

Costs of Non-Melanoma Skin Cancer

Final Report

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Table of Contents

Table of Contents	3
List of Tables	4
Background	5
1 Incidence and treatment	5
2 Health system expenditure	6
3 How we might identify costs of NMSC more accurately	7
4 The 45 and Up Study – prevalence of NMSC	8
5 Medicare costs for treating NMSC	11
6 Discussion	12
7 Conclusion	12
8 References	14

List of Tables

Table 1: Prevalence of non-melanoma skin cancer by ARIA, sex and age for respondents from the 45 and Up cohort (n=103,042)	9
Table 2: Distribution of characteristics of respondents from the 45 and Up cohort (n=103,042) with and without a previous diagnosis of non-melanoma skin cancer (NMSC)	10
Table 3: Frequency of skin cancer surgery among those with previous diagnosis of non-melanoma skin cancer (NMSC) by ARIA, sex and age	11
Table 4: Medicare benefits for items used to treat NMSC in NSW	11

Background

Non-melanoma skin cancer (NMSC) is the most common cancer diagnosed in Australia and according to a report from AIHW is estimated to be the most expensive cancer.¹ While mortality is low relative to other cancers (1% of cancer deaths were due to NMSC in 2003²), the high incidence of NMSC results in a substantial cost burden on the health system. The aim of this paper is to report the current information available on non-melanoma skin cancer (NMSC) and the cost of its treatment. It has been prepared at the request of the Cancer Institute NSW as part of the Costing and Economic Evaluation Program (CHEEP). It summarises the published information, describes how more accurate estimates of the treatment costs could be developed, and investigates the information available from respondents to the 45 and Up Study as at August 2008 dataset (n=103, 042). Finally, it concludes with the prospects for further research.

1 Incidence and treatment

NMSC is not recorded by any cancer registries in Australia except Tasmania so limited information is available on incidence. The best available incidence data come from the periodic cross-sectional national surveys conducted by the National Cancer Control Initiative (NCCI) in 1985, 1990, 1995 and 2002 using face-to-face interviews.^{3,4} These surveys asked respondents about skin cancers treated in the previous 12 months and also asked their permission to contact the treating doctor to verify the diagnosis. The NCCI reported the incidence of clinically confirmed (not all have histological diagnosis) and treated basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and total NMSC in the 12 month period preceding each survey. It also reported the type of treatment and type of treatment centre.

The most recent survey (2002) recorded a 32% response rate (sample 57,215 aged over 13 years). Eighteen percent reported ever having a skin cancer treated and 7% (4,098 people) reported being treated in the previous 12 months, of whom 77% gave consent to contact their treating doctor. Eighty percent of doctors responded to the request giving access to diagnosis for 61% of people reporting skin cancer treatment in the past 12 months. The age standardised incidence rate for NMSC was 1,170 per 100,000 persons per year.⁴ New South Wales (NSW) had the second highest incidence after Queensland (excluding Northern Territory and the Australian Capital Territory as the rates were based on small numbers).³ Treatment was by surgical excision for 75%, cryotherapy 10% and curettage or diathermy 9%. The treatment centre type was: general practitioner 51% (NSW 40%), dermatologist 18% (NSW 22%), skin cancer clinic 10% (NSW 20%), plastic surgeon 6% (NSW 3%), other surgeon 3% (NSW 4%) and hospital 2% (NSW 1%). Time trends between 1985 and 2002 showed an overall increase in both BCC and SCC; the increase was in older age groups with rates stabilising in the under 60s for BCC and under 50s for SCC, suggesting an effect of campaigns to reduce sun exposure.⁴

Although rates of mortality and hospitalisation due to NMSC are generally low, a report from the Australian Institute of Health and Welfare (AIHW) and Cancer Australia found evidence of differences in both by remoteness of residence and socio-economic status (SES).⁵ People living in high SES areas had more hospital separations and lower mortality for NMSC than those in low SES areas. Hospital separations were higher for people living in inner regional areas than other areas but mortality for NMSC was highest for outer regional areas.

