NICD) has recognized the need to establish a country level molecular surveillance system in South Africa to support the investigation of and public health response to MDR-TB. Therefore, the center conducted a study in collaboration with researchers from the United States, to determine the usefulness of a novel and simple genotyping approach, combining spoligotyping with *pnc*A sequencing (SpoNC), against two well-established methods: IS*6110*-RFLP and 24-loci MIRU-VNTR and the findings recently published in PloS One (see reference below). The discriminatory power of the SpoNC strategy was similar to the established methods (IS6110-RFLP and 24-loci MIRU-VNTR), and was able to detect important clonal strains that are relevant to the South African context rapidly and easily. SpoNC can be done directly from clinical samples without the need for prior culture, as well as from Ziehl-Neelsen-stained smear slides. Moreover, SpoNC is less costly in terms of consumables and labour as compared to either IS*6110*-RFLP or 24-loci MIRU-VNTR typing. Taken together, the results of our study support the value of SpoNC strategy for MDR-TB surveillance in a high burden setting. Based on these findings, the Centre for Tuberculosis has commenced with a tiered approach to MDR-TB transmission surveillance, involving SpoNC strategy as a first-line method, followed where relevant by 24-loci MIRU-VNTR typing. Further validation in different geographical settings is underway to ensure the system works well. This has begun in four districts with the target of one high burden district per province under surveillance for transmission clusters by end of 2017.

Further reading

Said HM, Kushner N, Omar SV, Dreyer AW, Koornhof H, Erasmus L, Gardee Y, Rukasha I, Shashkina E, Beylis N, Kaplan G, Fallows D, Ismail NA. A novel molecular strategy for surveillance of multidrug resistant tuberculosis in high burden settings. PLoS One. 2016 Jan 11;11(1):e0146106.

Source: Centre for Tuberculosis, NICD-NHLS (naziri@nicd.ac.za)

b Prospective sentinel surveillance of human immunodeficiency virus related drug resistance

South Africa has the world's largest antiretroviral (ARV) program. Approximately 3 million South Africans had started ARV therapy (ART) by 2015, predominantly using standardised ARV combinations. Routine testing for HIV drug resistance (HIVDR) is performed following protease inhibitor-based regimen failure (Regimen 2) only, as a prerequisite for access to 3rd-line regimen selection. Surveillance of HIVDR is essential to inform programmatic decisions as to regimen efficacy, and/or the need for enhanced diagnostics. The NICD established an integrated TB-HIV surveillance study in 2014/15 by building on the GERMS-SA hospital-based enhanced surveillance platform. This study introduced surveillance for TB drug-resistance among persons initiating TB treatment and/or HIV drug resistance

(HIVDR) surveillance among persons initiating antiretroviral therapy (ART) in the same clinic. In each province, a single primary health clinic was selected based on high TB and HIV case loads. Voluntary enrolment of participants is on-going in 3 clinics, with a fourth clinic starting in Gauteng in the first quarter of 2016. Here, we report on HIVDR data collected thus far.

By the end February 2016, 334 specimens had been collected for HIVDR testing, 70 (21%) from Eastern Cape, 64 (19%) from Mpumalanga and 200 (60%) from North West Province. Seventy-one percent of enrolled participants were female, and median age of all participants is 32 years (IQR 26 - 40 years). The median most recent CD4 count at time of ART initiation was 257 cells/µl (IQR 160 – 389 cells/µl). Of 326 case report forms with available data, prior exposure to ART (as PMTCT and/or previous ART) was reported in 80 (25%) participants. Fourteen of these (17.5%) reported receiving PMTCT and 47 (58.8%) had previously received standardized combination ART (cART) for clinical management, whilst 19 (23.7%) participants reported receiving both PMTCT and cART.

HIVDR testing was successful in 311 (93.1%) specimens. Non-nucleoside reverse transcriptase inhibitor (NNRTI) class resistance was detected in 18.6% (58/311) of specimens, and dual nucleoside reverse transcriptase inhibitor (N(t)RTI)/NNRTI drug resistance in 2.6% (8/311). When analysed according to prior ART exposure, HIVDR was present in 37.5% (30/80) of participants with any prior ART vs 14.2% (35/246) of those with no reported prior ART (Figure 4).

