Changes in practice morbidity between the 1970 and 1981 national morbidity surveys

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SUMMARY. The primary aim of the study was to evaluate practice differences in reported morbidity in the second and third national morbidity surveys (1970/71, 1981/82) and to discuss their cause. A secondary aim concerned the validation of trends identified from analysis of the data from the total populations in the practices. Altogether 19 practices participated in both surveys. Annual prevalences (that is, the number of patients attending the general practitioner with a condition per 1000 persons at risk) were examined for: all conditions; each of three categories of seriousness of disease; diseases aggregated by chapter of the International classification of diseases; *and each of 130 rubrics of the disease classification.*

Annual prevalence for 'all conditions' was approximately the same for males in both surveys, whereas for females there was an increase. In both sexes, annual prevalence for 'serious conditions' increased slightly and for 'trivial conditions' increased substantially. For 'intermediate conditions', there was a modest decrease in males. In the analysis at ICD *chapter level, substantial increases in prevalence occurred in infectious diseases, nervous system diseases, circulatory diseases, genitourinary diseases, musculoskeletal diseases, symptoms, signs and ill-defined conditions, injuries and poisonings. Decreases were found in blood diseases, mental disorders and digestive diseases. Among 130 individual conditions examined, increased annual prevalence was found for mumps, fungal infections, hypothyroidism, diabetes, gout, senile dementia, angina, left heart failure, catarrh, hay fever and asthma, orchitis, acne, osteoarthritis and for some symptoms. Decreases were found for iron deficiency anaemia, anxiety state, refractive errors, haemorrhoids, chronic bronchitis, functional disorders of the stomach, carbuncle and skin infections. Possible reasons for the differences are discussed; these include changes in recording quality, labelling of disease, consultation threshold, standards in medical care, environmental circumstances and in the epidemic nature of some diseases.*

The differences in morbidity established from these analyses of practice specific data were similar to those found on examination of population based data. This gives considerable support to the interpretation of the population based data in spite of the known difficulty of recruiting representative practices to national morbidity surveys.

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Introduction

THERE have been four general practice based national morbidity surveys conducted in England and Wales: in 1955/56,[1] 1970/71,[2] 1971/72[3] and 1981/82.[4] Each survey involved a total registered practice population of between 200 000 and 400 000 persons which was representative of the national population by age and sex. In the survey of 1970/71, the population was found to be representative by social class,[5] and in that of 1981/82 the population for which social data were obtained (approximately 100 000) was also representative by social class.[6]

Though the populations in these surveys were very representative by age and sex, the sampling frame for the surveys was medical practices rather than populations. When the sample of practices used to collect data was examined for its representativeness of all practices, in relation to such characteristics as practice list size, partnership size and age of doctors, there were some small differences.[3,4] It is much more difficult, however, to show that the sample of practices are representative in terms of doctors' perceptions of illness, diagnostic criteria and recording habits. Indeed, they are unlikely to be representative since the doctors who take part in major morbidity surveys are inevitably self selected.

The problem of selectivity has considerable bearing on the interpretation of all health care data based on small areas (geographical, operational or number of recording units). The problem is greatest where the variations attributable to the recorders and the recording systems are greater than those attributable to the research subjects.[7] In this paper we examine the differences in morbidity between the surveys of 1970/71 and 1981/82 (hereafter referred to as the 1970 and 1981 studies) using statistical methods which focus on the results in individual practices. A comparison of the two surveys using population based statistics has already been published.[6]

Method

The material for this study comes from the populations registered with 19 of the 49 and 44 general practices which participated in the morbidity surveys of 1970 and 1981 respectively. The main statistic reported is the annual prevalence, which is the number of patients attending the general practitioner during the course of the year with a specific condition, expressed as a rate per 1000 persons at risk. Prevalence rates for the 1970 survey were standardized to the 1981 survey population in five year age bands.

