Comorbidity of Diseases in the New General Medical Services Contract for General Practitioners: Analysis of QRESEARCH Data

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1 TABLE OF CONTENTS

2 EXECUTIVE SUMMARY

This report examines trends in comorbidity of chronic conditions in the new General Medical Services contract; and the inter-practice variation in recorded prevalence. As far as is possible or practicable, the same codes and methods as in the new GMS contract have been followed. However age and other cut offs have not been applied.

For all conditions examined here the following can be observed:

- Over the period of 10 years there has been a near doubling of the proportion of patients having 2 or more of the nGMS diagnoses, from 12% in 1994 to 23.2% in 2003.
- Of those patients contributing to nGMS analyses in 2003, two thirds (67.4%) contribute to only one disease area; and nine out of ten (89.5%) to either one or two. Only 3% contribute to 4 or more nGMS diagnoses analyses.
- The nGMS diagnoses most likely to be involved in co-morbidity are left ventricular failure, stroke, COPD, coronary heart disease and diabetes.
- Of those patients with at least two of the nGMS diagnoses, the most common combinations of two conditions is hypertension and coronary heart disease (17%), and hypertension and diabetes (17%).
- When the five "metabolic diagnoses" in the nGMS diagnoses list (diabetes, hypertension, LVF, stroke and coronary heart disease) are examined, of the population with at least one of these 70% have only one, 23% have two and 6% have three. Of these, hypertension was the most common to occur alone and hypertension and ischaemic heart disease the most common combination of two diagnoses.
- There is a substantial overlap between patients with diagnoses of asthma and COPD. One third of COPD patients also have asthma recorded. Clinically, distinguishing between the two conditions in the elderly is very difficult. However, to avoid these patients counting twice in the assessment of the GMS contract, then they would need to either have one diagnosis or the other recorded as it is not possible for someone to truly have both conditions.

3 OBJECTIVES

The objectives of this report are to report on the following:

1. The trends in % of patients who have at least one of the conditions in the new GMS contract between 1994 and 2003.
2. The percentage of patients with each condition who also have at least one other condition.
3. Of those with just two conditions, report the frequency and % of each of the common combinations.
4. Of those with the metabolic diseases (i.e. any of diabetes, stroke, hypertension, coronary heart disease, LVF), how many have one, two, three, four, five diseases and report on the commonest combinations of disease

4 BACKGROUND

The use of the term "co-morbidity" was first used in 1970[1]. Some use the term to refer to the coexistence of other diseases with an index disease (such as cardiovascular disease) [1-5]; but most use it, as we do in this report, to refer to the coexistence of diseases[5]. The prevalence of co-morbidity on this definition differs from 1% to over 50% depending on the groups of diagnoses used[6]. In one Dutch study, 78% of the elderly (aged 80 or over) with at least one chronic condition had one or more co-morbid diseases (compared to 10% in the 0-19 group) [6 7]. In another Dutch study, published in 1993, of 23,534 people in primary care, 1989 (8.5%) had one or more chronic disease; this rose to 23% in those 65 or over, with 15% having more than one[8]. In a USA study (Duke Established Populations for Epidemiologic Studies of the Elderly) the researchers found that older people with hypertension, IHD, CVA, diabetes and cancer had "substantial co-morbidity" from 47% with hypertension to 88% with stroke[9].

The importance of co-morbidity for primary care was emphasised by Barbara Starfield in her address to the North American Primary Care Research Group conference in 2000[10]. She observed that:

- In Canadian adults with hypertension, only one third of primary care consultation were for hypertension
- For adults with migraine, costs are 33% higher for non-migraine reasons than similar non-migraine population
- Children with one chronic disease are 1.5-4 times more likely to have another chronic condition compared to other children
- The link between low birth weight and IHD opens up a range of possible links between co-morbidities that haven't yet been defined

- The average adult over 60 years has two chronic conditions; 80% of females aged 65 to 85 have at least one chronic condition, 50% have more than one and 25% have three of more
- When looking at the co-occurrence of obesity, hypertension diabetes and/or hypercholesterolaemia, 75% of US adults can be regarded as "sick".

