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

Communicable Diseases Communiqué

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CONTENTS

1 SEASONAL DISEASES

a Influenza

Influenza data from Viral Watch Programme

The influenza season which started in week 19 (week ending 10 May) continues, though the number of specimens submitted by Viral Watch sites and the number of positive influenza results have declined (Figure 1). The peak of the season was in epidemiologic week 24 (week ending 24 June 2015). To date (14 August 2015), influenza has been detected in 455/935 (48.7%) of all specimens submitted by Viral Watch sites, Of these, influenza A(H1N1)pdm09 has been detected in 249, influenza A(H3N2) in 189, and influenza B virus in 28 patients, while a single strain of influenza A is still to be typed. 42 specimens have been received from patients at a point of entry into South Africa through the Viral Watch site stationed at OR Tambo International Airport, in which influenza was detected in 24 specimens.

Influenza data from the national syndromic surveillance for pneumonia

To date, 2,322 specimens from patients admitted with severe respiratory illness were tested from six national syndromic surveillance for pneumonia programme surveillance sites. Of these 140 (6%) were positive for influenza. Influenza A (H1N1) pdm09 was detected in 56% (78/140), influenza A (H3N2) in 34% (48/140) and influenza B in 10% (14/140).

The vaccine viruses recommended by World Health Organization (WHO) for the 2015-16 northern hemisphere influenza season are the same as those for the current southern hemisphere season. Practitioners can advise patients who are planning to travel for Hajj in September that the influenza vaccine currently available in South Africa is formulated to protect against viral strains currently circulating in the northern hemisphere. The full report of the recommendations for the southern hemisphere influenza vaccine can be accessed at: www.who.int/influenza/vaccines/virus/recommendations/201502_recommendation.pdf

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

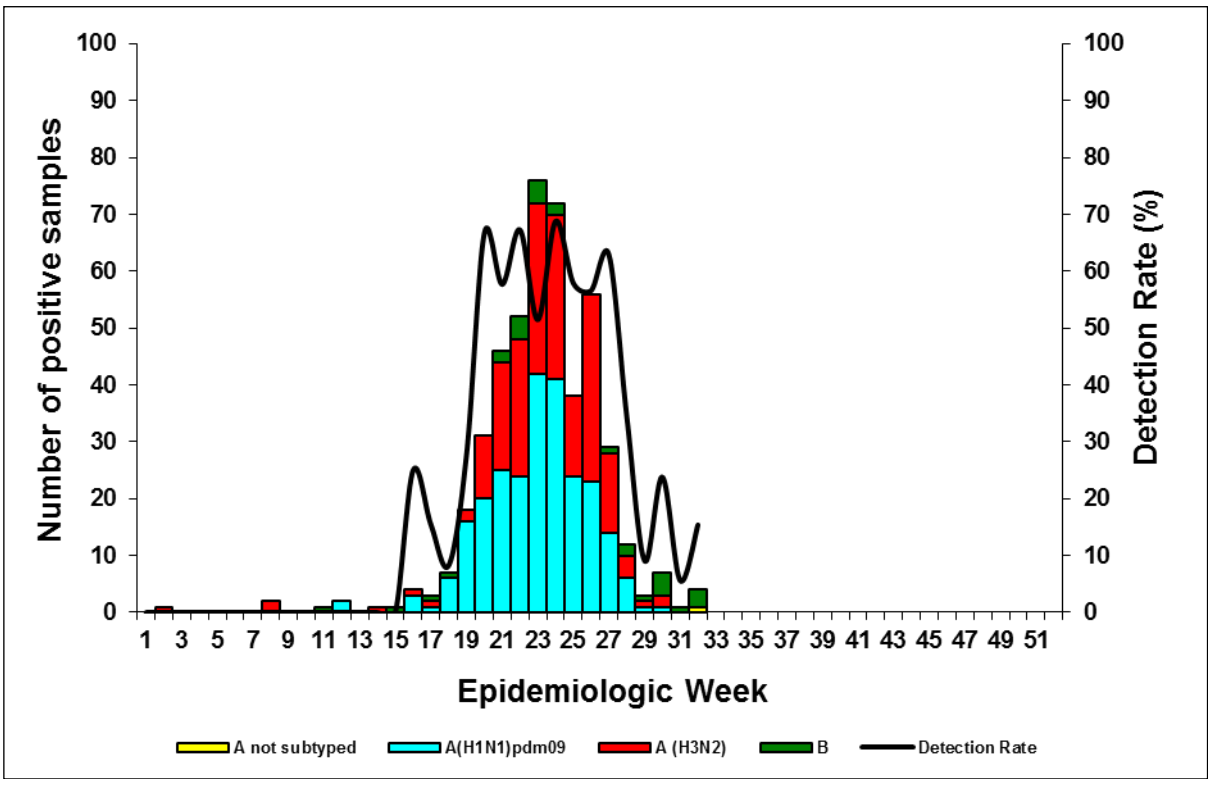

Figure 1. Number of positive samples by influenza types and subtypes and detection rate by week, Viral Watch programme, 2015

b Meningococcal disease

Invasive meningococcal disease in South Africa in 2015

A large scale meningococcal serogroup C outbreak has been reported from Niger earlier this year which is ongoing there and in other countries of the African meningitis belt. The link below includes an update on this outbreak.* Currently in South Africa the picture is very different from our northern 'neighbours'. The GERMS-SA surveillance program has only had sporadic cases reported from eight of our nine provinces, and in relatively low numbers, indicating that the incidence of meningococcal disease is still at a low point following the last outbreak (due to serogroup W disease), which peaked in 2006.

From January through July 2015, 75 cases of laboratory-confirmed *Neisseria meningitidis* have been reported through the GERMS-SA surveillance network, which covers NHLS and private microbiology laboratories around South Africa. Most cases were reported from Western Cape Province (22), followed by Gauteng (19), Eastern Cape (16), Kwazulu-Natal (7) and Free State provinces (7). No cases have been reported from the Northern Cape Province. Cases are reported throughout the year with a peak during the winter to spring months. Case numbers rose considerably from May (11 cases) to June (20 cases). The median age of the cases was 10 years (range 19 days to 65 years). As is typical, 39 percent of cases occurred amongst the ≤5 year age category (29 cases) with another peak in the 25-44 year age band (10%, 19 cases). Sixty percent of cases were male.

Serogroup data was available for 56% of the cases. Four of the six most common serogroups were detected. Serogroup W was again the most predominant (15, 36%), followed by serogroup B and Y (11 (26%) cases each) and then serogroup C (5 cases, 12%). Serogroup distribution differed somewhat by province (Figure 2). Ten percent (4/37) of the isolates tested were non-susceptible to penicillin (minimum inhibitory concentrations (MICs) >0.06µg/ml). The clinical relevance of increased MICs is unclear, and penicillin is, at present, still being recommended as the drug of choice for therapy for confirmed meningococcal disease.

GERMS-SA collects clinical data at selected enhanced surveillance sites (ESS) around South Africa: clinical data were available for 20% of the 75 cases. The majority of cases presented as meningitis (13/15), with only 2 cases having bacteraemia. One third of the case-patients were HIV infected. Mean hospital stay was 11 days. There were 2 deaths: both were in HIV-negative children <2 years of age, who presented with meningitis and died on the day of admission. This highlights the rapid progression of this devastating illness.