Diseases were classified using the *International classification of diseases*, eighth revision in 1970 (*ICD-8*); ninth revision in 1981 (*ICD-9*). Annual prevalence rates were compared: (1) for all conditions; (2) for each of the chapters of the disease classification (except 'Congenital disease' and 'Perinatal disorders', both of which involve very small numbers); and (3) for each of 130 morbidity rubrics which were directly comparable between the surveys.

Diseases were also categorized as serious, intermediate or trivial, based on an assessment of long-term risk associated with the condition rather than the clinical situation of individual patients. Data aggregated by these categories were compared for the two years. For those diagnoses in which there were dif-

ferences, the consolidated data was examined from all practices by age group.

The mean annual prevalence rates in the 19 practices were calculated and compared with the population based rate.

Finally, the consultation and referral rates for the individual practices were compared for the two years.

Analysis

Comparisons between the annual prevalence rates from the two surveys were made using Cochran's method[8] in which a weighting was assigned to the prevalances in each practice according to the number of registered persons. This system of weights is designed to detect small systematic differences between pairs of proportions and, in this context, gives more weight to differences found in relation to larger practices.

For prevalences analysed by *ICD* chapter and disease category, Pearson correlation coefficients were calculated comparing the mean prevalences in each of the two surveys. Values greater than 0.55 are significant at the 1% level and greater than 0.43 at the 5% level. The Wilcoxon matched pairs test was used to compare consultation and referral rates in the two surveys.

Results

The 19 practices participating in both surveys had 100 313 patients registered in 1970 and 108 652 in 1981 (Table 1). There were relatively more older people and fewer children in 1981 than in 1970. The people registered with each practice in both surveys were examined with respect to sex, age group and social class composition, and it was evident that very little demographic shift had taken place within individual practices between the two surveys.

Table 2 shows the annual prevalences for males and females for all diseases and for each of the three categories of seriousness. For each item the table shows the annual prevalence for the total population and the mean and standard deviation of prevalence for the individual practices plus the correlation coefficient between the practice prevalence in the two surveys. We also report the results of the Cochran test comparing practice prevalence for 1981 with 1970. Among males, annual prevalences for all diseases were similar in both surveys, whereas for females, prevalences in the 1981 survey were higher than those in 1970. For diseases classified as serious, there were small but significant increases for both sexes. For intermediate conditions, there was a significant decrease for males but the change in practice prevalences for females was not significant. Large increases were evident for trivial conditions: in males, annual prevalences increased in 17 practices and in females, prevalences increased in all 19 practices. The associations between the mean of the practice prevalences in the two surveys for each category and for all diseases were highly significant except for intermediate seriousness for males where a value of 0.52 did not quite reach the 1% significance level.

Analysis of annual prevalence by chapters of the *ICD* is presented for males and females (Tables 3 and 4). The tables also include the number of practices in which an absolute increase/decrease in annual prevalences occurred (irrespective of the size of change), the Pearson coefficient of association between annual prevalences for 1970 and 1981 and the probability value of the Cochran test. As an illustration, the male population based prevalence for nervous system diseases was 112 per

Table 1. Registered populations in the 19 practices by sex and age group for the 1970 and 1981 national morbidity surveys.

Age group (years)	No. (%) of males				No. (%) of females			
	1970		1981		1970		1981	
0–4	3744	*(7.8)*	3190	*(6.1)*	3514	*(6.7)*	3072	*(5.4)*
5–14	8074	*(16.9)*	7430	*(14.3)*	7685	*(14.6)*	6995	*(12.4)*
15–24	6953	*(14.5)*	8133	*(15.6)*	7390	*(14.1)*	8328	*(14.7)*
25–44	12157	*(25.4)*	14734	*(28.3)*	12746	*(24.3)*	15272	*(27.0)*
45–64	11602	*(24.3)*	11721	*(22.5)*	12515	*(23.8)*	12310	*(21.7)*
65–74	3608	*(7.5)*	4427	*(8.5)*	5020	*(9.6)*	5711	*(10.1)*
75+	1668	*(3.5)*	2380	*(4.6)*	3637	*(6.9)*	4949	*(8.7)*
Total	47806		52015		52507		56637	

Table 2. Annual prevalence (number of patients attending general practitioner with a condition per 1000 persons at risk) for all diseases for 1970 and 1981 by category of illness and patient's sex (1970 data standardized to 1981 population).

