

Methodologic quality and relevance of references in pharmaceutical advertisements in a Canadian medical journal

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Objective: To evaluate the methodologic quality and relevance of references in pharmaceutical advertisements in the *Canadian Medical Association Journal (CMAJ)*.

Design: Analytic study.

Data source: All 114 references cited in the first 22 distinct pharmaceutical advertisements in volume 146 of *CMAJ*.

Main outcome measures: Mean methodologic quality score (modified from the 6-point scale used to assess articles in the *American College of Physicians' Journal Club*) and mean relevance score (based on a new 5-point scale) for all references in each advertisement.

Main results: Twenty of the 22 companies responded, sending 78 (90%) of the 87 references requested. The mean methodologic quality score was 58% (95% confidence limits [CL] 51% and 65%) and the mean relevance score 76% (95% CL 72% and 80%). The two mean scores were statistically lower than the acceptable score of 80% ($p < 0.05$), and the methodologic quality score was outside the preset clinically significant difference of 15%. The poor rating for methodologic quality was primarily because of the citation of references to low-quality review articles and "other" sources (i.e., other than reports of clinical trials). Half of the advertisements had a methodologic quality score of less than 65%, but only five had a relevance score of less than 65%.

Conclusions: Although the relevance of most of the references was within minimal acceptable limits, the methodologic quality was often unacceptable. Because advertisements are an important part of pharmaceutical marketing and education, we suggest that companies develop written standards for their advertisements and monitor their advertisements for adherence to these standards. We also suggest that the Pharmaceutical Advertising Advisory Board develop more stringent guidelines for advertising and that it enforce these guidelines in a consistent, rigorous fashion.

Objectif : Évaluer la qualité méthodologique et la pertinence des références contenues dans la publicité pharmaceutique publiée dans le *Journal de l'Association médicale canadienne (JAMC)*.

Conception : Étude analytique.

Source de données : Les 114 références citées dans les 22 premières annonces pharmaceutiques distinctes parues dans le volume 146 du *JAMC*.

Principales mesures de résultats : Note moyenne de qualité méthodologique (modifiée à partir de l'échelle à 6 points utilisée pour évaluer les articles dans l'*American College of Physicians' Journal Club*) et note moyenne de pertinence (fondée sur une nouvelle échelle à 5 points) de toutes les références contenues dans chaque annonce.

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Principaux résultats : Vingt des 22 sociétés ont répondu en envoyant 78 (90 %) des 87 références demandées. La note moyenne de qualité méthodologique s'est établie à 58 % (limites de confiance [LC] à 95 %, 51 % et 65 %) et la note moyenne de pertinence, à 76 % (LC à 95 %, 72 % et 80 %). Les deux notes moyennes étaient statistiquement inférieures à la note acceptable de 80 % ($p < 0,05$) et la note de qualité méthodologique a dépassé l'écart cliniquement significatif fixé au préalable à 15 %. La note médiocre attribuée à la qualité méthodologique découle principalement de renvois à des articles de revue de qualité médiocre et à d'«autres» sources (c.-à-d. autres que les rapports d'essais cliniques). La moitié des annonces ont obtenu une note de qualité méthodologique inférieure à 65 %, mais cinq seulement ont obtenu une note de pertinence inférieure à 65 %.

Conclusions : Même si la pertinence de la plupart des références s'établit en-deçà des limites minimales acceptables, la qualité méthodologique était souvent inacceptable. Comme les annonces constituent un élément important du marketing et de l'éducation dans le domaine pharmaceutique, nous suggérons que les sociétés établissent des normes écrites de publicité et surveillent leurs annonces pour s'assurer que ces normes sont observées. Nous suggérons aussi que le Conseil consultatif de publicité pharmaceutique établisse des lignes directrices plus sévères sur la publicité et les applique de façon uniforme et rigoureuse.

Objective sources of information are vital to physicians' abilities to prescribe rationally. Physicians usually report that commercial sources of information such as journal advertisements play a minor role in providing them with therapeutic information about drugs or in influencing their prescribing decisions.¹⁻⁷ However, the more intensively a product is advertised in journals the greater its subsequent market share,⁸⁻¹⁰ and the greater the physicians' recall of an advertisement the more likely they are to prescribe the product.¹¹⁻¹³ One hypothesis for this apparent contradiction is that physicians are unaware of how much they are influenced by pharmaceutical promotion.¹⁴

In 1989 pharmaceutical companies spent more than \$181 million advertising their products in Canada through various means, including journal advertising, direct mail, sampling, product literature, and outside production and translation of literature.¹⁵ For some drugs, companies spend over \$1 million per year for journal advertisements.¹⁶

These advertisements usually include references. Some evidence suggests that the mere presence of references makes advertising more credible to physicians.¹⁷ The companies maintain that the references are there to provide additional information to doctors, whereas critics of the industry argue that the references are used to add a patina of respectability to the advertisements.