5 METHOD

5.1 Version of database used

The 4th National Version of the QRESEARCH database was used for this analysis. This database contains data until 1 August 2004 and has been described in detail in "Report 14 (October 2004)". The prevalence of conditions in the GMS contract from 4th National Version of QRESEARCH database was also described in "Report 17".

5.2 Practice inclusion criteria

In order to be included in the analysis for any given year, practices had to have complete data for that year and have been using their current EMIS computer system for the previous two years.

5.3 Patient inclusion criteria

In order to be included in the analysis, patients had to be registered on the 1st January of the relevant year and have been registered for the previous 6 months.

5.4 Case definition for each condition

Prevalent cases of each disease were defined by the presence of the relevant Read codes in their record prior to the end of the analysis period. The Read codes used have been taken from "New GMS Contract QOF Implementation Dataset and business rule set, version 5.0 release date 27.09.04".

In the new GMS contract, there are some age and treatment restrictions that have been applied to some diseases in order to select patients who are eligible for inclusion in the quality indicators. As agreed on 18 November 2004, we have reported on the prevalence according to the use of diagnostic Read codes alone. The only exception for this report is asthma where we have included patients with a diagnosis of asthma that have also had asthma treatment prescribed in the last year (which is consistent with the target population included for the new GMS). We decided to apply this treatment criteria because the prevalence of asthma without treatment is twice as high as the prevalence with treatment and this would have seriously skewed the comorbidity analysis.

6 RESULTS

6.1 Study population

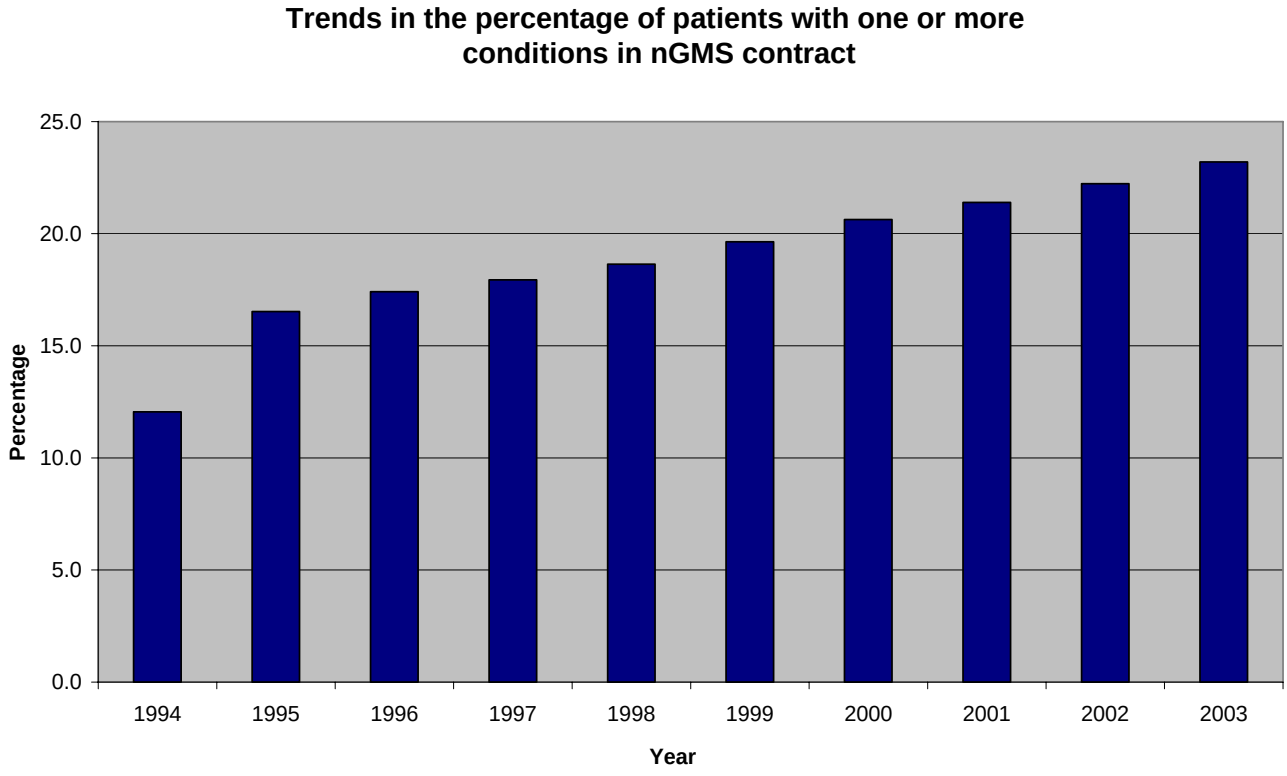
There were 71 practices that had been using EMIS for at least two years in 1994 (0.6 million patients) rising to 426 practices (2.9 million patients) in 2003. Table 1 (appendix) reports the number of patients included in each of the analysis years.

