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Division of the National Health Laboratory Service

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CONTENTS

Meningococcal disease

As is expected during the meningococcal season, cases of meningococcal disease continued to be reported from across the country. Numbers reported in September thus far are lower than weekly case numbers seen in July and August; there are, however, inherent delays in laboratory-based reporting, which lags behind clinical reports.

By epidemiological week 33 (week ending 18 August 2013), a total of 123 laboratory-confirmed cases was reported to the Centre for Respiratory Diseases and Meningitis (CRDM), NICD-NHLS (Table). Twenty-eight (25% of patients with known age) cases have been reported in the <1 year old age group this year so far; this is lower than the number of cases for the equivalent time period and age group in 2012 (n=38, 29%).

The reported cases were caused by diverse serogroups, which is in keeping with sporadic endemic disease in the country. Serogroup data were available for 84/123 (68%) of cases. Serogroup B and W135 have been identified most commonly this year (22/84, 26% serogroup B and 40/84, 48% serogroup W135). There were also fifteen cases of serogroup Y and seven cases of serogroup C disease. Two isolates were non-groupable.

Meningococcal disease occurs throughout the year, but the incidence is highest in the late winter and early spring. Clinicians should have a high index of suspicion for meningococcal disease in patients who present with an acute febrile illness and 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.

Table: Number of laboratory-confirmed meningococcal disease cases reported until end of epidemiologic week 33 (mid-August), 2012 and 2013, by province

	Year	
Province	**2012**	**2013**
Eastern Cape	21	27
Free State	6	8
Gauteng	50	28
KwaZulu-Natal	15	23
Limpopo	2	1
Mpumalanga	3	2
Northern Cape	0	1
North West	6	4
Western Cape	33	29
	136	123

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

Influenza surveillance

Since the start of the 2013 influenza season in epidemiologic week 17 (week starting 22 April 2013), influenza A(H1N1)pdm09 has predominated nationally followed by influenza A(H3N2) then influenza B. Influenza activity peaked in epidemiologic week 24 (week ending 16 June 2013), when the detection rate was 64%, with influenza A (H1N1)pdm09 predominating. A slight increase in activity has been observed since the beginning of August 2013 due to increased circulation of influenza A(H3N2) and influenza B, accounting for 52% and 25% of detections respectively during this period (Figure 1). This change in predominant circulating influenza subtype has been noted in both influenza-like illness (ILI) and in severe acute respiratory illness (SARI) patients (Figures 1 and 2).

For the period 1 January 2013 to 1 September 2013, influenza has been detected in 782 (46%) specimens of 1 698 patients presenting with ILI from all nine provinces: influenza A(H1N1)pdm09 in 599/782 (76%) patients; influenza A(H3N2) in 115/782 (15%) patients; and influenza B in 61/782 (8%) patients. There were seven mixed infections: influenza A(H1N1)pdm09 & influenza A(H3N2) in five patients; influenza A(H1N1)pdm09 & influenza B in one patient, and influenza A(H3N2) & influenza B in one patient.

Seventy patients positive for influenza were also positive for another respiratory virus, adenovirus being the most common and accounting for 67% (47/70) of co-infections. Other respiratory viruses were detected in 356 patients negative for influenza, most commonly rhinovirus (49%, 174/356) and adenovirus (24%, 84/356).

