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Update on an outbreak of meningococcal disease in Olievenhoutbosch, Gauteng Province

During September 2011, a cluster of meningococcal disease was reported in a crèche in Olievenhoutbosch, Gauteng Province which was overcrowded and had substandard facilities. The Department of Health (DoH) implemented numerous interventions to attempt to interrupt transmission; these included the administration of post-exposure prophylaxis (PEP) to crèche attendees (staff and children), administering PEP to close household contacts of reported cases, conducting an inspection of the crèche facilities and encouraging the correction of non-conformances. However, new cases continued to be identified, likely due to repeated reintroduction of the pathogen by asymptomatic carriers not identified at each round of PEP. The informal nature of the crèche and mobile nature of the crèche's clientele and the surrounding community makes this scenario possible. A single case was identified in a second crèche in the same area. On 19 October 2011, due to evidence of ongoing transmission despite interventions, responses were escalated to include the administration of both PEP and the polysaccharide quadrivalent (A,C,Y and W135) meningococcal vaccine to attendees of the two affected crèches, as well as their close household contracts. Vaccine was limited to persons 18 months or older as the polysaccharide vaccine is not effective in young infants. Vaccinations and chemoprophylaxis were further extended to two additional crèches that shared child transport arrangements with the affected crèches, and household contacts of all identified cases to date. Recent reports of additional cases that are not linked to these crèches indicates that disease transmission may now be occurring in the wider community. The most recent confirmed case reported illness reported on 21 October 2011. Additional interventions including conducting more widespread vaccination are being considered.

As of 14 November 2011, a total of 12 cases has been identified: including 1 suspected case (i.e. clinical features in keeping with meningococcal disease in a person from the community of Olievenhoutbosch, for whom no alternate diagnosis is made), 1 probable case (i.e. a suspected cases with additional clinical features (e.g. petechial rash, Waterhouse-Friderichsen syndrome) that increasing the likelihood of a diagnosis of meningococcal disease) and 10 confirmed cases (i.e. a suspected case with laboratory findings confirming meningococcal disease). Four of the 12 cases have been fatal (case fatality ratio 33%). Of the 12 cases, the majority (n=9, 75%) are aged 2-6 years; however, 2 cases are infants (21 months and 15 months-old respectively) and 1 case is an adult (36 years old). A third of (n=4/12) of cases to date are external to the two affected crèches, and 25% (n=3/12) of cases have no known link to either crèche. All specimens/isolates tested to date have been identified as *Neisseria meningitidis* serogroup W135, and are fully sensitive to the recommended chemoprophylaxis antimicrobials (ciprofloxacin, ceftriaxone or rifampicin).

All healthcare facilities and laboratories in Gauteng Province are urged to be on high alert for meningococcal disease (including meningococcal meningitis and meningococcal sepsis). Healthcare workers should maintain a high index of suspicion, and should a suspected case be identified, (1) immediately notify the DoH by telephone, (2) collect appropriate specimens for laboratory investigations, (3) ensure the correct patient treatment and infection control measures, and (4) ensure PEP is provided to close contracts where indicated. Consult the Guideline for the Management, Prevention and Control of Meningococcal disease in South Africa, 2011 for details.

Source: Division of Surveillance, Outbreak Response and Travel Health, and the Centre for Respiratory Diseases and Meningitis, NICD-NHLS. Department of Health: City of Tshwane Metropolitan Municipality, Gauteng Province and National. NHLS Kalafong Hospital and Tshwane Academic Hospital.

Meningococcal disease surveillance

By the end of epidemiological week 44, a total of 274 laboratory-confirmed cases had been reported to the Centre for Respiratory Diseases and Meningitis, NICD (Table).

These cases showed diversity in serogroups, which is in keeping with sporadic endemic disease in the country. Serogroup data were available for 201/274 (73%) of cases. Serogroup B (26%, 52/201) and W135 (50%, 100/201) have been identified most commonly this year. Other serogroups included: C (7%, 15/201) and Y (17%, 34/201).