6.2 Trends in the percentage of patients with at least one condition.

The first chart shows the trends in the percentage of the registered population who have at least one condition from the new GMS contract between 1994 and 2003. The corresponding data are shown in table 1 in the appendix.

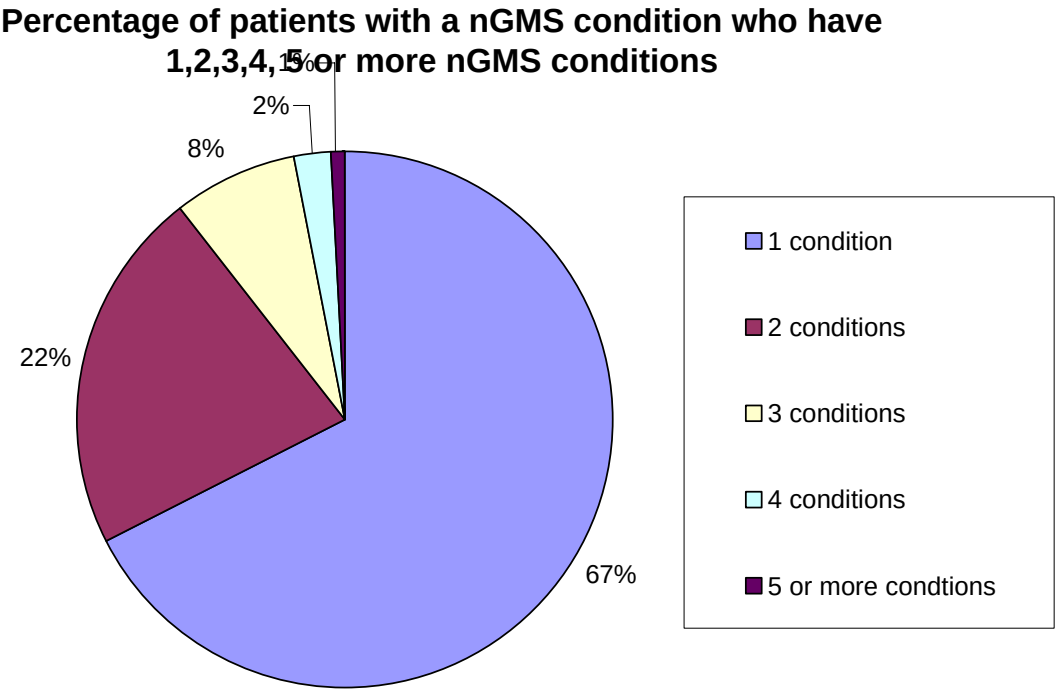
In 1994, there were 69 thousand (12.1%) patients with at least one of the new GMS conditions from a total population of 0.6 million registered patients.

In 2003, there were 0.7 million (23.2%) patients with at least one new GMS condition from a population of 2.9 million patients. The percentage of patients with at least one condition rose from 12% in 1994 to 23% in 2003 – just under a two fold increase. The reasons for increasing prevalence of conditions were discussed in Report 17.