Winter and spring are traditionally the times of year when meningococcal cases increase. Over the next few months clinicians should be vigilant when confronted by a patient with symptoms suggestive of meningitis or bacteraemia, and not delay in providing appropriate antibiotic treatment.

*http://www.afro.who.int/en/clusters-a-programmes/dpc/epidemic-a-pandemic-alert-and-response/outbreak-news/4693-cerebrospinal-meningococcal-disease-outbreak-in-niger-update-8-july-2015.html

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

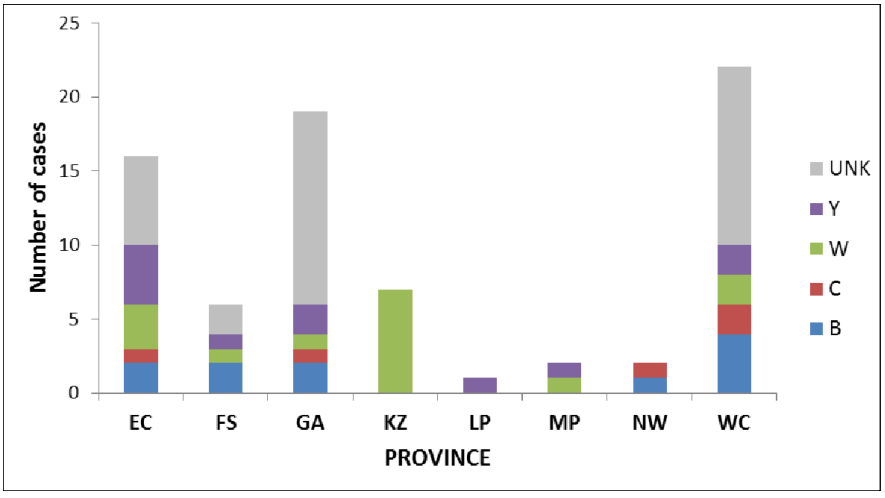

Figure 2 . Number of cases of laboratory-confirmed *Neisseria meningitidis* reported to GERMS-SA by province and serogroup, January-July 2015 (n=75)

2 VACCINE-PREVENTABLE DISEASES

a Diphtheria

Update on diphtheria outbreak, Kwa-Zulu Natal

The July Communiqué reported the latest suspected case of diphtheria involving a 12-year-old HIV-positive boy, well controlled on antiretroviral therapy from a town in Ugu District, KwaZulu-Natal Province (KZN). The case has value in proving the importance of laboratory processes in outbreak investigations. The boy presented to the casualty department of the local hospital on 24 July 2015. He had a sore throat and 'bull-neck' for two days, and subsequently developed shortness of breath and difficulty in swallowing – features in keeping with respiratory diphtheria. His vaccination status was unknown. On examination, he was in respiratory distress with an oxygen saturation of 80% in room air. His uvula was inflamed and a grey -white tonsillar exudate was noted. He was intubated but unfortunately had a cardio-respiratory arrest while at the X-ray department and demised. Two throat swabs and one nasal swab taken before death were submitted to the laboratory of the district hospital, but 24 hours later, no bacterial growth was observed.

According to the NICD guidelines, the case was classified as a 'possible case of diphtheria', as although there was no epidemiological link with a confirmed case, there had been cases in Ugu District, and it was not wise to discard the case in the context of an outbreak. Fortunately the family agreed to a post-mortem that revealed a clinical picture of extensive upper and lower respiratory tract disease secondary to infection with *Streptococcus pyogenes*, which grew profusely from all upper airway specimens. Extensive oedema, enlarged lymph nodes and pus was observed in and around tonsils, uvula and epiglottis, but no pseudomembrane was present. Bilateral pneumonic consolidation was present (more on the right lung) associated with a right-sided pyothorax. Pleural and pericardial samples were also sent which did not yield any organisms of clinical significance. In addition, extensive ulcerative and healed skin lesions resembling impetigo were observed and a swab from the leg also yielded growth of *S. pyogenes*. All the samples taken from the post-mortem were culture negative for *C. diphtheriae* on culture and PCR.

In the light of these findings, this case was removed from the diphtheria outbreak line list. This means that the outbreak is currently under control. No further cases of diphtheria have been identified since 12th June 2015.

Diphtheria: molecular epidemiology of *Corynebacterium diphtheriae* outbreak isolates

The Centre for Respiratory Diseases and Meningitis (CRDM) at the NICD received 21 *C. diphtheriae* isolates collected from suspected cases and contacts during the KZN diphtheria outbreak (March – June 2015). *C. diphtheriae* identification of positive cultures was confirmed by matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF) technology. Toxin production and the presence/absence of the A and B subunits of the *C. diphtheriae* toxin (*tox*) gene were confirmed by the Elek test and real-time PCR, respectively.[1,2] Whole genome sequencing was conducted on all 21 isolates together with three toxin-positive *C. diphtheriae* controls (including PW8, the vaccine-type strain isolated in the 1890s), a toxin-negative *C. diphtheriae* control, two historical *C. diphtheriae* clinical isolates from South Africa circa 1980s (one toxin producing and the other non-toxigenic), and *C. ulcerans*, *C. bovis* and *C. stratium* control organisms as outliers. Multilocus sequence typing (MLST), a sequence-based typing method that combines alleles of seven housekeeping genes to form a sequence type (ST), was used to characterise the isolates.[3] STs were extracted from whole genome data and compared to all available STs (n=409) listed in the global MLST database (http://pubmlst.org/cdiphtheriae/). Genomes of KZN outbreak-associated isolates were compared with control and historical isolate genomes to determine genetic relatedness.

Based on the clinical definition of respiratory diphtheria and results of laboratory testing, eleven isolates from case-patients were toxin producing. An additional six toxin-producing isolates were from asymptomatic carriers epidemiologically linked to cases. Toxin production was confirmed in all isolates that were genotypically positive for the *tox* gene. Our laboratory received two isolates from one case-patient: a toxin-producing isolate and a non-toxigenic isolate. Three additional non-toxigenic *C. diphtheriae* isolates were submitted. These had been isolated from two cases with suspected respiratory diphtheria and one case with suspected cutaneous diphtheria.

Two novel sequence types were identified among the outbreak isolates, none of which were related to

any other sequence types listed in the global database. All 17 toxin-producing isolates from the KZN outbreak (cases and contacts) had the same sequence type (ST-378) and clustered together on the whole genome phylogenetic tree. A second cluster comprised the four non-toxigenic KZN isolates (including the cutaneous *C. diphtheriae*) and one of the historical non-toxigenic clinical isolates from 1980 – all five isolates were of the same sequence type (ST-395). The toxin-producing historical isolate clustered separately and had a different sequence type that was also novel (ST-402). The ATCC and NCTC *C. diphtheriae* control isolates had different sequence types and clustered individually.

Two unusual features were noted during the laboratory investigations. Firstly, two unrelated isolates with different genotypes (one toxin-producing and the other non-toxigenic) were collected from the same patient at the same time. To the best of our knowledge laboratory error was excluded but this cannot be ruled out entirely. Secondly, a case infected with a non-toxigenic strain was epidemiologically linked to three asymptomatic individuals who were carriers of a toxin-producing strain with a different genotype to that isolated from the case. The PCR results correlated with the Elek results initially performed at the NHLS Greenpoint Laboratory in Cape Town, Western Cape Province for each of these isolates. Both these observations remain unexplained at this time.