Categories of disease by patient's sex	Annual prevalence for total population		Mean (SD) of annual prevalence for individual practices ($n = 19$)		Correlation between practice rates
	1970	1981	1970	1981	
Males					
Serious	130.9	136.2	137.0 (30.9)	141.6 (30.6)*	0.78
Intermediate	379.8	353.8	383.2 (39.9)	351.2 (41.3)***	0.52
Trivial	429.9	477.5	433.3 (48.2)	477.8 (55.6)***	0.74
All diseases	632.9	634.7	639.4 (42.9)	642.3 (51.6)	0.74
Females					
Serious	145.2	153.8	151.3 (28.0)	156.4 (37.0)***	0.67
Intermediate	433.7	433.4	436.2 (46.1)	426.7 (53.1)	0.77
Trivial	544.2	615.3	544.2 (56.7)	610.4 (57.9)***	0.81
All diseases	715.2	744.9	720.3 (48.2)	747.0 (56.2)***	0.81

SD = standard deviation. n = number of practices. Cochran test on practice rates for 1981 compared with 1970: * $P<0.05$; ** $P<0.01$; *** $P<0.001$.

Table 3. Annual prevalence (number of patients attending general practitioner with a condition per 1000 persons at risk) by *ICD* chapter for males.

ICD chapter		Annual prevalence for total population		Mean of annual prevalence for individual practices ($n = 19$)		Number of practices showing increase/decrease	Correlation between practice rates
		1970	1981	1970	1981		
I	Infectious diseases	66	97	62	94***	19/0	0.69
II	Neoplasms	11	11	11	12	12/7	0.74
III	Endocrine diseases	18	21	19	21**	12/7	0.63
IV	Blood diseases	5	4	6	4***	5/14	0.26
V	Mental disorders	71	56	70	55***	2/17	0.47
VI	Nervous diseases	112	125	111	122***	14/5	0.73
VII	Circulatory diseases	61	75	65	78***	16/3	0.59
VIII	Respiratory disease	242	241	242	241	9/10	0.55
IX	Digestive diseases	90	66	93	65***	3/16	0.06
X	Genitourinary diseases	24	28	24	28***	15/4	0.35
XII	Skin diseases	108	105	107	103	8/11	0.65
XIII	Musculoskeletal diseases	85	112	88	115***	18/1	0.67
XVI	Symptoms, signs, ill defined conditions	112	138	114	132***	13/6	0.43
XVII	Injuries and poisoning	106	109	111	112*	11/8	0.74

Cochran test on practice rates for 1981 compared with 1970 * $P<0.05$; ** $P<0.01$; *** $P<0.001$.

Table 4. Annual prevalence (number of patients attending general practitioner with a condition per 1000 persons at risk) by *ICD* chapter for females.

ICD chapter		Annual prevalence for total population		Mean of annual prevalence for individual practices ($n = 19$)		Number of practices showing increase/decrease	Correlation between practice rates
		1970	1981	1970	1981		
I	Infectious diseases	65	116	61	112***	19/0	0.70
II	Neoplasms	13	16	14	17***	13/6	0.79
III	Endocrine diseases	39	40	40	39	10/9	0.63
IV	Blood diseases	21	12	24	13***	5/14	0.71
V	Mental disorders	144	111	144	106***	1/18	0.71
VI	Nervous diseases	115	145	112	137***	17/2	0.53
VII	Circulatory diseases	86	93	91	97***	9/10	0.43
VIII	Respiratory disease	242	262	242	263***	14/5	0.74
IX	Digestive diseases	90	74	93	72***	3/16	0.03
X	Genitourinary diseases	126	135	127	131***	15/4	0.78
XII	Skin diseases	120	126	121	122**	13/6	0.71
XIII	Musculoskeletal diseases	106	148	108	148***	18/1	0.70
XVI	Symptoms, signs, ill defined conditions	142	184	145	178***	14/5	0.44
XVII	Injuries and poisoning	82	102	85	103***	15/4	0.78