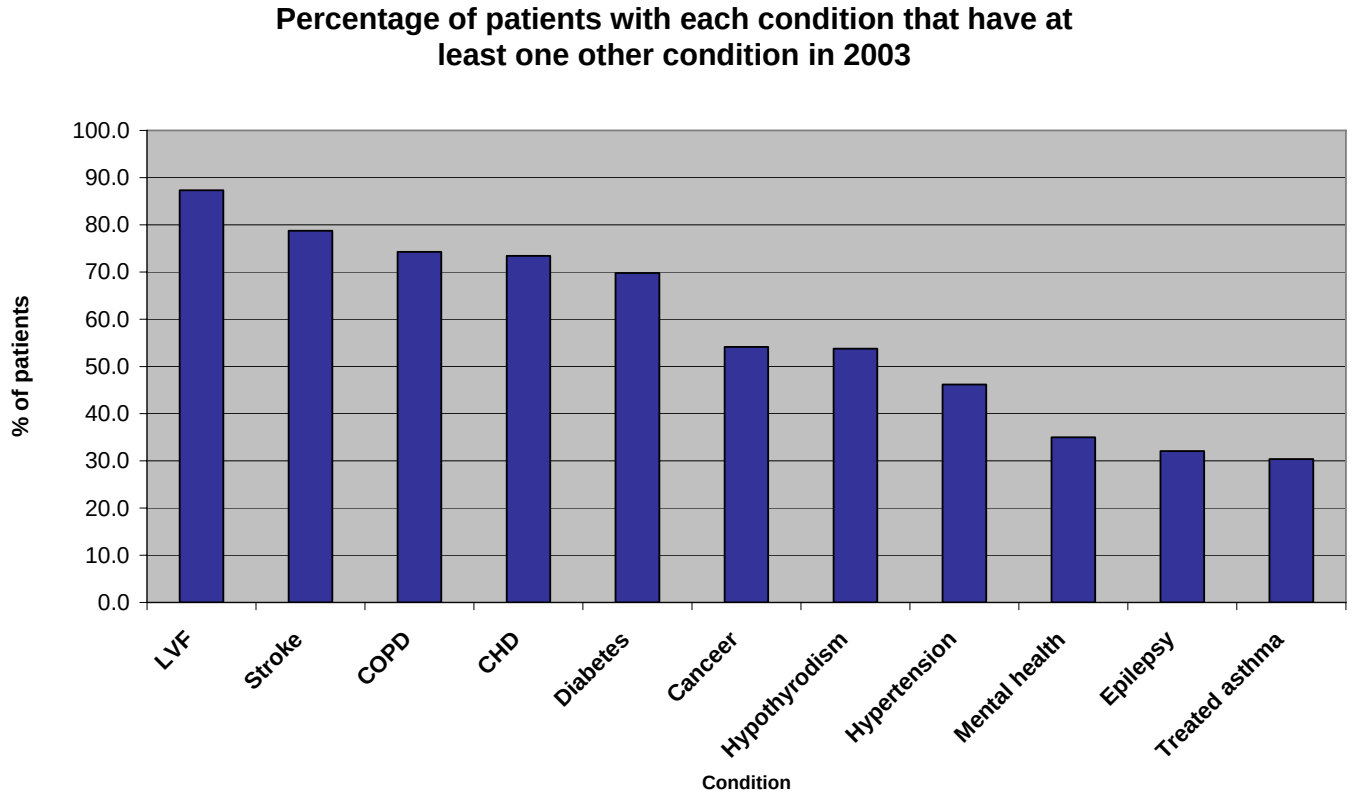
6.3 Number of conditions per patient in 2003

The following pie chart shows the percentage of the patients with a nGMS condition, registered in 2003, who have one, two, three, four or five or more conditions. The vast majority of patients (just over two thirds) have just one new GMS condition (as shown in the light blue section on the chart). This means that that they will only be contributing once to the new GMS contract points. Just under a quarter have two co-existing conditions (shown in dark red on the pie chart). Approximately 8% of patients have three conditions and only 3% have four or more conditions. The corresponding data can be found in Table 2 (appendix).