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

Table: Number of laboratory-confirmed meningococcal disease cases reported by week 44 (week ending 6 November), 2010 and 2011, by province

Province	2010	2011
Eastern Cape	24	38
Free State	22	21
Gauteng	161	122
KwaZulu-Natal	29	20
Limpopo	11	6
Mpumalanga	23	15
Northern Cape	18	6
North West	9	5
Western Cape	53	41
South Africa	**350**	**274**

How to detect NDM-1 producers: Resistance testing for carbapenemases

Recently, a private laboratory in Gauteng Province confirmed a number of isolates of *Klebsiella pneumoniae* producing the enzyme NDM-1 (New Delhi metalloenzyme) from hospitalised patients. In the public sector, one case was confirmed by the same private laboratory. Resistance to antibiotic therapy by production of the *K. pneumoniae* carbapenemase (KPC) enzyme is becoming more common. This resistance is not always detected by conventional antimicrobial susceptibility testing, which may result in inappropriate antimicrobial therapy for the patient.

Carbapenems are used to treat life-threatening infections caused by extremely drug-resistant Gram-negative pathogens as the last line antimicrobial agents. Organisms carrying NDM-1 and 2 will certainly colonise the environment of hospitals in time. Spread of this resistance has enormous implications for public health. In members of the Enterobacteriaceae, the gene *blaKPC*, which encodes KPC production, as well as genes for NDMs, can be detected by real-time PCR. The Centre for Opportunistic, Tropical and Hospital Infections (COTHI), NICD has issued an alert for such cases with the aim to strengthen infection control measures in hospitals.

Clinicians should be aware of the possibility of NDM-1-producing Enterobacteriaceae in patients who have received medical care in India or other countries where enzyme is endemic, and should specifically inquire about this risk factor when carbapenem-resistant Enterobacteriaceae are identified. Carbapenem resistant isolates from patients admitted to hospitals can be forwarded to the COTHI for further characterisation. Infection control interventions aimed at preventing transmission, as outlined in current CDC recommendations,[1] should be implemented when KPC and NDM-1-producing isolates are identified, even in areas where other carbapenem-resistance mechanisms are common among Enterobacteriaceae.

Early identification of NDM-1 producers in Enterobacteriaceae is mandatory to prevent their spread. We request NHLS laboratories to notify and refer isolates that meet the resistance criteria to the COTHI for molecular confirmation of KPCs and NDMs by multiplex real-time PCR. The CLSI guideline outlines the resis-

tance criteria as follows:

- MICs to imipenem and meropenem ≥4 µg/ml and ertapenem ≥1 µg/ml;
- A diameter >23 mm if screening by disk method for all three agents; or
- A positive MBL- Etest or imipenem-EDTA double disk synergy test.

Reference:

1. CDC. Guidelines for Control of Infections with Carbapenem-Resistant or Carbapenemase-Producing Enterobacteriaceae in Acute Care Facilities. *MMWR,* 2008. 58(10).

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

Influenza

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

Sporadic detection of influenza A(H3N2) and B continued throughout October, with a total of 8 influenza A(H3N2) and 15 influenza B positive specimens. These positive specimens were from patients attending Viral Watch sites in Gauteng, Limpopo, Mpumalanga, Northern Cape and Western Cape provinces. In addition one or more other respiratory virus (adenovirus, parainfluenza virus, respiratory syncytial virus and rhinovirus) were detected in a further 21 patients, the most common being adenovirus and parainfluenza virus (7 patients each).

Severe Acute Respiratory Illness (SARI) surveillance programme

For the period 1 January to 6 November 2011, 4 473 patients admitted with severe respiratory illness (SARI), at four sentinel surveillance sites were tested for influenza. Of these, 414 (9%) were positive for influenza virus. The majority, 169 (41%) of influenza positive samples were A(H1N1)pdm09, 136 (33%) influenza B, 103 (25%) influenza A(H3N2), five (1%) were co-infected with A(H3N2) and influenza B and one (0.2%) was co-infected with influenza A(H1N1) pdm09 and A(H3N2).