Cochran test on practice rates for 1981 compared with 1970 ** $P<0.01$; *** $P<0.001$.

1000 persons in 1970 compared with 125 in 1981: the mean practice prevalence were 111 per 1000 persons and 122 respectively; increased rates were observed in 14 practices and decreased rates in five, the correlation coefficient was 0.73 and the result of the Cochran test was highly significant ($Z = -6.9$, $P<0.001$). Among the 14 *ICD* chapters reported there were eight significant increases and three decreases for males and 10 increases and three decreases for females. There were three chapters in which significant increases were seen for females but not for males — neoplasms, respiratory disease and skin diseases.

In 26 of the 130 diagnoses examined individually, highly significant differences between 1970 and 1981 were found. Figure 1 shows the percentage changes in annual prevalence between 1970 and 1981 for these diagnoses. The differences were all significant (Cochran method) in one or both cases as indicated at the 1% level, except for hypothyroidism where $P<0.05$ for males. For the majority of these diagnoses, differences were similar in both sexes. Large changes were seen for: mumps (over 400% increase in both sexes), incontinence or urine (300% increase in males), refractive errors (400–600% decreases in both sexes), and pilonidal cyst and other skin infections (decreases over 200% in both sexes).

Comparisons of rates of consultations and referrals for all diseases are given in Table 5. In both males and females, the respective rates were similar in both surveys; none of the small differences reached statistical significance at the 5% level (Wilcoxon matched pairs test). Examination of the population data by age group revealed increased rates of consultations in pre-school children (0–4 years): in males the rate increased from 3.8 consultations per patient in 1970 to 5.1 in 1981 and in females from 3.4 to 4.6.

