Morbidity and prescribing patterns for the middle-aged population of Scotland

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SUMMARY

Background. *As part of a large national survey of morbidity recording on general practice computers, morbidity and prescribing data were collected from three separate sources for more than 10 000 patients aged 45–64 years, randomly selected from 41 Scottish general practices.*

Aim. *To amalgamate the three sources of data to provide estimates of prevalence rates for a range of common chronic diagnoses, and of medication rates for associated repeat prescription drugs.*

Method. *Forty-one Scottish general practices were selected on a geographic basis in relation to the national population distribution. Within each practice, 250 patients aged 45–64 years were selected at random. Data relating to 19 diagnoses and 40 repeat prescription drugs were extracted from the computer records of these patients and compared with information held on patients" paper records and supplied by patients in response to a postal questionnaire. After assessing the completeness and accuracy of computer-held information, the three sources of data were amalgamated according to agreed protocols.*

Results. *Lifetime prevalence rates are presented for each diagnosis, broken down by sex and age group. Differences in rates between the sexes, and with change in age, were in the expected direction for all diagnoses, and were matched by corresponding differences in entitlements to repeat prescription drugs. Comparison of these lifetime rates with published prevalence rates indicates a latent pool of morbidity within the community, which ranges from 1.0 to 10.0 times the annual prevalence rate for different conditions.*

Conclusion. *The amalgamated data provide an estimate of lifetime prevalence rates for the range of conditions examined. They complement conventional morbidity statistics and have potential value in allowing the underlying management costs of specific chronic conditions to be evaluated.*

Keywords: morbidity statistics; prescribing; Scotland.

Introduction

MORBIDITY statistics derived from general practice records should provide the most comprehensive picture of the patterns of sickness within the community. Such statistics, accurate and widely based, are essential for epidemiological research and health service planning purposes. However, owing to the difficulty and expense of collecting such data on a national scale, systematic studies of morbidity recording in general practice have been undertaken only at 10-yearly intervals, and to date have covered only practices in England and Wales.[1-4] Consequently, morbidity data derived from hospital in-patient and day-patient cases continue to form the basis for much National Health Service (NHS) planning and resource allocation. In Scotland, few national morbidity statistics are published other than those relating to hospital-based activities.[5] Under the new NHS contract arrangements, the intention to focus an increasing share of health service activity and resources towards primary care[6] further increases the need for comprehensive morbidity and prescribing data from this sector.

We have recently carried out a large national survey of morbidity and prescribing in general practice in which the primary aim was to audit the quality of data held on the standard Scottish software package, GPASS (General Practice Administration System for Scotland). This survey showed that the recording of morbidity data on GPASS for 45- to 64-year-old patients was highly accurate but only about 75% complete, whereas the recording of repeat prescription drugs was both complete and accurate.[7] Thus, computer-held morbidity data, even in the highly computerized practices selected for the survey, cannot yet be considered an adequate base for national morbidity statistics in Scotland. In the course of this work, morbidity and prescribing data were obtained from the computer records of over 10 000 patients, and these were compared with information from the practice paper records and from responses to a postal questionnaire. This sample represented approximately 1% of the Scottish population in this age group. In this paper, we have amalgamated these three sources of data to provide 'best estimates' of prevalence rates for a range of common diagnoses, and of medication rates for a selection of repeat prescription drugs.

The morbidity statistics reported here relate to the 45–64 year age group in Scotland, and are best described as 'lifetime prevalence' rates of the selected conditions as they represent *any occurrence* of the condition within a patient's medical records. Similarly, the medication rates reported, being person-based rather than item-based, are more accurately described as 'repeat prescription entitlement rates'.

Methods

The criteria used in selecting the set of morbid conditions and prescription drugs included in the study, and the methods adopted for the selection of practices and patients and for collection of data from patients' medical records, have been reported by Whitelaw *et al.*[7] Some of these methods are summarized here in the interests of completeness, but the reader is referred to the earlier publication for full details of the procedures involved.

Practices and patients

The practices that took part in the study were selected from an initial set of 132 practices identified from GPASS survey data as having above-average levels of morbidity recorded on computer. Of these, 52 expressed an interest in the project, and a final selection of 41 was made from these on a geographic basis and in relation to the national population distribution. Within each prac-

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tice, a set of 250 patients aged 45–64 years was selected at random from the registered list held on the practice computer. To ensure confidentiality, software was applied to each computer system to encrypt all patient identifiers other than sex, date of birth and postcode, and to allocate a unique patient and practice identity number to each of the selected patients.