Molecular typing is essential in outbreak investigation to understand patterns of transmission as well as to monitor the evolution and spread of epidemic clones. These molecular findings illustrate that the outbreak in KZN is caused by two strains. It is not possible yet to determine the origin of these outbreak strains as prior to the KZN outbreak, there are no data describing circulating genotypes in South Africa. The NICD therefore requests all laboratories nationally to submit stored or prospectively-identified *Corynebacterium* isolates to CRDM for molecular characterisation. Laboratory guidelines for *C. diphtheriae* isolation are available on the NICD website.

References

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2. Efstratiou A, Maple PA. WHO manual for the laboratory diagnosis of diptheria. Document ICP-EPI 038(C). World Health Organization, Geneva, Switzerland ed. 1994.

3. Maiden MC, Bygraves JA, Feil E, Morelli G, Russell JE, Urwin R, et al. Multilocus sequence typing: a portable approach to the identification of clones within populations of pathogenic microorganisms. Proc Natl Acad Sci U S A 1998 Mar 17;95(6):3140-5.

Source: Centre for Respiratory Diseases and Meningitis, NICD-NHLS; Kwa-Zulu-Natal Department of Health; University of Kwa-Zulu-Natal, Division of Public Health Surveillance and Response, NICD-NHLS.

3 ZOONOTIC AND VECTOR-BORNE DISEASES

a Rabies

Canine rabies diagnosed in Gauteng

A case of rabies was diagnosed in a dog from the suburb of Kloofendal, in Roodepoort, Gauteng Province, in August 2015. The dog was taken to the local vet with unsteady gait and hypersalivation. The diagnosis of rabies was confirmed following euthanasia and examination of brain tissue. The dog had received a single vaccination against rabies. The dog had been taken to Kroonstad, Free State Province with its family some weeks prior to presenting ill. This is the second case identified on the West Rand of Gauteng. A first case was identified in a bulldog kept in a townhouse complex in April 2015 in the adjacent suburb of Helderkruin. Molecular typing of the rabies strain isolated from both cases is pending, and will confirm if these cases are canid rabies, and allow identification of strain type.

It is crucial that pet owners ensure that their pets are vaccinated for rabies as required by law. Dogs and cats are vaccinated at three months of age, receive a booster vaccination before one year of age and every subsequent three years thereafter. Often Gauteng dog owners are complacent about rabies vaccination, as rabies is uncommon in the province. However, low vaccination coverage amongst dogs creates a susceptible population which allows for perpetuation of rabies transmission when the virus is introduced from other communities. This was demonstrated during the 2010 outbreak of rabies in Soweto, which was the first recorded outbreak of dog-associated rabies with local transmission in Gauteng Province. In this

case, the virus was traced back to an introduction from KwaZulu-Natal.

In the light of this case, all animal exposures in Gauteng Province, and especially in the West Rand, should be considered at risk of rabies virus transmission. The location of the exposure, behaviour and vaccination record of the animal involved are important to consider. Vaccination records should be scrutinized. Rabies post-exposure prophylaxis comprises thorough wound cleaning and four doses of rabies vaccine given on days 0, 3, 7 and 14 (add fifth dose on day 28 for immunocompromised patients). For category III exposures, e.g. where wounds drew even a drop of blood, rabies immunoglobulin should also be provided.

A total of five cases of human rabies has been confirmed for South Africa in 2015 to date. These cases were reported from Limpopo (n=2), KwaZulu-Natal (n=1), Eastern Cape (n=1) and Free State (n=1) provinces. In addition, a suspected case of rabies from Eastern Cape Province was reported but could not be confirmed by laboratory testing.

For more information and access to the national rabies guidelines, visit www.nicd.ac.za.

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

b Brucellosis

Case of Brucellosis: Laboratory diagnosis and safety

An isolate from the blood culture of a 21-year-old female patient who presented with fatigue, fever, headache and confusion was submitted to NICD from the NHLS Helen Joseph Microbiology Laboratory on 23 July 2015 for MALDI-TOF* identification. Unfortunately, the agar plates (chocolate and blood) had become contaminated with other organisms (possibly during transportation) and the following day, colonies from the mixed culture plate were carefully selected on the open bench, and prepared for testing on MALDI -TOF. Although the isolate yielded a spectrum of mass peaks on the MALDI-TOF, there was no reliable identification. This usually indicates that the genus and/or species are not represented in the database of the instrument.

The lack of a conclusive MALDI-TOF identification prompted the need for further investigation. Staff of the NICD commenced with bench-top tests. The Gram stain showed a tiny Gram-negative cocco-bacillus. The isolate was oxidase and catalase positive, urease positive (within a few hours), non-oxidative, rapid indole negative and failed to grow on MacConkey agar. The laboratory report on the patient indicated that the incubation time of the blood culture was 87 hours. As these results were compatible with *Brucella* species, all laboratory workers were informed, and appropriate laboratory safety measures implemented. Up to this point, testing and plating out had been performed on an open bench using only basic personal protective equipment i.e. lab coat and gloves. The isolate was submitted for 16sRNA sequencing, which identified it as a *Brucella* species. Subsequently, Onderstepoort Veterinary Institute confirmed the organisms to be *Brucella melitensis* biotype 3

Brucella spp. primarily infect animals, most commonly sheep, cattle, goats, pigs and dogs. Infection is transmitted to humans who come into contact with infected animals or animal products. Initial symptoms are generalized muscle and joints pain, headache and fever. A full description of clinical presentation of brucellosis may be found in the January 2011 Communiqué on the NICD website (www.nicd.ac.za). *Brucella* species pose a significant risk to laboratory workers (see reference below). The organism is easily aerosolised through bench-top manipulation of cultures especially through the catalase test (detection of oxygen production through the addition of a dilute solution of hydrogen peroxide to colonies on agar) and through flaming of a nichrome wire loop. For this reason, it is conventional to conduct laboratory manipulation of *Brucella* species in a biosafety level 3 environment. This implies the use of personal protective equipment, a class II biological safety cabinet (BSC), and a facility with positive air-pressure ventilation. In addition, access to the laboratory should be restricted. Procedures that generate splashes or aerosols minimized should be performed in a BSC. The sniffing of opened cultures plates to assist in the identification of the isolate should not be done.

Upon suspicion of *Brucella* spp., all the laboratory staff that had been working on the isolate was questioned to ascertain risk. Four staff members

had worked directly with the isolate or had come within 2.5m of the organism on an open bench and were thus identified as being at high risk of acquisition of *Brucella* infection. Fortunately only disposable inoculating loops had been used to pick off and plate out the isolate, minimising the risk of aerosolisation from flaming a nichrome wire loop. These staff members were prescribed doxycycline 100 mg orally, twice daily for 3 weeks, and are presently conducting daily symptom checks for fever, under the supervision of the NICD Occupational Health nurse. Blood has also been taken for *Brucella* serology at baseline, and will be repeated at 6, 12, 18 and 24 weeks after exposure.

*Matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF)

Reference: Yagupsky, P., Baron, EJ. Laboratory exposures to *Brucellae* and implications for bioterrorism. EID 2005; (11)8: 1180-1185.

Source: Centre for Opportunistic, Tropical and Hospital Infections, NICD-NHLS; Helen Joseph Hospital laboratory and Infectious Diseases Department.

