Non-melanoma skin cancer in Australia

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Abstract

Objectives: To report the burden and cost of non-melanoma skin cancer (NMSC) treatments in Australia and to project estimates of numbers and costs to 2015.

Design and setting: Retrospective study of data obtained from Medicare Australia for NMSC treated by excision, curettage, laser or cryotherapy between 1 January 1997 and 31 December 2010, by year, sex, age group and state or territory.

Main outcome measures: Total number, total Medicare Benefits Schedule (MBS) benefit and total cost in Australian dollars of NMSC treatments.

Results: The total number of NMSC treatments increased from 412 493 in 1997 to 767 347 in 2010, and we estimated that the number of treatments would increase to 938 991 (95% CI, 901 047–976 934) by 2015. The total MBS benefit for NMSC treatments in 2010 was $93.5 million, and we estimated that this will increase to $109.8 million (95% CI, $105.9–$113.7 million) by 2015, whereas the total cost with inflation (ie, cost which includes diagnosis, treatment and pathology) was $511.0 million in 2010, estimated to increase to $703.0 million (95% CI, $674.6–$731.4 million) by 2015.

Conclusion: NMSC treatments increased by 86% between 1997 and 2010. We anticipate that the number and the total cost without inflation of NMSC treatments will increase by a further 22% between 2010 and 2015. NMSC will remain the most costly cancer and place an increasing burden on the Australian health care system.

Non-melanoma skin cancer (NMSC), which includes basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), is the most common and expensive cancer in Australia[1,2] and places a high burden on the population, health care system and government. Australia has the highest incidence of NMSC in the world;[3] 2% of the Australian population (364 000 people) were treated for NMSC in 2001, with a total expenditure of $264 million making it the most expensive cancer.[1] In comparison, colorectal cancer was the second most common cancer in Australia in 2001, with 12 701 new cases and a cost of $235 million.[1] The risk of NMSC increases with age, and the ageing of the Australian population may increase the burden of NMSC on the Australian health system.

Unlike other cancers, the two subtypes of NMSC are not reportable to cancer registries in Australia.[2] Estimates of the number of treatments and cost of NMSC in Australia have been based on incidence data. The Australian Institute of Health and Welfare (AIHW) used these data to estimate health system expenditures,[1] but incidence data count only one instance of NMSC per year for an individual, whereas individuals diagnosed with NMSC tend to have multiple NMSCs.[4] Therefore, we were interested in the absolute number of treatments in 1 year and the associated costs.

We aimed to use Medicare data to report the annual numbers of NMSC treatments between 1997 and 2010, calculate the costs associated with these treatments and predict the numbers and costs for the year 2015.

Methods

For general information purposes, Medicare Australia publishes the total numbers of claims made and the benefits paid according to the Medicare Benefits Schedule (MBS) with respect to each individual Medicare item number. We sourced these freely available data from the Medicare Australia website for all item numbers that relate to treatment of NMSC.[5] We obtained the total number of claims and the total MBS benefit paid for claims for the period 1997 to 2010 by year, sex, age group, state and territory. We collected data pertaining to item numbers for the treatment of NMSC by excision, curettage, laser, or liquid nitrogen cryotherapy. The selected item numbers were: 30196, 30197, 30202, 30203, 31255, 31256, 31257, 31258, 31260, 31261, 31262, 31263, 31265, 31266, 31267, 31268, 31270, 31271, 31272, 31273, 31275, 31276, 31277, 31278, 31280, 31281, 31282, 31283, 31285, 31286, 31287, 31288, 31290, 31291, 31292, 31293 and 31295.

Data analysis

We formatted and analysed the data using Stata version 11.0 (StataCorp).

