ANTIBIOTIC RESISTANCE IN WESTERN KENYA

**Global Antibiotic Resistance Partnership**

By:

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INTRODUCTION

- In many developing countries, resistance to common antibiotics is on the rise

- In W. Kenya, bacterial infections ranked among top 10 causes of morbidity

- The burden of disease lies in rural communities who mainly access lower level health facilities

- District hospitals are the lowest level at which antibiotic susceptibility testing is done (Fig. 1).

Fig. 1: Referral system of public health facilities in Kenya
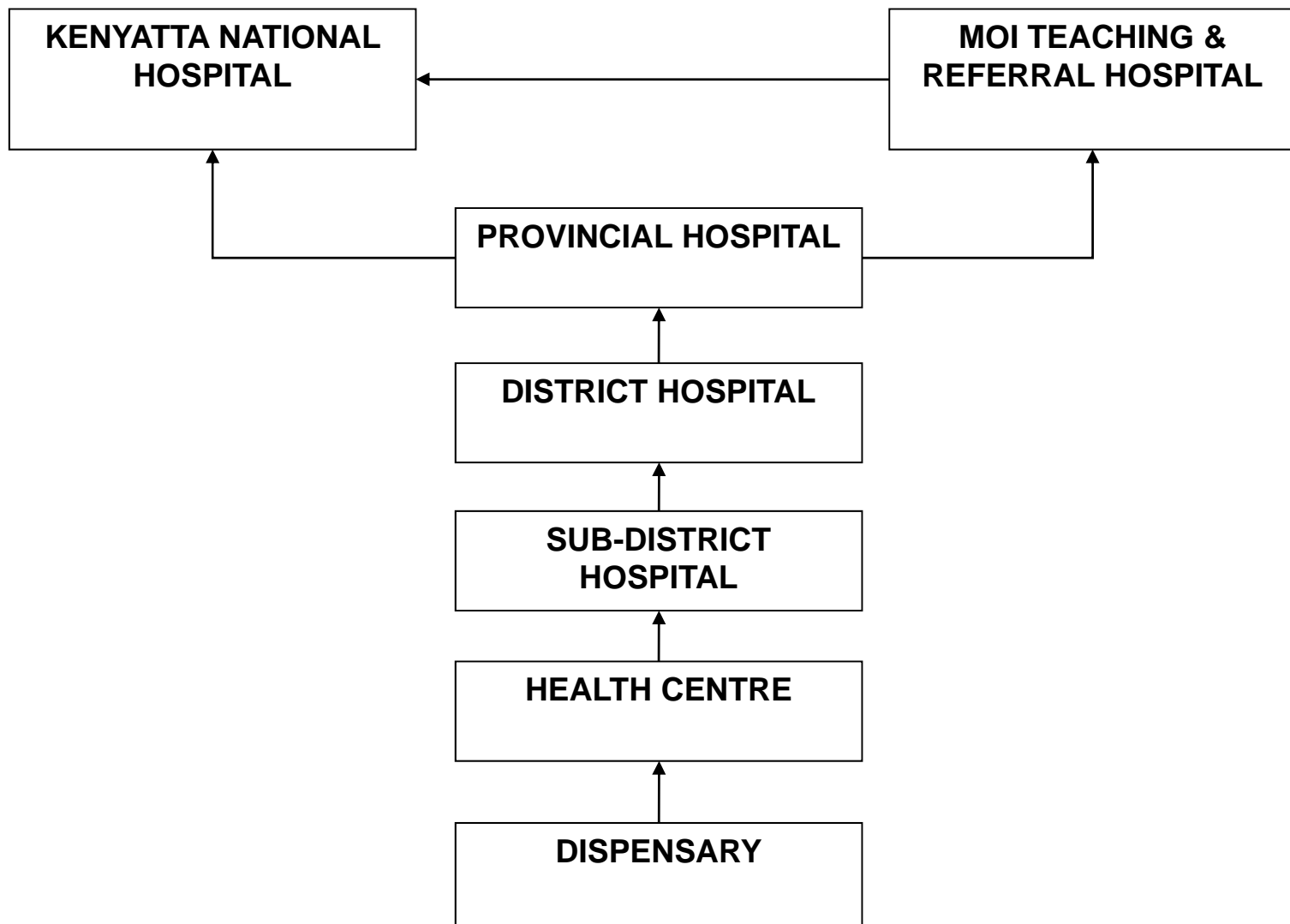
Problem statement

- Despite high prevalence of bacterial infections in western Kenya, the problem of antimicrobial resistance has gone largely unrecognized

Objective

- To identify antibiotic susceptibility patterns of the clinical isolates

Justification

- To inform policy in an effort to control the spread of antibiotic resistance

METHODS

Site:

- Five hospitals located in W. Kenya (Fig. 2)
- These included Bungoma, Busia, Kapsabet, Kisumu and Webuye District Hospitals.

Fig. 2: Map of Kenya showing study sites

Methods ....

