

Otolaryngology -- Head and Neck Surgery

<http://oto.sagepub.com/>

Uvulopalatopharyngoplasty funded by the Australian government's Medicare scheme (1995-2007)

Nathaniel S. Marshall, Stuart MacKay, Richard Gallagher and Sam Robinson

Otolaryngology -- Head and Neck Surgery 2010 142: S10

DOI: 10.1016/j.otohns.2009.06.011

The online version of this article can be found at:

http://oto.sagepub.com/content/142/3_suppl/S10

Published by:



<http://www.sagepublications.com>

On behalf of:



AMERICAN ACADEMY OF
OTOLARYNGOLOGY-
HEAD AND NECK SURGERY

FOUNDATION

[American Academy of Otolaryngology- Head and Neck Surgery](http://www.aao-hns.org)

Additional services and information for *Otolaryngology -- Head and Neck Surgery* can be found at:

Email Alerts: <http://oto.sagepub.com/cgi/alerts>

Subscriptions: <http://oto.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Mar 1, 2010

[What is This?](#)

ORIGINAL RESEARCH

Uvulopalatopharyngoplasty funded by the Australian government's Medicare scheme (1995-2007)

Nathaniel S. Marshall, PhD, Stuart MacKay, MBBS, Richard Gallagher, MBBS, and Sam Robinson, MBBS, Sydney and Wollongong, New South Wales, and Adelaide, South Australia, Australia

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

ABSTRACT

OBJECTIVE: To describe the provision, through the Australian state-funded Medicare system, of uvulopalatopharyngoplasty (UPPP) and its laser-assisted variation (LAUP) to the population of Australia between 1995 and 2007.

STUDY DESIGN: Case series using a comprehensive national administrative database.

SETTING: The Commonwealth of Australia.

SUBJECTS AND METHODS: Subjects comprised the population of Australia. The raw numbers of procedures, reimbursement amounts in Australian dollars, and per capita adjustment nationwide and in each state/territory for UPPP and LAUP for each calendar year from 1995 to 2007 were downloaded from a publicly accessible database run by Medicare.

RESULTS: The Australian federal government paid AUD 8.2 million for 19,534 UPPP procedures and AUD 1.1 million for 3270 LAUP procedures in the calendar years 1995 to 2007, inclusive. There is substantive variability between states in provision. Over time, provision of UPPP has declined slightly compared with population growth and overall Medicare provision. LAUP provision has declined markedly.

CONCLUSION: Provision of UPPP under Medicare in Australia has declined slowly relative to population growth and overall growth in Medicare per capita provision. Laser-assisted UPPP (LAUP) has steadily declined and is now rarely used compared with the peak in its provision in the mid 1990s.

© 2010 American Academy of Otolaryngology–Head and Neck Surgery Foundation. All rights reserved.

Uvulopalatopharyngoplasty¹ (UPPP or UP3) is the most widely used and studied surgical technique used for the relief of snoring or sleep-disordered breathing (SSDB). Although a number of surgical procedures are used to treat snoring and sleep apnea inside the Australian Medicare system, UPPP is the only technique with its own billing code specific to snoring and sleep apnea. Laser-assisted UPPP (LAUP), a variant of UPPP, is also billed under its own code in Australia. Other procedures are frequently

used, such as adenotonsillectomy in children, but they are not exclusively used for the relief of SSDB.

UPPP and upper airway surgery for the relief of obstructive sleep apnea (OSA) in general have been subject to some controversy in Australia² and Sweden³ recently. It has also been suggested that the incidence of upper airway surgery for SSDB is increasing.² Current guidelines of the American Academy of Sleep Medicine recommend that upper airway surgery be offered to patients with sleep apnea when conservative or device therapies are rejected or ineffective. However, guidelines for LAUP support its use only for simple snoring, and not for sleep apnea.⁴

We recently described Australian clinical practice in managing SSDB by publishing a study using a postal questionnaire of 10,000 randomly selected residents of the Australian state of New South Wales. In this survey, respondents reported that surgery was the most common form of treatment for snoring or sleep apnea.⁵ Unfortunately, it was not possible to tell from these data what type of surgical procedure was used or whether the patients had simple snoring or sleep apnea. The data also suffer from the weaknesses that they were self-reported in 2000 and represent only middle-aged people from one state of Australia.

