

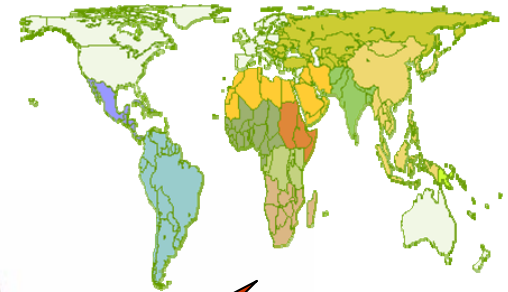
# Combating antimicrobial resistance in South Africa



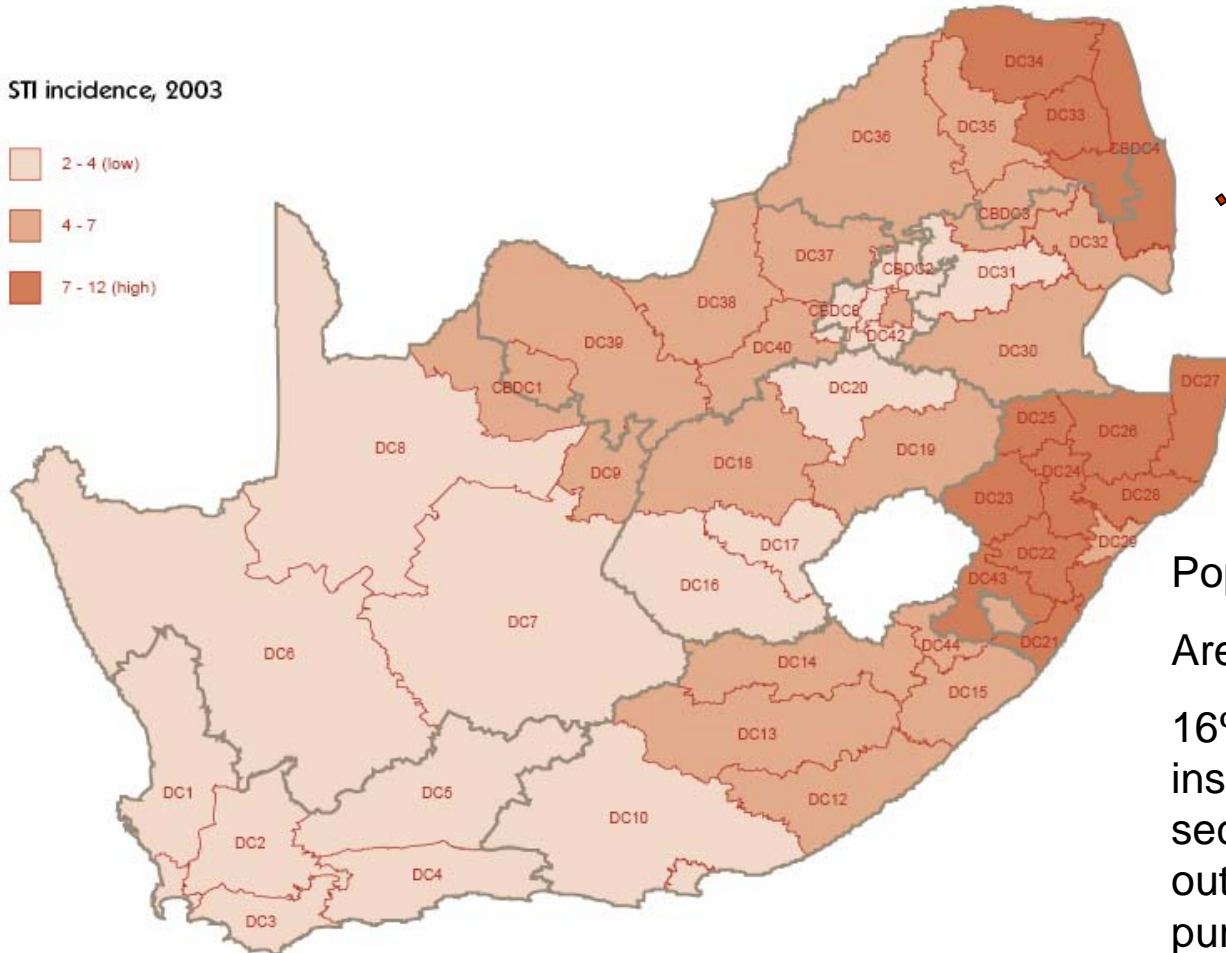
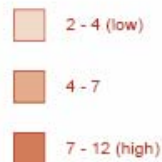
Andy Gray

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Nelson R Mandela School of Medicine