Design:

- Hospital-based cross sectional

Sampling procedure:

- Site selected by purposive sampling.
- All isolates tested for antibiotic susceptibility from Jan. - June 2009 were included

Data collection:

- Sec data from lab. records perused for bact isolates and antibiotic susceptibilities
- All susceptibilities done using disk diffusion

Methods ....

Data management and statistical analysis:

- Data was entered into data collection sheet and later into SPSS (v. 14), analyzed using descriptive statistics

Ethical considerations:

- Permission to collect the data was sought from the Medical superintendents of the respective hospitals.

RESULTS

- Total of 130 specimens, highest being from Kisumu and most frequent specimen was pus
- Many isolates were not tested. Reasons included high cost

Table 1: Freq. distribution of the specimens by hospital

Specimen	Number (%) of specimens from the District Hospitals					
	Ksm	Bgm	Busia	Wby	Kaps	Total
Pus	1	6	27	5	2	**41(31.5)**
Rectal swab	30	1	0	0	0	**31(23.8)**
Stool	10	9	3	3	5	**30(23.1)**
Urine	1	10	1	4	2	**18(13.8)**
Blood	0	6	0	0	0	**6(4.6)**
HVS	1	2	0	0	0	**3(2.3)**
CSF	0	1	0	0	0	**1(0.8)**
Total	**43(33.1)**	**35(26.9)**	**31(23.8)**	**12(9.2)**	**9(6.9)**	**130**

Table 2

- Most common pathogens isolated were *Staphylococcus* (38.5%) and *Escherichia coli* (21.5%).

- All isolates were resistant to penicillin

- Only 20 (18.9%) isolates were resistant to gentamicin

- Isolates that displayed 100% sensitivity were only for few specimens

Table 1: Antibiotic resistant pattern of the isolates

Number (%) of resistant isolates:

Drug	Staph	Strep	Salm	Shig	E. coli	N. gon	V.chol	Kleb	Pseud	Proteus	Citro	Gram neg rod	Total
Pen	8(100)	5(100)	3(100)		5(100)			1(100)		2(100)	1(100)		**25(100)**
Mino	6(46.2)	1(20)	2(66.7)	1(100)	5(50)			0/1		0/2	0/1		**15(41.7)**
Ery	7(53.8)	2(40)	3(100)	1(100)	8(80)			0/1		1(50)	1(100)		**23(63.9)**
Meth	12(92.3)	5(100)	3(100)		6(75)			1(100)		3(100)	3(100)		**33(91.7)**
Cotri	36(81.8)	8(88.9)	5(71.4)	4(80)	22(81.5)	2(100)	5(100)	6(85.7)	2(100)	2(40)	3(100)	4(80)	**99(81.8)**
Chlor	9(69.2)	2(33.3)	3(100)	1(100)	1(100)			0/1		1(50)	1(100)	2(66.7)	**20(50)**
Amp	28(70)	7(70)	3(42.9)	4(80)	21(77.8)	0/2	4(80)	8(100)	2(100)	4(80)	3(100)	5(100)	**89(74.8)**
Linco	6(75)	2(66.7)	1(100)		4(100)			1(100)					**14(82.4)**
Tet	12(70.6)	2(100)	2(50)	5(100)	8(72.7)	2(100)	1(100)	1(50)	1(100)		4(100)		**38(77.6)**
Nitro	17(56.7)	3(100)	4(100)	3(75)	6(46.2)	0/2	4(100)	1(14.3)	2(100)	2(100)		0/1	**42(58.3)**
NA	23(63.9)	2(66.7)	1(50)	1(25)	14(60.9)	2(100)	2(40)	3(42.9)	2(100)	1(33.3)	1(50)	0/1	**52(57.8)**
Strep	5(55.6)		1(25)	2(50)	2(33.3)	0/2	0/1	1(50)	0/1				**11(37.9)**
Sulph	6(85.7)		4(100)	4(100)	3(100)	2(100)	1(100)	1(50)	1(100)				**22(91.7)**
Gent	**4(9.3)**	**1(25)**	**0/4**	**1(20)**	**9(37.5)**	**0/2**	**1(20)**	**1(14.3)**	**0/2**	**0/3**	**1(50)**	**2(40)**	**20(18.9)**
Cipro	5(71.4)				1(100)								**6(75)**
Aug	21(70)	2(40)		1(100)	17(94.4)		3(75)	3(60)	1(100)	3(100)	2(66.7)	5(100)	**58(77.3)**
Norf	6(20)	1(100)			6(54.5)		0/3	3(60)	0/1	1(50)	1(50)	1(100)	**9(33.9)**
Kana	6(85.7)	0/1		1(100)	6(100)							0/4	**13(68.4)**
Cefu	16(52.2)	1(50)		1(100)	11(68.8)		0/3	1(20)	0/1	1(50)	0/2	1(25)	**32(49.2)**
Total													