To clarify the frequency of upper airway surgery for SSDB, we have aimed to describe the objective provision, through the Australian state-funded Medicare system, of UPPP (and its variation LAUP) to the population of Australia between 1995 and 2007. The Medicare database describes data from a comprehensive universal healthcare system, which covers all residents of the country. As such these data can be regarded as being near census level in quality and coverage for the population of interest. We will also describe this provision in terms of available demographic features in the Medicare database (per capita adjusted, and by state of residence, age, and gender).

Methods

Data from the Medicare Benefits Scheme pertaining to uvulopalatopharyngoplasty (UPPP, item number 41786) and laser-assisted uvulopalatopharyngoplasty (LAUP, item number

Received March 8, 2009; revised April 29, 2009; accepted June 9, 2009.

41787) were obtained from an electronic database for the calendar years 1995 to 2007 (www.medicareaustralia.gov.au). The figures provided include only those services that are performed by a registered provider and for which a claim has been processed by Medicare. Such aggregated financial information does not require ethical review board oversight. The figures do not include any services that might have been charged completely within the private sector. However, most private sector operations will also have been billed to Medicare because even the wealthiest patients are entitled to have their operations billed publicly even when they are being treated privately. A privately undertaken operation will bill additional charges to the patient or the patient's insurance company when those charges exceed the standard Medicare benchmark.

Only registered providers may provide Medicare reimbursable services. In the case of UPPP and LAUP, only registered specialist ENT surgeons qualify as registered providers. It is not currently required that either UPPP or LAUP be accompanied by an overnight sleep study (which must be ordered by a certified sleep physician) or any previous attempt at any medical therapy. Growth in this fee-for-service system is not capped.

Australia is a federation of self-governing states, with some similarities to the state-federal structure in the United States, and comprises the states of New South Wales, Victoria, Queensland, South Australia, Tasmania, and Western Australia, as well as two self-governing territories—the Australian Capital Territory and the Northern Territory. Within Medicare data, state or territory is determined according to the address (at the time of claiming) of the patient to whom the service was rendered. Services per capita (per 100,000 population) were calculated by dividing the number of services processed in a month by the number of people enrolled in Medicare at the end of that month. Data were provided in age groups 0 to 4 years and then by decade to 75+ years. However, only data from 1995 onward were provided with adjustment for services per capita and thus, 1995 served as a baseline for most of our descriptions. Raw or gross expenditure and expenditure per capita for UPPP were also available. Data were presented as means \pm SD, unless otherwise noted. Data unadjusted for population were available for the early 1990s, but we have focused mostly on post-1994 data.

Data were retrieved in a number of formats: 1) crude raw counts of operations performed, categorized by age and gender groups and also across the states/territories; 2) crude expenditure in Australian dollars across demographic and region; 3) per capita services provided, categorized by state/territory and by age/gender; 4) per capita expenditure, categorized by state/territory.

Results

Between 1995 and 2007, Medicare funded 19,534 UPPP procedures at a reimbursement total of AUD 8.17 million. This equates to AUD 41,086 per 100,000 or 98 procedures per 100,000 people enrolled in the Medicare scheme in Australia over this timeframe. LAUP was billed much less frequently, with 3270 procedures costing a total of AUD 1.08 million, or AUD 5442 and 17 procedures per 100,000 enrollees. These figures do not reflect substantial variation in procedures among states/territories, and different genders and ages of patients (Tables 1-4). The raw number of UPPP procedures has remained relatively constant at around 1300 per year since an initial peak in 1995 to 1996 of 2000 procedures per year. However, after adjustment for population growth, the use of this item number has declined from around 11 procedures per 100,000 enrollees in 1995 to 1996 to around six to seven procedures per 100,000 in 2006 to 2007 (Fig 1). This national decline reflects a general decline in the use of the procedure in most states (data not shown but available on request). Males have accounted for around 85 percent of procedures undertaken, and most of these males are 25 to 64 years of age. The female age peak has been in the 35 to 64 years age range (data not shown but available on request). The provision of LAUP has had a much more marked decline in both relative and absolute terms; after a peak in its use in the mid 1990s, it is now rarely used. Both UPPP and LAUP provision has also decreased compared with the overall growth in Medicare services, as corrected for population growth. Overall Medicare expenditure has increased in the last four years after being stable for a decade (Fig 2).

