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COMMUNICABLE DISEASES SURVEILLANCE BULLETIN

MAY 2010

NICD NHLS

FOREWORD

The May Bulletin of 2010 includes surveillance reports for the bacterial and fungal diseases under surveillance in the GERMS-SA programme. The report includes a summary of the main findings from national surveillance including enhanced surveillance sites, at 25 hospitals in 9 provinces, for the year 2009.

These reports include updates on emerging antimicrobial resistance in several pathogens: several fluoroquinolone-resistant non-typhoidal *Salmonella* isolates; a single, fluoroquinolone-resistant *Shigella* isolate; and significantly increased penicillin and ceftriaxone resistance amongst *Streptococcus pneumoniae* isolates predominantly from young children between 2008 and 2009. The emergence of antimicrobial resistance may impact on the choice of empiric treatment of common disease syndromes such as meningitis. Consideration of these data will need to be included in updated clinical guidelines for the management of these syndromes.

The pneumococcal conjugate vaccine was introduced into the Expanded Programme on Immunisation in April 2009. Despite low, estimated coverage of PCV and a high HIV prevalence, GERMS-SA has already demonstrated a significant decrease in serotype-specific, invasive pneumococcal disease amongst South African infants. These early, direct effects are likely to be amplified as vaccine coverage increases. This also highlights the value of laboratory-based surveillance programmes in providing valuable information on the impact of new vaccine programmes.

The incidence of cryptococcosis, a useful, sentinel, HIV-associated opportunistic infection, has stabilised. This may be an indication that the antiretroviral treatment programme has reached sufficient people to prevent an escalation in the number of new cases year-on-year. However, the overall incidence of this life-threatening fungal disease still remains high and work needs to be done to ensure that more cases are prevented and new cases are managed optimally. Early in 2010 the late Deputy Minister of Health announced a new plan to scale up access to HIV prevention and treatment[1]. As South Africa prepares to enter a new era of enhanced access to HIV prevention and care, GERMS-SA is well positioned to monitor the impact of these new interventions on the burden of opportunistic infections in South Africa.

Cheryl Cohen & Nelesh Govender,
Editors, GERMS-SA Surveillance Report 2009

Reference

1. Cabinet gives thumbs-up to new Aids plan. http://www.mg.co.za/article/2010-03-11-cabinet-gives-thumbsup-to-new-aids-plan. Accessed 20 April 2010

CONTENTS

NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES

WEB
This bulletin is available on the NICD website:
http://www.nicd.ac.za

THE GROUP FOR ENTERIC, RESPIRATORY & MENINGEAL DISEASE SURVEILLANCE IN SOUTH AFRICA (GERMS-SA)

INTRODUCTION

The Group for Enteric, Respiratory and Meningeal disease Surveillance in South Africa (GERMS-SA) has coordinated ongoing, national, population-based, laboratory-based, surveillance for several bacterial and fungal diseases since 2003. The system has been previously described[1]. Further details are available in the GERMS-SA Annual Report 2009 (access at www.nicd.ac.za). In this edition of the Communicable Diseases Surveillance Bulletin, we report summarised results, by pathogen/disease under surveillance, for 2009. Incidence rates were calculated using mid-year population estimates for 2008 and 2009 from Statistics South Africa (Table 1)[2]. Incidence rates in the HIV-infected and AIDS populations were calculated for 2008 and 2009, using estimated population denominators from the Actuarial Society of South Africa (ASSA) 2003 model (Table 1), assuming that the HIV/AIDS prevalence amongst cases with known status was similar to those with unknown status[3]. All reported incidence rates are expressed as cases per 100,000 population, unless otherwise stated. Surveillance cases which were detected by audit of the NHLS Corporate Data Warehouse are included in this report.

Table 1: Population denominators used to calculate incidence rates, 2008 and 2009

Province	General population*		HIV-infected population**		AIDS population**	
	2008	2009	2008	2009	2008	2009
Eastern Cape	6,579,245	6,648,601	728,915	757,818	75,300	79,705
Free State	2,877,694	2,902,518	393,863	395,344	49,656	50,111
Gauteng	10,447,246	10,531,308	1,446,094	1,454,006	165,632	166,078
KwaZulu-Natal	10,105,437	10,449,141	1,560,573	1,567,048	204,976	206,294
Limpopo	5,274,836	5,227,503	433,820	451,553	45,229	47,390
Mpumalanga	3,589,909	3,606,572	455,135	459,051	59,581	59,336
Northern Cape	1,125,881	1,147,137	67,330	69,595	6,787	7,458
North West	3,425,153	3,450,517	496,274	501,066	60,618	62,634
Western Cape	5,261,922	5,356,844	297,669	309,102	25,499	28,391
South Africa	**48,687,323**	**49,320,141**	**5,879,673**	**5,964,583**	**693,278**	**707,397**

Data source: *Statistics South Africa; **Actuarial Society of South Africa (ASSA)

References

1. GERMS-SA Annual Report 2006. Available from: www.nicd.ac.za/units/germs 2006.
2. Statistics South Africa. Mid-year population estimates, South Africa, 2009. P0302. 27 July 2009. Available from: http://www.statssa.gov.za/publications/P0302/P03022009.pdf. 2009. Accessed 15 April 2010.
3. Actuarial Society of South Africa AIDS Committee. ASSA2003 AIDS and demographic model, 2005. Available from: http://www.actuarialsociety.org.za/Models-274.aspx. Accessed 15 April 2010.

ENHANCED SURVEILLANCE SITE (ESS) PROJECT

National Microbiology Surveillance Unit, National Institute for Communicable Diseases

In 2009, of 23199 surveillance case patients detected by GERMS-SA, 5854 (25%) were diagnosed at ESS. Of case patients with recorded HIV status, 85% (3368/3979) were HIV-infected (Table 1). The proportion of case patients with confirmed HIV infection varied by disease: unsurprisingly, a very high proportion of patients with AIDS-defining infections like cryptococcosis (98%) and PCP (88%) were HIV-infected; HIV infection in patients with invasive pneumococcal disease and non-typhoidal salmonellosis, for which HIV is a known risk factor, were 74% and 75% respectively; and just less than half (46%) of patients with invasive meningococcal disease were HIV-infected.

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Table 1: Number and percentage* of patients, diagnosed with laboratory-confirmed disease at GERMS-SA enhanced surveillance sites, with confirmed HIV-1 infection**, South Africa, 2009, n=5,854.

Pathogen	Case patients, n	Case patients with completed case report forms, n (%)	Case patients with known HIV status, n (%)	Case patients with confirmed HIV infection, n (%)
Cryptococcus species	2,853	2371 (83)	1927 (81)	1887 (98)
Pneumocystis jirovecii	149	138 (93)	135 (98)	119 (88)
Neisseria meningitidis	170	156 (92)	115 (74)	53 (46)
Streptococcus pneumoniae	2034	1755 (86)	1363 (78)	1012 (74)
Haemophilus influenzae	177	145 (82)	107 (74)	53 (50)
Salmonella species	430	356 (83)	302 (85)	226 (75)
Shigella species	41	39 (95)	30 (77)	18 (60)
Total	**5,854**	**4,960 (85)**	**3,979 (80)**	**3,368 (85)**

*The percentage (in brackets) in each cell was calculated using the numerator from that cell and the corresponding denominator from the cell to the left; **HIV infection was confirmed by an age-appropriate, laboratory test and recorded by surveillance officers at enhanced surveillance sites.

Report compiled by (alphabetical order): Susan Meiring and Vanessa Quan

SALMONELLA ENTERICA SEROTYPE TYPHI AND *S. ENTERICA* SEROTYPES PARATYPHI A, PARATYPHI B AND PARATYPHI C

Enteric Diseases Reference Unit, National Institute for Communicable Diseases

Results

Salmonella Typhi isolates from both invasive and non-invasive sites are reported in Table 1. Two isolates of *Salmonella* Paratyphi A were received from Western Cape and two from North West Province, all from adults; a single isolate of *Salmonella* Paratyphi B L (+) tartrate (+) (*Salmonella* Paratyphi B var. Java) was received from a 32 month-old child in the Free State. No isolates of *Salmonella* Paratyphi C were received. The number of isolates within each age group is reported in Table 2, indicating that most isolates were from children in the 5-14 year age group, although infection was also seen in older and younger age groups. *Salmonella* Typhi isolation by month suggested a seasonal pattern in 2009, although numbers are too low to be conclusive (Figure 1). No major outbreaks were detected in 2009. A single isolate of *Salmonella* Typhi was resistant to ciprofloxacin[1] (Table 3), the treatment of choice. Two *Salmonella* Paratyphi A isolates were available for susceptibility testing: both were resistant to nalidixic acid, but susceptible to ampicillin, cotrimoxazole and chloramphenicol. The *Salmonella* Paratyphi B isolate was resistant to ampicillin, chloramphenicol and nalidixic acid.

Discussion

Salmonella Typhi isolates from both invasive and non-invasive sites were included in these analyses, as both added to the burden of infection in South Africa and thus represented a public health risk, although data may not reflect actual burden of disease. This is compounded by the challenges of alternative diagnostic methods for typhoid fever, including clinical and serological diagnosis. The number of reported *Salmonella* Typhi isolates was regarded as a substantial underestimate and thus incidence rates were not calculated. These results reflect culture-confirmed cases, and thus excluded those patients in whom a serological or clinical diagnosis was made without culture. Certain antimicrobials were tested for epidemiological purposes only, and should not be used for treatment of typhoid fever. Nalidixic acid resistance may be used as a marker for quinolone resistance; it is indicative of the potential for an organism to develop fluoroquinolone resistance[2]. Response to ciprofloxacin may be poor in the presence of nalidixic acid resistance. Ceftriaxone would be regarded as the alternative therapy of choice in these cases, as well as those typhoid fever cases where the organism is fully resistant to ciprofloxacin. The ciprofloxacin E-test is recommended to guide antimicrobial management in such cases[2].

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Table 1: Number of invasive and non-invasive *Salmonella* Typhi isolates reported to GERMS-SA, South Africa, 2009, n=66.

Province	Non-invasive *Salmonella* Typhi	Invasive *Salmonella* Typhi
Eastern Cape	2	10
Free State	1	2
Gauteng	1	25
KwaZulu-Natal	0	4
Limpopo	0	0
Mpumalanga	3	5
Northern Cape	0	1
North West	0	1
Western Cape	1	10
South Africa	**8**	**58**

Table 2: Number of *Salmonella* Typhi isolates reported to GERMS-SA by age category, South Africa, 2009, n=66.

