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NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES

Communicable Diseases Communiqué

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## Outbreak of meningococcal disease at a crèche

During September 2011, the Department of Health (DoH) was notified of a cluster of three cases (one probable without laboratory specimens and two laboratory-confirmed, including 2 deaths) of meningococcal disease, all attending a crèche in the City of Tshwane Metropolitan Municipality (Gauteng Province). The DoH led the public health response, including the identification and provision of post-exposure prophylaxis (PEP) to close household contacts. All identified children and staff members attending the crèche were provided PEP on 14 September, which included a single dose of ciprofloxacin. On inspection, the crèche was observed to have substandard facilities contravening safety and hygiene by-laws, was overcrowded and informally managed.

Subsequent to the initial round of intervention, four additional cases were identified: three laboratory confirmed in children who attend the same crèche, and one suspected case. The suspected case was a six-month-old child, not linked to the crèche, in whom a one-day history of fever was reported prior to death before arriving at the hospital. Post-mortem CSF and blood specimens were collected, but culture and PCR of these specimens did not detect *Neisseria meningitidis*; however, these results are not conclusive in discounting meningococcal disease in this case. A second round of PEP (single dose of cirprofloxacin) was provided on 30 September; again targeting all crèche attendees and staff, and close household contacts of cases.

Subsequent to the second round of provision of PEP, two additional confirmed cases were detected; one crèche attendee who had received PEP in the second round, and one child from a separate crèche in the same area. Ongoing transmission during this time was possibly due to re-peated reintroduction of the pathogen by asymptomatic carrier(s) following each round of PEP, potentially by a contact of one of the crèche attendees. The informal nature of the crèche, and the mobile nature of the crèche's population and the surrounding community makes this scenario possible.

On 19 October, further public health actions were taken. These consisted of, firstly, a third round of provision of PEP (single dose of ceftriaxone) extended to all attendees (children and staff members) of crèches with identified cases (currently two affected crèches), as well as all family members living in the same household as attendees of the crèches. Secondly, the polysaccharide quadrivalent (A,C,Y and W135) vaccine was simultaneously administered to the same group, but excluding children aged <18 months. Note that meningococcal conjugate vaccines are currently not available in South Africa. Thirdly, the first affected crèche was closed for a period of no less than two weeks post-administration of vaccine. During this period, the family of crèche attendees are being educated to discourage clustering of children outside of the crèche, and make alterna-tive arrangements for care of children in a dispersed manner. Furthermore, the practices and facilities/infrastructure of the crèche will be reviewed and corrected to enable children to return to a healthy environment.

As of 20 October, the cluster consists of a total of nine cases, including: seven laboratory-confirmed cases, one probable case (the initial case) and one suspected case. Three of these nine cases have been fatal (case fatality ratio 33%). Eight of the nine cases are crèche attendees (seven from the first crèche and one from a separate crèche) and are aged between two and six years. Specimens and/or isolates from six of seven laboratory-confirmed cases have been identified as *N. meningitidis* serogroup W135. The situation continues to be monitored closely, and during this period active surveillance for, and rapid notification of, clinically suspected cases of meningococcal disease is key to enable a rapid public health response.

**Source:** Outbreak Response, Respiratory and Meningeal Pathogens Reference, and Epidemiology and Surveillance units, NICD-NHLS. Department of Health: City of Tshwane Metropolitan Municipality, Gauteng Province and National. NHLS Kalafong Hospital and Tshwane Academic Hospital. A special thank you to supporting healthcare workers for their contributions.

## Meningococcal disease surveillance

Sporadic cases of meningococcal disease continued to be reported across the country. Laboratory-based reporting has inherent delays, so although clinical cases may be increasing, these cases may not be reflected in our reports.

By the end of epidemiological week 40, a total of 236 laboratory-confirmed cases were reported to the Respiratory and Meningeal Pathogens Reference Unit (RMPRU), NICD-NHLS (Table).