2 Health system expenditure

The AIHW report on Australia's expenditure on cancer in 2000-01 (published 2005) found that NMSC was the cancer with the highest expenditure overall (9% of total expenditure on cancer), the second highest expenditure in men (after prostate) and the second highest in women (after breast).¹ NMSC represented 25% of out-of-hospital medical expenditure for cancer and 7% of expenditure on admitted care. Expenditure was driven by the number of cases rather than cost per case; based on the NCCI survey data, the estimated number of cases of NMSC treated in 2001 was 364,140 compared with 88,398 new cases of all other cancers combined in the same year. Admitted care accounted for 45% of NMSC expenditure while out-of-hospital medical care accounted for 32%. The remaining expenditure comprised pharmaceuticals (less than 0.5%) and other (made up of aged care, research and other professionals).

This study tells us something about gross expenditure but some of the methods of assigning expenditure to disease are based on data which ignore changing patterns of disease, treatment and health service delivery. More importantly, it is not possible to calculate an average cost per case for NMSC using these results because of the limitations in terms of the available incidence data which measure cases treated within a one year period rather than true incident cases. The same cases may have been previously treated for NMSC and/or may be treated for new NMSC lesions in the future.

For the AIHW report, the following data sources were used to identify health expenditure and apportion this to cancer and the type of cancer.

2.1 Hospital

The proportions of total expenditure in public acute hospitals for admitted care were sourced from *Australian Hospital Statistics 2001-02*. Private hospital expenditure were obtained from the ABS Private Health Establishments Survey. Inpatient costs were estimated and allocated to the disease using DRG and National Hospital Data Collection data. Costs for sub-acute and non-acute admitted patients were estimated from the 1996 SNAP study. Non-admitted costs were allocated to the disease by adjusting the 1993-94 pattern (based on the 1989-90 ABS National Health Survey) for demographic changes. However, since the period of the survey there have been shifts from hospital outpatients to Medicare billing in this time, which may mean that these patterns no longer apply.

2.2 Out-of-hospital medical

The total expenditure was based on Medicare data and allocated to disease using the BEACH data.

2.3 Pharmaceuticals

Prescription drug expenditure was based on Pharmaceutical Benefits Scheme (PBS) data and used the Pharmacy Guild Survey data to estimate expenditure on private prescriptions

and under co-payment priced drugs. The BEACH data were used to allocate expenditure on prescription drugs to disease. Expenditure on over the counter drugs was derived from *Health Expenditure Australia 2001-02* and allocated to the disease by adjusting the 1993-94 figures (based on the 1989-90 ABS National Health Survey) for demographic change and increased expenditure in this area.

2.4 Research

Expenditure derived from *Health Expenditure Australia 2001-02* was allocated to disease using the ABS Research and Experimental Development survey data.

2.5 Other health professionals

Expenditure derived from *Health Expenditure Australia 2001-02* was allocated to the disease by adjusting the 1993-94 disease figures (based on the 1990-91 Survey of Morbidity and Treatment in General Practice in Australia and the 1989-90 ABS National Health Survey) for demographic change.

2.6 Aged care homes

Expenditure derived from *Health Expenditure Australia 2001-02* was allocated to disease using the ABS Disability Aging & Carers Survey data.

Thus the existing estimates for the 'disease costs' of NMSC are based on a range of assumptions most of which have been drawn from data sources more than ten years old. Further, estimating costs using such 'top-down' approaches is problematic due to the need to exhaustively allocate funds across all programs, including shared costs of overheads and joint production. Thus, the cost estimates which result from such an exercise are of limited value in any policy sense as they cannot provide an indication of what costs would be saved, if the disease profile or treatment patterns were changed.

3 How we might identify costs of NMSC more accurately

Given the shortcomings of the AIHW cost estimates, the first question we addressed was whether recent developments in administrative and survey data would enable more accurate and current cost estimates.

