

# Adherence by orthopaedic surgeons to AHPRA and Australian Orthopaedic Association advertising guidelines

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**The known:** Advertising influences patients by shaping their perceptions of surgeons and procedures, prompting requests for specific procedures, and guiding their expectations. Evidence for the low quality of health information on orthopaedic surgeon websites has been reported overseas.

**The new:** Online advertising complied with medical board and association guidelines for only 20 of 81 randomly selected Australian Orthopaedic Association surgeons, and seven of 59 surgeons at the top of Google search result lists.

**The implications:** Given increasing reliance on online health information, surgeons should take care with the information they publish online. We recommend stricter enforcement of professional advertising guidelines.

Direct-to-consumer advertising is common in orthopaedic medicine, particularly by surgeons who use new medical technologies.<sup>1</sup> Advocates argue that the advertisements are empowering educational tools that support informed decision making by patients.<sup>2</sup> However, critics voice concerns about inaccuracies, misleading claims, and biased information, as the primary aim of advertising is to increase the demand for particular services.<sup>3</sup> Several studies have identified inaccuracies and misleading information in online orthopaedic surgery advertisements that could lead to negative outcomes for patients.<sup>4-7</sup> Concerns have also been expressed about the quality of medical advertising in other surgical specialities, especially those in which elective surgery predominates and robotic technology is increasingly popular, such as plastic surgery,<sup>8</sup> urology,<sup>9</sup> and gynaecology.<sup>10</sup> Direct-to-consumer advertising influences decision making by shaping patient perceptions of surgeons and procedures, prompting requests for specific procedures or brands of implant, and guiding their expectations of treatments.<sup>1,11</sup>

The internet is a popular and cost-effective medium for advertising. A recent systematic review found that the internet and physicians are the sources of health information most frequently consulted by patients.<sup>12</sup> The commercial nature of the internet allows surgeons to adopt strategies such as search engine optimisation and paid advertisements to increase the probability of being placed among the top search results. This is important, as patients are most likely to visit the webpages linked with the top ten search results.<sup>13</sup> Patients are accordingly more likely to view information on the websites of surgeons using more aggressive marketing strategies.

In Australia, it has been a criminal offence since 2009, under section 133 of the *Health Practitioner Regulation National Law*,<sup>14</sup> to promote a regulated health service in a manner that could improperly influence health care choices. Health service promotional activities are governed by the Australian Health Practitioner Regulation Agency (AHPRA), which in 2014

## Abstract

**Objectives:** To examine adherence to Australian Health Practitioner Regulation Agency (AHPRA) and Australian Orthopaedic Association (AOA) advertising guidelines by AOA members.

**Design, setting:** Cross-sectional survey, Australia.

**Participants:** Two samples of AOA member orthopaedic surgeons: 81 randomly selected from a list of AOA members with publicly available contact details (AOA random sample); and a sample obtained by searching with Google for "orthopaedic surgeon" and the name of the major city in each of the eight Australian states and territories in turn; the top eight results for each search were considered for inclusion (AOA Google sample).

**Main outcome measures:** Non-compliance of advertising material, by surgeon sample, with the AHPRA and AOA guidelines; associations between non-compliance and sample, state, location (metropolitan, regional), and subspecialty.

**Results:** Of the 81 surgeons in the AOA random sample, 52 (64%) were non-compliant with at least one aspect of the AHPRA guidelines, and 53 (65%) were non-compliant with at least one aspect of the AOA guidelines. Of the 59 surgeons in the AOA Google sample, 48 were non-compliant with the AHPRA guidelines (81%) and 46 with the AOA guidelines (78%). Incidence of non-compliance with the AHPRA guidelines was influenced by sample source (AOA Google v AOA random: incidence rate ratio [IRR], 1.37; 95% CI, 1.01–1.87), but not non-compliance with the AOA guidelines (IRR, 1.09; 95% CI, 0.77–1.55).