6.4 Comorbidity in patients with specific conditions

We examined patients with each condition to determine the proportion who were recorded as having one or more other conditions from the new GMS contract. The next chart shows the results for patients registered in 2003. Almost 90% of patients with heart failure had at least one other condition. Over 70% of patients with stroke, with chronic obstructive airways disease or with coronary heart disease also had another condition. Between 50 and 70% of patients with diabetes, cancer and hypothyroidism also had another condition. The corresponding data can be found in table 3 (appendix). Whilst hypertension was the most prevalent condition overall, only 46% of patients with a computer diagnosis of hypertension also had another disease. This is likely to be because hypertension is often an asymptomatic disease detected by screening of younger patients.



6.5 Combinations in patients with two conditions

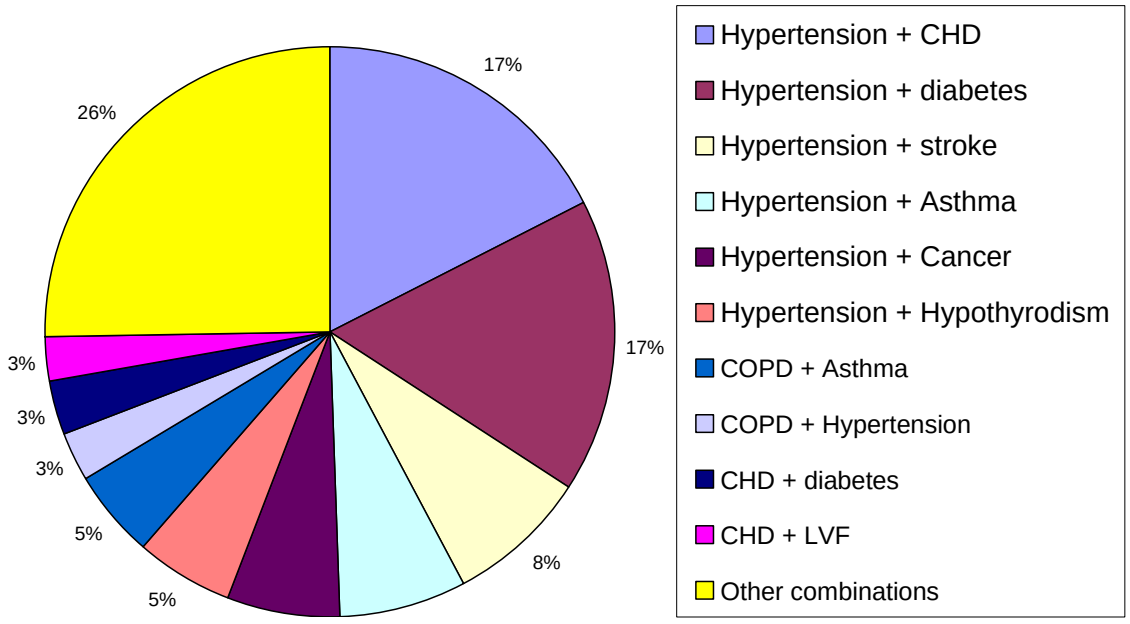
We identified 150 thousand patients in 2003 that had just two conditions recorded on their computer records. We then identified the thirty most commonly occurring combinations. These thirty combinations accounted for 95% of all patients with two conditions. The full results can be found in table 4 (appendix) which is listed with the most commonly occurring combinations at the top of the list.

We then identified the ten most common combinations which accounted for 75% of all the patients with two diseases. These data are displayed in the pie chart below. The most common combinations were:

(a) hypertension and coronary heart disease, occurring in 17%
(b) hypertension and diabetes occurring in 17%

It is notable that hypertension appeared in the seven of the top ten combinations. This is likely to be because it is the most prevalent condition in the population.