Part of a recently published study of the overall quality of pharmaceutical advertisements in leading peer-reviewed medical journals in the United States involved an assessment of the references cited in 109 advertisements.¹⁸ Fifty-five of the advertisements based claims on particular studies. Only 49% of the studies cited in 39 of the advertisements were judged by clinical experts to be adequate in justifying the use of the drug. The authors concluded that "the nature, quality and availability of references . . . is an important area meriting further investigation."

In Britain a study of the quality of references in journal advertisements¹⁹ revealed that the companies re-

sponsible for the advertisements were able to provide only 49 of the 60 references requested and that only 14 of the 31 reports of clinical trials were judged adequate on the basis of the criteria outlined by Mahon and Daniel.²⁰ In some cases there were discrepancies between claims in the advertisements and the original text of the articles cited.

Advertising in Canadian journals is governed by the Code of Advertising Acceptance, issued by the Pharmaceutical Advertising Advisory Board (PAAB).²¹ The PAAB screens advertisements before they appear in journals for compliance with its code. According to the code all reference materials, published and unpublished (data on file), should be the most recent available and should be consistent with current medical opinion. All references except those classified as confidential by the advertiser or the author must be available to health care practitioners on request. It has been suggested that pre-screening by the PAAB results in better quality printed advertisements in Canada than in other countries.¹⁸

Although compliance with the PAAB's code is nominally voluntary, one of the conditions of membership in the Pharmaceutical Manufacturers Association of Canada (PMAC) is acceptance of the requirements of the code.²² Members of the PMAC are primarily subsidiaries of the major transnational companies that market most prescription drugs sold in Canada.

References are extensively used in advertisements in Canadian medical journals, and the same advertisement usually appears in multiple journals. As a prelude to this survey, one of us (J.L.) reviewed all 24 issues of the *Canadian Medical Association Journal (CMAJ)* published in 1990 and identified 123 distinct advertisements (those with unique pictorial and copy content) for pharmaceutical products. Six reminder advertisements contained no therapeutic information and were thus excluded. Of the remaining 117 advertisements 103 (88%) cited 3.8 references on average per advertisement, and 14 (12%) had no references.

Of the 299 references to journal articles 70 (23%)

were to articles in journal supplements. Such articles are usually of reports presented at symposia sponsored by pharmaceutical companies, the cost of printing and distributing the supplement is underwritten by the sponsoring companies, and the articles may not be subject to the usual peer-review process.²³ Concern has been raised that only reports presenting medications in a favourable light are included and that this unique publication bias is compounded by the preferential quoting of these studies by the companies.

The primary purpose of our study was to evaluate the references cited in advertisements in *CMAJ*, the most widely read peer-reviewed Canadian general medical journal, in two dimensions: the quality of the evidence obtained from each reference and the relevance of each reference (i.e., the degree to which the cited article supported the statement[s] in the advertisement). Secondary questions that we sought to answer were How quickly do drug companies respond to a physician's request for copies of references cited in an advertisement? Are the companies following the provisions of the PAAB code by using current references and making these references available to health care practitioners? and Is there a difference in either the quality or relevance between references to articles in regular issues of a journal and those to articles in journal supplements?

Methods

Evaluation scales

Our survey of the advertisements in the 1990 issues of *CMAJ* revealed that nearly all of the references fell into one of two categories: literature reviews or clinical

trials of treatment. Separate 6-point scales to assess the methodologic quality of these two types of references were developed (Tables 1 and 2). These scales were adapted from those used to assess articles for the critical appraisal journal the *American College of Physicians' Journal Club*.²⁴ On the basis of our review of the 1990 *CMAJ* advertisements we expected few, if any, other types of references and therefore did not develop methodologic quality scales for them. To assess the relevance of each reference we developed *de novo* a 5-point scale (Table 3). All three scales were reviewed by an advisory panel of general practitioners and pharmacoepidemiologists to ensure face validity.

An initial pilot study was undertaken to familiarize us with the scales and to resolve procedural issues in their application. A single advertisement containing 10 references was chosen, and the references were obtained from the company.

