Content Analysis of False and Misleading Claims in Television Advertising for Prescription and Nonprescription Drugs

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BACKGROUND: False and misleading advertising for drugs can harm consumers and the healthcare system, and previous research has demonstrated that physician-targeted drug advertisements may be misleading. However, there is a dearth of research comparing consumer-targeted drug advertising to evidence to evaluate whether misleading or false information is being presented in these ads.

OBJECTIVE: To compare claims in consumer-targeted television drug advertising to evidence, in order to evaluate the frequency of false or misleading television drug advertising targeted to consumers.

DESIGN: A content analysis of a cross-section of television advertisements for prescription and nonprescription drugs aired from 2008 through 2010. We analyzed commercial segments containing prescription and nonprescription drug advertisements randomly selected from the Vanderbilt Television News Archive, a census of national news broadcasts.

MAIN MEASURES: For each advertisement, the most-emphasized claim in each ad was identified based on claim iteration, mode of communication, duration and placement. This claim was then compared to evidence by trained coders, and categorized as being objectively true, potentially misleading, or false. Potentially misleading claims omitted important information, exaggerated information, made lifestyle associations, or expressed opinions. False claims were factually false or unsubstantiated.

KEY RESULTS: Of the most emphasized claims in prescription (n=84) and nonprescription (n=84) drug advertisements, 33 % were objectively true, 57 % were potentially misleading and 10 % were false. In prescription drug ads, there were more objectively true claims (43 %) and fewer false claims (2 %) than in nonprescription drug ads (23 % objectively true, 7 % false). There were similar numbers of potentially misleading claims in prescription (55 %) and nonprescription (61 %) drug ads.

CONCLUSIONS: Potentially misleading claims are prevalent throughout consumer-targeted prescription and nonprescription drug advertising on television. These results are in conflict with proponents who argue the social value of drug advertising is found in informing consumers about drugs.

KEY WORDS: direct-to-consumer advertising; over-the-counter drug advertising; over-the-counter drug; false or misleading advertising; content analysis.
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Over the past 15 years, drug advertising to consumers has expanded to encompass more products and more channels. Advertising for prescription drugs has become more prevalent, with more products being promoted directly to consumers through traditional ad media such as magazines and television, plus the internet has become an additional means to connect with consumers for both prescription and nonprescription drugs. Drug companies increased their marketing budgets for advertising directly to consumers, particularly for prescription drugs. Prescription drug advertising to consumers totaled $4.8 billion USD in 2009,[1–3] well surpassing consumer promotion for nonprescription products at $3.0 billion USD that year.[4] Also over this time period, patients have become viewed more as consumers of health care, emphasizing shared decision-making[5–7] and self-care.[8–10] Healthcare consumers need unrestricted access to high-quality information about health, and an increasing volume of drug advertising can help meet this need. For consumers, television drug advertising is one of the most viewed types of health information in the marketplace.[11] Consumers may see up to 30 h of television drug advertising each year,[12] while only spending 15 to 20 min, on average, at each visit with their primary care physician.[13–15]

Given the broad consumer exposure to television drug advertising and the need for high-quality health-related information, it is important that information presented in

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drug advertising is truthful, not misleading, and supports consumer and physician decision-making. Rational prescribing and consumer decision-making are reduced when the information marketplace contains false or misleading drug advertisements.[16] Television advertising for prescription drugs has been shown to provide general information about the effectiveness of the drug, little information about harms or non-drug alternative treatments, and frequently includes emotional and persuasive appeals.[17–21] Over-the-counter (OTC) drug advertisements have more information about the benefits of the drug, while providing little to no information about the harms of the product and frequent emotional and persuasive appeals.[4,22–25]

Similar to physician-targeted advertising for drugs found in medical journals, consumer-targeted drug advertising must use clinical evidence to back up all ad claims. Numerous studies of medical journal advertising have compared ad claims with clinical evidence,[26–28] but few studies have similarly compared consumer-targeted ad claims to clinical evidence, and their results are limited by small sample sizes [29,30] or lack of peer-reviewed methodology.[31]