Number of NMSC treatments

We calculated age-specific rates of services for each year using population data from the Australian Bureau of Statistics (ABS).[6] We fitted separate linear regression models to the age-specific rates of services and extrapolated these rates to 2015. The age-specific rates of services were multiplied by the projected population data (Series B), which were also obtained from the ABS,[6] to estimate the number of NMSC treatments for the years 2011 to 2015. We calculated the standard error of the linear predictions (using Stata's "predict" command) and used these standard errors to calculate the corresponding 95% confidence intervals. Linear extrapolation is the option of choice for short-term predictions of most cancers.[7] We assumed that after 1997 no abrupt change in awareness and behaviour among the population occurred, as it did in the 1980s as a result of the start of the Australian Government-funded national skin cancer prevention campaign, "SunSmart", and that consequently the predictions would be more accurate using data from 1997 onward.[8]

MBS benefit and total treatment cost

The total benefit is the contribution of Medicare Australia for the service. However, rules regarding multiple procedures performed on the same day reduce the benefit paid for the second procedure by 50% and the third and subsequent procedures by 75%. While patients frequently make copayments to the treating doctor, the cost to Medicare is the specific cost of an NMSC treatment to the Australian health system. To estimate the total treatment cost for the years 2002 to 2010 we used the AIHW estimate for total treatment cost in 2001, which takes into account

1 Total number of services, total MBS benefit and total cost of non-melanoma skin cancer treatment in Australia, 1997–2015

Year	Total no. of services (95% CI)	Population*	Age-standardised rate of services,† per 100 000 (95% CI)	Total MBS benefit, $millions (95% CI)	Total cost‡ without inflation, $millions in 2001 (95% CI)	Total cost‡with health inflation, $millions (95% CI)
1997	412 493	18 514 741	2338 (2311–2366)	42.5	–	–
1998	443 701	18 708 571	2458 (2430–2486)	42.1	–	–
1999	452 914	18 923 236	2449 (2421–2477)	44.0	–	–
2000	467 669	19 153 840	2489 (2461–2517)	46.1	–	–
2001	510 590	19 413 240	2630 (2601–2659)	51.0	264.0	264.0
2002	544 028	19 662 781	2733 (2703–2762)	55.2	281.3	290.3
2003	591 179	19 895 435	2905 (2875–2935)	61.1	305.7	325.2
2004	617 546	20 127 363	2967 (2936–2997)	65.5	319.3	350.0
2005	635 959	20 328 609	2965 (2935–2995)	69.6	328.8	370.9
2006	649 476	20 697 880	2977 (2947–3007)	72.1	335.8	389.5
2007	667 647	21 015 042	2982 (2953–3013)	75.8	345.2	411.5
2008	693 022	21 431 781	3020 (2990–3050)	80.7	358.3	438.6
2009	724 520	21 955 256	3076 (3046–3106)	86.3	374.6	470.5
2010	767 347	21 991 011	3174 (3143–3205)	93.5	396.8	511.0
2011	801 988 (776 814–827 162)	22 319 066	3271 (3240–3303)	93.6 (90.9–96.3)	414.7 (401.7–427.7)	547.4 (530.2–564.5)
2012	835 270 (807 079–863 461)	22 647 464	3334 (3303–3366)	97.6 (94.6–100.6)	431.9 (417.3–446.5)	583.9 (564.2–603.6)
2013	869 194 (837 864–900 524)	22 976 367	3398 (3366–3429)	101.7 (98.4–105.0)	449.4 (433.2–465.6)	622.0 (599.6–644.4)
2014	903 766 (869 183–938 350)	23 305 898	3461 (3429–3493)	105.7 (102.1–109.3)	467.3 (449.4–485.2)	661.7 (636.4–687.0)
2015	938 991 (901 047–976 934)	23 636 109	3524 (3492–3556)	109.8 (105.9–113.7)	485.5 (465.9–505.1)	703.0 (674.6–731.4)

MBS = Medicare Benefits Schedule. * Data from the Australian Bureau of Statistics,[6] using Series B projections. † Age-standardised to the 2001 Australian standard population. ‡ Total cost is based on the Australian Institute of Health and Welfare report from 2001, and estimates before 2001 are not available.[1] ◆

costs related to admitted patients, out-of-hospital medical claims, pharmaceuticals requiring a prescription, pathology testing and consultations with general practitioners and specialists.[1] The total treatment cost for subsequent years was calculated, with and without inflation, by multiplying the unit cost of a single NMSC treatment by the total annual number of NMSC treatments identified by Medicare. To calculate the unit cost of a single NMSC treatment, we divided the total cost in 2001 estimated by the AIHW[1] by the total number of treatments in 2001 identified by Medicare Australia. To account for inflation, we adjusted the unit cost of a single NMSC treatment with the average annual growth rate for health inflation (ie, 3.2% per year).[9] We then multiplied the unit cost of a single NMSC treatment by the predicted number of NMSC treatments to obtain the predicted total cost of NMSC treatment for the years 2011 to 2015.

