Prevalence and patterns of multimorbidity in Australia

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The health care system in Australia, as in many other countries, focuses on single diseases. Payment structures increasingly support single chronic diseases,[1,2] and guidelines for care usually take a single-morbidity approach.[3] This is a challenge for primary care physicians, who care for the "whole" patient, as the presence of multimorbidity has implications for managing chronic illness. It is argued that patients are more than the sum of their parts, and that, using a single-morbidity model, we fail to grasp the pattern of disease, leading to inadequate management.[4] Calls are growing for a more holistic consideration of the patient.[2,5-7]

Research into multiple morbidity first concentrated on measurement of comorbidity, defined as "the existence or occurrence of any distinct additional disease entity in a patient who has the index disease under study".[8] More recent interest is in the mix of morbidities (multimorbidity) — the "co-occurrence of two or more diseases within one person without defining an index-disease".[7] Studies have investigated the relationship of multimorbidity (often with severity scores) with quality of life,[9-11] utilisation of medical services,[12] hospitalisations and mortality.[13] Some studies use self-report surveys, and others use administrative data[12] or data from primary care records.[14]

However, the study of multimorbidity is still in its infancy. A 2005 literature review identified few articles on multimorbidity, compared with the vast literature on specific diseases.[15] This is despite the fact that multimorbidity has an estimated prevalence of 60% among 65–74-year-olds, far higher than the prevalence of each individual disease.[15]

As in any new field, there are problems in measuring multimorbidity. In particular, the number and types of disease selected and their grouping greatly affect prevalence estimates. An international literature review of published data found widely varying methods and results. Although multimorbidity was always defined as the presence of two or more diseases, the morbidities included varied widely, as did study populations, age ranges and subgroups, and denominators for prevalence estimates.[16]

There are currently no published Australian data on population prevalence of multimorbidity. There are a few reports on comorbidities of selected target diseases drawn from the National Health Survey[17]

ABSTRACT

Objectives: To estimate the prevalence and patterns of multimorbidity in a sample of patients attending general practice, in the population who attended general practice in 2005, and in the Australian population.

Design, setting and participants: Secondary analyses of data from a study of prevalence of selected conditions (a substudy of the BEACH [Bettering the Evaluation And Care of Health] program); data were provided by 305 general practitioners for 9156 patients seen in July–November 2005, based on knowledge of the patient, patient self-report, and medical records. Listed conditions were classified according to the Cumulative Illness Rating Scale morbidity domains.

Main outcome measures: Prevalence of morbidity in each domain; prevalence of specific patterns of multimorbidity (defined as presence of morbidity in two or more domains).

Results: Prevalence of multimorbidity was estimated as 37.1% of surveyed patients, 29.0% of people who attended a GP in 2005, and 25.5% of the Australian population. Prevalence and complexity (number of domains present) increased with age: 83.2% of surveyed patients aged 75 years or older had multimorbidity, 58.2% had morbidity in three or more domains, and 33.4% in four or more. Prevalence of multimorbidity did not differ between the sexes. The most common morbidity combinations were arthritis/chronic back pain + vascular disease (15.0% of sample), a psychological problem + vascular disease (10.6%) and arthritis/chronic back pain + a psychological problem (10.6%). We estimate that 10.6% of people attending a GP in 2005 and 9.3% of the population have arthritis/chronic back pain + vascular disease (±other morbidity types studied), and this group accounted for about 15.2 million Medicare-claimed general practice encounters in 2005.

Conclusions: This study provides the first insight into prevalence and patterns of multimorbidity in Australia. Knowledge of the common combinations of multimorbidity may help in planning the health services needed in the future by an ageing population with an increasing burden of multimorbidity.

but, as discussed elsewhere,[18] this is based on patient self-report, which is of questionable reliability.