Our data show that rates of NNRTI resistance are ~15% in patients initiating ART and are higher in patients reinitiating cART. However, this data should be interpreted with caution as the study is at early stages (~20% of estimated specimen collection has been achieved) and analysis is currently based on small sample size.

Source: Centre for HIV and Sexually Transmitted Infections, NICD-NHLS (adrianp@nicd.ac.za)

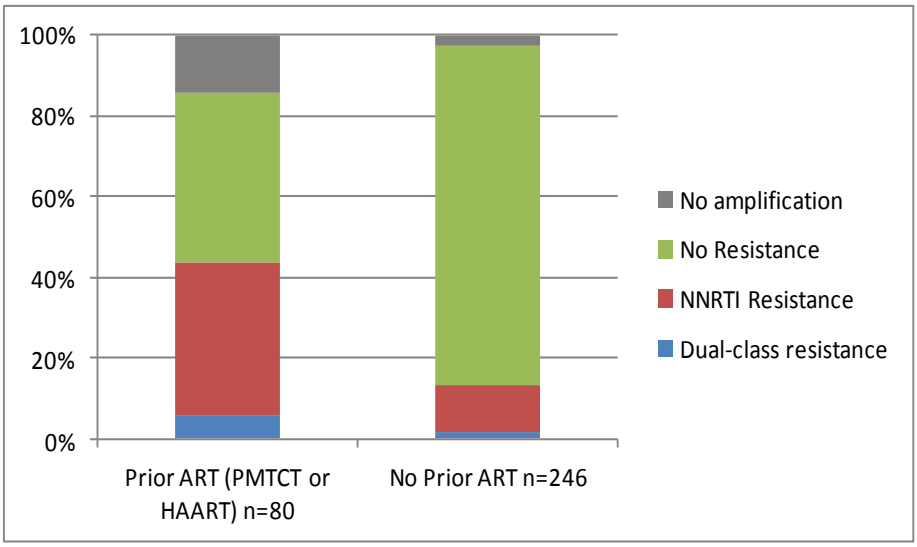

Figure 4.

HIV drug-resistance genotyping outcomes amongst 326 participants enrolled in NICD HIVDR surveillance, according to participants' prior exposure to anti-retroviral therapy

5 ENTERIC DISEASES

a *Salmonella* Typhi cases in South Africa, 2016

As of 14 March 2016, a total of 41 confirmed typhoid fever case-patients has been reported in five provinces across South Africa (Figure 5). Diagnosis was based on the isolation of *Salmonella* Typhi in blood culture (95%, n=39) and stool specimens (5%, n=2). The ages of these 41 case-patients range from 9 months to 52 years with a median of 13 years (IQR 8 –30 years). One case-patient's age is unknown. Six (6/41; 15%) case-patients are children <5 years of age while 13 are adults 20-45 years of age. Females account for 59% (n=24) of cases. Two deaths (5%) have been reported. Of 41 case-patients, 40 were admitted to hospital. The average length of stay was 7.1 days. Amongst the 41 case-patients, three epidemiological clusters were identified as reported in the Communiqué, February 2016. Currently, amongst the 32 case-patients in whom travel history is

known, 17 (17/32; 53%) have reported a history of travel outside their hometown/city within 1 month before the onset of illness. Travel was to Bangladesh (n=1), KwaZulu-Natal Province (n=1), India (n=2), Limpopo (n=2), Malawi (n=1), Eastern Cape Province (n=1) and Zimbabwe (n=9). Case investigation and screening of contacts is ongoing by the provincial and district departments of health. All isolates of *Salmonella* Typhi remain susceptible to ciprofloxacin, azithromycin and the 3rd generation cephalosporins. Clinicians are encouraged to remain vigilant for cases of typhoid, to exclude malaria and submit blood cultures for investigation in febrile patients who have no other apparent focus of infection.