Results

Total count of NMSC treatments

In 1997 and 2010, Medicare claims were made for 412 493 and 767 347 NMSC treatments, respectively, representing an increase of 86%. We calculated that by 2015 the number of NMSC treatments will be 938 991 (95% CI, 901 047–976 934) (Box 1). This represents an increase of 22% between 2010 and 2015 and a doubling in the number of NMSC treatments between 1997 and 2015. The total number of treatments for each state and territory in Australia are provided as an Appendix (online at mja.com.au).

In 2010, 83% of NMSC treatments were administered in people aged 55 years and over, and nearly two-thirds of NMSC treatments were administered in people aged 65 years and over. Examination of the total number of NMSC treatments by year and age (Box 2) indicates that in 2015 most treatments will be provided to people aged 65–74 years (313 795 NMSC treatments; 95% CI, 297 209–330 389) and aged 75 years and over (324 151 NMSC treatments; 95% CI, 309 335–338 967). From 1997 to 2015, NMSC treatments provided to those aged 65–74 years and 75 years and over will have increased by 171% and 215%, respectively. In contrast, people aged less than 45 years will receive fewer than 50 000 treatments in 2015. NMSC treatments provided to those aged less than 45 years will show only a modest increase of 3% (1259 treatments) from 1997 to 2015. The age-specific rates for the years 1997 and 2010 were 355 per 100 000 and 310 per 100 000, respectively, for the youngest age group and 10 849 per 100 000 and 18 036 per 100 000 for those aged 75 years and over (Box 3). The age-specific rates are expected to increase to 318 per 100 000 and 20 398 per 100 000 for the youngest and oldest age groups, respectively, in 2015.

MBS benefits for NMSC treatment

In 2010, the total MBS benefit for NMSC treatments was $93.5 million. We estimated that the total MBS benefit for NMSC treatments will be $109.8 million (95% CI, $105.9–$113.7 million) in 2015 (Box 1). The Appendix shows the predicted MBS benefit for each state; Queensland and New South Wales account for most of the cost.

Total cost of NMSC treatment

The total treatment cost, adjusting for health inflation, was $511.0 million in 2010 (Box 1). We estimated that this amount will increase to $703.0 million (95% CI, $674.6–$731.4 million) in

2015. The gap between the total MBS benefit and the total treatment cost with health inflation rose from $213.0 million in 2001 to $417.5 million in 2010 and will rise to $593.2 million in 2015 (Box 1).

Discussion

This study showed a substantial increase in the number of NMSC treatments, the total MBS benefit and total cost of NMSC in Australia between 1997 and 2010, and we predict a further increase between 2010 and 2015.

We also estimate that the number of NMSC treatments in those aged 55 years and over will continue to rise significantly while the number of NMSC treatments in those aged less than 55 years will only rise modestly. These findings are consistent with previous Australian findings that showed no significant increase in the incidence of SCC among people aged less than 50 years and no significant increase in the incidence of BCC among people under 60 years of age.[3]

The increase in NMSC treatments could be explained in part by population growth; from 1997 to 2015 the number of people aged 65–74 years will increase by around 57% and the number of people ⩾ 75 years by 68%,[6] compared with the predicted increase in NMSC treatments in these age groups of 171% and 215%, respectively. In contrast, the 3% increase in NMSC treatments between 1997 and 2015 among people aged less than 45 years coincides with a predicted 15% increase in this population,[6] indicating a relative decrease in the number of treatments for this age group.