These cases showed diversity in serogroups, which is in keeping with sporadic endemic disease in the country. Serogroup data were available for 190/236 (81%) of cases. Serogroup B (50/190, 26%) and W135 (91/190, 48%) were identified most commonly this year. Other serogroups included: C (8%, 15/190) and Y (18%, 34/190).

The winter and spring seasons are when we typically identify an increase in cases of meningococcal disease. As such, there should be a high index of suspicion for meningococcal disease which may present with nonspecific early signs and symptoms. Disease typically has a rapid progression and should be managed as a medical emergency in order to reduce morbidity and mortality. All cases of suspected meningococcal disease (meningitis and sepsis) should be notified telephonically to the Department of Health.

**Source:** Respiratory and Meningeal Pathogens Reference Unit, NICD-NHLS

**Table: Number of laboratory-confirmed meningococcal disease cases reported by week 40 (week ending 9 October), 2010 and 2011, by province**

| Province | 2010 | 2011 |
|---|---|---|
| Eastern Cape | 20 | 26 |
| Free State | 19 | 16 |
| Gauteng | 155 | 111 |
| KwaZulu-Natal | 28 | 16 |
| Limpopo | 10 | 4 |
| Mpumalanga | 20 | 13 |
| Northern Cape | 17 | 6 |
| North West | 8 | 5 |
| Western Cape | 48 | 39 |
| **South Africa** | **325** | **236** |

## Outbreak of newly emerged, highly antibiotic resistant bacteria in hospitalised patients in Gauteng Province: New Delhi metallo-β-lactamase (NDM-1)

A cluster of patients with colonisation and/or infection with highly-resistant bacteria producing the enzyme NDM-1 were recently identified in a Gauteng Province hospital. Most of the patients had underlying conditions that would place them at greater risk of acquiring these organisms, and had been hospitalised for an extended period. Three of the patients have died; all had advanced disease due to underlying chronic illness and it is likely that these co-morbidities played a major role in their demise.

NDM-1 is an enzyme that makes bacteria resistant to a broad range of β-lactam antibiotics, the group that includes such well-known antibiotics as the penicillins and cephalosporins. NDM-1 belongs to the metallo-β-lactamase family containing $Zn^{2+}$ as cofactor. It inactivates almost all classes of β-lactam antibiotics including carbapenems, which are a mainstay of the treatment of antibiotic-resistant bacterial infections, and usually reserved for treatment of severe infections. Therefore, the spread of pathogenic microorganisms carrying NDM-1 gene ("superbugs") has became a major global health problem. This is the latest example of the ability of bacteria to acquire resistance to almost any antibiotic, including new ones.

Many bacteria have been shown to produce this NDM-1 enzyme, including strains of Gram-negative gut bacteria (the Enterobacteriaceae, for example *Klebsiella pneumoniae* and

*Escherichia coli*), as well as other bacteria such as *Pseudomonas* and *Acinetobacter* species. When these bacteria express the gene for NDM-1, treatment is difficult because the bacteria may be susceptible to only very few antibiotics, for example the polymixin antibiotic colistin, and tigecycline. The former is a very old antibiotic that is not used frequently and the latter is a relatively new antibiotic related to tetracycline. Both of these are available in South Africa.

The enzyme was named after New Delhi, India, where the bacteria were first reported in 2009 in a Swedish patient, who had travelled to New Delhi and who acquired a hospital-related urinary tract infection caused by multidrug-resistant *K. pneumoniae*. NDM-1 bacteria have been identified in a number of other countries to date, typically in hospitalised patients. Currently there are very few reported cases worldwide but it is important that they are promptly identified so that the correct treatment can be given. Specific molecular laboratory tests are required to identify these strains, and these tests are available in some laboratories in South Africa. Certain risk factors are associated with infections caused by these organisms (Box).

