**Title:** Management of snoring and sleep apnea in Australian primary care: The BEACH study (2000-14)

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None of the authors have any conflicts of interest to report.

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**ABSTRACT (242/250 word limit)**

**Study Objectives:** To characterise the changes in management of snoring and obstructive sleep apnea (OSA) in general practice in Australia.

**Methods:** The Bettering the Evaluation And Care of Health (BEACH) study is a nationally-representative rolling cross-sectional survey of general practice activity in Australia. We analysed all adult (18+) encounters for OSA or snoring, annually from 2000 to 2014 (ca. N=1000 general practitioners (GPs) per year recording ca.100,000 patient encounters per year).

**Results:** Follow-up and initial consultations for OSA rose from 94 to 296 per 100,000 encounters, while management rate of snoring remained steady at around 15-25 per 100,000 encounters. The majority of patients managed for OSA were: middle-aged (25-64 years; 71.3% of all patients); overweight (90%); male (62%), although there was a trend for an increase in the proportion being female over the study period (21 to 37 per 100 encounters). Referral rates were high for both OSA (59 per 100 problems managed) and snoring (69 per 100) although medical referrals (to a sleep clinic or respiratory physician) were significantly higher for patients managed for OSA than for snoring (90% vs 60% of all referrals). Surgical referrals were higher for snoring than for OSA (37% vs. 3% of all referrals).

**Conclusions:** The management rate for OSA tripled from 2000 to 2014, while the rate for snoring remained steady. GPs significantly relied on the advice of other health professionals to manage OSA, however their referral patterns aligned with what most specialists would recommend.

**Keywords:** Obstructive Sleep Apnea, snoring, surgery, sleep clinic, primary care

**Brief summary:**

**Current Knowledge/Study Rationale:** The epidemiology of obstructive sleep apnoea (OSA) in the general population and patients seen in tertiary care has been well described, however the risk factors between the two differ in strength. Our present study aims to characterise the management of snoring and OSA in general practice in Australia to see if there has been any change in the rate of management and how patients are being managed.

**Study Impact:** The management rate for OSA tripled from 2000 to 2014, illustrating the significant rise in patients seeking treatment for the sleep disorder. Also of note is the finding that the traditional view of the OSA patient being male has changed in general practice as the gender ratio of males:females has shrunk from 4:1 to approximately 2:1.

## INTRODUCTION

The population-based epidemiology of obstructive sleep apnoea (OSA) is now substantively well described[1] and the characterisation of patients seen in tertiary care (i.e. sleep clinics) has long been a strength of sleep medicine with quite large clinical cohorts now being described.[2] However, risk factors between people with OSA in the population and in tertiary care differ in strength. Patients found in sleep clinics tend to be more commonly overweight with a higher BMI, and are significantly more often male (the gender ratios of male:female in the community are approximately 1.5-2:1 in the community[3] versus 5-9:1 traditionally commonly in clinics[4-6]). As expected in a tertiary care environment they have much more severe OSA on average than those in community-based samples. It has been suggested that this bias could mean that women and those patients with OSA not related to obesity are less likely to be offered the mechanical treatments that are generally regarded as being the most effective because these treatments are typically unavailable in a general practice setting in Australia.[7, 8] The referral bias could possibly be happening at the level of general practice. It is not clear whether this could be because patients who do not fit the long held stereotypic presentation (obese, male, hypersomnolent, loud snoring and witnessed apnoeas), do not have OSA recognised by themselves or their families, or general practitioners (GPs) treat in-house or refer these patients to places other than sleep clinics.[9]

Our previous study[10] of this question in Australia suggested that there existed 2 ‘silos’ of treatment for OSA and snoring: one medical (i.e. sleep clinics) and one surgical (i.e. ear nose and throat surgeons, [ENTs]). Surprisingly those not receiving a sleep study of any kind were more likely to be treated and the vast majority of those were treated surgically. However, that study had some limitations: it only included registered electors in one state (New South Wales); it did not sample post-retirement age people (65+ years), and it was retrospective. The retrospective nature of the survey meant that these findings could have represented historical patterns of treatment reaching back into childhood and not contemporary approaches.[11]

Our present study aims to characterise the management of snoring and OSA in general practice in Australia, using data from the Bettering the Evaluation and Care of Health (BEACH) program that have been gathered prospectively in rolling nationally representative cross-sectional surveys that allow us to undertake time-trend analyses from 2000-2014.

