Skin cancer clinics in Australia: workload profile and performance indicators from an analysis of billing data

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ABSTRACT

Objective: To describe the workload profile in a network of Australian skin cancer clinics.

Design and setting: Analysis of billing data for the first 6 months of 2005 in a primary-care skin cancer clinic network, consisting of seven clinics and staffed by 20 doctors, located in the Northern Territory, Queensland and New South Wales.

Main outcome measures: Consultation to biopsy ratio (CBR); biopsy to treatment ratio (BTR); number of benign naevi excised per melanoma (number needed to treat [NNT]).

Results: Of 69 780 billed activities, 34 622 (49.6%) were consultations, 19 358 (27.7%) biopsies, 8055 (11.5%) surgical excisions, 2804 (4.0%) additional surgical repairs, 1613 (2.3%) non-surgical treatments of cancers and 3328 (4.8%) treatments of premalignant or non-malignant lesions. A total of 6438 cancers were treated (116 melanomas by excision, 4709 non-melanoma skin cancers [NMSCs] by excision, and 1613 NMSCs non-surgically); 5251 (65.2%) surgical wounds were repaired by direct suture, 2651 (32.9%) by a flap (of which 44.8% were simple flaps), 42 (0.5%) by wedge excision and 111 (1.4%) by grafts. The CBR was 1.79, the BTR was 3.1 and the NNT was 28.6.

Conclusions: In this network of Australian skin cancer clinics, one in three biopsies identified a skin cancer (BTR, 3.1), and about 29 benign lesions were excised per melanoma (NNT, 28.6). The estimated NNT was similar to that reported previously in general practice. More data are needed on health outcomes, including effectiveness of treatment and surgical repair.

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Skin cancer is by far the most common cancer in Australia.[1] In 2002, there were an estimated 374 000 cases of basal cell carcinoma (BCC) plus squamous cell carcinoma (SCC) — collectively referred to as non-melanoma skin cancer (NMSC).[1] NMSCs are also the most expensive cancer to treat: $264 million in 2000–01.[2] Melanoma is the most common cancer among 15–44-year-olds and the second most common cause of cancer death in that age group. It accounts for 3% of all cancer deaths in all ages (1199 deaths in 2001).[1]

Skin cancers are the most common cancer managed by general practitioners, with more than 800 000 patient encounters for skin cancer each year.[1] Although, historically, GPs have managed most skin cancers, there has been a rapid proliferation of skin cancer clinics in the past few years. Little is known about these clinics. Some include large "corporate" chains and others comprise independent operators. Concerns have been raised about the profile and quality of work done by some of these clinics,[3,4] but these have been based on isolated cases with adverse outcomes rather than systematic appraisals. There are no published data upon which a reasoned debate about these clinics can be based.

Using billing data, we describe the workload profile in one network of skin cancer clinics in Australia. We present some preliminary performance indicators, and compare aspects of diagnostic performance with those in general and dermatological practice.

METHODS

Setting

Over the first 6 months of 2005, we studied the activity of seven of the eight clinics operated by Skin Alert (www.skinalert.com.au) in the Northern Territory, Queensland and New South Wales. Skin Alert is a service company that develops the facilities in which doctors work as contractors. There is clinical independence, training is provided, there is an annual doctors' conference, and a medical management committee provides oversight of medical issues.

All clinics have day-surgery facilities available on site, with nurses supporting the doctors in theatre. A mixed billing practice is used, with pensioners and children bulk-billed, while most income-earners are charged a theatre fee for procedures. The basic clinical model includes an initial consultation with a full skin examination (using a hand-held dermatoscope) but no digital imaging systems. If biopsies are required, these may be done during the initial consultation or at a separate time in theatre, as considered appropriate (they are typically punch biopsies). All excisional surgery is done in theatre.

At the time of our study, the clinics had been open for between 1 and 8 years and were staffed by 20 doctors — mainly Australian-trained GPs who were working full-time or part-time in skin cancer medicine.

Data collection

Medicare billing data are routinely collected each month from all clinics by staff at head office (excluding the eighth clinic not included here). These data, for the first 6 months of 2005, were de-identified and made available to the researchers in this form. Clinical records (including age and sex) and pathology records are held at each clinic and were not available to us. Hence, with the limited data available to us, it was not possible to perform a per-patient analysis, and multiple billings may have applied to one patient at one consultation. Nor was it possible to explicitly link an individual patient consultation with the patient's biopsy, any subsequent excision, and the pathology result.

