

# National Standard Hospital- Level Cumulative Antibigram Expert Roundtable

*Morgyn Warner*



1. What organisms and what antibiotics do you currently report?

# Gram positives

- Sterile sites (CSF, BC, sterile tissues)
  - All GPCs usually reported
    - *S. aureus*, Streps, enterococci; others selectively eg nutritionally variant strep, micrococcus)
  - GPBs
    - *Bacillus cereus*, *Listeria*, *Bacillus* sp., diphtheroids, Propionibacteria;
  - If likely to be a contaminant not always speciated (eg viridans grp streptococci or coagulase negative staphylococci, diphtheroids)
  - If identification system (MALDI or Phoenix) speciates the isolates, we will report to species level where possible for significant isolates and sometimes for contaminants or “significance uncertain”



# Gram positives

- Non-sterile sites (e.g. wound swabs)
  - $\beta$ -haemolytic streptococci
  - *S. aureus*
  - *B. cereus*
  - *Corynebacterium* (selectively) eye swab, breast abscess

# *S. aureus*

	CSF	MSSA Other sterile Sites	MRSA Other sterile sites	MSSA GMC SP GYN	nmMRSA GMC SP GYN	mmMRSA GMC SP GYN	MSSA UMM	MRSA UMM
PEN	1	1	3	1	3	3	1	3
AMP	1	1	3	1	3	3	1	3
AUG	3	1	3	1	3	3	1	3
MTH	1	1	3	1	3	3	1	3
CEP	3	1	3	1	3	3	1	3
ERY	3	3	3	1	3	3	3	3
CLI	3	3	3	1	1	3	3	3
VAN	1	1	1	2	1	1	2	1
RIF	2	3	3	3	3	3	3	3
FUS	3	3	3	3	3	3	3	3
DOX	3	3	3	3	3	3	3	3
CIP	3	3	3	3	3	3	3	3
GEN	3	3	3	3	3	3	3	3
CHL	3	3	3	3	3	3	3	3
SXT	3	3	3	2	1	3	1	1
TMP	3	3	3	3	3	3	1	1
MUP	3	3	3	3	3	3	3	3
LIN	3	3	1	3	3	3	3	3
NOR	3	3	3	3	3	3	1	1



# MSSA (Women's & childrens hospital)

Test	Report	Comments
Penicillin	Penicillin	
Cefoxitin <sup>a</sup>	Flucloxacillin <sup>b, c</sup>	
	Cefazolin	Extrapolate from cefoxitin result
Erythromycin	Erythromycin	Do <b>not</b> report for CSF isolates
Clindamycin	Clindamycin	If erythromycin-resistant, report clindamycin as resistant if D-test positive <sup>d</sup> (do <b>not</b> report for CSF)
Ciprofloxacin <sup>e</sup>	(Ciprofloxacin)	Report for cefoxitin resistant isolates
Trimethoprim-sulfa	(Trimethoprim-sulfa)	Report for cefoxitin resistant isolates
Tetracycline <sup>e</sup>	Doxycycline	If > 8 years old

<sup>a</sup> Cefoxitin-resistant staphylococci should have an extended range of antibiotic sensitivities performed using the Vitek 2, if not already performed ([see below](#)).

<sup>b</sup> Coagulase-negative staphylococci from sterile sites, and deemed significant or possibly significant by the registrar or consultant, must be speciated.

<sup>c</sup> Coagulase-negative staphylococci with cefoxitin zone diameter between 22 mm and 25 mm must be speciated before applying interpretative criteria.

<sup>d</sup> Refer to PRC-MBI-251 for Inducible Clindamycin Resistance Test (D-Test) Method.

<sup>e</sup> Chose either ciprofloxacin or tetracycline if doing disc diffusion on a single plate

EUCAST

# MRSA

## Cefoxitin-resistant *Staphylococcus* spp.

Method: Vitek 2

Additional guidelines to be included. For regional labs, all MRSA are referred to the RAH site

Test	Report	Comments
Vancomycin	Vancomycin <sup>a</sup>	
Rifampicin	Rifampicin	Do not report if from GP or regional labs
Fusidic acid	Fusidic acid	Do not report if from GP or regional labs
	Trimethoprim-sulfa	
Gentamicin		
Tetracycline	Doxycycline	If not tested previously
Ciprofloxacin	Ciprofloxacin	If not tested previously

<sup>a</sup> If vancomycin MIC > 2 mg/L, notify the registrar or consultant, confirm identification and refer the isolate to the Antibiotic Research laboratory for hVISA testing.

# GPC reporting

SPECIMEN: LEFT FIFTH FINGER WOUND SWAB

## MICROSCOPY

+ polymorphs

+++ gram positive cocci

## CULTURE

Org 1: +++ Streptococcus pyogenes (Group A)

Org 2: ++ Staphylococcus aureus

## Susceptibility Results

	Org 1	Org 2
Penicillin	S	R
Flucloxacillin		S
Amoxycillin	S	R
Amox/Clav	S	S
Cep/loth/lex/zol	S	S
Eryth/Roxith	S	R
Clindamycin	S	R



# Enterococci

	CSF	Other Sterile Sites	GMC SP GYN	UMM	Notes						
AMP	1	1	1	1	Report UMM with AMXENT						
CEP				R	Automatic reporting for GPs ignorant of this fact						
VAN	1	1	2	2							
HLG	3	3	3	3	Report HLG/HLS-R; if HLG-s add RECPEN comment on BCM isolates						
HLS	3	3	3	3							
LIN	2	2	2	2							
NFT	3	3	3	1							
NOR	3	3	3	1							



# Beta-haem strep

	B-haemolytic strep						
		BCM Steri	GMC SP GYN	UMM			
PEN		1	1	1			
AMP		1	1	1			
AUG		3	2	2			
CEP		1	1	1			
VAN		1	3	3			
ERY		3	1	3			
CLI		3	1	3	Report CLI on GAS from BCM		
CHL		3	3	3	Report on eyes/ears		
TET		3	3	1			



