

Comparison of patients presenting with four HIV-associated Opportunistic Infections, South Africa, 2006 - 2008

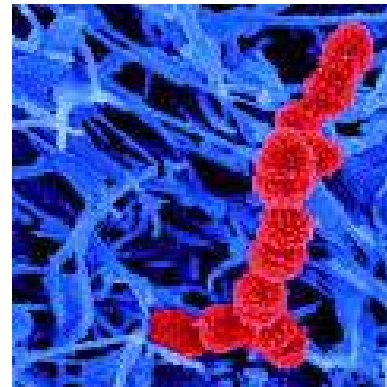
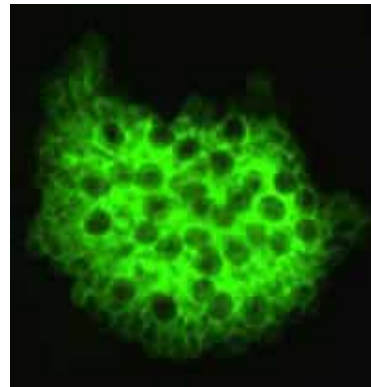
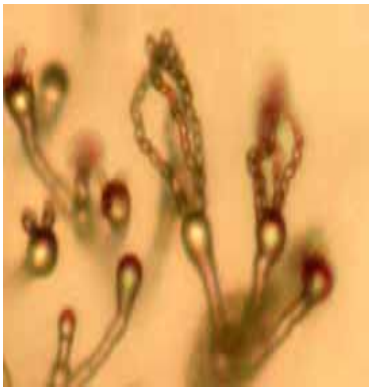
Veerle Msimang, M.Sc.
Epidemiology and Surveillance, NICD/NHLS



NICD

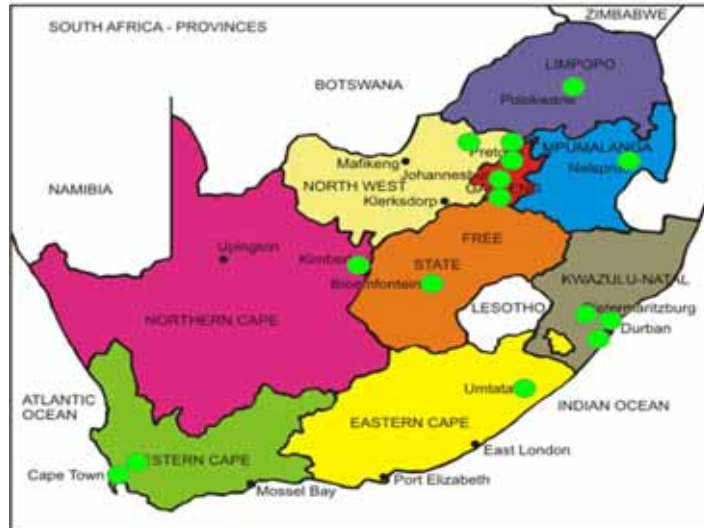
Four common causes of OI, under surveillance in South Africa, 2006 - 2008

- *Cryptococcus neoformans* (C)
- *Pneumocystis jirovecii* (PCP)
- *Streptococcus pneumoniae* (SP)
- Non-typhoid *Salmonella enterica* (invasive) (NTS)



Objectives and Methods

Source data 2006 - 2008:



GERMS-SA: National Laboratory-based Surveillance for Enteric, Respiratory and Meningeal Bacterial and Fungal Diseases in South Africa
Protocol Version 1.0 (February 2008)
Clinical Case Report Form
National Microbiology Surveillance Unit (NMSU)
TEL: 011 266 6234 OR 011 655 0053 FAX: 011 266 6077