# South Africa



STI incidence, 2003

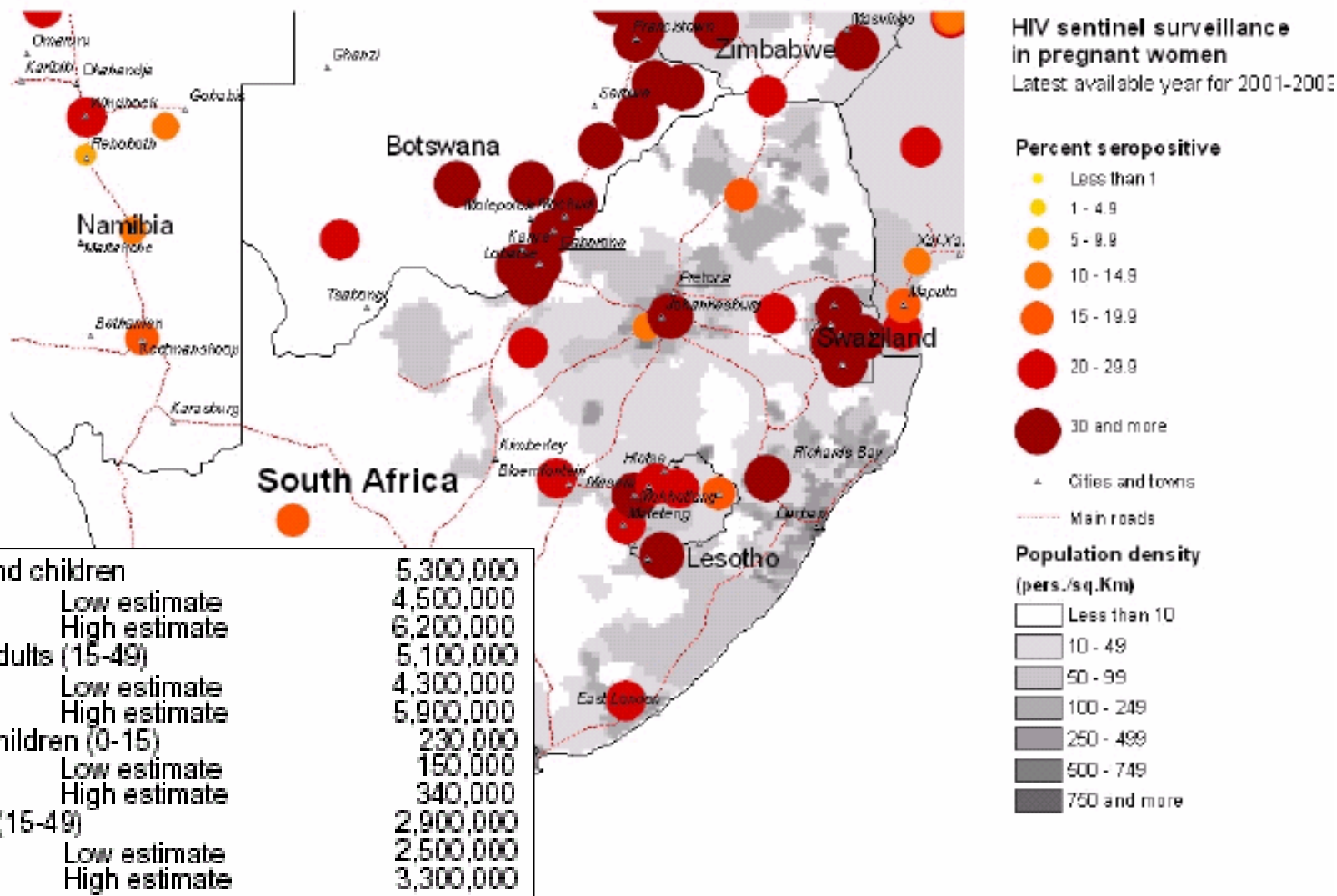


Population: 46 million

Area: 1.2 million km<sup>2</sup>

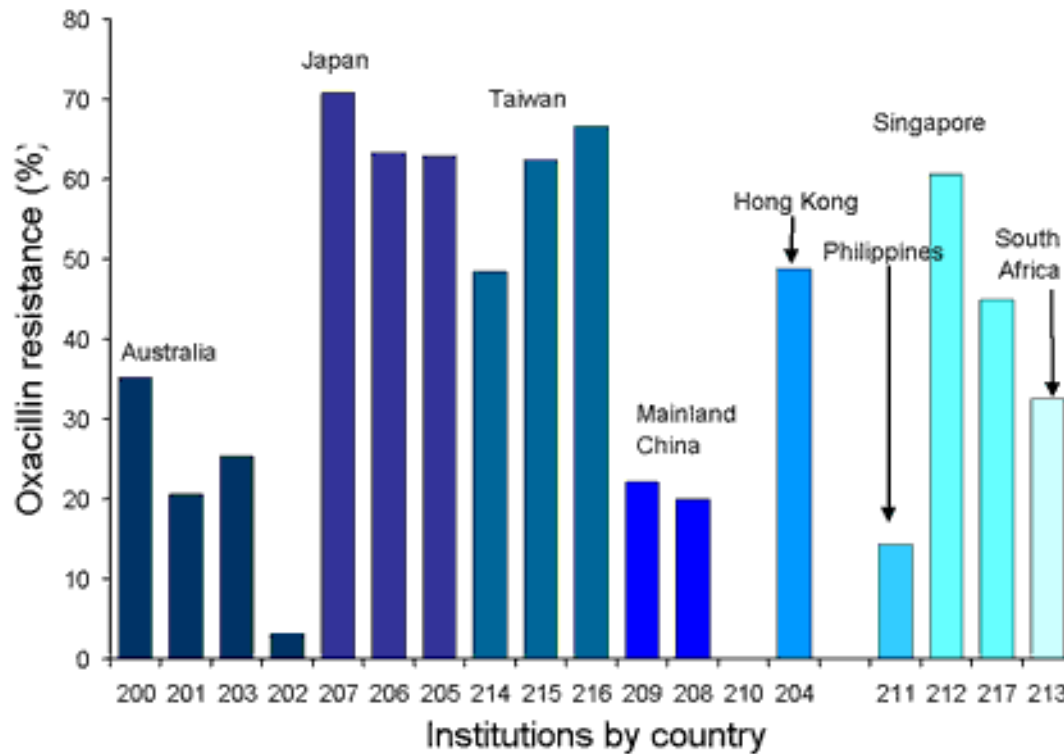
16% with medical insurance – rest public-sector dependent or out-of-pocket purchasers of health care services

