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Residual and recurrent non-melanoma skin cancers in Australia

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ABSTRACT

Introduction: Non-melanoma skin cancers (NMSC) are the most common skin cancers in Australia. There are very few studies which examine the epidemiology of residual and recurrent non-melanoma skin cancers.

Methodology: Medicare Australia (MA) billing data pertaining to the treatment of residual and recurrent NMSC were extracted. Data were subdivided into three different groups: primary treatment, residual treatment and recurrent treatments. Each sub-group was then examined after stratification for state, age and gender. The size of recurrent NMSC was also examined.

Results: There were 2,536,135 services for the treatment of NMSC, with only 2.73% accounting for the treatment of residual or recurrent treatments. The proportion of NMSC treated for recurrence was 1.53%. The proportion of NMSC requiring residual treatment was 1.26%. Over 71% of NMSCs treated for recurrence were initially treated by serial cautery and curettage, radiotherapy or cryotherapy. Approximately 11,594 of original NMSC lesions requiring a second treatment for residual occurrence were under 10mm, representing over one half of the residual NMSC billed.

Discussion: In brief, this study examines the proportion of residual and recurrent cases being billed to MA. This is the first study which examines rates throughout Australia. While most studies examine recurrence rates after surgical excision, this study also takes into account treatment of recurrences using ablative techniques.

INTRODUCTION

Non-melanoma skin cancers (NMSC) are the most commonly occurring cancer in Australia [1]. It is estimated that they cost the Australian Government $511 million in 2010 alone [2]. Incidence and prevalence rates of NMSC have been studied extensively over the last 50 years [1]. In contrast, there are a limited number of studies, which have investigated the demographics associated with residual and recurrent NMSC, particularly in the whole of Australia.

Studies in private practices or specialist tertiary centres in Australia have demonstrated that residual NMSC can occur in anywhere between 0.7% (3) to 12% [4]. Figures for recurrence also vary from 0.7% [3] in a private practice in Queensland to 8.0% [5] in an Australia-wide study examining lesions treated with Mohs surgery.

Around the world, recurrence rates have been found to be in the order of 3.3% to 5% [6-9]. A study by Sussman et al. of 723 BCCs conducted in Middlemore, New Zealand demonstrated that 11% of primary excisions had residual tumour cells [10]. By contrast, another study in New Zealand conducted in 1997 examining 61 lesions, found that the rate of residual tumour cells was 31% [11]. This study however, focuses on lesions that were excised by General Practitioners (GPs) who where possibly less experienced than the specialists used in the study by Sussman et al. [10]. The overall rate of incomplete excisions for GPs was found to be 16%, 12% for surgical consultants and 8% for surgical trainees [12]. Three different studies evaluating residual rates from hospital in-patients also showed similar results with rates of 13.73% [13], 14% [14] and 14% [12] respectively.

Examining these demographics and the proportions of NMSC services for the treatment of residual and recurrent NMSC, contributes to the understanding of the total burden of NMSC.

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METHODOLOGY

The Human Resources and Ethics Committee (HREC) granted approval to the Cancer Council of Victoria (CCV) on the 1/10/2008 by the Department of Health and Ageing and was given the reference number 2008/CO004599. Ethics approval was for the use of Medicare Australia (MA) data to be examined by the CCV for epidemiological purposes. MA publishes the total number of claims and benefits paid. These are made freely available to the public. MA data relevant to treatment of recurrent and residual non melanoma skin cancers were collected. The item numbers included: 31256, 31261, 31266, 31271, 31276, 31281, 31286, 31291, 31257, 31262, 31267, 31272, 31277, 31282, 31287, 31292, 31258, 31263, 31268, 31273, 31278, 31283, 31288, 31293, 31295.

Data were subdivided into three different groups: primary treatment, residual treatment and recurrent treatments. Each sub-group was then examined after stratification for state, age and gender. Treatment services were also examined by provider type – i.e. the number of specialists vs. the number of general practitioners (GPs) that provided the treatment service. Proportions of recurrent and residual non-melanoma skin cancers were calculated.