3.1 Costing NMSC treatment using administrative data alone

The AIHW report found that admitted hospital care and out-of-hospital medical care were the main components of NMSC expenditure.¹ The NCCI survey found that GPs treated over half of cases with the remainder treated by skin cancer clinics, specialists or hospitals.³ This apparent contradiction may simply mean that the majority of patients are not admitted but

those requiring admission are a lot more expensive, or be due to treatment practices in rural areas where GPs often have hospital admitting and operating rights.

The most frequently used treatment for NMSC in 2001, surgical excision, is identifiable by the MBS item which includes the type of skin lesion. The items for ablative techniques such as cryotherapy, curettage or diathermy are described in terms of 'malignant neoplasm of skin or mucous membrane' so these might be assumed to be NMSC if it is reasonable to assume these techniques would not be used for melanoma. Other treatments (topical applications and radiotherapy) which might be difficult to identify as being for NMSC would apply to less than 2% of cases (as per the NCCI 2001 survey). The pathology costs for NMSC would only be identifiable if data items are identified as belonging to the same individual ie tissue pathology for the same person undertaken on the same day as an NMSC treatment item. The cost of admitted hospital care due to NMSC should be identifiable from NSW Health or NHDC data using ICD10 and DRG codes. These would need to be linked to the Medicare data, if we are to estimate an average cost per person treated for hospital care. The cost of an episode of treatment may be able to be derived from several components of care, eg GP, pathology, specialist and hospital.

There are some important cost items which would not be available through administrative data. Patient charges and private health insurance payments for operating theatre time in private clinics would not be available in an administrative database and would affect many of the cases treated by specialists and skin clinics. Additional medical visits associated with NMSC could not be identified as such in Medicare data and while it might be reasonable to assume specialist visits such as dermatology are NMSC related, this would not be the case for GP visits.

3.2 Survey and administrative data combined

A more complete costing could be achieved if the administrative data were augmented with linked longitudinal survey data such as that in the 45 & Up Study. This would be useful for establishing the incidence of NMSC and the extent to which individuals are treated for repeated NMSC lesions. It would require verification of each reported case with the treating doctor or hospital to identify the type of skin lesion. If the appropriate questions were added, it could also allow for the inclusion of operating theatre charges and items in administrative data that are not identifiable as NMSC related (such as GP consultations).

Thus, it is possible to use a different approach to estimate the treatment costs of NMSC. The most promising source is the 45 and Up study as this provides individual records, with the possibility of linkage to other administrative data. The first step was to establish prevalence within the survey cohort.

4 The 45 and Up Study – prevalence of NMSC

The 45 and Up Study is a general population cohort study of over 260,000 men and women aged 45 and over from NSW. Information about participants' health, lifestyle and demographic characteristics is collected by survey and linked with administrative datasets including the Medical and Pharmaceutical Benefits Schedule (MBS and PBS) datasets, the NSW Admitted Patient Data Collection, the NSW Central Cancer Registry and the ABS mortality data. The baseline survey was conducted from 2006 to 2008 and data are linked to

Medicare data from 2004 onwards. Arrangements for general access to the final 45 and Up Study dataset (including linked data) were being finalised at the time of the current study. Consequently, this paper draws on the August 2008 survey dataset (n=103, 042) without linkage to administrative data.

The 45 and Up survey asked participants if a doctor had ever told them that they have skin cancer (not melanoma) and if they have ever had surgery for skin cancer. The prevalence of NMSC increased with age and was higher for men than for women and higher among those living in inner and outer regional areas than those living in major cities (Table 1). Overall, 26% of survey respondents reported ever having had NMSC. As participants were aged 45 years or older and over represented regional and remote areas, this is substantially higher than that reported by the NCCI 2002 survey which included participants as young as 14 years.