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# *Streptococcus pneumoniae*

	CSF	BCM other sterile site	SP	GMC					
PEN IV meningitis	1	1	3	3	As per E test results based on CLSI breakpoints				
PEN IV non-meningitis	3	1	3	3	As per E test results based on CLSI breakpoints				
PEN non-meningitis	3	3	1	1					
AMP	3	3	1	1					
AUG	3	3	2	2					
CXM	3	3	1	1					
TRI	1	1	2	3					
VAN	1	1	3	3					
ERY	3	3	1	1					
CLI	3	3	1	1	Report CLI on GAS from BCM				
CHL	3	3	3	3	Report on eyes/ears				
DOX	3	3	3	3					
LEV	3	3	3	3	Upgrade LEV if multi-resistant S. pneum from SF				

# Gram positive bacilli

Bacillus sp			
	Only performed on sterile site samples		
		penicillin	
		vancomycin	
		imipenem	
		CIP	
		ERY	
		CLI	
Diphtheroids			
	Only performed on sterile site samples		
		penicillin	
		vancomycin	
		ERY	
		CLI	
		TET	
		CIP	
Erysipelothrix			
		PEN	
		VAN =r	

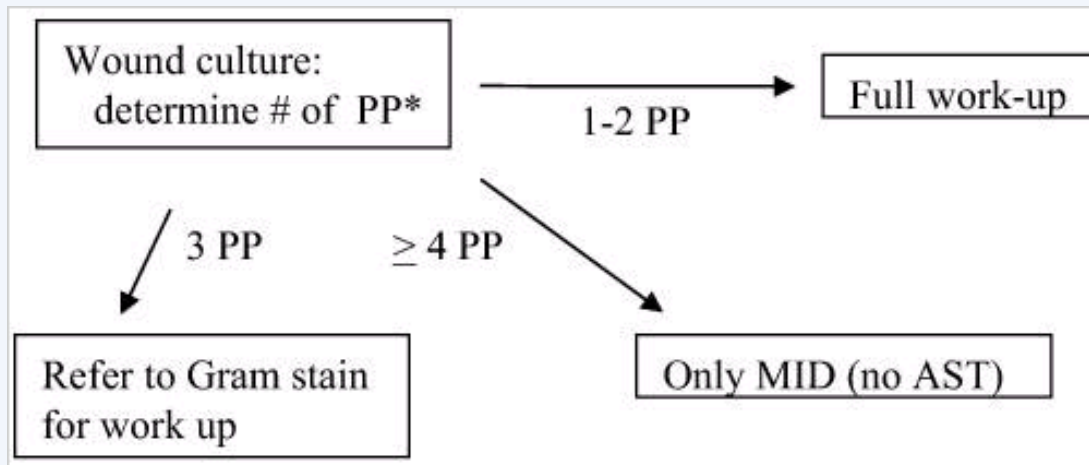
# Gram negatives

# Gram negative bacilli

- Sterile sites (CSF, BC, sterile tissues)
  - All GNBs usually reported

# Gram negatives

- Non-sterile sites (e.g. wound swabs)
  - Use “Q score” to determine whether isolates are to be reported or not



Matkoski JCM 2006

# Enterobacteriaceae

	CSF	Other Sterile Sites	GMC SP GYN	Salm/shig FMM	UMM	Notes
AMP	1	1	1	1	1	
AUG	3	1	1		1	
CEP	3	1	1	3	1	
TRI	1	1	1	2	1	Report TRI for extra-intestinal salmonellae
SXT	3	2	3	1	1	
TMP	3	3	3	3	1	
NFT	3	3	3	3	1	
NOR	3	3	3	1	1	
CIP	3	1	1	1	2	Extra-intestinal salmonellae require NALI disc test before reporting cip
GEN	1	1	1	3	1	
TOB	2	2	2	3	2	
AMI	2	2	2	3	2	
MER	1	1	2	3	2	Upgrade if amp/aug/cep -R
CHL	3	3	1	3	3	Test & report on eyes, ears, extra-intestinal salmonella/shigella

Urine panel (disc): AMP, AUG, CEPH, TRI, SXT, NFT, NOR, GEN



# Enterobacteriaceae

Antimicrobial Agent	Report	Comments
Ampicillin	Ampicillin	
Amoxicillin-clavulanate	<u>Amox-clavulanate</u>	Report only if ampicillin resistant
Ticarcillin-clavulanate		
Piperacillin-tazobactam	Pip-tazobactam	Report only if ampicillin and cefazolin resistant
* Cefazolin [AST-N246]	Cefazolin <sup>a</sup>	Test and report <b>cephalexin</b> if from urine
* Cephalothin [AST-N247]	Cephalothin	Report <b>cephalexin</b> if from urine; extrapolated from <u>cephalothin</u> result
Cefoxitin <sup>b</sup>		If resistant <i>E. coli</i> or <i>Klebsiella</i> spp. test for AmpC/ <u>ESBL<sup>c</sup></u> .
Ceftazidime		If MIC > 1 mg/L, test for <u>ESBL<sup>c</sup></u>
Ceftriaxone	Ceftriaxone	Report if ampicillin, amoxicillin-clavulanate and cefazolin resistant. If MIC >1 mg/L test for <u>ESBL<sup>c</sup></u>
Cefepime		
Meropenem		
Amikacin		
Gentamicin	Gentamicin	
Tobramycin		
Ciprofloxacin	Ciprofloxacin	Report if ESC <sup>d</sup> or if resistant to ampicillin and amoxicillin-clavulanate and cefazolin
Norfloxacin	(Norfloxacin)	Urine isolates only; Report if ESC <sup>d</sup> or if resistant to ampicillin and amoxicillin/clavulanate and cefazolin
Nitrofurantoin	(Nitrofurantoin)	Urine isolates only
Trimethoprim	(Trimethoprim)	Urine isolates only
Trimethoprim-sulfa		

