

# Analysis of BEACH general practitioner encounter data to examine the potential health effects of the mining industry and other exposures in Singleton, Muswellbrook and Denman

## Introduction

The Singleton Shire Healthy Environment Group (SSHEG) identified a number of local health concerns in their letter to the NSW Chief Health Officer, dated 4 May 2010.

In response, a report published by the NSW Department of Health provided an analysis of data comparing health outcomes for the communities concerned with other parts of NSW. The analysis examined patterns of NSW emergency department presentations and hospital admissions, as well as mortality, cancer incidence and self-reported health survey data<sup>1</sup>. A subsequent review of Cancer and Birth Defects Register data was conducted, which provided reassuring results.

However, there remained a need to access primary care (general practice) data to determine whether there were any indications of excessive or unusual patterns of illness in the communities of interest which did not require emergency department presentation or hospitalisation. This report provides the results from this analysis of primary care (general practice encounter) data.

The current report used data from the Bettering the Evaluation and Care of Health (BEACH) program to examine potential community health effects at general practice level<sup>2</sup>. The BEACH program collects data from approximately 1,000 General Practitioners (GPs) randomly selected from across Australia each year. Each GP contributes details of 100 consecutive patient encounters including the problems managed and treatment provided. Additional health behaviour data are collected on a sample of these encounters.

Problems managed are classified using the International Classification of Primary Care, version 2 (ICPC-2). This classification system groups health problems into problem chapters and components, and medications into groups and sub groups.

## Research questions for BEACH (general practice) analysis

- 1) Is there a difference in the type of health problems managed by GPs in residents of the potentially mining industry-affected postcodes of Singleton, Muswellbrook and Denman compared to health problems managed by GPs in residents of all other non-metropolitan NSW postcodes between 1998-2004 and 2005-2010 inclusive, or both time periods combined?
- 2) Is there a difference in the type of health problems managed by GPs for residents of Singleton, Muswellbrook and Denman between 1998-2004 and 2005-2010?

## Methods

NSW Health obtained BEACH data for the complete period 1998 – 2010 and for each of the 6 year periods 1998-2004 and 2005-2010 separately, for patients residing in:

- 1) The regions of Singleton (postcode 2330), Muswellbrook (postcode 2333) and Denman (postcode 2328) combined (called the Hunter region for the purposes of this report), and
- 2) All other non-metropolitan NSW postcodes combined (excluding the Hunter region).

For each of the three time periods, the analyses included a crude analysis (which included adjustment for clustering at GP level) and a more completely adjusted (weighted) analysis which included individual-level adjustment for:

- Patient age and sex (where age was split into three categories: 0-14, 15-64, 65 years and older)
- Patient's Health Care Card status (as a proxy for socio-economic status; this did not include veterans card status)
- Season of encounter date (using four season categories).

The adjustment used all other non-metropolitan NSW postcodes (excluding Singleton, Muswellbrook and Denman) as the reference population for the individual-level adjustment. Non-metropolitan NSW was defined using the Australian Standard Geographic Classification (ARIA+) system of the Australian Bureau of Statistics (2001). The postcodes used were the 2006 postcode boundaries of patient residence.

All direct (face-to-face) GP (not practice nurse) encounters, for both new and existing/chronic problems, were included in the analysis. The analysis examined the problems managed as diagnosed by the GP, presented as a rate per 100 encounters with 95% confidence intervals (CI), for all conditions and diagnostic chapter headings. The analysis also examined the medications prescribed or supplied by the GP per 100 problems managed, with 95% CI, presented by medication group and subgroup for all problems managed.

Data on conditions and problems managed are presented as a rate per 100 encounters. Data on medications prescribed or supplied are presented per 100 problems managed, as more than one problem could be managed per encounter, and the number of problems managed per encounter increased over time.

At the request of the NSW Chief Health Officer's Expert Advisory Group (EAG), the codes included in the overall asthma and chronic obstructive pulmonary disease (COPD) groups were expanded and these two problem groups then re-considered. The expanded group of asthma codes included asthma, asthmatic bronchitis, allergic bronchitis, status asthmaticus, wheezy bronchitis and hyperactive airways. The expanded group of codes for COPD included smokers lung, chronic bronchitis, chronic obstructive airways disease, COPD, chronic obstructive lung disease, emphysema, chronic airways limitation and chronic airways disease.

