Check for updates

COMMENTARY

An estimation of the prevalence of nonmelanoma skin cancer in the U.S. [version 1; peer review: 2 approved]

Eshini Perera^{1,2}, Rodney Sinclair ¹¹Department of Dermatology, Epworth Hospital, Richmond, Melbourne, 3121, Australia²Faculty of Medicine, University of Melbourne, Melbourne, 3010, Australia

V1 First published: 09 Apr 2013, 2:107
<https://doi.org/10.12688/f1000research.2-107.v1>
Latest published: 09 Apr 2013, 2:107
<https://doi.org/10.12688/f1000research.2-107.v1>

Abstract

Nonmelanoma skin cancer (NMSC) is the most commonly diagnosed cancer in Australia and has a significant impact on the cost of and use of healthcare resources. Current estimates of NMSC in the USA are 3.5 million cases in 2010 compared to 1.63 million cases of all other cancers combined. However, we believe that this figure significantly underestimates the prevalence of NMSC in the USA. We calculated that melanoma is diagnosed 5.7 times more in the USA than in Australia. In Australia, in 2010, there were 767,000 NMSC diagnoses. If the ratio of melanoma: NMSC is constant in both Australia and the USA, then there should be 5.7 times the number of NMSC in the USA or 4.3 million cases. The assumptions that underlie this calculation are discussed.

Open Peer Review

Approval Status

	1	2
version 1
09 Apr 2013	view	view

1. **Gabriella Fabbrocini**, University of Naples
Federico II, Naples, Italy

2. **Kamran Ghoreschi**, Eberhard Karls
University of Tübingen, Tübingen, Germany

Any reports and responses or comments on the article can be found at the end of the article.

Corresponding author: Eshini Perera (eshinip@gmail.com)

Competing interests: No competing interests were disclosed.

Grant information: The author(s) declared that no grants were involved in supporting this work.

Copyright: © 2013 Perera E and Sinclair R. This is an open access article distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. Data associated with the article are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

How to cite this article: Perera E and Sinclair R. **An estimation of the prevalence of nonmelanoma skin cancer in the U.S. [version 1; peer review: 2 approved]** F1000Research 2013, 2:107 <https://doi.org/10.12688/f1000research.2-107.v1>

First published: 09 Apr 2013, 2:107 <https://doi.org/10.12688/f1000research.2-107.v1>

Introduction

Nonmelanoma skin cancer (NMSC) includes basal cell carcinoma and squamous cell carcinoma of the skin, and is common in both Australia and the USA. In fact, in both Australia and the USA, NMSC is more common than all other forms of cancer combined^{1–3}. NMSCs are predominately managed privately in an outpatient setting. NMSC is not a reportable cancer and NMSC data are not recorded on national cancer registries in either Australia or the USA.

Estimates of the incidence of NMSC in both Australia and the USA are obtained by periodic surveys. Incidence data record an individual's first episode of skin cancer within a calendar year. As NMSC patients commonly develop multiple primary cancers, incidence data are likely to significantly underestimate the burden of disease.

In order to calculate NMSC prevalence in Australia, data from more than 8 million skin cancers treated between 1 January 1997 and 31 December 2010⁴ were evaluated by Fransen *et al.* Data from the study were obtained from Medicare Australia. The population of Australia grew 23% from 18.3 million in 1997 to 22.6 million in 2010⁵. Roughly 95% of the population or 21,470,000 people are of European or Anglo-Saxon descent. Medicare Australia is a Commonwealth Government-funded universal health insurance scheme. Medicare Australia data captures 98% of all skin cancer treatments in Australia. Fewer than 2% of NMSC lesions are treated in public hospitals that record data independently⁶. All skin cancer treatments in Australia, except those provided in a public hospital, are individually itemized and recorded by Medicare Australia for the purpose of patient reimbursement. Item numbers for the excision, cryotherapy, curettage or laser treatment of skin cancers require histological confirmation of the diagnosis or clinical diagnosis by a registered dermatologist prior to Medicare coding.

The total number of NMSC treatments increased by 186% from 412,493 in 1997 to 767,347 in 2010⁴. The number of treatments are estimated to increase to 938,991 (95% CI, 901,047–976,934) by 2015⁴.

So, what is the prevalence of NMSC in the USA? Rogers *et al.* estimated that in 2010 more than 3.5 million skin cancers were diagnosed in over 2 million people². The number of practicing dermatologists in USA in 2010 was 9598⁷. This figure suggests on average that each dermatologist treats 364 NMSCs a year, or one a day. Anecdotally, this figure seems low, even accounting for differences of skin cancer prevalence in each state.

Another way to estimate the burden of NMSC in USA is to compare the incidence of melanoma in the USA to that in Australia. Melanoma is a cancer that is reportable in both the USA and Australia. Reporting is mandatory and data on melanoma prevalence are likely to be more complete compared to data on NMSC.

In 2010, it was predicted that 68,130 melanomas would be recorded on the cancer registry in the USA³ and 11,900 were predicted for the national cancer registry in Australia in 2010¹. This amounts to 7.1 melanomas per dermatologist per year in the USA and 21.6 melanomas per dermatologist in Australia in 2010.