**Conclusion:** A large proportion of AOA members who advertise online do not comply with AHPRA and AOA advertising guidelines.

published advertising guidelines to protect patients from false or misleading claims and to facilitate informed health care choices.<sup>15</sup> In 2020, the Australian Orthopaedic Association (AOA) published a professional code with specific guidelines for their members.<sup>16</sup> However, little is known about adherence to these guidelines by orthopaedic surgeons in Australia.

The primary objective of our cross-sectional study was to assess adherence to AHPRA and AOA advertising guidelines by orthopaedic surgeons who advertise their services online. Our secondary objective was to examine factors associated with non-compliance with these guidelines. We thereby hope to improve awareness of the obligations of clinicians and to inform future guideline enforcement by regulatory bodies.

## Methods

We undertook a cross-sectional survey of online advertising during April–August 2020 by orthopaedic surgeons who are AOA members (about 90% of registered orthopaedic surgeons in Australia). The study protocol was prospectively registered with the Open Science Framework (<https://osf.io/67gav>; 20 March

2020). All variations to the registered protocol, implemented before sampling commenced, are listed in the [Supporting Information](#), table 1.

We used two sampling methods that reflect how people access information about orthopaedic surgeons. First, a list of 500 AOA members who have elected to make their details publicly available (about 40% of AOA members) was generated with the “find a surgeon” tool on the AOA website (<https://www.aoa.org.au>). Using the Australian Bureau of Statistics sample size calculator (<https://www.abs.gov.au/websitedbs/d3310114.nsf/home/sample+size+calculator>), we estimated that a sample of 81 orthopaedic surgeons was required for our survey (95% confidence level; confidence interval,  $\pm 10$  percentage points). Each surgeon was assigned a random number in Excel 16.37 (Microsoft), and advertising material for the 81 surgeons assigned numbers 1–81 was included in our “AOA random sample”; if a surgeon had no online advertising, they were replaced by the next surgeon on the list.

Second, a sample of orthopaedic surgeons was obtained by searching with Google (default search settings) for “orthopaedic surgeon” and the name of the major city in each of the eight Australian states and territories in turn (“AOA Google sample”). The top eight search results for each search, including paid advertisements and sponsored results, were considered for inclusion; only surgeons who were AOA members were included in our sample. If the search result pertained to a group practice, the practice as a whole was included for assessment.

Authors of this article who were involved in data collection were excluded from both samples.

### Advertising material: inclusion criteria and assessment

We assessed online items published by or on behalf of an orthopaedic surgeon that were related to the surgeon or their services. The items were typically personal or clinic websites, but we also included online videos, news articles, and social media pages. Sites not generated by the surgeon, such as user-generated sites, were not included.

Online advertising material was copied and stored electronically. Identifying information (eg, name, practice name, location, state) was removed by a researcher not involved in data extraction for that content. To maximise validity, assessment of compliance was piloted three times by a roundtable of five data collectors, and disagreements and uncertainty regarding compliance were discussed. Other data collection was completed by at least two independent assessors; any disagreements were resolved by discussion, with mediation by a third assessor if necessary. AHPRA website advertising resources<sup>17</sup> were used to clarify “compliance” under the AHPRA guidelines, and members of the AOA advertising subcommittee were available for consultation regarding AOA guidelines.

### Data items

We used checklists to assess the compliance of de-identified online material with the five main sections of the AHPRA advertising guidelines<sup>15</sup> and the four main sections of the AOA advertising guidelines<sup>16</sup> (Box 1, Box 2). Compliance with each section was recorded, and failure to comply with any section of a guideline was deemed to constitute non-compliance with the guideline.