In order to identify differences of potential interest, two major calculations were performed for each results table. Differences between the Hunter region and non-metropolitan NSW data were considered significantly different (significantly higher or lower) when there was no overlap of the 95% CIs between the regions. When there was not a significant difference (the CIs overlapped) but the Hunter point estimate for the rate was outside the upper or lower 95% confidence interval for the comparison region, the difference was reported as higher or lower.

Spearman's rank correlation test was used to detect differences in the ranking of problems managed and medication prescription rates between the weighted Hunter data and the comparison NSW non-metropolitan data. A  $p < 0.05$  was used to indicate that there was no significant difference in the ranking of the problems managed or medications prescribed in the two groups.

The number of different GPs and general practices in the Hunter region that contributed BEACH data during 1998-2010 was examined, as was the proportion of encounters provided by each participating GP.

Individual-level smoking status was not available for all GP encounters, and therefore could not be used to adjust the results at an individual level. Instead, the sub-sample of BEACH encounters with smoking status information (approximately 30%) was used to estimate the prevalence of current, previous and never smoked status. The smoking prevalence was estimated for patients who lived in the two areas of interest (the Hunter region and the rest of non-metropolitan NSW) for the two time periods of interest and the combined time period (1998-2010). We also obtained the current, previous and never smoked prevalence for adults (aged 16 years and older) in the Hunter region and the rest of non-metropolitan NSW from the NSW population health survey for the periods 1998-2003 and 2004-2009, and for the combined period.

## Results

**Table 1. Patient characteristics**

Patient variable		Hunter unweighted April 1998-July 2010 n=2286		Non-metro NSW excl Hunter April 1998-July 2010 n=89 614	
		Percent of encounters		Percent of encounters	
Sex	Female	63.2		58.4	
	Male	36.4		41.1	
	Missing	0.4		0.6	
Age group	0-15	14.5		11.3	
	15-64	61.6		57.1	
	65+	23.3		30.9	
	Missing	0.6		0.8	
Health Care Card	HCC holder	35.4		48.7	
	Non HCC holder	53.8		44.7	
	Missing	10.8		6.7	
Season	Jan-Mar	25.6		24.3	
	Apr-Jun	29.6		27.8	
	Jul-Sep	15.9		26.0	
	Oct-Dec	28.8		21.9	
	Missing	0.0		0.0	
		<b>Hunter</b>		<b>Non-metro NSW excl Hunter</b>	
		unweighted	weighted	unweighted	
Total encounters		2286	2254	89 614	
Total problems managed		3448	3460	140 645	

The unweighted Hunter sample had a higher proportion of females and patients in the 0-15 and 15-64 year age groups. There were fewer Health Care Card holders, fewer encounters in the July–September quarter and more encounters in the October-December quarter.

Hunter data included in Tables 2-5 has therefore been weighted for patient age, sex, Health Care Card status and season of encounter using the rest of non-metropolitan NSW as the reference population.

**Table 2. Rate of problems managed per 100 encounters and rank by ICPC-2 problem chapter**

Problem managed	Hunter Weighted data, April 1998-July 2010 Problems=3460, encounters=2254				Non-metro NSW excl Hunter Raw data, April 1998-July 2010 Problems=140645, encounters=89614			
	Rate per 100 encounters	95% LCL	95% UCL	Rank order	Rate per 100 encounters	95% LCL	95% UCL	Rank order
Musculoskeletal	21.3	18.7	23.9	1	19.2	18.7	19.6	2
Circulatory	19.2	16.6	21.7	2	20.0	19.3	20.6	1
Respiratory	17.8	14.7	20.9	3	19.2	18.6	19.7	3
Skin	15.1	12.8	17.5	4	17.9	17.4	18.5	4
General & unspecified	13.6	9.9	17.3	5	16.1	15.5	16.6	5
Endocrine & metabolic	12.6	9	16.2	6	12.3	11.9	12.7	6
Psychological	11.7	9.3	14.1	7	12.0	11.5	12.5	7
Digestive	10.7	8.7	12.7	8	10.6	10.3	10.9	8
Female genital system	7.8	5	10.6	9	6.7	6.3	7.1	9
Pregnancy/family planning	6.7	4.1	9.2	10	5.0	4.6	5.3	10
Neurological	4.8	3	6.6	11	4.0	3.9	4.2	11
Ear	3.7	2.7	4.6	12	3.9	3.8	4.1	12
Urology	2.8	2	3.7	13	3.3	3.1	3.4	13
Blood	2.2	1.1	3.3	14	2.4	2.3	2.5	14
Eye	1.9	1.3	2.4	15	1.8	1.7	1.9	15
Male genital system	1.5	0.8	2.1	16	1.8	1.7	1.9	16
Social	0.4	0.1	0.6	17	0.8	0.8	0.9	17