The number of samples testing positive for influenza and the detection rate is decreasing (Figure 1). Other respiratory viruses currently circulating, with detection rates above 20%, are adenovirus and rhinovirus (Figure 2). For the week starting 31 October 2011, the detection rate for both adenovirus and rhinovirus was 21%. The detection rates for all the other respiratory viruses, except for parainfluenza type 3 (DR=18%), were less than 10%.

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

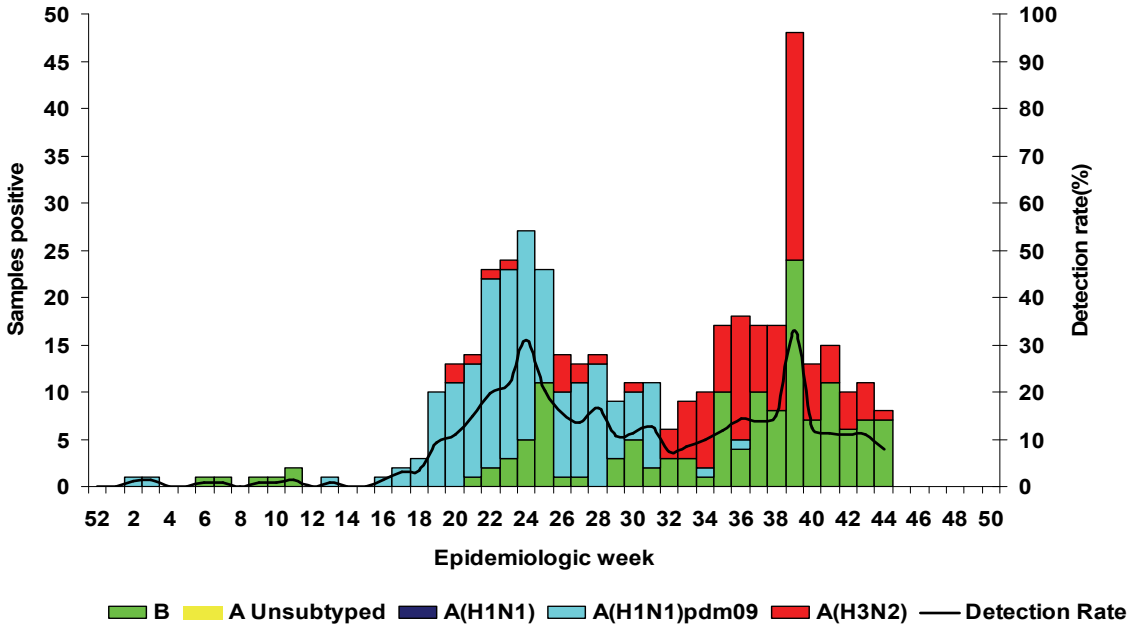

Figure 1: Number of positive samples by influenza types and subtypes and detection rate by week, SARI surveillance, South Africa, 2011.