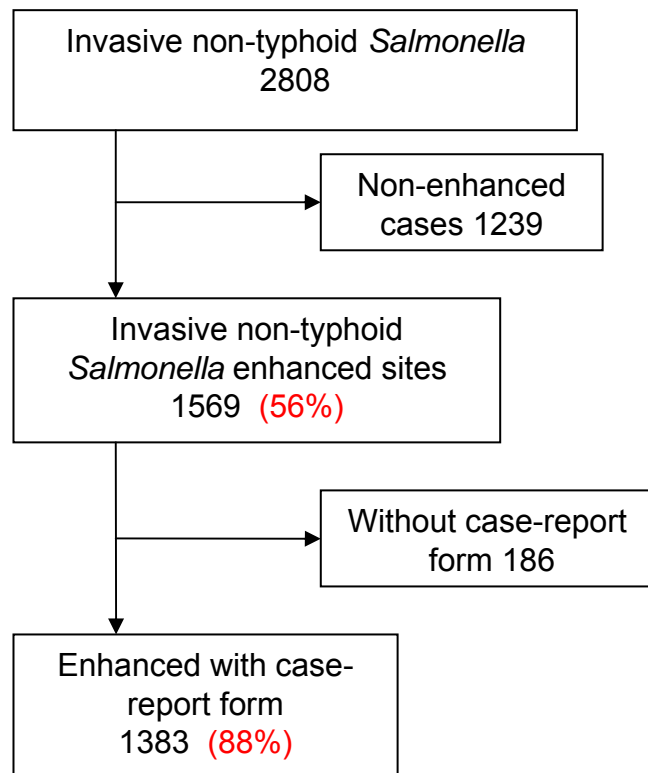
Laboratory Specimen Number: _____			
Meningococcus spp. and <i>S. pneumoniae</i> ONLY			
Vaccination status for <i>Meningococcus</i> influenzae:			
If <15 years of age, did patient receive <i>Meningococcus</i> influenzae type b vaccine: Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>			
Dose	Date given	Name of clinic	If patient received vaccine, was there documented proof of vaccine:
1	_____	_____	Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>
2	_____	_____	
3	_____	_____	
Vaccination status for <i>Streptococcus pneumoniae</i> :			
If <15 years of age, did patient receive pneumococcal conjugate vaccine: Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>			
Has the patient (all ages) received 23-valent polysaccharide vaccine: Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>			
Dose	Date given	Name of clinic	If yes, give date most recently given and vaccine name:
1	_____	_____	i. Most recent date given: _____
2	_____	_____	ii. Vaccine name: _____
3	_____	_____	
Organism spp. ONLY			
Antibiotics prior to this admission: _____ Weight _____ kg Unk <input type="checkbox"/>			
Fluconazole	Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>	If yes, date initiated _____	Dose _____ Daily <input type="checkbox"/> BD <input type="checkbox"/>
Amphotericin B	Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>	If yes, date initiated _____	Dose _____
Is this the first episode of cryptococcosis? Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>			
Management during this admission			
Fluconazole	Dose _____	Frequency _____	Date initiated _____ Total number of doses/ number of days _____
Amphotericin B	Dose _____	Frequency _____	Date initiated _____ Total number of doses/ number of days _____
Itraconazole	Dose _____	Frequency _____	Date initiated _____ Total number of doses/ number of days _____
Antifungal therapy unknown <input type="checkbox"/> Antifungal therapy not prescribed <input type="checkbox"/>			
Was opening intracranial pressure documented at time of first LP? Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/>			
If yes, what was the recorded opening pressure: _____ on H ₂ O Unk <input type="checkbox"/> Died <input type="checkbox"/> Discharge dose: _____ Daily <input type="checkbox"/> BD <input type="checkbox"/>			
On discharge was patient given fluconazole: Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/> Died <input type="checkbox"/> Discharge dose: _____ Daily <input type="checkbox"/> BD <input type="checkbox"/>			
Pneumocystis jirovecii ONLY			
Admission pulse oximeter reading off oxygen _____ % Unk <input type="checkbox"/>			
PCP treatment during this admission: _____ Weight _____ kg Unk <input type="checkbox"/>			
Cotrimoxazole	Dose _____	Route _____	Date initiated _____ Total number of doses/ number of days _____
Dapsone	Dose _____	Route _____	Date initiated _____ Total number of doses/ number of days _____
Other	Dose _____	Route _____	Date initiated _____ Total number of doses/ number of days _____
Prednisone	Dose _____	Route _____	Date initiated _____ Total number of doses/ number of days _____
Hydrocortisone	Dose _____	Route _____	Date initiated _____ Total number of doses/ number of days _____
PCP therapy unknown <input type="checkbox"/> PCP therapy not prescribed <input type="checkbox"/>			
On discharge was patient given cotrimoxazole: Yes <input type="checkbox"/> No <input type="checkbox"/> Unk <input type="checkbox"/> Died <input type="checkbox"/> Discharge dose/ number of days: _____			

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Revised Nov 2007

This work has been supported by the NICD/ NHLS & by cooperative agreements from the Centers for Disease Control and Prevention.

Objectives and Methods

Type: secondary analysis



ALL cases

- age-gender distribution
- incidence rate 2007
 - For general population
 - For HIV+ population

Extrapolation: we assume that age-specific HIV-status amongst cases without HIV data was the same as that amongst those with data on HIV-status.

enhanced sites cases

- HIV – prevalence
- known HIV – diagnosis
- case-fatality ratio

Excel 2003 and Stata 10.0

<http://www.actuarialsociety.org.za/Models-274.aspx>

<http://www.statssa.gov.za/publications/populationstats.asp>

Results

Summary cases C, PCP, SP and NTS, South Africa, 2006 - 2008

	CASES (N)		incidence (per 100,000)	HIV-prevalence % (n/N)	CFR % (n/N)
	ALL	enhanced			
<i>Cryptococcus neoformans</i>	21824	5261	15.1	99 (4336/4387)	32 (1654/5195)
<i>Pneumocystis jirovecii</i>	847	255		92 (216/236)	36 (88/245)
<i>Streptococcus pneumoniae</i>	13632	5565	9.5	79 (3205/4037)	28 (1527/5528)
invasive non-typhoid <i>Salmonella enterica</i>	2808	1383	1.9	84 (952/1138)	29 (393/1348)