### Outcomes

The primary outcome was non-compliance of advertising material, by surgeon sample, with the AHPRA and AOA

### 1 Criteria for assessing compliance with the Australian Health Practitioner Regulation Agency (AHPRA) advertising guidelines: prohibited advertising<sup>15</sup>

1. Is false, misleading, or deceptive, or is likely to be so:
  - i. Makes false or inaccurate claims
  - ii. Uses comparison or contrast to create a false impression
  - iii. Only provides partial information or omits important information
  - iv. Uses phrases such as “as low as” or “lowest prices” when advertising prices, in a way that is misleading or deceptive
  - v. Uses words, letters, or titles that may lead patients to believe a surgeon is more qualified than another surgeon in the same registration category
2. Offers a gift, discount, or other inducement to use the health service without stating the terms and conditions of the offer:
  - i. Contains inexact price information
  - ii. Does not state terms and conditions for price information, offers of discounts, or other inducements
  - iii. States an instalment amount without stating the total cost
3. Uses testimonials or purported testimonials:
  - i. Cites testimonials on a website or in social media
  - ii. Practitioner’s business website or social media allows patients to post testimonials about the practitioner
4. Arouses unreasonable expectation of beneficial treatment, or:
  - i. Arouses an unreasonable expectation of treatment outcomes by exaggerating or providing biased information
  - ii. Fails to disclose health risks associated with a treatment
  - iii. Indicates that positive outcome or cure is guaranteed
  - iv. Implies or states that a practitioner has an exclusive or unique skill that will benefit the patient
5. Encourages the indiscriminate or unnecessary use of health services:
  - i. Encourages use of services with phrases such as “don’t delay”
  - ii. Uses prizes, bonuses, bulk purchases, discounts or other endorsements to encourage the unnecessary use of health services unrelated to clinical need or therapeutic benefit
  - iii. Uses time-limited offers

guidelines. The statistical significance of differences between sample types in the proportions of surgeons classified as non-compliant was assessed in two-proportion  $z$  tests;  $P < 0.05$  was deemed statistically significant.

In *a priori* inferential exploratory analyses, we examined associations between levels of AHPRA and AOA non-compliance and the sample type (AOA random, AOA Google), state of practice, location of practice (regional or metropolitan<sup>18</sup>), and orthopaedic

### 2 Criteria for assessing compliance with the Australian Orthopaedic Association (AOA) advertising guidelines: prohibited advertising<sup>16</sup>

1. Makes claim of superior performance:
  - i. Claims that a particular implant, device, or technique is the newest, so it is the best
  - ii. Claims the use of robotics will achieve a superior clinical result
  - iii. Equates anecdotal experience with validated evidence
  - iv. Claims excellence by assertion (eg, “I am an internationally renowned surgeon”)
  - v. States they are the first or only surgeon who can perform a particular operation
  - vi. Optimistic assessments of possible future outcome presented as a guaranteed better outcome
  - vii. Misuse of Australian Orthopaedic Association National Joint Replacement Registry data
2. Uses journalistic material for advertising:
  - i. Uses print media material, such as journal or news articles, for advertising purposes
  - ii. Participates in interviews, television programs, or news reports for advertising purposes
3. References specific brand names:
  - i. Specifically mentions brand names of devices or implants
4. Fails to declare commercial relationships:
  - i. Does not declare a commercial relationship when a specific brand of device or implant has been mentioned

subspecialty. The number of guideline items not observed by a surgeon was used to score overall non-compliance, separately for the AHPRA and AOA guidelines. The non-compliance scores were included as count outcomes in a multivariable exploratory Poisson regression analysis, together with sample type, state, location, and subspecialty as explanatory variables. We report incidence rate ratios (IRRs) with 95% confidence intervals (CIs) for each explanatory variable. Statistical analyses were undertaken in Stata 12.1.

### Ethics approval

Formal ethics approval was not required for our study because we analysed de-identified, publicly available data.

### Results

We assessed advertising material for 81 surgeons in the AOA random sample and 59 in the AOA Google sample; four surgeons were included in both samples (Supporting Information, table 2). The most frequent subspecialty was hip and knee surgery (92 of 140 surgeons, 66%) (Box 3). One surgeon was excluded from the AOA random sample because they were involved in data collection for this study; two surgeons were excluded from the AOA Google sample because they were not AOA members.