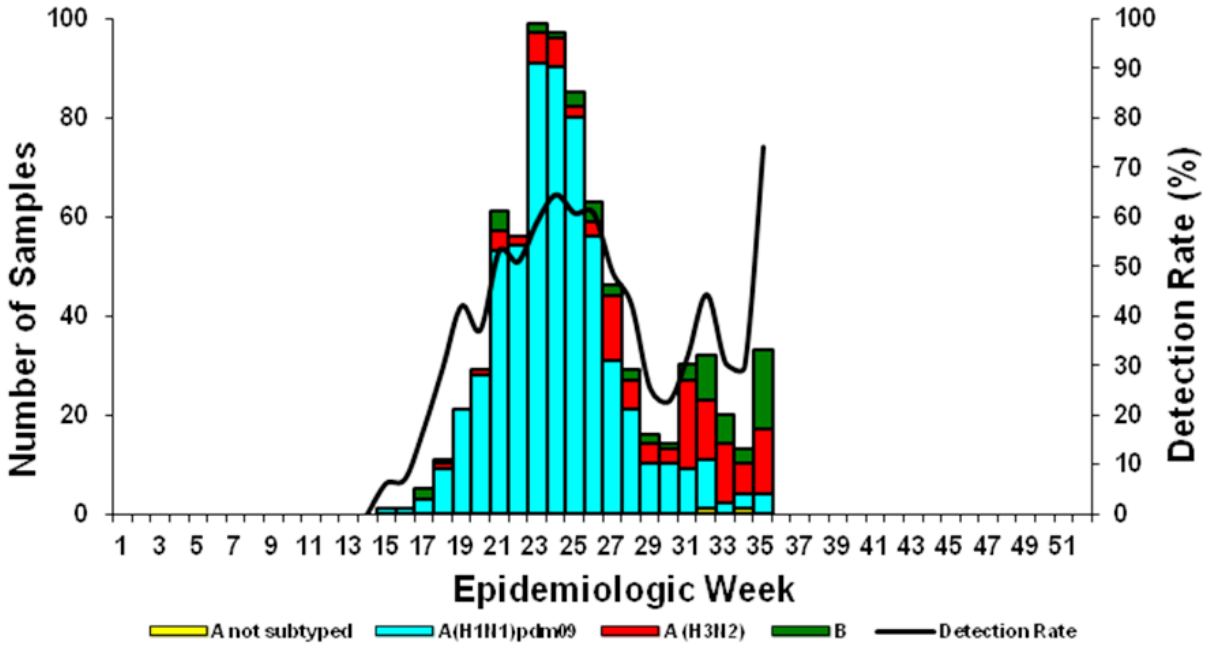

Figure 1: Number of positive samples by influenza types and subtypes and influenza detection rate by week, Viral Watch Programme, South Africa, 2013

For the period 1 January 2013 to 1 September 2013, 2 263 patients admitted with SARI were enrolled at the five sentinel sites. Although influenza detection in this group of patients was much lower than that seen in the patients with a mild presentation (ILI), a similar pattern of influenza circulation was seen, with influenza A(H1N1)pdm09 predominating initially followed by influenza A(H3N2) and influenza B circulation later in the season. Overall, influenza A(H1N1)pdm09 was detected in 4% (92/2 263) of patients, followed by influenza A (H3N2) in 1% (24/2 263)) and influenza B in <1 % (7/2 263). There was one mixed infection of influenza A(H1N1)pdm09 and A(H3N2). There were two cases of influenza A detected that were not subtyped. Other respiratory viruses were detected in samples of 1 787 patients; rhinovirus accounted for 35% (653/1 787) followed by respiratory syncytial virus 24% (420/1 787) and adenovirus 23% (404/1 787).

