



Antimicrobial Resistance Surveillance

The “What & How” of reporting

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Current reports

1. Two different streams of SASCM surveillance data:
 1. Public sector: NHLS/ CDW (hospital)
 2. Private sector: individual pathology groups (regional)
2. Reports are quite different (intention to align)

E. coli

Drug	Charlotte Maxeke Hospital	Chris Hani Baragwanath Hosp	Dr George Mukhari Hospital	Grey's Hospital	Groote Schuur Hospital	Helen Joseph Hospital	Inkosi Albert Luthuli Hospital	King Edward VIII Hospital	Mahatma Gandhi Memorial Hospital	Nelson Mandela Academic Hospital	Rk Khan Hospital	Steve Biko Academic Hospital	Tygerberg Hospital	Universitas Hospital
AMIKACIN	103	376	101	45	139	95	69	55	73	58	57	97	114	55
	96%	97%	90%	98%	95%	98%	93%	96%	95%	95%	95%	91%	98%	98%
AMPICILLIN/AMOXICILLIN	103	374	102	47	139	95	68	54	74	58	57	98	114	56
	19%	4%	13%	17%	26%	7%	6%	9%	5%	5%	28%	24%	18%	25%
CEFAZOLIN/CEPHALEXIN	95													
	63%													
CEFEPIME	103	379	100	47	139	97	53	35	48	57	52	98	114	33
	73%	77%	71%	64%	79%	81%	66%	66%	73%	49%	79%	83%	90%	94%
CEFOTAXIME/CEFTRIAXONE	104	381	32	47	139	94	67	55	72	58	55	98	114	53
	72%	76%	47%	64%	78%	79%	61%	71%	75%	50%	80%	83%	91%	89%
CEFOXITIN	103	370	102	47	139	95	68	56	74	58	57	98	40	51
	92%	92%	91%	94%	90%	93%	79%	80%	92%	97%	93%	97%	93%	94%
CEFTAZIDIME	103	383	86	47	139	95	66	55	74	58	55	98	114	34
	73%	75%	84%	64%	78%	79%	58%	71%	74%	52%	82%	83%	90%	100%
CIPROFLOXACIN	104	375	102	47	139	96	69	58	74	58	58	98	113	54
	75%	74%	70%	66%	74%	70%	57%	71%	80%	84%	74%	78%	81%	85%
COTRIMOXAZOLE	94				140					52			113	49
	35%				36%					21%			34%	31%
ERTAPENEM	104	360	75	44	139	96	52	44	48	58	51	51	112	54
	100%	97%	100%	100%	99%	99%	100%	95%	98%	100%	100%	100%	100%	100%
GENTAMICIN	102	380	101	47	139	97	68	53	73	58	56	98	114	56
	79%	76%	67%	77%	86%	82%	50%	74%	84%	76%	82%	84%	88%	88%
IMIPENEM	104	383	81	47	139	97	55	39	48	58	54	98	114	56
	100%	100%	100%	100%	99%	99%	98%	100%	100%	100%	100%	100%	100%	100%
LEVOFLOXACIN			79											
			67%											
MEROPENEM	104	381	77	46	139	96	68	56	73	58	55	98	114	35
	100%	99%	99%	100%	99%	98%	100%	98%	100%	100%	100%	100%	100%	100%
PIPERACILLIN/TAZOBACTAM	103	382	102	47	139	97	69	57	74	58	57	98	114	34
	88%	85%	88%	79%	89%	79%	74%	84%	86%	93%	82%	78%	93%	97%

Courtesy Prof. O. Perovic, NICD

E. coli

	Percentage Susceptible							
	Jhb	Pta	Dbn	CT	PE	EL	BFN	
n = Total of isolates	776	444	477	254	48	37	57	
Ampicillin	21	21	19	20	29	22	19	
Cefuroxime	78	81	66	87	81	78	82	
Ceftriaxone/cefotaxime	86	91	69	92	94	89	96	
Cefepime	86	92	70	94	94	89	96	
Amox / clavulanate	39	68	52	76	69	54	77	
Piperacillin/tazobactam	79	81	83	93	88	78	93	
gentamicin	85	88	79	86	92	97	82	
amikacin	94	95	52	94	98	100	100	
Ertapenem	100	100	99	100	100	100	100	
Imipenem/meropenem/doripenem	99	100	99	100	100	100	100	
Ciprofloxacin	73	77	61	80	77	97	63	
Tigecycline	98	96	100	NT	100	NT	100	
% ESBL	21	10	30	6	6	11	4	