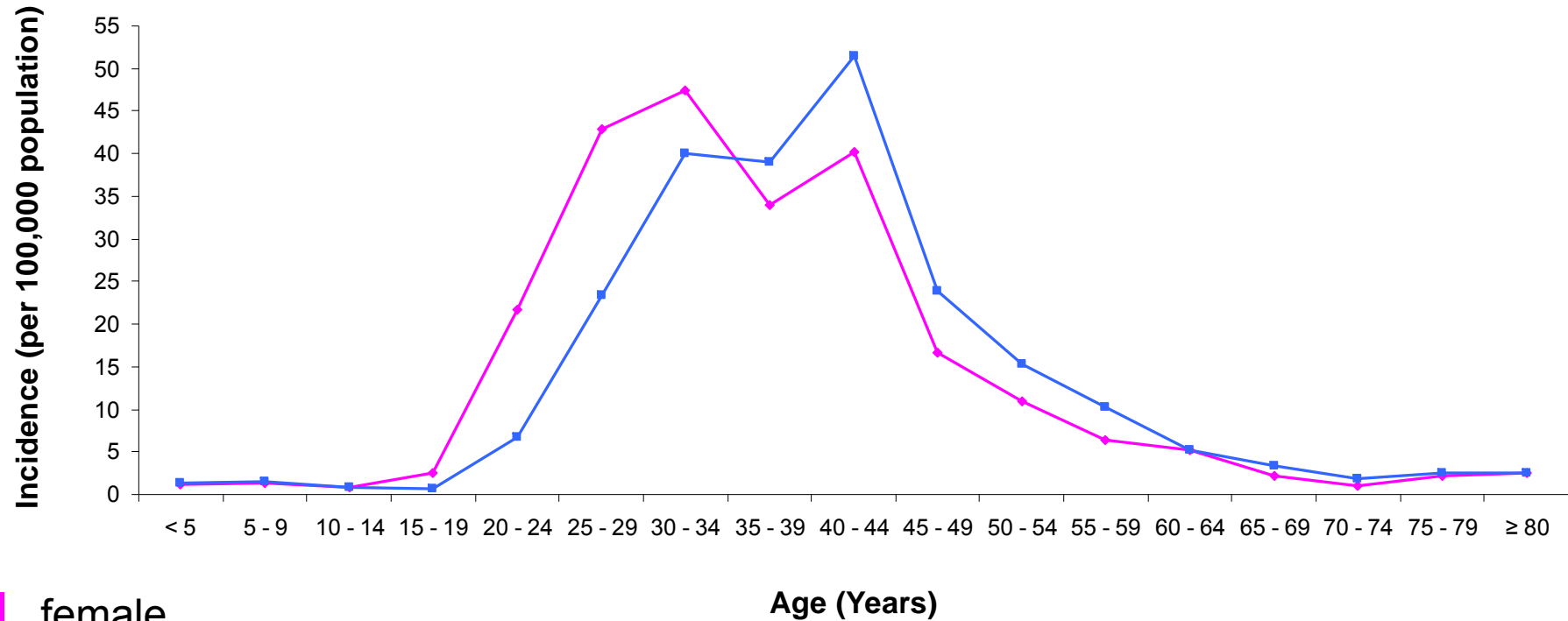
CFR = Case-fatality ratio

C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

Age-gender specific incidence *Cryptococcus neoformans*, South Africa, 2007

(N=7216)

F:M 1.1



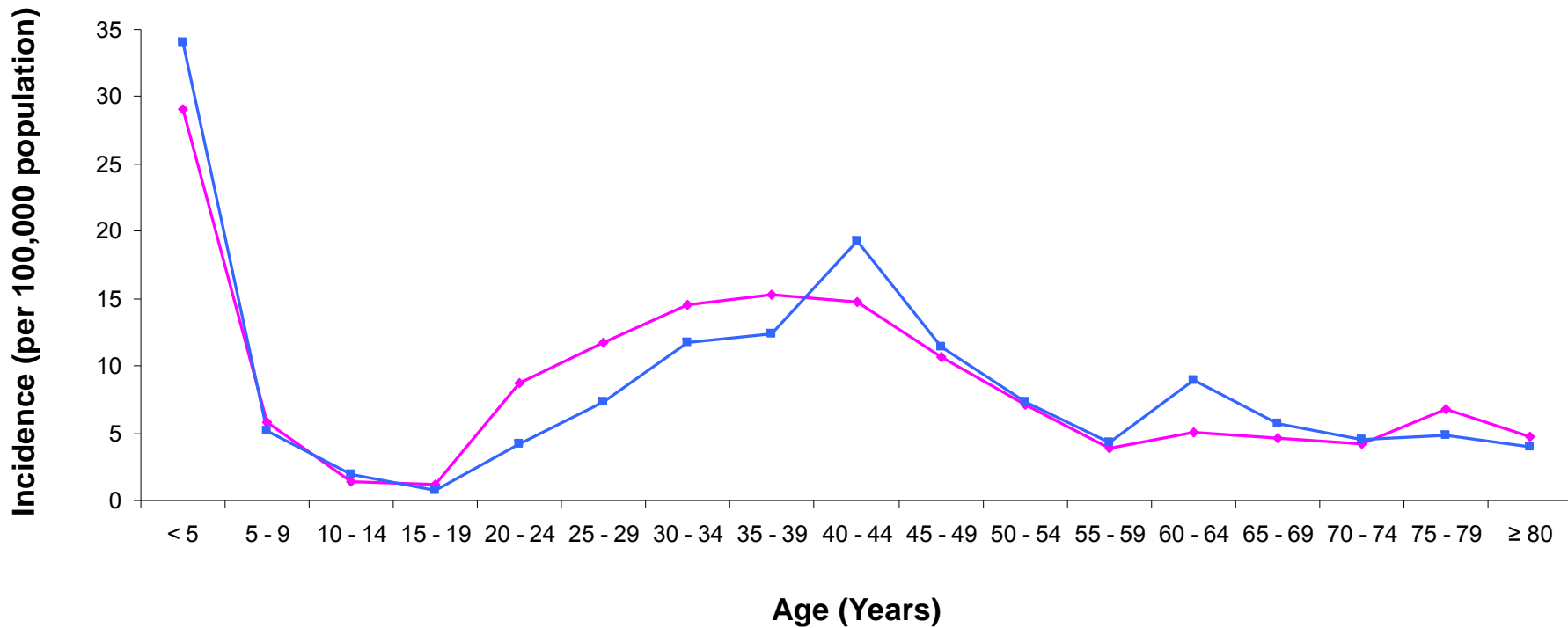
■ female
■ male

C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

Age-gender specific incidence *Streptococcus pneumoniae*, South Africa, 2007

(N=4734)

