Local cumulative antimicrobial susceptibility report: results from MSF pediatrics and surgical programs

Céline Langendorf[1], Justine Michel[2], Patrick Barks[1], Bastien Mollo[2], Rupa Kanapathipillai[2]
[1] Epicentre, [2] Médecins Sans Frontières, Paris, France,

BACKGROUND

Definition

- Susceptibility percentage of bacterial isolates to routinely tested antibiotics in a particular institution in a defined period of time

Objectives

- Guide antimicrobial stewardship (AMS) programs in the selection of empirical antibiotic therapy
- Develop local cumulative antibiogram over time and between locations
- Awareness and advocacy at project and national level (internal AND external)

METHODS

MSF/Epicentre developped a guidelines on local cumulative antimicrobial susceptibility tests report from WHOnet database in 2022 based on CLSI Guidelines (M39-A4, 2014)

Crypted WHOnet datasets from OCP projects → **Data cleaning** R software → **Primary data analyses** R software → **Secondary data analyses** Manually on Excel

- Only the **first isolate** with AST results **per patient**, per specimen type and per analysis period
- **Specimen types**: urine, blood/CSF, others
- ≥ 30 isolates or group per genus if species < 30
- AB tested on >80% isolates per species/genus

- Cleaning and formatting tables
- Keep clinically relevant AB
- Intrinsic resistance

RESULTS & DISCUSSION

Cumulative antibiogrammes of blood/CSF cultures from MSF Paediatric hospitals, 2022

Mali, Koutiala

Organisms type		# Isolates	3GC	GEN	CIP	ETP	AMK	PEN	CLX	VAN
Gram Negative Bacilli	*Enterobacterales*	168	64	76		92		-	-	-
	Enterob. <48h	88	74	82	61	98	99			
	Enterob. >48h	58	47	65		81				
	Escherichia coli	68	40			87		-	-	-
	E. coli <48h	39	51	63	31	97	97			
	E.coli >48h	20	15			65				
	Salmonella sp.	66	98	100	94	100	100	-	-	-
	Klebsiella sp.	27	44	52	56	81		-	-	-
	Klebsiella sp. <48h	14	71	79	86	93	100			
	Klebsiella sp. >48h	13	15	23	23	69				
	H. influenzae	30	93	-	100	-	-	80	-	-
Gram Positive Cocci	*Enterococcus sp.*	50	-	32	56	-	-	-	-	100
	S. aureus	44	86	91	0[I: 68]	86	98	2	86	*
	St. pneumoniae	59	100	-	98	-	-	46	-	*

Niger, Madarounfa

Organisms type		# Isolates	3GC	GEN	CIP	ETP	AMK
Gram Negative Bacilli	*Enterobacterales*	152				89	
	Enterob. <48h	88	48	66	17	100	95
	Enterob. >48h	58				82	
	Escherichia coli	68	14		10	81	88
	E. coli <48h	39	25	43	25	100	100
	E.coli >48h	20	8		5	73	84
	Salmonella sp. (included Typhi)	66	97	97	21	100	100
	Acinetobacter sp.	30	R	23	0 [I:63]	3	80

- **GEN**: Gentamicin
- **CIP**: Ciprofloxacin
- **CLI**: Clindamycione
- **ETP**: Carbapenems
- **AMK**: Amikacin
- **PEN**: Penicillin G
- **PIP**: Pip/Tazo
- **CLX**: Cloxacillin
- **VAN**: Vancomycin

➢ *E.coli* & *Klebsiella sp.*

- Low susceptibility percentage (%S) third generation Cephalosporins (3GC), Gentamicin & Ciprofloxacin
- High %S Amikacin & Carbapenems
- Lower susceptibility if blood culture collected > 48h after admission, particularly in Niger where higher % blood cultures collected >48h after admission

➢ *Salmonella sp.* : high %S 3GC but much lower %S Ciprofloxacine in Niger (21%) vs. Mali (94%)

Cumulative antibiogrammes of bones/tissues cultures from MSF surgical hospitals, 2022

Bangui, Central African Republic

Organisms type		# Isolates	3GC	GEN	PIP	ETP	AMK	CLX	CLI	VAN
Gram Negative Bacilli	*Enterobacterales*	346	55	64	85	93	98	-	-	-
	Escherichia coli	99	39	62	80	98	95	-	-	-
	Enterobacter sp	70	66	66	89	99	100	-	-	-
	Klebsiella sp	64	33	44	72	100	97	-	-	-
	Proteus sp	55	76	71	98	100	100	-	-	-
	Pseudomonas sp	70	2 [I:81]	-	2 [I:76]	2 [I:79]	90	-	-	-
Gram Positive Cocci	*S. aureus*	135	54	54	51	51	63	51	97	100
	Enterococcus sp	94	-	88	76	-	-	-	-	100
	Strepto. B haemolytic	34	82		82	82	-	82	91	*

Aden, Yemen

Organisms type		# Isolates	3GC	GEN	PIP	ETP	AMK	CLX	CLI	VAN
Gram Neg. Bacilli	*Enterobacterales*	172	39	79	88	95	95	-	-	-
	Escherichia coli	59	17	81	85	94	98	-	-	-
	Enterob. cloacae	45	51	78	86	98	100	-	-	-
	Klebsiella sp	36	25	77	83	90	90	-	-	-
	Pseudomonas sp	47	0 [I:96]	-	0 [I:98]	0[I:95]	100	-	-	-
Gram Pos. Cocci	*Enterococcus sp*	54	-	91	81	-	-	-	-	100
	S. aureus	67	25	95	25	25	100	25	75	100

- Similar pathogens between both projects
- Low %S to most frequently antibiotics used for trauma cases
- Slightly lower %S for Aden than for Bangui, especially for 3GC and *S.aureus*
- Therapeutical guidelines recommend use of last resort anitibiotics for resistant cases

CONCLUSIONS

- Regarding the methods, we think important to improve database standardization across the projects, implement a regular data cleaning, and work on automatization and real time analysis by the projects themselves.
- We reported high level of resistance to first-line treatments in paediatrics and surgical hospitals
- Surveillance and confirmation of carbapenems resistance is crucial and could be improved by the use of new RDT that will be evaluated soon in MSF laboratories.
- Those data are critical for advocacy at both internal and external level (national and international level)