Public	Private	Parameter
Ampicillin/ Amoxicillin	Ampicillin & Amoxiclav.	Grouping of agents
Mero & Imi separately	Mero/Imi/Dori	Class vs individual agents
Ceftazidime & Cefoxitin & Cotrimoxazole	Tigecycline	Types of antimicrobials
% ESBL inferred	% ESBL reported	Resistance mechanisms
Only BC isolates	Urine (E. coli) & LRTI (S. pneumo/ H.flu)	Specimen types
Graphic representation	Tables only	Format

EARS-NET Report

Figure 3.2. *Escherichia coli* country, EU/EEA countries:

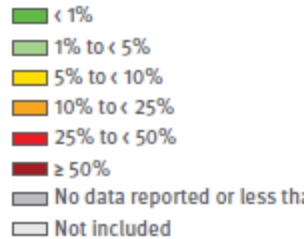


Table 3.1. *Escherichia coli*. Number of reporting laboratories, total numbers of invasive isolates resistant to third-generation cephalosporins (3GCREC) and percentage of these isolates positive for extended-spectrum beta-lactamase (ESBL), as ascertained by the participating laboratories, EU/EEA countries, 2013

Country	Number of laboratories	Number of 3GCREC	%ESBL
Denmark	5	121	73.6
Slovakia	14	240	74.6
France	51	861	76.5
Austria	21	196	81.6
Estonia	6	25	84
Spain	33	672	86.3
Poland	36	113	87.6
Netherlands	12	111	88.3
Latvia	5	18	88.9
Ireland	32	245	89.8
Bulgaria	11	66	90.9
Croatia	14	91	91.2
Czech Republic	44	387	91.2
Slovenia	10	107	91.6
Portugal	26	328	92.1
Finland	18	263	93.5
Italy	3	33	93.9
Romania	11	56	94.6
Luxembourg	5	22	95.5
Sweden	16	382	97.4
Hungary	7	40	100
Lithuania	8	33	100

cephalosporins, by



Table 3.4. *Escherichia coli*. Total number of invasive isolates tested (N) and percentage resistant to third-generation cephalosporins (%R), including 95% confidence intervals (95% CI), EU/EEA countries, 2010–2013

Country	2010			2011			2012			2013			Trend 2010–2013	Comment**
	N	%R	(95% CI)	N	%R	(95% CI)	N	%R	(95% CI)	N	%R	(95% CI)		
Iceland	104	3.8	(1–10)	130	6.2	(3–12)	138	5.1	(2–10)	121	5.0	(2–10)		
Sweden	3883	2.6	(2–3)	5011	3.6	(3–4)	5536	4.4	(4–5)	7532	5.2	(5–6)		>
Norway	2275	3.7	(3–5)	2523	3.6	(3–4)	3019	4.9	(4–6)	3077	5.5	(5–6)		>
Netherlands	3387	5.1	(4–6)	4408	5.7	(5–6)	4702	6.0	(5–7)	4740	5.8	(5–7)		
Finland	2509	3.7	(3–5)	3020	5.0	(4–6)	3162	6.2	(5–7)	3689	7.1	(6–8)		>
Estonia	309	5.5	(3–9)	90	12.2	(6–21)	305	7.9	(5–11)	340	7.4	(5–11)		
Lithuania	333	8.7	(6–12)	385	7.0	(5–10)	462	4.8	(3–7)	432	7.6	(5–11)		
Belgium	1952	5.2	(4–6)	3985	6.0	(5–7)	4097	6.9	(6–8)	4051	8.0	(7–9)		>
Denmark	2408	7.6	(7–9)	2532	8.5	(7–10)	2519	7.9	(7–9)	2451	8.1	(7–9)		
Slovenia	952	6.6	(5–8)	1002	8.8	(7–11)	1168	9.5	(8–11)	1224	8.7	(7–10)		
Croatia	882	8.7	(7–11)	983	9.6	(8–12)	906	7.5	(6–9)	1040	8.8	(7–11)		
Malta	102	15.6	(11–22)	210	12.8	(9–18)	216	12.0	(10–10)	248	8.0	(6–12)		