Discussion

The Medicare database describes patterns of use inside the Australian universal healthcare system. For UPPP and

Table 1
Provision of uvulopalatopharyngoplasty by territory/state and nationwide in Australia (1995-2007)

1995-2007	NSW	VIC	QLD	SA	WA	TAS	ACT	NT	Total
Raw number	5500	5139	2866	2225	2639	551	458	156	19,534
Procs per 100,000 people	82	105	76	145	136	113	139	76	98
Payment total AUD (1000s)	2321	2159	1205	891	1117	217	193	67	8171
AUD per 100,000 people	34,531	43,961	32,078	57,954	57,662	44,377	58,802	32,611	41,086

ACT, Australian Capital Territory; AUD, Australian dollars; NSW, New South Wales; NT, Northern Territory; Procs, procedures; QLD, Queensland; SA, South Australia; TAS, Tasmania; VIC, Victoria; WA, Western Australia.

Table 2
Provision of laser-assisted uvulopalatopharyngoplasty by territory/state and nationwide in Australia (1995-2007)

1995-2007	NSW	VIC	QLD	SA	WA	TAS	ACT	NT	Total
Raw number	682	1220	440	243	636	32	6	11	3270
Procs per 100,000 people	10	25	12	16	33	7	2	6	17
Payment total AUD (1000s)	236	390	141	75	225	10	2	3	1082
AUD per 100,000 people	3510	7934	3754	4900	11601	2032	586	1724	5442

ACT, Australian Capital Territory; AUD, Australian dollars; NSW, New South Wales; NT, Northern Territory; Procs, procedures; QLD, Queensland; SA, South Australia; TAS, Tasmania; VIC, Victoria; WA, Western Australia.

LAUP this probably means that the vast majority of all procedures undertaken in this country during 1995 to 2007 are included in this data set, and the data can probably be regarded as being close to a census in terms of inclusivity. Because the Medicare billing system lists only two surgical procedures specific to SSDB, we have been restricted to the description of UPPP and its variant LAUP. We postulate that the demonstrated slow population-relative decline in the billing of UPPP and the more rapid decline in LAUP were in response to increased provision of alternative, probably device-based treatments (continuous positive airway pressure and mandibular advancement splints) over the broad spectrum of snoring and sleep-disordered breathing/sleep apnea patients.

Medicare covers all Australians, with either citizenship or residency, and is responsible for administering payments to medical practitioners for consultations, tests related to medical diagnosis, and surgical procedures. The only exception is the payment of such services performed on patients admitted as inpatients to hospitals administered by the state and territory governments of Australia (public hospitals). Given that the vast majority of UPPP is performed in

private centers or as an outpatient procedure in public hospitals, Medicare probably funds the vast majority of UPPP operations in this country. The Medicare system is a fee-for-service system in which growth in provision is not explicitly capped. We are not aware of other data sources that are as nationally comprehensive and provide data over such a long period of time and that can be used to track the impact that evidence-based guidelines might have on provider behavior.

In the last 10 years, a simple, validated staging system allowing stratification of SSDB patients into those requiring UPPP alone versus UPPP with multilevel treatment has been introduced into widespread clinical practice.⁶⁻⁸ It has become clear that only patients with large tonsils and a small oral tongue size are appropriate for UPPP as a sole procedure (with a predicted 80% response rate). This explains why the results of unselected UPPP have been disappointing while multilevel surgery incorporating UPPP has been much more encouraging.⁸ A recent meta-analysis⁹ of all multilevel surgery (n = 1978) reported that 66.4 percent achieved a respiratory disturbance index (RDI) of less than 20 and a reduction in RDI of more than 50 percent. A

