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Cholera outbreak

There has been an ongoing outbreak of cholera in South Africa since November 2008. This outbreak was first recognised in Musina, Limpopo Province and subsequently affected all nine provinces. A total of 12 705 cases of cholera including 65 deaths (CFR= 0.5%) was reported nationally for the period 1 November 2008 to 19 April 2009. Of these, 1 140 (9%) have been laboratory-confirmed. Cases have been reported from all 9 provinces with the majority from Mpumalanga (n=6855, 54%) and Limpopo (n=5459, 43%) provinces (Table).

The number of new cholera cases had been declining steadily until a recent resurgence of laboratory-confirmed cases in Limpopo Province during epidemiological week 14. During that week, 30 new laboratory-confirmed cases were reported. The majority of these cases were linked to attendance at funerals in the Capricorn District. Extensive health promotion activities and environmental health interventions appear to have contained this recent cluster. Case frequencies during epidemiological weeks 15 and 16 have subsequently declined.

The outbreak linked to farms in Brits, Northwest Province, which occurred in early March 2009, has since been contained. Ongoing vigilance and clinical surveillance is required in all provinces in order to rapidly detect and contain further outbreaks. In addition, laboratory testing for cholera should be performed on all cases meeting the clinical case definition (any individual with acute watery diarrhoea) until further notice.

Table. Reported cholera cases and deaths in South Africa by province, 1 November 2009 to 19 April 2009

Province	Total cases*	Laboratory-confirmed cases no.(% of total)†	Deaths no. (CFR%)
Mpumalanga	6 855	386 (5.6)	30 (0.4)
Limpopo	5 459	610 (11.2)	26 (0.5)
Gauteng	286	71 (24.8)	4 (1.4)
North West	91	59 (64.8)	4 (4.4)
Western Cape	8	8 (100.0)	0 (0.0)
KwaZulu Natal	2	2 (100.0)	1 (50.0)
Northern Cape	1	1 (100.0)	0 (0.0)
Free State	1	1 (100.0)	0 (0.0)
Eastern Cape	2	2 (100.0)	0 (0.0)
Cumulative total	12 705	1 140 (9.0)	65 (0.5)

*This includes both laboratory-confirmed cases and cases meeting the current clinical case definition for cholera (all individuals with acute onset of watery diarrhoea)
†This includes all laboratory-confirmed cholera cases reported to the NICD from NHLS and private laboratories

Source: Outbreak Response Unit, Enteric Diseases Reference Unit, SA-FELTP,NICD; Limpopo local and provincial Departments of Health; NHLS; Mpumalanga SD: Communicable Disease Control; Communicable Disease Control Directorates in all provinces, National Department of Health Communicable Disease Control

Measles outbreak

During March 2009 several measles cases were reported from Tshwane District, Gauteng Province. Upon investigation, seven confirmed cases and three probable cases were identified (Figure). A suspected measles case is defined as any individual presenting with fever (≥38^{O}C) and rash and one or more of the following: cough, coryza (runny nose) or conjunctivitis (red eyes); a probable case is a suspected case that is epidemiologically linked to a confirmed case, and a confirmed case is a suspected/probable case that is laboratory-confirmed (measles IgM positive). Three of the cases required hospitalisation for severe disease. Four household clusters were identified; one household had three cases and three households had two cases. Within two household clusters, a parent was the primary case with subsequent transmission to children; however, within the other two clusters, siblings were both the primary and secondary cases.