<sup>a</sup> If isolate is from **urinary tract**, set up (if not already performed) and report **cephalexin** disc diffusion result; **do not extrapolate cephalexin from the Vitek cefazolin result**



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PATHOLOGY

# *P. aeruginosa*

	CSF	Other Sterile Sites	GMC SP GYN	UMM
PIP	3	1	1	1
TIM	3	1	1	1
GEN	1	1	1	1
TOB	2	2	2	2
AMI	2	2	2	2
CIP	3	1	1	2
NOR	3	3	3	1
TAZ	1	1	1	2
CPI	2	2	2	2
MER	1	2	2	2
COL	3	3	3	3



CULTURE

Org 1: Growth of Pseudomonas aeruginosa

Org 2: Growth of Serratia marcescens

	Org 1	Org 2
Amoxicillin		R
Amox/Clav		R
Cefazolin		R
Gentamicin	S	S
Pip/Tazo	S	
Ciprofloxacin	S	S
Ceftriaxone		R
Ceftazidime	S	
Meropenem	S	S

\*\*\*\*\* Secondaries \*\*\*\*\*

	Org 1
Amikacin	S
Tobramycin	S
Cefepime	S

\*\*\*\*\* Tertiaries \*\*\*\*\*

Susceptibility Results

	Org 1
Colistin	S



# Other GNBs

Stenotrophomonas maltophilia						
	SXT, MIN					
Pasteurella						
	PEN - primary after doing B-lactamase CLSI reports rare B-lact producers					
	AUG/TRI/MOX/SXT - primary (MOX & SXT for pen allergic)					
	CEP-r automatically					
	Currently do CXM but no CLSI zone sizes, only TRI					
Aeromonas						
	AMP-R automatically					
	AUG/CEP/TRI/GEN/CIP/SXT - primary (with AEROTF comment)					
	CHL - eyes secondary					
Plesiomonas						
	AMP-do not report (controversial due to presence of penicillinase & variable results)					
	AUG/CEP/TRI/GEN/CIP/SXT - primary					
	CHL - eyes secondary					
Campylobacter						
	ERY					
	NOR					
Vibrio sp						
	CIP					
	SXT					
	TET					
	TRI	with comment				



# H flu and Moraxella

<b>Haemophilus</b>					
	CSF	Other Sterile Sites	SP	GMC	
AMP	1	1	1	1	
AUG	3	3	2	2	
CXM	3	3	1	1	
TRI	1	1	3	3	
CHL	1	1	3	3	report on eyes/ears; and on CSF for pen allergic cases (in stock at RAH)
CIP	3	3	3	3	report on eyes/ears if other organisms
DOX	3	3	1	1	Test TET but report DOX
SXT	3	3	1	1	

<b>M. catarrhalis</b>		
	SP	GMC
PEN	1	1 Almost all resistant by B=lactamase
AZI	1	1
TET	1	1 Test TET report DOX
TMP	3	3 Resistant for ID
SXT	1	1
CXM	1	1
AUG	1	1
CHL	3	3 report on eyes/ears if other organisms

# Neisseria

<b>N. gonorrhoeae</b>							
	STD						
PEN		1					
TRI		1					
TET		3					
SPEC		3					
CIP		3					
<b>N. meningitidis</b>							
	CSF	BCM	STD	SP			
PEN		1		1			
TRI		1		1			
CHL		1		3			
RIF		1		3	CSF comment for prophylaxis only		
CIP		1		3	CSF comment for prophylaxis only		

2. What system do you use and how do you extract antibiograms?
3. Are you following WHO-Net/CLSI guidelines?

# Antibiotic susceptibility database

- The IMVS (Peter Lawson, Greg Handke) developed an antibiotic susceptibility database using data extracted from the ULTRA laboratory information management system.



# Database Structure

- Data is extracted from ULTRA as tab-delimited text and formatted for uploading to an Access database with an Excel-based interrogation system.
- Antibiotic susceptibility data from all IMVS laboratories from the years 1999-2011 is contained in the database.
- Antibiotic susceptibility data extracted from ULTRA is formatted to be cross-compatible with The Surveillance Network (TSN) database (USA) and Queensland's *Antibiogram*.

# Antibiotic database

- The IMVS antibiotic susceptibility database has been designed so that antibiotic trends in specific settings can be monitored
  - at a particular location within a hospital
    - e.g. intensive care unit, haematology ward
  - community patients
    - collection centre, area code










# IMVS antibiotic database

- The database is pre-processed into two separate databases:
- “Standard” database
  - all the data (including duplicate specimens from the same patient)
- “CLSI-processed” database
  - Conforms to CLSI guidelines for reporting antimicrobial susceptibility data
  - Database is culled

# Database “cull”

- Rationale: to prevent multiple repeat isolates of the same antibiotic-resistant organism from one patient falsely over-estimating antibiotic resistance.
- Method:
  - First occurrence of any patient-pathogen pair in a delimited time interval (1 year) is retained and subsequent occurrences are discarded regardless of whether
    - » In a “more significant” site
    - » sensitivity has changed
    - » more antibiotics have subsequently been tested for a particular organism.
- Disadvantage
  - does not allow the demonstration of development of resistance to an antimicrobial agent over time in an individual patient.
- Aimed mainly at data reported with the intent to support empiric prescribing on *primary patient presentation*
- Infection control surveillance swabs are excluded



 1999.mdb	199,820 KB
 2000.mdb	226,408 KB
 2001.mdb	261,196 KB
 2002.mdb	266,160 KB
 2003.mdb	265,332 KB
 2004.mdb	277,472 KB
 2005.mdb	297,496 KB
 2006.mdb	321,700 KB
 2007.mdb	346,900 KB
 2008.mdb	349,636 KB
 2009.mdb	402,392 KB
 2010.ldb	1 KB
 2010.mdb	484,804 KB
 2011a.mdb	272,400 KB