F:M 1.1

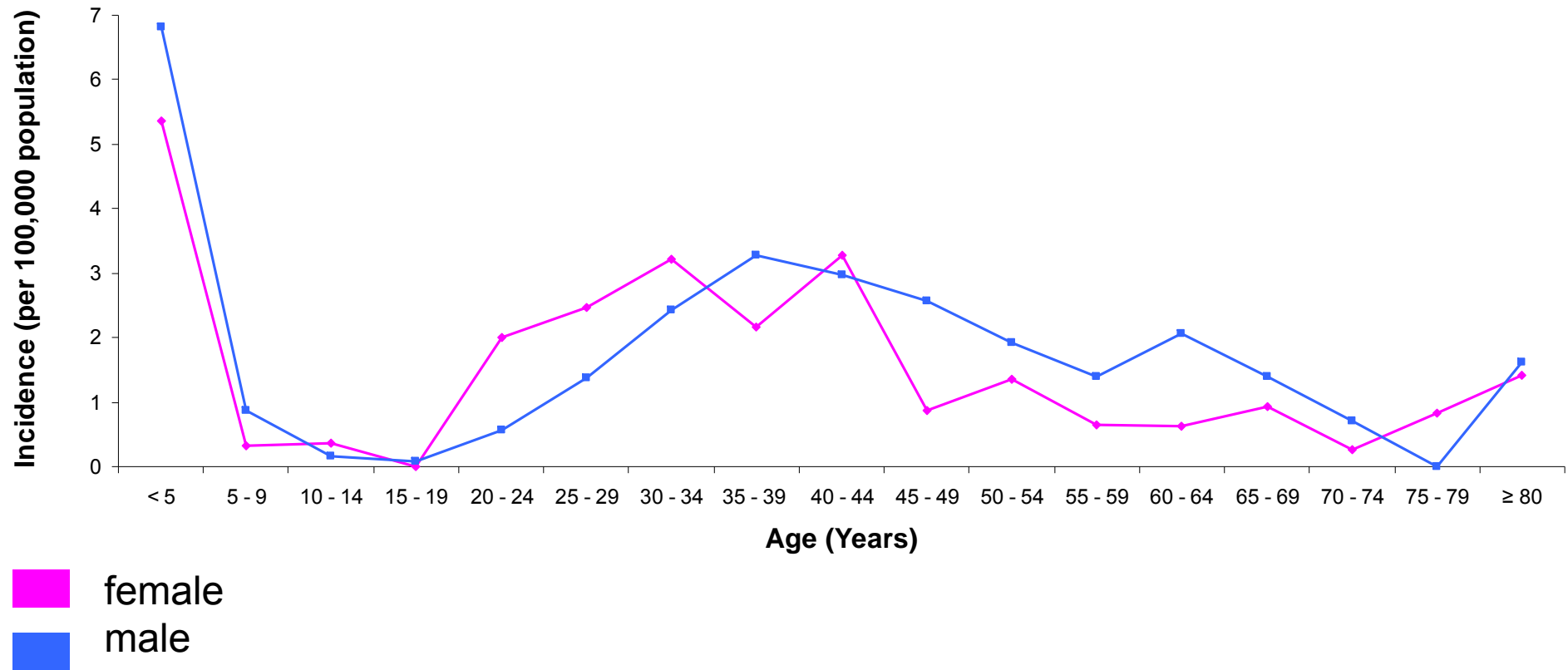


■ female
■ male

C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

Age-gender specific incidence invasive non typhoid *Salmonella enterica*, South Africa, 2007 (N=890)