Source: Division of Public Health, Surveillance and Response, NICD-NHLS (karenk@nicd.ac.za)

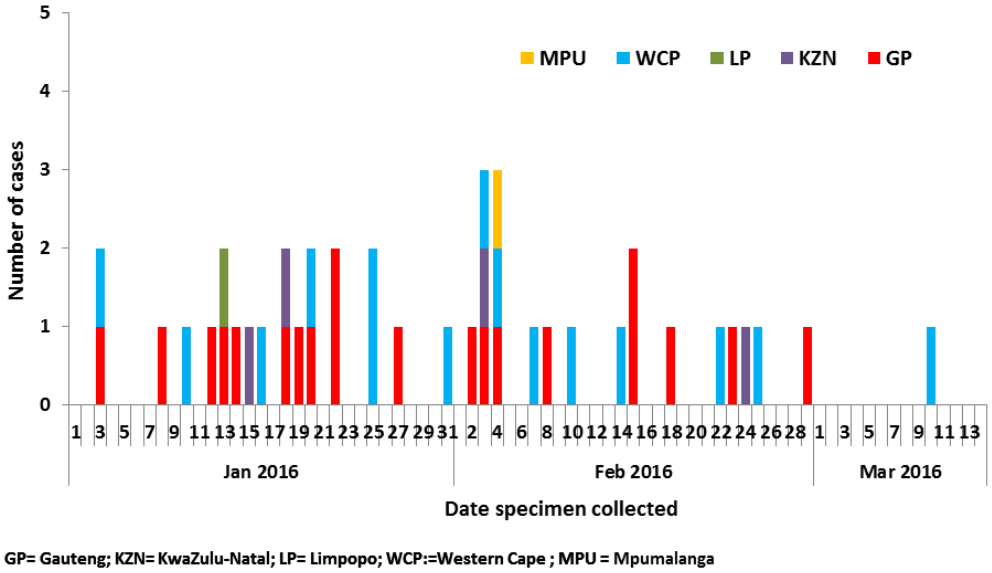

Figure 5. Number of Laboratory-confirmed typhoid fever cases identified in five South African Provinces, 1 January to 14 March 2016

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

a Ebola virus disease (EVD) outbreak: situation update

On 17 March 2016 the World Health Organization declared the Ebola outbreak in Sierra Leone over for the second time. Sierra Leone was first declared Ebola-free on 7 November 2015; however the Ebola virus disease re-emerged in the country in January 2016. As Guinea and Liberia were declared free of Ebola transmission on 29 December 2015 and 14 January 2016 respectively, the declaration that Sierra Leone is Ebola-free would have marked the end of the longest and worst Ebola outbreak ever reported in history. However at least two new confirmed cases of EVD were reported in Guinea in March 2016. This marked the first re-emergence of the Ebola virus disease in Guinea since the outbreak was declared over on 29 December 2015. Guinea would have been celebrating the end of its 90-day enhanced surveillance period on 27 March 2016. The cases emerged from the same family out of Koropara village in the N'Zerekore prefecture, about 1 000 kilometres southeast of the capital Conakry. As at 18 March 2016, a cumulative total of 28 605 cases (laboratory-confirmed, probable and suspected) including 11 303 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.

Situation in South Africa

As at 14 March 2016 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.

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)

Source: Division of Public Health Surveillance and Response, NICD-NHLS; (outbreak@nicd.ac.za)

Table 1. Number of Ebola virus disease cases and deaths in Guinea, Liberia and Sierra Leone (as at 17 March 2016)

Country	Total cases (laboratory-confirmed, probable and suspected)	Total deaths
Guinea (as at 29 December 2015)	3 804	2 536
Guinea (from 17 March 2016)	2	2
Liberia	10 675	4 809
Sierra Leone	14 124	3 956
Total	**28 605**	**11 303**