In addition to distorting drug information available to consumers, false advertising is illegal and can lead to criminal and civil penalties.[32] The Food and Drug Administration (FDA) oversees prescription drug advertising while the Federal Trade Commission (FTC) oversees advertising for nonprescription drugs. These two agencies share a common definition for false and misleading advertising,[33,34] but the agencies do not apply the same working definition of false and misleading advertising, and have different standards for evidence to support truthful and not misleading claims. The FDA has established a definition for false and misleading advertising through regulation,[35] guidance documents,[36–38] and letters from the FDA to drug manufacturers providing the agency's rationale for citing the advertisement as false or misleading.[39–41] In practice, if a prescription drug advertisement does not present "fair balance" information on the risks and benefits of the drug, that advertisement misleads consumers to the overall value of the drug,[42] and misbrands the drug.[43] This interpretation differs from the existing practice of the FTC, where truthful and not misleading nonprescription drug advertising may omit most information about the harms of the drug. The FDA and FTC also may not agree on the evidence necessary to substantiate, or back up, claims in prescription and nonprescription drug advertisements.[34] The FDA requires claims in prescription drug advertisements to be substantiated by two adequate and well-controlled human clinical trials,[44] while the FTC requires advertisers to have a "reasonable basis" for their claims from "competent and reliable" evidence,[45,46] not necessarily randomized clinical trials. The differences between the FDA and the FTC in working definitions and evidence standards may be resulting in differences in the amount of false or misleading advertising that is occurring for prescription and nonprescription drugs.

In this study, we aim to compare claims in consumer-targeted television drug advertising to evidence, in order to evaluate the frequency of false or misleading television drug advertising targeted to consumers.

METHODS

Study Sample

Content for this study came from the Vanderbilt TV News Archive (VTNA), an indexed archive of recordings of the nightly news broadcasts (the news and commercial segments) on ABC, CBS, and NBC since 1968, and on CNN since 1992. For any specific commercial segment, data were available on the products advertised during the segment, and the date, time, and network when the segment aired. Prescription and nonprescription drug advertisements were identified by matching products advertised during the segment with the FDA Orange Book (revised March 18, 2011) and a previously developed list of other drug products (e.g., biologics, nonprescription products approved before 1938, etc.) that were not included in the Orange Book.[47] The sample consisted of a random sample of commercial segments that contained one prescription (prescription drug or biologic drug) and one nonprescription (OTC) drug advertisement, aired between January 1, 2008 and December 31, 2010, stratified by quarter-year. The VTNA charges a fee per commercial segment, so we randomly selected commercial segments with one prescription and one nonprescription drug advertisement in order to minimize the costs of acquiring content. Each commercial segment was viewed before being included in the sample in order to remove duplicate advertisements. Overall, 309 commercial segments were reviewed, and 225 were rejected due to either the prescription and/or nonprescription advertisement being a duplicate of an already selected advertisement, due to recording errors that made content analysis impossible, or due to superimposed text aired by the local television station covering portions of the advertisement (e.g. tornado or thunderstorm warnings).

Coding: Identifying the Major Claim

Figure 1 describes the coding process. For each advertisement, we used a novel method to select the claim that was most-emphasized in ways that would facilitate perception, comprehension, and retention by consumers viewing the advertisement.[48,49] To identify the most-emphasized claim, each advertisement was unitized into individual claims,[50] then each claim in the advertisement was graded on four emphasis characteristics: mode of presentation (audio or visual only, audiovisual, or a mix of audio-only, visual-only and audiovisual), count of the number of times the claim was repeated in the ad (including the current claim),