A Western Australian study in the early 1990s used hospital chart review to describe "comorbidity", using the Charlson Comorbidity Index. For a subsample of patients, the patient's general practitioner at the time of admission was also asked to report (by tick box) the diseases present at that time. The authors rejected the GP survey as unreliable because GPs reported only 58% of morbidities found in hospital charts, but 20% more morbidities not matched in hospital charts.[19] It is curious that the additional GP diagnoses were judged erroneous. The project was geographically limited, involved a small selected sample, and must have relied on retrospective review of GP records.

In this study, we take a first step in the prospective measurement of the prevalence of multimorbidity in the population attending general practice in Australia and extrapolate these results to provide estimates for the Australian population.

METHODS

The data collection methods have been described elsewhere.[18] In summary, this is a secondary analysis of data from a substudy of the BEACH (Bettering the Evaluation And Care of Health) program, a continuous national study of general practice activity.[20,21] The substudy investigated prevalence of selected conditions among 9156 patients attending 305 GPs in July–November 2005. GPs were asked which of a list of morbidities were currently being managed for each patient, using their knowledge of the patient, the patient's self-report, and the medical record.

1 Classification of surveyed morbidities into Cumulative Illness Rating Scale (CIRS) domains

CIRS domain	Surveyed morbidities included in domain
Cardiac	Ischaemic heart disease, chronic heart failure
Vascular	Hypertension, peripheral vascular disease, hyperlipidaemia, other cardiovascular disease
Neurological	Cerebrovascular disease
Psychological	Depression, anxiety, insomnia, other psychological problem
Respiratory	Asthma, chronic obstructive airways disease
Musculo-skeletal	Arthritis (all types), chronic back pain
Endocrine	Diabetes (all types)
Upper gastro-intestinal	Gastro-oesophageal reflux disease
Not applicable*	Malignant neoplasm

* Malignant neoplasms are not a discrete CIRS domain. ◆

The BEACH study uses random samples of GPs, each providing data about a cluster of encounters. SAS version 9.1.3 (SAS Institute Inc, Cary, NC, USA) was used to adjust for clustering at individual GP level. The sample survey results were adjusted to provide prevalence estimates for the population attending a GP in 2005–2006, and the population of Australia, as described elsewhere.[18]

Three methods have been validated to some degree for measuring multimorbidity: the Johns Hopkins Adjusted Clinical Group case-mix system,[12] the Charlson Comorbidity Index,[22] and the Cumulative Illness Rating Scale (CIRS).[10,23,24] We chose the last as it has been validated[25] and applied in family practice.[9,10,16,24] It uses the presence of illness in each of 14 organ domains plus a measure of severity of each domain to provide an index of total chronic medical illness burden. We allocated the surveyed morbidities into these synergistic domains (ie, management of one problem is usually beneficial for management of another within the group). They fell into eight of the 14 domains. Our category "malignant neoplasms" was too broad to be allocated to a single CIRS domain, so we added it as an independent morbidity type, giving a total of nine morbidity domains (Box 1).

Respondents with more than one surveyed morbidity within a single CIRS domain were counted only once for that domain. Prevalence of illness in each CIRS morbidity domain among the sample was calculated. Multimorbidity was defined as presence of illness in two or more morbidity domains. Results are presented as estimated prevalence of each domain and of combinations of domains in the sample; estimated prevalence among patients who attended a primary care practitioner at least once in 2005–2006, after adjustment for attendance rates by age–sex category; and estimated population prevalence.[18] Estimated numbers of national encounters with patients having each multimorbidity combination were made through simple extrapolation from the crude prevalence estimate to the number of services by GPs in April 2005 – March 2006.[26]

The most common combinations of domains were first investigated for all patients with at least two morbidity domains, followed by patterns among those with three or more (a subgroup of the first analytical group), and then patterns among those with four or more (a subgroup of both previous groups). Only the 12 most common combinations of two or more morbidity types are presented here. The full results for all combinations are available at the website of the Family Medicine Research Centre (http://www.fmrc.org.au/publications/appendices/).