Table 3.8. *Escherichia coli*. Total number of tested isolates* and resistance combinations among invasive isolates tested against aminopenicillins, third-generation cephalosporins, fluoroquinolones, aminoglycosides and carbapenems (n=61 951), EU/EEA countries, 2013

Resistance pattern	Number of isolates	% of total**
Fully susceptible	25 493	41.2
Single resistance (to indicated drug classes)		
Total	21 423	34.6
Aminopenicillins	19 839	32.0
Fluoroquinolones	1 457	2.4
Aminoglycosides	115	0.2
Carbapenems	12	0
Resistance to two classes of antimicrobial drugs		
Total	7 487	12.1
Aminopenicillins + fluoroquinolones	4 864	7.9
Aminopenicillins + third-generation cephalosporins	1 562	2.5
Aminopenicillins + aminoglycosides	928	1.5
Fluoroquinolones + aminoglycosides	116	0.2
Aminopenicillins + carbapenems	15	0
Aminoglycosides + carbapenems	2	0
Resistance to three classes of antimicrobial drugs		
Total	4 632	7.5
Aminopenicillins + third-generation cephalosporins + fluoroquinolones	2 495	4.0
Aminopenicillins + fluoroquinolones + aminoglycosides	1 835	3.0
Aminopenicillins + third-generation cephalosporins + aminoglycosides	285	0.5
Aminopenicillins + fluoroquinolones + carbapenems	10	0
Aminopenicillins + third-generation cephalosporin + carbapenems	5	0
Aminopenicillins + aminoglycosides + carbapenems	2	0
Resistance to four classes of antimicrobial drugs		
Total	2 892	4.7
Aminopenicillins + third-generation cephalosporins+ fluoroquinolones + aminoglycosides	2 876	4.6
Aminopenicillins + third-generation cephalosporins + fluoroquinolones + carbapenems	6	0
Aminopenicillins + third-generation cephalosporins + aminoglycosides + carbapenems	5	0
Aminopenicillins + fluoroquinolones + aminoglycosides + carbapenems	5	0
Resistance to five classes of antimicrobial drugs		
Aminopenicillins + third-generation cephalosporins + fluoroquinolones + aminoglycosides + carbapenems	24	<0.1

The future of SASCM AMR reports...

WHAT



HOW

Objectives

1. Standardization of reports
 1. Require definitions based on lab data submitted.
2. “Clinically” relevant data
3. Data that aligns itself with and supports other initiatives (SAASP; AMR mapping)
4. User-friendly data

WHAT...

□ ORGANISMS:

- *Enterobacteriaceae*
 - ESBL/ CRE/ CPE
- *P. aeruginosa*
- *A. baumannii*
- *S. aureus*
- Enterococci
- *S. pneumoniae*
- *H. influenzae*
- *Candida* spp

WHAT...

☐ SPECIMENS:

- Blood cultures vs invasive isolates
- Urine
- Respiratory tract

WHAT...

□ ANTIMICROBIALS:

- Specific types vs classes/ groups
- Susceptible vs Resistant vs Non-susceptible (How?)
- MICs where relevant (How?)

HOW...

□ FORMAT

- Introduction/ Objectives/ Methods (data analysis; interpretation and limitations)/ Discussion (per organism)
- Graphs/ Maps/ Tables/ Mixture
- Regional vs Hospital

HOW...

□ ANALYSIS

- Confidence intervals
- Trends [statistical input]
- Weighting of data [#specimens; population; size of hospital]

HOW...

□ LIMITATIONS

- Assess what these are...
- Anything unique to SA?

“We cannot solve our problems with the same thinking that created them”

Albert Einstein