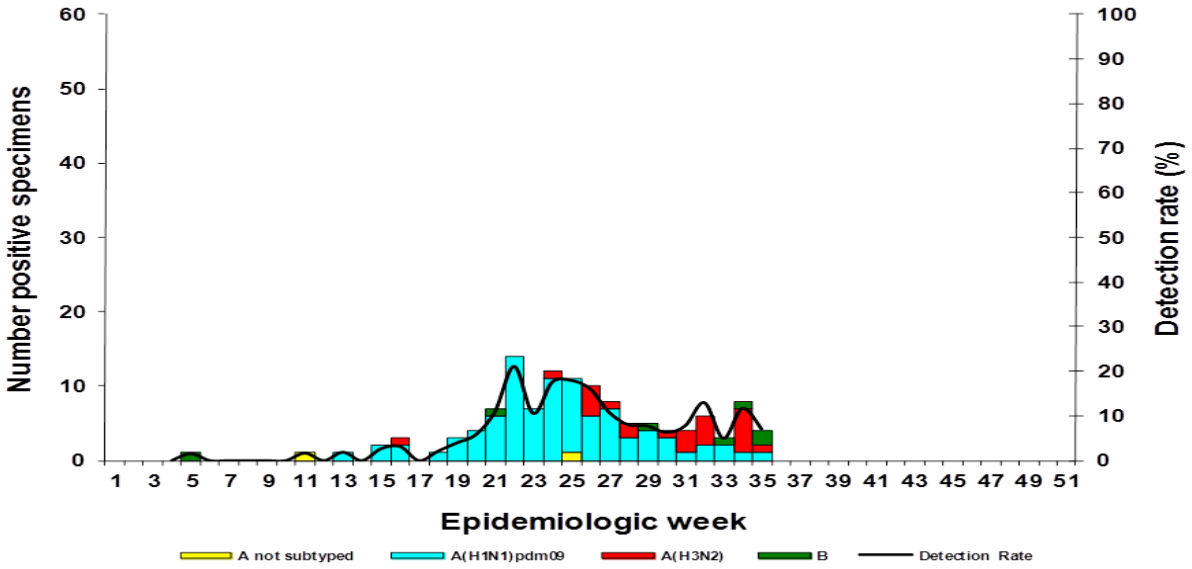

Figure 2: Number of positive samples by influenza types and subtypes and detection rate by week, SARI, South Africa, 2013

Although influenza circulation has started to decrease, influenza cases continue to be detected and clinicians are advised that they should consider influenza in their differential diagnosis for patients presenting with ILI and SARI. Early treatment with influenza antivirals should be considered in patients admitted with SARI who are at increased risk of influenza-associated disease and complications.

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

Rubella

This month, two clusters of fever-and-rash syndrome among school children in North West Province (NWP) and Gauteng Province (GP) were reported as suspected measles outbreaks for further investigation. A medical practitioner in Koster (NWP) reported seeing approximately 20 children during one week, all of whom attend a local school. The children, mostly aged 13 to 16 years, presented with a variety of symptoms including cough, coryza, conjunctivitis, rash and fever. Severity of illness in most cases was mild to moderate, and none required hospital admission. Most children had previously received measles vaccination. The suspected measles outbreak in GP was amongst primary school children who presented with fever-and-rash syndrome over a period of two weeks.

Three blood specimens from the NWP outbreak were tested at Ampath Laboratories and all were found to be rubella IgM positive and measles IgM negative; 16 of 20 blood specimens submitted from patients in the GP outbreak tested positive/ equivocal for rubella and negative for measles. These outbreaks are therefore highly likely to have been rubella.

Although rubella cases occur throughout the year, an annual increase in rubella transmission is usually seen at the end of winter and beginning of spring. These rubella outbreaks vary in size as they are dependent on the build-up of susceptible persons in the community. Rubella vaccination is not included in the Expanded Programme on Immunisation, which impacts on the pool of susceptible individuals. Since the onset of case-based surveillance for measles in 1998, up to 50% of specimens submitted have been positive for rubella IgM, with the median age of cases being 7 years. Please ensure that case investigation forms for suspected measles cases are always completed accurately and thoroughly, including the symptoms, vaccination history and dates of illness onset and specimen collection. No routine rubella surveillance is performed at NICD-NHLS; diagnostic rubella testing, if required, can be performed at routine NHLS virology/immunology laboratories. However, blood specimens for any case of suspected congenital rubella infection/syndrome or suspected rubella infection in a pregnant woman should still be referred to the NICD-NHLS for testing.

Source: Centre for Vaccines and Immunology, and Department of Public Health Surveillance and Response, NICD-NHLS; Department of Health, North West and Gauteng provinces; Ampath Laboratories

Malaria mosquito population monitoring in South Africa

The Centre for Opportunistic, Tropical and Hospital Infections (COTHI), NICD-NHLS, provides a service for the identification of medically important arthropods for entomologists, medical practitioners, health inspectors and health authorities. This includes the identification of potential malaria vector mosquitoes to species as a service to the KwaZulu-Natal, Limpopo and Mpumalanga Malaria Control Programmes. These provinces are low malaria transmission areas that are prone to malaria epidemics.

In most instances malaria vector mosquitoes cannot be identified to species using external morphological characteristics alone and subsequent molecular methods are required. This is because the major vectors of malaria in South Africa, *Anopheles funestus* and *An. arabiensis*, are members of the *An. funestus* species group and *An. gambiae* species complex respectively. Both of these taxonomic groups also contain closely related, morphologically similar, non-vector species.