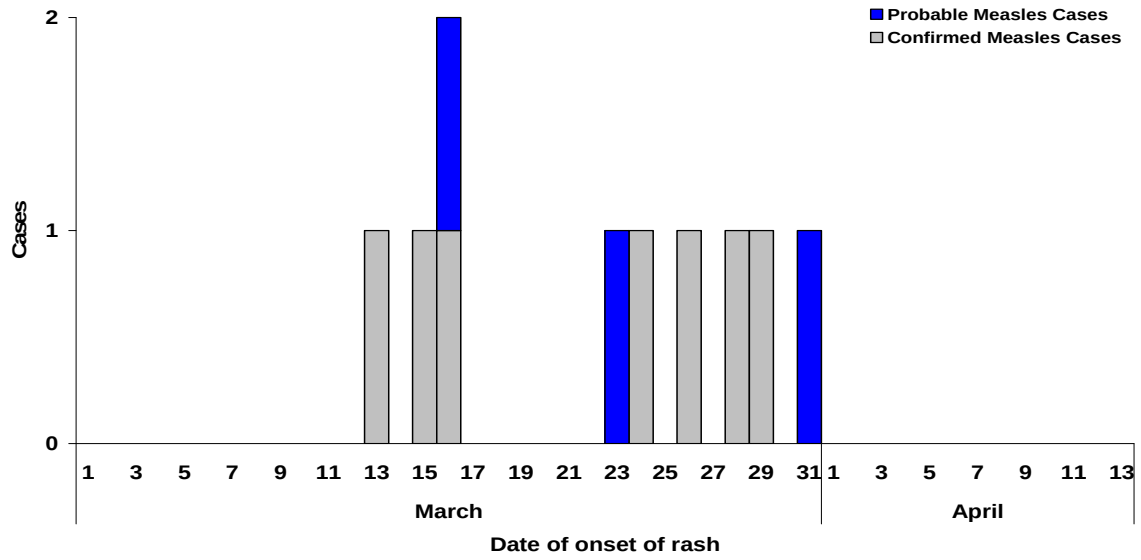

Figure. Epidemic curve of measles cases, Tshwane district, Gauteng Province, 1 January through to 31 March 2009

Of the total identified cases, six were male and four female, with ages ranging from 11 months to 34 years. The cases were widespread across the district.

A number of interventions have been instituted for control of this outbreak. These include the following:

- A directive to all healthcare facilities to provide measles vaccination for all children from 6 months to 15 years in Tshwane district upon admission with immediate effect, until the outbreak is over.
- Active case finding: retrospective record review in health facilities, where confirmed measles patients were consulted or hospitalised, has been conducted and is ongoing. In addition, facilities have been reminded of the clinical case definition for measles, the requirements for surveillance specimens (serum and urine), and to report all suspected cases immediately by telephone. Alerts have also been sent to private and public laboratories to expedite referral of all specimens from suspected measles cases to NICD for urgent testing.
- Use of a standardised case investigation form to facilitate contact tracing and establish links between confirmed cases. Interviews are still ongoing but no epidemiological links have been identified to date.
- Prevention of nosocomial infections by strengthening compliance with standard and

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transmission-based precautions, and ensuring "fast-tracking" and isolation of all suspected measles cases.
- Health promotion activities in the community.
- A measles vaccination campaign will be conducted in Tshwane District for children less than five years old.

Source: SA-FELTP, Epidemiology and Surveillance Unit, Outbreak Response Unit and Viral Diagnostic Unit, NICD; Tshwane District and Gauteng Province Communicable Disease Control

Diphtheria

A case of diphtheria was notified to local health authorities in the Eastern Cape Province in March 2009. The patient, a 10-year-old child, presented to a local hospital casualty with clinical features suggestive of diphtheria. The child was severely ill with marked neck swelling (bull neck sign), a pharyngeal membrane and sero-sanguinous nasal secretions. The patient was admitted to the Intensive Care Unit (ICU) in isolation and treatment with intravenous penicillin was initiated. The patient subsequently died due to renal and cardiac complications. The immunization history could not be confirmed. Diphtheria anti-toxin, which was indicated, could not be accessed as it is not available in South Africa. A throat swab was obtained for culture and *Corynebacterium diphtheriae* was isolated. Confirmation of the presence of diphtheria toxin using the Elek method will be performed.

In response to the notification of this case, public health officials traced the close contacts (family, close friends at school and in the neighborhood), post-exposure chemo-prophylaxis was given and immunization was offered to both adults and children. All close contacts were monitored for symptoms of diphtheria.

Humans are the only reservoir for *C. diphtheriae,* which is primarily spread via large respiratory droplets or direct contact with infected skin lesions. Asymptomatic carriage of *C. diphtheriae* is an important reservoir for endemic and epidemic diphtheria, and carriage rates are reduced by vaccination.[1] In areas of high vaccination coverage, carriage rates are markedly reduced and reservoirs for infection in these settings are difficult to determine.

The clinical features and systemic complications of diphtheria (myocarditis and peripheral neuritis) are toxin mediated. In rare instances, *C. diphtheriae* may become invasive and cause endocarditis, arthritis and bacteraemia. Treatment for diphtheria should be commenced on clinical suspicion alone when typical clinical features such as membranous pharyngitis with a grey, thick, firmly adherent membrane and enlarged cervical nodes ("bull neck") are present. In the era of vaccination, these clinical features may not be present and cases may resemble mild streptococcal pharyngitis with the absence of a membrane.[2] The diagnosis can be confirmed by culture of throat swabs and demonstration of toxin by Elek plate or PCR detection where available. It is essential that the laboratory is informed when the disease is suspected, as culture for *C. diphtheriae* requires selective media that is not part of routine processing.