Ten most combinations of two diseases in the nGMS contract

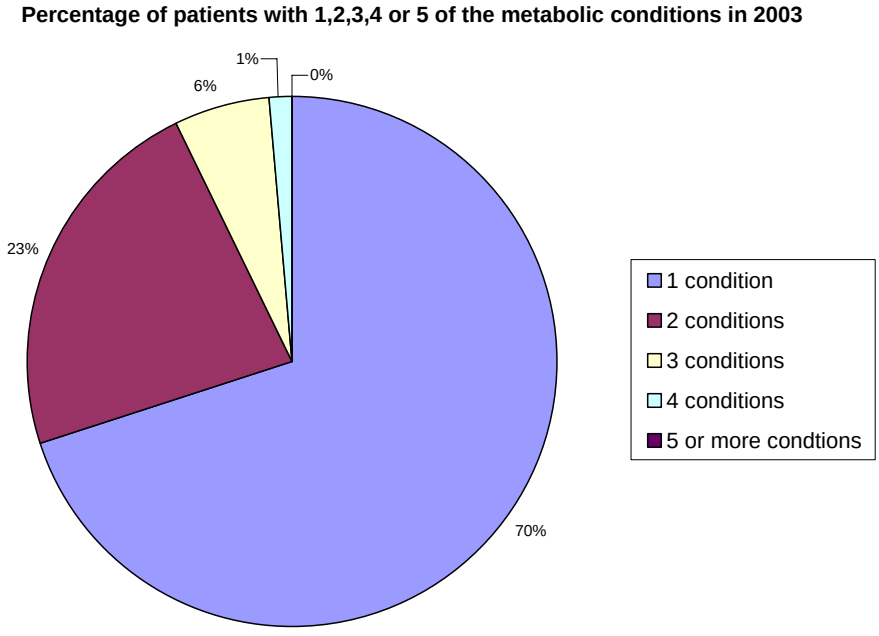


6.6 Patients with at least one of the metabolic conditions

We identified five conditions within the new GMS contract are known to be associated with one another. The conditions were diabetes, hypertension, left ventricular failure, stroke and coronary heart disease. Diabetes and hypertension, for example, are known to cause both stroke and coronary heart disease. Coronary heart disease and hypertension, as another example, are common causes of left ventricular. These conditions also overlap in the new GMS contract since some measures, such as blood pressure control and recording of smoking status, appear as quality measures for each condition. These measures, therefore, maybe recorded once for a patient but attract multiple points since the patient has multiple conditions. Conversely, failure to record and control these factors appropriately will loose points a number of times over.

We identified 466 thousand patients in 2003 (16% of the overall population of 2.9 million) who had any one of the five metabolic conditions. This subset was just over two thirds of the 680 thousand patients who had any of the 11 new GMS contract conditions in 2003.

The proportion of the 466 thousand patients with 1, 2, 3, 4, or 5 of the metabolic conditions is shown in the next pie chart. 70% of patients just had one metabolic condition. Just under a quarter had two conditions. The corresponding data are shown in table 5 in the appendix.



6.7 Combinations of the metabolic syndrome

We then determined the number of patients with each permutation of the metabolic conditions. The full results are shown in table 6 (appendix).

Of those who had just one metabolic condition, 70% had a computer recorded diagnosis of hypertension.

Of those that had a combination of two conditions, the most common combination was hypertension and coronary heart disease which occurred in just under a third of patients.

Of those that had a combination of three conditions, the most common combination was **hypertension, coronary heart disease and diabetes** which occurred in 30% of cases. The second most common combination of three diseases was **hypertension, coronary heart disease and left ventricular failure** which occurred in 20% of patients. The third combination was **hypertension, coronary heart disease and stroke**, occurring in just under 20% of cases. Together these three combinations accounted for 70% of the combinations found in people with three diseases.

Combinations of four diseases are reported in table 6 (appendix). The most common combination occurred in over a third of the 5,000 patients with four diseases. This was **hypertension, coronary heart disease, diabetes and left ventricular failure.**

6.8 Combination of asthma and COPD

We identified all patients who either had a diagnosis of asthma or COPD. In total, there were 187 thousand such patients.

Of the 155 thousand patients with asthma, there were 18 thousand (12%) who also had a recorded diagnosis of COPD. In other words, just over one in ten asthma patients also have COPD recorded.

Of the 32 thousand patients with COPD, there were 18 thousand (36%) who also had a diagnosis of asthma. In other word, a third of all COPD patients also have asthma recorded.

7 DISCUSSION

Inevitably chronic diseases will occur in the same people. As they become more common they will occur more often together. And this effect has been demonstrated in this report. The increasing prevalence of chronic disease is partly due to improved case finding and recording; however the greatest effect is the ageing of the population and improved survival in, for example, coronary heart disease and diabetes.