Between April 2012 and March 2013, 223 adult anopheline mosquitoes were collected from sentinel sites in KwaZulu-Natal Province, 1 102 from Mpumalanga Province and 424 from Limpopo Province (Figure 3), giving a grand total of 1 749 mosquitoes. These samples were preserved on silica and sent to COTHI for identification. In the first instance, each adult was morphologically assigned to a taxonomic group. Of these, 1 455 were identified as members of the *An. gambiae* complex, 164 were identified as members of the *An. funestus* group and 130 as other anophelines of no medical importance. Subsequent identification to species using multiplex PCR assays revealed the occurrence of *An. arabiensis*, *An. merus* (minor malaria vector) and *An. quadriannulatus* (non-vector) of the *An. gambiae* complex. *Anopheles rivulorum* (minor malaria vector) and the non-vectors *An. vaneedeni, An. parensis* and *An. leesoni* of the *An. funestus* group were also identified. No *An. funestus* sensu stricto were identified. Other non-vector anophelines identified included *An. demeilloni, An. rufipes, An. maculipalpis, An. pretoriensis* and *An. coustani*.

For vector incrimination, an enzyme-linked immunosorbent assay (ELISA) is routinely used to detect the presence of *Plasmodium* sporozoites in adult anopheline females. No sporozoite infections were detected in any of the samples.

These data have been reported to the respective provincial malaria control programmes. They serve as an indicator of the occurrence and prevalence of malaria vectors in each region and can be used to assist in the planning of ongoing control operations.

Source: Centre for Opportunistic, Tropical and Hospital Infections, NICD-NHLS; Malaria Control Programme managers (Limpopo, Mpumalanga and KwaZulu-Natal provinces)

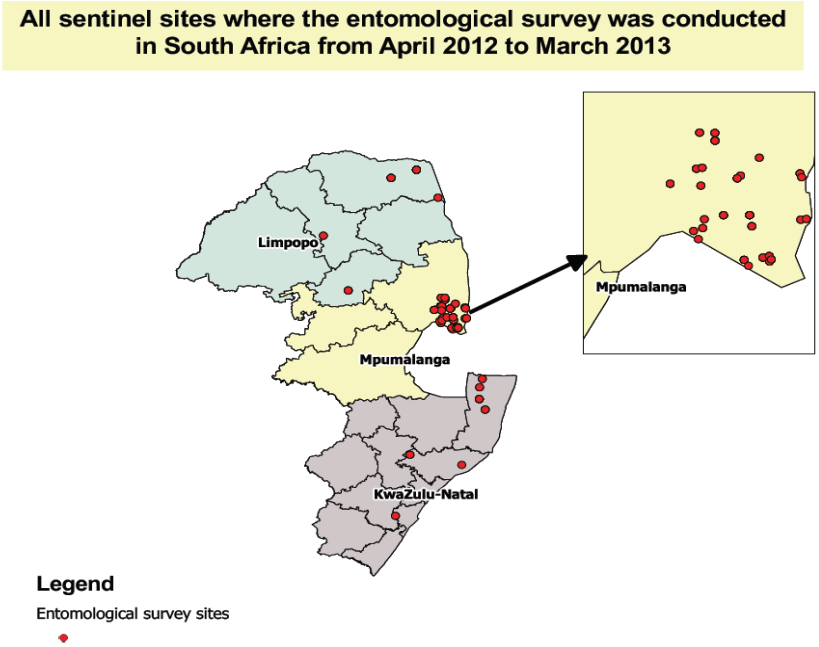

Figure 3: Survey sites for collection of anopheline mosquitoes, April 2012 to March 2013

Suspected diphtheria

An 8-month-old previously well infant was referred from a secondary hospital to Red Cross Children's Hospital in Cape Town (Western Cape Province) on 13 August 2013 with an initial diagnosis of croup. There was a three-day history of fever, cough, tachypnoea, 'sores in the mouth' and poor feeding. The child was resident in Western Cape Province and there was no history of recent travel. Clinically, the child had a barking cough, excessive salivation and stridor with rapidly progressive respiratory distress that was unresponsive to adrenaline nebulisation and necessitated intubation. On examination of the mouth and throat, there was marked halitosis, redness of the uvula and normal tonsils, but no associated lymphadenopathy. During intubation under anaesthesia, a necrotic appearance of laryngeal structures, cords and subglottic area was noted, and swabs were taken; these samples were submitted to the bacteriology laboratory for routine microscopy and culture as well as culture on selective media for *Corynebacterium diphtheriae*. Ampicillin, gentamycin, fluconazole and aciclovir were administered to the patient.

