Changes in coverage of sun protection in the news: threats and opportunities from emerging issues

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Abstract

This study aimed to determine whether there have been shifts in news coverage of sun protection issues over a 12-year period in the context of an evolving skin cancer prevention agenda. A content analysis was performed on all relevant articles (N = 552) published in the two metropolitan daily newspapers in Melbourne, Australia, from 2001 to 2012. Coding variables included theme, article type, prominence, spokesperson and topic slant. Articles were collapsed into three 4-year blocks and a series of chi-square analyses conducted to examine changes over time in coverage of topical issues (i.e. vitamin D and sunbeds) and established sun protection themes [i.e. health effects of ultraviolet (UV) exposure, education/prevention, attitudes/behaviour]. Coverage of vitamin D and sunbed issues increased over time and became more positive for sun protection objectives. The proportion of articles reporting on established sun protection themes remained steady over time (range: 36–38%) and there were no changes observed in the way these topics were presented in the news media. These results highlight that potentially competing sun protection issues that emerge over time need not pose a threat to existing skin cancer prevention programmes but instead can provide opportunities to further spread programme messages while increasing credibility.

Introduction

Skin cancer is a significant public health issue in Australia, with over 750,000 people treated for this disease each year [1]. It is estimated that at least two in three Australians will be diagnosed with skin cancer before the age of 70 years [2]. Excessive exposure to ultraviolet (UV) radiation from the sun and artificial sources such as sunbeds are the major causes of skin cancer [3, 4]. However, although sun protection is crucial in the prevention of skin cancer, this needs to be weighed against the benefits that sun exposure provides in maintaining vitamin D levels. Low vitamin D and deficiency can negatively impact on bone and musculoskeletal health and have been linked with an increased risk of conditions including bowel cancer, heart disease, infections and auto-immune diseases, although more research is needed to determine whether increasing vitamin D levels can help prevent these conditions [5–8].

A recent systematic review found sufficient evidence to recommend the implementation of multicomponent community-wide interventions to prevent skin cancer [9]. Australia has a long history of investing in such programmes, with the ‘SunSmart’ programme (which grew from a limited public education programme known as ‘Slip! Slop! Slap!’) running in the state of Victoria for over 30 years [10]. ‘SunSmart’, a programme of Cancer Council Victoria, aims to promote individual, social,
structural and environmental changes to reduce skin
‘SunSmart’ programme activities span a number of
settings including schools and early childhood
services, workplaces, local government, sporting or-
ganizations and outdoor events. Since its inception,
‘SunSmart’ has used a combination of paid mass
media campaigns and media advocacy strategies
(e.g. public campaign launches, general media re-
leases, lobbying for policy change) to influence
social norms and ensure the sun protection message
remains current and in the forefront of public
awareness.

Engaging in media advocacy is important for
health organizations as news media are a major
source of health-related information for the general
public [12–14]. The agenda-setting perspective
argues that media outlets have the power to influ-
ce public perceptions of key health issues, health-
related behaviours and governmental responses to
health issues through the frequency of coverage,
the variable prominence given to health-related art-
icles and the framing of health-related issues [15].
Evidence of agenda-setting effects have previously
been found in a study examining associations be-
tween potential exposure to sun-related news cover-
age and public attitudes and beliefs about tanning
and skin cancer [16]. News coverage of other health
topics such as smoking and cancer screening have
also been shown to be associated with changes in
health concerns and behaviours at a population level
[17, 18].

In light of the agenda-setting function of the news
media and its potential to further sun protection ob-
jectives, it is of value to monitor how sun protection
issues are being presented in the news and assess
whether advocacy efforts are gaining traction.
However, so far, research in this area has been
scant. An earlier study by our research team exam-
ining trends in print news coverage in Victoria from
1993 to 2006 found that coverage of controversies
surrounding vitamin D and sunbed use increased
over time, and that nearly all articles relating to vita-
min D were deemed to be either negative or mixed
for sun protection objectives [19]. Frame analysis of
Australian print media coverage of the campaign
against sunbeds sparked by Clare Oliver prior to her
death from melanoma in September 2007 found that
the majority of reports highlighted the
dangers of sunbeds and the need for regulation,
but with minimal consideration given to issues of
self-responsibility [20]. US studies have shown
that newspaper coverage of skin cancer is infrequent
[21, 22], and that such stories often do not contain
important educational information about skin cancer
prevention behaviours [21].