# Database

NCCLSFile

PatID

DOB

Sex

PostCode

Status

Hospital

Ward

TestLab

ReqNo

TestDate

SpecCode

SpecCat

Org

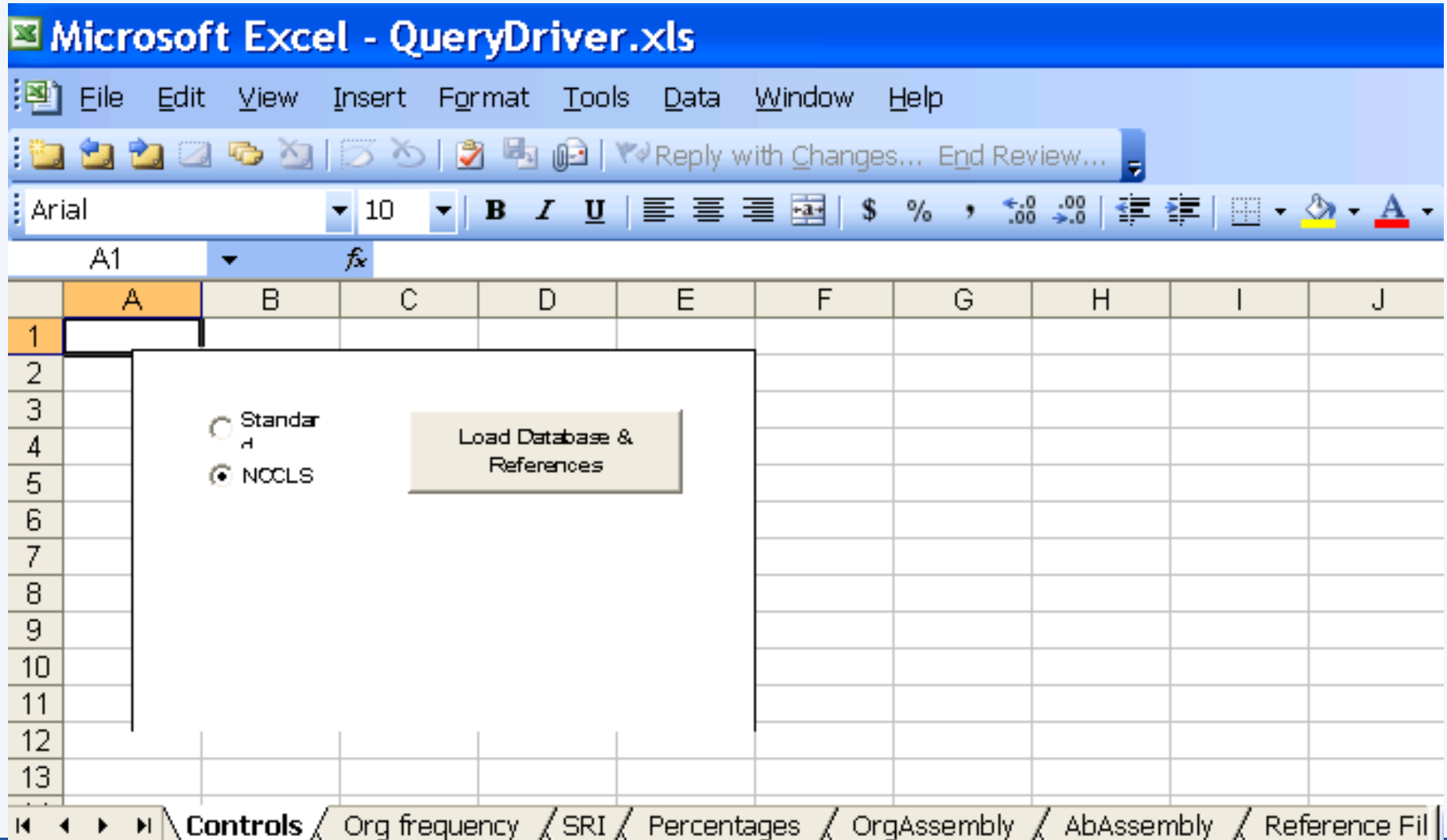
Sensitive

Intermediate

Resistant

SpecCat	Org	Sensitive	Interm	Resistant
RSP	Nocardia asteroides	AMK GEN IMI SXT TAX TOB TRI	MIN	AMP AUG CIP ERT RIF TET
URN	E. coli	AUG CEP GEN TRI		AMP TMP
URN	Proteus sp.	AMP AUG CEP GEN TMP TRI		
GEN	Staphylococcus aureus	AUG CEP CHL CIP CLI DOX ERY FUC GEN LIN MTH MUP RIF SXT VAN		AMP PEN
URN	enterococci	AMP NFT		CEP NOR
BLD	Klebsiella pneumoniae	AMK AUG CIP GEN MER TOB TRI		AMP CEP SXT TMP
RSP	Moraxella catarrhalis	AUG AZI CXM DOX SXT		PEN
BLD	Staphylococcus warneri	CHL CIP CLI DOX FUC LIN MUP RIF SXT VAN		AMP AUG CEP ERY GEN MTH PEN
GEN	Vancomycin-resistant E.faecium (VRE)			VAN
GEN	Staphylococcus aureus	AUG CEP CHL CIP CLI DOX ERY FUC GEN LIN MTH RIF SXT VAN		AMP MUP PEN
RSP	Haemophilus influenzae	AMP AUG CXM DOX TRI		SXT
URN	enterococci	AMP NFT NOR		CEP
RSP	Haemophilus influenzae	AMP AUG CXM DOX SXT TRI		
URN	E. coli	AUG GEN NFT NOR TMP		AMP CEP
URN	Morganella morganii	AMK CIP GEN MER NOR SXT TMP TOB		AMP AUG CEP NFT TRI
BLD	coagulase negative staphylococcus	AUG CEP CHL CIP CLI DOX ERY FUC GEN LIN MTH MUP RIF SXT VAN		AMP PEN
GEN	Morganella morganii	AMK CIP GEN MER SXT TMP TOB		AMP AUG CEP TRI
URN	E. coli	AMP AUG CEP GEN NFT NOR TMP		
BLD	coagulase negative staphylococcus	AUG CEP CHL CIP CLI DOX ERY FUC GEN LIN MTH MUP RIF SXT VAN		AMP PEN
RSP	Streptococcus pneumoniae	CLI DOX LEV VAN		ERY PEN
URN	E. coli	AUG CEP GEN NFT NOR		AMP TMP
GEN	Staphylococcus aureus	AUG CEP CHL CIP CLI DOX ERY FUC GEN LIN MTH RIF SXT VAN		AMP MUP PEN
GEN	Vancomycin-resistant E.faecium (VRE)			VAN