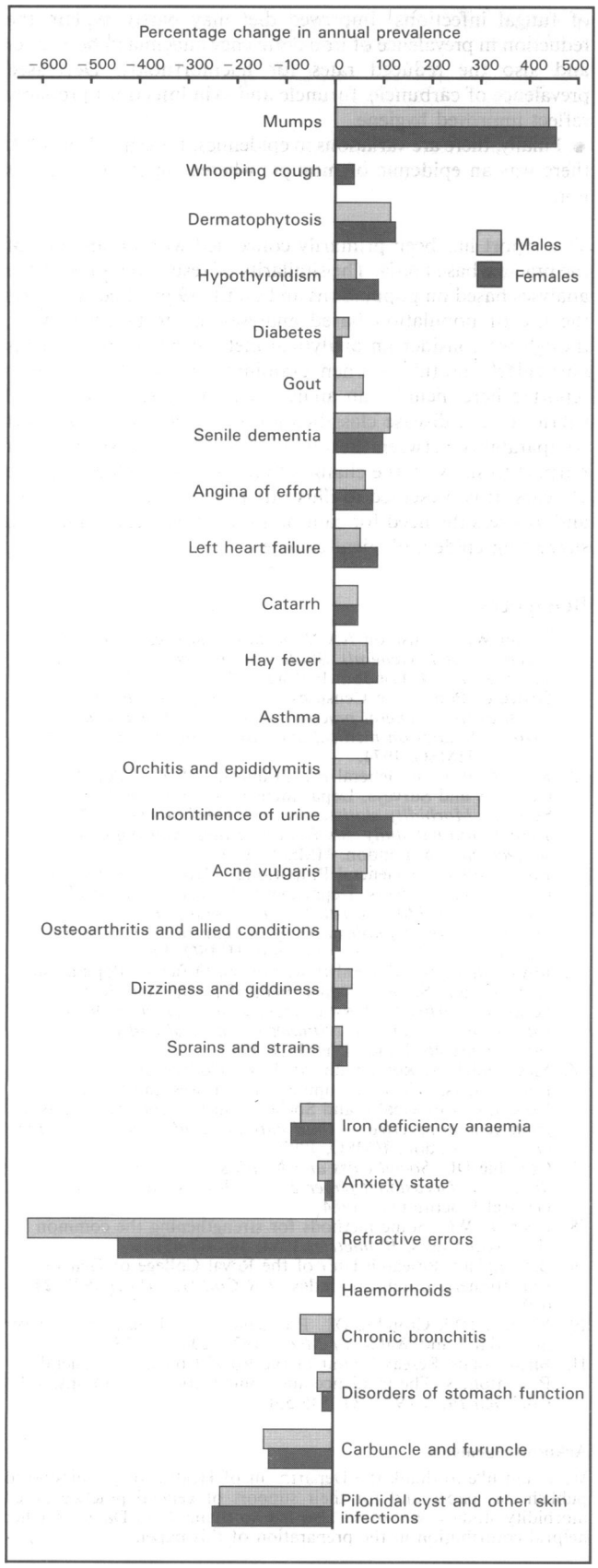

Figure 1. *Selected diagnoses in which highly significant changes occurred in annual prevalence between 1970 and 1981: bars show percentage change for males and females.*

Table 5. Mean consultation rate per person and referral rate per 100 persons (1970 data standardized to 1981 population).

	Mean of consultation rates for individual practices ($n=19$)		Mean of referral rates for individual practices ($n=19$)	
	1970	1981	1970	1981
Males	2.76	2.66	10.2	9.4
Females	3.65	3.82	12.1	12.6

Discussion

Comparison of population based and practice based analysis

The age, sex and social class compositions of the participating practices were similar in both surveys. In a limited analysis of data from three of the practices, we estimated that 52% of the population of those practices were found in both studies. The recording method was the same in both surveys.[9] Although individual doctors vary considerably in their use of diagnostic terms, practices were generally consistent from one study to another as was shown by the high values of the correlation coefficients in the chapter based data. About half of these equalled or exceeded 0.7 so that, in respect of these chapters, at least 50% of the variation in the 1981 rate is explained by factors which were evident in the equivalent rate for 1970.

By using data only from the 19 practices which participated in both surveys rather than data from all the practices in the two morbidity surveys, and by standardizing for age, we have been able to minimize the principal confounding variables, especially those associated with the use of different practices in morbidity surveys. Nevertheless it is important to appreciate those which we cannot allow for: the environment of a practice may change between surveys because, for example, a large factory has closed; the practice partnership may differ with perhaps the inclusion of a female doctor for the first time; the relative affluence (though not necessarily the social class) of a community or practice population may change because of a shift in the housing market. There are also changes which have national rather than local impact: weather conditions may differ between annual periods 11 years apart; new medical treatments are introduced which draw into medical care people who otherwise would not have consulted.

By using the data from individual practices rather than populations as the basis for making statistical comparison, we are placing a higher value on differences which occur consistently among the practices rather than on population based differences which, because of the large numbers of persons included in morbidity surveys, are more readily identifiable statistically. The population based statistics from the two surveys and some comparisons between them have been published elsewhere.[6] From the analysis reported here involving comparison of practice specific data in the two surveys, the overall impression is of a close similarity of the results to those reported above and hence of the conclusions drawn from both methods of analysis. Even for comparatively infrequent conditions (for example, gout, in which the annual prevalence in males in the two years were 3.0 and 4.9 per 1000 persons), differences were found whether analysed by population or practice. This finding gives considerable confidence in the use of practice based morbidity surveys for the recognition of change but we would stress the value of using statistical methods based on practices, which we believe to be more robust than those based on populations.