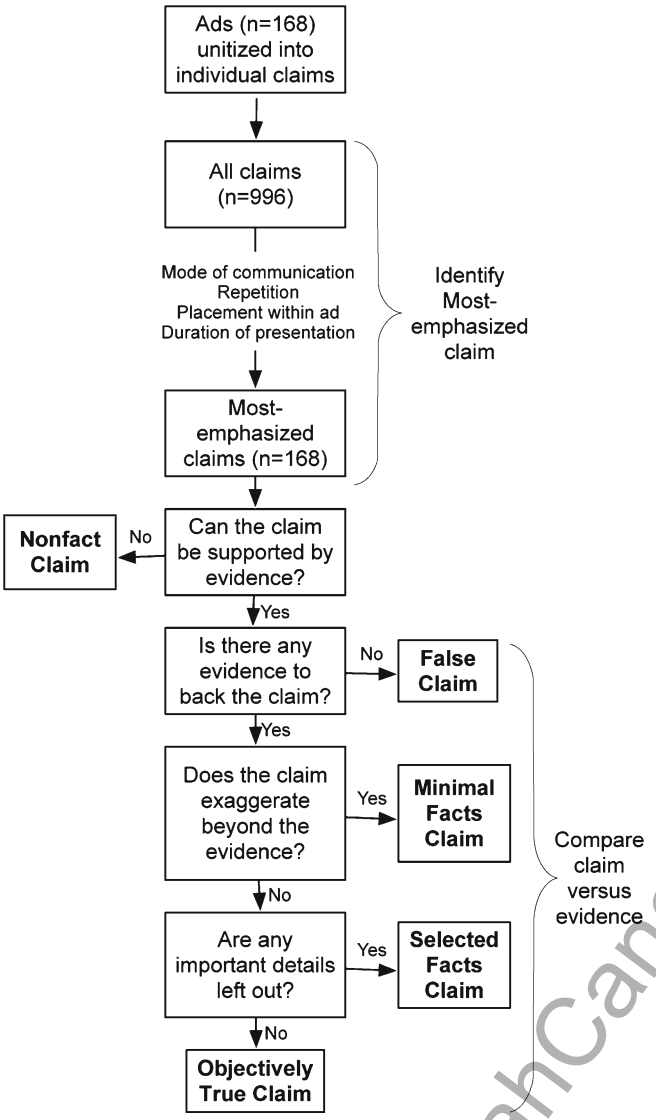

Figure 1. Flowchart of identification of the most-emphasized claim within each advertisement, comparing the claim to evidence and categorization of the claim. Detailed coding rubrics for identifying the most-emphasized claim and categorizing claims are included in the online appendix.

duration of the claim measured in seconds, and placement of the claim within the beginning, middle or terminal third of the ad (see the online appendix for the instrument). Ten percent of ads (N=17) were coded twice (by AEF) to establish intracoder reliability[51]: Cohen's Kappa=0.78 for mode of presentation, Pearson's r=0.80 for count of repetition, kappa=0.79 for duration, and kappa=0.97 for placement. Last, from these four emphasis characteristics, an overall emphasis score was calculated for each claim, assigning points for audiovisual communication, each iteration, claims longer than 2 s, and claims in the terminal third of the ad. The claim with the highest emphasis score was selected for further analysis. In the case of a tie, one claim was randomly selected for further analysis.

Coding: Evaluating the Truthfulness of the Major Claim

The coding instrument was developed to categorize each major claim as truthful, potentially misleading or false. We adapted Preston's typology of truthfulness in claims in advertisements as a guiding framework for a novel content analysis to categorize claims.[52] Preston's typology is based on the idea that consumers use advertising information to assess products, and advertising information that is not objectively true results in consumers making inferences in order to assess the product. For each category of Preston's typology, consumers make bigger inferences from the advertisement information while assessing the product, and bigger inferences may result in unrealistic assessment of the product. There are five mutually exclusive categories of claims in Preston's typology, and each category is increasingly misleading and potentially harmful to consumers: Objectively True Claims; Selected Facts Claims; Minimal Facts Claims; Nonfacts Claims; and False Claims (Table 3). For analysis, we categorized selected facts claims, minimal facts claims and nonfacts claims into a category of "potentially misleading" claims.

To aid categorization of the claim, a series of questions were formulated, using supporting questions derived from previous analyses of false and misleading drug advertising and FDA and FTC decisions identifying false or misleading advertising (see the online appendix for the instrument). Three upper-level pharmacy students (with training in pharmacology, pharmacotherapy and evaluating drug literature) were extensively trained on the coding instrument, without being explicitly informed of the study objectives. Before coding each claim, the coders viewed each advertisement and interpreted the meaning of the major claim, to facilitate analysis. For example, one advertisement made the claim "The difference is a better night's sleep." Given the context and presentation, the coding team agreed that the claim meant, "The difference between Brand X and Brand Y is less time awake and more time asleep."