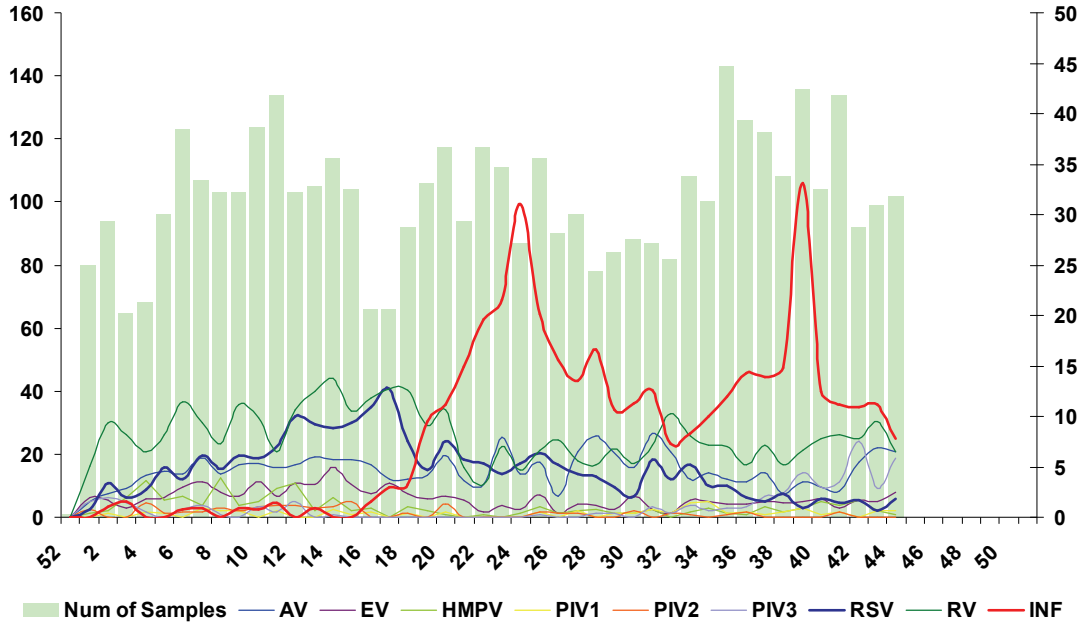

Figure 2: Detection rate of respiratory viruses and total number of samples by week, SARI surveillance, South Africa, 2011.

Measles and rubella

There were five new laboratory-confirmed measles cases since the last published NICD Communiqué. Since January 2011, a total of 6 890 suspected measles cases was tested. Of these, 1% (n=87) were measles IgM positive and 35% (n=2 413) rubella IgM positive. Cases were reported from all nine provinces. Age was reported in 91% (79/87) and 98% (2 354/2 413) of measles and rubella cases respectively. Of patients with measles, children <1 year accounted for 47% (37/79) of the cases with 38% (30/79) occurring in those aged ≤9 months. Of patients with rubella, children aged <12 years accounted for 88% (2 067/2 354) of the cases with 62% (1 449/2 354) occurring in those aged 5-11 years. Where age and sex were recorded (n=2 295), females accounted for 48% (1 105/2 295) of the cases with 13% (141/1 105) occurring in those aged 12-49 years.