The issue behind the question asked was the possibility of activity in one disease area contributing to multiple diagnoses within the new GMS Quality and Outcomes Framework. We have show that one third of all patients with any of the new GMS indicators have more than one of these diagnoses. Put the other way, for two thirds of patients their recorded activity is contributing to only one new GMS indicator.

Of the fifth for whom some activity might be "counted twice", some common diseases involved do not share any indicators with the other common ones. For example, COPD and diabetes do not share any values or activities.

However there are five conditions that are broadly described as the metabolic disease – diabetes, hypertension, left ventricular failure, stroke and coronary heart disease – that commonly occur together and which have similar values recorded (especially blood pressure) in their indicators within new GMS. They would be expected, therefore, to represent the most stark cases of "double counting". However, even within this group 70% had only one diagnosis and only 7% had 3 or more.

There is a substantial overlap between patients with diagnoses of asthma and COPD. One third of COPD patients also have asthma recorded. Clinically, distinguishing between the two conditions in the elderly is very difficult. However, to avoid these patients counting twice in the assessment of the GMS contract, then they would need to either have one diagnosis or the other recorded as it is not possible for someone to truly have both conditions.

Although the problem of single data items contributing to multiple indicators has not been shown here to be a major problem except for COPD, if the trend for increasing co-morbidity with time continues – as we expect it to – the problem of single data items contributing to multiple indicators will need to be considered in the evolution of the Quality and Outcomes Framework.

8 APPENDIX

Table 1: number (%) of patients with at least one condition in the new GMS conditions, 1994 to 2003

Year	total population registered on 1st Jan and previous 6 months*	Number of patients with one or more conditions in the new GMS contract	% of total with at least one disease
1994	571,281	68,870	12.1
1995	768,102	126,937	16.5
1996	1,066,011	185,631	17.4
1997	1,268,780	227,622	17.9
1998	1,570,367	292,804	18.6
1999	1,918,571	376,879	19.6
2000	2,164,407	446,710	20.6
2001	2,360,984	505,222	21.4
2002	2,781,948	618,543	22.2
2003	2,932,780	680,531	23.2

*Version 4 QRESEARCH database. Practices had to be using EMIS for at least 2 years prior to the start of the analysis year to be included in each year

Table 2: Number of patients with one, two, three, four, five or more new GMS conditions in 2003

Number of conditions per patients	count of patients	% of total
1 condition	458,640	67.4
2 conditions	150,195	22.1
3 conditions	51,394	7.6
4 conditions	15,473	2.3
5 or more conditions	4,829	0.7
Total with at least one condition	680,531	100.0

*Version 4 QRESEARCH database. Practices had to be using EMIS for at least 2 years prior to the start of the analysis year to be included in each year

Table 3: Percentage of patients with each condition that also have at least one other condition in 2003

Disease	total number of patients with disease	total number of patients who also have at least one other disease	Row %
Left ventricular failure	35,811	31,275	87.3
Stroke	52,671	41,475	78.7
Chronic Obstructive Airways Disease	49,538	36,803	74.3
Coronary Heart Disease	118,980	87,347	73.4
Diabetes Mellitus	93,941	65,557	69.8
Cancer	59,823	32,380	54.1
Hypothyrodism	53,259	28,634	53.8
Hypertension	345,487	159,462	46.2
Mental health problems	5,411	1,893	35.0
Epilepsy	30,075	9,650	32.1
Treated asthma	155,296	47,176	30.4

*Version 4 QRESEARCH database. Practices had to be using EMIS for at least 2 years prior to the start of the analysis year to be included in each year