Source: World Health Organization: Ebola outbreak - Ebola situation report of 16 March 2016 2016 (www.who.int); http://www.who.int/csr/disease/ebola/new-ebola-cases-confirmed-guinea/en/ ; http://who.int/mediacentre/news/statements/2016/end-flare-ebola-sierra-leone/en/

b Yellow fever outbreak in Angola 2016: an update

As of 26 February 2016, totals of 1073 suspected cases and 166 deaths have been reported in Angola from a yellow fever outbreak ongoing since December of last year (Figure 6). Amongst all cases, 344 have been laboratory confirmed. The outbreak of yellow fever began in the Luanda suburb of Viana located about 20 km from the capital but has spread to other areas affecting the provinces of Bie, Benguela, Huambo, Cunene, Cabinda, Huila, Malanje, Cwanza Sul, Uige, Zaire and Cwanza Norte (Figure 7). The Luanda province remains the hardest hit with a suspected 461 people infected so far. Angola is one of 31 countries in Africa that fall within the yellow fever belt where there exists persistent or periodic yellow fever virus transmission. The first report of an epidemic in Angola was in Luanda in 1860 and other coastal cities in the northern portion of the country during 1860-1871. There after two outbreaks were officially notified in Angola in Luanda in 1971 (65 cases) and in 1986 prior to the current epidemic.

Yellow fever can be prevented through immunisation. A single dose of vaccine provides long-term, probably even lifelong, immunity in 99% of the individuals vaccinated. However epidemics appear to emerge and are in part driven by declining and low vaccination coverage. To prevent outbreaks, vaccination coverage amongst population at risk in an endemic region must reach minimum between 60 and 80%, according to the World Health Organization. Despite the yellow fever vaccine being introduced in routine enhanced programme of immunisation in Angola since 1991, and other countries across the region around that time, coverage is variable, often below 80%. Angola had an estimated 64% vaccination coverage

against yellow fever in 2011. Mass vaccination campaigns are usually implemented to boost population with low immunity and have proven to be extremely effective to immediately curb yellow fever outbreaks. An immunisation campaign has been launched in the Luanda area and as of 17 March, a total of 5 792 294 persons have been vaccinated, a coverage of 83% of the target population. Vaccination is recommended for all travellers ≥9 months of age to Angola. China and Kenya have each reported imported cases in travellers returning from Luanda.

In addition to vaccination, yellow fever outbreaks can be prevented and brought under control by anti-mosquito measures. *Aedes aegyti* mosquitoes are the main vectors. Entomological studies revealed that the city of Luanda was invaded by them since early 1970s though importation of large quantities of infested rubber tires. Favourable conditions made it possible for the species to establish itself in the suburban belt. As the sanitary services for the ever-growing and overpopulated periphery of the city are not sufficient, conditions for mosquito breeding have expanded, exacerbating the scale of the mosquito-borne public health problems.

Although no specific treatment exists for yellow fever, the majority of patients recover after 3 or 4 days from a febrile disease characterised by fever, muscle pains, nausea and vomiting, or headaches. However, 15% of patients relapse within 24 hours after initial recovery. The mortality rate amongst persons who enter this second, toxic phase of disease is over 50%. The onset of jaundice signifies the commencement of the toxic phase. Vomiting, abdominal pains and bleeding are also seen, and kidney failure. Infection is confirmed with a blood test to detect yellow fever virus-specific IgM and IgG antibodies by immunofluorescence assays. The patient must not have a history of yellow fever vaccination. Because of cross-reaction between antibodies against other flaviviruses, a four-fold increase in IgG antibodies in convalescent blood sample collected 3-4 weeks later can confirm recent infection. Positive IgM antibodies result by IFA is only suggestive of recent infection. PCR tests and virus isolation can detect virus and confirm infection in the early phase of illness. Testing of post-vaccinal antibodies is not done by the NICD because vaccinated patients may not necessarily develop a detectable antibody response and there are no standard antibody cut-offs that indicate immunity. The WHO yellow fever card should be obtained and is proof of vaccination when required by country of entry.

Source: Centre for Emerging and Zoonotic Diseases, and Division of Public Health, Surveillance and Response, NICD-NHLS; (cezd@nicd.ac.za)