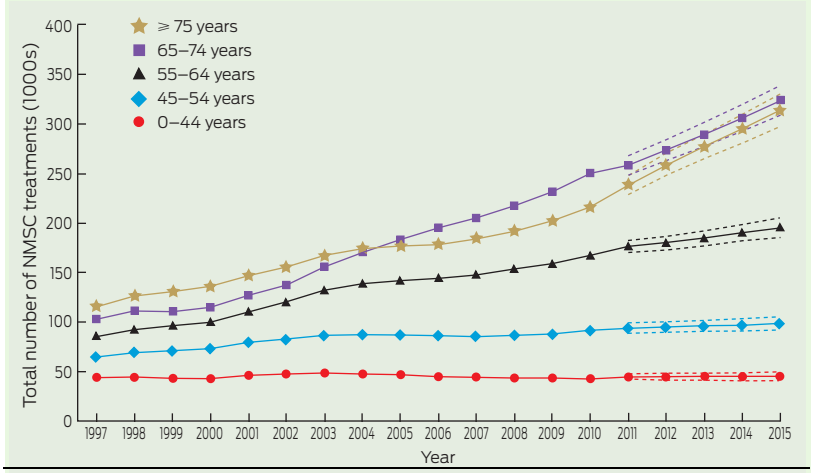
The increase in the total MBS benefit and total cost of NMSC reflects both population growth and the predicted increase in the total number of services. With 7.20 million residents in 2011, NSW has a larger population than other states in Australia and the highest number of NMSC treatments, and yet Qld, with a total population of 4.56 million in 2011, has a similar MBS benefit cost due to a higher incidence of NMSC.[3]

Our calculation of the MBS benefit cost is the cost of NMSC to the government and does not include co-payments made by the patient to the treating doctor. Medicare Australia records patient copayments for the purpose of calculating eligibility for benefits through the Extended Medicare Safety Net, a scheme that was introduced in March 2004 to help Australians who were facing substantial out-of-pocket costs for their medical services. These data were not available to us, so we were unable to calculate the total cost to the community of NMSC.

There are three major limitations of our dataset that could result in an underestimation of the disease burden and cost: Medicare Australia does not record data for veterans or patients treated within public hospitals; NMSC cases where treatment was provided by a GP without submission of the specimen for histological examination are not registered; and the extracted data were limited to occasions which were registered by Medicare and, as such, focused on procedures (ie, excision, curettage, laser or cryotherapy). In addition, we have assumed that the intensity of use of different health services (eg, Medicare services associated with NMSC, versus GP visits and hospitalisations) remains constant.

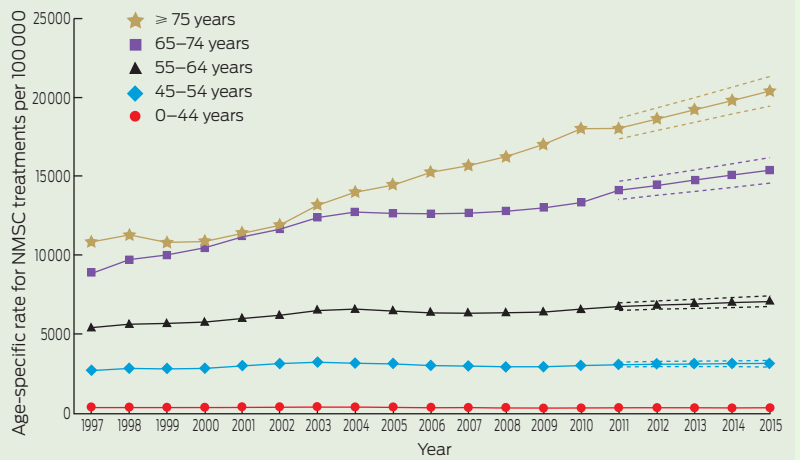
The cost to the government and the cost to the community for the treatment of NMSC will continue to increase in the near future. We predict the number of NMSC treatments in 2015 will be 938 991, the MBS benefit to government will be $109.8 million and that NMSC will continue to be the most costly cancer in Australia.

2 Total number of Medicare item numbers for non-melanoma skin cancer (NMSC) treatment, by age group, 1997–2015



Dotted lines represent the 95% confidence intervals around each of the predictions. ◆

3 Age-specific rate for non-melanoma skin cancer (NMSC) treatments, 1997–2015



Dotted lines represent the 95% confidence intervals around each of the predictions. ◆

NMSC trends have policy implications with respect to future medical workforce and physical infrastrucure requirements. In addition, continuing support for SunSmart can be evaluated with respect to the divergent NMSC trends between people aged above and below 55 years. In stark contrast to the pre-SunSmart "baby boomers", the number of NMSC treatments decreased relative to population growth among those aged under 45 years.

Future research will be focused on identifying trends in the incidence of NMSC, the ratio of BCC to SCC, associations between NMSC and other cancers, and the risk of subsequent primary NMSC.

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