Laboratory results showed procalcitonin of 185 ng/mL and WCC of 1.1 x 10^9/L which subsequently increased to 1.7 x 10^9/L (4% neutrophils, 39% monocytes, 52% lymphocytes, 3% band cells and 2% metamyelocytes). Although diphtheria was initially deemed unlikely as the child had received all age-appropriate vaccinations, the findings on laryngoscopy of a thick white adherent membrane that bled and revealed marked underlying inflammation on attempts to dislodge it raised concerns about possible diphtheria in this case. Histologically, the membrane showed areas of necrosis consistent with, but not diagnostic for, diphtheria. Additional swabs were submitted and cultured on selective media for *C. diphtheriae*. The case was notified to provincial and city health authorities as a suspected diphtheria, and specific patient management and appropriate public health response were initiated. The patient was isolated, and standard plus droplet precautions were instituted.

The initial management of the infant focussed on respiratory support and antibiotic treatment, and the process to procure diphtheria antitoxin (DAT) was initiated. Four days after initial presentation, 50 000 units of equine DAT was obtained and administered intravenously without adverse events. On day 6 of hospitalisation the child was successfully extubated, and eventually discharged home with no apparent sequelae of the illness. *C. diphtheriae* was not isolated from any specimens taken during hospitalisation; possible explanations include receipt of antibiotics prior to sampling, delay in transport of specimens to laboratory, and alternate diagnoses.

Pharyngeal swabs were taken on all household contacts, who also received erythromycin chemoprophylaxis and were monitored for symptoms. The infant's mother complained of a sore throat 3-4 days after her child was admitted; she was moved from the shared overnight accommodation and isolated, swabs were taken, and she was treated with appropriate antibiotics following which her symptoms improved rapidly. *Streptococcus pyogenes* was isolated from the mother's pharyngeal swab. Diphtheria vaccine was given to all household contacts as well as to ICU staff who had been in contact with the child.
Through the EPI programme, diphtheria immunisation is offered at 6, 10 and 14 weeks with boosters at 18 months as well as 6 and 12 years of age. The infant had in fact been fully immunised against diphtheria and did not require a booster, since antibody tests taken on admission showed protective titres of antibodies to diphtheria toxin.

The last laboratory confirmed case of diphtheria in South Africa was in February 2010 (reported in the February 2010 Communiqué). Although diphtheria is an uncommon disease in South Africa, there is concern that this potentially lethal disease may resurge, as it has in other regions of the world over the past decade - most notably Eastern Europe, Southeast Asia, South America and the Indian subcontinent. It is important that clinicians are aware of the range of clinical presentations and appropriate investigations in order to detect cases timeously and limit mortality. A presumptive diagnosis of diphtheria may be based on a number of clinical clues, including: mildly painful tonsillitis/pharyngitis associated with an exudate/membrane; adenopathy and cervical swelling; hoarseness and stridor; palatal paralysis; serosanguinous nasal discharge with associated mucosal membrane, and low-grade fever. Absorption of diphtheria toxin from the site of infection can cause systemic complications, including cardiac toxicity (myocarditis, acute congestive failure), neurotoxicity (paralysis of soft palate, cranial neuropathies and peripheral neuritis) and renal toxicity (renal failure). Confirmation of the diagnosis relies on the isolation *C. diphtheriae* from appropriate specimens; specimens should be taken from the nose and throat, and from beneath the membrane, if present. Multiple site sampling should always be considered

in a suspected case as this may increase the organism recovery rate. The specimens must be sent to the laboratory immediately since rapid inoculation of special culture media is extremely important for organism recovery; if the transportation is likely to be delayed, the specimens must be submitted in a suitable transport medium (e.g. Amie's). The laboratory must be contacted beforehand to ensure that the selective media is available and that the specimen is processed immediately on arrival. Following isolation of *C. diphtheriae,* the isolate/s are subjected to testing for toxigenicity since non-toxigenic *C. diphtheriae* may be isolated but do not cause clinical diphtheria.