Specifically, we aim to address the following questions:

1. What are the major characteristics of patients with OSA and snoring in general practice, and are some patients more likely to be managed?
2. Has the prevalence of OSA or snoring or the characteristics of those patients changed over time in general practice in Australia?
3. How is OSA being managed in general practice, and what are the referral pathways for snoring and OSA?

## METHODS

### Data collection

This study analysed data from the BEACH (Bettering the Evaluation And Care of Health) program, collected between April 2000 and March 2014.

BEACH is a continuous, national, cross-sectional survey of Australian general practice activity. The BEACH methods are described in detail elsewhere.[12] In summary, each year an ever changing random sample of 1,000 GPs from a source population of vocationally recognised, practising GPs in Australia is recruited into the study. Each GP records details for 100 patient encounters with consenting patients, on structured paper forms. The information collected at BEACH encounters includes details of the encounter, patient demographics, up to four problems managed at the encounter and any clinical actions used to manage the problems. These clinical actions are linked to

the problem they are used for, and include any medications, clinical and procedural treatments, imaging and pathology tests ordered and any referrals made. All problems managed, referrals, clinical and procedural treatments, and imaging and pathology tests ordered are classified according to the International Classification of Primary Care (version 2) (ICPC-2)[13] and coded to more specific terms in the ICPC-2 PLUS terminology.[14] The BEACH database now includes information for almost 1.6 million encounters from 15,759 participants representing 9,950 individual GPs.[12] Ethics approval for the BEACH program was obtained through the University of Sydney Human Research Ethics Committee and (from 2000–2010) the Australian Institute of Health and Welfare Ethics Committee.

**Participants**

For the purposes of this study snoring was defined as the ICPC-2 PLUS code 'R04005' – "Snoring" and OSA was defined as the codes 'P06014' and 'R04012' – "Sleep apnoea" and "Apnoea" respectively. All encounters at which these codes appeared as a problem managed were included in our analyses. We restricted our analyses to encounters with adult patients aged 18 years and over. Patient postcode of residence was also collected and classified into major cities, regional, and remote/very remote, according to the Australian Standard Geographical Classification (ASGC).[15]

**Analysis**

Changes over time in the management rate of OSA and snoring, and in some broad characteristics of the patients for whom these were managed by GPs, were measured over the full 15 years, April 2000 and March 2014. The investigation of current practice was limited to the most recent five year data period, April 2009–March 2014 inclusive.

The BEACH study has a cluster design with each GP having a cluster of 100 patient encounters around them. Rates and proportions were calculated using "survey means" procedures in SAS (version 9.1.3 SAS Inc, Cary, North Carolina) which produce robust 95% confidence intervals that

take into account the cluster design of the study. Due to the study design, statistical significance of differences is judged by non-overlapping 95% confidence intervals, which is more conservative than an alpha of 0.05.

Results representing the frequency of management of snoring and OSA are reported as rates per 100,000 encounters. More than one problem can be managed at each encounter, so all management actions are linked by the GPs directly to the problem being managed but as more than one action of a specific type (such as referrals) can be given for an individual problem managed that day results are reported as rates per 100 snoring/OSA problems managed.

Health professionals to whom GPs referred were grouped into three categories of relevance to the management of OSA or snoring: medical, surgical, other (allied health). Medical referrals included those to respiratory physicians (or 'physician'), sleep clinics (or 'clinic/centre'), neurologists, cardiologists, ophthalmologists, obstetricians, gastroenterologists, or hospitals. Referrals to ear nose and throat surgeons or surgeons (not specified) were classified as surgical. The other (allied health) referral group incorporated dentists, dietitian/nutritionists, exercise physiologists, podiatrists, chiropractors, Aboriginal health workers, nurses, other GPs, or where referral direction was not specified.

A section at the bottom of each recording form investigates aspects of patient health or health care delivery in general practice not covered by the consultation-based data. These additional sub-studies are referred to as SAND (Supplementary Analysis of Nominated Data). In the SAND section of forty of each GP's 100 encounter forms the GP is asked to record the height and weight of the patient at the encounter. From this data we calculated the body mass index (BMI) for about 40% of the patients at GP encounters for OSA or snoring.

To test whether proportions of patients 50 years and over or female had changed over the time series we ran a simple linear regression with year (1-14) as the independent variable and percentage aged 50 years and over and then percentage who were female, as the dependent variables.