Analysis

We tabulated all available billing data (as defined and categorised in the Medicare Benefits Schedule)[5] and analysed the data in the following categories (Box 1):

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1 Billed activites, by category and item number

Procedure		Item numbers
Consultation	Short	3, 52
	Standard	23, 53
	Long	36, 44, 54
Biopsy	Usually a punch biopsy	30071
Lesion removed	Benign	31200–31240
	BCC/SCC/other NMSC	31255–31295
	Melanoma	31300–31355
Repair	Flap repair (simple)	45200
	Flap repair (complicated)	45203
	Flap repair (site-specific)	45206
	Wedge excision	45665
	Graft	45439, 45445, 45451
	Ellipse with direct suture repair*	31200–31240, 31255–31295, 31300–31355
Non-surgical treatment of cancers	For example, curettage or liquid nitrogen treatment	30196, 30197, 30202, 30203
Other treatments	Cryotherapy to premalignant lesions	30192
	Other benign lesion treatments	30195

BCC = basal cell carcinoma. NMSC = non-melanoma skin cancer.
SCC = squamous cell carcinoma. * Total number of ellipse excisions with direct suture repair was calculated as total number of lesions removed minus number repaired by flaps, wedge excisions or grafts. ◆

- *Consultation:* short, standard or long;
- *Biopsy:* usually a punch biopsy;
- *Lesion removed:* benign, BCC/SCC/other NMSC, or melanoma;
- *Repair:* removal by ellipse with direct suture repair; flap repair (simple, complicated or site-specific); wedge excision; graft;
- *Non-surgical treatment of cancers:* eg, curettage or liquid nitrogen treatment; and
- *Other treatments:* including cryotherapy to premalignant lesions and other benign lesion treatments.

In accordance with Medicare Benefits Schedule rules, patients were not billed for a consultation when subsequently undergoing a biopsy or excision at a time different from the initial consultation, nor for normal aftercare.

In the absence of suitable outcome measures from comparable studies to describe our workload profile, we developed two ratios (the consultation to biopsy ratio [CBR] and biopsy to treatment ratio [BTR]) and used a modified version of number needed to treat [NNT]) (Box 2).

Our approach to estimating NNT would tend to overestimate the NNT compared with direct use of pathology data (which were not available to us), as items 31205–31240 are used both for benign (pigmented) naevi and a range of other benign (but non-pigmented) lesions excised for a variety of reasons.

RESULTS

There were 69 780 billed activities during the first 6 months of 2005 across all seven clinics — equivalent to about 20 billed activities per doctor per day. A breakdown of these activities is presented in Box 3.

In all, 6438 cancers were treated, of which 116 were melanomas treated by surgical excision, 4709 were NMSCs treated by excision, and 1613 were NMSCs treated non-surgically.

The CBR was 1.79 and the BTR was 3.1. The estimated NNT was 28.6.

DISCUSSION

To our knowledge, this is the first report of the workload profile in skin cancer clinics in Australia or elsewhere. It provides an important perspective on workload that other clinics and doctors working in the field may wish to use for comparison.

How can we characterise the workload profile revealed by our analysis? The clinics are busy, providing many consultations, large numbers of biopsies, and thousands of medical and surgical treatments. About 6400 cancers were treated, mainly NMSCs but including 116 melanomas, and about 2500 patients had premalignant lesions (actinic keratoses) treated.

We could find no published data with which to compare our CBR of 1.79, and it would be instructive to know what the ratio is for other skin cancer clinics and specialist practices. Importantly, the BTR was 3.1, indicating that about every third biopsy identified an NMSC. We believe that, on face value, this does not represent an excessive biopsy rate. In a US study of dermatologists involving 11 072 lesions biopsied over 6 months, the malignancy ratio (defined as the ratio of malignant tumours to all tumours) was 41%.[7] Furthermore, significant variation in the practice of dermatologists in this regard has been noted.[7,8]

The NNT in our analysis was estimated at 28.6. In other words, about 29 benign naevi are excised per melanoma. The caveat here is that by using billing data we included all benign lesions excised, not only benign naevi. Hence, the actual NNT would be smaller than 28.6, but we cannot estimate how much smaller. Our result is similar to the NNT of 29 (calculated using pathology data) found in a Perth study of treatment of skin lesions in mainstream general practice.[9] In a Victorian study, the NNT was reported to be 29.9 for GPs compared with 11.7 for dermatologists.[10] We are developing a project to determine the NNT for the Skin Alert clinics using pathology data, but at this stage we have no direct evidence that the NNT is any lower than in mainstream general practice.

2 Outcome measures*

Consultation to biopsy ratio (CBR)

Total number of consultations divided by total number of biopsies

Biopsy to treatment ratio (BTR)