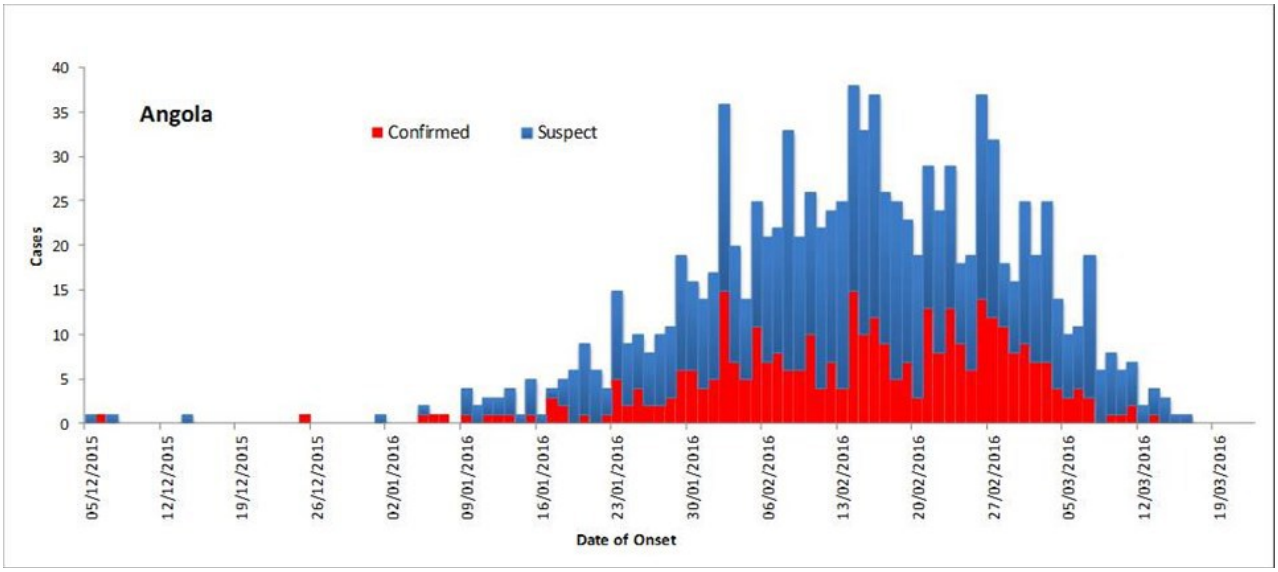

Figure 6. Epidemic curve showing suspected and confirmed cases of yellow fever in Angola from December 2015 until 17th March 2016 (source: WHO SITREP, March 18 2016)