Diphtheria is a notifiable condition in South Africa. The true burden of illness in SA is unknown. No cases of diphtheria were reported through the national notification system for 2004 and two cases in 2005 (personal communication, National Department of Health). One laboratory-confirmed case was reported in 2008 from the Western Cape Province.

All suspected diphtheria cases should be reported to health authorities urgently. Antibiotic treatment using penicillin or erythromycin should be given for 14 days and elimination of the organism should be confirmed on subsequent culture. Diphtheria anti-toxin treatment is only effective if given very early in the course of illness and is not available in SA. Cases should be isolated with droplet and contact precautions until 2 negative throat and nasal swabs

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are obtained >24 hours after completion of treatment and taken 24 hours apart.

Follow up of close contacts is essential. Throat and nasal swabs should be obtained from those who have had close contact with a case in the previous 7 days. Post-exposure chemo-prophylaxis should also be provided to these contacts with benzylpenicillin or erythromycin (newer macrolides may also be effective). Those contacts with positive cultures will require treatment and follow up as per symptomatic cases. The aim of chemoprophylaxis is both to eliminate asymptomatic carriage and to treat incubating disease. Booster immunisation should also be provided to those who have not received a booster in the previous 12 months. Contacts should be monitored for symptoms for at least 7 days after last exposure.[2]

The incidence of clinical diphtheria has been reduced by widespread childhood immunisation. In South Africa, the Expanded Program of Immunization (EPI) schedule as of April 2009 includes 6 doses of diphtheria vaccine. The primary series of vaccination is given in 3 doses at 6, 10, and 14 weeks of age using diphtheria toxoid given as DTaP-IPV/Hib (Diphtheria, Tetanus, acellular pertussis, inactivated poliovirus and *Haemophillus influenzae* type b). The fourth dose (first booster) is given at 18 months using DTaP-IPV/Hib. Two additional booster doses were introduced by the SA-EPI program in February 2008. Diftavax® (Td) vaccine (containing a reduced dose of diphtheria toxoid) is now administered at 6 and 12 years of age, respectively. Td vaccine has replaced DT vaccine, which was previously administered at 5 years of age. Td can be used as a booster in individuals ≥6 years of age. Antitoxin levels decline following vaccination and boosters are recommended at 10 year intervals to ensure protective levels.[1,2]

References

1. MacGregor RR. *Corynebacterium diphtheriae*. In: Mandell GL, Bennett JE, Dolin R, eds. *Mandell, Douglas and Bennett's: Principles and Practice of Infectious Diseases*. Vol 2. 6th ed. Philadelphia, PA: Elsevier; 2005: 2457-2465.
2. Bonnet JM, Begg NT. Control of diphtheria: guidance for consultants in communicable disease control. Communicable Disease and Public 1999; 2: 242-249.

Source: Outbreak Response Unit, NICD; Eastern Cape Province Communicable Disease Control; Infection Control Services NHLS

Viral haemorrhagic fevers

No cases of Crimean-Congo haemorrhagic fever (CCHF) have been confirmed this year to date. A total of 11 cases were confirmed during 2008.

No additional cases of Rift Valley fever (RVF) in humans were confirmed in the last month. A total of three cases was confirmed with RT-PCR and virus isolation. These were related to an outbreak of the disease in cattle within KwaZulu Natal Province, during March of this year. During the 2008 and 2009 RVF outbreaks human cases were related to occupational exposures. The three cases reported this year were two farmers and a veterinarian. All three cases recovered without apparent sequelae.

Source: Special Pathogens Unit and Outbreak Response Unit, NICD

Rabies update

No additional cases of human rabies were confirmed during the past month. Since January 2009 a total of 6 cases was confirmed. These were reported from KwaZulu Natal (n=3) and Eastern Cape (n=3) provinces.

Source: Special Pathogens Unit and Outbreak Response Unit, NICD

Meningococcal disease

Sporadic cases of meningococcal disease continued to be reported across the country in keeping with trends in previous years. By the end of epidemiological week 14, a total of 72 laboratory-confirmed cases were reported to the Respiratory and Meningeal Pathogens Reference Unit (RMPRU), NICD (Table).

The increase in cases seen this year in the Western Cape and KwaZulu-Natal provinces may reflect improved reporting in response to the recent media reports and community fears. These cases showed diversity in serogroups, which is in keeping with sporadic endemic disease in these provinces.

Serogroup data were available for 59/72 (81.9%) of cases. The predominant serogroup nationally for 2009 to date was serogroup W135 (49%, 29/59). The remaining serogroups included: A (0%), B (27%, 16/59), C (19%, 11/59), and Y (5%, 3/59).