Spearman's rho=0.998 (p for rejecting independent rank<0.0001) – this indicates no significant difference in the ranking of problems between the Hunter and the rest of non-metropolitan NSW.

**Legend**

Hunter significantly higher
Hunter higher
Hunter lower
Hunter significantly lower

No problems (grouped by chapter) were managed at significantly higher rates in the Hunter region.

Rates were higher for Musculoskeletal, Female genital system, Pregnancy and family planning, and Neurological chapters.

Rates were lower for Circulatory, Respiratory, Skin, General and unspecified, Ear, Urology, Blood and Male genital system chapters.

Rates were significantly lower for the Social chapter.

The rank order was very similar for the two groups.

**Table 3a. Rate of problems managed per 100 encounters and rank**

Problem managed	Hunter Weighted data, April 1998-July 2010 Problems=3460, encounters=2254				Non-metro NSW excl Hunter Raw data, April 1998-July 2010 Problems=140645, encounters=89614			
	Rate per 100 encounters	95% LCL	95% UCL	Rank order	Rate per 100 encounters	95% LCL	95% UCL	Rank order
Hypertension*	8.8	7.1	10.5	1	10.4	10.0	10.8	1
Arthritis all*	6.4	4.7	8.2	2	4.6	4.3	4.8	2
Osteoarthritis*	5.0	3.3	6.8	3	3.1	2.9	3.3	7
Depression*	4.3	3.2	5.3	4	4.3	4.1	4.5	3
Asthma	3.3	2.3	4.3	5	2.6	2.4	2.7	10
Diabetes - non-gestational*	3.2	2.1	4.2	6	3.7	3.5	3.8	4
Lipid disorders*	3.2	1.8	4.5	7	3.2	3.0	3.4	6
Oesophagus disease	3.2	1.8	4.5	8	2.5	2.4	2.7	13
Preventive immunisation/medication NOS	3.0	1.3	4.7	9	2.9	2.5	3.3	9
Back complaint*	2.8	1.8	3.7	10	3.1	3.0	3.3	8
Upper respiratory infection, acute	2.7	1.9	3.5	11	3.7	3.5	4.0	5
Acute bronchitis/bronchiolitis	2.3	1.2	3.4	12	2.6	2.4	2.8	11
Female genital check-up*	2.2	1.2	3.3	13	2.2	2.0	2.4	14
Sinusitis acute/chronic	2.1	0.8	3.4	14	1.3	1.2	1.4	25
Pregnancy*	2.0	0.7	3.2	15	1.4	1.2	1.5	23
Menopausal symptom/complaint	1.9	1.0	2.8	16	1.2	1.1	1.3	27
Pre/post natal check-up*	1.9	0.6	3.1	17	1.2	1.0	1.4	28
Solar keratosis/sunburn	1.8	0.9	2.8	18	1.9	1.6	2.2	16
Anxiety*	1.7	1.0	2.5	19	1.6	1.4	1.7	17
Cardiac check-up*	1.6	0.0	3.4	20	1.2	1.1	1.3	29
Tonsillitis*	1.6	0.5	2.7	21	0.9	0.8	1.0	40
General check-up*	1.6	0.9	2.4	22	2.6	2.5	2.8	12
Sprain/Strain*	1.5	0.6	2.4	23	1.3	1.2	1.4	26
Preventive immunisation/medication respiratory	1.5	0.3	2.7	24	2.1	1.9	2.2	15
Hypothyroidism/myxoedema	1.5	0.3	2.8	25	0.7	0.6	0.8	48
Acute otitis media/myringitis	1.4	0.8	1.9	26	1.1	1.1	1.2	32
Ischaemic Heart Disease*	1.3	0.7	1.9	27	1.6	1.5	1.7	18
Malignant neoplasm of skin	1.3	0.4	2.2	28	1.6	1.4	1.7	19
Dermatitis, contact/allergic	1.3	0.8	1.7	29	1.5	1.4	1.6	21
Sleep disturbance	1.3	0.4	2.2	30	1.5	1.4	1.6	22
Injury musculoskeletal NOS	1.1	0.2	2.0	31	1.0	0.9	1.0	34
Chronic obstructive pulmonary disease	1.1	0.5	1.7	32	1.1	1.0	1.1	33
Anaemia*	1.1	0.1	2.0	33	0.7	0.7	0.8	49
Elevated blood pressure	1.0	0.0	2.0	34	0.2	0.2	0.3	56
Arthritis*	1.0	0.3	1.7	35	0.8	0.7	0.9	42
Fracture*	1.0	0.5	1.5	36	1.2	1.1	1.2	30
Osteoporosis	1.0	0.5	1.5	37	0.9	0.8	0.9	41