Ethics approval

Ethics committees of the University of Sydney and the Australian Institute of Health and Welfare approved the BEACH study and the substudy on which this analysis is based.

RESULTS

Prevalence of each morbidity domain

Among the 9156 patients surveyed, vascular problems were the most prevalent morbidity domain (31.5%), followed by arthritis/chronic back pain (26.5%), and psychological problems (24.7%) (Box 2). The interpretation of these results is that, for example, 31.5% of GP encounters are with patients who have at least one of the listed vascular conditions.

Because older people have more chronic diseases and attend GPs more often, adjustment of results to the total population attending general practice resulted in a decrease in estimated prevalence of all morbidity domains. For example, we estimate that 24.6% of patients who attended a GP once in 2005–2006 have a vascular disease currently being managed (Box 2).

Prevalence of multimorbidity

Of the 9156 patients, 39.6% had no illness in any of the morbidity domains, and 23.3% had illness in only one domain. The remaining 3398 (37.1%) were classed as having multimorbidity. Almost two-thirds (61.5%) of patients with illness in at least one of the morbidity domains had multimorbidity, by far the most having illness in two or three domains. However, 10.1% of the sample had illness in four or more domains, and 1.8% in six or more. Adjusted results suggested that 29.0% of the population who attend general practice, and 25.5% of the population overall, have multimorbidity as measured in this study (Box 3).

There was no difference in prevalence of multimorbidity between male and female patients (Box 4). Prevalence increased steadily with age, from 2.6% among the sampled people younger than 25 years to almost half of those aged 45–64 years, three-quarters of those aged 65–74 years, and four out of five of those aged 75 years or older (Box 4). Likelihood of increased numbers of morbidity domains also steadily increased with age, with 0.6% of patients younger than 25 years having three or more morbidity domains, compared with 58.2% of those aged 75 years or older having three or more, and 33.4% having four or more domains.

After adjustment, 19.3% of patients who attend general practice had multimorbidity involving vascular disease, 16.6% involving arthritis and/or chronic back pain, and 14.8% involving a psychological problem (Box 2). The patients most likely to have multimorbidity were those with cardiac disease (ratio of adjusted prevalence of multimorbidity to morbidity, 98.6% [7.0%/7.1%]) and those with cerebrovascular disease (91.7%). Those least likely had asthma/chronic obstructive airways disease (59.8%) or a psychological problem (67.0%).

Common multimorbidity combinations

Box 5 shows the 12 most common combinations of two morbidity domains for all patients with multimorbidity.

The most prevalent morbidity combination was arthritis/chronic back pain + vascular disease (15.0% of the sample), followed by psychological problem + vascular disease and arthritis/back pain + psychological problem (both 10.6%) (Box 5). The most common combinations among those with morbidity in three or more domains were arthritis/back pain + vascular disease + psychological problem (6.1%) and arthritis/back pain + vascular disease +