Comparison of 1970 and 1981 surveys

Differences in annual prevalence between the 1970 and 1981 studies may arise for several reasons, some of which are considered here with appropriate examples.

- Around 300 statistics were tested for significance and the study could therefore be described as a 'fishing expedition'. Although three or four differences could have been significant at the 1% level by chance many of the differences found were significant at even higher levels of significance.
- The quality of recording in the practices could have differed between the surveys, although this is an unlikely explanation for the several differences reported here because the method of recording data did not change.
- It is not uncommon for changes to occur over time in the names doctors use for illnesses; asthma is a good example. A detailed study, however, showed that the increased annual prevalence for asthma was not merely the result of changes in the use of the term.[10] A further aspect of disease labelling concerns the classification system. The analysis of the two surveys was based on different versions of *ICD*. The apparent increases in infectious diseases were partly explained by the reclassification of diarrhoea and vomiting, from symptoms, signs and ill-defined conditions in *ICD-8* to infectious diseases in *ICD-9*. Decreased rates for mental disorders were influenced by the availability of a section on social problems in *ICD-9* which was not available in *ICD-8* and consulting rates for this chapter were significantly increased in the 1981 survey.
- These data are concerned with morbidity as it presents to general practitioners and not with the total morbidity experienced in the population. The need to consult the doctor can vary with administrative changes; for example the decreased prevalence of diseases of intermediate seriousness among males probably relates to the gradual relaxation of employees' certification procedures during the 11 years between the surveys, and the decreased rates for refractive errors follow the discontinuation of the need for patients to consult the general practitioner before visiting the optician. Attitudes to illness also change patients' perceived need to consult; for example increased consultation rates among children and prevalence of diseases defined as trivial suggest changes in the threshold for consultation; increased prevalence of acne was equally evident in males and females and may demonstrate greater concern for personal appearance rather than a true change in prevalence; decreased prevalence of anxiety in the age range 15–64 years suggests an increase in consulting thresholds because doctors in 1981 were less likely than in 1970 to prescribe tranquillizers and in consequence some patients stopped consulting with anxiety related problems.
- Improvements in the quality of care lead to increased recognition of disease and this explains the increased prevalence of hypothyroidism, diabetes, angina and senile dementia. The introduction of a new drug or procedure sometimes also involves a change of emphasis from primary to secondary care or vice versa; for example decreased prevalence of digestive diseases and particularly in disorders of function of stomach probably occurred as a result of the effective treatment of peptic ulcer and related conditions by H_2 antagonists; increased prevalence of gout may be due to greater use of thiazide diuretics for hypertension in 1981 compared with 1970; decreased prevalence of iron deficiency anaemia in females may be partly due to improved management of menstrual problems.
- Changes in peoples' habits affect prevalence; for example plastic pants and synthetic footwear were in much greater use by 1981 and this fact probably explains the increased prevalence of fungal infections. Improved diet may partly explain the reduction in prevalence of iron deficiency anaemia in both sexes and also the reduced rates for haemorrhoids. Decreased prevalence of carbuncle, furuncle and skin infections probably reflect improved hygiene.
- Finally, there are variations in epidemics; for example in 1981, there was an epidemic of mumps, whereas in 1970 there was not.[11]

This report has been primarily concerned with an analysis of the practice based data. The similarity of results obtained in the analyses based on populations and on the 19 practices supports the use of population based analyses in morbidity surveys, though we consider an analytical method based on practices particularly useful — when examining trends. The material reported here includes an analysis of only a selection of 130 rubrics of the disease classification in which there was direct comparability between the surveys; thus the analysis does not purport to show all the changes that have taken place over the 11 years. It is presented to illustrate possible causes of change and to stress the need for caution in the interpretation of data suggesting epidemiological change.

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