Conflicting messages in the public domain re-
garding vitamin D can cause confusion regarding
the health risks and benefits of sun exposure
[23, 24]. In addition, headlines such as ‘SunSmart
Aussies are paying the price for covering up’ [19],
although rare, have the potential to directly erode the
credibility of the programme and reduce public ac-
cceptance of skin cancer prevention measures.
Consequently, skin cancer prevention programmes
such as ‘SunSmart’ have broadened their scope in
recent years to explicitly promote a balanced ap-
proach to sun exposure and improve awareness of
the link with vitamin D. In Victoria, since 2009, this
has involved ‘SunSmart’ running an annual
vitamin D unpaid media campaign from May to
August (i.e. winter, when the UV Index is generally
below 3 all day). Concurrently, the Victorian
Department of Health has published key health mes-
sages to assist health professionals in giving advice
to people about vitamin D, in consultation with
‘SunSmart’ and consistent with consensus position
statements on sun exposure and vitamin D published
by working groups from the Australian and New
Zealand Bone and Mineral Society, Endocrine
Society of Australia, Osteoporosis Australia, the
Australasian College of Dermatologists and
Cancer Council Australia [25, 26]. However, the
dissemination of key messages about ‘healthy’ sun
exposure is not straightforward, with a range of fac-
tors including UV level, skin type and lifestyle all
impacting on both skin cancer risk and the amount
of time people need to spend in the sun to produce
sufficient vitamin D [27].

The previously observed incline in coverage of
sunbed issues in Victoria occurred against a back-
drop of rapid growth in tanning bed facilities [28],
inadequate compliance with voluntary industry standards [29] and an increasing desire for a tan among young Australians [30]. In the ensuing period, Australia has played a leading role in reforming the sunbed industry. Although Clare Oliver’s story served as a catalyst for tighter legislative controls to be placed on the use of sunbeds [31], it has been the sustained effort of public health advocates that has culminated in all state/territory jurisdictions announcing a complete ban on all tanning bed operations from the end of 2014 [32]. With the exception of Brazil, no other country has committed to such decisive action to protect the public from the harms associated with sunbed use [33].

With the emergence of vitamin D and sunbeds as prominent issues in the news media [19, 20], and as potentially competing foci of skin cancer prevention programme messaging, there is the risk that ‘SunSmart’s long-standing sun protection education messages could become less salient and news-worthy. Findings from our earlier content analysis study showed that from 1993–2006, the most frequent themes were articles on the health effects of UV exposure and education/prevention efforts, whereas another traditional ‘SunSmart’ topic, namely sun protection attitudes/behaviour, also generated some coverage [19]. The aim of this study was to provide an overview of news coverage of sun protection issues in an Australian setting from 2001–2012 and determine whether there have been shifts in the coverage of both recent and established sun protection themes in the context of an evolving skin cancer prevention agenda.

**Methods**

**Sample**

The sample comprised the (only) two daily and Sunday Melbourne metropolitan newspapers, The Age/Sunday Age and the Herald Sun/Sunday Herald Sun, published between January 2001 and December 2012. Articles were predominantly obtained from the Factiva database (Dow Jones, www.factiva.com). However, additional electronic data sources, including the news archive services for the Herald Sun (www.newstext.com.au) and The Age (http://newsstore.fairfax.com.au/apps/newsSearch.ac), The Age’s annual CD-ROM archives (2001–2006) and Fairfax Media Library Edition (2006–2012; http://www.libraryedition.com.au/), were also used in order to identify as many articles as possible.

Stories relevant to sun protection issues were retrieved using the following search string: [‘skin cancer’ and (tan or tanning or tanned or ‘sun protection’ or ‘skin protection’ or SunSmart or melanoma or sunburn or ‘slip slop slap’ or solarium or solaria)] or [‘vitamin D’ and (sun or skin)]. This procedure yielded 895 unique articles. To be included in the study, articles had to be three or more sentences long and have at least one in three sentences referring to sun protection issues. Articles about sun protection for pets or those that focused on skin cancer treatments or medical breakthroughs that may lead to improved treatment, were excluded. A total of 552 articles (62% of those retrieved) met the inclusion criteria and were subsequently coded.