## RESULTS

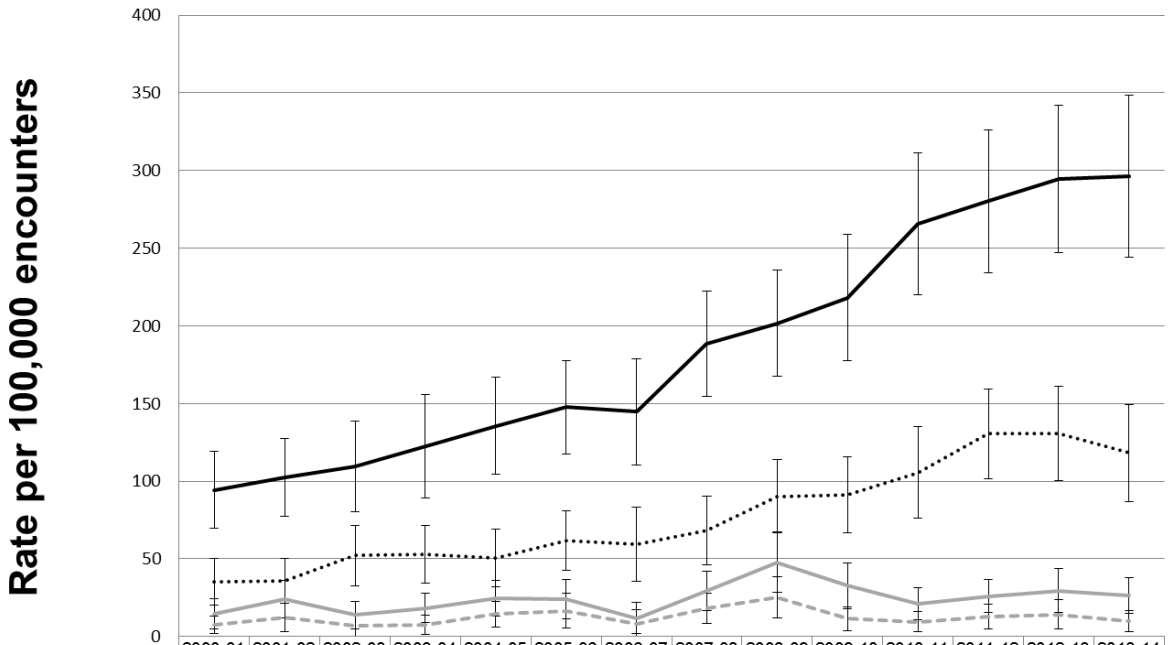
### Sample

Between April 2000 and March 2014, 13,721 GP's participating in BEACH, recorded details of 1,372,100 encounters. Of these, 1,170,268 encounters were with adults aged 18yrs or more, and 706,025 of these were with female patients.

### Rates of snoring and OSA in general practice

Figure 1 illustrates the change in the management rate of OSA and snoring between 2000 and 2014 relative to overall primary health care activity. While the management rate of previously diagnosed OSA increased from 94.4 (95% CI 69.9-118.9) to 296.4 (95% CI 244.3-348.5) per 100,000 encounters in general practice in Australia, so did the incidence rate of new cases of OSA, rising from 35.1 (95% CI 20.1-50.2) to 118.2 (95% CI 87.1-149.4) per 100,000 encounters.

The incidence of new presentations of snoring did not change from 2000-14, (7.4; 95% CI 2.0-12.8 v 9.9; 95% CI 3.0-16.9), nor did the rate for ongoing management during this period (14.5; 95% CI 4.9-24.1 v 26.3; 95% CI 4.9-15.1).