Age category (years)	*Salmonella* Typhi
Neonate	0
< 1	0
1 - 4	7
5 - 14	22
15 - 24	12
25 - 34	5
35 - 44	10
45 - 54	2
55 - 64	3
≥ 65	3
Unknown	2
Total	**66**

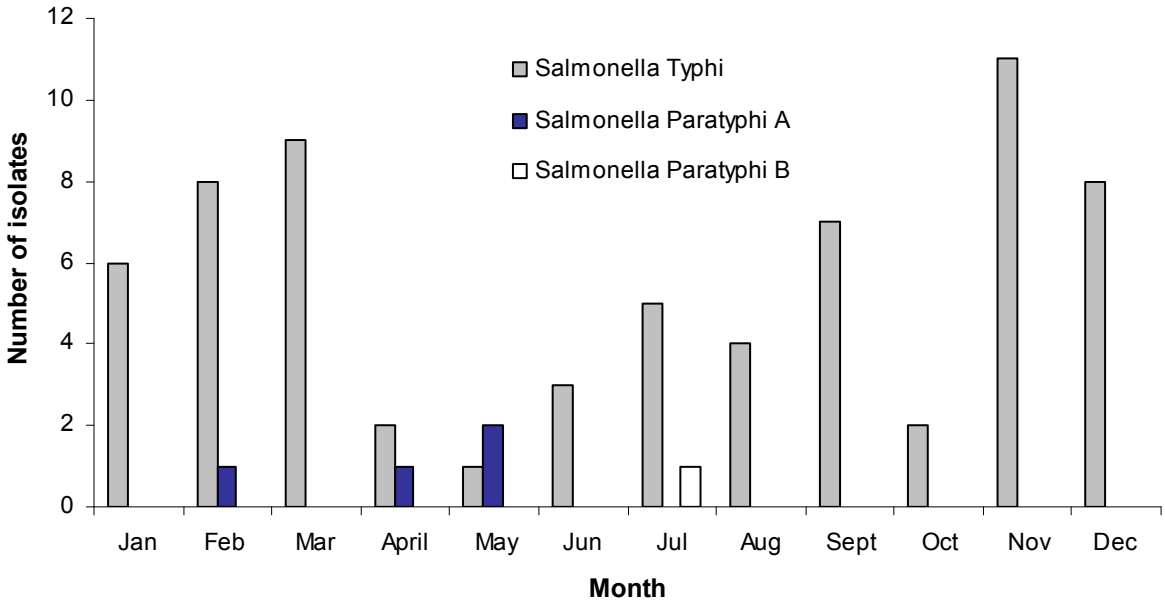

Figure 1: Number of non-invasive and invasive cases of *Salmonella* Typhi and Paratyphi A and B, reported to GERMS-SA, by month of specimen collection, South Africa, 2009, n=71 (including audit reports).

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Table 3: Antimicrobial susceptibility test results for all *Salmonella* Typhi isolates received by GERMS-SA, South Africa, 2009, n=65 (excluding audit reports).

Antimicrobial agent	Susceptible (%)		Intermediate (%)		Resistant (%)	
Ampicillin	50	(77)	0	(0)	15	(23)
Cotrimoxazole	52	(80)	0	(0)	13	(20)
Chloramphenicol	58	(89)	0	(0)	7	(11)
Nalidixic acid	53	(82)	0	(0)	12	(18)
Ciprofloxacin	64	(98)	0	(0)	1	(2)
Tetracycline	56	(86)	1	(2)	8	(12)
Kanamycin	65	(100)	0	(0)	0	(0)
Streptomycin	53	(82)	0	(0)	12	(18)
Imipenem	65	(100)	0	(0)	0	(0)
Ceftriaxone	65	(100)	0	(0)	0	(0)

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1. Keddy KH, Smith AM, Sooka A, Ismail H, Oliver S. Fluoroquinolone resistant typhoid fever, South Africa. Emerg.Infect Dis. 2010 May;16 (5):879-80
2. Crump JA, Barrett TJ, Nelson JT, Angulo FJ. Reevaluating fluoroquinolone breakpoints for *Salmonella enterica* serotype Typhi and for non-Typhi salmonellae. Clin Infect Dis 2003 Jul 1;37(1):75-81.

Report compiled by: Karen Keddy

NON-TYPHOIDAL *SALMONELLA ENTERICA* (NTS)

Enteric Diseases Reference Unit, National Institute for Communicable Diseases

Results

Both invasive and non-invasive disease appeared to have a seasonal prevalence in the warmer months (Figure 1). The number of cases of invasive and non-invasive disease, by province, reported to GERMS-SA, is stated in Table 1. The number of cases of invasive and non-invasive disease, by age group, is shown in Table 2, but incidence rates were only calculated for invasive NTS, due to differences in stool-taking practices in adult and paediatric medical care. Most invasive isolates were identified from blood cultures, although isolates were frequently identified from both blood culture and another site, including stool and other normally-sterile sites (Table 3). Multi-drug resistance remained a challenge, including resistance to first-line antimicrobial agents and the quinolones (Table 4). Of 2094 NTS isolates tested, 149 (7%) were extended-spectrum beta-lactamase (ESBL) producers (Table 4). Multi-drug resistant serotypes included primarily *Salmonella* Typhimurium and *Salmonella* Isangi (Table 5).

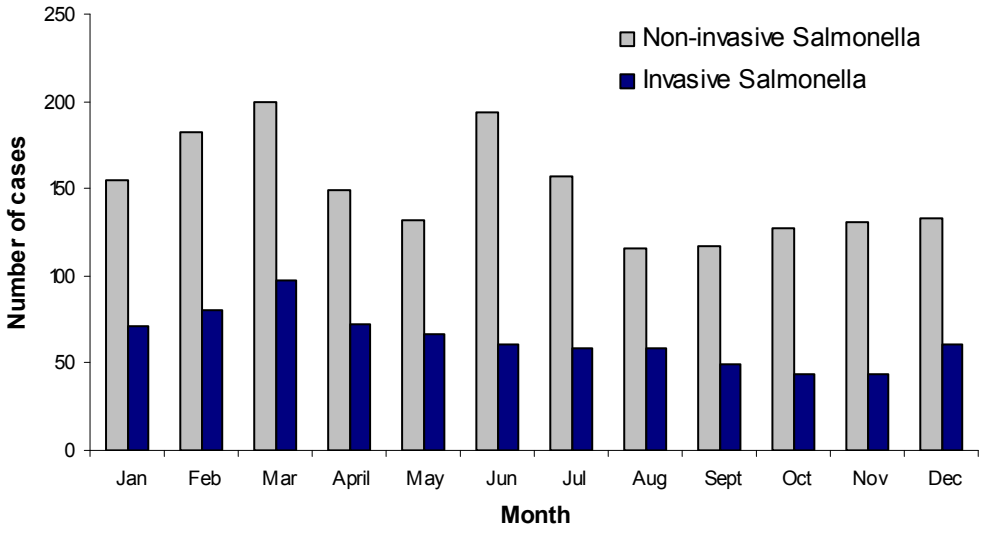

Figure 1: Number of non-invasive and invasive, non-typhoidal *Salmonella* cases, reported to GERMS-SA, by month of specimen collection, South Africa, 2009, n=2555 (including audit reports).

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Table 1: Number* of invasive and non-invasive non-typhoidal *Salmonella* isolates reported to GERMS-SA, by province, South Africa, 2009, n=2555 (including audit reports).

Province	Non-invasive, non-typhoidal *Salmonella*	Invasive, non-typhoidal *Salmonella*
Eastern Cape	192	63
Free State	50	30
Gauteng	849	396
KwaZulu-Natal	156	93
Limpopo	37	9
Mpumalanga	161	45
Northern Cape	30	12
North West	78	36
Western Cape	239	79
South Africa	**1792**	**763**

*Incidence rates were not calculated as there may have been regional differences in specimen collection practices

Table 2: Number of cases and incidence rates for invasive* non-typhoidal *Salmonella* reported to GERMS-SA by age category, South Africa, 2009, n=2555 (including audit reports).

	Cases		
Age Category (years)	Non-invasive	Invasive	Incidence rate for invasive disease**
0 - 4	711	215	4.24
5 - 14	172	35	0.34
15 - 24	116	58	0.57
25 - 34	213	142	1.71
35 - 44	196	154	2.69
45 - 54	136	85	1.98
55 - 64	90	32	1.09
≥ 65	93	18	0.75
Unknown	65	24	-
Total	**1792**	**763**	**1.55**

*Incidence rates for non-invasive non-typhoidal *Salmonella* were not calculated because specimens may not have been submitted for culture from all patients, with gastroenteritis due to non-typhoidal *Salmonella,* in clinical practice; **Incidence rates are expressed as cases per 100,000 population.

Table 3: Number of non-typhoidal *Salmonella* isolates reported to GERMS-SA by primary anatomical site of isolation*, South Africa, 2009, n=2555 (including audit reports).

Specimen	n	%
CSF	33	1.29
Blood culture	643	25.17
Stool	1491	58.36
Other	388	15.19
Total	**2555**	**100**

*Many cases had multiple isolates of the same serotype, including those with isolates from an invasive site of origin and a second isolate from stool, or isolates from two different normally-sterile sites.

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Table 4: Antimicrobial susceptibility test results for all non-typhoidal *Salmonella* isolates received by GERMS-SA, South Africa, 2009, n=2094 (excluding audit reports).

Antimicrobial agent	Susceptible (%)		Intermediate (%)		Resistant (%)	
Ampicillin	1673	(80)	0	(0)	421	(20)
Cotrimoxazole	1686	(81)	0	(0)	408	(19)
Chloramphenicol	1710	(82)	18	(1)	366	(17)
Nalidixic acid	1846	(88)	0	(0)	248	(12)
Ciprofloxacin	2087	(99.7)	4	(0.2)	3	(0.1)
Tetracycline	1365	(65)	212	(10)	517	(25)
Kanamycin	1948	(93)	47	(2)	99	(5)
Streptomycin	1592	(76)	0	(0)	502	(24)
Imipenem	2094	(100)	0	(0)	0	(0)
Ceftriaxone	1944	(93)	1	(0.1)	149	(6.9)

Table 5: Commonest invasive and non-invasive non-typhoidal *Salmonella* serotypes reported to GERMS-SA by province, South Africa, 2009, n=1579 (excluding audit reports).

	Serotype				
Province	Dublin	Enteritidis	Infantis	Isangi	Typhimurium
Eastern Cape	4	15	7	18	118
Free State	2	8	7	0	32
Gauteng	19	223	182	28	326
KwaZulu-Natal	8	53	16	35	86
Limpopo	0	2	1	1	3
Mpumalanga	4	21	12	0	68
Northern Cape	1	6	0	0	13
North West	0	16	3	1	19
Western Cape	10	58	39	6	108
South Africa	**48**	**402**	**267**	**89**	**773**

Discussion

Non-typhoidal salmonellosis may be a food-borne disease, for which data are poorly captured in South Africa, and where the patients normally present with gastro-enteritis, or may be an AIDS-defining illness, in which case the organism frequently becomes invasive. No marked seasonal prevalence was noted in 2009 for invasive or non-invasive isolates. *Salmonella* Infantis appeared to gain importance as a common serotype in South Africa. Certain antimicrobial agents were tested for epidemiological reasons only, and should not be used for treatment. Antimicrobial resistance remained a cause for concern.