**Measures**

A coding system developed for our earlier study of newspaper coverage of sun protection issues [19] and refined to ensure consistency with the current aims of the Victorian ‘SunSmart’ programme, was employed. For each article, the publication name and date were recorded as well as type of article [hard news (factual accounts of current issues and events), commentary (editorials, columns/opinion-editorials and letters), information (e.g. sunscreen or tanning product reviews, how to protect from the sun, how to boost vitamin D levels) and other (e.g. question and answer format, gossip columns, Vox Pops)] and article prominence (appeared in first four pages of the newspaper or not).

The most dominant theme in each article was identified from the following 11 options: health effects of UV exposure; education/prevention information, programmes, services and campaigns; sun protection attitudes/behaviour; early detection; school policies/issues; occupational health and safety (OH&S) issues; sun protection product.
issues and regulations; sunbed issues; fake tans; vitamin D issues; or other. These theme categories were developed and refined by the authors using an iterative process and were successfully used in our earlier study [19]. Examples of the information content that came under each article theme are provided in Table I.

All articles were coded for whether they featured a pro- or anti-sun protection spokesperson. This included both direct quotes and paraphrased statements attributed to the spokespersons that were either supportive or unsupportive of sun protection. A spokesperson was defined as an organization or an individual representing a health or industry organization or a health professional or researcher/scientist. Examples of an anti-sun protection spokesperson included tanning industry representatives speaking favourably about sunbed use and doctors advocating for increased sun exposure as a means of obtaining sufficient vitamin D without qualifying statements. For the purposes of this study, people with skin cancer and other members of the general public were not classed as spokespeople.

Finally, the ‘topic slant’ of each article was determined by coders identifying the newsworthy event or item relevant to sun protection that was being covered and judging whether it was positive, negative, mixed or neutral for sun protection objectives (Table II for examples).

**Coding procedures and analysis**

All articles from 2001–2006 were coded by one of two authors (M.S. or M.W.) as part of our earlier content analysis study, with intercoder reliability established on a sample of 20 articles for theme, topic slant and type of article. Kappa values for theme (0.94) and topic slant (0.76) indicated substantial agreement. The kappa value obtained for type of article (0.53) was affected by the distribution of data across the categories (i.e. there was a high prevalence of news articles); however, percent agreement was 85% suggesting that intercoder reliability for this measure was acceptable.

Vitamin D-related articles from this earlier period were reassessed by one author (M.S.) for consistency with the revised coding framework.

### Table I. Percentage of newspaper articles by article theme

<table>
<thead>
<tr>
<th>Article theme</th>
<th>Examples</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D issues</td>
<td>Population groups at risk of vitamin D deficiency; link between vitamin D and sun exposure; recommendations for maintaining adequate vitamin D levels</td>
<td>100 (18.1)</td>
</tr>
<tr>
<td>Sunbed issues</td>
<td>Negative health effects of sunbed use; regulation of the sunbed industry; adherence to sunbed industry code of conduct</td>
<td>94 (17.0)</td>
</tr>
<tr>
<td>Health effects of UV&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Skin cancer; sunburn; moles; premature ageing of the skin</td>
<td>93 (16.8)</td>
</tr>
<tr>
<td>Education/prevention&lt;sup&gt;a&lt;/sup&gt;</td>
<td>National awareness weeks; SunSmart activities; articles providing readers with information about how to be SunSmart</td>
<td>67 (12.1)</td>
</tr>
<tr>
<td>Attitudes/behaviour&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Desirability of a tan; wearing of hats and sunglasses; sunscreen use; shade use</td>
<td>44 (8.0)</td>
</tr>
<tr>
<td>Product issues</td>
<td>Sunscreen labelling; sunscreen safety; proper application of sunscreen; neck-to-knee swimsuits</td>
<td>43 (7.8)</td>
</tr>
<tr>
<td>Fake tans</td>
<td>Information about fake tan products; clinical trials of tanning drugs</td>
<td>42 (7.6)</td>
</tr>
<tr>
<td>Early detection</td>
<td>Performing regular skin checks at home; getting suspicious moles checked by a GP; new devices that will improve skin cancer detection</td>
<td>34 (6.2)</td>
</tr>
<tr>
<td>School policies</td>
<td>Compulsory hat wearing at schools; provision of shade in schools; need for greater emphasis on sun protection behaviour in secondary schools</td>
<td>14 (2.5)</td>
</tr>
<tr>
<td>OH&amp;S issues</td>
<td>Ways to minimize skin cancer risk in the workplace; employers facing litigation for failing to protect workers from the risk of skin cancer</td>
<td>14 (2.5)</td>
</tr>
<tr>
<td>Other</td>
<td>Articles that do not match any other themes</td>
<td>7 (1.3)</td>
</tr>
</tbody>
</table>