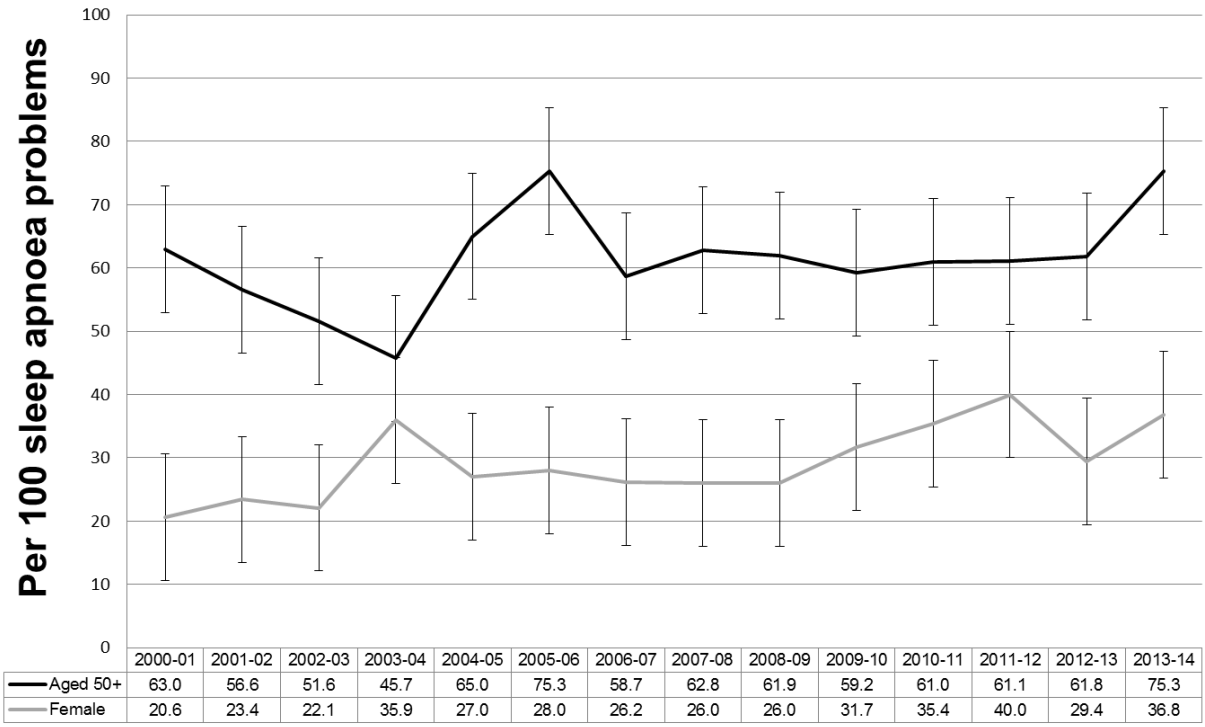

| | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sleep Apnoea | 94.4 | 102.4 | 109.4 | 122.3 | 135.6 | 147.5 | 144.6 | 188.5 | 201.6 | 218.2 | 265.7 | 280.2 | 294.5 | 296.4 |
| New Sleep Apnoea | 35.1 | 35.7 | 52.2 | 53 | 50.6 | 62 | 59.3 | 68.3 | 90.3 | 91.2 | 105.6 | 130.5 | 130.5 | 118.2 |
| Snoring | 14.5 | 23.9 | 13.7 | 18.4 | 24.5 | 24 | 11.9 | 29.3 | 47.8 | 32.6 | 21.3 | 26 | 29.4 | 26.3 |
| New snoring | 7.4 | 12.5 | 7.1 | 7.3 | 14.3 | 16.6 | 8.2 | 18 | 25.2 | 11.4 | 9.4 | 12.9 | 14.2 | 9.9 |

**Figure 1 Legend:** The management rate across time of new (grey dashed line) and previously diagnosed (solid grey line) cases of snoring and new (black dotted line) and previously diagnosed (solid black line) cases of OSA, between 2000 and 2014. Data are represented as rates per 100,000 encounters; error bars represent ±95% CI.

**Figure 1 Title:** Primary care management of sleep apnea and snoring in Australia (2000-2014)

## Change in patient demographics over time

The gender ratio (male:female) of patients being managed for OSA changed from 4:1 to approximately 2:1 over the 14 years (see Figure 2, linear regression for trend p=0.005). The other major characteristics of patients (e.g. age, BMI) at OSA encounters remained relatively unchanged, but with year to year fluctuations.




| | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aged 50+ | 63.0 | 56.6 | 51.6 | 45.7 | 65.0 | 75.3 | 58.7 | 62.8 | 61.9 | 59.2 | 61.0 | 61.1 | 61.8 | 75.3 |
| Female | 20.6 | 23.4 | 22.1 | 35.9 | 27.0 | 28.0 | 26.2 | 26.0 | 26.0 | 31.7 | 35.4 | 40.0 | 29.4 | 36.8 |

**Figure 2:** The proportion of patients at OSA encounters who were: aged 50+ years (black line), or; female (grey line) each year from 2000-2014. Data are represented as rate per 100 OSA encounters, error bars represent ±95% CI. Linear regression tests for trend indicated no significant increase in proportions of patients aged 50 years and over (p=0.15) but there was an increase in the proportion of patients who were female (p=0.005).