# Excel query



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Isolates from All Specimens	Count											
2	Staphylococcus aureus	106											
3	coagulase negative staphylococcus	72											
4	Haemophilus influenzae	54											
5	E. coli	48											
6	Pseudomonas aeruginosa	42											
7	Vancomycin-resistant E.faecium (VRE)	38											
8	methicillin resistant S. aureus (MRSA)	29											
9	Streptococcus pneumoniae	27											
10	Klebsiella sp.	25											
11	mixed coagulase negative staphylococci	25											
12	Klebsiella pneumoniae	24											
13	enterococci	22											
14	Staphylococcus epidermidis	20											
15	Proteus mirabilis	19											
16	Serratia sp.	18											
17	Enterobacter sp.	14											
18	Stenotrophomonas maltophilia	13											
19	Enterococcus faecalis	11											
20	Enterobacter cloacae	10											
21	Klebsiella oxytoca	10											
22	Enterococcus faecium	7											
23	Moraxella catarrhalis	7											

Test Lab **Selection** NCCLSFile

IMS

Specimen Category

All Specimens n = 746

Ward

RP4IC

Admission Status

Both IP and OP

Hospital

RAH

Patient Age Range

All

Sex

All

- Set Table
- Retrieve isolates
- Send criteria to SRI
- Select & copy isolates required to SRI org list
- Copy n formula (f button)
- Set SRI drug list
- Count SRI (button)
- Calculate percentages (button)



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1	A	B	C			D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
	TABLE	NCCLSFile	Count SRI	Calc. Percent	Clear SRI	f	PEN	PEN	PEN	AMP	AMP	AMP	MTH	MTH	MTH	AUG	AUG	AUG	CEP	CEP	CEP
2	Lab	IMS	Org			n	S	R	I	S	R	I	S	R	I	S	R	I	S	R	I
3	Hosp	RAH	Staphylococcus aureus			106	21	85	0	21	85	0	106	0	0	106	0	0	106	0	0
4	Ward	RP4IC	coagulase negative staphylococcus			72	5	67	0	5	67	0	14	58	0	14	58	0	14	58	0
5	Status	Both IP and OP	Haemophilus influenzae			54	0	0	0	42	12	0	0	0	0	54	0	0	1	0	0
6	Spec	All Specimens	E. coli			48	0	0	0	28	20	0	0	0	0	42	6	0	37	11	0
7			Pseudomonas aeruginosa			42	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0
8			Vancomycin-resistant E.faecium (VRE)			38	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
9			methicillin resistant S. aureus (MRSA)			29	0	29	0	0	29	0	0	29	0	0	29	0	0	29	0
10			Streptococcus pneumoniae			27	13	2	11	11	0	0	0	0	0	10	0	0	2	0	0
11			Klebsiella sp.			25	0	0	0	0	25	0	0	0	0	21	4	0	20	5	0
12			mixed coagulase negative staphylococci			25	0	25	0	0	25	0	1	24	0	1	24	0	1	24	0
13			Klebsiella pneumoniae			24	0	0	0	0	24	0	0	0	0	24	0	0	22	2	0
14			enterococci			22	0	0	0	16	5	0	0	0	0	0	0	0	0	22	0
15			Staphylococcus epidermidis			20	1	19	0	1	19	0	6	14	0	6	14	0	6	14	0
16			Proteus mirabilis			19	0	0	0	15	4	0	0	0	0	16	3	0	15	4	0
17			Serratia sp.			18	0	0	0	0	18	0	0	0	0	0	18	0	0	18	0

# Percentages

<b>TABLE</b>	<i>NCCLSFile</i>			<b>PEN</b>	<b>AMP</b>	<b>MTH</b>	<b>AUG</b>	<b>CEP</b>	<b>CXM</b>	<b>TRI</b>	<b>ERY</b>	<b>CLI</b>	<b>DOX</b>
<b>Lab</b>	<i>IMS</i>	<b>Org</b>	<b>n</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>	<b>%S</b>
<b>Hosp</b>	<i>RAH</i>	Staphylococcus aureus	106	20	20	100	100	100	-	-	86	86	99
<b>Ward</b>	<i>RP4IC</i>	coagulase negative staphylococcus	72	7	7	19	19	19	-	-	25	51	90
<b>Status</b>	<i>Both IP and OP</i>	Haemophilus influenzae	54	-	78	-	100	-	100	100	-	-	96
<b>Spec</b>	<i>All Specimens</i>	E. coli	48	-	58	-	88	77	-	92	-	-	-
		Pseudomonas aeruginosa	42	-	-	-	-	-	-	-	-	-	-
		Vancomycin-resistant E.faecium (VRE)	38	-	-	-	-	-	-	-	-	-	-
		methicillin resistant S. aureus (MRSA)	29	0	0	0	0	0	-	-	52	52	79
		Streptococcus pneumoniae	27	50	100	-	100	-	-	-	77	85	74
		Klebsiella sp.	25	-	0	-	84	80	-	90	-	-	-
		mixed coagulase negative staphylococci	25	0	0	4	4	4	-	-	8	32	100