Problem managed	Hunter Weighted data, April 1998-July 2010 Problems=3460, encounters=2254				Non-metro NSW excl Hunter Raw data, April 1998-July 2010 Problems=140645, encounters=89614			
	Rate per 100 encounters	95% LCL	95% UCL	Rank order	Rate per 100 encounters	95% LCL	95% UCL	Rank order
Abnormal result investigation NOS	1.0	0.1	1.8	38	0.8	0.7	0.8	43
Oral contraception*	1.0	0.5	1.5	39	1.0	0.9	1.0	35
UTI*	1.0	0.5	1.5	40	1.6	1.5	1.7	20
Heart failure	0.9	0.4	1.4	41	1.0	0.9	1.1	36
Chronic ulcer skin	0.9	0.3	1.5	42	0.7	0.6	0.7	50
Atrial fibrillation/flutter	0.8	0.3	1.3	43	1.2	1.0	1.3	31
Laceration/cut	0.8	0.3	1.2	44	0.8	0.7	0.8	44
Dermatophytosis	0.8	0.3	1.3	45	0.5	0.5	0.6	53
Skin check-up*	0.8	0.2	1.5	46	0.5	0.4	0.6	54
Viral disease, other/NOS	0.8	0.3	1.4	47	0.8	0.7	0.9	45
Vitamin/nutritional deficiency	0.8	0.3	1.3	48	0.6	0.5	0.7	52
Gastroenteritis*	0.8	0.4	1.2	49	1.0	0.9	1.1	37
Constipation	0.8	0.4	1.2	50	0.5	0.4	0.5	55
Otitis externa	0.8	0.2	1.4	51	0.7	0.6	0.7	51
Bursitis/tendonitis/synovitis NOS	0.7	0.3	1.1	52	1.0	0.9	1.1	38
Obesity (BMI > 30)	0.7	0.0	1.5	53	0.8	0.7	0.9	46

\* Includes multiple ICPC-2 codes

NOS – not otherwise specified

Spearman's rho=0.86 (p for rejection of independent rank<0.0001) for all problems managed.

Spearman's rho=0.71 (p for rejection of independent rank<0.02) for top 10 problems managed.

These both indicate no significant difference in the ranking of problems between the Hunter and the rest of non-metropolitan NSW.

**Table 3b. Rate of problems managed per 100 encounters for recoded asthma and chronic obstructive pulmonary disease groups**

Problem managed	Hunter Weighted data, April 1998-July 2010 Problems=3460, Encounters=2254				Non-metro NSW excl Hunter Raw data, April 1998-July 2010 Problems=140645, encounters=89614			
	Rate per 100 encounters	95% LCL	95% UCL		Rate per 100 encounters	95% LCL	95% UCL	
Chronic obstructive pulmonary disease – recoded	1.1	0.5	1.7		1.1	1.0	1.2	
Asthma – recoded	3.3	2.3	4.3		2.6	2.4	2.7	
COPD + asthma – recoded	4.4	3.2	5.6		3.7	3.5	3.9	

**Legend**

Hunter significantly higher

Hunter higher

Hunter lower

Hunter significantly lower

Tables 3a and 3b provide a rate and ranking by specific conditions per 100 GP encounters, with Table 3b including the results for the expanded code groupings for Asthma and Chronic Obstructive Pulmonary Disease. No problems were managed at significantly higher rates in the Hunter region.