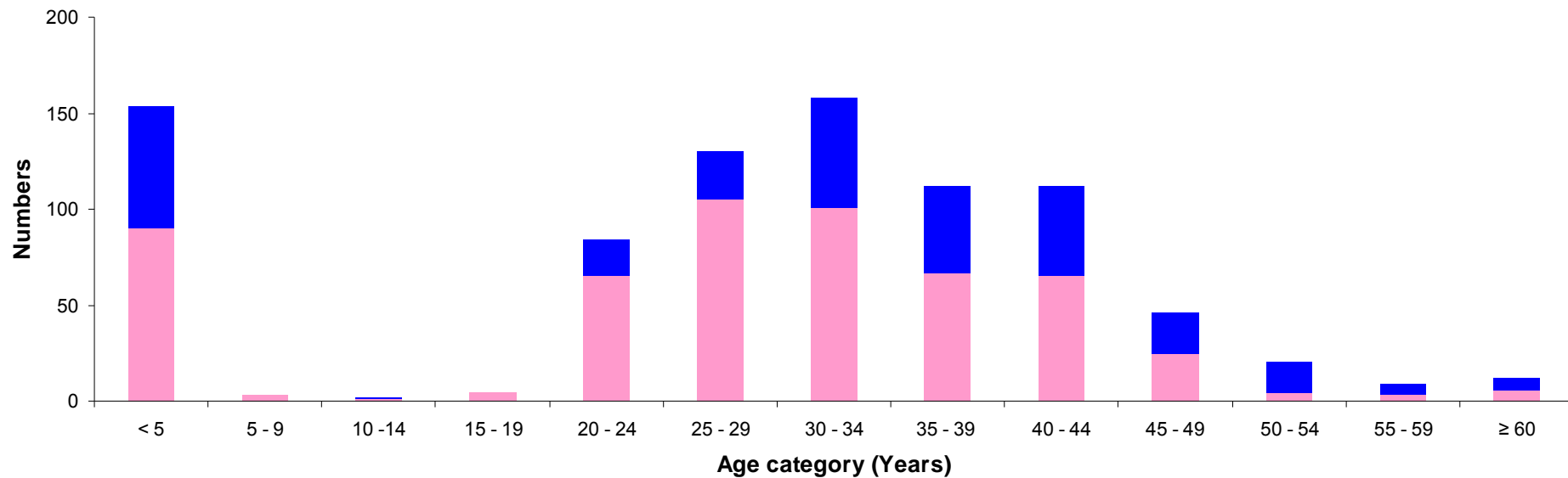
F:M 0.9



C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

Age-gender distribution for PCP cases, South Africa, 2006 – 2008 (N=255)

F:M 1.8



female
male

C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

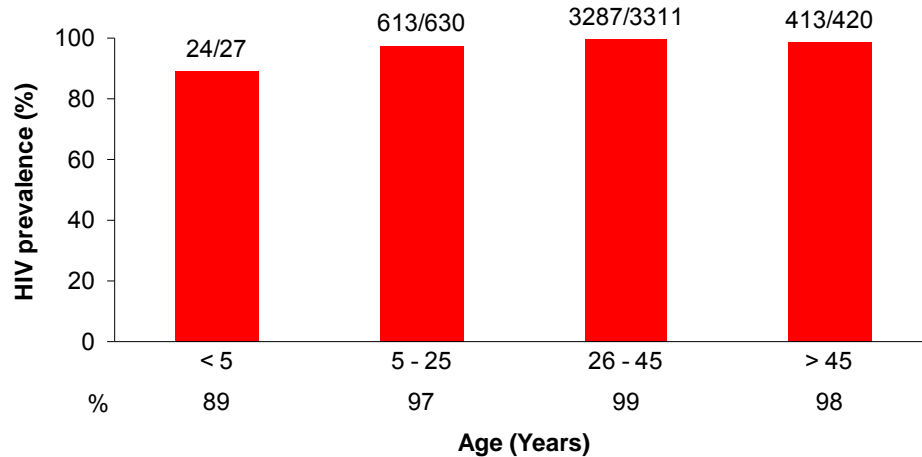
Incidence of C, SP and NTS according to HIV status, South Africa, 2007

	INCIDENCE (per 100,000 population)			
	HIV-positive population		general population	
	< 5 yrs.	25 - 44 yrs.	< 5 yrs.	25 - 44 yrs.
<i>Cryptococcus neoformans</i>	18	153	1.3	39
<i>Streptococcus pneumoniae</i>	625	45	32	12.8
invasive non-typhoid <i>Salmonella enterica</i>	93	10	6.1	2.6

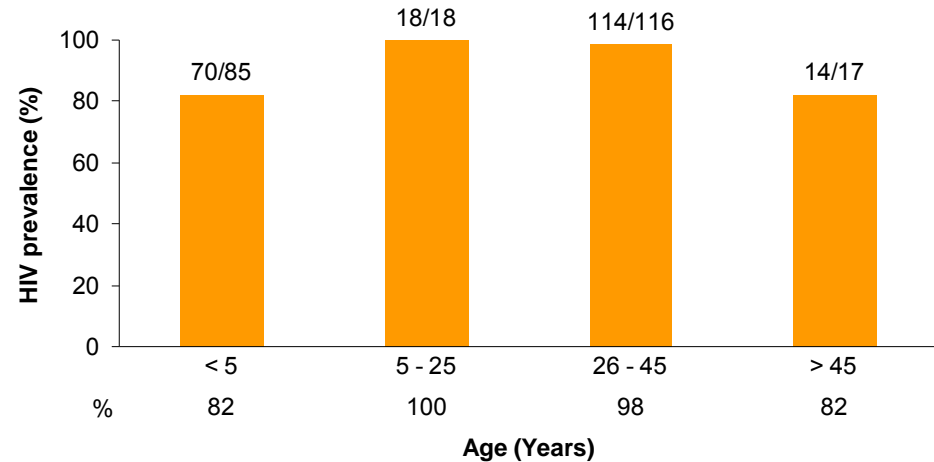
C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
 SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

HIV prevalence amongst C, PCP, SP and NTS cases, by age category, South Africa, 2006 - 2008