Tabe 3

- Most of the resistant isolates were from Kapsabet

Table 3: Proportion of antibiotic resistant strains by the hospital

Drug	Number (%) of resistant isolates in the following hospitals:					
	Bungoma	**Busia**	**Webuye**	**Kisumu**	**Kapsabet**	**Total**
Pen	10(100)	4(100)	1(100)			**25 (100)**
Mino	2(20))	3(75)	2(66.7)	1(10)	7(77.8)	**15 (41.7)**
Ery	6(60)	4(80)	1(50)	4(40)	8(88.9)	**23 (63.9)**
Meth	9(90)	4(100)	1(50)	19(95)		**33 (91.7)**
Cotri	25(73.5)	22(81.5)	8(100)	35(81.5)	9(100)	**99 (81.8)**
Chlor	5(45.5)	5(50)		5(50)	5(55.6)	**20 (50)**
Amp	21(61.8)	21(84)	8(100)	30(69.8)	9(100)	**89 (74.8)**
Linco	8(80)	4(100)	0/1	2(100)		**14 (82.4)**
Tet	14(63.3)	10(100)	5(62.5)		9(100)	**38 (77.6)**
Nitro	17(73.9)	9(45)	2(33.3)	14(60.9)		**42 (58.3)**
NA	16(76.2)	10(52.6)	5(62.5)	13(39.4)	8(89.9)	**52 (57.8)**
Strep	9(42.9)		2(25)			**11 (37.9)**
Sulph	19(90.5)		3(100)			**22 (91.7)**
Gent	**5(21.7)**	**4(13.3)**	**0/11**	**6(18.2)**	**5(55.6)**	**20 (18.9)**
Cipro		6(75)				**6 (75)**
Aug	0/4	24(89.9)	1(100)	24(70.6)	9(100)	**58 (77.3)**
Norf	4(16.7)		1(100)	14(45.2)		**9 (33.9)**
Kana	4(40)				9(100)	**13 (68.4)**
Cefu	10(41.7)		0/1	13(41.9)	9(100)	**32 (49.2)**

Table 4

- CSF isolate was resistant to all the drugs tested

Table 4: Proportion of antibiotic resistant strains by specimen

Drug	Number (%) of resistant isolates in the following specimens:							
	Pus	**Urine**	**Stool**	**HVS**	**Blood**	**CSF**	**Urethral swab**	**Total**
Pen	6(100)	5(100)	3(100)		3(100)	1(100)	7(100)	**25(100)**
Mino	5(55.6)	2(25)	6(75)		0/3	1(100)	1(14.3)	**15(41.7)**
Ery	6(66.7)	5(62.5)	7(87.5)		1(33.3)	1(100)	3(42.9)	**23(63.9)**
Meth	6(85.7)	5(100)	4(100)	1(100)	2(66.7)	1(100)	13(92.9)	**33(91.7)**
Cotri	28(82.4)	14(82.4)	26(89.7)	2(66.7)	5(83.3)	1(100)	23(74.2)	**99(81.8)**
Chlor	7(58.3)	5(71.4)	3(30)		0/3	1(100)	4(57.1)	**20(50)**
Amp	25(80.6)	12(70.6)	26(86.7)	1(33.3)	5(83.3)	1(100)	19(61.3)	**89(74.8)**
Linco	4(66.7	3(75)	2(100)		3(100)	1(100)	1(100)	**14(82.4)**
Tet	12(85.7)	8(66.7)	13(76.5)	2(100)	2(66.7)		1(100)	**38(77.6)**
Nitro	12(50)	6(75)	12(66.7)	0/2	2(66.7)		10(58.8)	**42(58.3)**
NA	17(65.4)	10(90.9)	11(47.8)	2(66.7)	2(66.7)		10(41.7)	**52(57.8)**
Strep	1(25)	5(62.5)	3(23.7)	0/2	2(66.7)		0/1	**11(37.9)**
Sulph	2(100)	6(85.7)	9(100)	2(100)	2(66.7)		1(100	**22(91.7)**
Gent	**4(11.4)**	**1(7.1)**	**9(33.3)**	**0/3**	**2(66.7)**		**4(16.7)**	**20(18.9)**
Cipro	5(71.4)	1(100)						**6(75)**
Aug	22(75.9)	4(80)	15(93.8)	1(100)			16(66.7)	**58(77.3)**
Norf	4(16.7)	1(100)	2(28.6)	1(100)			11(47.8)	**9(33.9)**
Kana	5(55.6)	2(66.7)	6(85.7)					**13(68.4)**
Cef	11(45.8)	3(75)	6(46.2)	1(100)			11(47.8)	**32(49.2)**

CONCLUSION

- There was R to several antibiotics
- All isolates tested were R to penicillin
- Most isolates were S to gentamicin
- The number of specimens processed in some hospitals was very low
- Cost was cited as a prohibiting factor to antibiotic susceptibility testing

RECOMMENDATIONS

- There is need for further investigation to establish a data base to ascertain the antibiotic susceptibility pattern and MICs in the region

- Authorities should consider strengthening capacity for antibiotic susceptibility testing on routine basis as a priority

ACKNOWLEDGEMENT

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Thank you all