4 ENTERIC DISEASES

a Suspected diarrhoeal outbreak in Upington—ZF Mgcawu District, Northern Cape Province March—July 2015

On the 11 June 2015, the Centre for Enteric Diseases (CED) at the National Institute for Communicable Diseases (NICD) received five stool specimens from Upington. A paediatrician at the district hospital noted an increase in diarrhoeal cases, and submitted these specimens directly to the NICD for further investigation. Reverse transcription polymerase chain reaction (RT-PCR), real-time RT-PCR, genotyping and sequencing methods were performed according to standardised protocols at NICD, CED. Three of the five specimens submitted tested positive for rotavirus antigens. The expanded testing results followed and other enteric pathogens including sapovirus (n=2) and norovirus (n=1) were also detected.

In response to these results, and by invitation of the Northern Cape Communicable Diseases co-ordinator, an outbreak investigation team was dispatched to establish the reason for the increase in case numbers. The team conducted a record review of cases seen in the district hospital casualty, and obtained the following data:

A total of 638 cases was identified from March to early July 2015. More females (326/638, 51%) were affected than males (278/638, 44%) with no gender indicated in the entries of 34/638 (5%). The majority of cases (318/638, 50%) were children under five years of age; of those 146/638 (23%) were <1 year of age. Amongst older adult cases, the majority were from age group of 45 years and above (103/638, 16%). A peak was identified around the 25 April 2015 and mid–June 2015 (Figure 3). In comparison to 2014, 251 cases were reported during mid – April 2014 to end June 2014 (epidemiologic week 14 – 26) and one death was reported. In contrast, at least 584 cases were reported for the same period in 2015 (epidemiologic week 14 – 26) with no deaths. Clinical symptoms that were identified along with diarrhoea were bloody diarrhoea (7/638, 1.7%), abdominal pain (61/638, 9%), fever (47/638, 7%) and vomiting (326/638 , 51%). According to the case records, 20 of 638 cases suffered from dehydration and severity of dehydration was mild in 13 (65%) and severe in 3 (15%). Underlying conditions were present in 23/638 (4%) and of these, HIV was present in 7 (30%). Treatment given to cases was intravenous therapy (185/638 – 29%), oral rehydration solution (25/638 – 4%) and antibiotics (71/638 – 11%).

While the outbreak team was on site, the mothers of nine infants who were admitted were interviewed to help identify any possible risk factors, and an additional four stool specimens were collected for processing at CED. Of the nine infants, 8 had received at least one dose of rotavirus vaccine, and 5/7 (71%) of age-eligible children had received two doses of rotavirus vaccine. The rotavirus ELISA screening revealed 6/9 (67%) of cases were rotavirus positive. Genotyping of the rotavirus strains revealed that all were G9P[8]. Sapovirus (n=1), norovirus (n=1) and adenovirus (n=1) were also detected in the rotavirus-positive cases. In one case negative for rotavirus, sapovirus was isolated. The increase in diarrhoeal cases coincided with the rotavirus season (April – June).

While the outbreak investigations were limited due to time constraints, it was felt that the increase in cases was most likely due to the seasonal increase in rotavirus that is typically seen during the winter months. Recommendations to the Department of Health of the Northern Cape included to continue to promote ongoing vaccination of infants against rotavirus according to the Expanded Programme of Immunisation, and to strengthen routine data collection and monitoring.

Source: Centre for Enteric Diseases, Field Epidemiology Training Programme, Division of Public Health Surveillance and Response, NICD-NHLS; Northern Cape Communicable Diseases Control

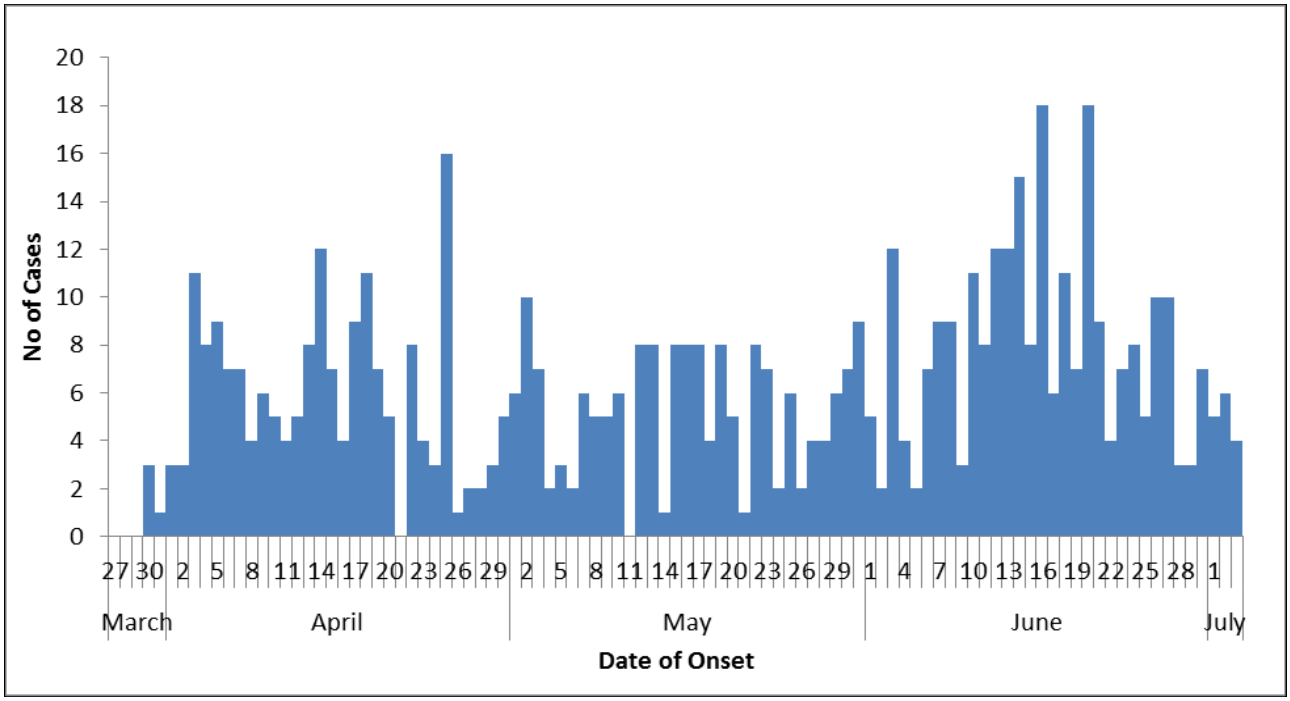


Figure 3 . Epidemic curve showing 638 diarrheal cases from 30 March to 3 July 2015, abstracted from the records of a district hospital in Upington, Northern Cape Province. (Date of consultation was used as a proxy for date of symptom onset.)

b Staphylococcal food-borne illness outbreak, Tshwane District—Gauteng

On 31 May 2015, Tshwane District Health-Outbreak Response Unit was notified of an increased number of people presenting with abdominal cramps, vomiting, nausea and diarrhea after consuming lunch that was served at a local hotel on 30 May 2015. Patients presented in three local hospitals and all of them reportedly ate lunch after participating in a film shoot in Pretoria.