2 Prevalence of morbidity in each CIRS domain and multimorbidity arising from that domain

Morbidity domain[‡]	No.	Prevalence in sample* (95% CI) (n = 9156)				Prevalence in GP patient population[†] (95% CI) (n = 17 468 583)			
		Morbidity	Multimorbidity arising in each domain			Morbidity	Multimorbidity arising in each domain		
			2 or more	3 or more	4 or more		2 or more	3 or more	4 or more
Vascular	2880	31.5% (29.6%–33.3%)	25.8% (24.0%–27.5%)	16.9% (15.4%–18.4%)	9.1% (8.1%–10.2%)	24.6% (23.1%–26.2%)	19.3% (17.9%–20.7%)	12.1% (10.9%–13.2%)	6.3% (5.6%–7.1%)
Musculo-skeletal[§]	2425	26.5% (24.7%–28.3%)	22.5% (20.8%–24.3%)	15.3% (13.8%–16.7%)	8.4% (7.3%–9.4%)	20.4% (18.9%–21.9%)	16.6% (15.2%–18.1%)	10.7% (9.6%–11.8%)	5.7% (4.9%–6.4%)
Psych	2261	24.7% (23.1%–26.3%)	18.0% (16.5%–19.5%)	11.7% (10.5%–12.9%)	6.3% (5.5%–7.2%)	22.1% (20.5%–23.6%)	14.8% (13.4%–16.1%)	8.8% (7.8%–9.7%)	4.5% (3.9%–5.1%)
Asthma/ COAD	1256	13.7% (12.7%–14.7%)	9.5% (8.7%–10.4%)	6.7% (6.0%–7.5%)	4.5% (3.9%–5.2%)	12.7% (11.7%–13.8%)	7.6% (6.9%–8.4%)	4.9% (4.3%–5.6%)	3.2% (2.7%–3.7%)
GORD	1204	13.1% (11.9%–14.4%)	11.9% (10.6%–13.1%)	9.2% (8.1%–10.4%)	5.9% (5.0%–6.7%)	10.4% (9.4%–11.5%)	9.1% (8.1%–10.1%)	6.7% (5.9%–7.6%)	4.1% (3.4%–4.7%)
Cardiac	977	10.7% (9.6%–11.7%)	10.4% (9.4%–11.5%)	8.6% (7.6%–9.6%)	5.8% (5.0%–6.6%)	7.1% (6.4%–7.9%)	7.0% (6.2%–7.7%)	5.6% (5.0%–6.3%)	3.8% (3.2%–4.3%)
Diabetes	756	8.3% (7.5%–9.0%)	7.7% (7.0%–8.5%)	5.9% (5.2%–6.6%)	3.9% (3.3%–4.4%)	6.6% (6.0%–7.3%)	6.1% (5.5%–6.7%)	4.5% (3.9%–5.0%)	2.8% (2.4%–3.3%)
CVD	343	3.7% (3.0%–4.5%)	3.5% (2.8%–4.2%)	3.1% (2.4%–3.7%)	2.3% (1.8%–2.8%)	2.4% (1.9%–2.9%)	2.2% (1.8%–2.7%)	1.9% (1.5%–2.3%)	1.5% (1.1%–1.8%)
Malignant neoplasms	280	3.1% (2.6%–3.6%)	2.6% (2.1%–3.0%)	1.8% (1.4%–2.3%)	1.2% (0.9%–1.5%)	2.3% (1.9%–2.7%)	1.8% (1.5%–2.2%)	1.2% (0.9%–1.5%)	0.8% (0.6%–1.0%)

CIRS = Cumulative Illness Rating Scale. GP = general practice. Psych = psychological problem. COAD = chronic obstructive airways disease. GORD = gastro-oesophageal reflux disease. CVD = cerebrovascular disease.
* Equates to estimated prevalence among patients in GP waiting room. † Estimated prevalence among patients who visited a GP at least once in a year.
‡ Where domain included one or two surveyed morbidities, the morbidities are specified. § Arthritis/chronic back pain. ◆

3 Distribution of multimorbidity currently under management

No. of morbidity domains	No.	Crude per cent of sample* (95% CI) (n = 9156)	Estimated prevalence (95% CI)	
			GP patient population[†]	Australian population[‡]
0	3624	39.6% (37.6%–41.6%)	46.9% (44.9%–48.9%)	53.2%
1	2134	23.3% (22.3%–24.4%)	24.2% (23.0%–25.3%)	21.3% (20.3%–22.2%)
Multimorbidity	3398	37.1%	29.0%	25.5%
2	1499	16.4% (15.4%–17.3%)	14.0% (13.1%–14.9%)	12.3% (11.5%–13.1%)
3	971	10.6% (9.7%–11.5%)	8.0% (7.2%–8.7%)	7.0% (6.4%–7.7%)
4	513	5.6% (5.0%–6.2%)	4.0% (3.5%–4.4%)	3.5% (3.1%–3.9%)
5	254	2.8% (2.3%–3.2%)	1.9% (1.6%–2.2%)	1.7% (1.4%–2.0%)
6	113	1.2% (0.9%–1.5%)	0.8% (0.6%–1.0%)	0.7% (0.5%–0.9%)
7	41	0.4% (0.3%–0.6%)	0.3% (0.2%–0.4%)	0.3% (0.1%–0.4%)
8	7	0.1% (0–0.1%)	0.0% (0–0.1%)	0.0% (0–0.1%)
9	0	0	0	0