Sample size and selection

From previous reports in the literature^{19,25-27} we set a minimum threshold for an acceptable mean relevance score at 80% of the maximum possible score. After dis-

Table 1: Scale for rating methodologic quality of clinical trials of treatment cited in pharmaceutical advertisements

Criteria	Score
(a) Random assignment, (b) control group, (c) follow-up rate of 80% and (d) demonstration of a statistically significant difference in at least one important clinical outcome (e.g., survival or major illness) or lack of demonstration of a statistically significant difference in an important outcome if power exceeds 80% to detect a clinically important difference	6
Presence of (a), but any or all of (b), (c) and (d) missing	5
Nonrandomized trial with contemporaneous control subjects selected systematically	4
Case series (10 patients or more) with or without historical or literature control group or before-after study	3
Case report (fewer than 10 patients)	2
Other (author's unreferenced opinion, experience)	1

Table 2: Scale for rating methodologic quality of review articles cited in pharmaceutical advertisements

Criteria	Score
(a) Comprehensive search for evidence described in methods section, (b) study selection described and avoids bias, (c) systematic assessment of accuracy of each cited original article, (d) quantitative summary of results across original trials and (e) conclusions of review article supported by data and analysis presented	6
Presence of (a), but one of (b) through (e) missing	5
Presence of (a), but two of (b) through (e) missing	4
Presence of (a), but three of (b) through (e) missing	3
Only (a) present	2
None of the above present	1

Table 3: Scale for rating degree to which references support statement in pharmaceutical advertisements

Criterion	Score
Completely supports statement	5
Supports statement only in limited circumstances or supports only a subset of all possibilities implied in statement	4
Addresses issues peripheral or not directly relevant to statement	3
Is irrelevant to statement	2
Contradicts part or all of statement	1

cussions with our advisory panel we decided that the acceptable methodologic quality score should also be 80% of the maximum. We agreed on 15% as the clinically significant difference, in the sense that it would make the advertisement more or less trustworthy. Using a standard deviation calculated from the pilot study we determined that the number of references necessary to detect this difference at a p value of less than 0.05 with a power of 95% was 36. Because of the potentially controversial nature of this study we deliberately chose a higher power than usual to increase the likelihood that we would detect any differences. This small number of references could be obtained from just a few advertisements; therefore, we decided to oversample in order to include advertisements representing a wide range of medications and companies.

Using *CMAJ* as the target journal we identified all the distinct pharmaceutical advertisements that quoted references in the first two issues of volume 146. If a company had advertisements for several products, only one advertisement, appearing earliest in the journal, was selected. A letter over the signature of a local general practitioner not involved in the study was sent to the medical director of each company requesting a copy of all the references cited. Company addresses were obtained from the 1991 edition of the *Compendium of Pharmaceuticals and Specialties (CPS)*.²⁸ If there was no response after 5 or 6 weeks a second letter was sent. No further attempts were made to contact the companies that did not respond to the second letter.

We did not inform the companies that the references were to be part of a study, because we felt that this knowledge might influence their responses.

Reference assessment

Only references that the companies sent were assessed. We did not independently attempt to locate missing references. The year of publication of each reference received was noted, and references were classified into one of five categories: review article; clinical trial of treatment; basic laboratory experiment, survey or government-generated statistics; secondary data source (e.g., book, product monograph or entry in the *CPS*); data on file (unpublished material).

For references in the first two categories the appropriate methodologic quality scale was applied. References in the third category were not assessed for methodologic quality. If information from a secondary source (fourth category) was unreferenced it was considered the author's unreferenced opinion and was assigned a quality score of 1 out of 6. If a secondary source was referenced no evaluation of the methodologic quality was undertaken. References received as "data on file" were classified into one of the first four categories and then treated accordingly.

The relevance of all references was evaluated with the scale in Table 3.

References were assessed with the two scales each time they were cited. Each of us independently rated the references. Disagreements were resolved by consensus to generate a single score for quality and relevance for each reference.

Mean scores were calculated separately for methodologic quality and relevance for all citations of each reference and expressed as a percentage of the maximum possible score (e.g., a score of 4/6 became 67%). Mean methodologic quality and relevance scores for each advertisement were computed and expressed as a percentage of the maximum possible score. We compared mean scores for references in regular journal issues with those in company-sponsored supplements.

Statistical analysis

We compared mean methodologic quality and relevance scores with the acceptable score of 80% using a two-tailed t -test, a p value of less than 0.05 being significant. The same test was used to compare scores for references in regular journal issues and those for references in journal supplements. Statistics were computed using Statview 512 + Graphics software for the Macintosh (Abacus Concepts Inc., Calabasas, Calif.).