The lunch was prepared and provided by an external caterer. Three food handlers were involved in cooking and prepacking the lunch during the early hours of the morning (05h00 – 06h00) on 30 May 2015. The lunch was served to 183 people at d intervals between 12h00 and 13h00 on the same day. The food items that were served were chicken, cabbage, yellow rice and brown onion sauce. Of 183 people who ate lunch 63 reportedly developed symptoms. Of the 63 cases, 51 received medical attention in the emergency departments of various hospitals. Most patients were dehydrated and were treated with intravenous fluids and discharged within three hours. There were no admissions or deaths reported.

Food samples (chicken, cabbage, yellow rice and brown onion saurce) were collected from the left overs and were sent to National Health Laboratory Services and Infection Control Laboratory at Charlotte Maxeke on 1 June 2015 for further investigation. Staphylococcus enterotoxin A was isolated from the chicken and no other pathogens were isolated from other foods. There were no clinical specimens collected from any of the patients who presented in three local hospitals.

The environmental health practitioners visited the catering company to conduct further investigations;

informal interviews with food handlers were also conducted. Environmental assessment was conducted in the kitchen, food storage and preparation area on the premises. None of the food handlers reported any illness. The environment was generally clean and the kitchen area was also clean with all utensils appropriately stored. No potential hazards for cross-contamination of food items were identified. Health education regarding safe food handling and preparation practices was given to the staff of the external catering company.

As illustrated in the epidemic curve (Figure 4.), the first case presented with symptoms at 13h00 following the food consumption at 12h00 on 30 May 2015. The number of cases peaked at 15h00 and 16h15 with thirteen and eight cases respectively. Onset of illness occurred at a mean of 2.7 hours after food consumption (range: 1 – 5 hours); and symptoms lasted a median of 24 hours (range: 2 – 48 hours). The epidemic curve clearly indicates a common or point source nature of the outbreak. Usually, the symptoms of staphylococcal food poisoning develop rapidly within 1 to 6 hours with a mean incubation period of 2.5 hours. The most common symptoms include nausea, violent vomiting, and abdominal cramps, with or without diarrhea. In many ways, this event represents a classic outbreak of staphylococcal food poisoning from food that was served during lunch in the hotel.

A suspected food-borne illness outbreak is defined as the occurrence of ≥2 epidemiologically-linked cases presenting with acute vomiting, diarrhoea, or abdominal pain. Case-patients are said to be epidemiologically linked if they have consumed common food. Health care workers are reminded to always collect clinical samples whenever a food-borne illness outbreak is suspected in order to assist the investigation process.

Food-borne illness outbreak falls in category A of the list of notifiable medical conditions in South Africa. These events should therefore be reported to the relevant health authority telephonically within 24 hours for an appropriate public health response to occur.

Source: Field Epidemiology Training Programme; Division of Public Health Surveillance and Response; Infection Control Laboratory, NHLS at Charlotte Maxeke Johannesburg Academic Hospital; Tshwane Communicable Diseases Control.

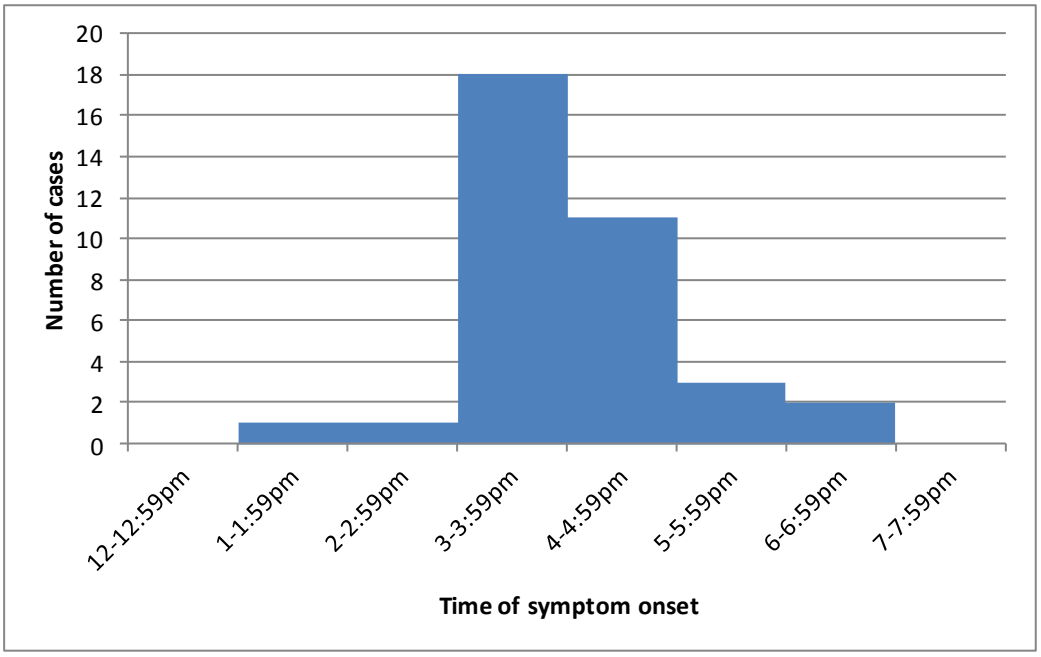


Figure 4. Epidemic curve by time of onset of symptoms Hotel X, Tshwane district, Gauteng Province, 30 May 2015.

c Plant intoxication following ingestion of seeds of *Jatropha curcas*

In early April 2015, nine children were admitted in Uthungulu District, KwaZulu-Natal Province, for ingesting nuts or fruit of an unknown plant. The sick children presented with cramping abdominal pains, vomiting, and diarrhoea with blood. The Environmental Health Services conducted home and site visits. The community related the children had eaten the 'nuts' of a 'diesel tree'. In 1996, three children ate the fruit or nuts of this tree and were admitted, but one child died, and that the tree had been chopped down and thrown away. However, when they went to see where the tree was discarded they found that it had grown again, with several small trees having sprouted from the discarded branches. Photographs of the tree were taken, and it was identified by a professor of Botany at the University of the Witwatersrand, Johannesburg and the Red Cross Children's Hospital Poisons Information Centre as *Jatropha curcas*.

Jatropha curcas is an exotic tree which can grow to 4.5 metres tall. It has thin, often greenish bark that exudes copious amounts of watery sap when cut. The tree is well known internationally as it is a candidate plant for biomass fuel production because it thrives in dry areas, requires minimal attention and the seeds contain 15-40% oil which can be used to power a diesel engine. In Uthungulu District, the plant is often used for hedging between homesteads in semi-urban areas. Unfortunately, the seeds of this plant (Figure 5.) contain a toxin called 'curcin' , a toxic protein or lectin (toxalbumin). When ingested, it causes gastro-intestinal symptoms within 30 minutes. Initially persons experience a burning sensation in the throat, followed by nausea, vomiting and diarrhoea. Vomitus and faeces may contain blood. In severe cases, haemorrhagic gastroenteritis and dehydration, along with central nervous system depression may occur. Treatment is supportive, in response to symptoms.

The Poisons Information Helpline 24 hour emergency telephone service can be reached at +27 861 555 777 in event of intoxications of all kinds.