Table 3
Per capita provision of uvulopalatopharyngoplasty across age ranges in Australian states/territories and nationwide (1995-2007)

Age (yrs)	NSW	VIC	QLD	SA	WA	TAS	ACT	NT	Total
0-4	1	1	1	1	2	0	0	0	1
5-14	1	1	3	2	3	0	0	0	2
15-24	15	22	14	34	21	12	20	9	18
25-34	79	102	70	102	120	79	111	63	89
35-44	151	213	159	268	259	214	224	124	190
45-54	203	255	193	374	340	292	329	232	246
55-64	147	160	116	259	238	214	313	188	166
65-74	51	48	40	86	76	83	125	36	55
75-84	8	4	4	15	6	18	10	0	7
≥85	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0
Average	82	105	76	145	136	113	139	77	98

ACT, Australian Capital Territory; NSW, New South Wales; NT, Northern Territory; QLD, Queensland; SA, South Australia; TAS, Tasmania; VIC, Victoria; WA, Western Australia.

Figures listed in the table indicate the number of procedures per 100,000 enrollees in Medicare for that particular region (absolute number provided by corresponding author upon request).

Table 4
Per capita provision of laser-assisted uvulopalatopharyngoplasty across age ranges in Australian states/territories and nationwide (1995-2007)

Age (yrs)	NSW	VIC	QLD	SA	WA	TAS	ACT	NT	Total
0-4	1	1	2	0	2	0	0	6	1
5-14	1	1	1	1	1	3	2	0	1
15-24	1	2	2	2	4	3	2	3	2
25-34	9	19	7	12	24	6	0	3	13
35-44	17	46	22	24	62	8	2	12	30
45-54	21	66	32	39	78	13	4	15	41
55-64	23	43	21	35	57	14	0	0	31
65-74	11	16	8	13	39	3	6	0	14
75-84	2	4	0	4	6	4	0	0	3
≥85	0	0	2	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0
Average	10	25	12	16	33	7	2	5	16

ACT, Australian Capital Territory; NSW, New South Wales; NT, Northern Territory; QLD, Queensland; SA, South Australia; TAS, Tasmania; VIC, Victoria; WA, Western Australia.

Figures listed in the table indicate the number of procedures per 100,000 enrollees in Medicare for that particular region (absolute number provided by corresponding author upon request).

recently published 10-year follow-up¹⁰ of a systematic review¹¹ of the quality of the published UPPP literature concluded that although the volume and quality of published studies had improved markedly, there was still margin for improvement.

Unfortunately, we were not able to determine from the billing codes which UPPP operations were done for simple snoring or obstructive sleep apnea (OSA). We also could not judge which UPPP operations were performed as a part of a multilevel reconstructive protocol for OSA, but a superior outcome over isolated UPPP might be expected if this were the case in the majority of patients.⁷ We also have no way to know whether UPPP/LAUP was ordered in conjunction with an overnight sleep study (polysomnography) be-

cause that diagnostic test must be ordered by a sleep physician, rather than an ENT surgeon.

The popularization of LAUP in the 1990s was initially based on short-term and limited data. However, longer-term and higher level studies have demonstrated that promising early results (at around 3 months) are frequently not sustained beyond 12 months, and treatment with LAUP could worsen SSDB.¹² Therefore, current clinical guidelines indicate no role for LAUP in the treatment of OSA. In addition, the advent of low-morbidity palatal-stiffening procedures for simple snoring in the last decade (for which no item number exists) might explain the effective abandonment of the LAUP technique by Australian ENT surgeons.¹³⁻¹⁶