**Figure 2 Title:** Changes in age and gender ratio in patients being managed for sleep apnea in Australian General practice (2000-2014)

**Recent management of OSA and Snoring (2009–14)**

In the 2009–14 data period information was available for 416,606 GP-patient encounters. OSA was managed at 1,109 of these encounters (266.2 per 100,000 encounters, 95% CI: 248.6 – 283.8) and snoring at 131 (31.4 per 100,000 encounters, 95% CI: 26.0 - 36.8). Data about patient height and weight were available for 431 (38.9%) of the patients for whom OSA was managed and for 50 (38.2%) of those for whom snoring was managed.

**Demographics of patients at OSA and snoring encounters in general practice**

For both OSA and snoring, the largest proportion of patients was aged 50-64 years (49.6% and 48.1% of patients respectively). While a significantly greater proportion of OSA patients were male

**Table 1 -** Characteristics of patients who were managed for OSA or Snoring in general practice 2009-2014

| **Characteristic** | **OSA (95% CIs)** | **Snoring (95% CIs)** |
|---|---|---|
| | ***n=1,109*** | ***n=131*** |
| **Age** | | |
| 18-24 years | 2.6% (1.7-3.6) | 3.8% (0.5-7.1) |
| 25-49 years | 21.7% (19.2-24.3) | 32.1% (23.9-40.2) |
| 50-64 years | 49.6% (46.6-52.6) | 48.1% (39.3-56.9) |
| 65-74 years | 16.9% (14.6-19.1) | 10.7% (5.4-16.0) |
| 75+ years | 9.2% (7.4-11.0) | 5.3% (1.4-9.3) |
| **Gender** | *(missing n = 4)* | *(missing n = 0)* |
| Male | 61.9% (59.0-64.9) | 52.7% (44.0-61.3) |
| Female | 37.7% (34.7-40.6) | 47.3% (38.7-56.0) |
| **Rurality(a)** | *(missing n=14)* | *(missing n=1)* |
| Major Cities | 62.0% (58.5-65.5) | 76.9% (69.4-84.5) |
| Regional | 36.5% (33.0-40.0) | 22.3% (14.8-29.8) |
| Remote/very remote | 1.5% (0.6-2.4) | 0.8% (0.0-2.3) |
| | | |
| **BMI** | *(Subsample n = 431)* | *(Subsample n = 50)* |
| Underweight/normal (<25) | 10.2% (7.4-13.0) | 20.0% (8.5-31.5) |
| Overweight (25-30) | 26.2% (22.0-30.4) | 36.0% (22.2-49.8) |
| Obese (>30) | 63.6% (59.0-68.1) | 44.0% (29.8-58.3) |

than female, patients with snoring were equally gender-distributed. Almost 64% of patients at encounters were obese and a further 26% were overweight. The majority of snorers were also either overweight or obese. As expected the majority of patients at OSA and snoring encounters were from major cities as Australia has a highly urbanised population (see Table 1). People who came from regional centres or remote or very remote places were not disadvantaged in terms of the identification or access to primary medical care for OSA as their rates per 100,000 were actually marginally higher than those in urban areas (see Table 3). Snorers outside major urban centres may however be disadvantaged (Table 3).

Table 2 illustrates the rate of management actions used by GPs per 100 encounters for OSA and snoring. The prescribing rate of medication was higher for snoring than for OSA. Pathology testing was higher in management of OSA than in the management of snoring. Referral rates were comparable in management of OSA (59.0 per 100) and snoring (68.7 per 100 encounters).