Project dataset

A set of 19, predominantly chronic, diagnoses were selected for study after consultation with a panel of health care professionals (see Table 2). The dataset also included 40 individual drugs, chosen to represent the selected diagnoses and known to be those most frequently issued on a repeat prescription basis by Scottish general practitioners (GPs).[8] The selected drugs represented 21 pharmacological groups and are identified in relation to the parent diagnoses in Table 1. Six surgical procedures were also present in the dataset, but these are not included in the current analysis.

Data collection

The collection of morbidity data at practices took place during the period April–September 1993. Data were collected from the following three sources for each individual patient: the practice computer records, the patient's paper records, and a postal survey instrument containing questions concerning the patient's lifetime morbidity experience and repeat prescription drug usage. The morbidity items in the questionnaire were generally of the form, 'Has any doctor ever told you that you have... [angina, for example]?'

For each patient, the practice computer record was searched for the occurrence of any of the set of clinical Read codes (the classification system used within GPASS)[9] or repeat prescription drugs specified in the project dataset. The Read code template included all common synonyms for the selected conditions. The scrutiny of paper records was undertaken by a single observer during a two- to three-day visit to each practice, using customized barcode software as an aid to speed and accuracy of data entry. Each patient's paper record was searched for the occurrence of the project dataset in three distinct parts of the record: the clinical history summary sheet; hospital letters; and the continuation sheets, which record brief notes of sequential consultations. Data on repeat prescription drugs were collected at the same time from the paper record or card index file. Responses to the postal questionnaire were identified only by the unique patient and practice number, but provided information on the patient's sex, year of birth and postcode to allow validation against the other sources of data.

Data validation and analysis

Initial validation involved identifying discrepancies between sources in the sex and dates of birth of individual patients; where these could not be resolved, the entire dataset relating to that patient was discarded. Corresponding computer and paper records for each individual patient, supplemented by questionnaire responses when available, were then amalgamated to provide 'best estimates' of the occurrence rate of each condition and prescription drug in the dataset. In amalgamating the three sources of data, the convention adopted was that any diagnosis recorded in the computer record, the clinical history summary sheet, or hospital letters was sufficiently reliable to be accepted as a confirmed diagnosis. In contrast, diagnoses recorded on the continuation sheets were included only if confirmed by a further 'clinical' entry in the patient questionnaire or by an associated 'drug' entry in either the computer record, paper record, or the questionnaire. Similarly, a clinical entry in the questionnaire was accepted only if confirmed by a drug entry in any part of the patient's record — clinical entries in the questionnaire that could

Table 1. Repeat prescription drugs in the project dataset and their associated primary diagnoses.

Diagnosis	Pharmalogical agent	Drugs
Angina	Nitrates	Glyceryl trinitrate, Isosorbide (mononitrate and dinitrate), Coro-Nitro (Boehringer Mannheim), GTN (Martindale), Nitrolingual (Lipha), Transiderm (Geigy)
COAD*	Beclomethasone	Beclomethasone, Becloforte (A&H), Becotide (A&H)
	Salbutamol	Salbutamol, Ventolin (A&H)
	Terbutaline	Terbutaline, Bricanyl (Astra)
	Aminophylline	Phyllocontin (Napp)
	Budesonide	Pulmicort (Astra)
	Cromoglycate	Intal (Fisons)
Diabetes	Insulin	Insulin (all variants)
Epilepsy	Valproate	Sodium Valproate, Epilim (Sanofi Winthrop)
	Carbamazepine	Carbamazepine, Tegretol (Geigy)
	Phenytoin	Phenytoin, Epanutin (P-D)
	Phenobarbitone	Phenobarbitone
Glaucoma	Timolol	Timolol, Timoptol (MSD)
	Pilocarpine	Pilocarpine
Gout	Allopurinol	Allpurinol, Zyloric (Wellcome)
Hypothyroidism	Thyroxine	Thyroxine, Eltroxin (Evans)
Parkinson's disease	Levodopa	Madopar (Roche), Sinemet (Du Pont)
Peptic ulcer	Ranitidine	Ranitidine, Zantac (Glaxo)
	Cimetidine	Cimetidine, Tagamet (SK&F)
Pernicious anaemia	Hydroxocobalamin	Hydroxocobalamin
Tumour (breast)	Tamoxifen	Nolvadex, Tamoxifen (Zeneca)

*COAD = chronic obstructive airways disease.

not be substantiated elsewhere were discounted. For drugs, the 'best estimate' was taken to be the presence of the drug in the computer record, the paper record or the the questionnaire.