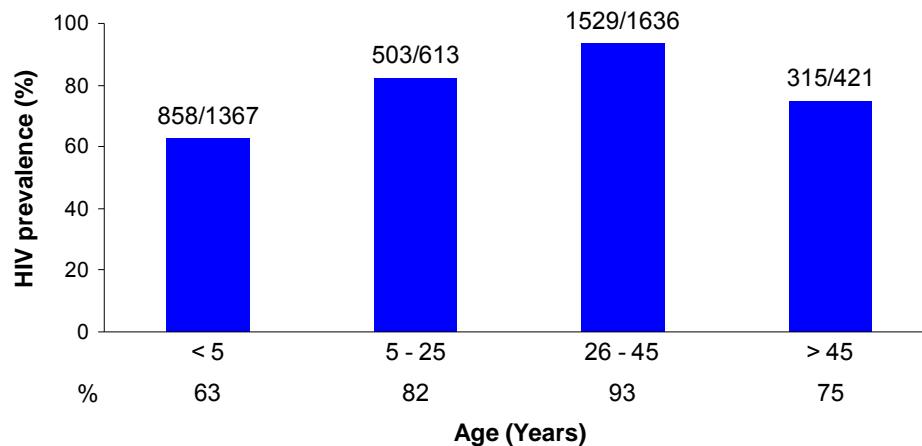
Cryptococcus neoformans



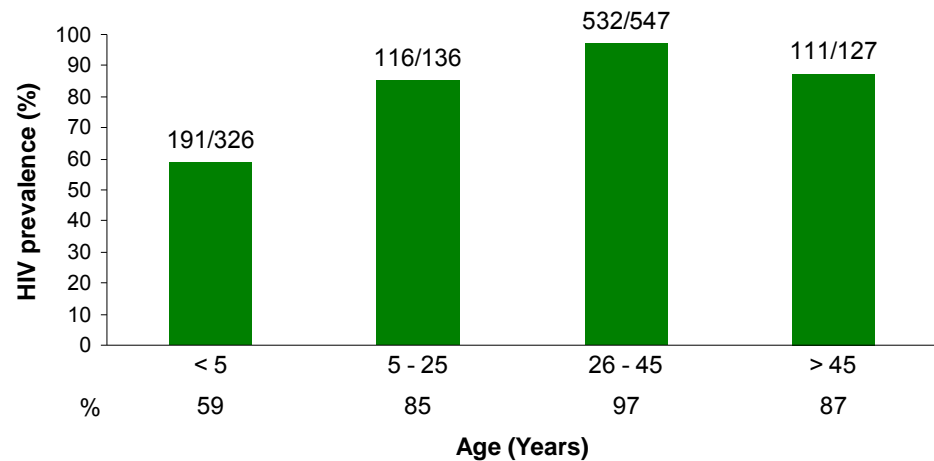
Pneumocystis jirovecii



Streptococcus pneumoniae



invasive non typhoid *Salmonella enterica*



C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
 SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

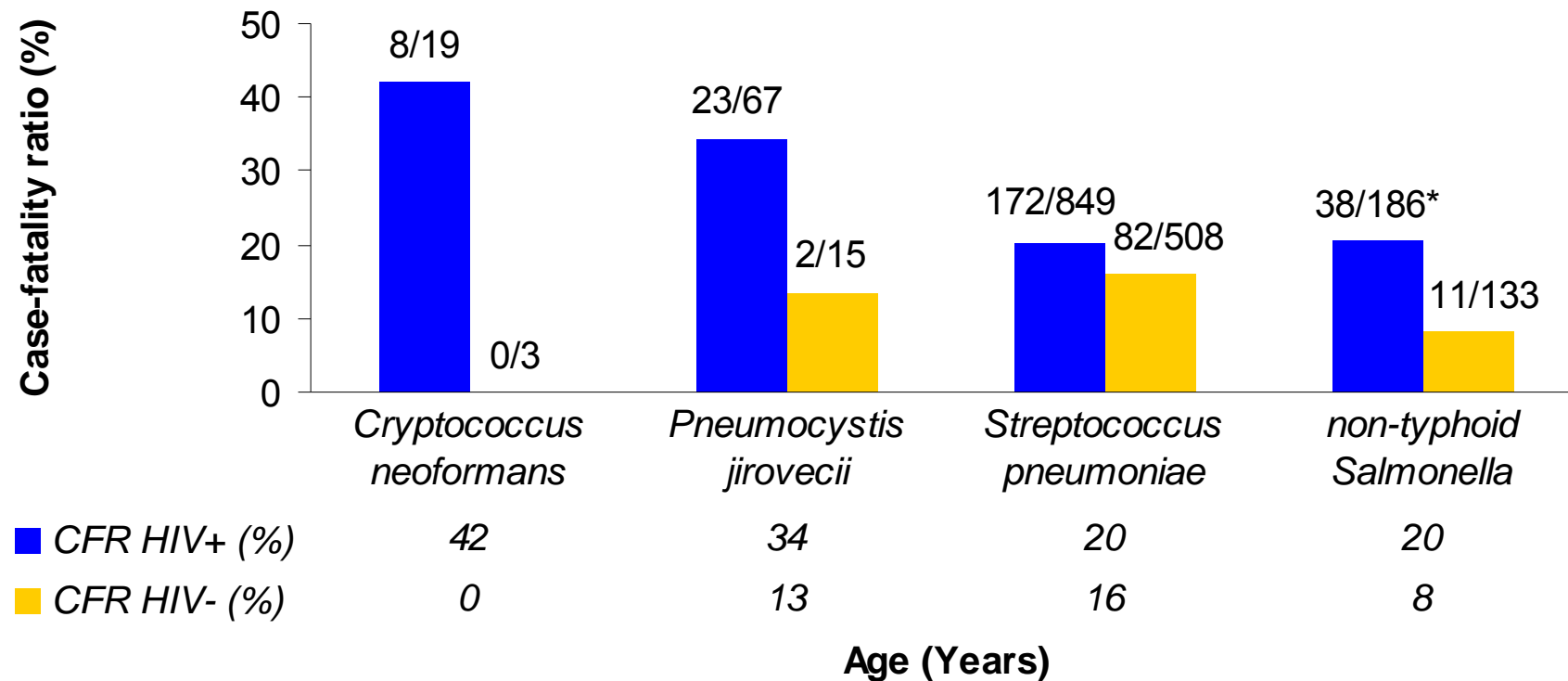
Percentage of C, PCP, SP and NTS cases with known HIV-positive status prior to current admission, South Africa, 2006 - 2008