RESULTS

For this study 2,607,119 services were extracted for use. Overall, MA was billed most commonly for serial curettage, carbon dioxide laser or erbium laser excision-ablation. For the treatment of NMSC, 60% of item numbers were billed by male patients in the 70 -79 year-old age group.

There were 2,536,135 services billed for the treatment of NMSC. Only 2.73% of these billings accounted for the treatment of residual or recurrent treatments (Table 1). Of the residual NMSC treatments billed, 80% were re-treated by the original practitioner.

Table 1. Number of primary, recurrent and residual treatment services in Australia from 2004 -2007

	Frequency	Percent
Primary	2,536,135	97.3
Recurrent	39,004	1.50
Residual (same practitioner)	22,101	.85
Residual (other practitioner)	9,879	.38
Total	2,607,119	100.0

New South Wales had the highest number of NMSC treatments. Both New South Wales and Queensland accounted for over 72.2% of medicare billings for all NMSC treatments(including primary, recurrent and residual lesions). In contrast the Australian Capital Territory, Northern Territory and Tasmania required roughly 2.65% of Australia's NMSC services.

Recurrent NMSC

A total of 39,004 recurrent NMSC treatments were billed between the period of 2004-2007. Specialists accounted for 78.9% of doctors treating these recurrences. Over 71% of NMSCs treated for recurrence were initially treated by serial cautery and curettage, radiotherapy or cryotherapy. The item number for recurrent NMSCs previously treated by these procedures does not define a lesion size and thus the sizes of most recurrences are not known. However, of the remaining recurrences where the size was known, over half of the lesions (5,802 services) were under 10mm. Recurrent lesions over 20mm accounted for 12% of all lesions. These lesions over 20 mm were removed by specialists in over 77 % of cases (**Table 2**).

Table 2. Size of recurrent NMSC by provider type

		NMSC SIZE				Total
		< 10 mm	11-20 mm	> 20 mm	unknown	
PROVIDER TYPE	General Practitioners	3,368	1,482	300	3,095	8,245
	SPECIALISTS	2,434	2,749	1,021	24,555	30,759
Total		5,802	4,231	1,321	27,650	39,004

Overall, the percentage of primary NMSC treatments that required subsequent treatment for a recurrence varied between states. Interestingly, only 1.12 % of all primary treatments in Queensland required further treatment for recurrence while 2.34% of primary treatments in Victoria required further treatment for recurrence **(Table 3**).

Table 3. Number of primary NMSC treatments and number of recurrent NMSC treatments by State/Territory.

	PRIMARY NMSC TREATMENTS	RECURRENT	% PRIMARY NMSC THAT REQUIRE SUBSEQUENT TREATMENT FOR RECURRENCE
New SOUTH WALES	985,293	15,449	1.57
Queensland	851,746	9,513	1.12
Victoria	311,362	7,291	2.34
Western Australia	198,915	2,905	1.46
South Australia	121,718	2,225	1.82
Australian Capital Territory	32,135	783	2.43
Tasmania	21,184	642	3.03
Northern Territory	12,184	181	1.40
Other/unknown	908	15	-
Total	2,536,135	39,004	1.53

Age group trends seen in the recurrent treatment of NMSC demonstrated that patients in the 70-79 year age group were the most likely patients to have a recurrent NMSC. Patients aged between 60 -79 years old accounted for more than half of the recurrent NMSC treatments. In the 50–79 year age group male patients were more likely to have a recurrence, with males in the 60-69 year age group almost twice as likely to have a recurrence compared to females. Males accounted for 60% of services for treatment of recurrences.

Residual NMSC

Similar to recurrent NMSC, Queensland and New South Wales accounted for the bulk of residual NMSC treatments billed (63.7% combined) in Australia. South Australia and Western Australia billed similar numbers of NMSC residual treatments (2,643 and 2,128 respectively), despite Western Australia billing 56% more primary NMSCs than South Australia.

Overall, the proportion of NMSC requiring residual treatment was 1.26% (**Table 4**). Rates were lowest in New South Wales at 1.06% and highest in Australian Capital Territory at 2.42%.