# UNAIDS 2003 estimate – 5.3 million HIV+



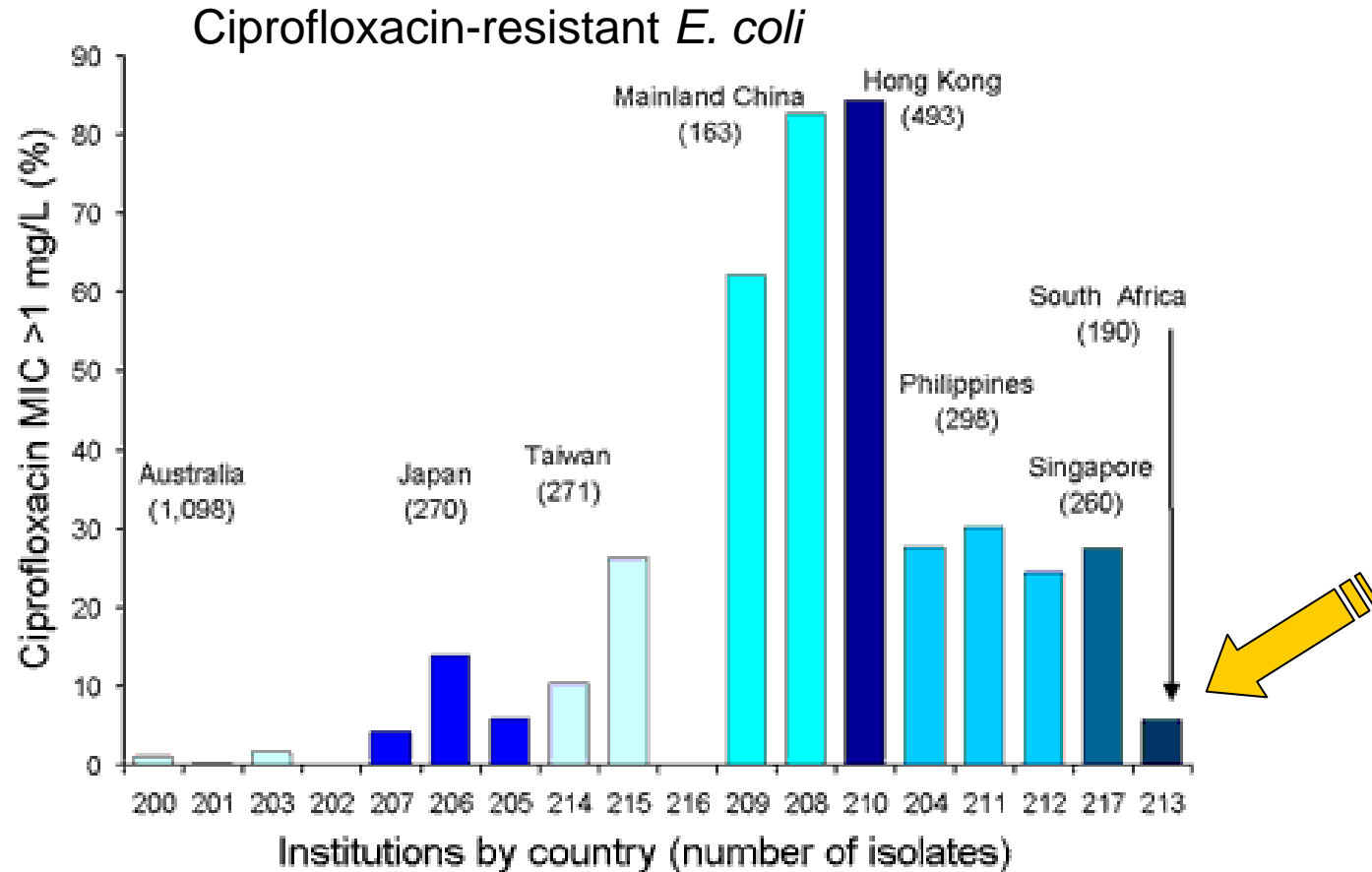
# Antimicrobial resistance

## Oxacillin-resistant *S. aureus*



SENTRY data – hospital and community-acquired infections  
Bell and Turnbridge. *Comm Dis Intell* 2003