Statistical analysis included the amalgamation of data from all patients in order to provide a national dataset, and from this the computation of lifetime prevalence rates for each diagnosis and of medication rates for each drug. These rates were computed first for all cases and then separately for each sex and 5-year age group within the 45–64 year age group. Differences between subgroups were identified by analysis of variance using the statistical package SPSS,[10] and 95% confidence limits were computed as described for proportional data by Gardner and Altman.[11]

The possibility of bias in the composition of the national dataset arising from the selection of 250 patients from each practice, irrespective of practice size, was examined by reference to the urban/rural and socio-economic characteristics of each practice population. These are the factors considered most likely to have an influence on morbidity levels or repeat prescribing patterns. Individual patient postcodes were available for 74% of the study population and these were used to assign patients into five urban/rural categories according to the classification used in the 1981 National Census,[12] and into the seven categories of relative affluence/deprivation developed by Carstairs and Morris[13] and updated to the 1991 Census base by McLoone.[14] Practices were assigned to four subgroups according to practice size. These subgroups and the number of practices in each were: (1) fewer than 3000 patients (6 practices); (2) 3000–5000 patients (12 practices); (3) 5000–7500 patients (13 practices); and (4) more than 7500 patients (10 practices).

Results

Computer records were available for 10 244 patients, paper records for 8398 and questionnaire responses for 6642. Lifetime prevalence rates, as described above, were derived from the 8398 patients for whom both computer records and paper records were present; of these, 5567 (66%) also had questionnaire data available. The ratio of females to males in this group was 0.98:1.00, and the distribution of patients across 5-year age groups was as follows:

- 45–49 years 29.8%
- 50–54 years 25.5%
- 55–59 years 22.8%, and
- 60–64 years 22.0%.

These ratios and proportions are identical to those of the original sample population.

The mean urban/rural score for all 41 practices was 3.18 (standard deviation 1.18) on a scale which ranged from 1 (continuous urban block, population > 1 million) to 5 (wholly rural). The mean scores for practice subgroups ranged from 2.88 for those with fewer than 3000 patients to 3.58 for those having 3000–5000 patients. Overall, there were no significant effects of practice size on the urban/rural score of the practice populations. Similarly, the mean Carstairs category over all practices was 3.62 (standard deviation 1.15) on the scale of 1 (affluent) to 7 (most deprived), and the means for practice subgroups ranged from 3.41 for the smallest practices to 3.81 for the largest, with no significant differences between subgroups. In addition, an examination of the study population profile for Carstairs' categories 1–7 showed that this was closely similar to the profile presented by Carstairs and Morris[13] for the whole Scottish population.

The lifetime prevalence rates of each diagnosis for the 45–64 year age group in Scotland are given in Table 2 for the total patient population and for males and females separately. In Table 3, these categories are further subdivided by sex within each 5-year age group. It should be noted that the rates reported here for breast tumour include all references to cysts, lumps, lipomas and adenomas,[7] malignant or otherwise, and hence are higher and show a different pattern with increasing age than would be seen for malignant conditions alone. Also, the values reported here for hypertension relate to our search criteria for the scrutiny of paper records that specified one reading in which systolic or diastolic values were greater than 160 or 110 respectively, or more than one reading in which these values exceeded 150 or 100 respectively.[7]

Lifetime morbidity experience differed between males and females for 10 of the 19 diagnoses examined (Table 2). Males

Table 2. Mean lifetime prevalence (rates/1000 patients, with 95% confidence intervals) of the selected diagnoses. The data relate to 8398 patients aged 45–64, selected at random from 41 general practices in Scotland.