GP = general practice. * Equates to estimated prevalence among patients in GP waiting room. † Estimated prevalence among patients who visited a GP at least once in 2005–2006. ‡ Estimated prevalence among the Australian population. ◆

gastro-oesophageal reflux disease (GORD) (5.3%). The most common combinations among those with morbidity in four or more domains were arthritis/back pain + vascular disease + GORD + psychological problem (2.6%) and arthritis/back pain + vascular disease + GORD + cardiac problem (2.2%) (Appendix, *Multimorbidity*, http://www.fmrc.org.au/publications/appendices/).

In Box 5, Column 4 shows the estimated number of Medicare-claimed encounters nationally in 2005–2006 with patients who have each multimorbidity combination (although some have additional morbidity domains). The adjusted estimate of the proportion of people attending a GP at least once in the study year who have each combination of diseases (± other morbidity domains) is provided in Column 5, and the adjusted estimate for the total population in Column 6. For example, 10.6% of the patients attending GPs in 2005–2006, and 9.3% of the community as a whole (about 1.8 million people) have arthritis/chronic back pain + vascular disease (± other morbidity domains), and this group of people accounted for an estimated 15.2 million general practice Medicare-claimed encounters in 2005–2006.

Columns 7 and 8 indicate the likelihood of more complex morbidity among people in the population with the listed combinations. For example, of the estimated 9.3% of the population who have arthritis/chronic back pain + vascular disease, 31.2% have morbidity in one other studied domain, and 48.2% have morbidity in two or more other domains. Disease complexity was greatest for those with arthritis/chronic back pain + cardiac disease, 21.6% of whom had morbidity in one other domain, and 72.2% in two or more other domains. (More detailed results for specific combinations are available in Appendix, *Multimorbidity*, http://www.fmrc.org.au/publications/appendices/.)

DISCUSSION

This study has given a first insight into the prevalence of multimorbidity in Australia. It suggests that about three in 10 people who

4 Prevalence of levels of mulitmorbidity, by patient characteristics

Patient characteristic	No. in sample*	Prevalence of CIRS morbidity domains among the sample (95% CI)[†]			
		1 or more	2 or more	3 or more	4 or more
Sex[‡]					
Male	3581	60.3% (57.7%–62.9%)	36.4% (33.7%–39.1%)	20.1% (17.8%–22.3%)	10.1% (8.5%–11.6%)
Female	5522	60.5% (58.4%–62.6%)	37.5% (35.2%–39.9%)	21.1% (19.3%–22.9%)	10.1% (8.9%–11.4%)
Age (years)[‡]					
< 25	2047	20.2% (18.1%–22.3%)	2.6% (1.9%–3.4%)	0.6% (0.3%–0.9%)	0.2% (0–0.4%)
25–44	2281	43.9% (41.3%–46.5%)	14.7% (12.8%–16.6%)	3.9% (2.9%–4.8%)	1.1% (0.6%–1.6%)
45–64	2450	76.9% (74.7%–79.1%)	46.5% (43.6%–49.5%)	22.7% (20.4%–24.9%)	9.1% (7.6%–10.6%)
65–74	990	92.3% (90.5%–94.2%)	74.6% (71.3%–78.0%)	46.0% (42.2%–49.8%)	22.6% (19.5%–25.7%)
75 +	1343	96.2% (95.1%–97.3%)	83.2% (80.9%–85.6%)	58.2% (54.5%–61.9%)	33.4% (29.9%–36.8%)