<sup>a</sup>Denotes core sun protection issues. OH&S = occupational health and safety.
Articles from 2007–2012 were coded independently by two of the authors (M.S. and S.M.), who then discussed any discrepancies in coding and reached consensus as to how these should be coded. Reliability of coding across the two periods was assessed by repeating the coding procedure of 2007–12 on a sample of 20 articles from 2001–2006. Cohen’s kappa was 1.00 for type of article, 0.83 for theme and 0.62 for topic slant.

Data were analysed using Stata SE 12.0 (StataCorp, TX). Simple descriptive statistics (frequencies and proportions) are reported. Articles were collapsed into three 4-year blocks and a series of chi-square analyses conducted to examine changes over time in coverage of topical issues (i.e. vitamin D and sunbeds) as well as established or ‘core’ sun protection themes (i.e. health effects of UV exposure; education/prevention information, programmes, services and campaigns; sun protection attitudes/behaviour).

### Results

Yearly coverage of sun protection issues over the study period ranged from 31 articles in 2004 to 68 articles in 2008 (mean = 46.0, SD = 10.23). Of all the articles, 69% were published in the Herald Sun/Sunday Herald Sun.

### Theme

As Table I shows, the most prevalent theme covered between 2001 and 2012 was vitamin D issues, accounting for 18% of total sun protection news coverage. Sunbed issues also generated substantial media attention with 17% of articles focusing on this
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theme. Themes considered as being ‘core’ sun protection issues by ‘SunSmart’ constituted over a third (37%) of total coverage when combined.

There were significant differences in the proportion of articles on vitamin D \( \chi^2(2) = 10.38, P = 0.006 \) and sunbed \( \chi^2(2) = 10.84, P = 0.004 \) issues across the three study time periods. As highlighted in Fig. 1, coverage of vitamin D issues increased relative to other sun protection themes in 2009–12, whereas proportional coverage of sunbed issues peaked in 2005–08. This pattern was also reflected in the actual number of articles, with 45 vitamin D articles published in 2009–12 compared with 22 in 2001–04 and 49 sunbed articles appearing in 2005–08 compared with just 18 in the preceding 4 years. The proportion of articles reporting on ‘core’ sun protection issues remained steady over time \( \chi^2(2) = 0.20, P = 0.906 \).

‘Core’ sun protection issues

As Table III illustrates, there were no significant differences in coverage of ‘core’ sun protection issues across the three time periods in terms of the type \( \chi^2(6) = 8.85, P = 0.182 \), prominence \( \chi^2(2) = 2.02, P = 0.364 \) or topic slant \( \chi^2(6) = 6.17, P = 0.405 \) of the articles or whether they featured a pro-sun protection \( \chi^2(2) = 4.49, P = 0.106 \) or anti-sun protection \( \chi^2(2) = 2.42, P = 0.298 \) spokesperson.

Overall, 61% of articles on ‘core’ sun protection issues were categorized as hard news, nearly a quarter (23%) were information and 12% were commentary pieces. Around 1 in 10 (11%) of these articles were prominently positioned in the newspaper. The majority of coverage of ‘core’ sun protection issues was either positive (55%) or mixed (28%), with only 13% of articles considered to be reporting on an event that was negative for sun protection objectives. Of the articles on ‘core’ sun protection issues, 59% included a pro-sun protection spokesperson, whereas just 2% featured an anti-sun protection spokesperson.