Diagnosis/procedure	Total (n = 8398)	Males (n = 4240)	Females (n = 4158)	Significant differences (Males versus females)
Angina	61 (56–67)	72 (64–80)	51 (44–58)	$P<0.001$
COAD	85 (79–91)	87 (79–96)	82 (74–90)	
Dementia	1 (0–2)	1 (0–2)	1 (0–2)	
Depression	127 (120–134)	89 (81–98)	165 (154–176)	$P<0.001$
Diabetes*	7 (5–9)	8 (5–10)	6 (4–9)	
Epilepsy	18 (15–21)	18 (14–22)	17 (13–21)	
Glaucoma	7 (5–9)	7 (5–10)	7 (4–9)	
Gout	14 (11–16)	25 (20–29)	3 (1–5)	$P<0.001$
Hypertension	220 (211–229)	207 (195–220)	233 (220–246)	$P<0.01$
Hypothyroidism	25 (23–30)	8 (5–10)	43 (37–49)	$P<0.001$
Myocardial infarction	34 (30–38)	51 (45–58)	16 (13–20)	$P<0.001$
Parkinson's disease	1 (0–2)	0 (0–1)	2 (0–3)	
Peptic ulcer	98 (92–104)	133 (123–143)	63 (55–70)	$P<0.001$
Pernicious anaemia	3 (2–4)	3 (1–5)	3 (2–5)	
Rheumatoid arthritis	14 (12–17)	8 (5–11)	20 (16–25)	$P<0.001$
Schizophrenia	8 (6–9)	8 (6–11)	7 (4–9)	
Stroke	12 (10–14)	15 (11–19)	9 (6–12)	$P<0.05$
Tumour (breast)	87 (81–93)	2 (0–4)	173 (162–185)	$P<0.001$
Tumour (lung)	1 (0–1)	1 (0–2)	0 (0–1)	

*All cases having a diagnosis of diabetes and receiving insulin on prescription. COAD = chronic obstructive airways disease.

Table 3. Lifetime prevalence (rates/1000 patients, with 95% confidence intervals) of the selected diagnoses classified by sex within 5-year age groups.

Diagnosis/ procedure	Age group (years) 45–49 Males (*n*=1340)	45–49 Females (*n*=1164)	50–54 Males (*n*=1066)	50–54 Females (*n*=1072)	55–59 Males (*n*=935)	55–59 Females (*n*=977)	60–64 Males (*n*=899)	60–64 Females (*n*=945)	Significant effects Sex	Age-group	Interaction
Angina	22 (15–32)	15 (9–24)	53 (41–69)	39 (28–53)	88 (70–108)	64 (50–82)	150 (127–174)	94 (76–115)	*P*<0.001	*P*<0.001	*P*<0.01
COAD	62 (50–76)	57 (44–72)	91 (74–110)	72 (64–97)	91 (73–111)	98 (80–119)	116 (95–137)	99 (81–120)		*P*<0.001	
Dementia	0 (0–3)	0 (0–3)	0 (0–3)	1 (0–5)	1 (0–6)	1 (0–6)	4 (1–11)	2 (0–8)		*P*<0.01	
Depression	74 (61–89)	156 (135–177)	105 (87–123)	188 (164–211)	96 (78–117)	174 (150–198)	86 (68–106)	141 (119–163)	*P*<0.001	*P*<0.01	
Diabetes*	7 (4–14)	4 (1–10)	8 (3–15)	1 (0–5)	11 (5–20)	14 (8–24)	6 (2–13)	7 (3–15)		*P*<0.05	
Epilepsy	13 (7–20)	19 (12–29)	27 (18–39)	23 (15–34)	20 (12–32)	17 (10–28)	13 (7–23)	8 (4–17)		*P*<0.01	
Glaucoma	4(1–9)	4 (1–10)	8 (3–15)	7 (3–13)	6 (2–14)	4 (1–10)	13 (7–23)	13 (7–22)		*P*<0.01	
Gout	23 (16–33)	0 (0–3)	16 (9–26)	1 (0–5)	24 (15–36)	3 (1–9)	38 (26–52)	8 (4–17)	*P*<0.001	*P*<0.001	
Hypertension	122 (104–139)	130 (110–149)	180 (157–203)	206 (182–230)	251 (224–279)	268 (240–296)	321 (291–352)	353 (323–384)	*P*<0.05	*P*<0.001	
Hypothyroidism	5 (2–11)	29 (20–41)	7 (3–14)	34 (24–46)	11 (5–20)	58 (45–75)	10 (5–19)	54 (41–70)	*P*<0.001	*P*<0.001	*P*<0.05
Myocardial infarction	25 (14–34)	5 (2–11)	48 (36–62)	14 (8–23)	57 (43–74)	20 (13–31)	90 (72–111)	29 (19–41)	*P*<0.001	*P*<0.001	*P*<0.01
Parkinson's disease	0 (0–3)	0 (0–3)	1 (0–5)	1 (0–5)	0 (0–4)	0 (0–4)	1 (0–6)	6 (2–14)		*P*<0.001	*P*<0.05
Peptic ulcer	96 (80–112)	57 (44–72)	121 (101–141)	61 (47–77)	155 (132–178)	67 (52–84)	179 (154–204)	68 (53–86)	*P*<0.001	*P*<0.001	*P*<0.001
Pernicious anaemia	1 (0–5)	3 (1–9)	2 (0–7)	2 (0–7)	6 (2–14)	3 (1–9)	3 (0–10)	5 (2–12)			
Rheumatoid arthritis	4 (2–10)	14 (8–22)	8 (4–16)	16 (9–25)	10 (4–18)	31 (21–44)	11 (5–20)	22 (14–34)	*P*<0.001	*P*<0.05	
Schizophrenia	4 (2–10)	4 (1–10)	13 (7–22)	7 (3–15)	9 (4–17)	8 (4–16)	8 (3–16)	7 (3–15)			
Stroke	4 (1–9)	4 (1–10)	14 (8–23)	6 (2–12)	21 (13–33)	12 (6–21)	26 (16–38)	16 (9–26)	*P*<0.01	*P*<0.001	
Tumour (breast)	1 (0–5)	191 (168–213)	2 (0–7)	181 (158–204)	3 (1–9)	170 (146–193)	2 (0–8)	146 (124–169)	*P*<0.001		*P*<0.05
Tumour (lung)	0 (0–3)	0 (0–3)	0 (0–3)	1 (0–5)	0 (0–4)	1 (0–6)	4 (1–11)	0 (0–4)		*P*<0.05	*P*<0.01