Results

We requested copies of 114 references in 22 consecutive advertisements. Responses were eventually received from 20 companies. Nineteen were PMAC members, constituting approximately one third of the entire PMAC membership. The two companies that did not respond were PMAC members. A reminder letter was required for seven companies; in two cases the company claimed not to have received the initial letter. One company telephoned the general practitioner who signed the letter to explain that the references could not be sent because of copyright problems but then sent the requested references: two published papers and the product monograph. The median response time was 20 (range 10 to 87) days.

The number of references cited per advertisement ranged from 1 to 23 (median 4), for a total of 114 references. Twenty-seven of these references were in the two advertisements (4 in one and 23 in the other) for which no response was received. Of the remaining 87 references 78 (90%) were received. Two of the missing references appeared not to have been sent because of a clerical error: not all of the references referred to in the covering letter were enclosed.

Table 4 shows the source of the references and the number of each type that were requested and received. Although nearly all of the references to articles in the regular journal issues and the journal supplements were sent (96% and 100% respectively) only 60% of the 10 data-on-file references were sent. One company wrote

that it could not send the data on file since they were not yet in the public domain. Some companies sent additional references beyond those cited in the advertisement, and one company prepared a summary of the findings from both the references requested and additional, unrequested material. Of the 74 references for which the date of publication was stated 54 (73%) were published after 1986, 16 (22%) between 1980 and 1986, and 4 (5%) in the 1970s.

Of the 78 references 50 were clinical trials, 20 were review articles, and 8 were product monographs, books, monographs in the *CPS* or government documents (Table 5). The 78 references were cited 98 times. From these citations we calculated 97 methodologic quality scores and 98 relevance scores; one reference was a government publication that was not scored for methodologic quality.

The mean methodologic quality score was 58% (95% confidence limits [CL] 51% and 65%), and the mean relevance score was 76% (95% CL 72% and 80%) (Table 5). For the methodologic quality scores the initial interrater agreement was 70% (68 of 97 scores). The ambiguous nature of statements in the advertisements resulted in more interrater variability in the relevance scores, with an initial agreement of only 46% (45 of 98 scores). Disagreements in both sets of scores were reconciled by consensus.

Table 4: Source of references requested from the pharmaceutical companies*

Source	No. (and %) of references	
	Requested	Received
Regular journal issue	46	44 (96)
Journal supplement	19	19 (100)
Data on file	10	6 (60)
Product monograph	4	4 (100)
Other	8	5 (62)
Total	87	78 (90)

*Two companies, whose advertisements cited 4 and 23 references respectively, did not respond.

Overall, the mean methodologic quality score was significantly lower than the mean relevance score ($p < 0.0001$). The two scores were significantly lower than the acceptable score of 80% ($p < 0.05$), and the mean methodologic quality score was outside our preset clinically significant difference of 15%.

The poor rating for the methodologic quality was mainly the result of the citation of references to low-quality review articles and "other" types of references (i.e., other than reports of clinical trials). The mean methodologic quality scores for the 24 citations of review articles and the 10 citations of other types of references were much lower than the mean score for the 64 citations of clinical trials (Table 5). The relevance scores for the three categories of references were similar (Table 5).

Table 6 shows the separate scores for each advertisement. Half the advertisements had a methodologic quality score of less than 65%, our lower limit of clinical acceptability; only five of the advertisements had a relevance score below 65%.

References to articles in regular journal issues did not differ significantly from those to articles in journal supplements in either methodologic quality or relevance.

Although our main objective was to produce a quantitative rating for references used in advertisements, a qualitative review often raised concerns about the relevance and accuracy of the advertisement as a whole. Under relevance, concerns included extrapolation of data (e.g., dosage forms in references differed from the ones advertised), the citation of references whose contents were not referred to in the advertisement and the use of nonclinical surrogate markers (e.g., "positive effect on . . . cartilage") to suggest clinically meaningful outcomes.

Our concerns with overall accuracy of the advertisements can be divided into the general categories of misleading information and noninformation. Examples of misleading information included (a) the citation of references that supported the immediate statement(s) but not the larger text or headings in the advertisement, (b) the comparison of the drug with competitors without reference to relative potency or dose equivalence and

Table 5: Methodologic quality and relevance scores for the references received, by type of reference

Type of reference	No. of references	No. of times cited	Overall mean score (and 95% CL), %*	
			Methodologic quality	Relevance
Report of clinical trial	50	64	79 (73, 84)	77 (73, 81)
Review article	20	24	19 (16, 23)	75 (66, 84)
Other†	8	10	17 (17, 17)	72 (53, 91)
Total	78	98	58 (51, 65)	76 (72, 80)

*The scores represent the percentage of the maximum possible score. CL = confidence limits.