The NICD-NHLS is setting up a monitoring programme for the public sector as well as a referral diagnostic service. A number of laboratories in the private sector have the capacity for diagnosis, and were responsible for the diagnosis in the current cluster of patients. Not all patients who harbour these bacteria are ill, but some have systemic infections and do require definitive antibiotic treatment.

**Box: Risk factors for healthcare-associated infections with multidrug-resistant bacteria**

- Hospitalisation in the previous 3 months
- Long-term dialysis
- Intravascular devices
- Antimicrobial therapy in the previous 3 months
- High incidence of antimicrobial resistance in the community or in the specific hospital unit
- Immunosuppression

In response to the outbreak, additional infection control measures to reduce spread of these organisms within the hospital have been instituted, and a monitoring programme for patients has been set up to detect any new infections or colonisation, as well as provision of specific antibiotic management for systemic infections as required.

Infection control measures and prudent antibiotic usage are overall critical factors in reducing the ongoing emergence of antibiotic resistance worldwide.

**Source:** Microbiology External Quality Assessment & Antimicrobial Resistance Reference Units, Microbiology Division, and Epidemiology Division, NICD-NHLS

## Influenza

**Viral Watch: influenza-like illness (ILI) surveillance programme**

The number of specimens collected from Viral Watch sites per week has continued to decline, with 37 and 27 specimens respectively for the weeks ending 25 September and 2 October 2011. Small numbers of influenza A(H3N2) and B are still being detected (Figure). The last influenza A(H1N1)2009 positive specimen this year was collected on 8 August 2011.

**Severe Acute Respiratory Illness (SARI) surveillance programme**

For the period 1 January to 2 October 2011, 3 975 patients were enrolled into SARI, a sentinel hospital-based surveillance programme. Of these, 98% (n=3 875) have been tested for influenza and 337 (9%) were positive for influenza virus. The majority, 169 (50%) of influenza positive samples were A(H1N1)2009, 92 (27%) influenza B, 76 (23%) influenza A (H3N2), three (1%) were co-infected with A (H3N2) and influenza B and one (0.3%) was co-infected with influenza A(H1N1)2009 and A (H3N2).

The 2011 influenza season, which started in week 20 (week starting 16 May 2011), has two peaks (Figure). The first, which was dominated by influenza A(H1N1)2009 peaked at week 24 (week starting 5 June 2011) and this was followed by smaller peak, which was due to influenza A(H3N2) and influenza B. The influenza season is still ongoing with influenza

A(H3N2) and influenza B occurring predominantly in the past 8 weeks. Clinicians are still encouraged to consider influenza as a differential diagnosis in patients admitted with severe acute respiratory infection.

**Vaccine Recommendations for 2012**

The influenza vaccine strain recommendations for 2012 have been published by WHO and endorsed by AIVC and will be our recommendations for the 2012 season. They have not changed from the 2011 vaccine strains, i.e.:

- an A/California/7/2009 (H1N1)-like virus;
- an A/Perth/16/2009 (H3N2)-like virus [note, A/Wisconsin/15/2009 and A/Victoria/210/2009 are A/Perth/16/2009-like viruses];
- a B/Brisbane/60/2008-like virus.

These are the same strains as used for the northern hemisphere 2011/12 season, and it is recommended that people traveling to the northern hemisphere should be vaccinated against influenza.