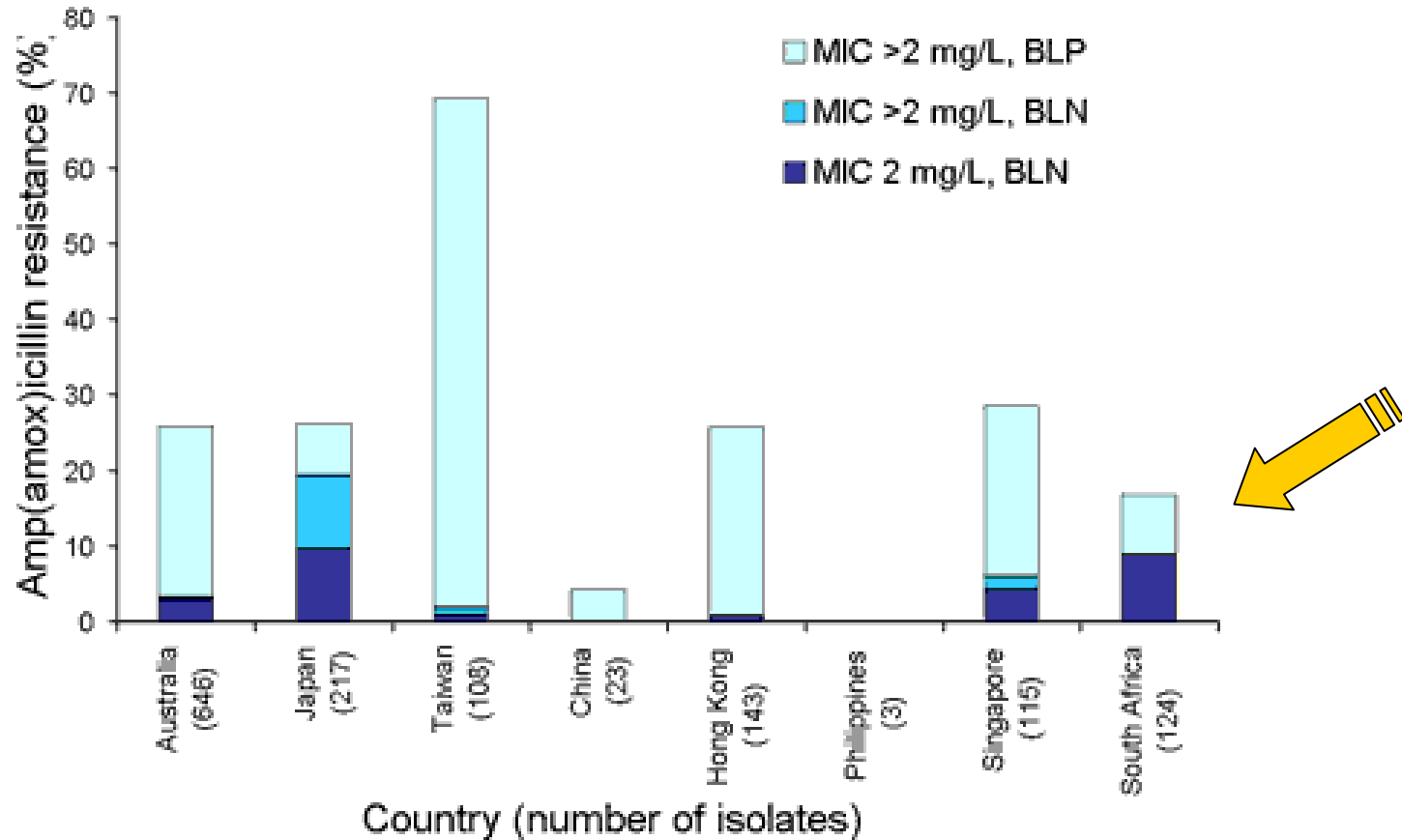
# Antimicrobial resistance



SENTRY data – hospital and community-acquired infections  
Bell and Turnbridge. *Comm Dis Intell* 2003

# Antimicrobial resistance

Amp(amox)icillin-resistant *H. Influenzae*

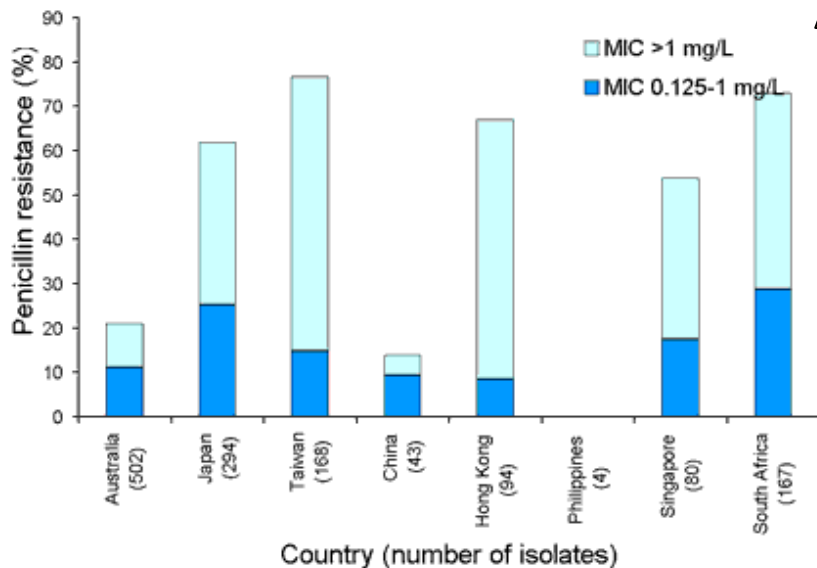


SENTRY data – hospital and community-acquired infections  
Bell and Turnbridge. *Comm Dis Intell* 2003

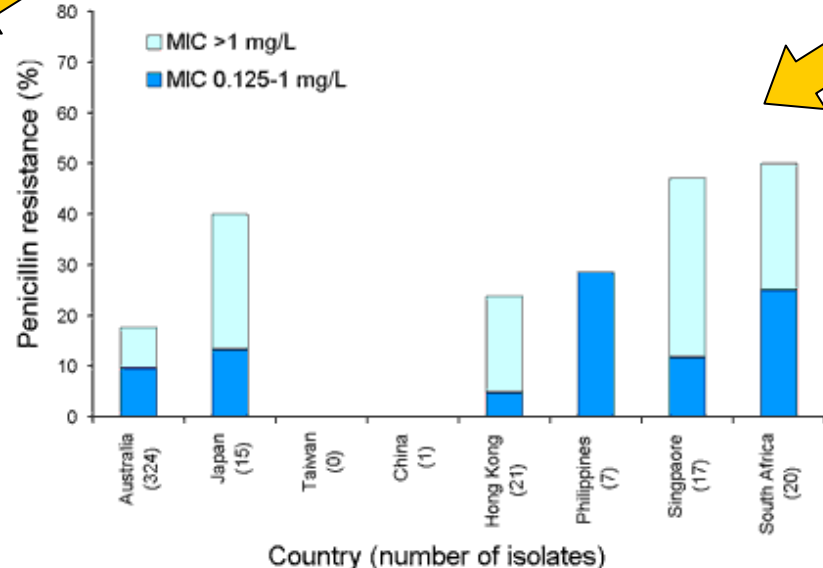
# Antimicrobial resistance

## Penicillin-resistant *Strep pneumoniae*

Respiratory isolates



Blood isolates



SENTRY data – hospital and community-acquired infections  
Bell and Turnbridge. *Comm Dis Intell* 2003

# Pneumococi – a particular problem

Table 6. Lineage by country of 366 dual *erm(B)+mef(A)* erythromycin-resistant *Streptococcus pneumoniae* isolates collected during the PROTEKT global study (1999–2003)

Country	No. isolates	Clonal complex			
		CC 271	CC 242	CC 81	None*
Australia	6	6	–	–	–
Brazil	2	2	–	–	–
Canada	4	4	–	–	–
China	13	12	–	–	1
France	3	1	–	–	2
Germany	1	1	–	–	–
Hong Kong	2	2	–	–	–
Hungary	2	2	–	–	–
Italy	2	2	–	–	–
Japan	44	12	16	1	15†
Mexico	6	4	–	–	2
South Africa	129	116	9	2	2
South Korea	111	102	–	6	3
Taiwan	5	3	–	–	2
United Kingdom	1	1	–	–	–
United States	35	35	–	–	–
Total, n (%)	366 (100)	305 (83.3)	25 (6.8)	9 (2.5)	27 (7.4)

\*No clonal lineage found except for 2 isolates (ST 1467) and 1 isolate (ST 1452), which were clonally related (CC 1467).