Source: KwaZulu-Natal Communicable Diseases Control; Division of Public Health Surveillance and Response, NICD-NHLS; Red Cross Children's Hospital Poisons Information Centre, University of

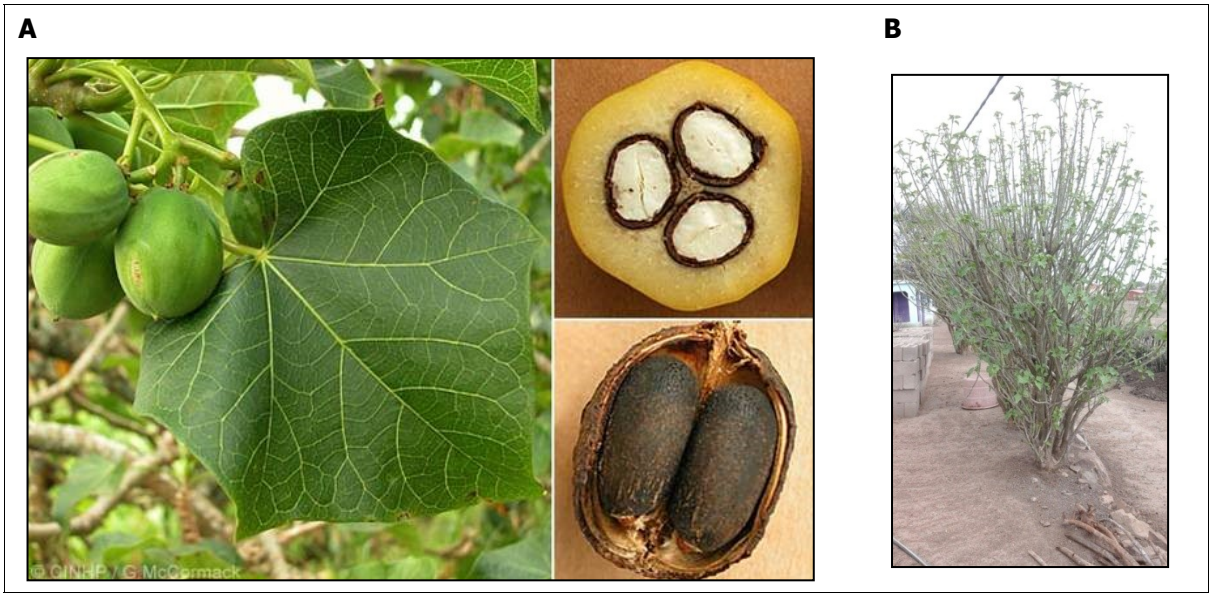


Figure 5A. The seeds and leaves of *Jatropha curcas;* Figure 5B. *Jatropha curcas* used as a hedging plant in Uthungulu District, KZN

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

a Middle East Respiratory Syndrome Coronavirus (MERS-CoV) update

Background

The Middle East respiratory syndrome (MERS) is an emerging infectious disease caused by a MERS coronavirus (MERS-CoV). It was first reported in Saudi Arabia in 2012. Since September 2012 and as of 12 August 2015, WHO has been notified of a total of 1,401 laboratory-confirmed cases of human infection with MERS-CoV, including 500 related deaths. To date 26 countries have reported cases: ten in the Middle East, eight in Europe, five in Asia, two in Africa and one in the United States of America. So far, all the cases reported from outside the Middle East have either had a recent travel history to the Middle East or could be linked to a chain of transmission originating from a case with a travel history to the Middle East.

MERS-COV outbreak in South Korea

The largest MERS outbreak outside of the Middle East has been reported in South Korea. The outbreak, which began in May 2015 through the importation of a single case in a person who had travelled in the Middle East, remained confined to health-care facilities. This outbreak was propagated mainly through nosocomial transmission and transmission to family caregivers. There has been no evidence of airborne transmission and sustained human-to-human transmission in communities. Since May 2015 and as of 12 August 2015, WHO has been notified of 186 (including one confirmed in China) MERS-CoV cases, including 36 related deaths in South Korea. The last case of MERS-CoV infection in South Korea as reported to WHO was laboratory confirmed on 4 July 2015. For the latest update on cases click on the WHO link below:
http://www.wpro.who.int/outbreaks_emergencies/wpro_coronavirus/en/

Situation in South Africa

In South Africa, 51 samples have been tested for MERS-CoV in 2015, and none of these have tested positive. The majority of specimens 75% (38/51) were received from the viral watch sentinel influenza surveillance site at OR Tambo International Airport, where all suspected influenza patients are also tested for MERS-CoV. Among these individuals, 23 (61%) tested influenza positive.

An additional 13 patients were suspected by the attending clinician to have MERS-CoV. Amongst these 13 individuals, 10 had travelled to the Middle East, two had close contacts who had travelled to the Middle East and one had no travel history but a screening test positive for coronavirus and was tested to exclude MERS CoV infection. Among these individuals, 4 (31%) tested influenza positive.

Transmission

Camels are likely to be a major reservoir host for MERS-CoV. However, the exact role of camels in transmission of the virus and the exact route(s) of transmission are unknown. The majority of human cases reported to date have resulted from human-to-human transmission in health care settings. However, to date, there is no evidence of sustained human-to-human transmission.

Travel

WHO does not advise screening at points of entry or travel or trade restrictions with regards to MERS. This year, Hajj will take place from approximately 20–25 September. Because people with pre-existing medical conditions (e.g. chronic diseases such as diabetes, chronic lung disease, renal failure immunodeficiency) and the elderly are more likely to develop severe disease from MERS-CoV infection, the Kingdom of Saudi Arabia and the WHO advises pilgrims to consult a health care provider before travelling, and to consider postponing their pilgrimage:http://www.gov.sa/en/Hajj/News/Pages/News-2015-07-06-001.aspx. The NICD has issued a Haj travel advisory, available at http://www.nicd.ac.za/?page=alerts&id=5&rid=575

Precautions and infection prevention and control considerations

At present, no vaccine is available. However, individuals are encouraged to be vaccinated against seasonal influenza and to practice good hand hygiene and cough etiquette in order to reduce the risk of infection with respiratory viruses. Nosocomial transmission has been a hallmark of MERS-CoV. Health care providers are advised that appropriate infection control measures should be used while managing all patients with symptoms of acute respiratory infection, and whenever specimens are collected from cases under investigation, the appropriate infection control guidelines should be followed. Droplet precautions should be added to the standard precautions when providing care to patients with symptoms of acute respiratory infection; contact precautions and eye protection should be added when caring for probable or confirmed cases of MERS-CoV infection; airborne

precautions should be applied when performing aerosol generating procedures

Additional resources and updates:
World Health Organization website: http://www.who.int/csr/disease/coronavirus_infections/en/index.html
http://www.who.int/csr/bioriskreduction/infection_control/publication/en/
CDC website: http://www.cdc.gov/coronavirus/index.html
NICD website: http://www.nicd.ac.za

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

b Ebola virus disease (EVD) outbreak

Ebola virus disease (EVD) outbreak: situation update as at 9th August 2015

The outbreak continues in the affected countries. However, case incidence continues to decline in Guinea and Sierra Leone. Nonetheless, still of concern is the detection of new cases from unknown chains of transmission. In Guinea (in the past 21 days), transmission has been occurring in Conakry and two other prefectures (Forecariah and Coyah), while in Sierra Leone, mostly in Tonkolili and Free Town (Western Area Urban). In Liberia, since the re-emergence of EVD cases on 29 June 2015 in Margibi County, no new laboratory-confirmed cases have been reported since 12 July 2015. The last EVD patients tested negative twice on 23 July 2015 and all contacts have completed their 21-day follow-up period.

