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Surveillance of the overall use of antimicrobial drugs in humans over a 5 year period (1997–2001) in Kenya

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Sir,
Pharmacological surveillance, in the form of analysis of antibiotic consumption data, is essential for the study and control of

the evolution of bacterial resistance.¹ Both quantitative and qualitative records of antibacterial drug use are crucial to enable the impact of antibiotic policy to be evaluated and to allow determination of possible correlations between the use of certain groups of antibacterial drugs and the emergence of resistance.² In this study, we estimated the annual overall consumption of antimicrobial drugs and evaluated their patterns of use in humans in Kenya for the period 1997–2001.

Data on the use of antimicrobial drugs were obtained from import licenses and manufacturers' records held at the Pharmacy and Poisons Board, which approves and/or licenses all drugs for use in Kenya before sale. The amount of antimicrobial drug in kilograms was converted into the number of defined daily doses (DDD), as set out by WHO³ and consumption expressed as the number of DDD/1000 inhabitants per day. Consumption per antimicrobial class and the mean annual score for the 5 year period were calculated to determine the prevalence of use for the various antimicrobials.

Data on overall antimicrobial use are shown in Table 1. During the study period, total annual antimicrobial use decreased, except in the year 2000 when a 4% increase in consumption was registered. This coincided with a severe drought resulting in famine in January 2000. Bacterial pneumonia is common in malnourished persons and an upsurge in such cases may have contributed to an increased consumption of antimicrobial drugs. Implementation of antimicrobial resistance strategies outlined in 1997 at a national workshop on the surveillance of antimicrobial resistance⁴ may account for the decrease in antimicrobial use observed in this study. In addition, rising costs⁴ amidst the declining socio-economic status of a substantial proportion of the population in Kenya may have also played a part. The mean yearly national antimicrobial use was 20.21 DDD/1000/day. This was lower than 21 DDD/1000/day reported for Spain and other developed countries.¹ The pattern of consumption for antibiotic classes constituting 97.2% of this mean was penicillins, tetracyclines, trimethoprim, sulphonamides, aminoglycosides, chloramphenicol, macrolides and fluoroquinolones. Penicillins (6.27 DDD/1000/day) accounted for 31% of the overall mean. Penicillins are widely used in most hospitals in Kenya⁵ and other countries.² Use of extended-spectrum penicillins accounted for 67.5%. Tetracyclines registered a 37.2% decrease in use in 1998 and demonstrated year-to-year variation with no specific trend thereafter. Doxycycline was the most commonly used member of this group. In combination, the consumption of trimethoprim and sulphonamides increased during 1997–1999. Trimethoprim/sulfamethoxazole combinations are first-choice drugs for both preventing and treating pneumonia in

Table 1. Antimicrobial drug use in DDD/1000/day in humans in Kenya during 1997–2001

Antimicrobial class	Year of monitoring					Total	Mean
	1997	1998	1999	2000	2001		
Tetracyclines	7.10	4.46	4.63	3.02	3.42	22.63	4.53
Aminoglycosides	0.96	1.48	0.71	2.18	2.30	7.63	1.53
1st CEP	0.002	0.13	0.25	0.65	0.04	0.85	0.17
2nd CEP	0.009	0.01	0.016	0.067	0.042	0.145	0.03
3rd CEP	0.0001	0.0021	0.0008	0.011	0.0004	0.014	0.003
Macrolides	1.10	0.08	1.26	1.01	1.29	4.74	0.95
Chloramphenicol	5.09	0.49	0.24	0.47	0.37	6.66	1.33

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Table 1. (Continued)

Antimicrobial class	Year of monitoring					Total	Mean
	1997	1998	1999	2000	2001		
βLSP	2.5	1.18	1.11	0.91	1.34	7.04	1.41
ESP	2.92	8.36	2.05	4.48	3.36	21.17	4.23
βLRP	0.54	0.72	0.21	0.96	0.72	3.15	0.63
Fluoroquinolones	0.04	0.71	1.29	1.32	0.55	3.91	0.78
Rifampicin	0.08	0.03	0.34	0.39	0.38	1.22	0.24
Spectinomycin	0.006	–	–	–	0.0003	0.0063	0.0013
Sulphonamides	2.25	1.32	1.69	1.58	1.19	8.03	1.61
Trimethoprim	2.58	3.87	4.5	1.79	0.52	13.26	2.65
Gramicidin	–	–	0.002	–	0.60	0.602	0.12
Nitrofurantoin	–	–	–	–	0.05	0.05	0.01
Total	25.16	22.84	18.07	18.83	16.17	101.07	20.21

1st CEP, first-generation cephalosporins; 2nd CEP, second-generation cephalosporins; 3rd CEP, third-generation cephalosporins; βLSP, β-lactamase-sensitive penicillins; βLRP, β-lactamase-resistant penicillins; ESP, extended-spectrum penicillins; –, no records during the year.

HIV-positive patients, which continues to be a major problem in Kenya. Consumption of aminoglycosides rose steadily after 1999. Their use in combination with other antibiotics for the treatment of bacterial pneumonia could explain the marked increase in their consumption during 2000–2001. Gentamicin (1.2 DDD/1000/day) accounted for 78.4% of the mean annual use. Chloramphenicol is one of the mainstay drugs in the treatment of typhoid fever in developing countries such as Kenya,⁵ >75% of its use was recorded in 1997. Increased cases of typhoid fever following El Niño rains in 1997 and early parts of 1998 may account for the high consumption in that year. Use of fluoroquinolones, which became more affordable from 1998,⁶ as treatment for typhoid fever may account for the decrease in chloramphenicol use after 1997. Use of fluoroquinolones showed an increasing trend, with a >18-fold margin in 1998. Following expiry of the patent period for novel fluoroquinolones, many affordable generic products became plentiful.⁶

Consumption of macrolides remained relatively stable from 1999 onwards. The use of rifampicin increased from 1999. This may be attributed to its use in the combinations for treatment of tuberculosis, which is currently one of the most common secondary infections among HIV/AIDS patients. During the study period, the average yearly use was high for first-generation cephalosporins compared with that of both second- and third-generation cephalosporins. The yearly use of second-generation cephalosporins increased until 2000 before decreasing in 2001. Use of gramicidin, nitrofurantoin and spectinomycin remained low over the study period. More than three-quarters (79%) of the antimicrobial drugs were orally administered over the study period. This percentage, however, was much lower than 92% reported for Norway.²

This study has shown that penicillins are the most widely used antibiotics in humans in Kenya and that the use of fluoroquinolones increased 18-fold during 1997–1998. The present study provides baseline data on antimicrobial drug usage, which are useful in interpreting any current or future emergence of antimicrobial resistance and in evaluating antimicrobial resistance mitigation strategies in humans in Kenya. It is suggested that a study to investigate antimicrobial resistance in indicator microorganisms be conducted to compare resistance patterns with data from this study.

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