†8 isolates were clonally related (ST 1426).

**David J. Farrell, Stephen G. Jenkins, Steven D. Brown, Manish Patel, Bruce S. Lavin, and Keith P. Klugman.** Emergence and Spread of *Streptococcus pneumoniae* with *erm(B)* and *mef(A)* Resistance. *Emerging Infectious Diseases* • www.cdc.gov/eid • Vol. 11, No. 6, June 2005

# Other challenges

- >3000 MDR-TB cases per year
  - Case series of 30 MDR-TBM (Patel *et al.* CID 2004) – 17 deaths, 18 HIV+, 3 with no previous hx of TB treatment
- High usage of cotrimoxazole prophylaxis
  - The use of TMP-SMX prophylaxis in HIV-infected children was associated with an increased nasopharyngeal carriage of *S. aureus* [22 of 51 (43%) vs. 17 of 79 (22%),  $p = 0.009$ ]. The rising prevalence of HIV infection and the use of TMP-SMX prophylaxis may alter the spectrum of colonizing and pathogenic bacteria in children in developing countries (Zar *et al.* J Trop Pediatr 2003)
- Changes in susceptibility of *N. gonorrhoea* (Moodley *et al.* JAC 2001; emerging data and changes in protocols)
- Extended-spectrum beta-lactamases (Pitout *et al.* AAC 1998; Essack *et al.* Int J Antimicrob Agents 2004)

# Other challenges (2)

- Emerging problems

- Vancomycin-intermediate *S. aureus* (Amod *et al.* J Infect 2005)

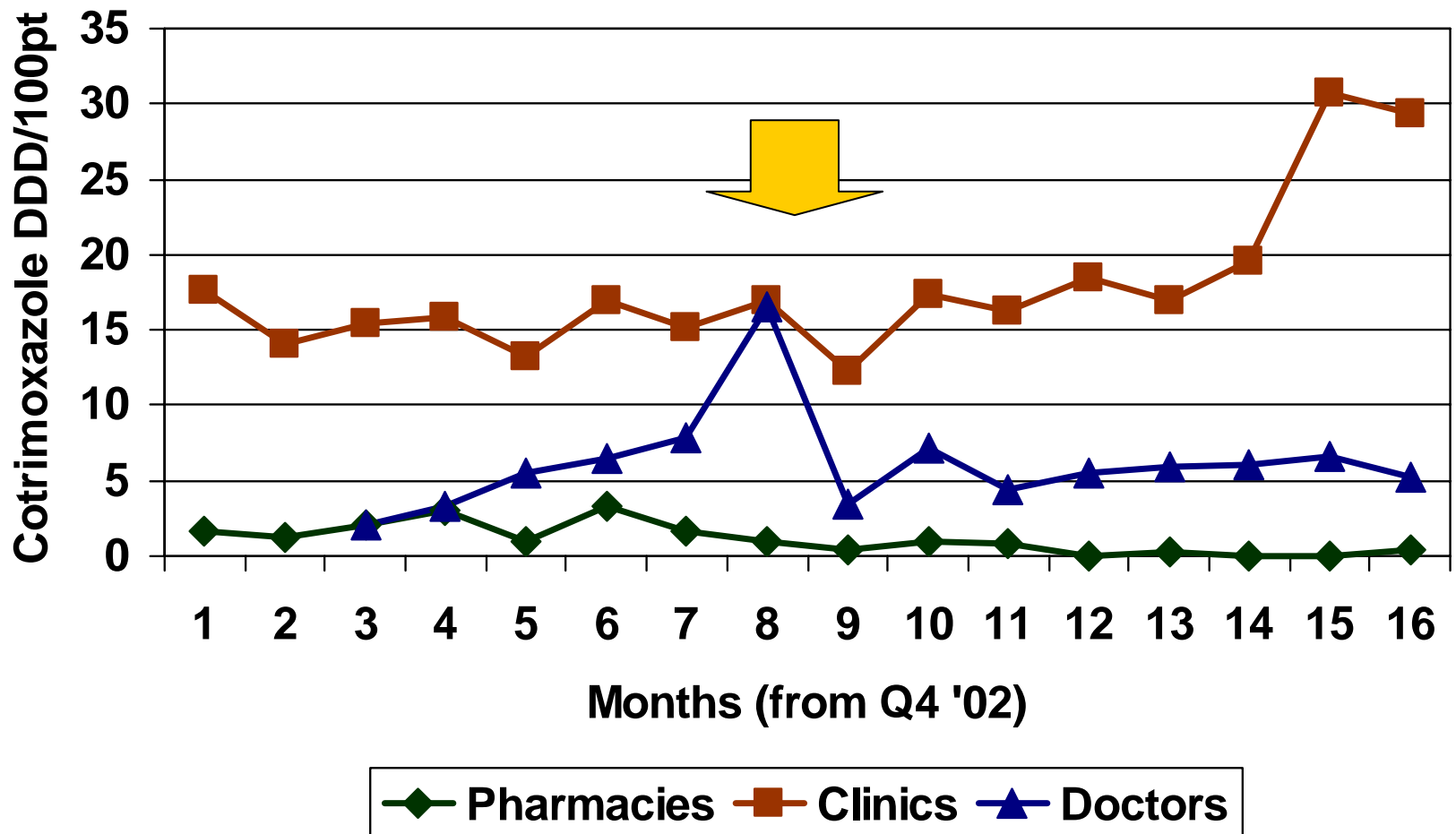
- Inter-hospital spread of pan-resistant organisms

