

No End in Sight: The Skin Cancer Epidemic Continues

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The incidence of nonmelanoma skin cancer (NMSC) continues to increase. Multiple reports from the United States and Europe suggest we are in the midst of an epidemic. European studies show substantial NMSC incidence increases during the last 2 decades. In the United States, a recent analysis of Medicare Claims data showed that procedures performed for NMSC nearly doubled from 1994 to 2006. From these data, the total number of new NMSC in 2006 was estimated to be 3,507,693. Procedure data for 2006-2008 from the 5% Medicare Claims sample dataset corroborate the reported trajectory of incidence increase. Destructures, excisions, and Mohs procedures for NMSC have increased by 2.6% per year during the last 2 years. On the basis of this current rate of increase, the annual incidence of NMSC in the United States in 2008 would be nearly 3.69 million. Recognizing the NMSC epidemic is critical as the incidence—and cost—will continue to increase.

Semin Cutan Med Surg 30:3-5 © 2011 Elsevier Inc. All rights reserved.

Estimates from the past several decades have suggested that the incidence of nonmelanoma skin cancer (NMSC) is increasing. However, the magnitude of the skin cancer epidemic is difficult to gauge. Estimating the incidence of NMSC has been historically challenging. This can be attributed to lack of standardized registries and NMSC not being a reportable disease. Estimates within the last 2 decades vary by geography, sex, tumor type, database, and study method.¹ In the past year, reports from both the United States and Europe suggest that the incidence of NMSC is steadily and alarmingly increasing.^{2,3} In the United States, Medicare claims data were used to track the number of fee-for-service procedures performed for NMSC.² These figures were combined with data from the National Ambulatory Medical Care Survey to estimate the number of new NMSC and persons affected. The full extent of increasing skin cancer incidence and associated treatment costs are just now being realized.

Incidence Estimates of NMSC

Before the past year, the best estimates of NMSC in the United States dated to 1994. At that time, new cases of NMSC were placed between 900,000 and 1,200,000.⁴ Age-adjusted an-

nual incidence per 100,000 persons for basal cell carcinoma (BCC) ranged from 407 to 485 for men and 212-253 for women.⁴ Rates for squamous cell carcinoma (SCC) were much lower at 81-136 for men and 26-29 for women. Recent numbers from Scotland, the Netherlands, Wales, Germany, Canada, and Northern Ireland put BCC incidence rates between 54 and 128 per 100,000 persons per year for men and 44-105 for women.⁵⁻¹¹ for SCC, lower estimates between 11 and 46 for men and 5 and 23 for women were reported. These numbers pale in comparison with Australia. This population has the greatest incidence of NMSC estimated at 1%-2% per 100,000 persons per year.^{12,13}

Incidence Increases of NMSC

In nearly all longitudinal studies from the past 15 years, the incidence of NMSC has been increasing. NMSC incidence jumped 109% from 1972 to 1999 in New Mexico.¹⁴ In New Hampshire, an 80% increase in BCC incidence was found from 1979 to 1993.¹⁵ SCC increased 235% in women and 350% in men. A Canadian report from the New Brunswick Provincial Cancer Registry showed similar increases between 1992 and 2001.¹⁰ Estimates from South Wales indicate NMSC incidence increased from 173.5 to 265.4 cases per 100,000 persons annually from 1988 to 1998 in that population.⁶ A similar trend was seen in Northern Ireland.⁵ Scottish Cancer Registry data showed a modest increase in SCC, SCC in situ, and first-time BCC from 1992 to 2003.⁹

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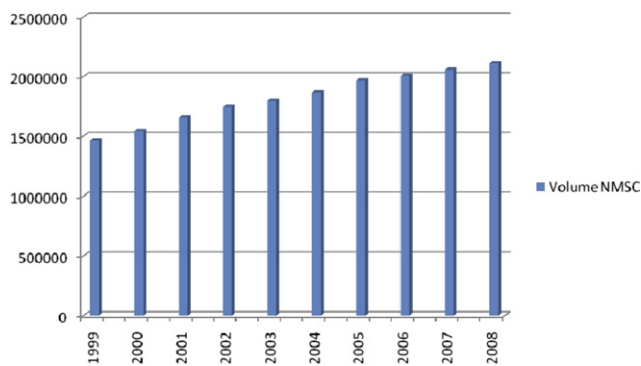


Figure 1 Total volume of procedures for NMSC per 5% sample Medicare Data Set (1999-2008).

A recently published, single-site study from the Netherlands provides further evidence of the NMSC epidemic. The authors evaluated all BCC specimens submitted to a single dermatologic oncology referral center in 1991, 1999, and 2007.³ BCC incidence increased by an alarming 7% per year.³ Incidence rates jumped from 54.2 to 162.1 per 100,000 men and 61.7 to 189.8 per 100,000 women per year from 1991 to 2007. Interestingly, they also noted a significant shift in type of BCC with increases in both superficial (from 17.6% to 30.7%) and infiltrating BCC (from 11.1% to 28.7%).