Vitamin D issues

The type of articles appearing on vitamin D issues changed significantly over the study period \( \chi^2(6) = 27.89, P < 0.001 \). Commentary pieces on this theme were only published from 2005–2008, and the proportion of information articles increased substantially in the last 4 years to comprise almost half the coverage during this latter time period. No significant change in the prominence of vitamin D articles was observed \( \chi^2(2) = 3.42, P = 0.181 \).

There was evidence of a significant difference over time in the topic slant of vitamin D coverage \( \chi^2(6) = 12.73, P = 0.048 \). Specifically, the proportion of positive vitamin D articles climbed from 0% in 2001–04 to just over a quarter in 2009–12, and

Fig. 1. Percentage of articles on core sun protection, vitamin D and sunbed issues over time.
there was also a corresponding decline in negative coverage (Table III). Vitamin D articles featuring a pro-sun protection spokesperson became more prevalent over time \[\chi^2(2) = 8.83, \ P = 0.012\], whereas there was no significant change in the proportion of vitamin D articles that included an anti-sun protection spokesperson \[\chi^2(2) = 2.78, \ P = 0.249\].

**Sunbed issues**

Overall, the majority of articles reporting on sunbed issues were deemed to be hard news (77%), with the type of coverage not changing significantly across the three time periods \[\chi^2(6) = 5.20, \ P = 0.519\]. Similarly, there were no differences over time in the proportion of sunbed articles appearing prominently in the newspaper \[\chi^2(2) = 1.33, \ P = 0.513\], or featuring a pro-sun protection \[\chi^2(2) = 4.16, \ P = 0.125\] or anti-sun protection \[\chi^2(2) = 2.01, \ P = 0.367\] spokesperson.

However, the topic slant of coverage of sunbed issues did change significantly over time \[\chi^2(4) = 16.41, \ P = 0.003\], with the proportion of negative articles decreasing after 2001–04. This shift also corresponded with an increase in positive sunbed articles (Table III).

**Discussion**

The results of our study indicate that news coverage of vitamin D and sunbed issues were the most prevalent themes covered between 2001 and 2012. This was in contrast to our earlier analysis of coverage from 1993–2006, in which health effects of UV exposure was the dominant theme overall [19].

However, despite the escalating media attention on vitamin D and sunbeds, there was no corresponding decline over the same period in coverage of key sun protection issues including the health effects of UV exposure, education/prevention efforts and attitudes/behaviour. This shows that increased coverage of vitamin D and sunbed issues was not displacing articles reporting on traditional skin cancer prevention programme messaging.

With agenda-setting research providing evidence to show that the salience and framing of news stories can affect public opinion and actions [34], it is reassuring that ‘SunSmart’s long-standing sun
protection education messages have been able to sustain their level of media attention in this changing landscape. These results highlight the importance of ongoing media advocacy for skin cancer prevention to maintain a strong news presence in the context of potentially competing emerging issues in sun protection. One avenue for further research would be to undertake a more in-depth assessment of sun protection article content to determine whether there are gaps in coverage of recommended UV reduction-specific behaviours (e.g. sunscreen use, wearing of protective clothing), as has been found in a recent US study [35]. Such data could potentially assist in identifying areas where communication strategies may be further improved to ensure that comprehensive and accurate skin cancer prevention information is being disseminated by newspapers. This is especially important, given that news media are one of the main channels through which the public learn preventive health information [36].

We found that news coverage of vitamin D issues was prominent across all three time periods, with a significant peak in 2009–12. The sustained media attention on this topic may be attributable to the fast-moving nature of vitamin D research during this time, which generates frequent new evidence against which previous recommendations for sun exposure are re-evaluated [26], creating ‘news-worthy’ controversy. Compared with our earlier content analysis study which showed that nearly all vitamin D-related coverage from 1993–2006 was either negative or mixed for sun protection objectives [19], in the most recent 4-year period (2009–12), there were twice as many vitamin D-related articles with a positive slant for sun protection as there were negative articles on this topic. This shift in coverage slant combined with a rise in pro-sun protection spokespeople appearing in news stories discussing vitamin D issues is likely reflective of the proactive role that ‘SunSmart’, in collaboration with government health departments and other health organizations, is now playing in response to this issue.