When analyzing the claim, coders had access to the FDA-approved drug label or the FDA nonprescription monograph, and the review of comparative effectiveness for the drug class from the Oregon Drug Effectiveness Reviews Project (DERP).[53] The DERP reviews are updated at least annually, and are subject to peer review and public comment before final publication.[54] These sources were sufficient for evaluating most claims, but for six claims, the coders were provided with additional references: publications from head-to-head trials comparing acetaminophen to ibuprofen,[55–61] IMS Health data from 2008 to evaluate a claim of prescription popularity,[62] nonprescription label information for a discontinued product from an archived web page,[63,64] links to specific nonprescription drug product labels to evaluate the incipient ingredients in the product,[65,66] and a press release providing up-to-date

information to support an advertising claim.[67] We only used publicly available evidence to evaluate claims and did not make requests to pharmaceutical companies for unpublished or "on-file" evidence.

Two coders categorized each major claim into one of the five categories; intercoder reliability was excellent:[51] Cohen's kappa=0.90. Additionally, a random 10 % subsample was recoded at the end of the coding process to establish test-retest reliability; again reliability was excellent: kappa=1.00. Before analyzing the data, disagreements between coders were resolved through discussion among all of the coders.

Statistical Analysis

Statistical analysis involved descriptive statistics and tabulation of frequencies. Differences between groups were evaluated using t-tests or chi-squared tests, where applicable. Statistical analyses were performed using Stata 12 (StataCorp).

RESULTS

During the 2008–2010 period, 15,925 drug advertisements were aired during the nightly news for 115 unique drug brands: 55 prescription and 60 nonprescription. The final sample included 84 unique prescription and 84 unique nonprescription drug ads for 34 prescription drug brands and 31 nonprescription drug brands in 21 product categories (Table 1). Prescription drug ads ranged in duration from 30 to 120 s, while OTC ads were shorter, either 15 or 30 s.

In all 168 unique ads, 996 claims were identified (Table 2). Prescription drug ads, due to their longer duration, had more claims per ad (6.4) than nonprescription drug ads (5.4, t=2.63, p=0.01). The claims in prescription drug ads were longer in duration (prescription 2.45 s, OTC 1.82 s, p<0.01). Additionally, claims in prescription drug ads occurred more at the beginning and middle of the ad, while claims in OTC ads occurred more toward the middle and end of the ad. Major claims selected for further analysis, compared with other claims, were repeated more frequently (1.98 times versus 1.58 times, $p \leq 0.01$), were more likely to be presented with audiovisual communication (67 % versus 30 %), and were placed at the end of the advertisement (75 % versus 20 %). Although all of the advertisements were unique, in the process of selecting the major claim, some similar or identical claims in advertisements for the same brand of drug were selected for further analysis.

Each major claim was categorized as objectively true, potentially misleading or false (examples in Table 3, tabulations in Table 4, full results in the online appendix). Overall, 33 % of claims were objectively true, 57 % were potentially misleading (selected facts, minimal facts, or nonfacts), and 10 % were false. Comparing prescription and nonprescription drug ads, there were significantly different distributions in the numbers of claims categorized as objectively true, potentially misleading and false across prescription and nonprescription drug ads (X^2=16.40, p=0.003). There were more objectively true claims, and fewer false claims for prescription drug ads than nonprescription drug ads.