**Table 2** - Management rates of sleep apnoea and snoring among adults, per 100 encounters

| | Sleep apnoea (95% CIs) | Snoring (95% CIs) |
|---|---|---|
| | (n = 1,109) | (n = 131) |
| **Total medications** | 5.0 (3.4-6.5) | 22.1 (13.0-31.3) |
| **Total clinical treatments** | 30.8 (27.6-34.1) | 27.5 (18.4-36.6) |
| **Total procedural treatments** | 2.7 (1.5-3.9) | 2.3 (0.0-4.9) |
| **Total referrals** | 59.0 (55.8-62.1) | 68.7 (59.4-78.0) |
| **Total pathology** | 15.7 (11.2-20.2) | 3.1 (0.0-9.1) |
| **Total imaging** | 0.8 (0.2-1.4) | 1.5 (N/A) |

The referral pathways for OSA and snoring patients who were referred to medical, surgical or other specialists in the five years 2009-14 are detailed in Figure 3. The referral patterns did not differ between genders in either OSA or snoring. Medical referrals (to a sleep clinic or respiratory physician) were significantly higher for patients being managed for OSA than for snoring (53.3 v

41.2 per 100 encounters; 90.1% v 60.0% of all referrals), while GPs were more likely to refer a patient with snoring to a surgeon (25.2 vs. 1.9 per 100 encounters; 36.6% v 3.2% of all referrals). Referral rates to other care (apart from medical and surgical) did not significantly differ between snoring and OSA. Further analysis of referral rates for OSA revealed that medical referrals were almost double for new problems than at follow-up consultations for previously diagnosed problems (69.9 vs 37.5 per 100 encounters). Referral rates to surgeons and other care did not differ for new and for previously diagnosed OSA.

**Prevalence of OSA and snoring stratified within major risk factors**

Table 3 details the characteristic-specific management rate of OSA and snoring. The highest management rates of OSA and of snoring were among middle aged patients (50-64 years). However for snoring, the second highest management rate was among 25-49 year olds, while the second highest management rate of OSA was among older adults (aged 65-74). The management rate of both OSA and snoring was higher among males than among females. Patients with a BMI >30 had a significantly higher rate of OSA and snoring than those with a BMI < 25. The management rate of OSA was significantly higher in regional areas than in major cities. In contrast, management rate of snoring did not differ by geographic area.

**GP demographics**

The characteristics of GPs managing encounters for OSA and snoring in the time period 2009-2014 are summarised in Table S2.