*All cases having a diagnosis of diabetes and receiving insulin on prescription. COAD = chronic obstructive airways disease.

showed significantly higher rates for angina, gout, myocardial infarction, stroke and peptic ulcer, while females had higher rates for depression, hypertension, hypothyroidism, rheumatoid arthritis and breast tumour. All diagnoses other than pernicious anaemia, schizophrenia and breast tumour showed significant increases in the prevalence rate with advancing age (Table 3); where present, this increase was linear ($P<0.05$–0.001) for all except depression, diabetes and epilepsy. For depression and epilepsy, the highest rates were seen in the 50–54 year age group, suggesting a possible cohort effect for these conditions in people born during the war years. Significant age group by sex interactions were present for angina, hypothyroidism, myocardial infarction, Parkinson's disease, peptic ulcer, breast tumour and lung tumour ($P<0.05$–0.001).

The data for the medication rates of the 21 pharmacological drug groups, classified by sex and age group, are shown in Table 4. Differences between the sexes in the pattern of repeat prescribing mirrored the sex differences seen in the lifetime prevalence rates for the corresponding diagnoses, with males being prescribed significantly more nitrates, allopurinol, ranitidine and cimetidine, and females receiving more thyroxine, levodopa and tamoxifen. Similarly, where the prevalence rates of the specific condition did not differ between the sexes (chronic obstructive airways disease, diabetes, epilepsy, glaucoma and pernicious anaemia — Table 2), this was true also for the medication rates of the corresponding drugs (Table 1). Changes in prescribing with advancing age generally reflected an increase with age in the prevalence of the associated diagnosis (Table 4); the prescribing of antiepileptics, taken as a group, showed a possible cohort effect in 50- to 60-year-olds, similar to that seen for the primary diagnosis.

Discussion

The morbidity and prescribing data presented here relate to a sample of 45- to 64-year-old patients selected at random from a geographic cross-section of Scottish general practices. The sample population reflected the Scottish population in terms of the balance of socio-economic characteristics, and an anlaysis of the urban/rural and socio-economic make-up of individual practice populations (see p.709) indicated that the relative under-representation of patients from larger practices was unlikely to lead to bias in the aggregated data. We therefore consider our data to be a valid representation of the pattern of morbidity in middle-aged Scots.