Report compiled by: Karen Keddy

SHIGELLA SPECIES

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Higher isolation rates in January to March and increasing numbers from October to December in 2009 suggested seasonality (Figure 1). Although the primary burden of disease due to *Shigella* is non-invasive dysentery or diarrhoea, invasive disease remained an important cause of morbidity in South Africa (Table 1). The predominant burden of disease, including both invasive and non-invasive shigellosis, was in the under-five-year age group (Table 2). Quinolone resistance remained low, but fluoroquinolone resistance appeared to be emerging (Table 3). Three of 1612 (0.2%) isolates tested were ESBL-producers. *S. flexneri* 2a remained the commonest cause of shigellosis in South Africa and *S. dysenteriae* type 1 was rarely isolated (Table 4).

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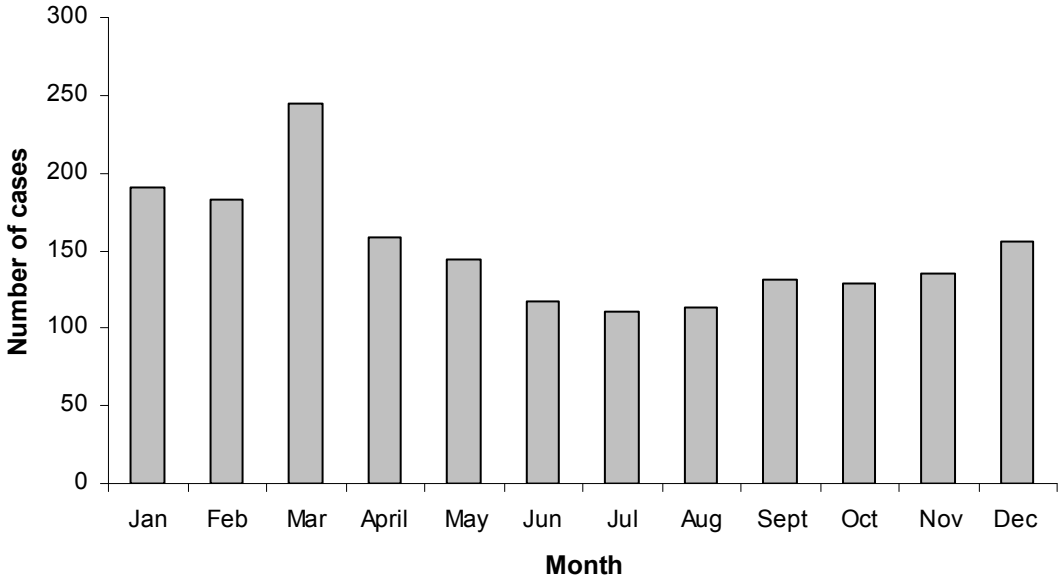

Figure 1: Number of non-invasive and invasive *Shigella* isolates, reported to GERMS-SA, by month of specimen collection, South Africa, 2009, n=1812 (including audit reports).

Table 1: Number of invasive and non-invasive *Shigella* isolates reported to GERMS-SA by province, South Africa, 2009, n=1812 (including audit reports).

Province	Non-invasive *Shigella*	Invasive *Shigella*
Eastern Cape	277	3
Free State	80	4
Gauteng	664	21
KwaZulu-Natal	146	9
Limpopo	16	2
Mpumalanga	92	5
Northern Cape	20	0
North West	27	4
Western Cape	422	20
South Africa	**1744**	**68**

Table 2: Number of cases* and incidence rates for *Shigella* (invasive and non-invasive)** reported to GERMS-SA by age category, South Africa, 2009, n=1812.

	Cases		
Age Category (years)	Non-invasive	Invasive	Incidence rate for invasive disease**
0 - 4	810	27	0.53
5 - 14	272	5	0.05
15 - 24	94	4	0.04
25 - 34	188	11	0.13
35 - 44	121	5	0.09
45 - 54	76	9	0.21
55 - 64	59	4	0.14
≥ 65	70	1	0.04
Unknown	54	2	-
Total	**1744**	**68**	**0.14**

*Cases may be under-reported due to local clinical practices: no mixed infections were identified.
**Incidence rates are expressed as cases per 100,000 population

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Table 3: Antimicrobial susceptibility test results for *Shigella* isolates received by GERMS-SA, South Africa, 2009, n=1612.

Antimicrobial agent	Susceptible (%)		Intermediate (%)		Resistant (%)	
Ampicillin	866	(54)	0	(0)	746	(46)
Cotrimoxazole	259	(16)	0	(0)	1353	(84)
Chloramphenicol	1102	(68)	8	(1)	502	(31)
Nalidixic acid	1594	(99)	0	(0)	18	(1)
Ciprofloxacin	1611	(99.9)	0	(0)	1	(0.1)
Tetracycline	679	(42)	24	(2)	909	(56)
Kanamycin	1604	(99.5)	1	(0.1)	7	(0.4)
Streptomycin	644	(40)	0	(0)	968	(60)
Imipenem	1612	(100)	0	(0)	0	(0)
Ceftriaxone	1609	(99.8)	0	(0)	3	(0.2)

Table 4: Commonest* invasive and non-invasive *Shigella* serotypes reported to GERMS-SA by province, South Africa, 2009, n=1169 (excluding audit reports).

Province	*S. dysenteriae* type 1	*S. flexneri* type 1b	*S. flexneri* type 2a	*S. flexneri* type 6	*S. sonnei* phase I/II
Eastern Cape	0	91	33	17	23
Free State	0	25	8	2	16
Gauteng	1	158	57	70	199
KwaZulu-Natal	0	38	16	13	20
Limpopo	0	2	0	2	1
Mpumalanga	1	14	5	11	21
Northern Cape	0	3	1	7	0
North West	0	2	1	1	8
Western Cape	0	175	64	25	38
South Africa	**2**	**508**	**185**	**148**	**326**

*Including *Shigella dysenteriae* type 1: Although these isolates are currently rare in South Africa, the potential for future epidemics remains while these strains are in circulation.

Discussion

Shigella infection is largely due to water-borne outbreaks in South Africa, although person-to-person transmission may play a role. Certain antimicrobials were tested for surveillance purposes only, and should not be used for treatment. Resistance to the third generation cephalosporins and fluoroquinolones remains low, but should continue to be monitored.

Report compiled by: Karen Keddy

DIARRHOEAGENIC *ESCHERICHIA COLI* (DEC)

Enteric Diseases Reference Unit, National Institute for Communicable Diseases

Results

Enteropathogenic *E. coli* (EPEC) remained the commonest cause of diarrhoea, due to this pathogen, identified in South Africa (Table 1). The predominance of cases amongst younger children under five years of age may reflect, in part, specimen-taking practices, as well as the burden of diarrhoeal disease in this age group (Table 2). Three patients had mixed infections with three different DEC pathotypes and 23 patients had mixed infections with two different DEC pathotypes. A range of serotypes were associated with STEC/EHEC, including O157 (a single isolate), O26 and O111. Serotypes associated with EPEC included O55, O111, O119, O127, O142 and O157. Diverse serotypes were also noted for other enterovirulent *E. coli* isolates. Identification of both EHEC and STEC was incidental[1].

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Table 1: Number of diarrhoeagenic *Escherichia coli* isolates reported to GERMS-SA by province, South Africa, 2009, n=549*.

Province	DAEC	EAggEC	STEC/ EHEC	EIEC	EPEC	ETEC
Eastern Cape	8	27	0	2	69	15
Free State	1	0	0	0	8	1
Gauteng	25	24	9	1	236	9
Kwazulu-Natal	1	4	1	0	4	0
Limpopo	1	1	0	0	0	0
Mpumalanga	31	16	0	0	15	16
Northern Cape	0	0	0	0	0	0
North West	1	3	0	0	7	0
Western Cape	9	0	0	1	3	0
South Africa	**77**	**75**	**10**	**4**	**342**	**41**

*Representing 520 infectious episodes, including those patients who had more than one pathotype;
DAEC: diffusely-adherent *E. coli*; EAggEC: enteroaggregative *E. coli*; STEC/EHEC: Shiga-toxigenic *E. coli* or enterohaemorrhagic *E. coli*; EIEC: enteroinvasive *E. coli*; EPEC: enteropathogenic *E. coli*; ETEC: enterotoxi-

Table 2: Number of diarrhoeagenic *E. coli* isolates reported to GERMS-SA by age category, South Africa, 2009, n=549.

Age category (years)	DAEC	EAggEC	EHEC/ STEC	EIEC	EPEC	ETEC
Neonate	5	5	0	0	33	3
< 1	19	31	3	0	144	15
1 - 4	21	27	5	2	150	15
5 - 14	5	0	0	0	2	0
15 - 24	3	0	0	0	2	2
25 - 34	8	4	1	1	1	3
35 - 44	4	3	0	1	2	1
45 - 54	6	2	0	0	1	0
55 - 64	2	1	0	0	1	1
≥ 65	4	0	0	0	1	0
Unknown	0	2	1	0	5	1
Total	**77**	**75**	**10**	**4**	**342**	**41**

Discussion

Incidence rates were not calculated as numbers were not viewed as being fully representative. Actual burden of disease due to diarrhoeagenic *E. coli* was probably greatly underestimated in South Africa, as management is primarily syndromic and centres on rehydration. As a result, clinicians were unlikely to prioritise stool-submission in uncomplicated cases of diarrhoea. Disease in the past appears to have been primarily associated with water-borne outbreaks, due to high level of faecal contamination in water sources, and this trend appeared to continue. The predominance of isolates received in children under the age of one year may reflect culturing practices; infants are more likely to have stools taken for culture due to the devastating effects of diarrhoea in children of this age. Seasonality was not reflected as it is believed that the current specimen-taking and laboratory diagnostic practices may not be optimal to accurately reflect burden of illness in South Africa of disease due to diarrhoeagenic *E. coli*.

Reference

1. Werber D, Frank C, Wadl M, Karch H, Fruth A, Stark K. Looking for tips to find icebergs - surveillance of haemolytic uraemic syndrome to detect outbreaks of Shiga toxin-producing *E. coli* infection. Website 2008 February13 (9)Available from: URL: http://www.eurosurveillance.org/edition/v13n09/080228_4.asp

Report compiled by: Karen Keddy

VIBRIO CHOLERAE O1

Enteric Diseases Reference Unit,, National Institute for Communicable Diseases

Results

The number of laboratory-confirmed cases reported to GERMS-SA in 2009 by province is shown in Table 1. This does not reflect the actual number of cases that were identified clinically and a large proportion was identified by audit. Where isolates were received contaminated or were missing, these have been included in the analysis, to improve estimates of duration of the outbreak and age distribution of cases. A number of cases may have been imported from Zimbabwe, but as these cases increase the burden on South African health care facilities as well as the public health risk to the local population, they have been included in the overall count. All age categories were affected (Table 2). Multidrug resistance was increasingly common and was noted with each outbreak cluster. Although resistance profiles differed amongst isolates from different clusters (data not shown), resistance to the quinolones was high (Table 3). Figure 1 shows the temporal clustering of the cholera outbreaks in South Africa in 2009. The case distribution highlights the epidemic that started in November 2008 (following an epidemic in Zimbabwe), and waned over the first half of 2009.

Table 1: Number of *Vibrio cholerae* O1 isolates reported to GERMS-SA by province, South Africa, 2009, n=575 (excluding audit reports).