The mainstay of treatment of a case of suspected diphtheria is prompt administration of DAT; this should be given without waiting for laboratory confirmation of a diagnosis. DAT only neutralises toxin before its entry into cells so it is critical that DAT be administered as a matter of urgency. The recommended dosage and route of administration depend on the extent and duration of disease. Antibiotics should also be given to suspected diphtheria cases, in order to eradicate carriage of the organism, limit transmission, and stop further production of diphtheria toxin. The current recommendations for antibiotic therapy of diphtheria include erythromycin or penicillin. Management of contacts should include screening for possible respiratory diphtheria, obtaining nasopharyngeal cultures for *C. diphtheriae,* administering chemoprophylaxis, and assessing diphtheria vaccination status.

Unfortunately, there are currently few manufacturers of DAT globally and supplies are limited to few facilities/institutions worldwide. South Africa does not stock any supplies of DAT, and it needs to be sourced from overseas suppliers on a case-by-case basis through an emergency MCC Section 21 application. DAT was sourced for this patient with the assistance of the Centers for Disease Control and Prevention (Atlanta, USA) and supplied by the Ministry of Health in Israel through an emergency MCC Section 21 application. The generous support and assistance of the many persons involved locally and internationally in this process and the rapid response to the call for DAT are gratefully acknowledged.

Source: Clinicians at Red Cross Children's Hospital; Groote Schuur NHLS laboratory; Western Cape Department of Health; Department of Public Health Surveillance and Response, NICD-NHLS

Rabies

No additional cases of human rabies have been reported since the last Communiqué. A total of seven laboratory-confirmed and two probable cases of human rabies has been reported in South Africa for 2013 to date. In 2012, a total of ten laboratory-confirmed cases of human rabies was recorded in South Africa. During the last decade (2003-2013), human rabies cases were reported from KwaZulu-Natal (n=51), Limpopo (n=40), Eastern Cape (n=31), Mpumalanga (n=6), Free State (n=4), North West (n=2) and Northern Cape (n=1) provinces. A case of locally-acquired rabies was recorded in a young child from Soweto, Gauteng Province, in 2010.

During the previous decade, nearly three-quarters of the rabies victims were children under 16 years of age. The majority of patients reported exposures to domestic dogs, but cases of exposure to mongoose (n=3) and single cases of exposure to jackal, domestic cat, caracal and bat (the rabies case associated with Duvenhage virus infection) were also reported. The NICD-NHLS serves as the reference laboratory for investigation of suspected human rabies cases in South Africa. Appropriate specimens for ante-mortem investigation of suspected rabies cases include saliva, cerebrospinal fluid and nuchal biopsies. Ante-mortem diagnosis of rabies remains challenging and is influenced by many factors, including the timing of specimen collection and rabies vaccination status of the patient. Post-mortem diagnosis is conducted on brain biopsy specimens, and includes brain impression smears and detection of rabies viral antigen using an anti-rabies virus nucleocapsid polyclonal serum coupled to a fluorescent detection dye.

Domestic dogs and cats, due to their high level of contact with the human population, pose the main risk to humans, although any mammal can contract rabies. Domestic dogs and wildlife (including bat-eared fox, yellow mongoose and black-backed jackal) are most commonly diagnosed with rabies in South Africa. Smaller mammals such as rodents and squirrels are not considered animals of concern for rabies transmission; usually these animals will die as a result of the rabid animal attack before they can successfully incubate and transmit the disease. The Agriculture Research Council-Onderstepoort Veterinary Institute in Pretoria and Allerton Veterinary Laboratory in Pietermaritzburg are the Department of Agriculture, Forestry and Fisheries (DAFF)-approved laboratories for animal rabies

testing in South Africa. Rabies-infected animals have been reported from all nine provinces in South Africa. KwaZulu-Natal (KZN) Province has the highest rate of dog rabies in the country; in 2012, DAFF reported a total of 315 positive canine cases countrywide, of which 233 (74%) originated from KZN.