As at 9 August 2015, a cumulative total of 27,929 cases (laboratory-confirmed, probable and suspected) including 11,283 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. Although the outbreak has been widespread with intense transmission, not all prefectures in these countries were affected. Sustained transmission of infection occurred at community level for a prolonged time in numerous regions and towns. The number of cases differed within regions with certain districts accounting for the highest proportion of total cases reported. In Guinea and Liberia, people aged 15-44 years are about four times more likely to be affected than children aged <15 years and three times more likely to be affected in Sierra Leone. Cumulative incidence increases with increasing age to high levels in persons aged ≥45 years. Rates of disease incidence are similar among males and females. Case fatality rates (CFR) vary from country to country with the highest overall CFR recorded in Guinea.

Situation in South Africa

As at 13 August 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 necessary given on-going EVD transmission 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.

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

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)

Table 1. Number of Ebola virus disease cases and deaths in Guinea, Liberia and Sierra Leone (as at 9 August 2015)

Country	Total cases (laboratory-confirmed, probable and suspected)	Total deaths	Case fatality rate	Number of cases among healthcare workers (Number of deaths)
Guinea	3 787	2 524	67%	195 (99)
Sierra Leone	13 470	3 951	29%	307 (221*)
Liberia (as at 9 May)	10 666	4 806	45%	378 (192)
Liberia (from 29 June)	6	2	33%	
Totals	**27 929**	**11 283**	**40%**	**880 (512)**

Source: World Health Organization Global Alert and Response: Ebola situation report of 12 August 2015 (www.who.int); *Data as at 17 February

6 ANTIMICROBIAL RESISTANCE

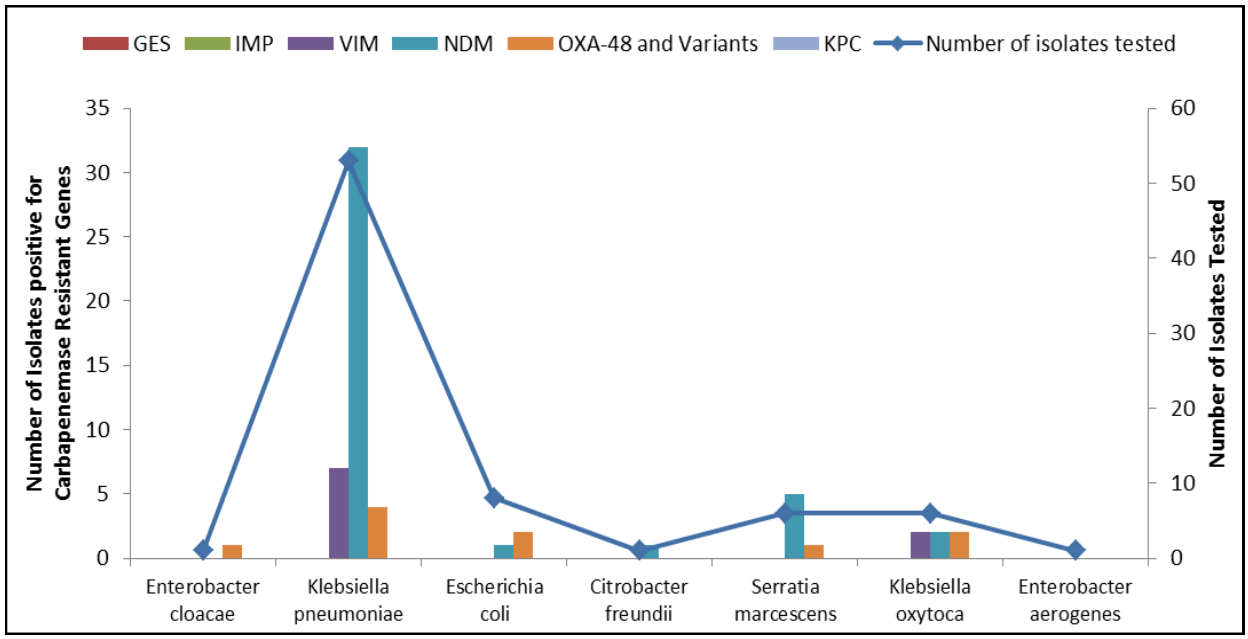
Update on carbapenemase-producing Enterobacteriaceae

The Johannesburg Antimicrobial Resistance Laboratory-Culture Collection (AMRL-CC) of the Centre for Opportunistic, Tropical and Hospital Infections (COTHI) at the NICD/NHLS have been testing referred isolates of suspected carbapenemase-producing Enterobacteriaceae (CPE) for the presence of selected carbapenemase genes. CPEs 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 July 2015, a total of 87 Enterobacteriaceae isolates was received. Eighty-four carbapenem-resistant isolates were screened, 63 of which were CPE isolates. The majority of the isolates were *Klebsiella pneumoniae* (53) followed by *Enterobacter cloacae* (8) *and E. coli* (8) (Figure 6).

Forty-six bla_{NDM}-positive isolates were identified; 13 from private hospitals (all from KwaZulu-Natal Province) and 30 from public hospitals – 10 from Gauteng, 18 from KwaZulu-Natal (KZN) and two from Eastern Cape. Seven bla_{OXA-48}-positive isolates were identified; all seven isolates were from public hospitals, of which three were identified from Gauteng Province and three were identified from the Eastern Cape. Nine blaVIM-positive isolates were identified from public hospitals in Gauteng (6), KZN (1) and two blaVIM-positive isolates were from unknown provinces . No other CPE enzyme types were identified in July (Figure 7).

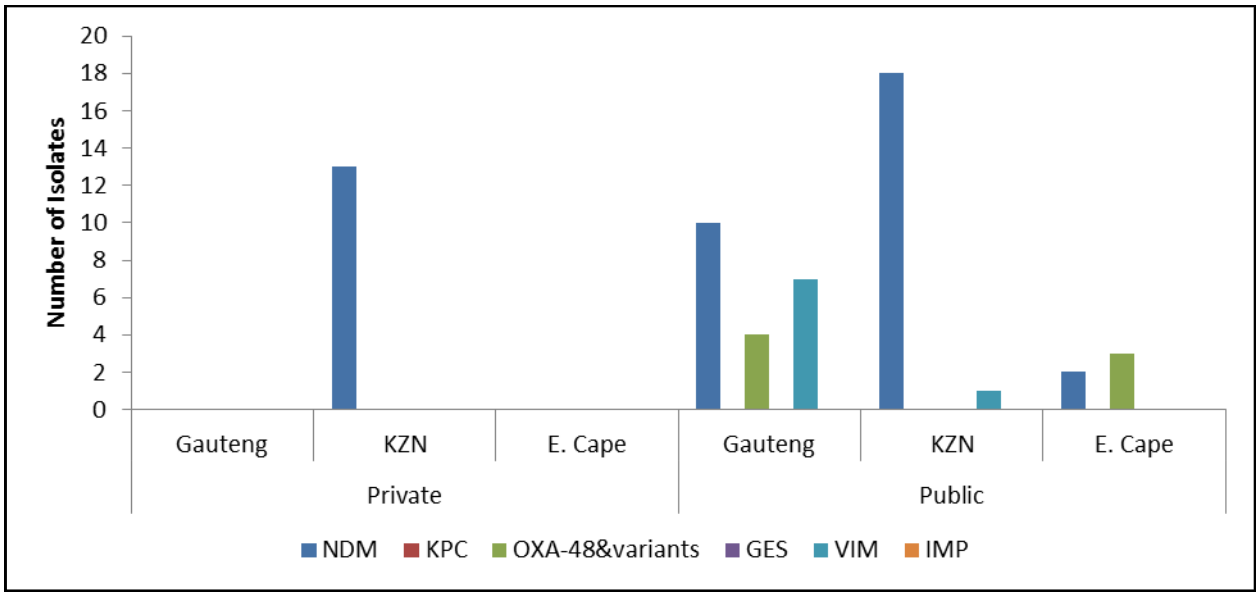
It is important to note that these figures do not represent the current burden of CPEs in South Africa. Given that CPE infections are currently not reportable or notifiable in South Africa, there is no platform for appropriate surveillance reports and consequently no locally representative data is available. This is of major concern, since meaningful data can inform public health policy and highlight priorities for action. Controlling the spread and limiting the impact of CPEs in South Africa will require intensive efforts in both the public and private healthcare sectors going forward. NHLS and private laboratories are encouraged to submit suspected CPE isolates based on antimicrobial susceptibility testing (AST) criteria to the 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