Rates were higher for a number of conditions including Asthma, Sinusitis, Tonsillitis, Acute otitis media, Arthritis and Oesophagus disease.

Rates were lower for numerous problems including Hypertension, Diabetes, Acute upper respiratory infection and Acute bronchitis. Rates were significantly lower for General check-ups.

There were no differences in rates for Depression or Anxiety.

Rank order was higher in the Hunter region for Osteoarthritis, Asthma, Preventive immunisation/medication, Sinusitis, and Pregnancy related problems, however there was no significant difference in the overall ranking of problems in the Hunter region compared to the rest of non-metropolitan NSW.

The expanded coding process for Asthma and COPD identified very few additional encounters to include in these recoded problem groups, and the results of the analysis remained the same.

**Table 4. Rate of medication group prescribed or supplied and rank per 100 problems managed**

Medication group	Hunter Weighted data, April 1998-July 2010 Problems=3460, encounters=2254				Non-metro NSW excl Hunter Raw data, April 1998-July 2010 Problems=140645, encounters=89614			
	Rate per 100 problems	95% LCL	95% UCL	Rank order	Rate per 100 problems	95% LCL	95% UCL	Rank order
Anti-infections/infestations	10.6	8.2	13.1	1	9.1	8.7	9.4	2
Cardiovascular	10.4	8.0	12.8	2	11.4	11.0	11.8	1
CNS	8.1	6.1	10.1	3	7.5	7.3	7.8	3
Allergy, immune system	6.1	3.2	9.0	4	5.0	4.7	5.4	5
Psychological	5.5	4.0	6.9	5	5.4	5.2	5.7	4
Hormones	4.5	3.7	5.3	6	4.4	4.2	4.6	6
Musculoskeletal	4.4	3.0	5.9	7	3.6	3.5	3.8	7
Respiratory	4.3	3.2	5.4	8	3.5	3.3	3.7	8
Digestive	3.8	2.7	4.8	9	3.2	3.1	3.3	9
Blood	2.2	1.4	3.1	10	2.0	1.9	2.2	11
Skin	2.0	1.3	2.7	11	2.5	2.4	2.6	10
Urogenital	1.3	0.8	1.8	12	1.5	1.4	1.5	12
Ear, nose topical	1.3	0.6	2.0	13	1.1	1.0	1.1	14
Nutrition, metabolism	1.1	0.5	1.7	14	1.0	0.9	1.1	15
Eye medications	1.0	0.6	1.4	15	1.0	0.9	1.0	16
Contraceptives	1.0	0.4	1.5	16	1.1	1.0	1.2	13
Surgical preparations	0.5	0.0	1.2	17	0.2	0.2	0.3	19
Miscellaneous	0.5	0.3	0.8	18	0.4	0.3	0.4	18
Anti-neoplastics	0.2	0.0	0.6	19	0.4	0.4	0.5	17

Spearman's rho=0.98 (p for rejection of independent rank<0.0001) – this indicates no significant difference in the ranking of problems between the Hunter and the rest of non-metropolitan NSW

**Legend**

<b>Hunter significantly higher</b>
Hunter higher
Hunter lower
<b>Hunter significantly lower</b>

No medication groups were prescribed or supplied at significantly higher rates in the Hunter region.

Prescription rates were higher in the Hunter region for a number of medication groups including Anti-infections, Central Nervous System (CNS), Allergy/immune system, Musculoskeletal, Respiratory, Digestive and Ear/nose topical.

Prescription rates were lower in the Hunter region for Cardiovascular, Skin, Urogenital and Anti-neoplastic medication groups, and rates were not significantly lower for any medication groups.

The rank order was very similar for the two groups.