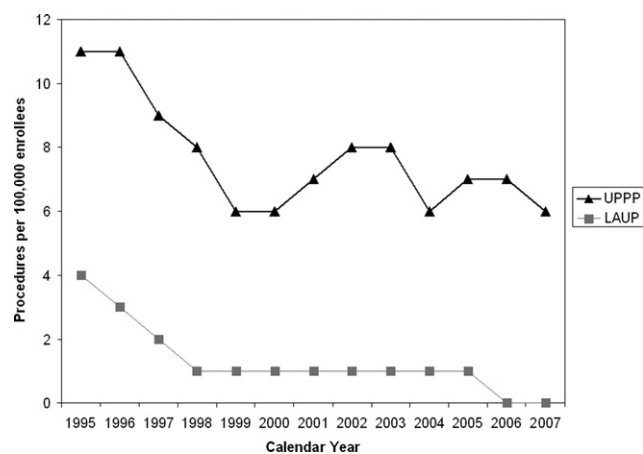


Figure 1 Per capita Medicare billing for uvulopalatopharyngoplasty (UPPP) and laser-assisted uvulopalatopharyngoplasty (LAUP) in Australia (1995-2007) showing a population-relative decline in use of both these procedures. Per capita data were available only from 1995 onward.

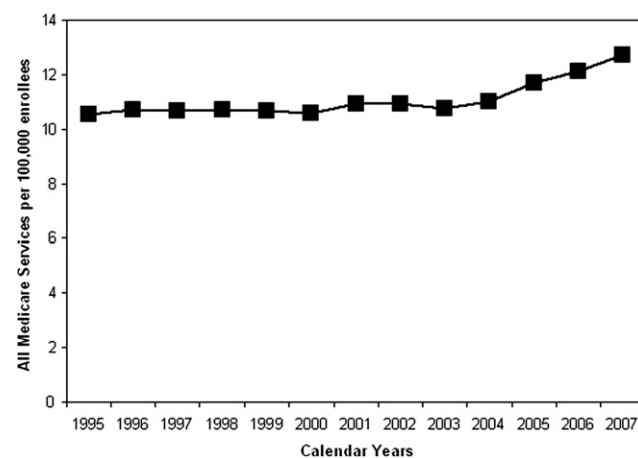


Figure 2 Per capita Medicare billing for all services in Australia (1995-2007) showing a slight increase in procedures billed during the same time period as the decline in uvulopalatopharyngoplasty (UPPP) and especially in laser-assisted uvulopalatopharyngoplasty (LAUP), as detailed in Figure 1.

Data from a postal survey of New South Wales electoral enrollees performed in 2000⁵ indicated that over their lifetimes the most common treatment for SSDB was surgical and was not usually associated with a sleep study. The Medicare data we present here indicate a shallow relative decline in the use of UPPP and a marked decline in LAUP since then; thus, it appears that the proportion of people being treated for SSDB by purely surgical means has declined over time. By assuming that the steady increase in Medicare-funded provision of polysomnography (i.e., sleep studies)¹⁷ can be used as an index of medical treatment provision, we postulate that the ratio of medical to surgical therapies has increased markedly. This would be consistent with the provision of upper airway surgery in the context of a salvage treatment for SSDB in which conservative and device therapy are rejected, poorly tolerated, or ineffective: a practice that is in line with current American Academy of Sleep Medicine clinical guidelines. However, we were not able to examine this hypothesis directly from these Medicare billing data.

Conclusion

The provision of UPPP to the Australian population (1995–2007) has been declining slightly relative to population size, and is also declining relative to the noted growth in polysomnography billed to Medicare over the same period and the slight growth in overall population-adjusted growth in overall Medicare provision. Provision of LAUP has been in marked relative and absolute decline since an initial peak in use during the mid 1990s.

Acknowledgment

Keith Wong: provision of useful comments on the manuscript.

Author Information

From the Woolcock Institute of Medical Research, University of Sydney, and the National Health and Medical Research Council Centre for Clinical Research Excellence in Respiratory and Sleep Medicine (Drs. Marshall and Gallagher), Sydney, New South Wales, Australia; the Flinders Medical Centre, Bedford Park, and the Memorial Hospital (Dr. Robinson), North Adelaide, South Australia, Australia; the St. Vincents Hospital, Darlinghurst (Dr. Gallagher), Sydney, New South Wales, Australia; and the University of Wollongong and the South-Eastern Sydney and Illawarra Area Health Service (Dr. MacKay), Sydney, New South Wales, Australia.

Corresponding author: Nathaniel S. Marshall, PhD, Sleep and Circadian Research Group, Woolcock Institute of Medical Research, PO Box M77, Missenden Rd, NSW Australia 2050.