We are now entering the winter season, where we typically identify an increase in cases. As such, there should be a high index of suspicion for meningococcal disease which may present with non-specific 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.

Table: Number of laboratory-confirmed meningococcal disease cases reported 1 January to 4 April 2008 and 2009, by province

Province	2008	2009
Eastern Cape	4	4
Free State	5	1
Gauteng	45	31
KwaZulu-Natal	2	10
Limpopo	-*	-*
Mpumalanga	8	4
Northern Cape	2	-*
North West	-*	2
Western Cape	9	20
South Africa	75	72

*No cases reported

Source: Outbreak Response Unit, Respiratory and Meningeal Pathogens Reference Unit, NICD

Malaria

Plasmodium falciparum malaria was confirmed in two southern Gauteng residents with no recent travel history. The two cases were brothers living on a farm near Suikerbosrand. The first case (a 15-year- old male) presented on 14 March 2009 with symptoms of fever, myalgia, headaches, dizziness, rigors and diarrhoea. The patient was hospitalised with clinical suspicion of malaria and encephalitis. Blood and cerebrospinal fluid specimens were collected for laboratory confirmation of the two respective diagnoses. A malaria smear confirmed *P. falciparum* infection.

The second case (an 18-year-old male) experienced onset of an intermittent fever, myalgia, rigors, vomiting and diarrhoea seven days after his brother. A malaria smear processed immediately upon hospital admission also confirmed *P. falciparum* malaria. Full blood counts revealed neither patient experienced thrombocytopaenia (a commonly reported laboratory finding in both uncomplicated and severe malaria). Their younger sister also reported symptoms of nausea, myalgia and stomach cramps during the same period; however, laboratory testing did not find any evidence of malaria.

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Further investigation and inspection of the patients' residences revealed the presence of many mosquitoes. Several mosquito cadavers were collected; however, neither potential *Anopheles sp.* malaria vectors nor obvious breeding sites (open and stagnant water) were identified within the vicinity of the household. Despite this, the close proximity of the farm to two significant transport routes (railway line and main road within 5km) and a neighbouring family from Mozambique (travel history unknown), suggest that an infectious mosquito was imported. Infection of these two cases may have occurred during the same night as they share a bedroom.

Over the past decade there have been 47 reported cases of 'airport malaria' (patients with no travel history to malaria areas) in Gauteng Province. Anopheline malaria vector species do not occur naturally in the Highveld region. However, importation of mosquitoes from malaria endemic areas in transport vehicles regularly occurs. These mosquitoes may survive for up to three weeks depending on environmental conditions, and have the potential to transmit malaria to humans if infected.

The recent cases further highlight the need for clinicians to be vigilant, and malaria should always be considered in patients with unexplained fever. Recommended treatment includes the use of artemether-lumefantrine (Coartem®), or quinine plus doxycycline/clindamycin for uncomplicated falciparum malaria. Severe falciparum malaria should be treated using quinine plus doxycycline/clindamycin. (See also the National Malaria Treatment Guidelines 2008: www.doh.gov.za/docs/factsheets/guidelines/prevention_malaria08a.pdf).

Source: Outbreak Response Unit, SA-FELTP and Vector Control Reference Unit, NICD

Severe acute respiratory illness (SARI) surveillance

The NICD (Epidemiology and Surveillance Unit, Molecular Diagnostic Laboratory and Respiratory and Meningeal Pathogens Reference Unit) in partnership with Vaccine Preventable Diseases Unit (Wits Health Consortium) has established a surveillance programme for severe acute respiratory infections (SARI). Four sentinel surveillance sites will participate in the programme namely CH Baragwanath Hospital in Gauteng Province, Mapulaneng and Matikwana Hospitals in Mpumalunga Province, and Edendale Hospital in KwaZulu-Natal Province. The programme receives funding from the Centers for Disease Control and Prevention (CDC) in Atlanta, USA

We aim to describe trends in number of SARI cases at sentinel surveillance sites and determine the relative contribution of influenza and other respiratory viruses (respiratory syncitial virus (RSV), parainfluenza virus 1,2 and 3 (PIV123), human metapneumovirus (HMPV) and adenovirus (AV)) to this disease presentation in a setting with a high prevalence of human immunodeficiency virus (HIV) infection. The programme also aims to describe the trends in pneumococcal infection and to describe the trends in serotype isolation of pneumococcal infection following the introduction of the 7 valent pneumococcal vaccine into the Expanded Programme of Immunisation (EPI).