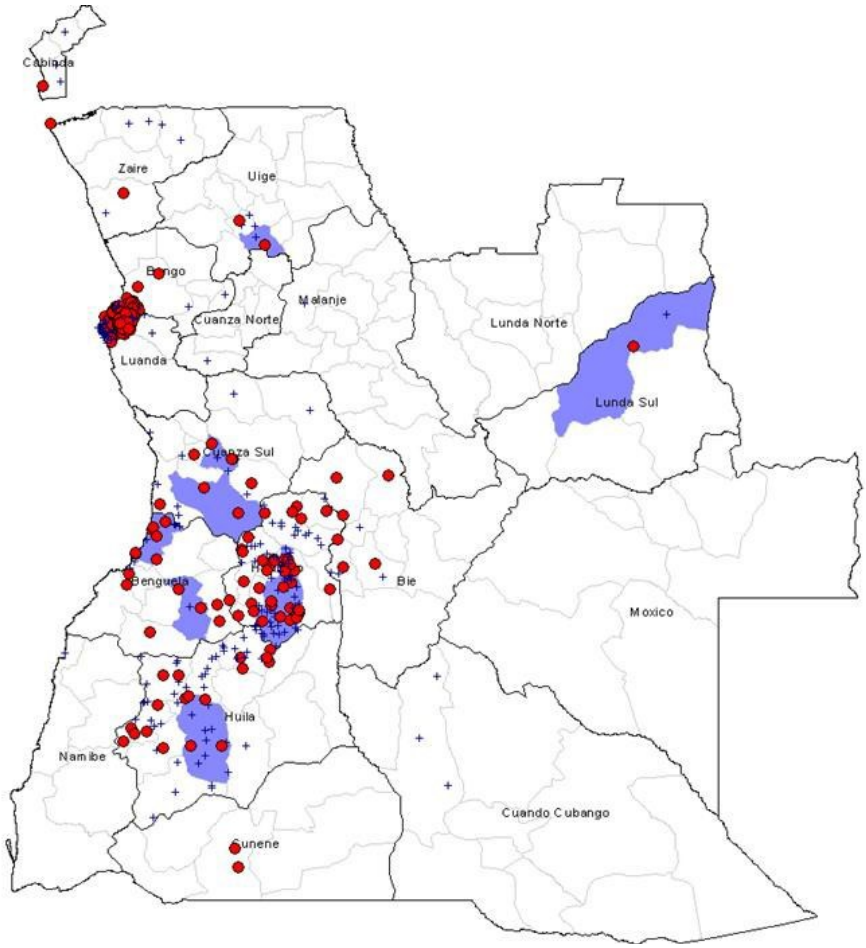

Figure 7.
A map of Angola showing the distribution of suspected (blue) and confirmed (red dots) cases of yellow fever, December 2015-March 2016 (Source: WHO SITREP, March 17, 2016)

7 SURVEILLANCE FOR ANTIMICROBIAL RESISTANCE

a Update on carbapenemase-producing Enterobacteriaceae

The 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 February 2016, a total of 92 Enterobacteriaceae isolates were received. Seventy-eight isolates were screened, 61 of which expressed carbapenemases (Table 2 and Table 3). The majority of these CPE isolates were *Klebsiella pneumoniae* (59) followed by *Enterobacter cloacae* (8).

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.

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

Table 2. Enterobacteriaceae by CPE enzyme type, AMRL-CC, COTHI, NICD, January and February 2016

Organism	NDM		OXA-48 & Variants	
	Jan 2016	Feb 2016	Jan 2016	Feb 2016
Citrobacter amalonaticus	-	-	-	1
Citrobacter freundii	1	1	-	1
Enterobacter aerogenes	-	-	1	1
Enterobacter cloacae	5	1	4	1
Escherichia coli	-	-	3	1
Klebsiella oxytoca	-	1	-	-
Klebsiella pneumoniae	19	20	34	32
Morganella morganii	-	-	-	-
Proteus mirabilis	-	-	-	1
Serratia marcescens	5	2	2	-
Grand total	34	25	44	36

NDM: New Delhi metallo-beta-lactamase; **OXA**: oxacillinase.

Table 3: Enterobacteriaceae isolates by specimen type and province, AMRL-CC, COTHI, NICD, January– and February 2016

Organism	EC	FS	GA	KZ	WC	Total Feb 2016	Total Jan 2016
Citrobacter amalonaticus	**1**	**-**	**-**	**-**	**1**	**2**	**-**
Non-sterile	1	-	-	-	1	2	
Sterile	-	-	-	-	-	-	-
Unknown	-	-	-	-	-	-	-
Not stated	-	-	-	-	-	-	-
Citrobacter freundii	**-**	**-**	**1**	**1**	**2**	**4**	**2**
Non-sterile	-	-	-	-	-	-	-
Sterile	-	-	-	1	1	2	2
Unknown	-	-	-	-	-	-	-
Not stated	-	-	-	-	-	-	-
Enterobacter aerogenes	**-**	**1**	**-**	**-**	**1**	**2**	**1**
Non-sterile	-	-	-	-	-	-	1
Sterile	-	1	-	-	1	2	-
Unknown	-	-	-	-	-	-	-
Not stated	-	-	-	-	-	-	-
Enterobacter cloacae	**1**	**4**	**1**	**2**	**8**	**16**	**18**
Non-sterile	-	-	-	-	-	-	4
Sterile	1	4	-	2	7	14	11
Unknown	-	-	1	-	1	2	3
Not stated	-	-	-	-	-	-	-