The primary modes of limiting rabies transmission and risk to humans include keeping rabies vaccination of domestic dogs and cats up to date, avoiding contact with unknown and stray or wild animals, and seeking prompt medical care (including rabies post-exposure prophylaxis) after potential exposures.

Healthcare workers and members of the public can access the NICD website (www.nicd.ac.za) for further information regarding rabies. The national rabies guideline document may also be downloaded from the NICD website at http://www.nicd.ac.za/?page=guidelines&id=73.

On 28 September, the world celebrates World Rabies Day. Events and programs for World Rabies Day are aimed at increasing awareness for the prevention and control of this deadly disease. More information regarding World Rabies Day may be found at http://rabiesalliance.org/world-rabies-day/.

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

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.

Disease & countries	Comments	Advice to travellers
MERS-CoV Middle East: Jordan, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). France, Germany, Tunisia and the United Kingdom	As of 7 September 2013, WHO has been informed of a total of 114 laboratory-confirmed cases of infection with MERS-CoV, including 54 deaths.	Infection prevention and control measures include good cough etiquette, avoiding contact with sick people, and frequent hand washing with soap and water or the use of an alcohol-based hand rub. Travellers should contact a medical practitioner if they develop acute respiratory symptoms upon return from a known risk area.

Disease & countries	Comments	Advice to travellers
Cholera in Africa New outbreaks: Guinea, Nigeria Ongoing outbreaks: Guinea-Bissau, Niger, Sierra Leone, Somalia, Congo DR	New outbreaks of cholera have been declared in Nigeria (Oyo State) and Guinea (Banfele locality), whilst ongoing cases are reported in other countries with established outbreaks (Guinea-Bissau, Niger, Sierra Leone, Somalia and Congo DR).	Drink and use safe water (bottled with unbroken seal, boiled, or treated with chlorine tablets). Wash hands with soap and safe water often. Eat hot well-cooked food, peel fruits and vegetables. Vaccines offer delayed and incomplete protection and are not routinely recommended.
Poliovirus (wild- type) Horn of Africa (Kenya, Somalia and Ethiopia) Israel, West Bank and Gaza	The outbreak of wild poliovirus type 1 (WPV1) in the Horn of Africa has spread into 2 new states of Somalia. As of 4 September 2013, 160 cases were reported in Somalia since April 2013, and 13 cases in Dadaab (Kenya) which hosts a major refugee camp home to Somalian nationals. One case has also been reported from the Somali region of Ethiopia. WPV1 has been detected in 27 sites in Israel and 1 site in West Bank. However, no case of paralytic polio has been reported in either Israel or the West Bank and Gaza to date.	Travellers are advised to ensure that they have completed the recommended age-appropriate polio vaccine series. It is recommended for the unvaccinated, incompletely vaccinated, or those whose vaccination status is unknown that they receive 2 doses of IPV administered at an interval of 4–8 weeks, and a third dose should be administered 6–12 months after the second. Vaccinated travellers to the area should receive a booster (ideally the inactivated polio vaccine (IPV) or alternatively oral polio vaccine (OPV) booster.

Disease & countries	Comments	Advice to travellers
West Nile virus European Union (EU) and neighbouring countries: Croatia, Greece, Hungary, Italy, Romania, Bosnia & Herzegovina, Israel, Russian Federation, Serbia, Macedonia, Montenegro, Ukraine	As of 12 September, 139 cases of West Nile virus infection have been reported in the European Union, and 361 cases in neighbouring countries since the beginning of the 2013 season.	There is no vaccine or specific treatment for West Nile virus infection. Severe cases may require hospitalisation for intravenous fluid and symptomatic care. Travellers should wear long-sleeved shirts and long pants during the day and stay in well-ventilated (fan/air-conditioned) rooms where possible; use mosquito repellents containing DEET to avoid being bitten. The burning of mosquito coils at night and sleeping under a mosquito net in a well-ventilated room are also helpful at preventing other infections transmitted through mosquito bites.

References and additional reading:

ProMED-Mail (www.promedmail.org)
World Health Organization (www.who.int)
Centers for Disease Control and Prevention (www.cdc.gov)
Global Polio Eradication Initiative (http://www.polioeradication.org/Dataandmonitoring/Poliothisweek.aspx)

Last accessed: 17 September 2013.

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