**Source:** Divisions of Epidemiology and Virology, NICD-NHLS

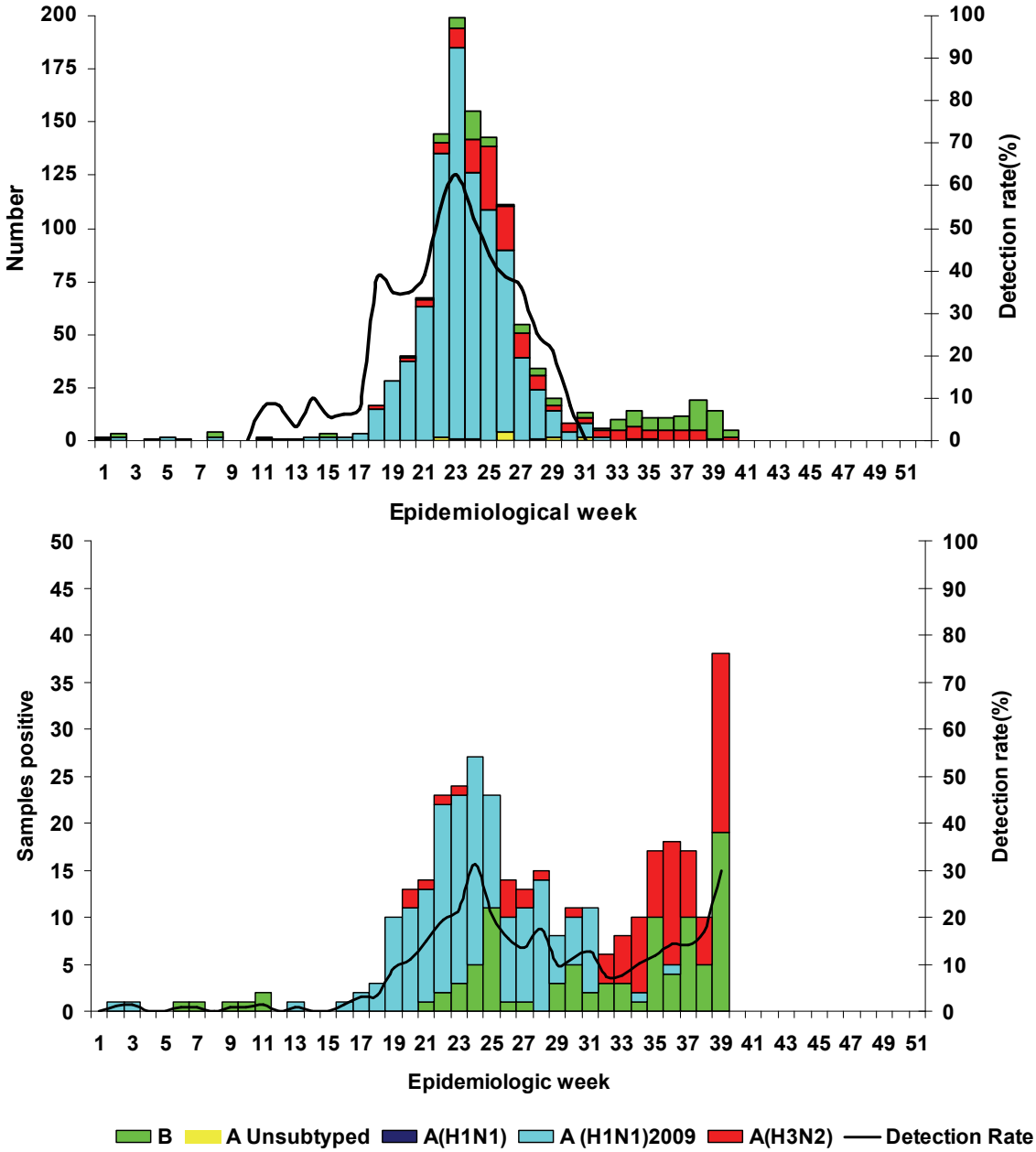


**Figure: Number of positive samples and detection rate by influenza types and subtypes by week, (top) Viral-Watch and (bottom) SARI surveillance programmes, 2011.**

## Measles and rubella

Rubella surveillance forms part of the national case-based surveillance programme. Specimens from suspected measles cases (patients presenting with fever and rash, with at least one of cough, coryza or conjunctivitis) are submitted to the NICD-NHLS for measles and rubella testing.

