Placement of Benefits and Risks in Prescription Drug Manufacturers' Websites and Information Source Expectations

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Two studies addressed aspects related to consumers obtaining risk information about prescription drugs. The first study surveyed people's beliefs and perceptions concerning the use of nine potential sources of prescription drug information (eg, physicians and pharmacists). Two hundred thirteen participants were asked to rate potential sources of prescription drug information according to: (1) likelihood-of-use, (2) perceived ease-of-use, and (3) completeness of information. Because manufacturers' direct-to-consumer (DTC) prescription drug websites were rated relatively high in Study 1, a second study was conducted to examine how benefit and risk information was being presented in manufacturers' DTC websites. Study 2 consisted of an examination of website characteristics (eg, the number-of-clicks and amount of scrolling required) of 20 randomly chosen manufacturers' DTC prescription drug websites in two separate time periods (March 2001 and July 2003). The current results suggest that risk information is more difficult to access than benefit information. Implications for the delivery of risk information are discussed with particular emphasis on the growing use of the World Wide Web.

Key Words
Benefits; Risks; Prescription Drug Manufacturers; Websites

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Since its inception, direct-to-consumer (DTC) advertising has changed the way pharmaceutical manufacturers market their prescription medications. Previously, manufacturers directed virtually all of their marketing to the medical professional community, not the end user. Now, through DTC advertising, pharmaceutical manufacturers have increased the marketing of their products directly to the end user (1). Recent research suggests that DTC advertising has had at least some positive effects on consumers. According to the Center for Drug Evaluation and Research (CDER), 50% of the people who have been exposed to some form of DTC advertisement in broadcast (television) and print media (newspaper, magazine, and billboards) report having looked for additional product information (2).

Other than DTC advertisements, there are many potential sources of information about prescription drugs. The traditional sources are physicians and pharmacists, but people are also likely to seek out information from nonmedically trained persons such as family or friends. With access to technology, drug information can also be obtained from the World Wide Web, including manufacturers' DTC drug websites and second-party websites (eg, WebMD and PlanetRx).

The World Wide Web offers two basic types of websites with substantial prescription drug information:

1. Manufacturer's websites, which are considered by current U.S. Food and Drug Administration (FDA) regulations to be DTC prescription drug advertisements if they provide benefit and risk information, and
2. Second-party websites, which are maintained by organizations that do not manufacture drugs and usually contain content across many drug manufacturers. The information on second-party websites may be perceived as more credible than the information in manufacturers' DTC drug websites because second-party websites may be viewed as more objective than manufacturer websites, possibly because they usually do not profit from drugs sales.

Credibility of information is an important issue with the World Wide Web in general and this can become even more important with websites that offer information about prescription drugs. The World Wide Web offers several advantages

(eg, convenience and customization) to people seeking information. However, it has some disadvantages, such as being more complex to use and making certain information less accessible than other information (eg, requiring more clicks and scrolling). Research has shown that risk information placed deeper in a hierarchical structure is less likely to be found (3).

Also, information maybe obtained from other sources, such as by calling the manufacturer's consumer phone number or by examining medical reference texts. These sources vary in many different aspects of information presentation (eg, amount and type of content, usability, and amount of interactivity), which may influence their use by consumers.

The FDA has recognized that the market for prescription drug marketing has evolved, as indicated by the implementation of new regulations with the 1997 FDA Modernization Act. The FDA regulations have the broad requirement that information not be false, misleading, or lack fair balance. These regulations also have specific stipulations for the placement and layout of risk information (warnings, precautions, negative side effects, and contraindications) in broadcast and print DTC prescription drug advertisements. Although there are no regulations that specifically focus on DTC prescription drug website advertisements, manufacturers' prescription drug website advertisements are considered to fall under the 1997 FDA Modernization Act.

The FDA regulations state that DTC drug advertisements require a fair balance between the number of benefits and risks presented. Fair balance is further described as an equal presentation of benefit and risk information in both prominence and readability (4). This balance is easy to define in television and static prints advertisements but the stipulation falls short for the World Wide Web.

Websites are more complex than television or print advertisements in that they may have a hierarchy with multiple pages of content organized into a basic information architecture. The information architecture of the website determines how it is navigated by organizing the content into a functional/useful hierarchy. Users of websites have to navigate this hierarchy to find the benefit and risk information when this information is not presented on the homepage. This fundamental difference in the manner in which information is presented in website advertisements as compared with television and print advertisements has created an interest in determining how risks and benefits are actually being presented in manufacturers' DTC prescription drug advertisements on the World Wide Web.

The present research is comprised of two studies that address aspects related to consumers obtaining risk information about prescription drugs. Study 1 was a survey that examined peoples' beliefs and perceptions concerning the use of nine different sources of prescription drug information, and Study 2 examined how risk information compared to benefit information is presented in manufacturers' DTC drug advertisements on the World Wide Web.