Province	*Vibrio cholerae* O1 El Tor Inaba	*Vibrio cholerae* O1 El Tor Ogawa
Eastern Cape	0	0
Free State	0	0
Gauteng	0	37
KwaZulu-Natal	0	0
Limpopo	8	445
Mpumalanga	0	62
Northern Cape	0	0
North West	1	18
Western Cape	0	4
South Africa	**9**	**566**

Table 2: Number of *V. cholerae* O1 cases, reported to GERMS-SA, by age category, South Africa, 2009, n=1222 (including audit reports).

Age category (years)	*V. cholerae* O1 cases
< 1	14
1 - 4	82
5 - 14	119
15 - 24	202
25 - 34	224
35 - 44	150
45 - 54	105
55 - 64	103
≥ 65	130
Unknown	93
Total	**1222**

Discussion

Imported cases of cholera add to burden of infection in South Africa and thus represent a public health risk. The organism was multi-drug resistant, but as these resistant patterns were inconsistent, cumulative (for-the-year) resistance patterns could not be used to guide management of severely-dehydrated patients and could not be used to predict treatment for current or future outbreaks. Inappropriate usage of antimicrobials may have driven resistance. Antimicrobial treatment has not been shown to alter mortality rates[1]. Certain antimicrobials were tested for epidemiological purposes only and are not suitable for treatment.

(Continued on page 30

Table 3: Antimicrobial susceptibility test results for four outbreak clusters of *V. cholerae* O1 reported to GERMS-SA, South Africa, 2009, n=573.

Antimicrobial agent	Susceptible (%)		Intermediate (%)		Resistant (%)	
Ampicillin	556	(97)	0	(0)	17	(3)
Cotrimoxazole	1	(0.1)	0	(0)	572	(99.9)
Chloramphenicol	343	(60)	222	(39)	8	(1)
Nalidixic acid	1	(0.1)	0	(0)	572	(99.9)
Ciprofloxacin	573	(100)	0	(0)	0	(0)
Tetracycline	558	(97)	10	(2)	5	(1)
Kanamycin	557	(97)	9	(2)	7	(1)
Streptomycin	2	(0.3)	0	(0)	571	(99.7)
Imipenem	573	(100)	0	(0)	0	(0)
Ceftriaxone	566	(99)	0	(0)	7	(1)
Erythromycin*	391	(70)	159	(29)	5	(1)

*Where standard CLSI breakpoints do not exist, susceptibility categories were determined according to the methods of Ng *et al*.[2] Not all viable isolates received were available for susceptibility testing and only 555 isolates were available for testing against erythromycin.

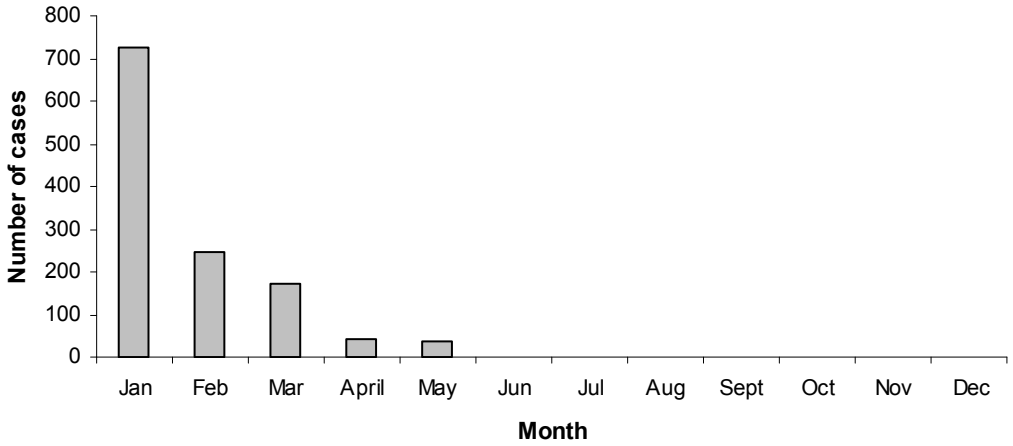

Figure 1: Number of *V. cholerae* O1 isolates, reported to GERMS-SA, by month of specimen collection, South Africa, 2009, n=1222 (including audit reports).

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Report compiled by: Karen Keddy

CRYPTOCOCCUS SPECIES

Mycology Reference Unit, National Institute for Communicable Diseases

Results

During 2009, 7965 case patients, with laboratory-confirmed, incident cryptococcal episodes, were reported. The overall incidence for the general South African population remained stable: 15/100000 in 2008 and 16/100000 in 2009 (Table 1). Similarly, incidence amongst HIV-infected individuals (128/100000 in 2008 and 134/100000 in 2009) and people sick with AIDS (11/1000 in 2008 and 12/1000 in 2009) remained stable. Incidence remained fairly stable in all provinces, except Limpopo and Northern Cape where the incidence increased (Table 1). The absolute number of detected cases decreased in 3 provinces: Western Cape, North West and Free State. The peak incidence of cryptococcosis was recorded amongst patients aged 35-39 years (Figure 1). Two hundred and fifty four children, younger than 15 years, had laboratory-confirmed cryptococcosis; 66/254 (26%) were younger than 1 year-old. Where gender was known (7860/7965, 99%), 51% patients were female. Most patients (7347/7965; 92%) were diagnosed with meningitis (laboratory tests on cerebrospinal fluid positive for *Cryptococcus* species), and 545/7965 (7%) were diagnosed with fungaemia (Table 2). The remainder of

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case patients (n=73) were diagnosed by culture of urine, sputum, pleural fluid and other specimen types. At ESS, 2135 patients were diagnosed with cryptococcosis, with viable isolates received from 1537/2135 (72%) patients. Of 1533 isolates which were typed, 1470 (96%) were identified as *Cryptococcus neoformans*; the remaining 63 were identified as *Cryptococcus gattii. C. gattii* cases were diagnosed in 5 provinces: Gauteng (n=25), Mpumalanga (n=13), Limpopo (n=9), KwaZulu-Natal (n=7), North West (n=5), and Western Cape (n=4). The in-hospital case-fatality ratio for patients at enhanced surveillance sites did not significantly change between 2008 and 2009 (566/1841 (31%) vs. 591/1812 (33%); p=0.2).

Table 1: Number of cases and incidence rates of cryptococcal disease reported to GERMS-SA by province, South Africa, 2008 and 2009, n=15511.

	2008*†		2009*	
Province	**n**	**Incidence rate****	**n**	**Incidence rate****
Eastern Cape	1218	19	1329	20
Free State	497	17	467	16
Gauteng	2011	19	2049	19
KwaZulu-Natal	1242	12	1271	12
Limpopo	432	8	671	13
Mpumalanga	758	21	805	22
Northern Cape	57	5	87	8
North West	749	22	729	21
Western Cape	582	11	557	10
South Africa	**7546**	**15**	**7965**	**16**

*A similar surveillance audit was performed for NHLS laboratories in 8 provinces (excluding KwaZulu-Natal) in 2008 and 2009, detecting additional microscopy (India ink), cryptococcal antigen and culture-confirmed cases; **Incidence rates were calculated based on population denominators provided by Statistics South Africa, and are expressed as cases per 100,000 population; †The number of detected cases in 2008 was updated following data cleaning procedures.

Discussion

In 2009, approximately 400 more patients with incident, laboratory-confirmed cryptococcosis were reported, compared with 2008. However, the overall incidence remained stable and fewer cases were detected in 3 provinces. This indicates that the National HIV/AIDS Comprehensive Care, Management and Treatment (CCMT) Programme has made an impact; this will be confirmed with ongoing surveillance data. Although the incidence increased in Limpopo and Northern Cape, this was associated with a relatively small increase in the absolute number of detected cases. Most patients continued to be diagnosed with meningitis. It is likely that clinical syndromes such as pulmonary cryptococcosis were not recognised by clinicians or were masked by co-morbid diseases such as pulmonary tuberculosis[1]. The demographic profile of patients with cryptococcosis continued to mirror the profile of HIV-infected patients in South Africa. Although very few children were diagnosed with cryptococcosis, more than a quarter of cases were diagnosed amongst infants <1 year-old. In 2009, a small proportion of patients were infected with *C. gattii;* the geographical distribution of *C. gattii* cases was unchanged from 2008. The in-hospital mortality of patients with cryptococcosis remained high, and is probably due to patients entering the health care system with advanced cryptococcal disease.

Table 2: Number and percentage of cases of cryptococcal disease reported to GERMS-SA by specimen type, South Africa, 2009, n=15511.

Site of specimen	2008		2009	
	n	**%**	**n**	**%**
CSF	7079	94%	7347	92%
Blood	440	6%	545	7%
Other	27	<1%	73	1%
	7546		**7965**	

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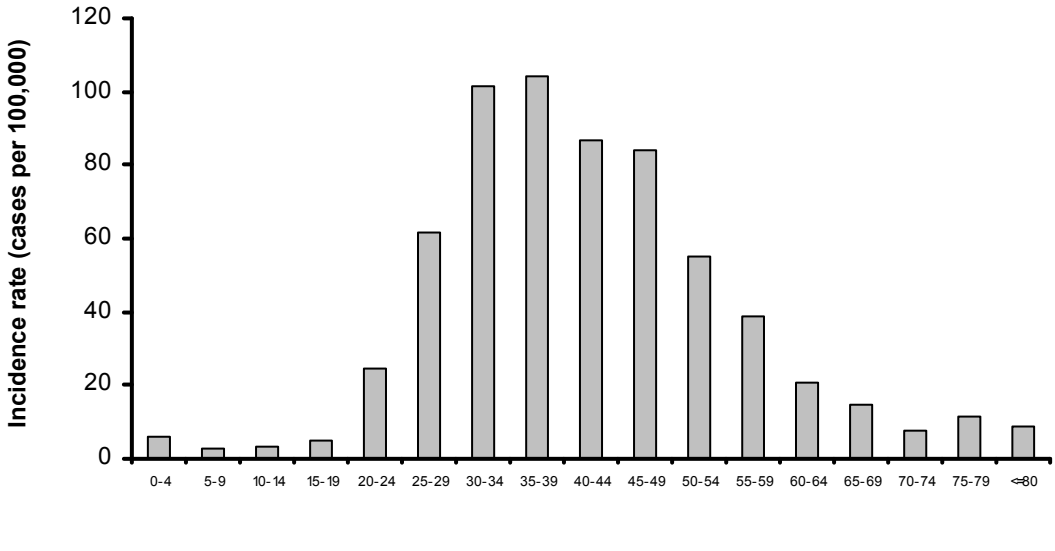

Figure 1: Age-specific incidence rates for laboratory-confirmed, cryptococcal cases, reported to GERMS-SA, South Africa, 2009, n=7965.