	Percentage cases with known HIV-positive status prior to current admission	
	%	(n/N)
<i>Cryptococcus neoformans</i>	80	(3445/4333)
<i>Pneumocystis jirovecii</i>	54	(115/215)
<i>Streptococcus pneumoniae</i>	65	(2062/3199)
invasive non-typhoid <i>Salmonella enterica</i>	72	(687/952)

C: *Cryptococcus neoformans*, PCP: *Pneumocystis jirovecii*,
 SP: *Streptococcus pneumoniae*, NTS: invasive non-typhoid *Salmonella enterica*

Case-fatality ratio (CFR) of C, PCP, SP and NTS cases by HIV status, South Africa, 2006 - 2008

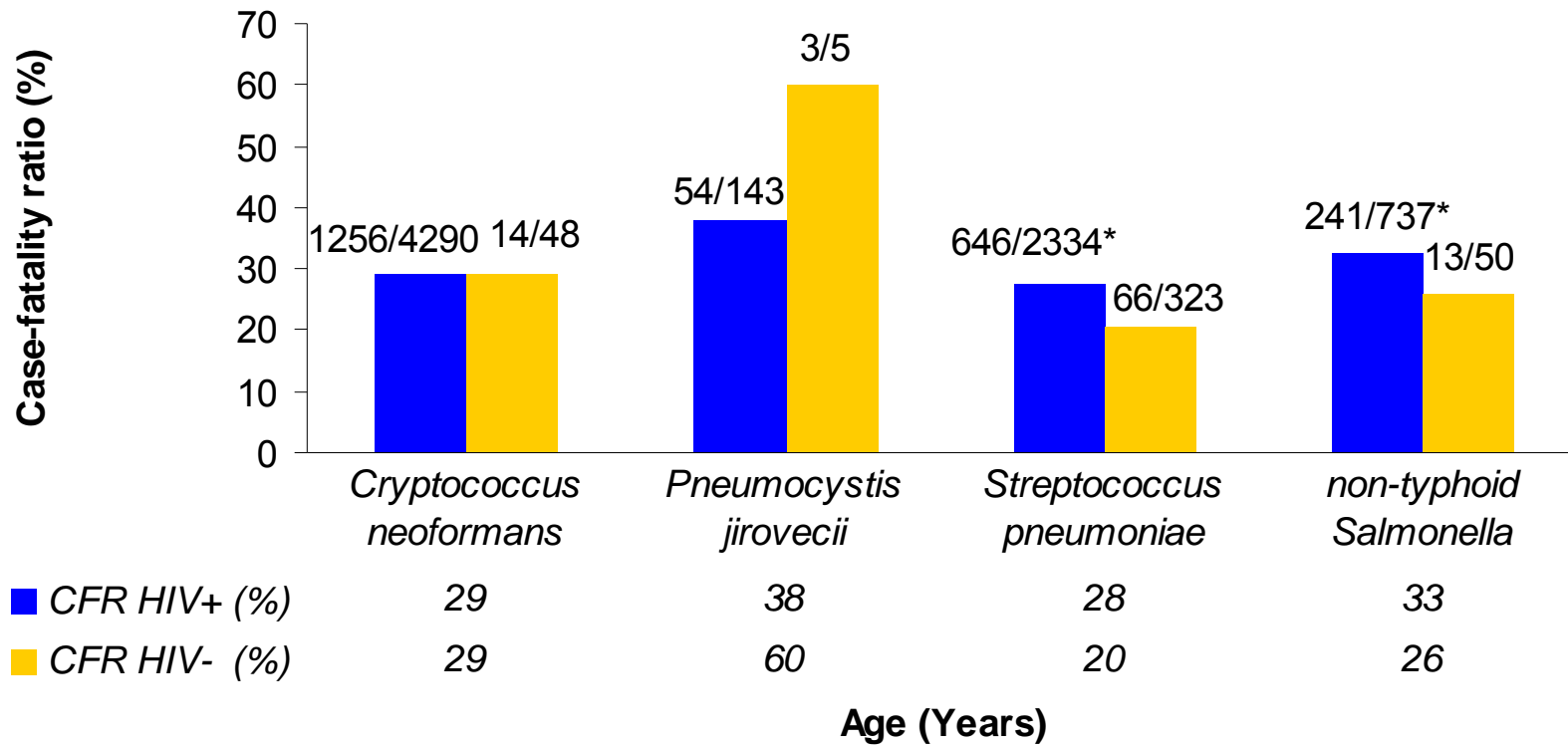
children under five years old



* = statistically significant

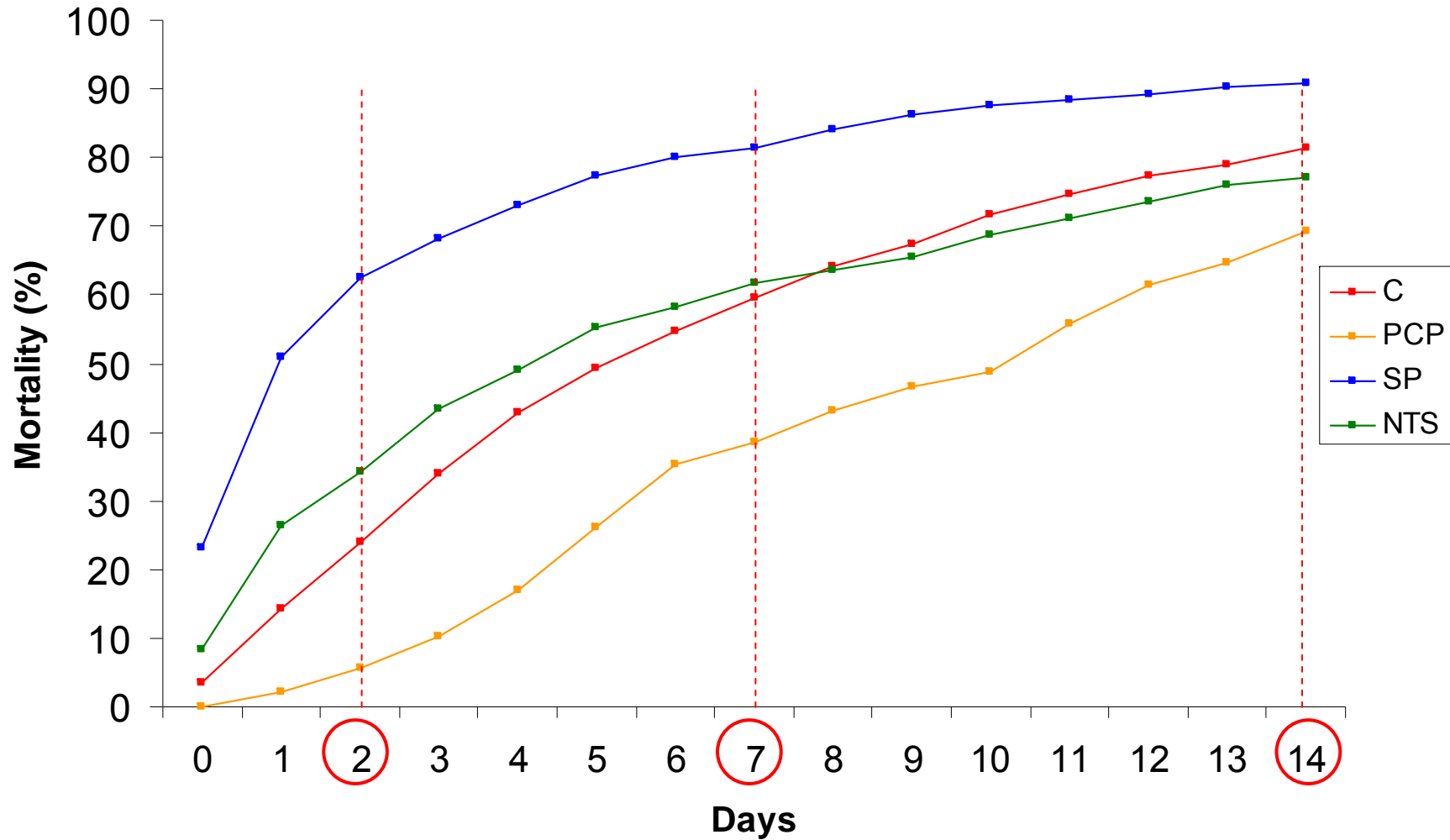
Case-fatality ratio (CFR) of C, PCP, SP and NTS cases by HIV status, South Africa, 2006 - 2008

patients of five years and older



* = statistically significant

Time to death for C, SP, PCP, NTS cases who died in hospital, South Africa, 2006 – 2008



Conclusions

- for SP, NTS and PCP, peaks in case numbers were seen in children <5 years and adults aged 26-45 years, while the majority of cases of C occurred amongst adults
- for all pathogens, more than 90% of patients aged 26-45 years were HIV-infected: 98% (PCP) and 99% (C), higher than 19% in the community for same age group
- smaller proportions of children than adults are HIV-infected, however high compared to estimated 5% in children < 5 years in the community

Conclusions

- for all pathogens, in-hospital mortality is more than 25% and over 60% die within 7 days for SP, C, NTS
- short survival of C and PCP cases and difficulties in follow-up underestimates mortality among those cases
- in Uganda, prospective studies have reported over 50% 6-month mortality with therapy assumption of 70% 3-month CFR is not unreasonable

1. Kambugu, A., D. et Al., Clin. Infect. Dis. 2008
2. Longley N. et Al., Clin. Infect. Dis. 2008



All participating patients,
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NICD

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