E-mail address: nmarshall@med.usyd.edu.au.

Author Contributions

Nathaniel S. Marshall, conception and design, acquisition, analysis, and interpretation of data, drafting of article, final approval of article; **Stuart**

MacKay, interpretation of data, critical revision of article, final approval of article; **Richard Gallagher**, interpretation of data, critical revision of article, final approval of article; **Sam Robinson**, interpretation of data, critical revision of article, final approval of article.

Disclosures

Competing interests: None.

Sponsorships: The Centre for Clinical Research Excellence in Respiratory and Clinical Sleep Medicine and the Australasian Sleep Trials Network, funded by the National Health and Medical Research Council of Australia (salary to N.S.M.). Sponsor had no input in study design, analyses, or the decision to publish.

References

1. Fujita S, Conway W, Zorick F, et al. Surgical correction of anatomic abnormalities in obstructive sleep apnoea syndrome: uvulopalatoplasty. *Otolaryngol Head Neck Surg* 1981;89:923–4.
2. Elshaug AG, Moss JR, Southcott AM, et al. Redefining success in airway surgery for obstructive sleep apnea: a meta analysis and synthesis of the evidence. *Sleep* 2008;30:461–7.
3. Franklin KA, Anttila H. Effects and side-effects of surgery for snoring and obstructive sleep apnea—a systematic review. *Sleep* 2009;32:27–36.
4. Littner M, Kushida CA, Hartse K, et al. Practice parameters for the use of laser-assisted uvulopalatoplasty: an update for 2000. *Sleep* 2001;24:603–19.
5. Marshall NS, Bartlett DJ, Matharu KS, et al. Prevalence of treatment choices for snoring and sleep apnea in an Australian population. *J Clin Sleep Med* 2007;3:695–9.
6. Thorpy MJ, Chesson A, Derderian S, et al. Practice parameters for the treatment of obstructive sleep apnea in adults: the efficacy of surgical modifications of the upper airway. *Sleep* 1996;19:152–5.
7. Friedman J, Ibrahim H, Joseph NJ. Staging of obstructive sleep apnea/hypopnea syndrome: a guide to appropriate treatment. *Laryngoscope* 2004;114:454–9.
8. Sher AE, Schechtman K, Piccirillo JF. The efficacy of surgical modifications of the upper airway in adults with obstructive sleep apnea syndrome. *Sleep* 1996;19:156–77.
9. Lin H-C, Friedman M, Chang H-W, et al. The efficacy of multilevel surgery of the upper airway in adults with obstructive sleep apnea/hypopnea syndrome. *Laryngoscope* 2008;118:902–8.
10. Megwalu UC, Piccirillo JF. Methodological and statistical problems in uvulopalatopharyngoplasty research: a follow-up study. *Arch Otolaryngol Head Neck Surg* 2005;134:805–9.
11. Schechtman K, Sher AE, Piccirillo JF. Methodological and statistical problems in sleep apnea research: the literature on uvulopalatopharyngoplasty. *Sleep* 1995;18:659–66.
12. Berger G, Stein G, Ophir D, et al. Is there a better way to do laser-assisted uvulopalatoplasty? *Arch Otolaryngol Head Neck Surg* 2003;129:447–53.
13. Brietzke SE, Mair EA. Injection snoreplasty: extended follow-up and new objective data. *Otolaryngol Head Neck Surg* 2003;128:605–15.
14. Nordgård S, Stene BK, Skjøstad KW, et al. Palatal implants for the treatment of snoring: long-term results. *Otolaryngol Head Neck Surg* 2006;134:558–64.
15. Maurer JT, Hein G, Verse T, et al. Long-term results of palatal implants for primary snoring. *Otolaryngol Head Neck Surg* 2005;133:573–8.
16. Emery BE, Flexon PB. Radiofrequency volumetric tissue reduction of the soft palate: a new treatment for snoring. *Laryngoscope* 2000;110:1092–8.
17. Marshall NS, Wilshire B, McEvoy RD, et al. Polysomnography in Australia—trends in provision. *J Clin Sleep Med* 2007;3:281–4.