# Assemble antibiotics

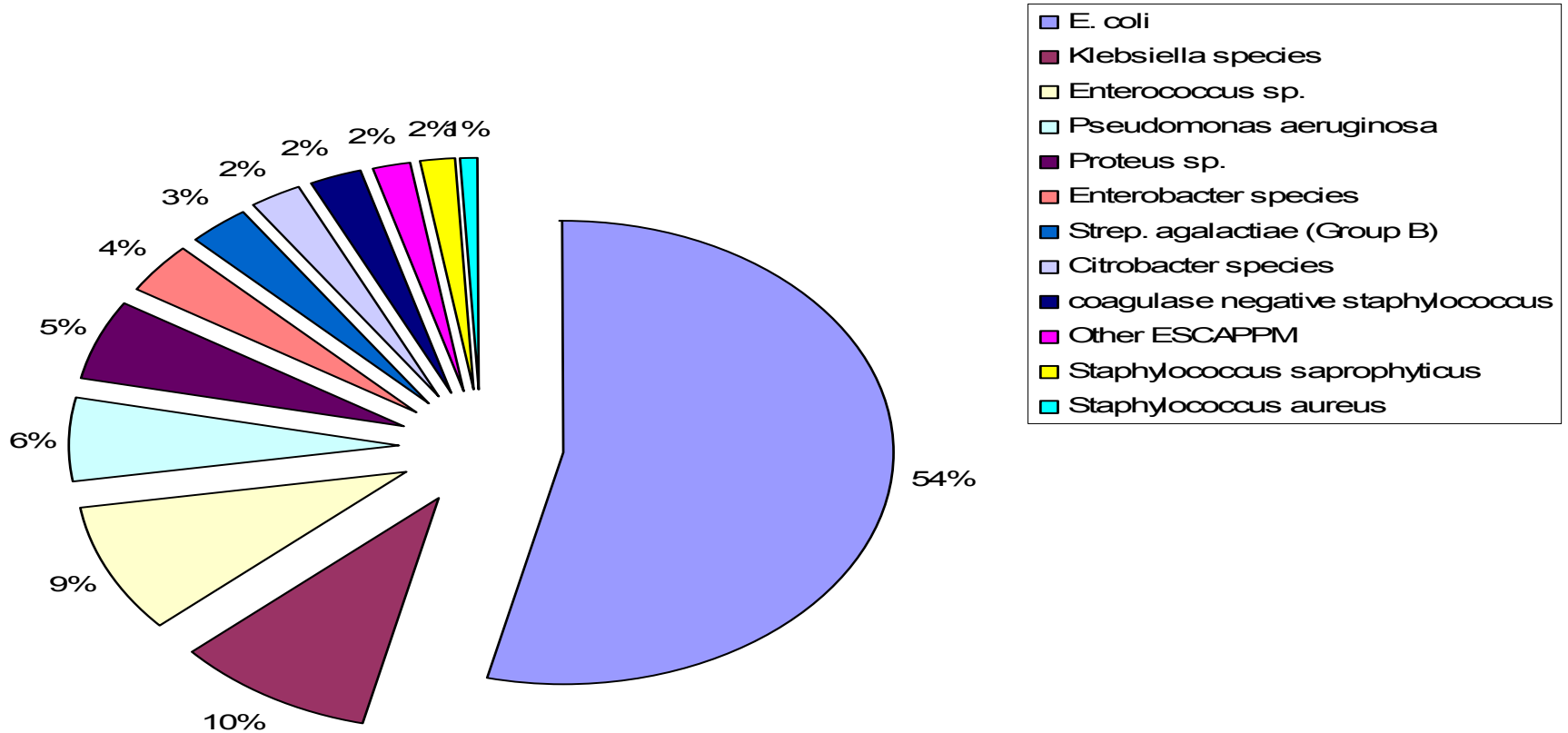
						PEN	PEN	PEN
						S	R	I
Assemble Selected Drug List			Clear Assembly		Copy to SRI			
<b>GNEG</b>	<b>GPOS</b>	<b>COMB</b>	<b>IVAN1</b>	<b>IVAN2</b>	<b>IVAN3</b>	<b>MW</b>	<b>Resp</b>	
AMP	PEN	AMK	PEN	PEN	PEN	PEN	PEN	AMP
AUG	AMP	AMP	AMP	AMP	AMP	AMP	AMP	AUG
CEP	AUG	AUG	MTH	AUG	MTH	AUG	AUG	CEP
TRI	ERY	CEP	ERY	CEP	ERY	MTH	CXM	TRI
TAZ	CLI	CHL	CLI	TRI	CLI	CEP	TRI	TAZ
CPI	VAN	CIP	VAN	TAZ	VAN	ERY	ERY	PIP
SUL	RIF	CLI	RIF	CPI	RIF	CLI	CLI	TIM
TMP	FUC	CPI	FUC	TMP	FUC	SXT	TET	NOR
NFT	TET	CXM	TET	TET	TET	CIP	GEN	GEN
NOR	NOR	ERY	CIP	CIP	CIP	RIF	CIP	TOB
CIP	CIP	FUC	GEN	CXM	GEN	FUC		AMK



# 4. What data do you present?



# ED Urine isolates



# Antibiogram of urine isolates TQEH ED 2010

ORGANISM	n	%	AMP	AUG	CEP	NFT	NOR	TMP	SXT	GEN	Ceftriaxon e	AMOX + GENT	Ceftriaxone + gent
<i>E. coli</i>	452	54 %	56%	96%	84%	99%	96%	83%	75%	96%	96%	96%	96%
<i>Klebsiella</i> species	82	10%	0%	94%	89%	73%	99%	83%	90%	100%	94%	100%	100%
<i>Enterococcus</i> sp.	76	9%	96%	96%	0%	96%	70%	0%	-	-	0%	96%	0%
<i>Pseudomonas aeruginosa</i>	50	6%	-	-	-	-	98%	0%	-	100%		100%	100%
<i>Proteus</i> sp.	46	5%	80%	93%	91%	2%	100%	77%	67%	98%	93%	98%	98%
<i>Enterobacter</i> species	30	4%	0%	0%	0%	57%	100%	86%	93%	97%	0%	97%	97%
<i>Strep. agalactiae</i> (Group B)	27	3%	100%	100%	100%	-	-	-	-	-	100%	100%	100%
<i>Citrobacter</i> species	21	2%	0%	62%	62%	81%	95%	95%	95%	95%	0%	95%	95%
Other ESCAPPM	16	2%	0%	0%	0%	27%	93%	100 %	87%	94%	0%	94%	94%
<i>Staphylococcus saprophyticus</i>	15	2%	100%	100%	100%	-	100%	93%	-	100%	100%	100%	100%
<i>Staphylococcus aureus</i>	7	1%	0%	71%	71%	-	71%	-	83%	100%	71%	100%	100%
Empiric treatment coverage (org not known)			49%	83%	67%	74%	91%	87%	62%	84%	73%	96%	87%