GES: Guiana extended-spectrum; IMP: imipenemase; VIM: verona integron-encoded metallo-beta-lactamase; NDM: New Delhi metallo-beta-lactamase; OXA: oxacillinase; KPC: Klebsiella pneumonia carbapenemase

Figure 6. Enterobacteriaceae isolates screened (n=84) and confirmed CPEs (n=63) at the Antimicrobial Resistance Laboratory-Culture Collection, COTHI (NICD-NHLS), July 2015



Guiana extended-spectrum; IMP: imipenemase; VIM: verona integron-encoded metallo-beta-lactamase; NDM: New Delhi metallo-beta-lactamase; OXA: oxacillinase; KPC: Klebsiella pneumonia carbapenemase

Figure 7. The total number of CPEs (n=57) in the public and private sectors from three provinces, July 2015

7 BEYOND OUR BORDERS

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

Disease & countries	Comments	Advice to travellers
1. Respiratory diseases		
MERS-CoV Saudi Arabia South Korea	As of 12 Aug 2015 there was a total of 1,086 laboratory confirmed cases including 474 deaths and 24 persons with currently illness. This includes 4 new cases, 1 death since the last update. As of 13 Aug 2015 the epidemic is under control. There have been no new cases, nor fatalities.	Good hygiene and basic infection prevention measures should be practiced. Travellers with diabetes, chronic lung disease and immune-compromised states are at risk of infection and should avoid contact with animals if possible. Strict hand washing must be followed after touching animals. Avoid raw camel milk or undercooked camel meat at all times. Travellers should avoid contact with animals and eat food that is fully cooked. Infection control practices such as regular hand washing must be followed to prevent infection.
H5N1 avian influenza Nigeria	The National Veterinary Research Institute reported that new cases of highly pathogenic avian influenza [HPAI] (bird flu) have been discovered in Abia and Enugu states on Tue 11 Aug 2015. The previous cases were eliminated in May 2015, after destroying more than 1.4 million birds.	At this time, it is not recommended that the general public avoid travel to any of the countries where there is avian influenza in poultry or other birds.
2. Water-borne disease		
Cholera Kenya Tanzania Haiti	Kenya has reported a total of 3,223 acute cases of cholera and 72 deaths as of 9 June 2015. Tanzania has reported a total of 4,487 suspected cases of cholera as of 28 May 2015. Haiti has reported a total of 15,000 cases of cholera and 126 deaths since the beginning of 2015.	Cholera is an acute diarrhoea illness that causes severe dehydration. Drink lots of safe water (bottled water with an unbroken seal, boiled water or water treated with chlorine tablets). Strict washing of hands with soap and safe water must be practiced. Food must be well-cooked before eating. Peel fruit and vegetables before eating.
3. Vector-borne diseases		
Dengue fever Taiwan Ecuador	Taiwan report from 28 Jul - 3 Aug 2015, 124 cases of which 114 locally acquired; Tainan 330 cases since May 2015, 102 new cases in the last week. Ecuador has reported a total of 20,800 cases since the beginning of 2015	Dengue fever (like chikungunya) is a mosquito-borne viral infection transmitted by *Aedes* spp. mosquitoes, which bite mostly during the day. Travellers can protect themselves from dengue fever by preventing mosquito bites by using insect repellent and sleeping in an air conditioned room. Mosquito nets are useful for those sleeping in an area that is exposed to the outdoors.

7 BEYOND OUR BORDERS

Disease & countries	Comments	Advice to travellers
3. Vector-borne diseases cont.		
Chikungunya Hondurus Mexico USA French Guiana Puerto Rico Colombia Ecuador	 60,741 cases by 24 Jul 2015 3,306 cases and 0 deaths by 7 Aug 2015 265 cases by 7 Aug 2015 1,756 confirmed local cases with 2 deaths by 31 Jul 2015 105 confirmed local cases with 14 deaths by 24 Jul 2015 11,963 cases with 37 deaths by 24 Jul 2015 27,364 cases by 7 Aug 2015	Chikungunya is a mosquito-borne viral infection transmitted by *Aedes* spp. mosquitoes, which bite mostly during the day. The most common symptoms of chikungunya virus infection are fever and joint pain. Other symptoms may include headache, muscle pain, joint swelling, or rash. Since its discovery in Tanganyika, Africa, in 1952, chikungunya virus outbreaks have occurred occasionally in Africa, South Asia, and Southeast Asia, but recent outbreaks have spread the disease over a wider range. Outbreaks have occurred in countries in Africa, Asia, Europe, and the Indian and Pacific Oceans. In late 2013 chikungunya virus was found for the first time in the Americas on islands in the Caribbean and in Mexico the virus was reported at the beginning of 2014. Travellers should wear long-sleeved shirts and long pants during the day and stay in well-ventilated (fan/air-conditioned) rooms.
Yellow fever Brazil	Brazil (Goiras) has reported a total of 4 cases of yellow fever to date. The last outbreak in Brazil was in 2008 where 17 people were infected and 10 died.	Yellow fever is an acute viral haemorrhagic disease transmitted by infected mosquitoes. The "yellow" in the name refers to the jaundice that affects some patients. Vaccination is the most important preventive measure against yellow fever. The vaccine is safe, affordable and highly effective, and a single dose of yellow fever vaccine is sufficient to confer sustained immunity and life-long protection against yellow fever disease and a booster dose of yellow fever vaccine is not needed. The vaccine provides effective immunity within 30 days for 99% of persons vaccinated.
***Yersinia Pestis* (Plague)**	Two cases have been diagnosed in the USA this year, both amongst residents of New Mexico. Seven cases in animals have been identified, including two in squirrels at Yosemite National Park.	Bubonic plague typically presents with fever, delium and 'buboes' - or enlarged, pus-filled glands in the groin, armpits or neck—usually at a site closest to a bite by an infected flea, (*Xenopsylla cheopis*). The risk to humans remains low, but residents in affected areas have been advised to keep their pets free from fleas. Campsites in Yosemite were closed to allow health officials to spray insecticides into rodent holes.

References and additional reading:

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