**Table 5. Rate of medication subgroup prescribed or supplied and rank per 100 problems managed**

Medication subgroup	Hunter Weighted data, April 1998-July 2010 Problems=3460, encounters=2254				Non-metro NSW excl Hunter Raw data, April 1998-July 2010 Problems=140645, encounters=89614			
	Rate per 100 problems	95% LCL	95% UCL	Rank order	Rate per 100 problems	95% LCL	95% UCL	Rank order
Immunisation	6.0	3.1	8.8	1	4.7	4.3	5.0	2
Antihypertensives	5.8	4.4	7.3	2	6.4	6.1	6.6	1
NSAIDs	3.9	2.5	5.4	3	2.9	2.8	3.1	4
Penicillins/Cephalosporins	3.9	2.6	5.2	4	2.8	2.7	2.9	5
Broad spectrum penicillins	3.1	2.0	4.2	5	2.9	2.8	3.1	3
Antiulcerants	2.8	1.8	3.8	6	2.2	2.1	2.3	7
Other antibiotics	2.5	1.6	3.5	7	1.9	1.8	2.0	11
Antidepressants	2.5	2.0	3.1	8	2.5	2.4	2.6	6
Simple analgesics	2.4	1.6	3.2	9	2.1	2.0	2.2	9
Compound analgesics	2.3	1.6	3.0	10	1.8	1.7	1.9	12
Narcotic analgesics	2.3	1.2	3.3	11	2.1	2.0	2.2	10
Bronchodilators/Spasm relaxants	2.1	1.3	2.8	12	1.8	1.7	1.9	13
Other cardiovascular system	2.0	1.3	2.8	13	2.2	2.1	2.3	8
Asthma preventives	1.9	1.4	2.5	14	1.4	1.3	1.5	16
Sex/Anabolic hormones	1.6	0.9	2.3	15	1.2	1.1	1.2	21
Antianxiety	1.6	0.9	2.2	16	1.3	1.2	1.4	19
Other blood drugs	1.5	0.7	2.3	17	1.4	1.3	1.5	18
Corticosteroids	1.3	0.9	1.7	18	1.2	1.1	1.2	20
Beta-blockers	1.2	0.8	1.7	19	1.4	1.3	1.5	17
Topical steroids	1.2	0.7	1.7	20	1.5	1.4	1.6	15
Hypoglycaemic	1.1	0.6	1.6	21	1.6	1.4	1.7	14
Sedatives/Hypnotics	1.0	0.4	1.6	22	1.1	1.0	1.2	22
Diuretics	0.9	0.5	1.4	23	0.9	0.9	1.0	24
Contraceptives oral/systemic	0.9	0.4	1.4	24	1.1	1.0	1.1	23
Antiemetics/Antinauseants	0.9	0.5	1.3	25	0.9	0.8	0.9	25
Anti-infectives eye	0.8	0.5	1.0	26	0.6	0.5	0.6	29
Topical otic	0.7	0.4	1.1	27	0.5	0.5	0.6	30
Antiangina	0.7	0.3	1.1	28	0.8	0.7	0.8	26
Haemopoietics	0.7	0.4	1.0	29	0.6	0.6	0.7	27
Tetracyclines	0.6	0.4	0.9	30	0.6	0.5	0.6	28

Spearman's rho=0.95 (p for rejection of independent rank<0.0001) – this indicates no significant difference in the ranking of problems between the Hunter and the rest of non-metropolitan NSW.

**Legend**

**Hunter significantly higher**  
Hunter higher

Hunter lower  
**Hunter significantly lower**

No medication subgroups were prescribed or supplied at significantly higher rates in the Hunter region, and prescription rates were also not significantly lower in the Hunter region for any medication subgroups.

Prescription rates were higher in the Hunter region for a number of medication subgroups including Bronchodilators, Asthma preventives, and Anti-anxiety medicines.

Prescription rates were lower in the Hunter region for a number of medication subgroups including Antihypertensives and Other cardiovascular drugs.

There was no difference the rate of prescription for Anti-depressants in the Hunter region compared to the rest of non-metropolitan NSW.

The rank order was similar for the two groups.