Reference

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Report compiled by Nelesh Govender

PNEUMOCYSTIS JIROVECII

Parasitology Reference Unit, National Institute for Communicable Diseases

Results

In 2009, 371 cases of PCP were reported (Table 1). The number of *P. jirovecii*-positive specimens peaked amongst children less than one year of age and in the 20 to 59 year age group (Figure 1). Of cases with known gender, 62% (227/364) were female. Of all reported case patients, 153 (41%) were diagnosed at ESS and had available clinical data. During admission, 88% (125/142) of patients tested for HIV were HIV-infected. Where outcome was known, the in-hospital case-fatality ratio was 31% (44/144). In 18% (22/120) of patients, the diagnosis of PCP was associated with a second or later hospitalisation for PCP. Of patients who recovered, 96% (95/99) were discharged with a lower respiratory tract infection as a final diagnosis. Most of the case patients had concurrent infections, of which clinically-diagnosed candidiasis (49/153) and tuberculosis (23/153) were the most common (Figure 2).

Table 1: Number of *Pneumocystis jirovecii* pneumonia (PCP) cases reported to GERMS-SA by province, South Africa, 2008-2009, n=715.

Province	2008	2009
Eastern Cape	30	37
Free State	20	19
Gauteng	163	141
KwaZulu-Natal	23	19
Limpopo	1	0
Mpumalanga	14	6
Northern Cape	3	0
North West	25	44
Western Cape	65	105
South Africa	**344**	**371**

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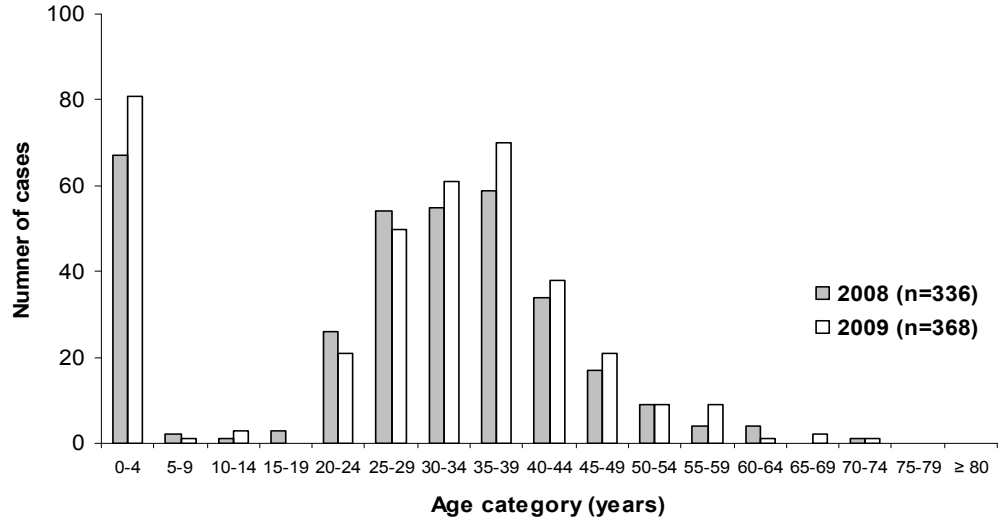

Figure 1: Number of laboratory-confirmed, *Pneumocystis jirovecii* pneumonia (PCP) cases reported to GERMS-SA, by age category, South Africa, 2008-2009, n=734.

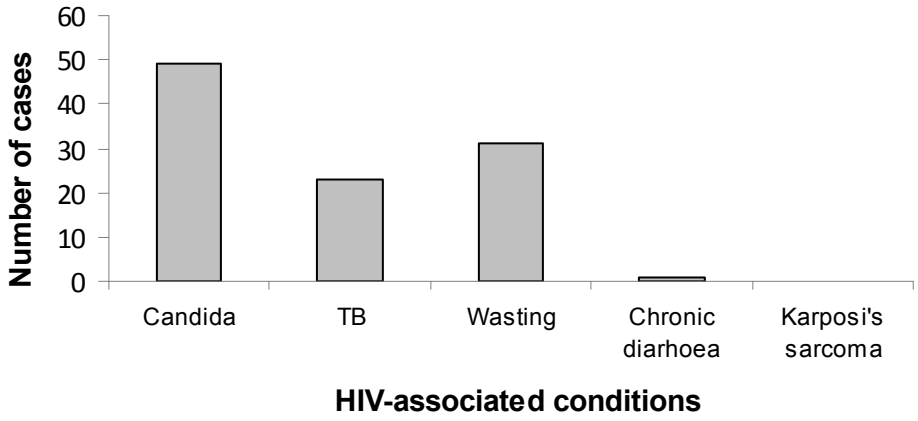

Figure 2: Number of laboratory-confirmed *Pneumocystis jirovecii* pneumonia (PCP) cases with reported HIV-associated conditions, South Africa, 2009, n = 153*.

Discussion

PCP is often the first-diagnosed opportunistic infection[1]. The number of cases reported here does not approximate the true burden of disease in South Africa. This is because PCP is usually clinically-diagnosed, and only laboratory confirmed cases of PCP are reported through GERMS-SA; there are only ten laboratories that offer PCP testing in four of the nine provinces in South Africa; PCP testing is expensive and needs well-trained personnel; and the quality of the specimens received by the testing laboratory is often poor which may affect the result. Since 2008, the Parasitology Reference Unit has taken steps to tackle some of these problems. Training was offered to all existing PCP-testing laboratories; five laboratories were trained in 2008 and 2009. In 2009, NHLS Grey's Hospital (KwaZulu-Natal) became a testing site for PCP and was provided with a UV microscope and training. Set-up of PCP testing is now targeted for provinces where no such facilities exist: Eastern Cape, Northern Cape, North West, Limpopo and Mpumalanga. A proficiency testing scheme for the identification of *P. jirovecii* was launched in 2008; 9 laboratories participated in 2009.

Reference

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Report compiled by (in alphabetical order): Desiree du Plessis, John Frean and Bhavani Poonsamy

NEISSERIA MENINGITIDIS

Respiratory & Meningeal Pathogens Reference Unit, National Institute for Communicable Diseases

Results

In 2009, 425 cases of meningococcal disease were reported, and an additional 37 cases were identified on audit: 462 cases of laboratory-confirmed, meningococcal disease were identified by the surveillance system during the year (Table 1). The number of cases reported increased during the winter and spring months (Figure 1). Of all cases reported, cerebrospinal fluid (CSF) was the most common specimen yielding meningococci (Table 2), and the number of cases diagnosed on blood culture remained similar in 2009 compared to 2008 (p=0.2). Cases of W135 disease were reported from all provinces, and this serogroup was the most predominant in South Africa (235/397, 59%) (Table 3); the proportion was the same as in 2008 (207/360, 58%; p=0.6). The only increase in disease incidence was noted for Mpumalanga (1.86 cases per 100,000 population in 2009 compared with 1.00 in 2008, p=0.002). The predominant serogroup in Mpumalanga was serogroup W135 (47/60, 78% in 2009 vs. 19/24, 79% in 2008; p=0.9). In Gauteng, the incidence of meningococcal disease was estimated at 1.93 cases per 100,000 population, and most of that disease was due to serogroup W135 (111/173, 64%). The preponderance of serogroup B disease in Western Cape was still noted: 35/68 (51%) of all isolates serogrouped. Disease confirmed to be caused by serogroup C decreased in Gauteng, from 21 cases in 2008 to 13 cases in 2009. Risk of disease was greatest amongst children less than five years of age. Age and serogroup-specific incidence rates show that infants were at greatest risk of disease for all serogroups (Figure 2). Preliminary analysis of case-fatality ratios, as calculated at ESS where in-hospital outcome is specifically looked for, was 24/155 (15%) in 2009, compared to 47/178 (26%) in 2008 (p=0.02). Of the viable isolates tested for antimicrobial resistance, 17/319 (5%) isolates had penicillin minimum inhibitory concentrations (MICs) >0.06µg/ml, and would be considered intermediately resistant.

Table 1: Number of cases and incidence rates of meningococcal disease reported to GERMS-SA by province, South Africa, 2008 and 2009, n=922 (including audit cases).

Province	2008		2009	
	n	Incidence rate*	n	Incidence rate*
Eastern Cape	29	0.44	36	0.54
Free State	21	0.73	18	0.62
Gauteng	224	2.14	203	1.93
KwaZulu-Natal	34	0.34	32	0.31
Limpopo	5	0.09	3	0.06
Mpumalanga	36	1.00	67	1.86
Northern Cape	8	0.71	9	0.78
North West	15	0.44	19	0.55
Western Cape	88	1.67	75	1.40
South Africa	**460**	**0.94**	**462**	**0.94**

*Incidence rates were calculated based on population denominators provided by Statistics South Africa, and are expressed as cases per 100,000 population.

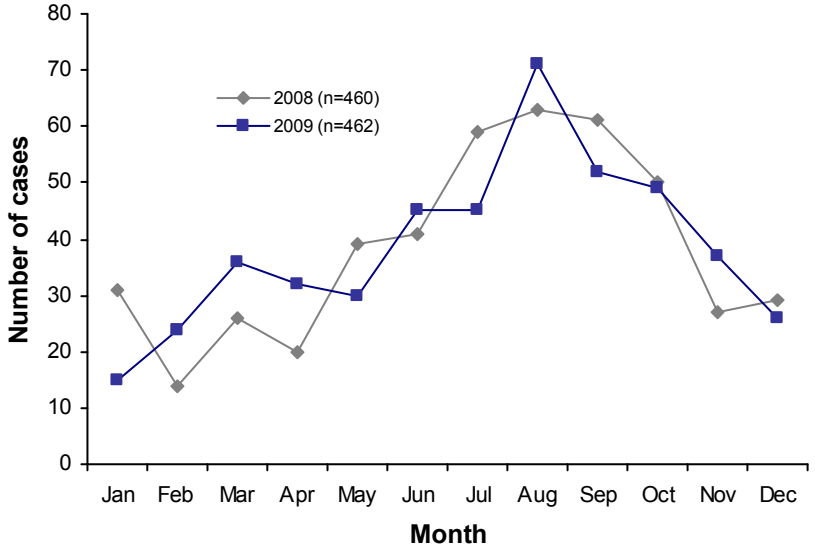

Figure 1: Number of laboratory-confirmed, invasive, meningococcal cases, reported to GERMS-SA, by month and year, South Africa, 2008-2009, n=922.

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Discussion

Overall incidence of disease did not change from 2008 and serogroup W135 disease remained stable. Increases of meningococcal disease incidence in Mpumalanga may reflect improved laboratory confirmation of disease and better reporting to the surveillance network, or may reflect a true increase in incidence. Case-fatality ratios decreased, and correspond more closely with the range 9% to 12% as reported from other settings[1-4]. The prevalence of intermediate resistance to penicillin remained low in 2009, and was within the annual prevalence range (from 3% to 13%) previously reported from South Africa[5]. The clinical relevance of increased MICs is unclear, and penicillin is, at present, still being recommended as the drug of choice for therapy for confirmed meningococcal disease.

Table 2: Number and percentage of cases of meningococcal disease reported to GERMS-SA by specimen type, South Africa, 2008 and 2009, n=922.