Since January 2011, a total of 5 420 suspected measles cases were tested. Of these, 32% (1 747/5 420) were rubella IgM positive. Cases were reported from all nine provinces with Gauteng (24%, 411/1 747), Limpopo (19%, 332/1 747) and Mpumalanga (15%, 215/1 747) provinces accounting for the highest proportions of the total (Table). An increase in numbers of rubella IgM positive cases were observed from August through to September (Figure). Age was reported in 98% (1 706/1 747) of the cases. Children aged <12 years accounted for 88% (1 497/1 706) of the cases with 62% (1 061/1 706) occurring in those aged 5-11 years. Where sex was recorded, females accounted for 48% (810/1 700) of the cases with 13% (103/810) occurring in those aged 12-49 years.

There were no new laboratory-confirmed measles cases since the last published Communiqué. For 2011, the total number of laboratory-confirmed measles cases remains at 82.

**Source:** Divisions of Epidemiology and Virology, NICD-NHLS

**Table: Number of rubella IgM positive results per province, South Africa, 2011**

| Province | 2011 cumulative total |
|---|---|
| Eastern Cape | 202 |
| Free State | 24 |
| Gauteng | 411 |
| KwaZulu-Natal | 181 |
| Limpopo | 332 |
| Mpumalanga | 258 |
| Northern Cape | 45 |
| North West | 215 |
| Western Cape | 79 |
| **South Africa** | **1 747** |