Table 1. Advertised Drugs, by Product Category

Prescription (n=84)	n	Nonprescription (n=84)	n
Allergy		Allergy	
Nasonex (mometasone)	2	Claritin (loratadine)	2
Omnaris (ciclesonide)	2	Zyrtec (cetirizine)	4
Alzheimer's Dementia		Alopecia	
Aricept (donepezil)	3	Rogaine (minoxidil)	1
Exelon (rivastigmine)	1	Cough and cold*	
Antidiabetic		AlkaSeltzer (aspirin/sodium bicarbonate)	8
Onglyza (saxagliptin)		Coricidin (chlorpheniramine)	2
Asthma/COPD	1	Mucinex (guaifenesin)	1
Advair (fluticasone/salmeterol)	5	Robitussin (dextromethorphan)	2
Singulair (montelukast)		Theraflu†	1
Spiriva (tiotropium)	1	Vicks†	1
Symbicort (budesonide/formoterol)	5	Eye products	
Blood thinner	1	Visine (tetrahydrozoline)	1
Plavix (clopidogrel)	6	Gastrointestinal	
Enlarged prostate		Dulcolax (bisacodyl)	2
Avodart (dutasteride)	1	GasX (simethicone)	1
Flomax (tamsulosin)	1	Imodium (loperamide)	1
Cholesterol		Miralax (polyethylene glycol)	5
Caduet (amlodipine/atorvastatin)	2	Phillips (magnesium hydroxide)	1
Crestor (rosuvastatin)	3	Heartburn	
Lipitor (atorvastatin)	3	Pepcid (famotidine)	2
Trilipix (fenofibric acid)	1	Prevacid (lansoprazole)	4
Erectile dysfunction		Prilosec (omeprazole)	2
Cialis (tadalfil)	10	Tums (calcium carbonate)	1
Levitra (vardenafil)	2	Zantac (ranitidine)	2
Viagra (sildenafil)	2	NSAIDS	
Eye products		Advil (ibuprofen)	8
Restasis (cyclosporine ophthalmic)	1	Aleve (naproxen)	12
Gastrointestinal		Bayer (aspirin)	
Amitiza (lubiprostone)	1	Excedrin (aspirin)	7
Heartburn		Tylenol (acetaminophen)	4
Nexium (esomeprazole)	1	Smoking cessation	2
Immune suppressant		Nicoderm (nicotine)	
Enbrel (etanercept)	1	Topical analgesics	1
Neuropathic pain		Cepacol (benzocaine)	
Lyrica (pregabalin)	3	Cortizone (hydrocortisone)	2
NSAIDS		Lanacane (benzocaine)	1
Celebrex (celecoxib)	2	Orajel (benzocaine)	1
Osteoperosis		PreparationH (phenylephrine)	1
Boniva (ibandronate)	2		1
Evista (raloxifene)	2		
Reclast (zeledronic acid)	4		
Overactive bladder			
Detrol (tolterodine)	3		
Toviaz (fesoterodine)	2		
Vesicare (solifenacin)	2		
Sleep aid			
Ambien (zolpidem)	3		
Lunesta (eszopiclone)	2		
Smoking cessation			
Chantix (varenicline)	3		

**Most advertisements for cough and cold products included multiple formulations. Mentioned here is the predominant ingredient in most formulations*

†Theraflu and Vicks advertisements were for cold products that included multiple formulations combining acetaminophen, dextromethorphan and chlorpheniramine

Table 2. Characteristics Used to Emphasize Claims in Prescription and Nonprescription Drug Advertisements

	All claims (n=996)	Emphasized claims			Drug products		
		Major (n=168)	Other (n=828)	P value	OTC (n=456)	RX (n=540)	P value
Repetitions	1.65	1.98	1.58	< 0.01	1.63	1.66	0.67
Duration (seconds)	2.16	2.33	2.12	0.07	1.82	2.45	< 0.01
Mode of communication							
Audio or visual	40 %	12 %	46 %		40 %	41 %	
Mixed Modes	24 %	21 %	25 %	< 0.01	22 %	26 %	0.08
Audiovisual	36 %	67 %	30 %		39 %	33 %	
Start of claim							
Beginning	31 %	4 %	36 %		16 %	44 %	
Middle	40 %	21 %	44 %	< 0.01	43 %	37 %	< 0.01
End	29 %	75 %	20 %		41 %	20 %	

Mixed Mode is a combination of audio-only, video-only and/or audiovisual
OTC nonprescription drugs; RX prescription drugs

Objectively True Claims

Thirty-three percent of claims were objectively true, and claims in prescription drug advertisements were more often objectively true (3 %) than claims in nonprescription drug advertisements (23 %). Many of these claims described the marketing characteristics about the product like, "DRUGNAME is the brand doctors prescribe most," "DRUGNAME is the only approved treatment for fibromyalgia" or "DRUGNAME is FDA approved." Other claims stated basic properties of the drug like, "DRUGNAME works for a full 24 hours," "DRUGNAME treats sore throat," or "DRUGNAME lowers cholesterol." Objectively true claims also described well-supported product superiority. For example, naproxen (brandname Aleve) is taken less frequently than ibuprofen (Advil) or acetaminophen (Tylenol), and many of the claims in Aleve advertisements describe this advantage over other OTC pain relievers: "Get the all-day pain relief of Aleve."