CIRS = Cumulative Illness Rating Scale. * Denominator for prevalence. † Estimated prevalence among patients in general practice waiting room. ‡ Data were missing for sex of 53 patients and age of 45. ◆

attend general practice, and one in four Australians overall, have multimorbidity as defined in this study. This aligns with overseas estimates of 30% in Quebec, Canada, and the Netherlands.[14] Extrapolation suggests that over 5 million Australians are currently being managed for diagnosed diseases from at least two of the morbidity domains.

Our finding that prevalence and complexity do not differ by sex but are highly age-related are consistent with the results of other studies.[14] However, our prevalence estimates for older patients (75% for 65–74-year-olds and 83% for those aged 75 years or over) are higher than those from Quebec in 1999 (63.4%),[15] the Netherlands in 1990 (> 60%) and the United States in 1999 (ranging from 54% among 65–70-year-olds to 73% in those aged 80 years or more).[16] All studies used different methods to measure multimorbidity, raising further questions rather than providing answers.

Our study has the limitations reported elsewhere in the adjustment processes used to account for higher chance of selection associated with higher morbidity independent of age and sex of patient.[18] In addition, it includes only diagnosed morbidities currently under management and cannot consider morbidities not yet diagnosed. Further, it includes a limited number of morbidities, selected because they are National Health Priorities or because of their high frequency of management in general practice.[18] However, together these morbidities account for about 80% of all occasions of chronic disease[27] management in general practice in Australia (unpublished BEACH data), and this is the only approach possible given the cross-sectional patient sampling processes. Surveyed patients with none of the listed morbidities may have other,

unlisted, chronic diseases, and patients who had one of the morbidity domains plus other chronic diseases not studied would be classed as not having multimorbidity. We therefore cannot conclude that 29% of the population has multimorbidity, but we can conclude that this proportion has multimorbidity as defined in this study.

Obesity was not included in the study, as it did not fulfil the inclusion criteria at the time. However, in 2005–2006, 22% of patients attending a GP were classified as obese (through self-reported height and weight),[28] about the same prevalence as, for example, arthritis (22.8%).[18] As obesity has now been added to the National Health Priorities, it should be included in future studies. Other morbidities that could be considered for inclusion are renal impairment, osteoporosis and other musculoskeletal conditions, and their inclusion would certainly raise prevalence estimates for multimorbidity. We believe the next study should be structured on the basis of the CIRS domains and include tick boxes for each of the more commonly managed morbidities in general practice, as well as other individual morbidities within each domain relevant to government health policy. Ideally, severity should be assessed with multimorbidity, but would require a separate study as this would be too demanding for BEACH participants in the confines of the GP–patient encounter.

Underlying these limitations is the lack of an internationally accepted standard for measuring multimorbidity. A clear conceptual framework must be developed that includes a consistent approach to measurement of multimorbidity and age categorisation in the study population to allow comparison between studies and populations.[29]

Some suggest that, if we are to deal with an increasing prevalence of multimorbidity in an ageing population, we need to know about disease combinations so we can design best practice guidelines for clinicians.[5] They also note that continuing to combine care plans will increase polypharmacy and the chance of adverse drug events.[5] Some multimorbidity combinations are particularly problematic for both patient and clinician. For example, combinations of cardiac and respiratory system morbidity have a particularly strong synergistic negative effect.[10] The common combination of musculoskeletal morbidity with vascular and upper gastrointestinal problems may result in a non-steroidal anti-inflammatory agent increasing the mortality of the other two morbidities, particularly in older patients.[30] These issues are often not considered in guidelines for individual conditions.

Governments are currently considering the structure and function of the Australian health care system. Our study, although only a first step in measuring prevalence of multimorbidity, may help inform planning of health services of the future.

