

Age- and sex-specific antibiotic prescribing patterns in general practice in England and Wales in 1996

AZEEM MAJEED

KATH MOSER

SUMMARY

Using data from 288 general practices in England and Wales contributing data to the General Practice Research Database in 1996, we derived age-sex specific antibiotic prescribing and exposure rates. The overall antibiotic prescribing rate was 607 per 1000 in males and 852 per 1000 in females. In both males and females, prescribing rates were highest in children aged 0–4 years and in the elderly. Prescribing rates in young and middle-aged women were substantially higher than in men of the same age. Overall, 29% of males and 39% of females were prescribed antibiotics in 1996. Children under five years of age were most likely to receive a prescription for an antibiotic. Antibiotic prescribing rates for the 288 practices in the study varied nearly five-fold, from 333 to 1616 per 1000. Reducing this variation and overall antibiotic prescribing rates will be major challenges for general practitioners.

Keywords: antibiotics; primary care; prescribing rates; comparative study.

Introduction

THERE is concern that antibiotics may be being overused in general practice, leading to an increase in the prevalence of antibiotic-resistant bacteria.^{1,2} Consequently, general practitioners (GPs) are being encouraged to be more parsimonious in their use of antibiotics. Although most antibiotic prescribing takes place in general practice, relatively little is known about how the prescribing of antibiotics in primary care varies by age and sex. We recently analysed data from the General Practice Research Database (GPRD) to derive age-sex specific prescribing rates for the main antimicrobial groups, to estimate the percentage of the population treated with antibiotics, and to investigate the inter-practice variation in antibiotic prescribing.

Method

The data for this study came from 288 general practices — total list size 2.1 million — in England and Wales contributing data to the GPRD in 1996. General practices participating in the GPRD follow agreed guidelines for the recording of clinical and prescribing data and submit anonymized patient-based clinical records to the database at regular intervals. The accuracy and comprehensiveness of the data recorded in the GPRD has been documented previously.^{3,4}

We calculated age- and sex-specific prescribing rates for selected antibiotic categories and the percentage of patients in

each age-sex group receiving a prescription for an antibiotic in 1996. Finally, we calculated annual prescribing rates for each of the 288 practices.

Results

The overall antibiotic prescribing rate in 1996 was 607 per 1000 in males and 852 per 1000 in females. In both males and females, prescribing rates were highest in children aged 0–4 years and in the elderly. Prescribing rates in young and middle-aged women were substantially higher than in men of the same age. Prescribing of individual antimicrobial groups reflected these relationships with rates of prescribing generally highest in 0–4 year-old children. Overall, 29% of males and 39% of females were prescribed antibiotics in 1996. Children under five years of age had the greatest exposure to antibiotics, with 57% of boys and 54% of girls receiving at least one prescription for an antibiotic (Table 2). For males, exposure to antibiotics was lowest in 35–54 year-olds. Except in girls aged 0–4 years, the percentage of females receiving an antibiotic prescription in 1996 varied little by age.

Annual antibiotic prescribing rates for the 288 practices varied nearly five-fold, from 333 to 1616 per 1000 (median = 725, interquartile range = 603–848). Prescribing of quinolones varied over 100-fold from one to 166 per 1000 (median = 14, interquartile range = 9–25). The correlation between total prescribing rates and prescribing of quinolones was 0.27 (95% confidence interval = 0.16–0.37).

Discussion

There was a nearly five-fold inter-practice variation in antibiotic prescribing rates. Reducing the extent of this variation and total antibiotic prescribing rates will be major challenges for GPs. To help achieve these objectives, greater use should be made of routinely available prescribing data, including both routine prescribing data and data from computerized general practice prescribing records. Not all general practices have the ability to produce the same information on prescribing as do the practices in the GPRD. However, all health authorities now have access to detailed information on prescribing in their practices from the Prescription Pricing Authority.⁵ These data could be used to derive comparative antibiotic prescribing rates for general practices and to help plan strategies for a reduction in the volume of antibiotic prescribing.

Particular concern has been expressed about the use of quinolones in general practice. Although there was a large inter-practice variation in the prescribing of quinolones, overall they accounted for less than 3% of all antibiotic prescriptions. The correlation between total antibiotic prescribing rates and the prescribing of quinolones was low, suggesting that different factors may be driving total antibiotic prescribing and the choice of antibiotic when one is prescribed. Hence, measures aimed at curbing overall prescribing rates may not, by themselves, improve the choice of the antibiotic that is actually prescribed. Finally, the data in this paper refer to prescriptions issued. As not all pre-

A Majeed, MD, MRCP, medical epidemiologist; and K Moser, BA, MSc, senior research officer, Office for National Statistics, London. Submitted: 13 August 1998; final acceptance: 10 March 1999.