Potentially Misleading Claims

Potentially misleading claims omitted important information (selected facts), exaggerated information (minimal facts), or presented information not about the drug (nonfacts). Over half of major claims (57 %) were potentially misleading in some regard, and there was no difference in the proportion of potentially misleading claims in prescription versus nonprescription drug ads (55 % versus 61 % respectively, X^2=0.61, p=0.44).

Selected facts claims that omitted important information were the least frequent type of potentially misleading claims (11 %), and occurred with similar frequency in prescription (8 %) and nonprescription (14 %) advertisements. For example, a heartburn treatment had recently switched from prescription to over-the-counter and claimed it was "the same medicine, [but with a] new location—the store shelf." While this claim was factually true, it failed to mention that stronger doses of the drug continued to be available only by prescription, hence, for some consumers, the same medicine was not available on the store shelf. Some selected facts claims presented a new product, like a reformulation to a liquid, or a combination of two existing drugs, but failed to include that the active ingredient had been on the market for some time. For example, a combination of ibuprofen and phenylephedrine was marketed as "new" without disclosing that the active ingredients had been available for many years.

One in five claims was of the minimal facts type, where the claim exaggerated information. Minimal facts claims occurred with similar frequency in prescription (18 %) and nonprescription (23 %) advertisements. Often, reformulations of products like liquid capsules, rapid-dissolving tablets or crystalline packets were frequently promoted as faster than the previously available formulation. In these cases, there was evidence that the product did dissolve faster, but the product did not relieve symptoms faster. For example, a crystal packet was promoted as "ready to work faster" than other formulations, and a liquid capsule was "allergy relief at liquid speed."

Of the potentially misleading claims, the most common were nonfacts claims (26 %) that did not make a claim about the drug itself, but instead provided an opinion about the product or linked the product with a lifestyle. Nonfacts claims occurred with similar frequency in prescription (29 %) and nonprescription (24 %) advertisements. For example, a famous spokesperson for an osteoporosis drug told consumers, "I'm using DRUGNAME to build strong, healthy bones." This opinion provides no factual information about the effectiveness of the drug, but instead provides a subjective evaluation of the product quality or effectiveness. Consumers are left to make the inference that if the drug works for the famous spokesperson, then it will work for the consumer. In lifestyle associations, advertisements claimed that the product was appropriate for a subgroup of consumers due to the consumer's aspirations or self-image. For example, a once-a-year injectable drug for treating osteoporosis claimed to be "for on-the-go women" and depicted middle-aged women vigorously walking or swimming. Women were left to infer that the drug was more appropriate for healthy, active women than a product taken

Table 3. Definitions and Examples of Objectively True, Potentially Misleading and False Claims