†One reference was to a government publication for which there was no methodologic quality score.

(c) the citation of references that did not entirely support the suggested indications for the medication.

Noninformation was the most prevalent problem. Examples included (a) the use of vague or suggestive phrases such as "special care must be taken with the elderly," "remarkable tolerability," "impressive side-effect profile," "highly reliable" and "enhanced effect," (b) the predominant failure to mention any cost data, either in comparison with alternate therapies or no therapy, (c) the tendency not to weigh risks and benefits fairly (e.g., no mention of the possibility of nitrate tolerance in an advertisement for a long-acting nitrate) and (d) the citation of secondary data sources such as the (usually unreferenced) product monograph rather than the original research article.

Discussion

Although the relevance of most of the references was above the minimally acceptable limit, the methodologic quality of the references in many of the advertisements was poor. Low scores for methodologic quality were due primarily to the citation of references to poorly designed review articles and "other" types of references. Our quantitative study of the use of references and our qualitative concerns with the general tenor of many of the advertisements are consistent with findings from recent work that documented major inadequacies in journal advertisements in other developed countries.^{18,29}

The PAAB code that was in force during the time we collected our data²¹ and the newly revised code³⁰ contain seven provisions dealing with claims, quotations

and references in printed advertisements. Our study evaluated companies' compliance with two of them:

References used must be available to health practitioners on request. . . . A copy of the summary of the Data on File may be provided to health practitioners at the discretion of the advertiser if the information is classified as Confidential by the advertiser or author (pending publication).²¹

All reference materials . . . should be the most recent available and should be consistent with current medical opinion and practice as recognized by the Canada Food and Drugs Act and Regulation.²¹

With some exceptions the response to our request for references was timely and complete; however, in contravention of the PAAB code, two companies did not reply even after receiving a second letter. In another five cases it took over 40 days to receive the material. As well, the lack of access to data on file (40% of the references were not sent even in summary form, as provided for under the PAAB code) is disturbing since there is no other way for physicians to obtain and assess the material.

Although 73% of the references for which the publication date was stated had been published within the previous 5 years it is impossible to know whether they were the most recently available. Since the literature on many therapeutic topics (e.g., myocardial infarction) advances quickly even evidence from 5 years ago may be out of date.

We chose to concentrate on a more fundamental issue — accuracy of information, which depends primarily on methodologic quality and clinical relevance. The PAAB code states that references should reflect current

Table 6: Mean scores for methodologic quality and relevance for individual advertisements

Advertisement no.	No. of references received	No. of citations assessed	Mean methodologic quality score	Mean relevance score	Drug class*
1	4	4	71	75	Antihistamine
2	3	3	83	60	ACE inhibitor
3	3	3	78	60	Bronchodilator
4	6	7	26	54	Antibiotic
5	2	2	75	90	H ₂ antagonist
6	1	1	17	100	Potassium replacement
7	5	6	92	80	Bronchodilator
8	3	3	56	53	Calcium-channel blocker
9	3	3	28	80	Abstinence promoter
10	5	6	83	78	NSAID
11	1	1	83	80	Vasodilator
12	3	3	61	87	Antibiotic
13	3	4	33	80	NSAID
14	1	1	100	80	Antibiotic
15	6	7	55	86	Antibiotic
16	1	2	100	70	Antilipemic
17	2	7	100	89	Antiviral
18	13	20	56	82	NSAID
19	9	11	23	70	Migraine prophylaxis
20	4	4	28	65	Dermatologic

*ACE = angiotensin converting enzyme, NSAID = nonsteroidal anti-inflammatory drug.

medical opinion rather than current medical evidence. Also, the code does not explicitly require that references accurately reflect the statement(s) in the advertisement that they are cited to support.

The mean methodologic quality and relevance scores for each advertisement were calculated from the individual scores for each reference in that advertisement. Therefore, advertisements were effectively penalized for including low-quality references even if they also included high-quality ones. To accept the use of low-quality references means that a clinician would have to consult each reference in an advertisement to determine its quality and appropriateness. Such an endeavour would be time consuming and detract from other activities expected of a busy clinician.