Twenty surgeons in the AOA random sample (25%) were fully compliant with both sets of guidelines. Fifty-two were non-compliant with the AHPRA guidelines (64%): 39 because of misleading or deceptive advertising (48%), 20 because they cited testimonials (25%), and 33 who aroused unreasonable

expectations of benefit (41%). Fifty-three surgeons were non-compliant with the AOA guidelines (65%), including 44 who made claims of superior performance (54%) (Box 4).

Seven surgeons in the AOA Google sample (12%) were fully compliant with both sets of guidelines. Forty-eight were non-compliant with the AHPRA guidelines (81%): 34 because of misleading or deceptive advertising (58%), 31 because they cited testimonials (53%), and 34 who aroused unreasonable expectations of benefit (58%). Forty-six surgeons were non-compliant with the AOA guidelines (78%): 41 who made claims of superior performance (69%), 30 who referred to specific brand names (51%), and 27 who referred to specific brand names but did not state whether they had commercial relationships with the companies (46%). Overall, AHPRA guideline non-compliance was more frequent in the AOA Google sample than the AOA random sample ( $P = 0.026$ ), but overall non-compliance with the AOA guideline was similar for the two groups ( $P = 0.11$ ) (Box 4; Supporting Information, table 3).

AHPRA compliance scores were influenced by sample type (AOA Google *v* AOA random: IRR, 1.37; 95% CI, 1.01–1.87), but AOA compliance scores were not (IRR, 1.09; 95% CI, 0.77–1.55). The incidence of non-compliance with AHPRA guidelines was lower in Victoria (IRR, 0.60; 95% CI, 0.38–0.93) and higher in South Australia (IRR, 1.60; 95% CI, 1.14–2.25) than in New South Wales. Non-compliance with the AOA guidelines was more frequent in South Australia (IRR, 2.28; 95% CI, 1.51–3.43), the Northern Territory (IRR, 2.37; 95% CI, 1.37–4.10), and Tasmania (IRR, 1.89; 95% CI, 1.09–3.25) than in NSW. Differences in compliance by geographic location and subspecialty were not statistically significant (Box 5).

### 3 State, geographic location, and subspecialty of the Australian Orthopaedic Association member surgeons included in our study, by sample group

Characteristic	Total number	AOA random sample	AOA Google sample
Number of surgeons	140	81	59
State of practice			
New South Wales	38 (27%)	29 (36%)	9 (15%)
Victoria	27 (19%)	19 (24%)	8 (14%)
Queensland	21 (15%)	14 (17%)	7 (12%)
Western Australia	18 (13%)	11 (14%)	7 (12%)
South Australia	13 (9%)	5 (6%)	8 (14%)
Tasmania	9 (6%)	1 (1%)	8 (14%)
Australian Capital Territory	9 (6%)	2 (3%)	7 (12%)
Northern Territory	5 (4%)	0	5 (8%)
Geographic location			
Metropolitan	132 (94%)	73 (90%)	59 (100%)
Regional	8 (6%)	8 (10%)	0
Subspecialty			
Hip/knee	92 (66%)	56 (69%)	36 (61%)
Shoulder/elbow	12 (9%)	7 (9%)	5 (9%)
Spine	6 (4%)	6 (7%)	0
Hand/wrist	11 (8%)	10 (12%)	1 (2%)
Foot/ankle	6 (4%)	2 (3%)	4 (7%)
Group practice	13 (9%)	0	13 (22%)

AOA = Australian Orthopaedic Association. ♦

### Discussion

We found that many AOA members do not comply with AHPRA and AOA advertising guidelines. Non-compliance was often characterised by unverified claims of reputation and skill, or misleading representations of the benefits of treatment. We did not investigate the reasons for these breaches, but our findings suggest that surgeons, or those responsible for their online material, either do not fully understand the guidelines or intentionally violate them seeking commercial advantage.<sup>2</sup> Previous studies have found that health information on orthopaedic surgeon websites was of low quality, characterised by exaggeration, subjective information, and no supporting scientific references.<sup>4-7</sup> Our findings are consistent with these reports, suggesting that poor quality online material is common in orthopaedic medicine. Our study, however, is the first to examine the nature of online information published by orthopaedic surgeons in Australia.