© British Journal of General Practice, 1999, 49, 735–736.

Table 1. Age–sex specific prescribing rates of antibiotics per 1000 patient years at risk (based on British National Formulary sections), 1996.

Section	Antibiotic	Age (years)							All ages	Percentage of total
		0–4	5–15	16–34	35–54	55–74	75–84	85+		
I. Males										
5.1.1.1	Benzylpenicillin and phenoxymethylpenicillins	122	111	70	32	23	19	13	57	9.3
5.1.1.2	Penicillinase-resistant penicillins	50	40	35	32	39	53	71	38	6.2
5.1.1.3	Broad-spectrum penicillins	1006	327	146	164	268	370	409	263	43.3
5.1.2	Cephalosporins and cephamycins	155	48	25	30	63	110	152	50	8.2
5.1.3	Tetracyclines	0	22	100	50	71	75	54	61	10.1
5.1.5	Macrolides	258	100	66	50	73	88	92	80	13.2
5.1.8	Sulphonamides and trimethoprim	64	19	14	20	44	87	136	29	4.8
5.1.11	Metronidazole and tinidazole	1	1	6	9	13	13	15	7	1.2
5.1.12	4-Quinolones	0	1	8	14	32	53	75	15	2.5
5.1.13	Urinary antiseptics	1	1	1	1	3	7	12	2	0.3
	Other antibiotics in 5.1	2	4	3	4	9	9	5	5	0.8
5.1	All antibiotics	1661	673	473	405	638	883	1033	607	100
II. Females										
5.1.1.1	Benzylpenicillin and phenoxymethylpenicillins	107	154	126	52	32	21	18	81	9.5
5.1.1.2	Penicillinase-resistant penicillins	41	38	43	38	41	57	81	43	5.0
5.1.1.3	Broad-spectrum penicillins	905	354	275	265	316	321	373	330	38.8
5.1.2	Cephalosporins and cephamycins	138	65	78	79	107	135	159	91	10.7
5.1.3	Tetracyclines	0	24	91	86	73	51	32	68	7.9
5.1.5	Macrolides	221	111	102	87	93	84	92	103	12.0
5.1.8	Sulphonamides and trimethoprim	70	41	72	74	99	139	179	81	9.5
5.1.11	Metronidazole and tinidazole	3	3	39	25	17	14	19	22	2.6
5.1.12	4-Quinolones	1	2	16	23	37	47	52	22	2.6
5.1.13	Urinary antiseptics	3	3	7	8	13	17	22	8	1.0
	Other antibiotics in 5.1	3	2	3	4	6	6	5	4	0.4
5.1	All antibiotics	1490	796	850	739	834	890	1031	852	100

Table 2. Percentage of patients prescribed antibiotics in 1996 by age and sex.

Age group (years)	Males	Females
0–4	57	54
5–15	34	39
16–34	24	38
35–54	22	36
55–74	29	37
75–84	36	37
85+	38	40
All ages	29	39

scriptions are actually dispensed, and some of those that are dispensed are not used, actual antibiotic exposure rates may be a little lower than the rates reported in this paper.

References

- House of Lords Select Committee on Science and Technology. *Resistance to antibiotics and other antimicrobial agents*. London: The Stationery Office, 1998.
- Standing Medical Advisory Committee Sub-group on Antimicrobial Resistance. *The path of least resistance*. London: DoH, 1998.
- Hollowell J. The General Practice Research Database: quality of morbidity data. *Population Trends* 1997; **87**: 36–40.
- Office for National Statistics. *Key health statistics from general practice 1996*. [Series MB6, no 1.] London: ONS, 1998.
- Majeed A, Evans N, Head P. What can PACT tell us about prescribing in general practice? *BMJ* 1997; **315**: 1515–1519.

Acknowledgements

We thank colleagues at Office for National Statistics for their help in carrying out this study. We also thank all the general practices that contribute data to the General Practice Research Database. The Medicines Control Agency has been responsible for the overall management and financial control of the General Practice Research Database since April 1999. The database is operated by the Office for National Statistics.

Address for correspondence

Dr Majeed, Room B7/10, Office for National Statistics, 1 Drummond Gate, London SW1V 2QQ. E-mail: azeem.majeed@ons.gov.uk