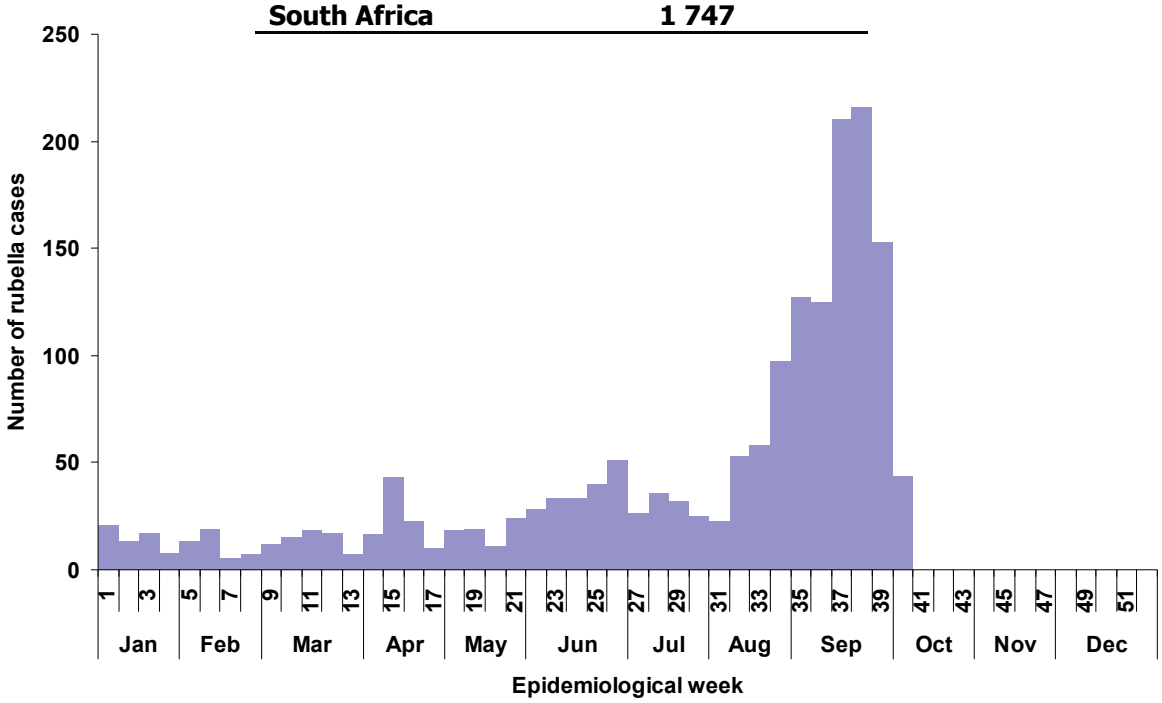


**Figure: Number of rubella IgM positive cases by week specimens were collected, South Africa, 2011**

## Rabies

One additional case of human rabies was confirmed from KwaZulu-Natal Province in September 2011. The patient is a 62-year-old male who was bitten by a stray dog on the right arm two months before he died. The incident occurred as the deceased was herding his cattle. He went to the clinic where he received wound treatment and was referred to the local hospital for rabies post-exposure prophylaxis (PEP) for a category 3 exposure. Unfortunately, because of adverse weather conditions, the patient did not go to the hospital and therefore did not receive PEP.

On 21 September 2011, the patient started experiencing itching on the healed wound site, then developed hallucinations and hydrophobia and died in hospital the day of admission. Post-mortem specimens were positive for rabies by fluorescent antibody test.

Rabies PEP is a life-saving intervention. It includes prompt wound care and administration of rabies vaccines and, in category 3 exposures, the administration of rabies immunoglobulin as well. For more information refer to the rabies guidelines available on the NICD-NHLS website (www.nicd.ac.za).

Healthcare workers (HCWs) involved in care of the patient raised concerns about their risk of infection, appropriate infection control measures and response if exposed to patients with rabies disease. Infection control precautions are important for HCWs responsible for managing these patients and should include both standard precautions (hand washing, gloves, mask, eye protection or a face shield, gown and plastic apron) and respiratory precautions. Patients should be sedated to reduce the chances of biting HCWs.

No human-to-human transmission has ever been reported, even after humans with rabies have bitten HCWs. A cautious approach should, however, be taken. Any HCW who is bitten by the patient should receive PEP as per category 3 exposure, this also applies when HCWs are exposed through their mucous membranes to a patient's saliva. PEP is not indicated for persons in the same room or those who care for the patient but who do not experience specific exposures.

The rabies virus is not particularly resilient and is inactivated by heat, sunlight and desiccation. Objects soiled by infective secretions must be disinfected by boiling or autoclaving. Disposable items used in treating patients should be incinerated. Surgical instruments should be autoclaved, while other items in the patient's environment should be cleaned with an appropriate disinfectant containing chlorine (10 000ppm available chlorine) or glutaraldehyde. The corpse of a rabies victim is thought to pose little risk but it is prudent to avoid embalming the body.

A total of 4 human rabies cases have been laboratory-confirmed for South Africa for 2011 to date. These cases originate from Limpopo (n=3) and KwaZulu-Natal (n=1) provinces.

**References:**

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2. Manning SE, Rupprecht CE, Fishbein D, et al. Human rabies prevention--United States, 2008: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep. May 23 2008;57:1-28.
3. Guide for the Medical, Veterinary and allied Professions, Second Edition 2010.

**Source:** Special Pathogens and Outbreak Response Units, NICD-NHLS

## Tick bite fever

A 46-year-old resident on a farm in Delmas, Gauteng Province presented with a 2-week history of acute febrile illness, severe headache and vomiting. The patient delayed seeking medical attention and the condition had also been misdiagnosed initially as an allergy by the local general practitioner. She was semi-comatosed on admission, a maculo-papular rash was evident on her trunk, palms and soles had petechiae, and there was a lesion on the right shoulder suggestive of an eschar. The patient also had digital gangrene of both her hands & feet, was encephalopathic and on initial chest X-ray had pulmonary infiltrates sug-

gestive of acute respiratory distress syndrome (ARDS) and, therefore, required mechanical ventilation. The infiltrates cleared fairly rapidly following treatment and her brain CAT scan was normal (no micro-infarcts).