We found that guideline violations were frequent in advertisements for robotic surgery. Promising results regarding the effectiveness of orthopaedic robotic systems,

#### 4 Non-compliance of Australian Orthopaedic Association member surgeons with Australian Health Practitioner Regulation Agency and Australian Orthopaedic Association advertising guidelines, by sample type

Criteria	AOA random sample	AOA Google sample
Number of surgeons	81	59
<b>Australian Health Practitioner Regulation guidelines</b>		
Overall non-compliance	52 (64%)	48 (81%)
1. Advertisement is false, misleading, or deceptive, or likely to be so	39 (48%)	34 (58%)
2. Offers a gift, discount, or other inducement	1 (1%)	0
3. Cites testimonials or purported testimonials	20 (25%)	31 (53%)
4. Arouses unreasonable expectation of beneficial treatment	33 (41%)	34 (58%)
5. Encourages the unnecessary use of health services	1 (1%)	1 (2%)
<b>Australian Orthopaedic Association guidelines</b>		
Overall non-compliance	53 (65%)	46 (78%)
Makes claim to superior performance	44 (54%)	41 (69%)
i. Claims that particular implant/device/technique is the newest, so it is the best	27 (33%)	20 (34%)
ii. Claims the use of robotics will achieve a superior clinical result	11 (14%)	17 (29%)
iii. Equates anecdotal experience with validated evidence	2 (2%)	0
iv. Claims excellence by assertion	23 (28%)	24 (41%)
v. States they are the first or only person who can perform a particular operation	6 (7%)	8 (14%)
vi. Optimistic assessments of future outcome presented as guaranteed outcome	2 (2%)	4 (7%)
vii. Misuse of AOANJRR data	1 (1%)	1 (2%)
2. Uses journalistic material for advertising	12 (15%)	9 (15%)
3. References specific brand names	21 (26%)	30 (51%)
4. Fails to declare commercial relationships	21 (26%)	27 (46%)

AOANJRR = Australian Orthopaedic Association National Joint Replacement Registry. ♦

compared with traditional methods, have been reported.<sup>19,20</sup> However, systematic reviews have found that differences in patient outcomes are not statistically significant, and their authors have criticised the lack of secure evidence for safety and long term outcomes data.<sup>21,22</sup> Installing robotic surgery systems can cost as much as \$1 000 000,<sup>23</sup> and these costs are likely to be passed onto patients. The AOA guidelines specifically advise surgeons not to claim that the clinical outcomes of robotic surgery are superior to those of standard surgery, but this advice was breached by 14% of surgeons in the AOA random sample and 29% of the AOA Google sample. Specific robotic systems were advertised with claims of greater accuracy and shorter recovery times, but rarely mentioned their disadvantages or robust evidence for their value. An American study similarly found that 86% of United States hospital websites advertising robotic surgery made claims of clinical superiority.<sup>24</sup>

The medical device industry has undoubtedly contributed to improving orthopaedic care. However, many surgeons have financial links with the industry, and this could lead them to prefer certain products and potentially compromise patient care.<sup>25</sup> Surgeons should therefore disclose any financial incentives for choosing the treatments they provide. In our study, 26% of surgeons in the AOA random sample and 51% in the AOA Google sample mentioned specific brands in their advertising; only one clarified that they had no commercial relationship with the company, and only two of

all 140 surgeons declared any commercial relationships. In the United States, the level of payments by drug and device manufacturers to orthopaedic surgeons is higher than for all other specialties.<sup>26</sup> Orthopaedic surgeons in Australia may also be exposed to financial incentives, but no relevant data are publicly available.