Type of claim	Definition	Examples
Objectively True	A claim that presented all of the information, both positive and negative, in order for a consumer to compare products on the advertised attribute.	"Lyrica is the only approved treatment for fibromyalgia." At the time the commercial was aired, other products were used off-label to treat fibromyalgia, but only Lyrica had obtained FDA approval. "Just two Aleve have the strength to relieve arthritis pain all day." There was substantial, high-quality evidence to show the two-pill dose will relieve arthritis pain for 12 h.
Selected Facts	A claim that presented a meaningful difference among products, but omitted important facts about the advertised drug or the competitor's drug that would affect consumer evaluation of the advertised attribute.	"Once a Year Reclast" This claim, in context, does not adequately convey that the product was an intravenous injection that was taken at the doctor's office. "Prevacid 24 h is the same medicine, but with a new location on the store shelf," omits that Prevacid 30 mg was still available prescription-strength, so patients prescribed the higher dose would not get the same medicine. "Claritin Liquigels are new," The claim was correct that loratadine was recently reformulated into a liquid-filled capsule, hence was new to the market. The claim omits the fact that the product was identical to tablet Claritin that has been on the market for a long time.
Minimal Facts	A claim that presented a difference among products, but exaggerated the importance of the difference, promoting the difference as important when it is not; for example, when advertisers use poor-quality clinical evidence to support a claim, and exaggerate the clinical importance of the poor-quality evidence.	"Bayer Quick Release Crystals are ready to work faster than caplets or tablets." The formulation may dissolve quicker, but it is not taken up by the body any faster, nor will it relieve pain faster than other formulations. "Nothing works better than Prevacid" implies that Prevacid is superior to other heartburn remedies when, in fact, it is just as good as other heartburn remedies.
Nonfacts	A claim that presented an intangible characteristic, but not about the product. Often these claims were in the form of product opinions or lifestyle claims. Opinions say nothing about the product, but consumers are left to misinterpret the opinion as an objective product evaluation. Lifestyle claims associate the product with a target market that the advertiser believes is likely to buy the product, in the absence of evidence to support additional benefit to this subpopulation.	"Move on up to Aleve," provides the advertisers baseless opinion or recommendation on the choice of product. "AlkaSeltzer is the official cold medicine of the US Ski Team." Product endorsements like this one are the opinion of a famous or identifiable entity and do not say anything about the functioning of the product. "Help bridge the gap between the life you live and the life you want to live [by taking Enbrel]." This claim makes a vague lifestyle association between the product and the life "you want to life." "Levitra works for me. Maybe it can work for you," provides the opinion of the actor in the advertisement about the functioning of Levitra.
False	A claim that was objectively false by directly contradicting evidence, or lacking any evidence to support it.	"Alkaseltzer crystal packs are a taste-free powder." Inspection of the inactive ingredients from the product label include both flavor and sucrose. "The difference between Advil PM and Tylenol PM is a better night's sleep." The specificity of this claim implied that specific head-to-head comparative evidence was available. No studies had been published comparing Advil PM (ibuprofen with diphenhydramine) versus Tylenol PM (acetaminophen with diphenhydramine), only studies comparing ibuprofen with acetaminophen.

more frequently. There is no medical reason why active women should choose one osteoporosis treatment over another, and, in fact, women who get regular exercise are at decreased risk of osteoporosis.[68]

False Claims

False claims were rare (10 %), and occurred less frequently in prescription (2 %) than nonprescription (17 %) advertisements. Like in the Advil PM example (Table 3), some claims were false due to lack of evidence supporting the claim. Other claims directly contradicted evidence found in the label or nonprescription monograph. One topical analgesic product claimed to "work 100 %" (meaning completely), directly contradicting with clinical evidence showing only partial pain

Table 4. Frequency of Objectively True, Potentially Misleading and False Claims in Prescription and Nonprescription Drug Advertisements on Television 2008–2010

	All claims (n=168)	OTC (n=84)	RX (n=84)
Objectively true, % (n)	33 % (55)	23 % (19)	43 % (36)
Potentially misleading	57 % (97)	61 % (51)	55 % (46)
Selected facts	11 % (19)	14 % (12)	8 % (7)
Minimal facts	20 % (34)	23 % (19)	18 % (15)
Nonfacts	26 % (44)	24 % (20)	29 % (24)
False	10 % (16)	17 % (14)	2 % (2)

OTC nonprescription; RX prescription

relief in a subset of patients. Similarly, some claims were judged as false because the advertiser implied an effect secondary to the clinical effect of the drug. For example, an analgesic combined with a sedating antihistamine was marketed as helping people "feel better," and while there was evidence that the combination drug reduced pain, there was no evidence that observed pain reduction resulted in better sleep, mood or overall functioning.

DISCUSSION

Overall, 33 % of major claims in prescription and nonprescription drug advertisements aired on television from 2008 through 2010 provided consumers with information that was truthful. False or potentially misleading claims appeared in 66 % of televised drug advertisements. The overall frequency of objectively false claims was relatively low—only one in ten claims were objectively false. Since false claims are illegal, this study should have found no false claims. However, the claims we identified as potentially misleading are not necessarily illegal, and we do not assert that illegal advertising activities were identified through this analysis.