STUDY 1

Consumers use a variety of different sources to gather information about prescription drugs. In the present study, sources of prescription drug information were evaluated according to three perception/belief dimensions:

1. Relative likelihood-of-use,
2. Perceived ease-of-use, and
3. Perceived completeness of the information provided.

The information sources were similar to those cited in a FDA survey examining the effects of DTC prescription advertising on patient information-seeking behavior (2).

METHOD

Participants. A total of 213 individuals from the Raleigh, North Carolina area participated. Table 1 presents a summary of demographic information of the participant sample. The sample was composed of 120 males and 93 females (M =

TABLE 1

Demographics of Respondents to Prescription Drug Information Sources Survey			
Gender	*n*	**Student vs. Nonstudent**	*n*
Male	120	Student	151
Female	93	Nonstudent	62
First language		**Education**	
English	203	Some high school	3
Chinese	5	High school diploma	32
Korean	2	Some college	124
Vietnamese	1	College degree	41
Spanish	1	Post-graduate	13
French	1		
Race			
Caucasian	182		
Other	31		

24.5 years, $SD = 9.0$) with 151 students (93 males 58 females with $M = 21.0$ years, $SD = 2.8$) and 62 nonstudents (27 males 35 females with $M = 33.4$ years, $SD = 12.2$).

Materials and Procedure. Participants completed a multi-page survey that addressed a variety of topics including demographics, automotive safety, and familiarity with various products. The present research examined the responses to items concerning the perceptions and beliefs about the nine sources of prescription drugs information. The specific sources evaluated are listed in Table 2.

The participants were first asked if they had ever been prescribed a drug, and if so, to estimate the percentage of the labeling information they read (0–100%). Then each of the nine sources of information was rated according to: likelihood-of-use, perceived ease-of-use, and perceived completeness.

With the likelihood rating, the participants rated how likely they would be to use each of the nine information sources to gather more information about a prescribed drug. This question was accompanied by a linear scale numerically and verbally anchored with: 0 = extremely unlikely, 30 = very unlikely, 50 = likely, 70 = very likely, and 100 = extremely likely.

With the ease-of-use rating, participants rated their belief about how easy it would be to obtain risk information for a prescription drug using the information sources. The scale was numerically and verbally anchored with: 0 = not at all easy, 30 = not very easy, 50 = easy, 70 = very easy, and 100 = extremely easy.

With the completeness rating, participants rated their belief on how complete the risk information would be from the sources. The scale was numerically and verbally anchored with: 0 = no information, 30 = not very complete, 50 = half complete, 70 = very complete, and 100 = totally complete.

RESULTS

Ninety-nine percent of the participants reported having been prescribed a drug and having read an average of 75% of the labeling. Table 2 presents the mean ratings (and standard deviations) for each dimension and source of information.

A 3 (dimension) X 9 (source of information) repeated measures analysis of variance (ANOVA) was conducted. Two significant main effects

TABLE 2

Mean Ratings and Standard Deviations for Prescription Drug Information Sources

	Perceived Likelihood-of-use		Perceived Ease-of-use		Perceived Completeness	
Source of Prescription Drug Information	Mean	SD	Mean	SD	Mean	SD
Doctor	74.5	26.6	76.1	24.1	80.4	19.4
Pharmacist	71.4	27.7	81.3	21.4	83.7	18.6
Friend or family	53.3	28.0	54.1	28.8	43.2	24.6
Manufacturer's website	46.9	29.9	63.6	27.6	66.1	25.5
Medical reference book	45.7	30.9	60.5	28.5	73.5	24.2
Manufacturer's phone number	39.1	29.6	51.7	28.7	58.6	26.6
Second-party prescription drug websites	38.8	28.8	53.9	26.6	51.4	24.2
Print advertisements	29.0	24.7	38.4	27.3	36.3	25.5
Television	27.8	26.1	34.7	29.6	30.5	23.0

were found for dimension, $F(2, 212) = 72.83$, $p < .0001$, and source of information, $F(8, 212) = 176.31$, $p < .0001$. A significant dimension by source of information interaction was also found, $F(16, 212) = 24.43$, $p < .0001$. To further examine this interaction, simple effects analyses were performed followed by post hoc comparisons. These analyses are described in the next three sections.

Likelihood-of-use. The one-way source of information ANOVA on likelihood-of-use was significant, $F(8, 212) = 105.09$, $p < .0001$. Pairwise comparisons using Tukey's Honestly Significantly Difference (HSD) test indicated that pharmacists and physicians were rated significantly higher than all the other sources of information. The friend/family source was rated third and was significantly higher than all remaining sources except for manufacturers' DTC drug advertisement websites. Manufacturers' DTC prescription drug advertisement websites were rated significantly higher than all remaining sources except for medical reference book. Medical reference book, manufacturer's toll free number, and second-party websites were all rated significantly higher than television and print advertisements, which were given the lowest ratings.