The white cell count (WCC) was 12 x $10^9$/L with a 82% neutrophilia, she had thrombocytopenia (platelets = 10 x $10^9$/L, raised transaminases (aspartate aminotransferase (AST) = 490 x $10^9$/L, and alanine aminotransferase (ALT) = 198 x $10^9$/L). Despite giving a history of a possible tick exposure, she was managed initially as a bacterial septicaemia with a third generation cephalorosporin, as a consequence of her severe illness and clinico-pathological findings. On admission to the critical care unit, tick bite fever (TBF) was considered highly likely and oral doxycycline treatment was started. Intravenous ciprofloxacin was added because of concerns that oral doxycycline may not be tolerated in a critically ill patient. Crimean-Congo haemorrhagic fever (CCHF) tests were conducted to rule out its possibility given the residence on a farm and findings of thrombocytopenia and raised transaminases. Tests for CCHF were negative by RT- PCR and serology but positive for *Rickettsia conorii* IgG and IGM by indirect immunofluorescence. The patient has continued to improve.

Tick bite fever is common in South Africa in both the urban and rural setting at all times of the year. It is important in the differential diagnosis of acute febrile illness with multi-organ involvement and haemorrhage. However, the possibility of a viral haemorrhagic fever (VHF) must be urgently considered in these cases and excluded by laboratory testing. The diagnosis of TBF is a clinical one based on the findings of an eschar, usually with local lymphadenopathy in a patient with acute febrile illness and should prompt treatment with doxycycline. The Weil Felix test is neither sensitive nor specific, PCR is not well standardised and the rickettsial IFA serology test typically becomes positive only after 7-10 days of illness. Doxycycline is optimal therapy in all age groups.

**Source:** Special Pathogens and Outbreak Response Units, NICD-NHLS; Helen Joseph Hospital

## Foodborne illness outbreaks

Of the 7 foodborne illness outbreaks reported to the Outbreak Response Unit, NICD-NHLS in September 2011, a selection of three are presented here.

***Phedisanang, Free State Province***

On 9 September, the district CDC coordinator was informed of a suspected foodborne illness outbreak at a local primary school. Thirty children aged between 8-15 years, of 850 children who ate porridge the morning, developed symptoms that included nausea, vomiting, and abdominal cramps. Two of the 30 children were admitted to hospital for overnight observation and discharged the following day. Food (milk and porridge) had been distributed as part of the school feeding scheme.

Clinical specimens and food samples were collected and forwarded to the NHLS Infection Control Services Laboratory (NHLS-ICSL) for testing. *Clostridium perfringens* was isolated from all 22 stool specimens submitted, and *Bacillus cereus* from 2 stool specimens – one of which was positive for *B. cererus* enterotoxin. A non-typhoidal *Salmonella* spp was identified on one of the specimens. *Staphylococcus aureus* was identified (enterotoxin negative) from the milk sample. Food culture results were all indicative of contamination.

***Pienaarsdam, Middelburg, Mpumalanga Province***

At a conference centre, 75 of 147 conference attendees developed symptoms that included diarrhoea and abdominal cramps, and some had nausea and vomiting. Symptoms started at midnight after a dinner that was served on 14 September, consisting of roast chicken, lamb stew, green beans, and chakalaka. Food samples were not obtained from the implicated dinner but were obtained from selected items from breakfast (mince, eggs and bread) and lunch (chicken, beef, rice, peas, cabbage, potato salad, ice cream, pudding and orange juice) served on 15 September.

Sixty-one attendees were seen at the local hospital at 10 am on 15 September; they were treated, and there were no admissions. Only one stool specimen could be obtained and was forwarded to NHLS-ICSL; *C. perfringens* identi-

fied. *C. perfringens* was also isolated from the potato salad. Food culture results (bacterial counts) from some food samples were indicative of contamination.

***Phalaborwa, Limpopo Province***

The NHLS-ICSL reported a suspected foodborne illness outbreak on 19 September after receipt of food samples. On further investigation, it was established that on 15 September, 101 technical school students presented to a local hospital with symptoms that included diarrhoea, abdominal cramps and headaches. Two students were admitted and were discharged on 19 September. No clinical specimens were collected. Food samples were collected from the school cafeteria and student residence kitchen.