National registries data indicate that 5.7 times the number of melanomas were diagnosed in the USA among a population that is 14 times larger than Australia. One model⁶ assumes that the climate, ethnicity, sun exposure behaviour and population differences that lead to the higher incidence of melanoma in Australia do not affect the ratio of melanoma to NMSC. We also assume that melanoma is recorded with equal accuracy and completeness in both the USA and Australia. Based on these assumptions, the number of NMSCs treated in the USA in 2010 would also be 5.7 times the number of NMSCs treated in Australia. As 767,000 NMSCs were treated in Australia in 2010, we estimate that 4.3 million NMSC were treated in USA.

The population of the USA was 308.7 million in 2010 and 72.4% were White or European American⁸, 12.6% were black or African American⁸. The remaining 15% comprised people of different ethnicities including Hispanic or Latino, Asian, Native American, Hawaiian and Pacific Islanders⁸. The skin cancer with the least ethnic variation in incidence is acral lentiginous melanoma (ALM). ALM only represents 2–3% of all melanoma diagnosed in the USA⁹. If ALM were excluded from the total number of melanomas diagnosed in the USA in 2010, that reduces our estimate of NMSC in USA from 4.3 to 4.21 million cases.

This is roughly an extra 700,000 cases on top of the current estimations of NMSC by Rogers *et al.*². This now equates to approximately 1.2 NMSCs per US dermatologist per day. Anecdotal experience would suggest this figure still underestimates the true burden of NMSC in USA. A prospective registry may be required to better estimate the full burden of NMSC and to ensure that there are adequate physical resources and manpower to treat NMSC patients in the USA.

Author contributions

RS conceived the article. EP and RS prepared the first draft of the manuscript. All authors were involved in the revision of the draft manuscript and have agreed to the final content.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

References

1. **Australian Institute of Health and Welfare & Australasian Association of Cancer Registries. Cancer in Australia: an overview 2010.** (Cancer series no 60). AIHW Cat. No 56. Canberra: Australian Institute of Health and Welfare; 2010.
[Reference Source](#)
2. Rogers HW, Weinstock MA, Harris AR, *et al.*: **Incidence Estimate of Nonmelanoma Skin Cancer in the United States, 2006.** *Arch Dermatol.* 2010; **146**(3): 283–287.
[PubMed Abstract](#) | [Publisher Full Text](#)
3. American Cancer Society. **Cancer facts and figures 2010.** Atlanta: American Cancer Society; 2010.
[Reference Source](#)
4. Fansen M, Karahalios A, Sharma N, *et al.*: **Non-melanoma skin cancer in Australia.** *Med J Aust.* 2012; **197**(10): 565–568.
[PubMed Abstract](#) | [Publisher Full Text](#)
5. Australian Bureau of Statistics. **Population projections, Australia, 2006 to 2101.** (Cat. No. 3222.0). Canberra: Australian Bureau of Statistics; 2008.
[Reference Source](#)
6. Sinclair R: **Nonmelanoma skin cancer in Australia.** *Br J Dermatol.* 2013; **168**(1): 1–2.
[PubMed Abstract](#) | [Publisher Full Text](#)
7. Yoo JY, Rigel DS: **Trends in Dermatology: Geographic Density of US Dermatologists.** *Arch Dermatol.* 2010; **146**(7): 779.
[PubMed Abstract](#) | [Publisher Full Text](#)
8. Humes K, Jones N, Ramirez R: **Overview of Race and Hispanic Origin: 2010.** Washington DC. U.S. Census Bureau; 2011.
[Reference Source](#)
9. Bradford PT, Goldstein AM, McMaster ML, *et al.*: **Acral lentiginous melanoma: incidence and survival patterns in the United States, 1986–2005.** *Arch Dermatol.* 2009; **145**(4): 427–34.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)

Open Peer Review

Current Peer Review Status:

Version 1

Reviewer Report 15 April 2013

<https://doi.org/10.5256/f1000research.1269.r890>

© 2013 Ghoreschi K. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Kamran Ghoreschi

Department of Dermatology, Eberhard Karls University of Tübingen, Tübingen, Germany

The findings of this commentary are based on the estimations and calculations made by the authors of the work. The commentary itself is interesting, and helps provoke the idea that there is a higher prevalence of non-melanoma skin cancer (NMSC) in the US. However, the authors quite rightly demonstrate the potential weaknesses in the epidemiology of the disease; it is still difficult to collect data on the epidemiology of skin cancer even in Western countries. The authors do encourage prospective registries to help estimate NMSC, however as discussed, sun exposure and other factors have to be considered too in order to provide a more definitive answer for the prevalence of NMSC in the US.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 15 April 2013

<https://doi.org/10.5256/f1000research.1269.r893>

© 2013 Fabbrocini G. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Gabriella Fabbrocini

Department of Dermatology, University of Naples Federico II, Naples, Italy

This study can be considered very interesting for the new epidemiological insights that it provides. The study is interesting for the evaluation of relationship between melanoma and non-melanoma skin cancers (NMSC) in Australia and in USA; it highlights the underestimation of NMSC prevalence

in USA, so it opens new inputs for a better demographic evaluation of these tumors.

The title is simple and appropriate for the content of the article and the abstract can be considered a good summary of the work. The design of the study, and relative materials and methods are clearly explained and appropriate for this study. All data are clearly specified, clearly exposed and well schematized. The conclusions respect the basis of the study results.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

The benefits of publishing with F1000Research:

- Your article is published within days, with no editorial bias
- You can publish traditional articles, null/negative results, case reports, data notes and more
- The peer review process is transparent and collaborative
- Your article is indexed in PubMed after passing peer review
- Dedicated customer support at every stage

For pre-submission enquiries, contact research@f1000.com

F1000Research