Site of specimen	2008		2009	
	n	%	n	%
CSF	318	69%	336	73%
Blood	136	30%	124	27%
Other	6	1%	2	<1%
	460		**462**	

Table 3: Number of cases of invasive meningococcal disease reported to GERMS-SA by serogroup and province, South Africa, 2009, n=462.*

Province	Serogroup							
	Serogroup not available	A	B	C	W135	X	Y	Total
Eastern Cape	6	0	8	3	16	1	2	36
Free State	3	0	3	6	4	0	2	18
Gauteng	30	2	32	13	111	0	14	203
KwaZulu-Natal	4	0	3	1	22	0	2	32
Limpopo	1	0	1	0	1	0	0	3
Mpumalanga	7	0	1	6	47	1	4	67
Northern Cape	1	0	3	0	4	0	1	9
North West	6	0	2	0	9	0	2	19
Western Cape	7	0	35	7	21	0	4	75
South Africa	**65**	**2**	**88**	**36**	**235**	**2**	**31**	**462**

*397 (86%) with specimens or viable isolates available for serogrouping.

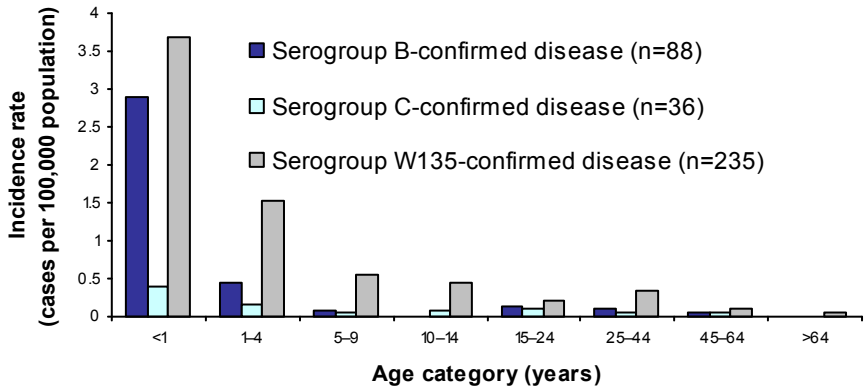

Figure 2: Age-specific incidence rates for laboratory-confirmed, invasive, meningococcal cases, by serogroup, South Africa, 2009, n=462 (age unknown for n=12; specimens or viable isolates unavailable for serogrouping n=65).

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Report compiled by (in alphabetical order): Linda de Gouveia and Anne von Gottberg

HAEMOPHILUS INFLUENZAE

Respiratory & Meningeal Pathogens Reference Unit, National Institute for Communicable Diseases

Results

The number of cases of *Haemophilus influenzae* invasive disease reported in 2009 was 292, while an additional 95 cases were identified during the surveillance audit (total number of cases available for analysis was 387). Of these, 264 (68%) had isolates or specimens available for serotyping, and 105/264 (40%) were confirmed as serotype b (Table 1). Serotype b isolates were more likely to be isolated from CSF than non-typeable *H. influenzae* (56/105, 53% vs. 9/112, 8%, p<0.001) (Table 2). In 2009, a total of 73 cases of *H. influenzae* serotype b (Hib) were reported in children <5 years (Figure 1). Of the non-viable isolates received or culture-negative cases reported, serotyping was identified by polymerase chain reaction (PCR) testing of transport media or specimens wherever possible. Serotype b was the more common *H. influenzae* causing disease in infants (Figure 2). Since 2002, rates of Hib disease as recorded by our surveillance network in infants <1 year of age have increased, and there seems to be a continued increase in 2009 (p<0.001, chi-squared test for trend, 2002 to 2009) (Figure 3). Small increases in numbers of Hib cases confirmed on viable isolates (methodology used since 2000) were seen for four provinces comparing 2008 to 2009 (Eastern Cape, Kwa-Zulu Natal, Northern Cape and Western Cape). Numbers were small for all provinces except Western Cape: increase from 13 viable isolates confirmed as Hib in 2008 to 24 in 2009. Nineteen percent of serotype b strains were resistant to ampicillin (MIC>1mg/L, all producing beta lactamase), 17 of 91 isolates tested, while 13% (12/96) of non-typeable strains were resistant (p=0.2).

Table 1: Number of cases of invasive *Haemophilus influenzae* disease reported to GERMS-SA by serotype and province, South Africa, 2009, n=387*.

Province	Serotype								
	Serotype not available	a	b	c	d	e	f	Non-typeable	Total
Eastern Cape	22	0	13	0	0	1	0	3	39
Free State	8	1	8	0	1	0	0	4	22
Gauteng	54	9	26	2	3	2	11	52	159
KwaZulu-Natal	5	0	18	1	0	1	1	17	43
Limpopo	1	0	2	0	0	0	0	1	4
Mpumalanga	17	0	4	1	0	0	2	3	27
Northern Cape	3	0	4	0	0	0	0	1	8
North West	5	0	4	0	0	1	0	1	11
Western Cape	8	4	26	0	1	1	4	30	74
South Africa	**123**	**14**	**105**	**4**	**5**	**6**	**18**	**112**	**387**

*264 (68%) with specimens or viable isolates available for serotyping.

Table 2: Number and percentage of cases of invasive *Haemophilus influenzae* disease reported to GERMS-SA by specimen type, South Africa, 2009, n=387.

Site of specimen	No serotype available		Serotype b		Serotypes a, c, d, e, f		Non-typeable	
	n	%	n	%	n	%	n	%
CSF	24	20	56	53	19	40	9	8
Blood	68	55	46	44	27	57	90	80
Other	31	25	3	3	1	2	13	12
Total	**123**		**105**		**47**		**112**	

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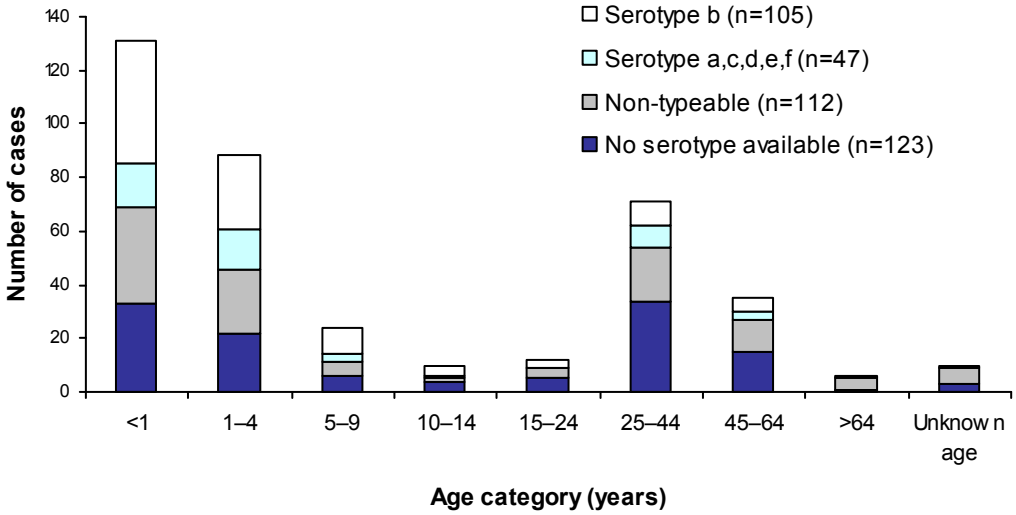

Figure 1: Number of laboratory-confirmed, invasive, *Haemophilus influenzae* cases, reported to GERMS-SA, by serotype and age group, South Africa, 2009, n=387 (age unknown for n=10; specimens or viable isolates unavailable for serotyping for n=123).

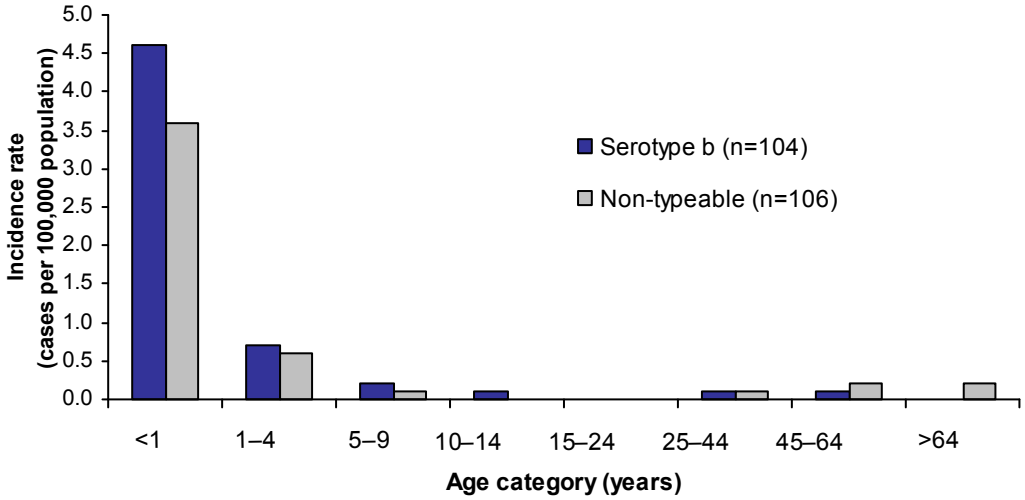

Figure 2: Age-specific incidence rates for laboratory-confirmed, invasive *Haemophilus influenzae* disease, reported to GERMS-SA, by serotype, South Africa, 2009, n=387 (age unknown for n=10; viable isolates unavailable for serotyping for n=123).

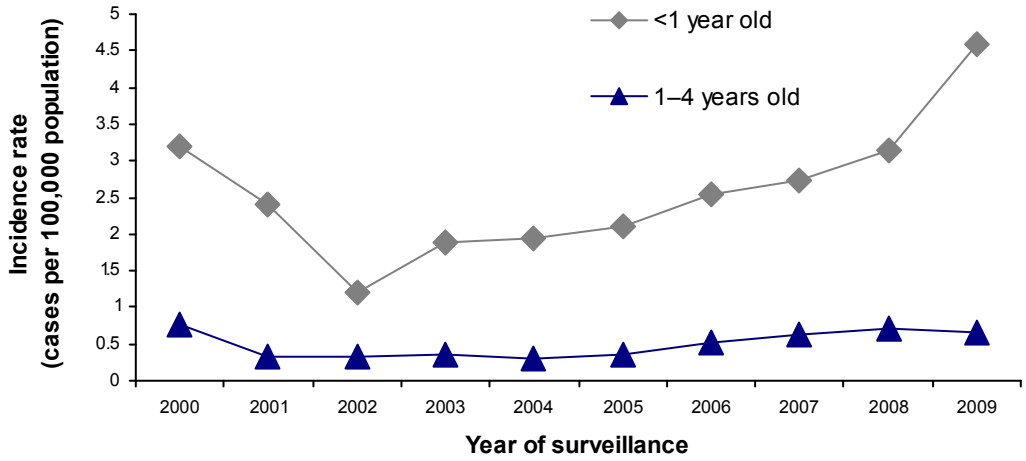

Figure 3: Incidence rates of laboratory-confirmed, *Haemophilus influenzae* serotype b disease, reported to GERMS-SA, in children <5 years old, South Africa, 2000-2009 (excluding cases identified using polymerase chain reaction (PCR) on specimens which was only done 2007-2009).