Food culture results were indicative of contamination and various food pathogens were identified:

- *S. aureus* was identified (enterotoxin positive) on the soup sample
- B. cereus (enterotoxin positive) was identified on the chicken stew
- *B. cereus* and *S. aureus* (enterotoxin negative) were identified on the roasted chicken sample
- *C. perfringens* and *B. cereus* were identified on the beef stew
- *E. coli* was present on the beef stew and chakalaka samples.

**Source:** Outbreak Response Unit, NICD-NHLS; NHLS Infection Control Services Laboratory, Johannesburg; Free State, Mpumalanga and Limpopo Department of Health.

## Beyond our borders: infectious disease risks for travellers

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

**Cholera:** Chad, Cameroon, Republic of Congo, Central African Republic.

**Alert:** Cholera outbreaks in west and central African countries are ongoing. During 2011, over 85 000 cases and 2 466 deaths were reported in these regions.

**The disease:** Cholera is an acute diarrhoeal infection caused by the bacterium *Vibrio cholerae* O1 or O139. Disease is characterised by a wide range of severity, but may include symptoms of acute onset of watery diarrhoea with/without vomiting, which may rapidly progress to severe dehydration or death if left untreated. Aggressive rehydration and close monitoring of patients is required to prevent death.

**Advice to travellers:** Cholera is transmitted through the faecal-oral route, via contaminated water or food. Vaccine is not routinely recommended for travellers. Travellers are urged to take precautions when consuming food and water, utilise water purification tablets where needed, and practice good hand hygiene. Drink water that is bottled or bring it to a rolling boil for 1 minute. Bottled carbonated water is safer than uncarbonated water. Avoid products made from contaminated water (e.g. ice and ice-cream). Eat only foods that have been thoroughly cooked. Peel fruit and vegetables yourself after washing hands (do not eat peelings), and avoid those that cannot be peeled. Avoid food and beverages from street vendors.

**Poliomyelitis:** Pakistan

**Alert:** An ongoing outbreak of wild poliovirus type 1 (WPV1) has been reported in Pakistan. As of the 13 September 2011, 84 cases were reported, compared to the 48 cases for the same period in 2010.

**The disease:** Transmission occurs via the oral-faecal route or contact with saliva. Most infections remain completely without symptoms, while 10% of cases develop mild symptoms only, such as fever, malaise, nausea, and vomiting. The virus may spread from the digestive tract to the central nervous system, resulting in meningitis and neural damage with paralysis. No specific therapy is available against the virus.

**Advice to travellers:**

Travellers to areas currently reporting wild-type polio outbreaks, who have previously received three or more doses of OPV or IPV, should be offered a booster dose of polio vaccine before departure. Non-immunised individuals require a complete course of vaccine. It is also impor-

tant to note that vaccination does not guarantee the traveller's safety. Travellers are additionally advised to follow safe food and water practices, and practice good hand hygiene to prevent infection.

**Listeriosis:** USA

**Alert:** A multistate outbreak of listeriosis was reported in the USA. As of 11 October 2011, 116 persons (including 23 deaths) became infected with one of four outbreak-associated strains across 25 states. Consumption of cantaloupes (melons) was found to be associated with the outbreak strains.

**The disease:** Infection caused by eating food contaminated by *Listeria monocytogenes*. Symptoms include fever, muscle aches, confusion, loss of balance and convulsions. In pregnant women it can cause miscarriages, stillbirth and preterm labour.

**Advice to travellers:** Travellers are advised to practice good hand hygiene, wash/scrub the surface of melons prior to cutting, and promptly consume cut melon, or refrigerate for no more than 7 days. Discard melons left at room temperate for more than 4 hours.

**References and additional reading:** ProMED-Mail, World Health Organization, Unicef, European Centres for Disease Prevention and Control, Centers for Disease Control and Prevention.

Last accessed: 2011/10/12

**Source:** Outbreak Response and Travel Health Units, NICD-NHLS

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