The pattern of disease present in a 1% sample of the population of England and Wales has recently been reported in *Morbidity Statistics in General Practice. Fourth National Study 1991-1992* (MSGP4).[4] That study provides morbidity statistics classified by sex and conventional age groups for the full range of conditions covered by the diagnostic section of the Read Clinical Classification System,[9] and presents these both as incidence and as prevalence rates for each condition. Prevalence rates are defined as 'the number of patients who consulted at least once during the year for a condition or group of conditions' and are thus period prevalence rates with the period being the one-year interval in which the observations were made. The statistics reported here from Scottish general practice are also period prevalence rates, but in this case the period is the lifetime of the patients selected for study. The two sets of estimates therefore measure different aspects of morbidity. One set represents those patients who seek medical advice for a condition, either at first onset or at recurrence of an existing problem, and who thereby contribute to a GP's workload during the specified time interval; the other represents the latent pool of those suffering from that condition in the community and includes both those who consult and those who don't. Depending on the chronicity of the condition, patients within the pool may have the active condition, may have achieved control through medication, or may be in temporary or long-term remission; but the majority, to some degree, will be actual or potential consumers of health service resources. Knowledge of the size of this pool is therefore of value, both at practice level and nationally, in assessing the underlying maintenance costs of the more chronic clinical conditions.

Measures of lifetime prevalence have been reported previously for depression and other psychiatric disorders[15-20] and, less frequently, for asthma,[21,22] epilepsy[23] and peptic ulcers.[24] Owing to the paucity of comparable data, only an indirect validation of the values presented here is possible. In Figure 1, our lifetime prevalence rates are compared with the one-year period prevalence rates for 45- to 64-year-old patients published in MSGP4.[4] Breast tumour and lung tumour have been omitted from the comparison as the entries for these conditions are not strictly comparable in the two sets of data. In addition, it should be noted that the MSGP4 value for *diabetes mellitus* represents all diabetics, whereas the present work recorded only insulin-taking diabetics and would thus include all type 1s and a proportion of type 2s.[25] As expected, lifetime prevalence is considerably higher than the one-year prevalence rate for most conditions, with ratios ranging from approximately 0.9 for Parkinson's disease to 10.3 for peptic ulcer (Figure 1). Diabetes is an exception, as noted above, but the

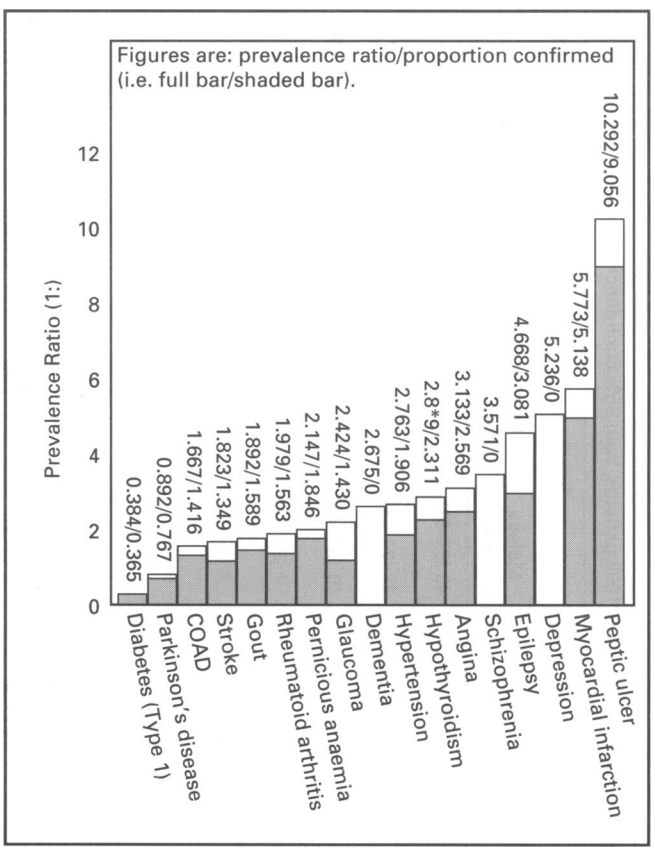

Figure 1. Ratio of annual prevalence rates given in *Morbidity Statistics from General Practice. Fourth National Study*[4] (MSGP4) to lifetime prevalence rates for selected conditions in the 45–64 year age group. The full bar represents the ratio of prevalence rates (MSGP4 : present study), with MSGP4 being accorded the value 1.0. The shaded portio represents the proportion of the lifetime value confirmed by a positive response in the patient questionnaire (see text). For dementia, schizophrenia and depression, no corresponding questions were included in the questionnaire.