Source: Centre for Vaccines and Immunology, NICD-NHLS

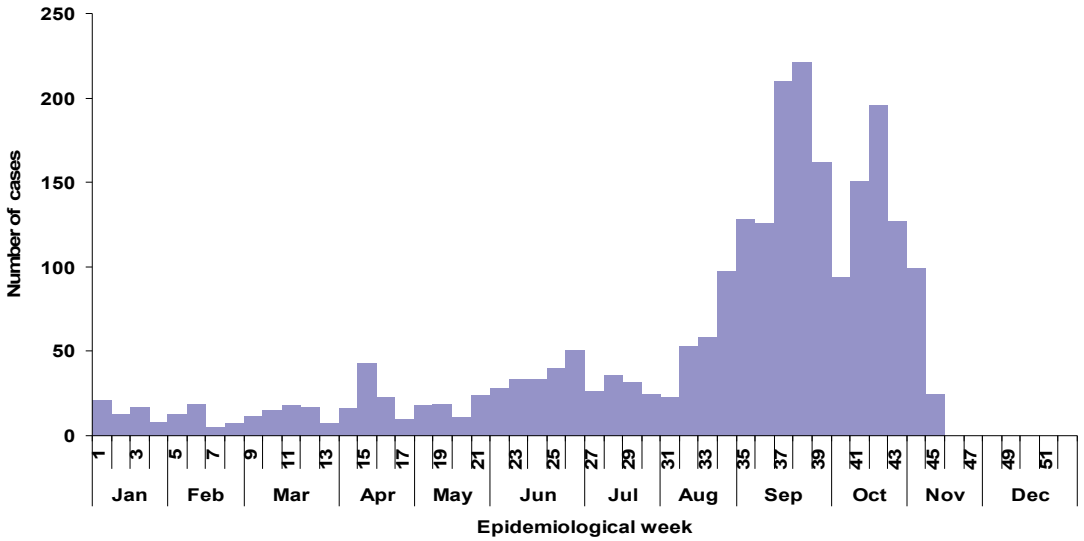

Figure: Number of rubella IgM positive cases by week specimens were collected, South Africa, 2011

Rabies

Two cases of rabies have been confirmed in unvaccinated domestic dogs in a suburb of Randfontein, West Rand, Gauteng Province, during October 2011. Work is ongoing to further characterise the virus and identify a possible source.

Last year there was a rabies outbreak in south-western Johannesburg, with 42 cases in mostly domestic dogs. The first animal case was in May 2010 and the most recent was confirmed in March 2011. There were a number of human exposures and one human fatality, a 2-year-old child. An intensive dog vaccination programme was conducted in the affected areas.

A total of 4 human rabies cases has been laboratory confirmed for South Africa for 2011 to date. Three of these cases originated from Limpopo Province and one from KwaZulu-Natal Province. Each death is a public health failure and could have been prevented by timely and appropriate post-exposure prophylaxis (PEP).

Since a significant number of people experience dog bites in Johannesburg and the majority of these are related to dogs 'protecting their territories', rabies biologicals need to be used judiciously and the decision whether to give PEP must be based on a full assessment of the risk of transmission. There are no laboratory tests that can confirm whether rabies has been transmitted. Relevant information includes the species of the animal (there is no risk from small rodents), whether it was an unprovoked attack, whether the animal was visibly ill or exhibiting unusual behaviour (e.g. aggression, salivation, weak limbs, or snapping at imaginary objects), and the category of exposure. If the animal is well with no symptoms 10 or more days after the exposure, rabies is not likely and no PEP is needed.

Thorough wound cleaning is important for any patient with a possible rabies exposure; in addition, wounds should not be sutured and local anaesthetic should not be used as both can spread the virus. For **category 1** exposures such as touching or feeding an animal or licking of intact skin, no vaccine or immunoglobulin should be given. Vaccine should, however, be given for **category 2** exposures, which include minor or superficial scratches without bleeding or nibbling of uncovered skin. Vaccine is given as one amp per dose, on days 0, 3, 7, and 14. It should be given intramuscularly into the deltoid muscle in adults, and into the anterolateral thigh in children.

Category 3 exposures are the most serious, and occur when the patient has suffered bites or scratches that penetrate the skin and draw blood, or there has been licking of broken skin or mucous membranes (e.g. eyes or mouth). Vaccine is given as for category 2 exposures, with the addition of rabies immunoglobulin infiltrated into all wounds, at a dose of 20 IU/kg. If a full dose cannot be given at the wound site, the remainder should be given intramuscularly in the opposite arm to vaccination, but not into the gluteal muscle. Immunoglobulin must be given for category 3 exposures as soon as possible after exposure to provide immediate neutralisation of the virus, but may still be given up to 7 days after the first dose of vaccine if not immediately available (but not if 8 or more days have passed). PEP should still be given even if there has been a delay in presenting to the health facility and should not be delayed to await results of rabies tests on the animal.

More information can be found in the 2010 updated rabies guidelines. Clinical advice, for healthcare professionals only, is available on the NICD hotline: 082 883 9920.