The most surprising result was the frequency of potentially misleading claims—claims that were true when taken literally, but upon further investigation may mislead consumers due to omissions, exaggerations, opinions and meaningless associations. Over half of major claims (57 %) in this sample of drug advertisements were potentially misleading to consumers, and there were no observed differences in the extent that potentially misleading claims appeared in prescription and nonprescription drug ads. The frequency of potentially misleading claims in drug advertising is in conflict with proponents who argue the social value of drug advertising is found in informing consumers about drugs.[69] These results, combined with the results from previous studies,[29–31] indicate a wider pattern of persuasion and deception in drug advertising to consumers.

We compared the frequency of false or potentially misleading claims in prescription and nonprescription drug advertising. We showed more objectively true claims in prescription drug advertising, more false claims in nonprescription drug advertising, and no difference in the frequency of potentially misleading claims. Given the split in drug advertising regulation between the FDA and FTC, these results may indicate that the differences in the regulatory environments may be increasing the use of objectively true claims in prescription drug advertisements or permitting more false claims in nonprescription drug advertisements. It is also important to note that potentially misleading claims were equally prevalent in both prescription and nonprescription drug advertisements, and neither the FDA nor the FTC explicitly support or forbid the use of these potentially misleading claims. Future studies may analyze a subset of advertisements for drugs that have switched from prescription to over-the-counter, to determine if the observed differences are due to the differences in regulation or product characteristics. In addition, the quality of the evidence supporting claims in prescription and nonprescription advertisements should be investigated further.

One criticism of this research is that our definitions of false or potentially misleading claims set a high standard for truthfulness in advertising and that we used a more rigorous standard than what is applicable in the marketplace. We did not conduct this research to identify illegal advertising activities—an approach used in previous evaluations of false and misleading advertising in medical journals.[27,28] Instead, we wanted to systematically contrast advertised information with an objective evidence base. We may have over-estimated the frequency of false claims, because there may be some claims that we categorized as false because the evidence to substantiate the claim was held by the drug advertiser and not publicly available. However, evidence-based rational prescribing and informed consumer decision-making are based on evaluation of publicly available information and evidence of the benefits and harms of treatment options. There would seem to be little rationale to conceal information that is valuable enough to use in advertisements, but not valuable enough to share publicly.

Critics also may contend that selected facts, minimal facts and nonfacts claims are true and do not violate regulations prohibiting false or misleading advertising. We believe it is important to recognize that these claims can potentially mislead consumers, and consequently are worth identifying and considering. The harm from omission of information may be less than the harm from blatantly false information, but that harm potentially still exists and, with the prevalence of drug advertising currently in the marketplace, a high level of misleading information may be affecting the quality of decision-making about drug use.

There are limitations in the study methods to note. First, the sample of advertisements was drawn from a 30 min period of the television broadcast day on four major networks, and does not represent all possible advertising on television. However, the nightly news is a desirable slot for drug advertisers because of the older audience that watches the nightly news,[12,70] and thus drugs advertised during this programming would reflect drugs widely advertised on television. Second, we only analyzed what we determined as the most-emphasized claim in each advertisement instead of a randomly selected claim or all claims. The relationship between claim emphasis and claim truthfulness has not been characterized previously, so we are unable to predict whether this selection directly influenced the frequency of false or potentially misleading claims. Third, the coders needed to interpret the meaning of claims to facilitate analysis. Although steps were taken to

ensure this process was consistently performed, this step did introduce subjectivity in the analysis of claims. Last, we did not evaluate the impact that these false or potentially misleading claims may have on consumer decision-making. Some claims may not mislead consumers, or a consumer may be misled but still make a good drug choice. Further research can explore the potential impact of these claims on consumer beliefs.

In conclusion, we evaluated the truthfulness of claims in a sample of television drug advertisements and found that few claims were false, but many claims were potentially misleading to consumers. Additional research can provide clarity about whether these patterns are also observed in other consumer-targeted advertisements and how these claims may affect consumer decision-making.

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