The programme started enrolling patients at CH Baragwanath in February 2009 and has enrolled 720 patients at this site. Mapulaneng hospital started enrolling patients in April 2009 and has 21 patients enrolled. Processing of clinical samples has started including a validation process of a respiratory virus multiplex PCR. The programme has identified two samples positive for influenza A to date. Additional results will follow in the May 2009 NICD Communicable Diseases Communiqué.

Source: Surveillance and Epidemiology Division; Molecular Diagnostic Laboratory; Respiratory and Meningeal Pathogens Unit, NICD; Vaccine Preventable Diseases Unit, Wits Health Consortium

Beyond Our Borders: infectious disease risks for travellers

The "Beyond Our Borders" column focuses on selected and current international disease risks that may affect South Africans travelling abroad. This issue reflects selected disease events from 21 March 2009 and 15 April 2009 .

Disease	Countries	Comments	Advice to travellers
Dengue Fever	Tropics and sub-tropics	Dengue fever is currently the most common cause of fever in travellers returning from the Caribbean, Central America, and South Central Asia. Since the beginning of the year, Brazil has reported an estimate of 45,180 cases. Increased case frequency has also been reported in Argentina, Saudi Arabia, Viet Nam, Australia Cook Islands, Society Islands, Indonesia, and Pakistan.	Dengue virus typically causes a mild illness; however, can complicate as a hemorrhagic fever, which may be fatal if not treated. Differential diagnosis of travellers returning with fever, myalgia and rash must include Dengue Fever. The mosquito vectors responsible for transmission commonly breed around households and are most active and feed during the day (at dusk and dawn) and indoors. Travellers should take precautionary measures to avoid being bitten by mosquitoes*.
Hand foot and mouth disease (HFMD)	China	HFMD has become a common occurrence in China. The Ministry of Health reports the current outbreak has thus far caused a total of 115,000 cases and 50 deaths to in 2009.	HFMD, caused by enteroviruses [predominantly enterovirus 71 and coxsackievirus A16], is common in infants and young children. Clinical presentation includes: fever and a vesicular rash on the hands, feet, and mouth. Disease may complicate as myocarditis, pulmonary oedema, or aseptic meningitis. There is no vaccine or antiviral treatment specific for HFMD. Travellers may prevent infection by practicing good hygiene, including: washing hands thoroughly and frequently, cleaning dirty surfaces and soiled items and avoiding close contact with persons with HFMD.
Chikungunya	India, Sri Lanka, Indonesia, Malaysia, Singapore	India and Indonesia have reported 100 and 200 cases since the beginning of this year respectively.	Chikungunya fever is caused by a virus, which is transmitted through infected mosquitoes. Symptoms can include sudden fever, chills, headache, nausea, vomiting, joint pain with or without swelling, lower back pain, and rash. Chikungunya mainly occurs in areas of West Africa and Asia. No medications or vaccines are available for prevention; however, travellers are reminded to protect against mosquito bites*.
Measles	Burkina Faso	Burkina Faso is currently experiencing the largest measles outbreak in more than a decade. More than 19 000 cases have been reported, with 150 deaths. This is 10 times more than the number of infections reported in any specific year since 1997.	Measles is an acute, highly communicable rash illness due to a virus transmitted by direct contact with infectious droplets or, less commonly, by airborne spread. Measles is vaccine preventable and travellers should ensure that they are up to date with all routine immunisations. There is no specific antiviral therapy, and treatment consists of providing supportive therapy (hydration and antipyretics) and treating complications (e.g. pneumonia). Vitamin A supplementation improves the outcome of measles in children.
Avian Influenza	Egypt, China, Viet Nam	22 human cases and 7 deaths due to influenza A H5N1 cases have been reported to WHO in 2009 to date. The majority of these have occurred in Egypt (n=12) over a short period, however none of these cases have been fatal.	H5N1 is transmitted to humans primarily by direct contact with sick or dead birds. Travellers to areas reporting outbreaks are advised to: avoid direct contact with birds (incl. poultry and wild birds), avoid touching surface with bird droppings or fluids, eat only thoroughly cooks poultry meet and products, and practice good hygiene (incl. hand washing) at all times.

*Vector-borne transmission by mosquitoes. Travellers should take precautionary measures to avoid bites: use insect repellents (containing 30-50% DEET), wear light-coloured clothing, and use insecticide-treated bed nets.

Source: Travel Health Unit, Outbreak Response Unit, SA-FELTP, Epidemiology Division.

References: ProMED-Mail (www.promedmail.org), The Centres of Disease Prevention and Control (www.cdc.gov), Europe Media Monitor (http://medusa.jrc.it/medisys/helsinkiedition/en/home.html); last accessed 2009/04/15.

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