Source: Division of Surveillance, Outbreak Response and Travel Health, and Centre for Emerging and Zoonotic Diseases, NICD-NHLS; Onderstepoort Veterinary Institute of the Agriculture Research Council; Veterinary Services; Gauteng Department of Agriculture and Rural Development

Malaria

The malaria season in southern Africa is from September to May and an increase in both local and imported cases in travellers can be expected over the holiday season. There should be a high index of suspicion for malaria as the cause of acute febrile illness in all residents of areas with local transmission and in all returning traveller from these areas. Urgent laboratory testing is mandatory. The majority of travel-related malaria is seen in persons returning to South Africa from Mozambique. This is clearly a reflection of the large numbers of visi-

tors to Mozambique, and also of the significant malaria risk in Mozambique, particularly in areas north of Maputo, at this time of the year.

In accordance with the national guidelines, artemether-lumefantrine (Coartem®) is the first choice for treatment of uncomplicated falciparum malaria (except in children <6 months of age and in the first trimester of pregnancy), or quinine plus either doxycycline or clindamycin. Artesunate, where available, is the preferred initial treatment for severe malaria; alternatively intravenous quinine can be administered (remember to give an initial loading dose of 20mg/kg over 4-6 hours). In addition to the use of personal preventive measures to reduce mosquito bites, chemoprophylaxis is recommended for visitors to high-risk areas; mefloquine, doxycycline, or atovaquone-proguanil are recommended agents, with the choice dependent on individual traveller profiles.

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

Tick bite fever

A 70-year-old cattle farmer from Christiana, North West Province presented with an acute febrile illness 7 days after being bitten by a tick. He was admitted hypotensive with a depressed level of consciousness to a hospital in the Northern Cape and required ventilation. A preliminary diagnosis of tick bite fever (TBF) was made on the basis of the history of tick exposure and the presence of an eschar. Doxycycline, intravenous ciprofloxacin and ceftriaxone were administered. A profound thrombocytopenia (WCC 7.7 x 10^9/L with an absolute neutrophilia, platelets 29 x 10^9/L), and transaminasemia (AST 274 U/L, ALT 109 U/L, creatinine 240 µmol/L, and urea 34 mmol/L) were noted. Crimean-Congo haemorrhagic fever (CCHF) was considered in the differential diagnosis given the epidemiological history and blood results, and he was isolated pending the outcome of laboratory testing. PCR and serology were negative for CCHF. The serology for TBF on a specimen taken at day 10 of illness was negative, but this does not exclude TBF. The patient died most likely as a result of complicated TBF.

An increase in the number of cases of TBF has been noted in parts of the country since the beginning of September 2011, including several patients with severe illness largely as a result of misdiagnosis and delayed treatment. In South Africa, TBF is common in both urban and rural settings at all times of the year. Symptoms include rash, fever, headache and lymphadenopathy after an incubation period of 5 to 7 days. TBF is an important differential diagnosis of acute febrile illness with multi-organ involvement and haemorrhage. CCHF must be urgently considered in such cases and investigated by laboratory testing. The diagnosis of TBF is a clinical one, based on the findings of an eschar or possible tick exposure. The Weil-Felix test is neither sensitive nor specific, the sensitivity of PCR is variable, and IFA serology typically becomes positive only after 7-10 days of illness. Doxycycline is the treatment of choice in all age groups.

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

Foodborne illness outbreaks

Foodborne illness outbreaks refer to any food related incident involving 2 or more individuals that are epidemiologically linked to a common food/beverage source. The cause may be infectious or toxin-related. It is essential for public health officials/healthcare workers investigating foodborne illness outbreaks to indicate to NHLS laboratory staff when specimens are collected as part of an outbreak, and to label these as "Outbreak Specimens". It is recommended that both food and clinical (i.e. stool, rectal swabs and/or vomitus) samples should be referred to one of the designated NHLS public health laboratories. These laboratories have the capacities to perform specialised testing for foodborne pathogens and toxins, which may not be routinely detected by standard microscopy and culture techniques. Furthermore, when enteric pathogens (such as *Salmonella* spp.) are cultured, we request that isolates are referred to the Enteric Diseases Centre, NICD for further characterisation. This will enable the detection of widespread foodborne illness outbreaks, in addition to fully characterising local outbreaks.