In our multivariate analysis, violation of AHPRA and AOA guidelines was more frequent in the AOA Google sample than in the AOA random sample. This may indicate more aggressive marketing strategies by surgeons whose advertising does not comply with guidelines. Second, the frequency of non-compliance differed between states; some instances may have been responses to similar violations by other surgeons in the same location, attempting to maintain competitiveness. Finally, violations were more frequent among hip and knee surgeons, but the difference was not statistically significant. This information may be useful for directing future audits of advertising material by regulatory bodies, and for stimulating discussion and practice change in specific subgroups.

Our findings suggest that audits of practitioner compliance and stricter enforcement of advertising guidelines are needed to improve the quality of information on orthopaedic surgeon websites. This may be supported by the newly proactive approach of AHPRA to advertising compliance,<sup>27</sup> but may also require targeted action by the AOA, including independent audits, providing education for their members, and disciplinary

**5 Australian Health Practitioner Regulation Agency (AHPRA) and Australian Orthopaedic Association (AOA) guideline non-compliance scores: multivariate regression analysis\***

Characteristic	Incidence rate ratio (95% CI)	
	AHPRA non-compliance scores	AOA non-compliance scores
Sample		
AOA random	1	1
AOA Google	1.37 (1.01–1.87)	1.09 (0.77–1.55)
State of practice		
New South Wales	1	1
Victoria	0.60 (0.38–0.93)	0.80 (0.48–1.34)
Queensland	0.92 (0.60–1.41)	0.95 (0.56–1.62)
Western Australia	0.78 (0.46–1.31)	0.83 (0.50–1.40)
South Australia	1.60 (1.14–2.25)	2.28 (1.51–3.43)
Tasmania	0.68 (0.39–1.19)	1.89 (1.09–3.25)
Australian Capital Territory	0.98 (0.57–1.69)	1.70 (1.00–2.89)
Northern Territory	1.27 (0.79–2.04)	2.37 (1.37–4.10)
Geographic location		
Regional	1	1
Metropolitan	0.76 (0.43–1.33)	0.93 (0.41–2.12)
Subspecialty		
Hip/knee	1	1
Shoulder/elbow	0.95 (0.57–1.57)	0.53 (0.28–1.01)
Spine	0.55 (0.22–1.39)	0.98 (0.38–2.50)
Hand/wrist	0.81 (0.46–1.42)	0.72 (0.38–1.35)
Foot/ankle	0.79 (0.57–1.10)	0.80 (0.54–1.19)
Group practice	0.85 (0.62–1.16)	0.88 (0.62–1.23)

CI = confidence interval. \* Mean scores are summarised by sample and category are included in the [Supporting Information](#), table 4. ♦

action against members who fail to respond to feedback about their advertising material.

**Strengths and limitations**

Strengths of our study included our inclusion of the AOA random sample, removing identifying information to reduce measurement bias, prospectively registering the research protocol we had developed by consensus, and having at least two independent assessors evaluate compliance by each surgeon. However, interpretation bias was possible, and the statistical power of our inferential analysis was limited by small subgroup sizes for most categories. Further, subspecialty categorisation was imperfect, as some surgeons work in more than one subspecialty. Our guideline compliance scores may have underestimated the extent of non-compliance, as we recorded only one instance of non-compliance when multiple subsections of a guideline were violated. This may have also reduced the statistical power of our regression analysis.

**Conclusion**

Many AOA members who advertise their services online do not comply with AHPRA and AOA advertising guidelines. Further, surgeons whose websites appear among the top Google search results violated guidelines more frequently than a random sample of AOA members. As patients increasingly rely on online health information, it is important that surgeons recognise that misleading information on their websites can have serious implications for informed patient decisions. Increasing patient demand for specific treatments can lead to inappropriate use of health care resources and adoption of novel technologies of still uncertain efficacy. Our findings suggest surgeons must take greater care with the information they publish online, and that the AHPRA and AOA must undertake further steps to enforce compliance with their advertising guidelines.

**Competing interests:** Michael Gillespie is president of the Australian Orthopaedic Association. Alexander Burns and Michael Solomon are current members of the Australian Orthopaedic Association Advertising Complaints Subcommittee. ■

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## Supporting Information

Additional Supporting Information is included with the online version of this article.