- Multi-drug resistant *A. anitratus* (Jeena *et al.* Ann Trop Paediatr 2001; Marais *et al.* Am J Infect Control 2004)

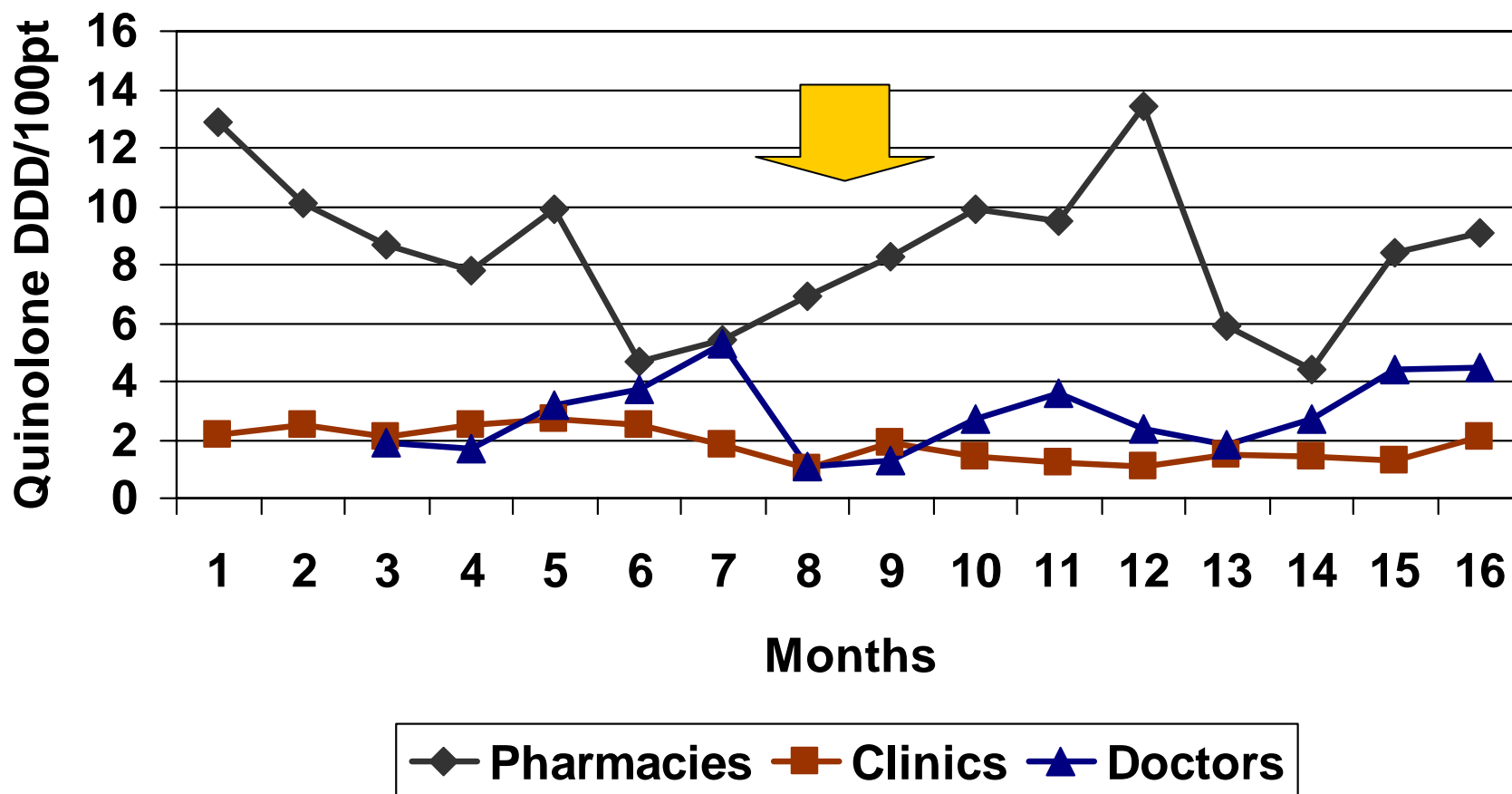
# Containment measures

- Legal control of antimicrobials
  - Prescription-only status
  - Limited agricultural use
- Surveillance
  - Mostly hospital-based
  - Large, international projects (Alexander, Libra, Protekt, SENTRY)
  - Pilot projects supported by WHO
- Guidelines
  - Standard Treatment Guidelines and Essential Drugs Lists (in the public sector)