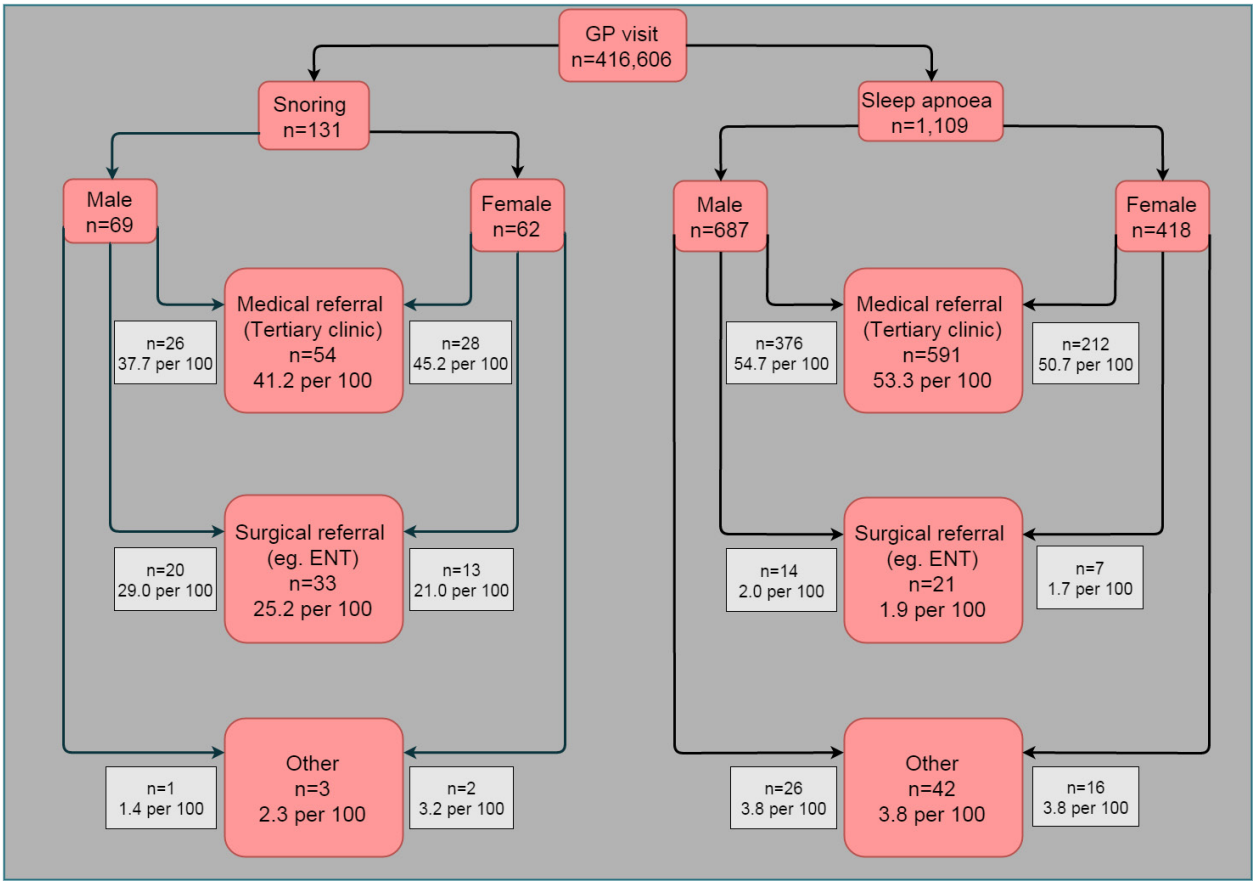



**Figure 3:** The referral pathways for snoring and OSA encounters between 2009-2014, split by gender. GP = general practice; ENT = ear nose and throat surgeon. Some addition errors are present because gender data was missing for some patients.

**Figure 3 Title:** Referral pathways for Sleep apnea and snoring differ in Australian General Practice

**Table 3**– Patient characteristic specific management rates per 100,000 encounters of OSA and snoring 2009- 2014.

| | OSA | Snoring |
|---|---|---|
| | (95% CIs) | (95% CIs) |
| | | |
| **Age (n=416,606)** | | |
| 18-24 years | 95.1 (60.5-129.6) | 16.4 (2.0-30.8) |
| 25-49 years | 221.2 (192.2-250.3) | 38.6 (26.7-50.4) |
| 50-64 years | 413.5 (376.4-450.6) | 47.4 (35.7-59.0) |
| 65-74 years | 287.0 (243.4-330.6) | 21.5 (10.3-32.7) |
| 75+ years | 129.1 (103.1-155.2) | 8.9 (2.3-15.4) |
| | | |
| **Gender (n=413,717)** | | |
| Male | 428.6 (393.7-463.4) | 43.0 (33.0-53.1) |
| Female | 164.9 (148.3-181.6) | 24.5 (18.3-30.6) |
| | | |
| **Rurality† (n=408,467)** | | |
| Major Cities | 245.1 (224.5-265.8) | 36.1 (29.1-43.2) |
| Regional | 319.1 (283.8-354.3) | 23.1 (12.6-33.7) |
| Remote/very remote | 261.9 (108.0-415.7) | 16.4 (0.0-48.2) |
| | | |
| **BMI (subsample n = 166,266)** | | |

| | | |
|---|---|---|
| Underweight/normal (<25) | 72.1 (50.9-93.3) | 16.4 (6.2-26.5) |
| Overweight (25-30) | 205.1 (166.5-243.7) | 32.7 (17.6-47.7) |
| Obese (>30) | 647.4 (568.9-726.0) | 52.0 (30.3-73.7) |

**Table 4** - Rate of OSA and snoring for main GP characteristics per 100,000 encounters in general practice between 2009- 2014 (n = 416, 606).