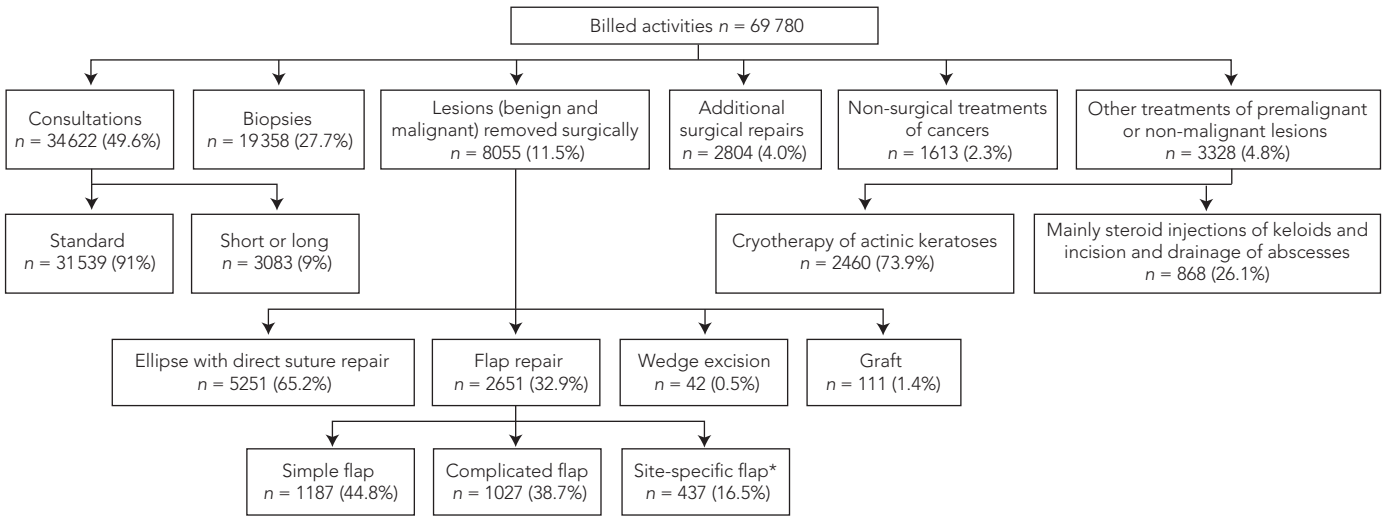
Total number of biopsies divided by total number of non-melanoma skin cancers (treated either surgically or non-surgically)

Number needed to treat (NNT)

Number of benign lesions (pigmented or non-pigmented) excised per melanoma, defined as number of benign lesions excised (items 31205–31240 — ie, all lesions sent for histological confirmation) plus number of melanomas excised divided by number of melanomas excised

* For all measures, the number of procedures was based on number of billings for the relevant Medicare Benefits Schedule items. ◆

3 Activities billed at seven Skin Alert clinics in the first 6 months of 2005



* Eyelid, nose, ear, lip, neck, hand, digit or genitals. ◆

A quarter of NMSCs were treated non-surgically, which is about the same as the proportion reported in a national survey,[6] suggesting that the therapeutic choices made for treatment of NMSCs in the Skin Alert clinics reflect standard practice throughout Australia. However, it is vitally important to determine what proportion of NMSCs are treated definitively. For NMSCs treated surgically, this means determining the proportion of specimens with margins reported to be clear of cancer. We are developing a project to determine this.

Almost two-thirds of the lesions treated by surgery were elliptical excisions with direct suture repair. About half of the other excisions were repaired with a simple flap. Our literature review did not provide any data from other settings with which to compare this surgical profile. Major concerns have been raised by the Australian Society of Plastic Surgeons[3] about the type and quality of surgery done in some skin cancer clinics. It will be critically important to further characterise the surgical workload in skin cancer clinics: is surgery always needed, is choice of flap repair appropriate, and what is the quality of the cosmetic result?

Interpretation of our results should be cautious. We had access only to billing data, not to demographic, clinical or pathology data. Nevertheless, being aggregated over a 6-month period from seven clinics and 20 doctors, the data provide a useful average across a large system of skin cancer clinics, incorporating doctors of various levels of experience, clinics that have been operating for various lengths of time, and populations with different profiles of age and skin disease. Our data cannot describe the individual experiences of patients attending the clinics. Neither can our findings necessarily be generalised to other corporate clinic chains or independent providers. We urge colleagues to repeat and extend our analyses.

The substantial and growing burden of skin cancer in Australia[1,2] demands an effective, efficient, and safe system for treatment, both in primary care and through referral. Both mainstream general practice and, it would now seem, a growing network of skin cancer clinics are playing a significant role in skin cancer treatment and management. We have provided the first workload profile from skin cancer clinics, presented some performance indicators, and compared performance with general and dermatological practice where data exist. However, much more research is needed to better characterise the type and quality of work done in these settings and to ensure the best patient outcomes.

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COMPETING INTERESTS

David Wilkinson works in a Skin Alert skin cancer clinic 1 day each week and is paid for this work in the same way as other doctors working in these clinics. Anthony Dixon works in private practice in Geelong and is contracted by Skin Alert (and other organisations) to provide educational programs to its doctors. Skin Alert skin cancer clinics made these data available with no restriction on the analyses undertaken. The company Board reviewed the manuscript for accuracy before initial submission (and made no comment), and had no influence on the data presented or their interpretation.

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