Table 4. Repeat prescription entitlements (rates/1000 patients, with 95% confidence intervals) of the selected drug groups, classified by sex and 5-year age groups.

Pharmacological group	Total (*n*=8398)†	Sex		Age group (years)				Significant effects		
		Males (*n*=4240)	Females (*n*=4158)	45–49 (*n*=2504)	50–54 (*n*=2138)	55–59 (*n*=1912)	60–64 (*n*=1844)	Sex	Age-group	Interaction
Nitrates	38 (34–42)	43 (37–50)	32 (27–37)	12 (8–17)	30 (24–39)	48 (39–58)	71 (60–84)	*P*<0.001	*P*<0.001	
Beclomethasone	32 (28–35)	29 (24–34)	34 (29–40)	21 (16–28)	29 (22–37)	34 (26–43)	47 (37–57)		*P*<0.001	
Salbutamol	43 (39–47)	40 (34–46)	46 (40–53)	26 (20–33)	42 (34–52)	52 (43–63)	59 (48–70)		*P*<0.001	
Terbutaline	8 (69)	7 (5–10)	8 (5–11)	7 (4–11)	5 (3–9)	8 (4–13)	11 (7–17)			
Aminophylline	4 (2–5)	2 (1–4)	5 (3–7)	1 (0–3)	4 (2–8)	4 (2–8)	6 (3–11)		*P*<0.05	
Budesonide	5 (3–6)	5 (3–7)	4 (2–6)	5 (3–9)	2 (1–5)	6 (3–10)	6 (3–11)			
Cromoglycate	1 (0–2)	1 (0–3)	1 (0–2)	1 (0–3)	1 (0–4)	0 (0–2)	2 (1–6)			
Insulin	7 (5–8)	8 (5–10)	6 (3–8)	6 (3–9)	3 (1–7)	12 (7–17)	7 (4–12)		*P*<0.05	
Valproate	3 (2–4)	3 (1–4)	3 (1–5)	3 (1–6)	4 (2–7)	3 (1–7)	2 (1–6)			
Carbamazepine	5 (4–7)	4 (2–6)	6 (4–9)	5 (3–8)	5 (3–9)	7 (4–12)	4 (2–8)			
Phenytoin	4 (2–5)	4 (2–6)	3 (2–5)	2 (1–5)	6 (3–10)	4 (2–8)	3 (1–6)			
Phenobarbitone	3 (2–4)	3 (1–4)	3 (1–5)	1 (0–3)	4 (2–8)	6 (3–10)	1 (0–4)		*P*<0.01	
Timolol	3 (2–4)	3 (1–5)	3 (2–5)	1 (0–2)	3 (1–7)	2 (1–5)	8 (4–13)		*P*<0.001	
Pilocarpine	1 (0–2)	2 (0–3)	1 (0–2)	0 (0–2)	2 (1–5)	1 (0–3)	2 (0–5)			*P*<0.05
Allopurinol	8 (6–10)	14 (11–18)	2 (1–4)	8 (5–12)	4 (2–8)	8 (5–14)	14 (9–20)	*P*<0.001	*P*<0.05	
Thyroxine	24 (20–27)	7 (5–10)	41 (35–47)	15 (11–21)	19 (14–26)	32 (25–41)	31 (24–41)	*P*<0.001	*P*<0.001	*P*<0.05
Levodopa	1 (0–2)	0 (0–1)	2 (0–3)	0 (0–1)	0 (0–3)	0 (0–2)	4 (2–8)	*P*<0.05	*P*<0.001	*P*<0.05
Ranitidine	40 (36–45)	46 (40–53)	34 (29–40)	36 (29–44)	36 (28–44)	42 (34–52)	50 (41–61)	*P*<0.01		
Cimetidine	31 (27–34)	36 (30–41)	25 (21–30)	19 (14–25)	36 (29–45)	33 (26–42)	38 (30–48)	*P*<0.01	*P*<0.001	
Hydroxocobalamin	3 (2–4)	3 (1–5)	3 (1–5)	2 (1–5)	1 (0–4)	5 (2–9)	4 (2–8)			*P*<0.05
Tamoxifen	6 (5–8)	0 (0–1)	12 (9–16)	4 (2–8)	5 (3–9)	7 (4–12)	9 (5–15)	*P*<0.001		

ratio recorded (0.38) would represent equality between the two sets of estimates if approximately one-third of all diabetics in this age group were on insulin. In fact, this proportion accords well with that reported by Nabarro[26] and others[27,28] for insulin-taking diabetics in the general diabetic population.