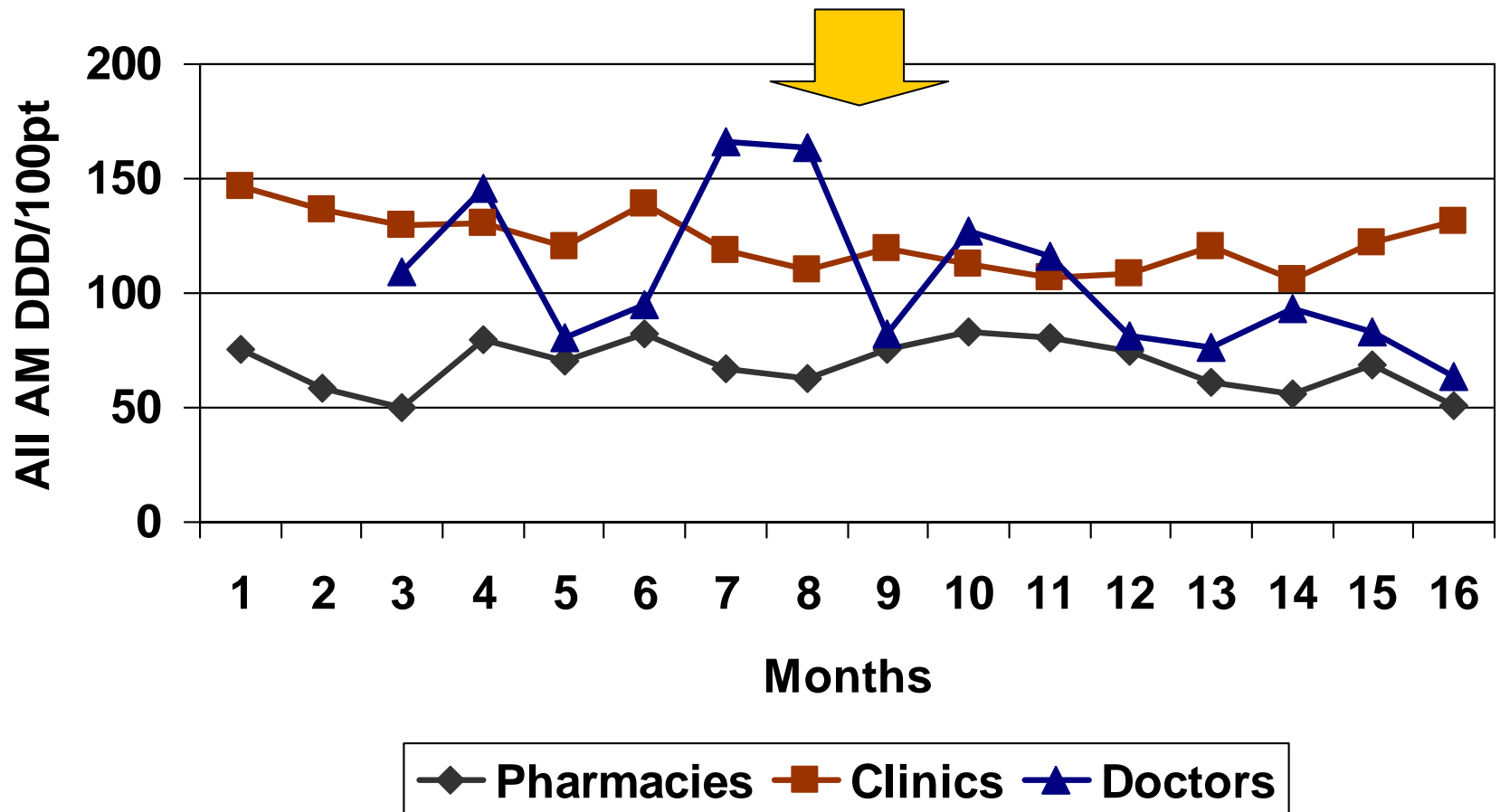
# Inner West, Durban- use of cotrimoxazole



# Antimicrobial use - quinolones

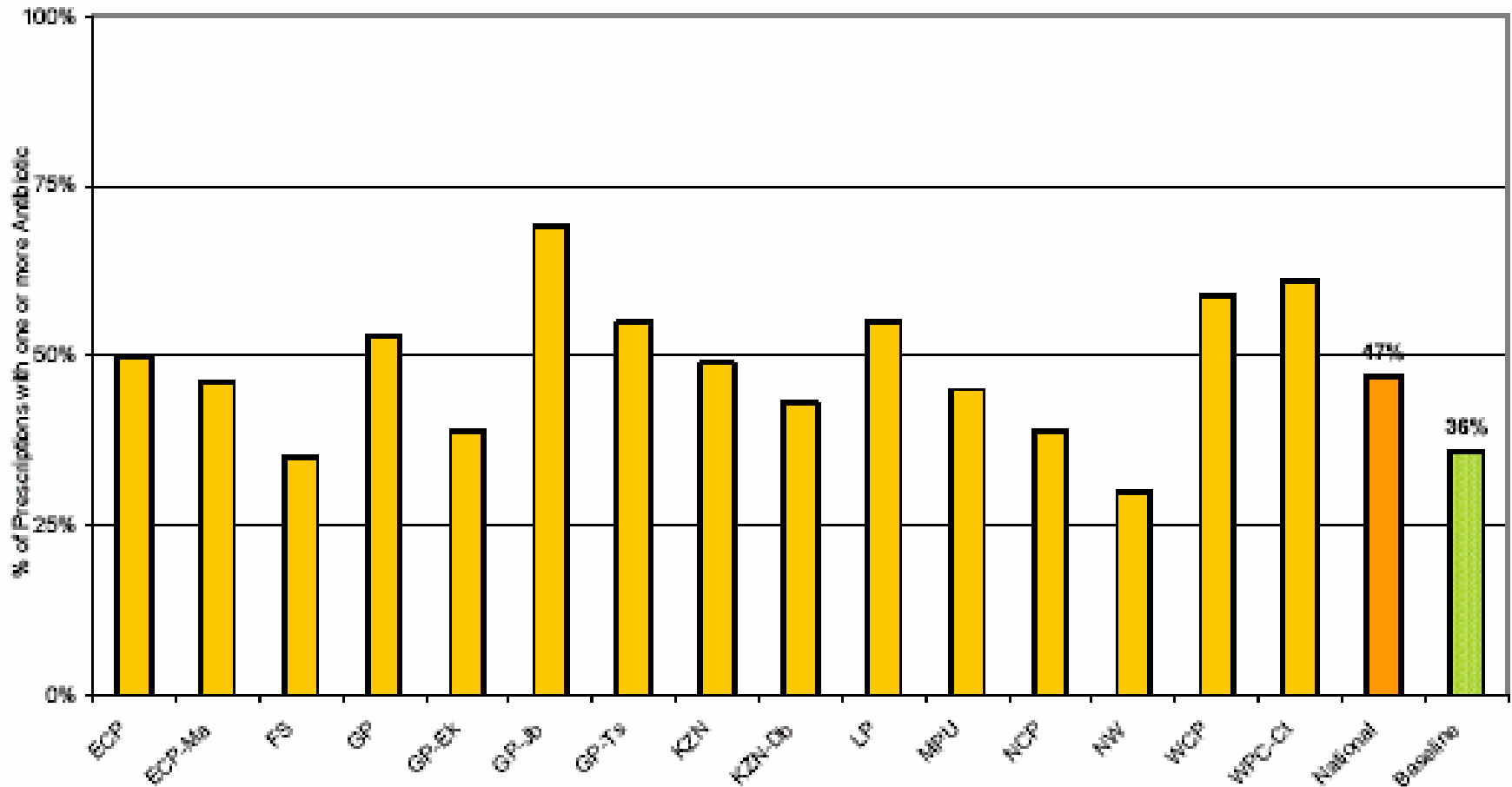


# Antimicrobial use – all AM



# SA EDP review 2003 – PHC facilities

Figure 3.2.8: Antibiotic Prescribing



# Challenges – mostly paper-based records

Name of Health Care Provider (PRINT) THU Signature THU  
 Rank CPI Date 03/12/03 Telephone 7075482