5 Prevalence estimates for the 12 most common combinations of two or more CIRS morbidity domains

Combination of morbidity domains	No. of patients	Crude rate (95% CI)* (n = 9156)	Estimated national encounters pa (millions)	Estimated prevalence (95% CI)		Proportion of national estimate (95% CI)	
				GP patient population (n = 17 384 208)†	National population‡	With 1 more morbidity	With ≥ 2 more morbidities
Arthritis/chronic back pain + vascular	1377	15.0% (13.6%–16.4%)	15.20	10.6% (9.5%–11.6%)	9.3% (8.4%–10.2%)	31.2% (28.6%–33.9%)	48.2% (44.9%–51.5%)
Psych + vascular	972	10.6% (9.6%–11.7%)	10.73	8.2% (7.3%–9.1%)	7.2% (6.4%–8.0%)	31.2% (28.1%–34.4%)	48.9% (45.0%–52.7%)
Arthritis/chronic back pain + psych	969	10.6% (9.5%–11.7%)	10.70	8.2% (7.2%–9.1%)	7.2% (6.4%–8.0%)	30.6% (27.3%–33.9%)	45.5% (41.6%–49.4%)
Cardiac + vascular	783	8.6% (7.7%–9.5%)	8.65	5.8% (5.1%–6.4%)	5.1% (4.5%–5.7%)	25.0% (21.6%–28.4%)	60.4% (55.7%–65.0%)
GORD + vascular	724	7.9% (6.9%–8.9%)	8.00	5.7% (5.0%–6.4%)	5.0% (4.4%–5.6%)	25.1% (21.6%–28.5%)	63.7% (59.5%–67.8%)
Arthritis/chronic back pain + GORD	698	7.6% (6.6%–8.6%)	7.71	5.5% (4.7%–6.2%)	4.8% (4.1%–5.5%)	27.9% (24.3%–31.6%)	62.5% (58.5%–66.5%)
Diabetes + vascular	588	6.4% (5.7%–7.1%)	6.49	5.0% (4.5%–5.6%)	4.4% (3.9%–4.9%)	26.5% (22.4%–30.6%)	53.2% (48.4%–57.9%)
Arthritis/chronic back pain + cardiac	574	6.3% (5.5%–7.0%)	6.34	3.9% (3.4%–4.4%)	3.5% (3.0%–3.9%)	21.6% (17.7%–25.5%)	72.2% (67.6%–76.8%)
GORD + psych	520	5.7% (4.9%–6.5%)	5.74	4.5% (3.8%–5.2%)	4.0% (3.4%–4.5%)	24.9% (20.6%–29.1%)	59.3% (54.2%–64.3%)
Asthma/COAD + vascular	514	5.6% (5.0%–6.3%)	5.69	4.1% (3.6%–4.6%)	3.6% (3.2%–4.1%)	20.0% (15.7%–24.2%)	66.9% (61.9%–71.9%)
Arthritis/chronic back pain + asthma/COAD	487	5.3% (4.7%–6.0%)	5.38	3.9% (3.3%–4.4%)	3.4% (2.9%–3.8%)	21.1% (17.0%–25.3%)	66.1% (61.1%–71.1%)
Asthma/COAD + psych	440	4.8% (4.2%–5.4%)	4.86	4.0% (3.4%–4.5%)	3.5% (3.0%–4.0%)	21.8% (17.0%–26.6%)	50.1% (44.4%–55.8%)

CIRS = Cumulative Illness Rating Scale. pa = per annum. GP = general practice. Psych = psychological problem. GORD = gastro-oesophageal reflux disease. COAD = chronic obstructive airways disease.
* Estimated prevalence among patients in GP waiting room. † Estimated prevalence among patients who visited a GP at least once in a year.
‡ Estimated prevalence among the Australian population of 19 855 290 (2006 census). ◆

COMPETING INTERESTS

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