Organism	EC	FS	GA	KZ	WC	Total Feb 2016	Total Jan 2016
Escherichia coli	**1**	**-**	**-**	**1**	**2**	**4**	**3**
Non-sterile	1	-	-	1	2	4	3
Sterile	-	-	-	-	-	-	-
Unknown	-	-	-	-	-	-	-
Not stated	-	-	-	-	-	-	-
Klebsiella oxytoca	**-**	**1**	**-**	**-**	**1**	**2**	**1**
Non-sterile	-	-	-	-	-	-	-
Sterile	-	1	-	-	1	2	1
Unknown	-	-	-	-	-	-	-
Not stated	-	-	-	-	-	-	-
Klebsiella pneumoniae	**18**	**24**	**9**	**7**	**58**	**116**	**59**
Non-sterile	16	8	-	1	25	50	13
Sterile	1	12	2	6	22	44	39
Unknown	-	4	7	-	11	22	7
Not stated	-	-	-	-	-	-	-
Morganella morganii		**1**	**-**	**-**	**1**	**2**	**-**
Non-sterile	-	-	-	-	-	-	-
Sterile		1			1	2	
Unknown	-	-	-	-	-	-	-
Not stated	-	-	-	-	-	-	-
Proteus mirabilis	**-**	**1**	**-**	**-**	**1**	**2**	**-**
Non-sterile	-	-	-	-	-	-	-
Sterile	-	-	-	-	-	-	-
Unknown	-	**1**	**-**	**-**	**1**	**2**	**-**
Not stated	-	-	-	-	-	-	-
Providencia rettgeri	**-**	**1**			**1**	**2**	**4**
Non-sterile	-	-	-	-	-	-	-
Sterile		**1**			**1**	**2**	**4**
Unknown	-	-	-	-	-	-	-
Not stated	-	-	-	-	-	-	-
Serratia marcescens		**1**	**1**	**-**	**2**	**4**	**7**
Non-sterile	-	-	-	-	-	-	-
Sterile	-	1	-	-	1	2	2
Unknown	-	-	1	-	1	2	3
Not stated	-	-	-	-	-	-	2
Grand Total	**21**	**34**	**12**	**11**	**78**	**156**	**95**

9 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 8 on page 19.

1. Measles (United Kingdom)
The Public Health England agency has reported a rise in measles cases, having confirmed 20 cases across London, Cambridge, Essex and Hertfordshire since February 2016, mainly diagnosed in adolescents and young adults (ages 14 – 40). The agency urged members of the public to check with their GPs that their measles vaccines are up-to-date. Measles is a highly infectious disease commonly affecting children that is transmitted via droplets from the nose, mouth and throat of infected people. Initial symptoms include a high fever, runny nose, bloodshot eyes and tiny whitish spots in the mouth. This is followed by a rash on the face and neck which then spreads downwards. Most patients recover in 2 to 3 weeks. Many countries include measles vaccination as part of their nationwide public health programs. The recent increase in cases, particularly in first world countries, has been linked to a decrease in immunisation coverage.

2. Hepatitis E (India)
The Ministry of Health reported on 12 February 2016 that about 15 000 persons had been affected by the disease and that 6 persons have died so far this year. As at 7 March 2016 more than 500 cases of jaundice have been reported in the city of Shimla, in the province of Himachal Pradesh in the past few weeks. Half the families in the Shimla town were reported to have been affected by the outbreak. The outbreak has been traced to contaminated water being supplied to Shimla from the Ashwani Khad, which is a rivulet that is the town's main drinking water source. The contamination has been caused by sewage making its way into the rivulet as a result of the sewage treatment plant (STP) at Malyana being non-functional. Water supply from Ashwani Khad has been stopped. Kulgam district in South Kashmir, is another district affected by hepatitis E outbreaks. The outbreak is reportedly under control following public health actions taken by the ministry.

3. Yellow fever (Angola)
See article on page 13

4. Ebola virus disease (Guinea)
See article on page 12

5. Cholera (Kenya)
Kenya is currently tackling a cholera outbreak in the Mandera County, with 35 cases being reported in the week ending 12 March 2016. Public health officials have reassured the public and report being in a position of adequate readiness to combat the outbreak. With the 1st case of cholera being reported on 1 Mar 2016, involving a student who showed signs while at school, the disease has spread to 3 other villages in Mandera East Sub-County. The public health officials report that they are currently treating 20 patients while carrying out public health campaigns in Bula Mpya, Bula Hamari, Shafshafey, and Barwaqo regions.