Although some of the dispartities in rates seem large, the ratios appear to rank conditions in an order which reflects the degree of clinical supervision required. The magnitude of the lifetime rates is also supported by the responses given by patients to the corresponding questions in the patient quesitonnaire — Figure 1 shows that, for those conditions where an item is available for comparison, a high proportion of the lifetime prevalence value for each condition is confirmed by patients' responses to the questionnaire. It is noted above that questionnaire responses were used only to confirm other sources of data in the derivation of prevalence rates and were not accepted as valid occurrences in their own right. The 'average' ratio of lifetime rates to MSGP4 rates over all conditions was 3.2, suggesting that the latent pool of those suffering from these conditions in the middle-aged population is about three times greater than that indicated by one-year prevalence rates.

Similar ratios of lifetime to 'current' rates have been reported in other studies. In the United States, two reports on depression[15,16] suggest lifetime to current prevalence ratios of 3.3 and 3.5, while Schatzberg[20] gives a value of 2.0 for the ratio of lifetime to one-month prevalence rates for anxiety disorders in the general population. For epilepsy, Cockerell[23] has reported lifetime rates of 20 per 1000 in a United Kingdom (UK) population, and a ratio of 4.3 for lifetime to 'active epilepsy' prevalence rates. For peptic ulcer, Kurata *et al*[24] reported a lifetime prevalence of 13.5% for men, similar to the present study, but 11.0% for women in an analysis of over 34 000 subjects in California. For gout, a recent UK study[29] gave a prevalence rate of 28.7 per 1000 for 45- to 64-year-old males, which is higher than that reported here and greatly exceeds the 12.5 per 1000 given for this age group in MSGP4. The authors concluded that they had identified a real and large increase in the prevalence of gout in England, but it seems more likely that their gout population, being extracted principally from practice computer records, belonged to a lifetime prevalence group rather than an 'active gout' group. This instance serves to highlight the fact that lifetime rates will be the statistic most readily available to the general practitioner as the entry of morbidity data onto computer gathers pace.

A further indirect validation of the present data can be made by comparing the prevalence rates for males and females with those reported in MSGP4. For the 17 diagnoses included in Figure 1, a close correspondence in sex ratios between lifetime rates and the one-year rates reported in MSGP4 was evident — only Parkinson's disease and pernicious anaemia showed major discrepancies, and these probably resulted from the small number of cases recorded for these conditions in the present study (9 and 27 respectively).

The estimates of entitlement to repeat prescription drugs (Table 4) differ from conventional prescribing rates and cannot therefore be compared directly with values available from other sources, such as PACT.[30] Being person-based rather than item- or volume-based,[31] the present estimates arguably provide a better indication of the nature of prescribing relative to morbidity than can be derived from currently available statistics. Again, the validity of the estimates can be assessed by reference to the proportion of prescriptions verified by corresponding entries in the self-completed patient questionnaires. Low values for verification were recorded for hydroxocobalamin (0.37), a drug which is frequently administered by practice staff rather than the patient, and for pilocarpine (0.50), but otherwise the proportion ranged from 0.67 for timolol to 1.00 for levodopa, with a mean of 0.81 (95% confidence interval 0.76 to 0.85). The values given in Table 4 thus appear to be realistic estimates of the entitlement ot repeat prescription drugs in the 45- to 64-year age group, and might provide a useful index for assessing variations in prescribing habits between practices.

Conclusions

From the limited possible comparisons with other sources of morbidity statistics, the present data appear to provide realistic estimates of the pool of morbidity within the community and indicate that this, on average, is about three times larger than that estimated by one-year prevalence rates. The data reported here provide a further dimension to conventional morbidity statistics and may be of value in defining the true costs to the nation of chronic clinical conditions.

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