Two foodborne illness outbreaks reported to the NICD during October 2011 are presented here. In addition, we provide a summary of non-typhoid *Salmonella* (NTS) identified by the Enteric Disease Centre, NICD-NHLS, as well as a summary of the foodborne illnesses, incidents and food pathogens related to the consumption of meat of a dead cow.

Sisonke, KwaZulu-Natal Province

On 13 October isolates that were received from the NHLS Laboratory, Pietermaritzburg. On further characterisation, *Salmonella enterica* serotype Blockley (*Salmonella* Blockley) was identified from all 3 isolates and all had identical PFGE fingerprint patterns. The district found that 3 children from the same family (aged 4, 14 and 16 years) experienced diarrhoea, stomach cramps and headaches on 24 September after consuming meat of a cow that died on the previous day (apparently due to consumption of plastic). None of the neighbours or other community members experienced illness after consumption of the implicated meat, suggesting that the food may have been contaminated after preparation in the home or the infection may have been caused by another food item.

Umlazi, KwaZulu-Natal Province

On 20 October an NHLS field epidemiologist reported that *Salmonella* sp. was identified by the NHLS Public Health Laboratory, Durban, from a stool and a food sample. These specimens formed part of a foodborne illness outbreak where 9 family members (aged 5 to 72 years) became ill after eating boiled chicken on 8 October. The chicken was purchased from an informal poultry seller, and it was prepared at the family's home. They presented with symptoms that included headache, stomach cramps, diarrhoea, vomiting and nausea on 9 October. The cases were treated at the local hospital and a private doctor, where stool specimens were collected. A chicken sample was collected and health education was provided to the family by environmental health practitioners. *Salmonella* Stanleyville was identified from a stool specimen and cooked chicken.

NTS serotypes

There are more than 2 400 *Salmonella enterica* serotypes that have been described and reported worldwide. All of the NTS are ubiquitously present in the environment and reside in the gastro-intestinal tracts of animals and can be acquired from multiple animal reservoirs. With the exception of *Salmonella* Typhi and Paratyphi A, B and C, NTS disease is primarily zoonotic. Transmission of *Salmonella* infection to humans occurs by many routes, including consumption of food animal products (e.g. eggs, poultry, undercooked ground meat and diary products), fresh produce contaminated with animal waste, or through contact with animals or their environment.

Table 1 illustrates the number of selected NTS serotypes that have been identified from 2007 to 11 November 2011. The most common serotypes identified in South Africa are *Salmonella* Typhimurium and *Salmonella* Enteritidis. Of the identified serotypes in the above-mentioned foodborne illness outbreaks, *Salmonella* Blockley was identified in 2009 (2 cases) and 2010 (1 case), and more than 10 cases of *Salmonella* Stanleyville have been identified yearly from 2008-2011.

2011 foodborne illnesses related to the consumption of meat of a dead cow

Of the 62 suspected foodborne illness incidents/outbreaks reported in 2011 to the NICD, six were related to the consumption of meat of a dead cow. *Salmonella* spp. were identified in six of these incidents and with further characterisation different serotypes were identified (Table 2).

Table 1: Number of *Salmonella* serotypes per year in South Africa, 2007 - 11 November 2011

Year	*Salmonella* Typhimurium	*Salmonella* Enteritidis	*Salmonella* Anatum	*Salmonella* Stanleyville	*Salmonella* Weltevreden	*Salmonella* Roodepoort	*Salmonella* Blockley
2011	345	410	18	17	5	2	3
2010	644	559	40	10	6	0	1
2009	774	402	25	14	1	0	2
2008	857	319	3	11	2	0	0
2007	744	202	2	1	3	0	0
Total	**3364**	**1892**	**88**	**53**	**17**	**2**	**5**

Public health officials are urged to promote general hygiene, and safe storage, handling and preparation of food. Health education regarding food safety is critical in preventing foodborne illness outbreaks. All healthcare workers should have knowledge of, and promote, food safety whenever such opportunities arise. The WHO Five keys to safer food promote practices that are easily implemented in most settings: keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures, and use safe water and raw materials.