6. Zika Virus (South and Central America)
See article on page 3

7. Middle East respiratory syndrome coronavirus (MERS-CoV) (Saudi Arabia)
As of noon 14 Mar 2016, there has been a total of 1 345 laboratory-confirmed cases of MERS-CoV infection including, 569 deaths (case fatality rate 42.3%), 751 recoveries, and 25 currently active cases (including 3 asymptomatic infections). Travellers are advised to continue exercising good hygiene practices in order to prevent upper and lower respiratory tract infections with the virus.

8. Influenza
In the Northern Hemisphere high levels of influenza activity continued with influenza A(H1N1)pdm09 predominating (Canada, USA, Western Asia, Northern Africa) as well as an increase in the proportion of influenza B viruses detected in these regions. In the Southern Hemisphere and in tropical countries influenza activity was generally low. In tropical countries of the Americas, Central America and the Caribbean, influenza and other respiratory virus activity were at low levels, with the exception of Jamaica, and Puerto Rico with somewhat high but decreasing influenza activity. In South East Asia, continued low influenza activity was reported during this period. In the temperate countries of the Southern Hemisphere influenza activity remained low at inter-seasonal level. Precautionary seasonal influenza vaccination administration prior to international travel, as well as adequate hand-washing practices are advised to travellers.

References
http://www.promedmail.org/
http://www.who.int/topics/measles/en/

Source: Division of Public Health, Surveillance and Response, NICD-NHLS (outbreak@nicd.ac.za)

Figure 8. 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

9 PHOTOQUIZ

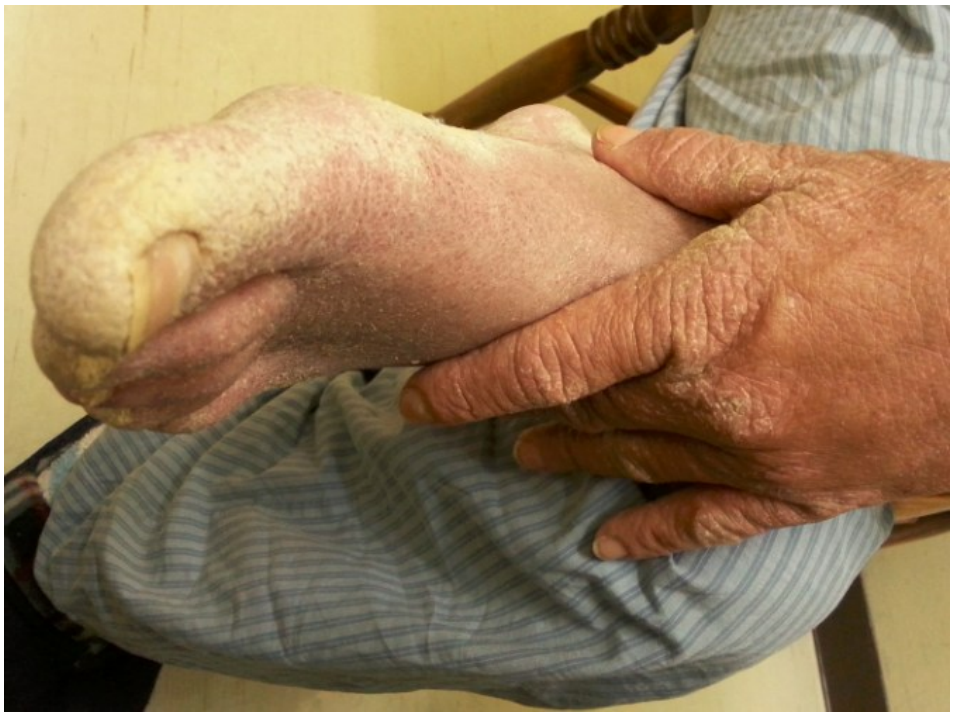

Figure 9. This 53-year-old HIV positive man stopped taking his anti-retroviral therapy, and 6 months later presented to his doctor with a CD4 count of 3 cells/mm^3. Over a 3 week period he had developed intensely itchy, encrusted lesions of his feet and hands, and other isolated areas of his body.

Name the condition, and the organism commonly associated with this condition. Send an email to kerriganm@nicd.ac.za with 'March photoquiz' and the answer in your subject line. Correct and incorrect responses will receive a free subscription to the NICD Communiqué.