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Discussion

Since the introduction of the Hib conjugate vaccine into the Expanded Programme on Immunisation (EPI) for South Africa in 1999, there has been a reduction in cases reported due to this serotype[1]. Population-based studies in South Africa before the introduction of the conjugate Hib vaccine had demonstrated annual rates of invasive Hib disease of 170 per 100 000 infants below one year of age[2,3], and any increases noted recently are still small in comparison to the substantial decline in disease subsequent to the introduction of the vaccine. The biggest increase was seen for Western Cape, and this may have been linked to more aggressive laboratory protocols to maintain viability of bacterial isolates. Recognising that our surveillance system underestimates disease, the increases in reported cases of Hib disease in children <1 year are being monitored carefully. In April 2009, the updated infant vaccination programme in South Africa introduced a booster dose of conjugate Hib vaccine given at 18 months as part of a combination vaccine (Pentaxim: diphtheria-tetanus-acellular pertussis-inactivated poliovirus-*Haemophilus influenzae* type-b conjugate). It is hoped that this booster will improve long-term protection against disease and impact on ongoing Hib transmission in the community.

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Report compiled by (in alphabetical order): Linda de Gouveia and Anne von Gottberg

STREPTOCOCCUS PNEUMONIAE

Respiratory & Meningeal Pathogens Reference Unit, National Institute for Communicable Diseases

Results

Incidence of reported invasive pneumococcal disease (IPD) varied widely by province (Table 1). The age group at highest risk of disease in South Africa was infants <1 year of age, and there was a significant reduction in disease comparing 2008 to 2009, p<0.001(Figure 1). The majority of episodes reported to GERMS-SA were diagnosed from positive blood culture specimens (Table 2). Penicillin non-susceptible isolates (2009 CLSI breakpoints for penicillin [oral penicillin V], MIC>0.06mg/L)[1], have increased (1276/3326, 38% in 2008 compared to 1478/3387, 44% in 2009, p<0.0001). Prevalence of non-susceptible strains ranged from 32% to 52% in different provinces (Table 3). Penicillin non-susceptible isolates were common in children less than 5 years of age (Figure 2). A non-meningitis-causing pneumococcus with a penicillin MIC of ≤2mg/L, according to updated CLSI guidelines (penicillin parenteral, non-meningitis), can be considered susceptible[1]. Using this breakpoint, only 3% (70/2141) of isolates cultured from specimens other than CSF were non-susceptible to penicillin. Ceftriaxone non-susceptibility was detected in 8% (276/3387) of all IPD cases, and in 8% (102/1246) of isolates detected from CSF specimens. Ceftriaxone-resistant pneumococci were more common in children <5 years (137/1007, 14% in children <5 years vs. 129/2267, 6% in individuals ≥5 years of age, p<0.001), and this remained significant if restricted to meningitis. The majority of cetriaxone-resistant isolates were serotypes contained in PCV7 (256/276, 93%). On preliminary univariate analysis, there were no differences by gender, province, enhanced surveillance site, syndrome or in mortality when comparing susceptible to non-susceptible isolates. Prevalence of ceftriaxone resistance as detected by the surveillance system from 2003 through 2008 ranged from 0.4% to 0.9% (data not shown). Prevenar® (7-valent conjugate pneumococcal vaccine, PCV7) was introduced into the EPI in South Africa from 1 April 2009. The number of cases in children less than 5 years of age due to common serotypes in 2009 (including the seven serotypes in PCV7: 4, 6B, 9V, 14, 18C, 19F and 23F) are compared with 2008 in Figure 3. The percentage of disease in 2009 in children <5 years due to PCV7 and newer valency vaccine formulations are shown in Table 4.

Discussion

Differences in IPD incidence by province have been documented for several years, and are partly due to differences in specimen-taking practices and laboratory reporting, however real differences in disease incidence cannot be excluded. The decrease in incidence of disease in children <1 year of age was mostly likely due to the introduction of PCV7 in South Africa. In a preliminary analysis performed within 6 months of PCV7 introduction, we noted a significant decrease of approximately 25% in serotype-specific disease among infants less than 1 year of age, and no changes in other age groups[2]. Ongoing surveillance will be essential to document further reduction in disease in infants, and as vaccine coverage increases we hope to see declines in disease in older children. Our data for 2009 show an increase in pneumococcal resistance to penicillin and ceftriaxone. Although a true, sudden increase may be possible, we believe that this increase is due to a change in laboratory methodology that was introduced in 2009. For isolates that are screened non-susceptible by disk diffusion, we changed from using

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agar dilution or Etest® (AB bioMérieux, Solna, Sweden) methodology for MIC determination to broth microdilution methodology (the recommended CLSI method). The low levels of penicillin non-susceptibility from blood culture specimens still support the use of penicillin as first-line therapy for community-acquired pneumonia. Vancomycin, together with ceftriaxone, should be considered for the empiric treatment of suspected pneumococcal meningitis (CSF specimens positive for Gram-positive cocci or latex agglutination tests positive for *S. pneumoniae*), especially amongst unvaccinated children. As most of these ceftriaxone-resistant isolates were identified as serotypes contained in PCV7, we anticipate that the number of resistant isolates causing disease will decrease with wider use of the vaccine.

Table 1: Number of cases and incidence rates of invasive pneumococcal disease reported to GERMS-SA by province, South Africa, 2008 and 2009, n=9605.

Province	2008		2009	
	n	Incidence rate*	n	Incidence rate*
Eastern Cape	356	5.41	362	5.44
Free State	320	11.12	309	10.65
Gauteng	2356	22.55	2254	21.40
KwaZulu-Natal	573	5.67	528	5.05
Limpopo	112	2.12	111	2.12
Mpumalanga	257	7.16	302	8.37
Northern Cape	84	7.46	88	7.67
North West	193	5.63	175	5.07
Western Cape	586	11.14	639	11.93
South Africa	**4837**	**9.93**	**4768**	**9.67**

* Incidence rates were calculated based on population denominators provided by Statistics South Africa, and are expressed as cases per 100,000 population

Table 2: Number and percentage of cases of invasive pneumococcal disease reported to GERMS-SA by specimen type, South Africa, 2008 and 2009, n=9605.

Site of specimen	2008		2009	
	n	%	n	%
CSF	1755	36%	1805	38%
Blood	2644	55%	2513	53%
Other	438	9%	450	9%
	4837		**4768**	

Table 3: Number and percentage of penicillin non-susceptible isolates from invasive pneumococcal disease cases reported to GERMS-SA by province, South Africa, 2009, n=4768.

Province	Isolate not available	Susceptible*		Intermediate*		Resistant*	
	n	n	%	n	%	n	%
Eastern Cape	165	95	48	88	45	14	7
Free State	78	143	62	67	29	21	9
Gauteng	698	904	58	487	31	165	11
KwaZulu-Natal	69	233	51	196	43	30	7
Limpopo	48	43	68	18	29	2	3
Mpumalanga	141	98	61	49	30	14	9
Northern Cape	21	39	58	18	27	10	15
North West	83	56	61	31	34	5	5
Western Cape	78	298	53	217	39	46	8
South Africa	**1381**	**1909**	**56**	**1171**	**35**	**307**	**9**

*2009 CLSI breakpoints for penicillin (oral penicillin V) were used: susceptible, ≤0.06mg/L; intermediately resistant, 0.12-1mg/L; resistant, ≥2mg/L.

(Continued on page 40)

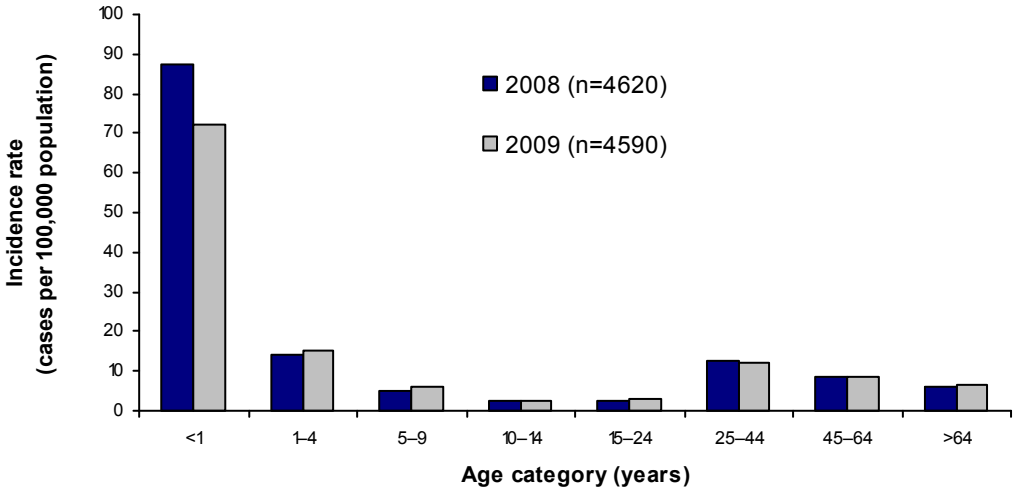
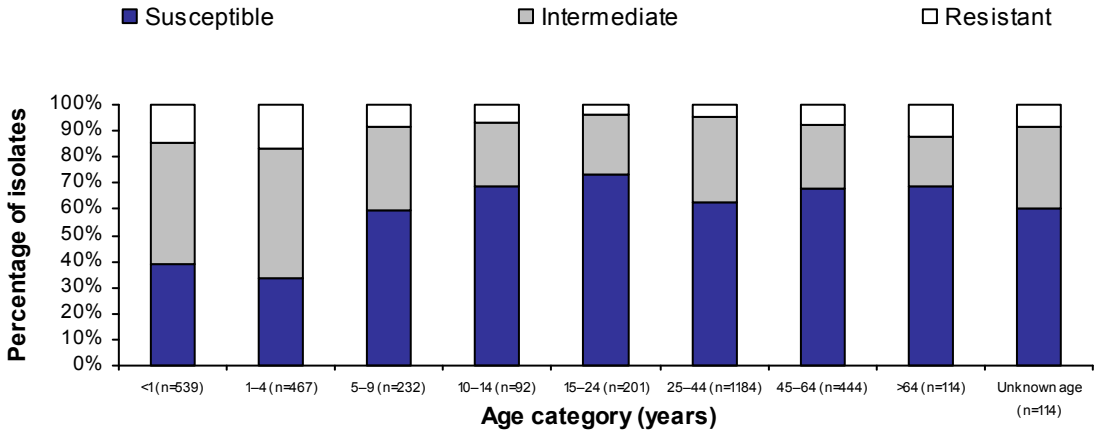


Figure 1: Age-specific incidence rates for laboratory-confirmed, invasive pneumococcal disease, reported to GERMS-SA, South Africa, 2008 and 2009 (2008: n=4837; age unknown for n=217; 2009: n=4768; age unknown for n=178).



2009 CLSI breakpoints for penicillin (oral penicillin V) were used: susceptible, ≤0.06mg/L; intermediately resistant, 0.12-1mg/L; resistant, ≥2mg/L.

Figure 2: Percentage of laboratory-confirmed, invasive pneumococcal disease cases, reported to GERMS-SA, by age group and penicillin susceptibility, South Africa, 2009, n=4768 (n=3387 with viable isolates).