**Table 6a. Smoking status, BEACH sub-sample**

Smoking status	Hunter unweighted April 1998-July 2010 n=743			Non-metro NSW excl Hunter April 1998-July 2010 n=30 717		
	Percent	95% LCL	95% UCL	Percent	95% LCL	95% UCL
Never smoked	58.3	52.5	64.1	47.2	46.4	48.1
Previous smoker	24.0	19.6	28.5	31.0	30.2	31.7
Current Smoker	17.7	13.8	21.5	21.8	21.0	22.5

**Table 6b. Smoking status, NSW population health survey**

Smoking status	Hunter 1998-2009 n=396			Non-metro NSW excl Hunter 1998-2009 n=53 074		
	Percent	95% LCL	95% UCL	Percent	95% LCL	95% UCL
Never smoked	55.4	48.9	61.9	52.0	51.3	52.6
Previous smoker	22.8	17.3	28.4	27.1	26.6	27.7
Current Smoker	21.7	16.4	27.1	20.9	20.4	21.4

**Legend**

Hunter significantly higher
Hunter higher
Hunter lower
Hunter significantly lower

In the BEACH sub-sample, a significantly higher proportion of people had never smoked and a significantly lower proportion of people were previous smokers in the Hunter region than in non-metropolitan NSW. The level of current smokers was lower in the Hunter region.

The NSW population health survey data provided consistent results for people who had never smoked (higher in the Hunter region) and previous smokers (lower in the Hunter region). However the data for current smokers differed, with a higher level in the Hunter region compared to non-metropolitan NSW.

These data suggest that smoking prevalence is unlikely to explain any increased rate of respiratory disease managed in the Hunter region compared to the rest of non-metropolitan NSW.

All rank tests were highly correlated ( $\rho > 0.85$ ) except for the top 10 problems managed (Table 2), which was moderately correlated ( $\rho = 0.71$ ). All tests of independence of ranking between the Hunter weighted and non-metropolitan NSW data were rejected, indicating no significant difference in ranking between the Hunter region and the rest of non-metropolitan NSW.

BEACH encounter data was provided by 18 different GPs in the Hunter region, representing 7 General Practices. The median proportion of encounters provided by each Hunter region GP was 3.9% (range 1.3% to 11.4%). Consultations for Hunter region residents occurred in the Hunter region for 91% of encounters. The Hunter region data should thus not be unduly influenced by the different diagnostic and prescribing practices of individual participating GPs.

In addition to the aggregated data for the period 1998-2010 presented in the tables above, data was also considered separately for the time periods April 1998-March 2004 and April 2004-June 2010.

Comparison of Hunter weighted data with non-metropolitan NSW for each period separately did not identify any information that differed significantly from the summary presented above.

When weighted Hunter data for the two periods were compared, the only significant increase over time was in the rate of management of neoplasms and malignant neoplasms (ICPC Component category), an increase that was also seen over this time period in non-metropolitan NSW.

There was a non-significantly higher rate of management of Respiratory, Skin and Blood chapter problems in the Hunter region over this time. Within the Respiratory chapter, the rate for Sinusitis was higher but the rate for Asthma remained unchanged. In comparison, the rate for Respiratory chapter problems was significantly lower over this time period in non-metropolitan NSW.

## Conclusion

There is no evidence for significantly higher rates for any problems managed or medications prescribed or supplied in the Hunter region when compared to the rest of non-metropolitan NSW over the period 1998 to 2010.

The rate of management of respiratory problems overall (by ICPC-2 chapter) was lower in the Hunter region during this period. However, rates of management of asthma, sinusitis, tonsillitis, and acute otitis media were higher in the Hunter region but the differences were not statistically significant. Similarly, bronchodilators and asthma preventives were prescribed at higher rates in the medication subgroup analysis but these differences were also not statistically significant.

These findings are consistent with the emergency department presentation and hospital admission data for this region<sup>1</sup> which noted higher rates for asthma and respiratory disease overall.

The comparison of rates in 1998-2004 with those in 2005-2010 is also consistent with this picture, with Respiratory chapter problems tending to be higher in the Hunter region but lower in the rest of non-metropolitan NSW.

Rates for depression and anxiety were not higher in the Hunter region, nor were prescriptions for anti-depressants. The prescription of the anti-anxiety medication subgroup was higher in the Hunter region but this was not statistically significant.

## References

1. NSW Department of Health. *Respiratory and cardiovascular diseases and cancer among residents in the Hunter New England Area Health Service*. NSW Department of Health, 2010. Available at: [http://www.health.nsw.gov.au/pubs/2010/hne\\_respi\\_cardio.html](http://www.health.nsw.gov.au/pubs/2010/hne_respi_cardio.html) (accessed 22 September 2010)
2. Britt H, Miller GC, Charles J, et al. *General Practice activity in Australia 2008-09*. Canberra: Australian Institute of Health and Welfare, 2009.