| | (95% CIs) | (95% CIs) |
|---|---|---|
| | | |
| Age (missing n = 2,591) | | |
| < 35 years | 250.8 (180.8-320.9) | 29.9 (9.4-50.5) |
| 35-44 years | 287.2 (244.2-330.3) | 28.6 (15.9-41.2) |
| 45-54 years | 282.3 (251.5-313.0) | 36.5 (26.3-46.6) |
| 55 years & older | 250.1 (223.2-276.9) | 28.9 (21.0-36.7) |
| | | |
| Gender (missing n = 0) | | |
| Male | 287.8 (263.6-312.1) | 24.1 (17.9-30.3) |
| Female | 235.3 (210.2-260.4) | 41.9 (32.3-51.6) |
| | | |
| FRACGP status (missing n=2,045) | | |
| Yes | 297.9 (272.0-323.7) | 31.4 (23.9-38.9) |
| No | 229.1 (205.6-252.6) | 31.3 (23.5-39.1) |
| | | |
| Practice size (missing n=8,153) | | |
| Solo | 254.1 (196.2-312.0) | 9.6 (0.2-18.9) |
| 2-4 GPs | 255.3 (221.5-289.1) | 37.0 (25.7-48.3) |
| 5-9 GPs | 265.2 (237.4-292.9) | 29.8 (21.6-38.0) |
| 10-14 GPs | 291.7 (245.7-337.7) | 40.8 (25.1-56.5) |
| 15 + GPs | 263.8 (199.3-328.2) | 28.5 (9.0-48.0) |
| | | |
| Country of graduation (missing n=1,036) | | |
| Australia | 282.3 (260.6-304.0) | 35.5 (28.5-42.4) |
| Overseas | 232.2 (202.0-262.4) | 22.7 (14.5-30.8) |

FRACGP status - Fellow of the Royal Australian College of General practitioners; practice size is a count of individual GPs and does not consider whether a GP is full time or part time.

## DISCUSSION

Over the 15 years of this study the management rates of both newly diagnosed and of previously diagnosed OSA in general practice tripled from 94 to 296 per 100,000 encounters. The most comparable condition being driven by the obesity epidemic is diabetes, which is far more likely to be managed, but growth in OSA encounters has been much faster (diabetes growth from 2000/2001 to 2013/14 was 2800 to 4200 per 100,000 encounters[16, 17]). In contrast, snoring steadily remained a rarely managed problem in general practice. Some stereotypical patient characteristics remained stable over this time, with 90% of sleep apnea patients being at least overweight (36% obese), and 66.5% being middle aged (50-74 years). However, the traditional view of the OSA patient being male has changed in general practice as the gender ratio of males:females has shrunk from 4:1 to approximately 2:1. The traditional gender imbalance of 6:1 or 8:1 seen in sleep clinics[4-6] has recently been reported to also be approaching the 2:1 ratio[2, 18, 19] expected from population prevalence estimates.[2,16,17]

Our results somewhat support our previous silo hypothesis of treatment for OSA and snoring. Previously we had identified a pattern where snorers reported that they were sent primarily to ENT surgeons and they may never have had a sleep study but sleep apnea patients said that they had been sent through the more traditional sleep clinic/sleep physician referral pathway.[10] The current study indicates that snorers are more likely (25%) to be referred to a surgeon than are sleep apnea patients (2%). Both are likely to be referred to a sleep clinic or sleep physician (41% of snorers and 53% of sleep apnea patients). This suggests that the potential 'silo' mentality we had previously identified based on historical reports from patients of what had occurred in their case,[10] may not be as strong as we had suspected.

We found no gender gap in the management rate of OSA or snoring in primary care (see Figure 3). Referrals were the most common clinical management for Conditions but overall referral rates, as

well as referral rates to tertiary medical specialists (e.g. sleep clinics), did not differ between the sexes.

There are some limits to the implications that can be drawn from this data. BEACH data does not tell us what happens to patients after they are referred, and whether they actually enter tertiary care. We do not know whether GPs are having their patients formally tested for OSA, and by which means (via a laboratory or in-home testing) or which pathway (testing only after seeing a specialist vs direct referral for testing). Our previous survey within New South Wales found that surgical options were the most common patient-reported treatment for sleep disordered breathing, and that usually this was not accompanied by any formal diagnostic test.[10] While the current data show that OSA patients are referred more commonly to medical care (i.e. sleep physicians) than surgical care, we do not know whether patients are being referred for comprehensive diagnostic services. As such patients managed for OSA may or may not have the condition or may have a related condition such as Central Sleep Apnea or simple snoring. Conversely snoring patients in this study may also have occult sleep apnea that has not yet been identified formally.

This is a comprehensive nationally-representative long-term characterisation of sleep disordered breathing management in general practice within Australia. OSA management in Australian general practice has significantly increased in both absolute and relative terms. This growth is mirrored in medicare billing data for polysomnography.[20] Males are at twice the risk of OSA compared with females, and the vast majority of patients with OSA are overweight or obese. While GPs rely heavily on the help of other health professionals for the management of OSA, our results suggest that the care they do provide, and their referral choices, are aligned with what most sleep physicians would recommend.[21,22]

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