Medicare Claims Data and the U.S. NMSC Epidemic

An important study published in the last year has verified the existence of an NMSC epidemic in the United States.² Rogers et al² analyzed fee-for-service claims data on procedures for NMSC billed to Medicare. The Medicare total claims dataset was queried for malignant destruction, malignant excision, and Mohs procedure codes for 1992 and 1996-2006. Figures were then cross-referenced to the 5% sample Medicare data set (5SMD) and the National Ambulatory Medical Care Survey. Because a procedure for NMSC should not be performed unless a definitive histopathologic diagnosis has been obtained, the number of treatments is an excellent proxy for the number of NMSC. The total number of fee-for-service Medicare skin cancer procedures increased by 77% from 1992 to 2006. The age-adjusted procedure rate changed from 3514 per 100,000 beneficiaries in 1992 to 6075 in 2006. This represents a 4.2% annual increase in cases. Based upon procedures performed, they found that NMSC in 2006 was nearly double that in 1994. The extrapolated total number of

NMSC and persons with NMSC in 2006 were 3,507,693 and 2,152,500, respectively.

Interpretation of these data is not without limitation. This analysis did not incorporate data from private insurers and likely underrepresents non-Medicare populations. It also relied upon some survey data and imprecise ICD-9 codes in the 5% claims set. Nonsurgical treatments, such as imiquimod, 5-fluorouracil, or radiation for superficial NMSC, would also be missed. These modalities are often used as first-line treatments for superficial NMSC. Arits et al³ found a large regional shift toward superficial BCC in the Netherlands. If a similar trend is occurring in the United States, the volume of NMSC is significantly underestimated. Regardless, the volume of procedures claimed demonstrates the continued parabolic increase of NMSC in the Medicare population.

5% Sample Claims Data: A 2008 Update

An analysis of the most recent 5SMD shows that NMSC incidence continues to increase. These data represent a random sampling and are not reliable for exact procedure numbers. However, it demonstrates trends in procedure use and has information on associated International Classification of Disease, 9th Revision (ICD-9) codes. The 5SMD was queried from 1999 to 2008 for codes representing malignant destructions (11600-46), malignant excisions (17260-86), and Mohs procedures (17311, 17313). Cases performed for malignant melanoma were subtracted on the basis of associated ICD-9 data. These did not represent a significant number of Mohs cases or destructions but ranged from 0% to 25% for specific excision codes. Approximately 5% of procedures 17260-86 were performed for melanoma and were excluded from our calculations. The small number of adnexal tumors expected to be mixed with NMSC by code is not significant in this context.

The estimated number of procedures performed for NMSC in 2006, 2007, and 2008 was 2,007,803, 2,059,588, and 2,112,142, respectively. Figure 1 depicts increasing procedure volume from 1999 to 2008. There was a 44% increase in NMSC procedures during this span. As depicted in Table 1, annual incidence percent change has been positive each year from 1999 to 2008. From 2006 to 2008 the rate of increase was 2.6% per year. This is greater than that seen from 2005 to 2006 (1.9%) and lower than that from 1999 to 2005 (average 5% per year).

Table 1 Annual Percent Increases in Procedures Performed for NMSC on the Basis of 5% Sample Medicare Claims Data

Year	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
Annual % increase in procedures for NMSC (11600-46, 17260-86, 17311-3)	5.4	7.4	5.4	2.8	3.9	5.4	1.9	2.6	2.6

NMSC, nonmelanoma skin cancer.

Annual percent increases in the 5SMD are representative of total NMSC procedure increases in the Total Medicare Claims data. The annual percent increases from 1999 to 2006 for the 5% Sample Medicare set (Table 1) mirror those seen in the Total Medicare Claims data set. The published rates of increase for the Total Medicare Claims data for 1999-2006 are as follows: 1999-2000, 5.3%; 2000-2001, 7.5%; 2001-2002, 5.3%; 2002-2003, 2.8%; 2003-2004, 3.9%; 2005-2006, 2.0%.² Assuming other parameters stay relatively constant as calculated in 2006, the 2.6% annual increase seen in the 5SMD suggest the number of new NMSC in 2008 would be roughly 3,689,976.

The data set we referenced is limited and the period from 2006 to 2008 is short. These factors make it difficult to determine whether annual incidence rates will hold steady, increase to prior levels or decrease. Regardless, annual NMSC incidence continues to rise and the epidemic continues.

Conclusions

The increased incidence of NMSC appears to be multifactorial. Recreational and occupational outdoor activity, changes in clothing style, ozone depletion, and increased life expectancy likely contribute.^{1,11} Immunosuppression, ionizing radiation, and carcinogens are also important factors in affected populations. As life expectancy increases and the population age shifts, incidence should continue to increase.¹⁶

This NMSC epidemic has great implications for health care resource allocation. A recent review of the most current research on the societal cost of NMSC highlighted the findings of 4 studies.¹⁷ Estimates of the cost of NMSC in the Medicare population from 1992 to 1995 was 1.7 billion or 426 million a year.¹⁸ For this period, the estimated cost to the entire population was \$650 million a year. If the number of estimated NMSC has gone from 0.9 to 1.2 million in 1994 to over 3.6 million a year, costs may have increased 3-fold or more. Dermatologists treat most cases of NMSC in the office setting. Use of resources for NMSC will continue to increase in the future. Identifying the most cost-effective approaches to treatment is essential given the current financial climate and the increasing cost of health care in the United States. It is critical for health policy analysts and congress to recognize the NMSC epidemic. Because the Medicare pool is fixed except for the addition of money for additional beneficiaries, an increase in intensity of disease (more disease per patient) competes with existing dollars. As Medicare beneficiaries live longer their intensity of disease increases. If there is no adjustment made for this, reimbursement or cognitive services must decline proportionately. Refusal to add new money to

the Medicare pool will result in the epidemic being funded by those physicians treating the disease.

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