Table 1: Prevalence of non-melanoma skin cancer by ARIA, sex and age for respondents from the 45 and Up cohort (n=103,042)

	Major city		Inner regional		Outer regional		Remote & very remote	
	Male n=22,293 %	Female n=22,459 %	Male n=17,165 %	Female n=19,850 %	Male n=8,842 %	Female n=10,200 %	Male n=957 %	Female n=1,151 %
Total	27.4	21.7	31.2	23.9	30.4	23.9	28.5	24.9
Age								
45-54	15	14	20	17	21	17	19	19
55-64	23	20	29	23	28	23	27	21
65-74	32	29	37	31	35	29	33	31
75-84	40	32	42	33	40	35	42	43
85+	39	30	41	33	37	39	50	36

Abbreviations: ARIA Accessibility/Remoteness Index of Australia

In the 45 and Up Study, there were some small differences in other socio-demographic characteristics between those reporting NMSC and those who did not, probably reflecting the higher prevalence of NMSC among the older age groups. Relative to those not reporting NMSC, a higher proportion of people reporting NMSC had private health insurance, a Department of Veterans Affairs (DVA) card or a Health Care card (Table 2). A slightly higher proportion of people with a low household income (less than \$40,000 per annum) reported having had NMSC.

Table 2: Distribution of characteristics of respondents from the 45 and Up cohort (n=103,042) with and without a previous diagnosis of non-melanoma skin cancer (NMSC)

	NMSC = Yes (26%) n=26,788 %	NMSC= No (74%) n=76254 %
Age		
45-54	18	32
55-64	29	33
65-74	27	20
75-84	21	12
85+	5	3
Sex		
Male	54	46
Female	46	54
Residence		
Major city	41	44
Inner regional	38	35
Outer regional	19	18
Remote & very remote	2	2
Education		
Degree or higher	22	23
Certificate/diploma/trade	33	31
Higher school/leaving	8	10
School/Intermediate	23	22
No qualification	12	12
Household income (gross)		
Missing	20	23
\$70,000 pa or more	20	23
\$40,000-69,999 pa	18	17
\$20,000-39,999 pa	20	17
\$19,999 pa or less	22	20
Health insurance		
Private	65	62
DVA card	5	2
Healthcare card	31	27
None of these	11	16

While the precise treatment for NMSC and the number of episodes of treatment are not identifiable from the 45 and Up Study survey data, the number of respondents reporting a previous operation for skin cancer are consistent with the NCCI data identifying surgical excision as the most common treatment. Among people reporting NMSC, the majority (80% or more) reported having had an operation for skin cancer; this was slightly lower for women compared to men (Table 3).

Table 3: Frequency of skin cancer surgery among those with previous diagnosis of non-melanoma skin cancer (NMSC) by ARIA, sex and age

	Major city		Inner regional		Outer regional		Remote & very remote	
	Male n=6,115 %	Female n=4,875 %	Male n=5,347 %	Female n=4,736 %	Male n=2,687 %	Female n=2,434 %	Male n=273 %	Female n=287 %
Total	84.2	80.3	84.8	81.0	84.6	80.6	81.7	79.8
Age								
45-54	84	79	85	82	83	81	75	78
55-64	85	81	85	81	85	81	81	81
65-74	84	81	84	80	84	81	83	74
75-84	84	80	85	80	85	81	85	91
85+	85	78	89	81	89	74	100	67

Abbreviations: ARIA Accessibility/Remoteness Index of Australia

5 Medicare costs for treating NMSC

The 2002 NCCI survey found that the treatment setting for all but 1% of people with NMSC in NSW was a GP, private clinic or specialist. While Medicare data does not identify the purpose of medical visits, the most frequently used item for GP consultation in the year July 2008 to June 2009 was item 23 and for specialist consultations item 104. The average benefit paid for these in 2008-2009 was \$33.48 per GP visit and \$70.06 per specialist visit (Table 4). The most frequently used Medicare items for excision of SCC or BCC in 2008-2009 were 31280, 31265, 31285, 31270 and 31255; together these five items represented 89% of all items claimed for removing NMSC in NSW. The average benefit paid for these five items was \$135.83 in 2008-2009. The most frequently used tissue pathology item (72816) attracted an average benefit of \$73.83 in 2008-2009. The average benefit for the individual items and the current benefit are listed in Table 4.