Table 4: Common combinations of two diseases in 150,195 patients with 2 conditions in 2003

	combination	number of patients with combination	% of all those with two diseases	Cumulative %
1	Hypertension + CHD	26,131	17.4	17.4
2	Number of conditions per patients	25,302	16.8	34.2
3	Hypertension + stroke	11,932	7.9	42.2
4	Hypertension + Asthma	10,977	7.3	49.5
5	Hypertension + Cancer	9,701	6.5	56.0
6	Hypertension + Hypothyrodism	8,245	5.5	61.4
7	COPD + Asthma	7,277	4.8	66.3
8	COPD + Hypertension	4,466	3.0	69.3
9	CHD + diabetes	4,427	2.9	72.2
10	CHD + LVF	3,823	2.5	74.8
11	LVF + stroke	3,729	2.5	77.2
12	CHD + stroke	2,653	1.8	79.0
13	CHD + cancer	1,970	1.3	80.3
14	CHD + COPD	1,880	1.3	81.6
15	Hypertension + epilepsy	1,873	1.2	82.8
16	Asthma + Hypothyrodism	1,753	1.2	84.0
17	Asthma + CHD	1,750	1.2	85.1
18	Asthma + Diabetes	1,622	1.1	86.2
19	CHD + Hypothyrodism	1,541	1.0	87.3
20	Asthma + Epilepsy	1,475	1.0	88.2
21	Hypothyrodism + cancer	1,349	0.9	89.1
22	diabetes + hypothyroidism	1,348	0.9	90.0
23	Cancer + Asthma	1,289	0.9	90.9
24	Cancer + Diabetes	1,130	0.8	91.6
25	Stroke + Diabetes	1,036	0.7	92.3
26	Cancer + Stroke	949	0.6	93.0
27	Cancer + COPD	902	0.6	93.6
28	LVF + COPD	727	0.5	94.0
29	Stroke + Epilepsy	632	0.4	94.5
30	Other combinations	8,306	5.5	100.0
	Total of all patients who have just two conditions	**150,195**	**100.0**	

*Version 4 QRESEARCH database. Practices had to be using EMIS for at least 2 years prior to the start of the analysis year to be included in each year

Table 5: Patients with 1, 2, 3, 4, or 5 of the metabolic conditions (2003) as a proportion of patients with nGMS condition

Number of metabolic conditions per patient i.e. Diabetes, hypertension, left ventricular failure, stroke or coronary heart disease	number of patients	% of total with any metabolic condition
1 condition	326,132	69.9
2 conditions	106,553	22.8
3 conditions	27,843	6.0
4 conditions	5,397	1.2
5 or more conditions	507	0.1
Total number of patients with at least one of the metabolic conditions	**466,432**	**100.0**

*Version 4 QRESEARCH database. Practices had to be using EMIS for at least 2 years prior to the start of the analysis year to be included in each year

Table 6: Number (%) of patients with combinations of 5 'metabolic' conditions

	Number of patients	% of 326,132
stroke alone	15,291	4.7
CHD alone	41,267	12.7
Diabetes alone	34,591	10.6
Hypertension alone	227,740	69.8
LVF alone	7,243	2.2
Sub total of patients with one disease	**326,132**	**100**
CHD + diabetes	5,834	5.5
Stroke + Diabetes	1,419	1.3
CHD + LVF	5,984	5.6
LVF + Diabetes	998	0.9
LVF + Stroke	1,013	1.0
CHD + stroke	3,833	3.6
Hypertension + LVF	5,694	5.3
Hypertension + stroke	15,934	15.0
Hypertension + Diabetes	31,603	29.7
Hypertension + CHD	34,241	32.1
Sub total of patients with two diseases	**106,553**	**100.0**
Hypertension + stroke + diabetes	2,923	10.5
CHD + LVF + Stroke	1,096	3.9
CHD + stroke + diabetes	660	2.4
Hypertension + CHD + LVF	5,392	19.4
Hypertension + LVF + Diabetes	1,381	5.0
Hypertension + CHD + Diabetes	8,478	30.4
Hypertension + stroke + diabetes	1,166	4.2
CHD + LVF + Diabetes	1,322	4.7
LVF + Stroke + diabetes	162	0.6
Hypertension + CHD + Stroke	5,263	18.9
sub total of patients with 3 diseases	**27,843**	**100.0**
All except LVF	1,544	28.6
All except hypertension	232	4.3
All except diabetes	1,334	24.7
All except stroke	1,993	36.9
All except CHD	294	5.4
sub total of patients with 4 diseases	**5,397**	**100.0**
Patients with all five conditions	507	

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