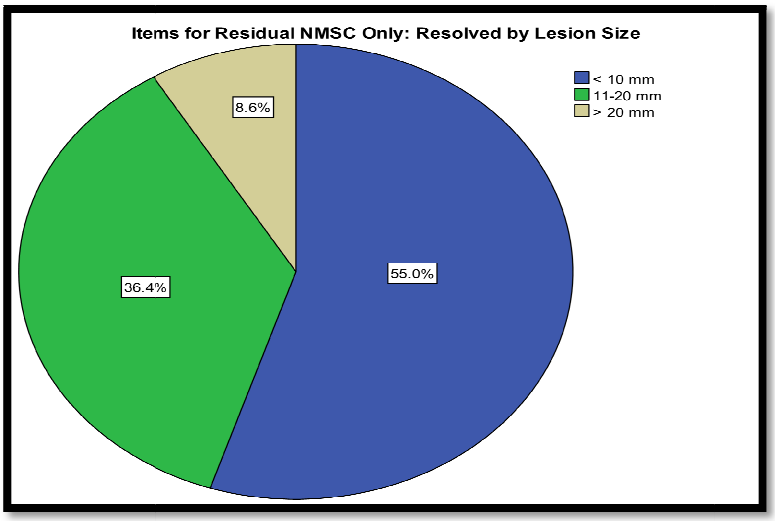
Table 4. Number of residual NMSC treatments by State/Territory.

	PRIMARY NMSC TREATMENTS	RESIDUAL NMSC TREAMENTS	PROPORTION OF RESIDUAL NMSC TREATMENTS%
New South Wales	985,293	10,441	1.06
Queensland	851,746	9,939	1.17
Victoria	311,362	5,539	1.32
Western Australia	198,915	2,643	1.33
South Australia	121,718	2,128	1.75
Australian Capital Territory	32,135	777	2.42
Tasmania	21,184	259	1.22
Northern Territory	12,184	240	1.97
Other/unknown	908	14	-
Total	2,536,135	31,980	1.26

Sizing of recurrent NMSC

Approximately 11,594 of original NMSC lesions requiring a second treatment for residual occurrence were under 10mm, representing over one half of the residual NMSC billed (**Figure 1**).

Figure 1. Pie graph representing proportions of the size (< 10mm, 11-20mm and > 20mm) of the original NMSC which required further residual treatment.



DISCUSSION

NMSC remains the most common cancer in Australia, yet there is limited literature examining the trends in recurrent or residual NMSC.

This study is the first that reviews both recurrent and residual NMSC within the whole of Australia using multiple treatment modalities.

The method of using MA data to evaluate the frequencies of residual and recurrent NMSC has not been used to evaluate recurrence or incomplete excisions. There have been no recent studies that have examined these figures in Australia. Studies by Malhotra et al. [15] and Leibovitch et al. [16] examine an Australia-wide databases, however the NMSC in these studies were excised only by Mohs surgery.

MA item numbers chosen for this study were all relevant to NMSC. Each billing code has a service 'definition' or criteria. For example item 31277 contains the following criteria: "Basal or squamous cell carcinoma, residual, removal of, from face, neck (anterior to the sternomastoid muscles) or lower leg (mid calf to ankle), where performed by a practitioner other than the practitioner who provided the previous treatment, where the original tumour size was more than 20mm in diameter and where removal is by surgical excision (other than by shave excision) and suture and where the specimen excised is sent for histological examination". Unfortunately since each of the item number 'definitiions' assigned by Medicare include either Basal cell or squamous cell carcinoma in the definition, it was not possible to determine what type of NMSC was treated at the visit .

The proportion of recurrences (8%) predicted in a study by Czarnecki et al. (1996) were more than four times higher than the rates predicted in this chapter (1.54%), which was an unexpected result. All patients seen in the study by Czarnecki et al. [17] were seen by one doctor in a private practice and a public hospital every 3-6 months. Factors such as specialist treatment and participant selection are potential biases. Presumably, specialist treatment would result in increased accuracy of detecting both new and recurrent NMSCs. Given the quarter-yearly follow-up, it is likely that a larger number of recurrences were picked up by Czarnecki [17] compared to routine examination by a patient's regular practitioner and recorded by MA. This discrepancy may suggest that providers are not accurately picking up recurrences of NMSC in the wider population, or that providers are under-reporting NMSC recurrence treatments to MA, reporting these as primary treatments instead.