However, with just over a quarter of vitamin D articles published between 2009 and 2012 considered to be mixed for sun protection objectives and 13% negative, there is still the potential for public confusion. Concurrent with the increase in media coverage of vitamin D issues, vitamin D testing in Australia increased 94-fold between 2000 and 2010, prompting concerns about over-testing [37]. Research conducted in Queensland, Australia, showing an approximate 15 percentage point increase from 2004–2007 in adults believing that sun protection could lead to inadequate vitamin D levels underlines the impact that uncertainty and concern within the community about vitamin D and sun exposure can have on people’s sun protection attitudes [23]. This uncertainty is also evident among health professionals, with a survey of general practitioners in New South Wales showing that respondents expressed greater concern about vitamin D deficiency than skin cancer and some respondents reported offering advice that may increase their patients’ risk for skin cancer [38]. Thus, it is important that ‘SunSmart’ continues to build on their work in this area to further improve the consistency and accuracy of messaging the public (and health professionals) receive about vitamin D.

The change in coverage of sunbed issues over the past 12 years to become almost exclusively positive for sun protection objectives illustrates how public health advocates can take advantage of the momentum gained from news interest in a single event (in this instance, Clare Oliver’s death from melanoma in 2007) to effectively raise public awareness of health messages as well as to advance their policy agenda in the media. Media coverage of Clare Oliver focused on the affect-laden story of her diagnosis and subsequent death. Such narrative communications are increasingly considered in both theory and practice to be an effective format for persuasive public health messages [39–41]. A recent experimental study conducted in the Netherlands found that presentation of narrative risk communication about sunbed use influenced feelings of skin cancer risk among female sunbed users compared with non-narrative messages (i.e. factual risk information) [42]. While MacKenzie and colleagues believed that an opportunity to ban sunbeds immediately following Clare Oliver’s campaign had been missed [20], lessons learned from tobacco control...
suggest that sustained effort is required to achieve significant policy reform [33]. Concurrent with the observed trends in the slant of sunbed coverage since Clare Oliver’s campaign, public awareness of the skin cancer risk associated with sunbeds improved, all states and territories introduced legislation restricting access of high-risk groups to sunbeds and the number of sunbeds more than halved [43]. Followed by the recent announcements of state and territory bans on commercial tanning beds from the end of 2014 [32], these incremental changes would appear to align with past experiences in the tobacco area.

A number of study limitations should be acknowledged: (i) we only examined coverage of sun protection issues across one media channel. As major daily newspapers commonly set the agenda for other outlets such as television and radio [44], it served as a good proxy measure for all news media coverage in our study. However, with the growth in use of the Internet and social media, particularly among young people [45], it would be of interest for future content analysis studies to explore whether there are differences in the framing of sun protection issues across these newer forms of media compared with newspapers; (ii) although a broad search strategy was employed to optimize the number of articles retrieved, it is possible that our search string may not have captured all sun protection-related news coverage. Multiple data sources were used to maximize our ability to identify relevant articles; (iii) a different set of coders was used for articles published in 2001–06 (M.S. or M.W.) and those from 2007–2012 (M.S. and S.M.). Reliability of coding across the two periods was found to be good, though, suggesting that consistency of coding was achieved.

Conclusion

Against a background context of long-term skin cancer prevention programmes in Australia, established sun protection themes continue to maintain a strong presence. Important emerging issues such as vitamin D and sunbed use can generate substantial news coverage, which have the potential to be negative or mixed for sun protection objectives. For example, there is a tendency among some working in skin cancer control to frame vitamin D media coverage principally as a threat to skin cancer prevention [23, 27]; however, these study results highlight the capacity for skin cancer prevention programmes to use news media interest in these issues as an opportunity for both advocacy purposes and to promote their education messages in new forums and with new stakeholders.

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Conflict of interest statement

None declared.

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