Child / Infant Document Number	PATIENT NAME	ADDRESS	PROVISIONAL DIAGNOSIS	TREATMENT / MANAGEMENT	Age in years	Sex	Weight (kg)	Height (cm)	Temp (°C)	HR (b/min)	RR (b/min)	SPO <sub>2</sub> (%)	SpO <sub>2</sub> (SaO <sub>2</sub> ) (%)	SpO <sub>2</sub> (SvO <sub>2</sub> ) (%)	SpO <sub>2</sub> (SvO <sub>2</sub> ) (%)	SpO <sub>2</sub> (SvO <sub>2</sub> ) (%)	
170/03	[Redacted]	637 Madaket C LERMONT	PTB	Ritinal 400mg x 1/2	9M	L											
487/03	[Redacted]	475-23rd C LERMONT	PTB / RUS	Ritinal 400mg x 1/2	8M	L											
298/03	[Redacted]	173-28th A C LERMONT	PTB	Ritinal 400mg x 1/2	8F	L											
266/03	[Redacted]	1988 Cha. Rd C LERMONT	PTB	Ritinal 400mg x 1/2	11M	L											
325/03	[Redacted]	122-5th C LERMONT	PTB	Ritinal 400mg x 1/2	22F	L											
333/03	[Redacted]	2121-34th C LERMONT	PTB	Ritinal 400mg x 1/2	33F	L											
764/03	[Redacted]	2496-55th C LERMONT	RNA HPT	Polysen 250mg	35F	L											
69/03	[Redacted]	1819-32nd C LERMONT	Distalve Other	Mefenidol 100mg tabs	24F	L											
3127/03	[Redacted]	163-Office C LERMONT	Cough/fever Other	Liquid paracetamol	26M	L											
311/03	[Redacted]	1393 10th C LERMONT	URT Other	Co-trimoxazole 500	6M	L											
		Under 5 years	5 years and over														
		0000000000	0000000000														
		Brought forward	64														
		Cumulative Total	74														

Name of Health Care Provider (PRINT) THU Signature THU  
 Rank CPI Date 03/12/03 Telephone 7075482

# ANTIMICROBIAL RESISTANCE CONGRESS

## "FACING THE REALITY" – Medicines Control Council 2003



- National meeting with international (Swedish, Australian) input
- Key issue of contention – agricultural use
  - Swan - Human safety risk-assessment should form the basis of approval of veterinary antimicrobials; An integrated veterinary and human national antimicrobial policy is required; Abuse of antimicrobials is synonymous to promoting conditions for resistance development; The risk-benefit of the use of antimicrobials as growth promoters needs to be re-evaluated.
- Many recommendations – little follow-up action

# Recommendations

- Surveillance and monitoring systems to contain antimicrobial resistance need to be customised to meet country requirements. The WHO has proposed a model for containment including multiple interventions that could be made. Monitoring of drug usage and microbial surveillance was identified as the priority interventions, and the others interventions should be prioritised within countries. **Surveillance is the key to a national antimicrobial resistance containment programme.** Different aspects of definition, technical considerations, including aspects such as denominators, choice of populations, numbers and types of samples and responsibility are important issues to be considered. The communication and reporting back to persons and organisations supplying data is essential
- Risk assessment strategies as well as regulatory control of human and veterinary medicines based on scientific data are essential. Strategies to contain antimicrobial resistance should integrate and harmonise with international efforts and initiatives, including with those of WHO and FAO
- Initial programmes for containment of antimicrobial resistance should utilise existing infrastructure and coordination with all stakeholders (e.g. involvement of TB and malaria control) should be facilitated as a matter of urgency. In this regard, deficiencies and gaps in the already existing surveillance systems should be identified and corrected.
- The contribution of current clinical infection control guidelines and strategies including interventions in agriculture and veterinary health should be reviewed. The prudent use of antiseptics and disinfectants must be advocated. The use of other methods to control infection, in addition to antimicrobials, needs to be emphasised. In this regard, good disease control measures, increased health status, improved management systems and a focus on hygiene factors are alternatives that will go a long way in reducing the need for antimicrobials in animals and therefore in the containment of resistance.
- Appropriate Pharmacovigilance systems need to be supported by surveillance, monitoring and laboratory data. Quality control systems need to be applied in animal production.
- Targeted surveillance is required to guide empirical therapy (surveillance need to be followed by intensive appropriate intervention and it is critical to be different for various problems)
- In developing guidelines, all stakeholders need to be involved and a system for continuous review of documents needs to be instituted. Professional and public education and information requirements need to be developed and implemented as part of a coordinated containment strategy.
- Surveillance and monitoring of viral resistance needs to be integrated as an essential component of an antiretroviral treatment programme. Resistance testing should be done as part of therapeutic monitoring. To this end, the establishment of a focused task group, which includes a virologist, epidemiologist, statistician and clinician, should be considered.

# Potential positives

- National Health Laboratory Services
- National Essential Drugs List Committee and Provincial Pharmacy and Therapeutics Committees
- Growing cost containment in the for-profit private sector; increasing health spend in the public sector
- National Health Act with strong compliance/quality elements

# Thank you!