Table 4: Medicare benefits for items used to treat NMSC in NSW

Item	Mean benefit/claim in 2008-09 ^a	Current benefit ^b
	\$	\$
GP consultation		
23	33.48	34.30
Specialist consultation		
104	70.06	68.75
Excision BCC/SCC		
31280	109.00	125.25
31265	130.29	148.20
31285	151.07	171.15
31270	171.78	207.50
31255	141.19	177.85
Tissue pathology		
72816	73.83	73.95

^a Medicare Item Reports – 2008-09 financial year

^b Medicare Benefits Schedule May 2010

6 Discussion

There are existing (but not robust) data on the incidence and total proportion of health costs attributable to NMSC. The data sources (administrative combined with unlinked survey data) and costing approach (requiring assumptions about the distribution of costs and allocation of joint and overhead costs) mean these are extremely 'broad brush' estimates. More precise estimates could be obtained by using administrative data with linkage to survey data, at the level of the individual. While the NSW 45 & Up Study could provide the vehicle for this in the future, it would involve new data collection to comprehensively measure patient out-of-pocket costs.

There are known changes that will have affected service delivery patterns. There have been some changes in the item numbers and descriptors used to treat NMSC. It is likely that these have changed treatment and/or practice behaviour. At the same time, specialised skin cancer clinics have been established to diagnose and treat suspicious skin lesions. These do not require a referral from a general practitioner. It is not possible to distinguish general practitioner services from clinic services in the administrative data. Studies of these clinic services^{6,7} have relied on data provided by the clinics themselves but it is not clear that co-operating clinics are representative of all clinics. Even a study performed by clinic personnel was not able to obtain (or perhaps publish) individual data which would provide insights into service delivery at the episode of care or individual case level. If individual level data could be obtained, it too would be limited to a partial perspective unless services could be linked across providers at the individual level, and preferably over several years spanning changes to Medicare items and hospital funding. Furthermore, while such data analysis might provide some information on patterns of service delivery, without outcome data and some criterion for addressing appropriateness of treatment, little policy relevant information would be produced.

While the 45 & Up Study survey data provided prevalence estimates for NMSC that are consistent with the NCCI surveys, there is little that can be added to the existing cost information without the ability to estimate an annual cost per case using linked survey and administrative data over a period of several years. A comprehensive costing study would also require additional questions to be added to the 45 and Up Study survey to request information on all out-of-pocket costs and identification of NMSC related medical visits. However, there are no identifiable policy issues regarding the cost of NMSC that have emerged from discussions with the Cancer Institute NSW or the literature provided⁶⁻¹¹. The issues raised by the papers focus on uncertainty regarding the effectiveness of skin cancer screening in terms of the value of early intervention, the accuracy of GP screening and the effects of skin cancer clinics. While there may be questions around the impact of the latter on the volume of benign lesions excised, any analysis of existing data would not be able to address this.

7 Conclusion

The AIHW report on cancer expenditure found NMSC to have higher total expenditure than any other cancer. This result was driven by the high number of cases of NMSC relative to the number of cases of other cancers. The results from the 45 and Up survey are consistent with this, with 26% respondents reporting having had NMSC; surgical excision is the most common treatment. More rigorous cost estimates could be achieved using linked

administrative data augmented with longitudinal survey data. The collection of further waves will enable investigation of the incidence and subsequent treatment of NMSC. However, such an investigation would require substantially more resources. Unless there is a specific policy relevant question to be addressed, then further research is unlikely to add any new understanding to what is known already.

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