# RAH bacteraemias 2010

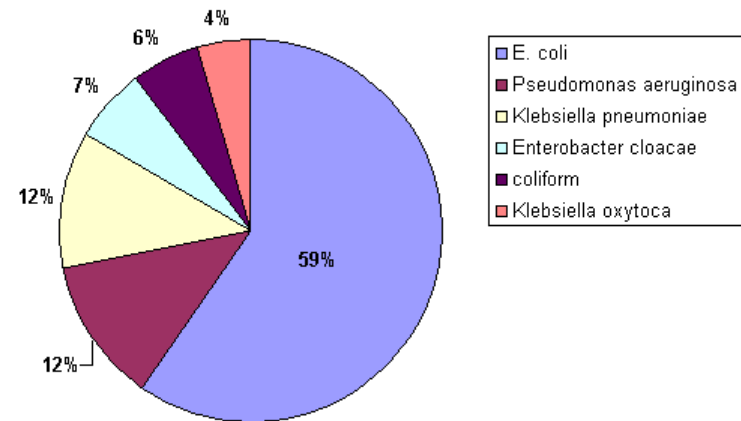
<i>Org</i>	<i>n</i>	AMP %S	AUG %S	CEP %S	TRI %S	TMP %S	SXT %S	CIP %S	GEN %S	TAZ %S	CPI %S	TOB %S	AMK %S	PIP %S	MER %S	TIM %S
<i>E. coli</i>	110	57	77	30	96	85	82	95	96	-	-	96	100	-	100	-
<i>Klebsiella pneumoniae</i>	39	0	92	82	95	81	87	95	95	-	-	95	100	-	100	-
<i>Pseudomonas aeruginosa</i>	28	-	-	-	-	-	-	96	96	100	96	96	96	93	96	96
<i>Enterobacter sp.</i>	13	0	0	0	0	91	92	100	92	-	-	92	100	-	100	-
<i>Proteus mirabilis</i>	13	77	92	85	100	85	92	100	92	-	-	100	100	-	100	-

<i>Org</i>	<i>n</i>	PEN %S	AMP %S	MTH %S	AUG %S	CEP %S	ERY %S	CLI %S	DOX %S	SXT %S	CIP %S	RIF %S	FUC %S	VAN %S	LIN %S	GEN %S	CHL %S	MUP %S
coagulase negative staphylococcus	431	17	17	41	41	42	48	69	92	66	69	91	80	99	100	61	96	86
mixed coagulase negative staphylococci	122	7	7	25	25	26	28	60	85	42	64	85	59	98	99	48	89	81
<i>Staphylococcus aureus</i>	68	16	16	100	100	100	79	79	100	97	97	99	96	100	100	99	99	100
<i>Enterococcus faecalis</i>	39	-	97	-	-	-	-	-	-	-	-	-	-	100	100	-	-	-
viridans streptococci	39	82	95	-	94	95	59	92	78	-	-	-	-	100	-	-	-	-
<i>Staphylococcus epidermidis</i>	37	8	8	19	19	19	32	50	86	41	47	78	64	97	100	44	83	81
<i>Streptococcus pneumoniae</i>	21	100	-	-	-	-	80	84	90	-	-	-	-	100	-	-	-	-
<i>Enterococcus faecium</i>	20	-	10	-	-	-	-	-	-	-	-	-	-	100	100	-	-	-
<i>Staphylococcus capitis</i>	18	11	11	44	44	44	50	61	89	89	78	100	94	100	100	61	100	100
<i>Streptococcus mitis</i> group	16	75	-	-	-	-	63	100	53	-	-	-	-	100	-	-	-	-
methicillin resistant <i>S. aureus</i> (MRSA)	15	0	0	0	0	0	47	47	87	93	53	100	100	100	100	87	100	100
<i>Staphylococcus hominis</i>	11	18	18	27	27	27	64	73	100	45	91	91	82	100	100	73	100	91