There are several potential limitations to our study. Although the scales for rating the methodologic quality of clinical trials and review articles were based on widely accepted and used models,³¹ the scale for assessing relevance was untested. The decision not to develop specific methodologic quality rating scales for other, secondary sources of information may have influenced the scores that these references received, since none got more than the minimum. Also, the rating scales for clinical trials and review articles did not consider key elements of trial design such as blinding, inclusion and exclusion criteria, and methods of statistical analysis. Inclusion of these factors would almost certainly have decreased the scores that these references received.

Minor and major errors in quoting material from references used in journal articles have ranged from 12% to 30%,²⁵⁻²⁷ with a weighted mean of 21%. On the assumption that journal advertisements should be of the same quality as journal articles¹⁸ we chose a minimum acceptable mean relevance score of 80% of the maximum possible score. Whether this standard for methodologic quality is more stringent than that used by journal editors and reviewers in evaluating submitted manuscripts is unknown and would be a subject worthy of further research. Application of the same standards to references in advertisements as those in journal articles is not universally accepted.³² However, the criteria enunciated by the PAAB and accepted by the PMAC do explicitly demand a certain standard for using references in advertisements. The designation of 65% as the absolute lowest acceptable score is arbitrary, but in our opinion references with a score below that level would not add to the credibility of an advertisement.

A different group of advertisements might have produced different results. However, our sample size was well beyond that required statistically, and we selected enough advertisements to provide a good cross section of those used in Canadian medical journals. Our sample did not include any advertisements for mood-modifying drugs, for instance, but the overall quality of the advertisements for this group of drugs may well be poorer than that of most other classes of drugs.³³

We chose to review only a single advertisement per pharmaceutical company so as not to alert the company to the purpose of the request and thus avoid a type of Hawthorne effect. It is possible that by using this strategy we may have inadvertently chosen either a particularly good or bad example of the use of references from an individual company. However, some companies may be better than others in their use of references for all of their advertisements. In the study by Wilkes, Doblin and Shapiro¹⁸ recommendation for rejection or major revision of advertisements did vary depending on the manufacturer.³³

Conclusions

Although this study revealed that the relevance of the references in the advertisements was acceptable, the low methodologic quality of many of the references, especially to review articles, makes the issue of relevance somewhat secondary. The relevance of a reference to a poorly designed study is unlikely to enhance the quality of an advertisement.

We do not believe that journals currently have the resources to scrutinize or edit advertisements. We suggest that all pharmaceutical companies develop explicit written standards to control the quality of their advertisements and that they regularly monitor their advertisements to ensure that they are maintaining these standards.

The failure of some companies to respond to our requests, the length of time taken by others to send the material and the relatively poor response rate in sending data on file suggests a lack of compliance with some provisions of the PAAB code on the part of pharmaceutical companies. The low methodologic quality scores indicate that current PAAB activities may need to be enhanced.

A 1990 review of advertisements in Canadian medical journals revealed that the system of review by the PAAB was not consistent or stringent enough and that provisions in its code were not clearly defined. Of 131 advertisements that were assessed 47 (36%) had specific minor or major deviations from the PAAB code.³⁴

Therefore, our findings of poor methodologic quality scores seem to represent both leniency in the PAAB review process and an inadequate set of PAAB guidelines. The voluntary, self-regulatory approach, which is the PAAB model, has been questioned in several other jurisdictions.^{19,35,36}

The update of the PAAB code³⁰ does not contain any substantial changes to the section on claims, quotations and references. Explanatory notes added to the code may result in a better quality of references, since the notes explicitly mention that clinical and therapeutic claims should be based on well-controlled studies. These notes also state that the PAAB may send unpublished data for external scientific review and that claims based

on testimonials are unacceptable. However, the code still does not require references to reflect current medical evidence rather than opinion. As well, the changes do not appear to deal with any of the concerns raised in our qualitative review of the advertisements.

The stringency with which the PAAB code will be applied is also uncertain. We are not aware of any efforts on the part of the PAAB to recruit staff with training in either clinical epidemiology or critical appraisal. To further help ensure that the PAAB guidelines are applied in a consistent and rigorous fashion the PAAB should regularly publish detailed reports of the number of advertisements accepted and rejected and the specific reasons for rejection. At present, the PAAB is required to prepare quarterly reports only of complaints received about published advertisements, and these reports are not publicly circulated.

Since printed advertising of pharmaceutical products will continue for the foreseeable future, the goal should be to improve the quality of the advertisements so that their message does not adversely affect physicians' prescribing behaviour. Advertisements should be more closely scrutinized before publication by both the companies and the PAAB.

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