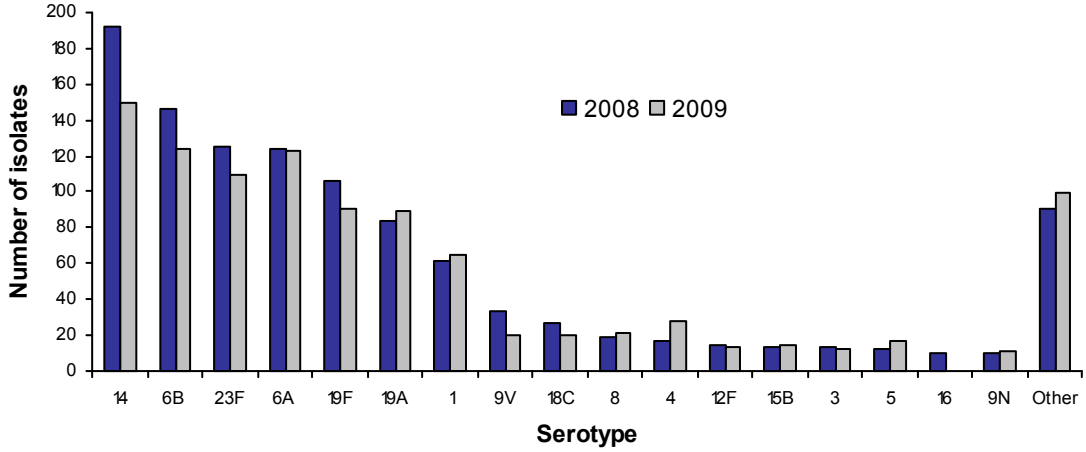


Figure 3: Pneumoccocal serotypes, in descending order, causing laboratory-confirmed, invasive pneumococcal disease, reported to GERMS-SA, in children <5 years, South Africa, 2008-2009 (2008: n=1464, n=1098 with viable isolates; 2009: n=1334; n=1007 with viable isolates).

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Table 4: Number and percentage of invasive pneumococcal cases reported amongst children less than 5 years of age caused by the serotypes contained in the 7-valent, 10-valent and 13-valent pneumococcal, conjugate vaccines, South Africa, 2009, n=1007.

Province	Total isolates available for serotyping	7-valent serotypes *		Serotype 6A#		10-valent serotypes*		13-valent serotypes*	
		n	%	n	%	n	%	n	%
Eastern Cape	54	28	52	13	24	28	52	45	83
Free State	50	31	62	4	8	35	70	44	88
Gauteng	462	233	50	55	12	287	62	385	83
KwaZulu-Natal	145	83	57	15	10	90	62	122	84
Limpopo	12	8	67	2	17	8	67	10	83
Mpumalanga	47	18	38	6	13	27	57	37	79
Northern Cape	40	20	50	2	5	25	63	32	80
North West	11	6	55	2	18	7	64	11	100
Western Cape	186	115	62	24	13	121	65	166	89
South Africa	**1007**	**542**	**54**	**123**	**12**	**628**	**62**	**852**	**85**

*7-valent serotypes: 4, 6B, 9V, 14, 18C, 19F, 23F; 10-valent serotypes: 4, 6B, 9V, 14, 18C, 19F, 23F, 1, 5, 7F; 13-valent serotypes: 4, 6B, 9V, 14, 18C, 19F, 23F, 1, 5, 7F, 19A, 3, 6A.
Cross-protection with 6B has been demonstrated[3]

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3. Whitney CG, Pilishvili T, Farley MM, Schaffner W, Craig AS, Lynfield R, et al. Effectiveness of seven-valent pneumococcal conjugate vaccine against invasive pneumococcal disease: a matched case-control study. Lancet 2006 Oct 28;368 (9546):1495-502.

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Erratum

March 2010;8:1:3.Table 1: Number and rate of suspected measles cases (SMC) with specimens submitted and measles and rubella IgM positive cases from suspected measles case-based surveillance, South Africa: 2009. The number of SMC/100 000 population for Gauteng province (GAP) presented in the table as 722 was incorrect. The correct figure is 72. This can be found in the corrected version of this publication available at: http://www.nicd.ac.za/pubs/survbull/2008/CommDisBullMar10_Vol0801.pdf

Table 1: Provisional number of laboratory confirmed cases of diseases under surveillance reported to the NICD - South Africa, corresponding periods 1 January - 31 March 2009/2010*

Disease/Organism	Cumulative to 31 March, year	EC	FS	GA	KZ	LP	MP	NC	NW	WC	South Africa
Anthrax	2009	0	0	0	0	0	0	0	0	0	0
	2010	0	0	0	0	0	0	0	0	0	0
Botulism	2009	0	0	0	0	0	0	0	0	0	0
	2010	0	0	0	0	0	0	0	0	0	0
Cryptococcus spp.	2009	415	145	671	399	157	254	22	221	178	2462
	2010	355	136	597	296	143	228	17	189	138	2099
Haemophilus influenzae, invasive disease, all serotypes	2009	6	2	38	15	0	8	1	4	25	99
	2010	7	5	38	12	1	0	2	2	20	87
Haemophilus influenzae, invasive disease, < 5 years											
Serotype b	2009	1	1	5	6	0	0	1	0	7	21
	2010	0	1	4	1	0	0	1	1	3	11
Serotypes a,c,d,e,f	2009	0	1	7	0	0	1	0	0	4	13
	2010	0	0	1	3	0	0	0	0	3	7
Non-typeable (unencapsulated)	2009	0	0	5	4	0	0	0	0	4	13
	2010	0	0	13	3	0	0	0	0	5	21
No isolate available for serotyping	2009	1	0	4	3	0	3	0	2	1	14
	2010	3	1	3	0	1	0	1	0	1	10
Measles	2009	2	0	7	1	0	2	0	1	2	15
	2010	888	253	574	1818	175	904	146	468	1069	6295
Neisseria meningitidis, invasive disease	2009	5	1	33	12	0	4	0	2	18	75
	2010	7	4	24	4	1	3	5	2	13	63
Novel Influenza A virus infections***	2009	0	0	0	0	0	0	0	0	0	0
	2010	0	0	0	0	0	0	0	0	0	0
Plague	2009	0	0	0	0	0	0	0	0	0	0
	2010	0	0	0	0	0	0	0	0	0	0
Rabies	2009	3	0	0	3	0	0	0	0	0	6
	2010	1	0	0	1	3	1	0	0	0	6
**Rubella	2009	26	1	5	23	6	20	10	7	11	109
	2010	139	32	43	116	13	57	13	56	106	575
Salmonella spp. (not typhi), invasive disease	2009	22	4	99	28	0	13	3	7	25	201
	2010	11	3	74	15	3	5	2	1	20	134
Salmonella spp. (not typhi), isolate from non-sterile site	2009	53	16	144	19	10	37	16	19	56	370
	2010	50	14	211	52	1	24	3	15	35	405
Salmonella typhi	2009	2	1	9	1	0	1	0	0	3	17
	2010	2	0	11	5	0	4	0	0	2	24
Shigella dysenteriae 1	2009	0	0	0	0	0	0	0	0	0	0
	2010	0	0	0	0	0	0	0	0	0	0
Shigella spp. (Non Sd1)	2009	73	24	169	32	2	28	9	13	166	516
	2010	68	15	219	23	0	9	5	8	110	457
Streptococcus pneumoniae, invasive disease, all ages	2009	85	64	425	106	13	42	17	29	153	934
	2010	66	40	305	80	19	44	21	32	119	726
Streptococcus pneumoniae, invasive disease, < 5 years	2009	31	23	132	37	4	14	8	7	58	314
	2010	15	9	87	22	2	11	12	8	32	198
Vibrio cholerae O1	2009	1	1	45	0	639	396	0	55	5	1142
	2010	0	0	0	0	0	0	0	0	0	0
Viral Haemorrhagic Fever (VHF)											
Crimean Congo Haemorrhagic Fever (CCHF)	2009	0	0	0	0	0	0	0	0	0	0
	2010	0	1	0	0	0	0	1	0	0	2
Other VHF (not CCHF)****	2009	0	0	0	4	0	0	0	0	0	4
	2010	7	69	0	0	0	0	11	0	0	87

Footnotes

*Numbers are for cases of all ages unless otherwise specified. Data presented are provisional cases reported to date and are updated from figures reported in previous bulletins.

**Rubella cases are diagnosed from specimens submitted for suspected measles cases.

*** Confirmed cases. Excludes pandemic influenza H1N1. See weekly influenza reports on www.nicd.ac.za.

**** All Rift Valley fever

Provinces of South Africa: EC – Eastern Cape, FS – Free State, GA – Gauteng, KZ – KwaZulu-Natal, LP – Limpopo, MP – Mpumalanga, NC – Northern Cape, NW – North West, WC – Western Cape

U =unavailable, 0 = no cases reported

Table 2: Provisional laboratory indicators for NHLS and NICD, South Africa, corresponding periods 1 January - 31 March 2009/2010*

Programme and Indicator	Cumulative to 31 March, year	EC	FS	GA	KZ	LP	MP	NC	NW	WC	South Africa
Acute Flaccid Paralysis Surveillance											
Cases < 15 years of age from whom specimens received	2009	10	2	16	29	8	15	3	3	7	93
	2010	14	3	18	26	9	10	0	9	5	94
Laboratory Programme for the Comprehensive Care, Treatment and Management Programme for HIV and AIDS											
CD4 count tests											
Total CD4 count tests submitted	2009	311,600	184,577	587,437	186,757	218,527	49,035	197,515	645,919	192,447	2,573,814
	2010	367,052	227,070	696,976	242,671	273,181	55,592	226,253	784,075	222,064	3,094,934
Tests with CD4 count < 200/µl	2009	111,711	62,213	214,898	63,278	78,648	15,108	64,732	211,650	55,654	877,892
	2010	113,916	69,426	227,469	74,775	81,882	17,994	68,290	227,664	55,643	937,059
Viral load tests											
Total viral load tests submitted	2009	135,790	56,270	277,608	80,969	79,397	21,886	82,218	322,008	67,952	1,124,098
	2010	138,894	59,191	313,523	93,412	89,811	22,232	90,636	411,531	94,397	1,313,627
Tests with undetectable viral load	2009	70,277	36,584	168,243	47,752	44,700	12,202	51,752	188,945	55,043	675,498
	2010	90,417	42,913	226,849	62,299	65,713	14,467	64,970	298,673	76,350	942,651
Diagnostic HIV-1 PCR tests											
Total diagnostic HIV-1 PCR tests submitted	2009	26,921	11,554	53,542	14,375	14,105	3,303	15,026	68,022	16,687	223,535
	2010	28,574	12,523	57,092	19,555	21,738	3,884	16,883	78,627	16,654	255,530
Diagnostic HIV-1 PCR tests positive for HIV	2009	3,353	1,830	7,046	2,270	2,472	474	2,234	9,085	1,447	30,211
	2010	2,583	1,352	5,971	2,372	2,510	431	1,781	6,629	1,238	24,867

Footnotes

*Numbers are for all ages unless otherwise specified. Data presented are provisional numbers reported to date and are updated from figures reported in previous bulletins.

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U = unavailable, 0 = no cases reported

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