Source: Division of Surveillance, Outbreak Response and Travel Health, and Enteric Disease Centre, NICD-NHLS; KwaZulu-Natal Department of Health; NHLS Laboratory, Pietermartizburg, NHLS Public Health Laboratory, Durban.

Table 2: Foodborne illness outbreaks related to the consumption of dead cow meat, 1 January - 11 November 2011

	Province, District	Month	Serotype
1	Kwazulu-Natal, Sisonke	February	*Salmonella* sp. (isolate not available for serotyping)
2	Kwazulu-Natal, Sisonke	March	*Salmonella* Typhimurium
3	Eastern Cape	May	*Salmonella* Typhimurium
4	Kwazulu-Natal, Sisonke	July	*Salmonella* Enteriditis
5	Kwazulu-Natal, Sisonke	July	*Salmonella* Weltevreden
6	Kwazulu-Natal, Sisonke	October	*Salmonella* Blockley

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.

Yellow fever: Ghana

Alert: 3 yellow fever cases were reported on the upper west region.

The disease: Yellow fever is an acute viral haemorrhagic disease transmitted by infected mosquitoes. After a 3-6 day incubation period infection typically presents as an acute illness phase including: fever, muscle pain, prominent backache, headache, shivers, loss of appetite, and nausea or vomiting. Fifteen percent of patients thereafter develop a more severe, toxic phase of illness which includes: jaundice, abdominal pain with vomiting, renal failure and/or haemorrhage, of which 50% may die.

Advice to travellers: Vaccination is the single most important preventative measure against yellow fever. Under the International Health Regulations, South Africans travelling to endemic countries (including Ghana) must receive yellow fever vaccine at least 10 days prior to departure. Yellow fever vaccination certificates are valid for 10 years. The vaccine is contraindicated in pregnant women, infants <9 months, individuals with egg allergies, and certain immunosuppressed individuals (including HIV-infected persons with CD4<200/mm3). These individuals still require a health certificate indicating the reason for non-receipt of vaccine when travelling. The main vector of yellow fever virus (*Aedes aegypti*) feeds during the daytime. Travellers should take precautions to protect against mosquito bites, including: use effective insect repellent (containing ≥30% DEET) and wear protective clothing (long sleeves, trousers and socks when weather permits) when outdoors.

Malaria: Greece

Alert: Due to the ongoing transmission of malaria in the Laconia region of Greece, prophylaxis is now indicated for travellers visiting this region. Since 27 September 2011, a total of 20 malaria cases has been reported in persons with no history of travelling to malaria endemic areas.

The disease: The incubation period may vary between one and four weeks; however, depending on the plasmodium species involved, much longer incubation periods are possible. Disease is characterised by fever and other non-specific symptoms, and may be life-threatening if untreated. Malaria should always be included the differential diagnosis of travellers to endemic areas who develop fever.

Advice to travellers: Malaria chemoprophylaxis is indicated for travellers to this area and other endemic countries. However, chemoprophylaxis is not 100% effective and measures to prevent mosquito bites should always be taken. These include using insect repellent (containing ≥30% DEET), staying in an air-conditioned or well-screened area, and sleeping under an insecticide-treated bed net. This is especially important during peak period for mosquito activity (between dusk and dawn).

References and additional reading: ProMED-Mail , European Centres for Disease Prevention and Control, Centers for Disease Control and Prevention.

Last accessed: 2011/11/14

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

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