# Flinders medical centre bacteraemias 2010

## Gram negative bacilli

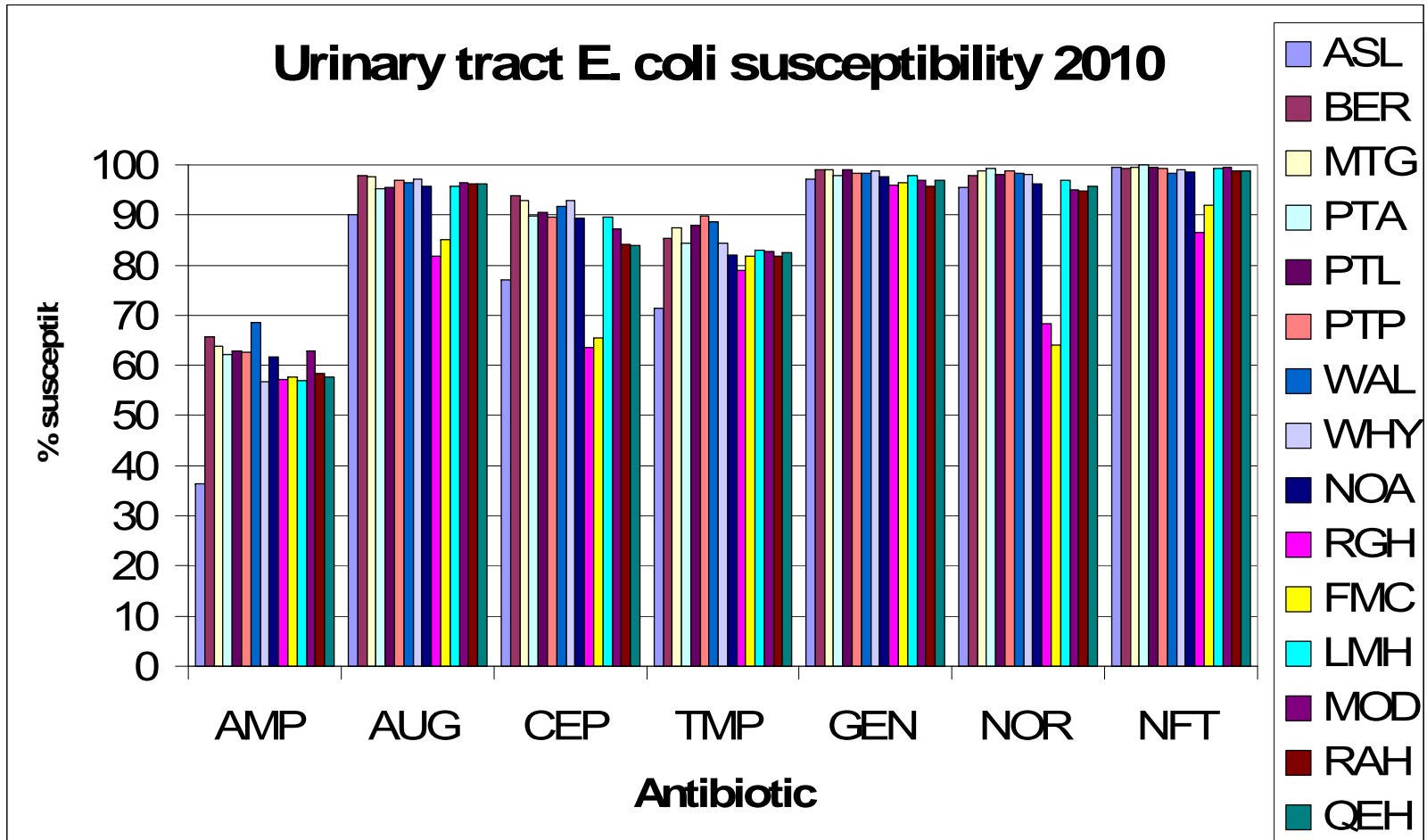
Gram negative bacteraemias FMC 2010



Org	n	%	amp/amox	amox/clav	cephazolin	ceftriaxone	cipro	gent	cefepime	amikacin	piperacillin	mero
<i>E. coli</i>	82	59%	54	99	89	96	95	95	-	-	-	-
<i>Pseudomonas aeruginosa</i>	17	12%	-	-	-	-	88	88	93	93	90	93
<i>Klebsiella pneumoniae</i>	16	12%	0	100	94	94	94	100	-	-	-	-
<i>Enterobacter cloacae</i>	9	7%	0	0	0	78	100	89	-	-	-	-
coliform	8	6%	38	100	63	100	100	100	-	-	-	-
<i>Klebsiella oxytoca</i>	6	4%	0	83	83	83	100	100	-	-	-	-



# Urinary tract E. coli susceptibilities



# Susceptibility of bacterial respiratory isolates general practice 2010

<i>Org</i>	%	PEN %S	AMP %S	AUG %S	CXM %S	TRI %S	ERY %S	CLI %S	DOX %S	GEN %S	CIP %S
<i>H.influenzae</i>	40%	-	70	100	100	100	-	-	96	-	-
<i>M.catarrhalis</i>	15%	4	-	100	100	-	-	-	100	-	-
<i>P. aeruginosa</i>	14%	-	-	-	-	-	-	-	-	84	90
<i>S.pneumoniae</i>	11%	95(100)	100*	100*	95(100)*	100	80	89	82	-	-
<i>S.aureus</i>	3%	19	19	100	100*	-	75	75	100	-	(88)#
<i>Klebsiella sp.</i>	2%	-	0	91	91	100	-	-	-	100	100
<i>E. coli</i>	2%	-	40	60	-	100	-	-	-	100	100
MRSA	1%	0	0	0	0	0	0	0	100	100	(45)#

\*95% sensitive, 99% including *I* strains  
with MIC ≤ 2 for penicillin

N~600

15% of submitted specimens



SA PATHOLOGY

## GP *H.influenzae* susceptibilities by age group.

Antibiotic	Age group, % susceptible			
	0-5 n=1	6-25 n=23	26-55 n=88	>55 n=212
Amp	‡	65	74	75
Aug	-	100	100	100
Tri	-	100	100	100
TMP	-	65	81	79
Tet	-	96	93	92
CXM	-	100	98	98

‡ Insufficient number of isolates (n<10)



SA PATHOLOGY

# Resistance in bacteraemic *S. pneumoniae* isolates IMVS 2010-2011

PEN MIC>2	PEN MIC >4	CEFTRI MIC >1	MERO MIC >0.5	ERY	CLIND	VANC	DOXY
6%	0	1.5%	0	21%	15%	0	15%

Non meningitis *S pneumoniae* breakpoints: ceftriaxone ≤1 sensitive  
≥4 intermediate



SA PATHOLOGY

# Who looks at the antibiograms and how are they used?



# Antibiograms-who gets them?

- Rather ad hoc at present
  - ID unit, AMS committee
  - In presentations (grand rounds, ICU)
  - To support clinical guidelines (CAP, UTI)
  - On request
- Major limitations
  - Reliant on IT to do data extracts
  - Same antibiotics are not tested on all isolates and different testing practices at different sites
  - More extensive tests skewed towards more resistant isolates
  - Data capture reliant on lab staff entering all antibiotics tested
  - Staffing!