Residual NMSC rates in Australia, ranged within the literature, between 0.7% and 24.5%, while rates for recurrence ranged between 0.7 and 17% [5,15-27]. There are a number of reasons for these discrepencies. Overall, the studies did not use a sample population that was representative of all NMSC lesions. For example, in some studies, lesions examined were obtained from specialist referral centres, specialist clinics or GP-run clinics. Lesions excised by specialists were more likely to have a lower residual and recurrence rate compared to lesions excised by GPs. One study examined reports from a single pathologist who received excised lesions from rural and metropolitan Western Australia. This was the only study that examined lesionsfrom all specialist types and GPs [28].

Studies by Malhotra et al. and Leibovitch et al. examined recurrence and residual rates in the entire Australian population. Data for these studies were extracted from the database for Skin and Cancer Foundation of Australia [5,15,18,22,26]. However, the estimated rates were for lesions treated with Mohs surgery. Some of the studies examined rates within one body location or lesions with perineural invasion [16,18].

The rates for both recurrence and residual NMSC vary in both the Australian studies and in the studies performed overseas. Furthermore, most studies in Australia examined reports from surgically excised lesions, with only one study which examined a variety of treatments within a specialist referral centre [29]. Whilst the studies led by Leibovitch et al. [5,16,18,19,22] and Malhotra et al. [25-27] examined lesions from the entire Australian population, they focused on only one treatment modality. There are no other studies that examine recurrent and residual NMSC in the entire population. Access to the MA data set allows for a novel approach in exploring residual and recurrent NMSCs in the Australian population that have been treated with a variety of modailities.

This study also revealed that lesions under 10mm in diameter were more likely to require a second excision for residual NMSC. One suggested reason is that larger lesions may be treated with larger margins to ensure that the whole lesion is excised, where as smaller margins are more likely to be used for smaller lesions. The results of this study may potentially dictate future guidelines on the treatment options for NMSC and may prompt further review of the recommended excision margins for smaller lesions.

A limitation of this study was that there was no record of the initial lesion the recurrence was associated with. For example, in a patient with several primary lesions excised over the last month, there was no way of identifying which primary lesions developed the recurrence. The time frame for recurrences was therefore unable to be calculated.

Another limitation of examining the recurrent and residual NMSC databases are that the assumption was made that providers billed MA correctly. While there is no financial incentive to bill a recurrent lesion as a primary NMSC, it is a possibility that physicians may not remember the characteristics of the original primary due much time passing between the primary and recurrence. This would explain the low numbers of residual and recurrent billing data for NMSC. Given that the Medicare definitions contained arbitrary groupings of NMSC body locations (e.g. item 31256 is used for NMSC on the nose, eyelid, lip, ear, digit or genital), it was not possible to analyse body location trends and produce results that could be interpreted.

Furthermore, recurrences may take years to develop and there is a possibility that a clinician would bill the recurrence as another primary lesion rather than a recurrent lesion. This study was based on the assumption that residual and recurrent lesions were accurately billed to MA. Unfortunately, body locations of each NMSC lesion were not recorded by MA and therefore rates of residual and recurrent lesions could not be calculated for each body part.

This study focused on rates of residual and recurrent NMSC rates within Australia and in each state. The Medicare data has the potential to examine these trends further at a Local Government Area (LGA) level. Further studies could then examine if differences in rates lie within rural and urban populations, and whether this difference is a reflection of the experience of the healthcare providers. Furthermore, with the rise of GP-led skin clinics in Australia, future monitoring of rates within these clinics could be examined in more depth.

Due to the limitations in the Medicare dataset, body locations were not able to be obtained. Hence, distinguishing between cryotherapy, electrocautery and dessication and laser was not possible. Studies that examine rates of recurrence in lesions that have initially been treated using these modalities have not been conducted in Australia. Future research could be conducted on a smaller scale to establish rates in Australia for each treatment modality and to make recommendations in the future regarding their use in the treatment of NMSC.

In brief, this study examines the proportion of residual and recurrent cases being billed to MA. This is the first study which examines rates throughout Australia. While most studies examine recurrence rates after surgical excision, this study takes into account recurrences using ablative techniques.

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