Ease-of-use. The one-way source of information ANOVA on ease-of-use was significant, $F(8, 212) = 91.62$, $p < .0001$. The pattern of means was similar to likelihood-of-use means except that friend and family was lower and was only rated significantly higher than the two lowest rated sources: television and print advertisements.

Completeness. The one-way source of information ANOVA on completeness was significant, $F(8, 212) = 174.19$, $p < .0001$. The completeness means had the same general pattern as the other two dimensions described above.

Demographic Variables. Two three-factor mixed model ANOVAs were performed adding the factors of gender and student status (student vs. nonstudent) individually to the two-factor ANOVA (dimension X source of information) models described above.

Gender. The ANOVA that included gender yielded no significant main effect of gender but showed a significant interaction of gender by source of information, $F(8, 212) = 3.23$, $p < .01$. The pattern of mean scores was similar for males and females except that females rated pharmacist significantly higher than males ($p < .05$) and males rated television significantly

higher than females. No other interaction was found ($p < .05$).

Student Status. The ANOVA that included student status (student vs. nonstudent) yielded no main effect of student status but produced a significant three-factor interaction with dimension and source of information, $F(16, 212) = 3.47$, $p < .0001$. As a follow-up, three two-factor mixed model ANOVAs involving student vs. nonstudent and source of information for each dimension were performed. The results indicated that for both likelihood-of-use and ease-of-use, there was a significant interaction of student vs. nonstudent and source of information, $F(8, 212) = 2.68$, $p < .01$, and $F(8, 212) = 2.50$, $p < .01$, respectively. Post-hoc tests indicated that students rated friend or family significantly higher on likelihood-of-use than nonstudents. Students also rated television, friend or family, and print advertisements significantly higher in perceived ease-of-use than did nonstudents.

DISCUSSION

Study 1 examined the ratings of consumers' reported likelihood-of-use, perceived ease-of-use, and perceived completeness for nine potential sources of prescription drug information. In general, all three dimensions produced a similar pattern of results. Overall, the results show that pharmacists and physicians are the two most preferred sources of prescription drug information. This is not surprising since they are the two main points of contact for a patient obtaining prescription drugs.

Of specific interest, manufacturers' DTC prescription drug websites were also consistently rated as one of best sources of information on all three dimensions. The only sources that were consistently rated higher were pharmacists and physicians. Second-party websites were rated lower than DTC drug advertisement websites. Another interesting result is that the two very prominent sources of information on prescription drugs, namely, television and print advertisements, were consistently rated lowest compared to the other sources evaluated across all three dimensions.

Overall, the pattern of means was similar across all three rating dimensions, except for a few notable differences. Some of the rating differences found in the dimension by information source interaction could be due to perceived differences in the rated dimensions inherent to each source. One example of this is the manufacturers' DTC prescription drug websites being rated easier to use than a medical reference book, but in contrast, the medical reference book being rated as more complete compared to manufacturers' DTC prescription drug websites.

Some gender differences were also found but the differences were relatively small and could be due to differences in how much each gender interacts with the different information sources. The student vs. nonstudent variable produced some interesting findings with students rating the friends or family source higher than nonstudents on likelihood-of-use and ease-of-use. Students may have closer ties and more social opportunities to ask friends/family for this and other types of information than nonstudents.

Despite its relative newness, the present results suggest that the Internet is already playing an important role as an information source to consumers (2). Because of the relatively high ratings in Study 1 and the fact that this source of information is relatively new, Study 2 sought to examine the manner in which prescription drug information is structured in manufacturers' DTC prescription drug websites.

STUDY 2

Study 2 examined the structure of existing manufacturers' DTC prescription drug websites with respect to the relative placement of benefit and risk information. The manner in which benefit and risk information is presented may provide insight on whether people will acquire a balanced amount of information about a drug's positive and negative effects. The accessibility, accuracy, and completeness of risk information in manufacturers' DTC drug websites may affect the quality of peoples' decision making process. These characteristics of a website can also provide insight on the usability (ease-of-use) of the DTC drug advertisement websites; that is, the

manner in which the benefit and risk information is presented may affect whether the information is seen and used.

METHOD

Twenty prescription drug websites were selected randomly from the *Physician's Desk Reference* (PDR) (5) using the following procedures. Numbers from a random number table were used to select page numbers in the PDR. The drug with information comprising the majority of the page was chosen. If the drug listed was an over-the-counter (OTC) drug, the page was skipped and the next random number was used. This procedure was repeated until a large pool of prescription drugs (including biologics) was selected for the next stage of the process.

Web searching involved the use of two search engines: Infoseek.com and Hotbot.com. The results of the Web search were used to determine if there was a manufacturer's DTC prescription drug website for the drug. Frequently, the drug sites were sub-sites of a larger site. To be included in the study the website had to be a prescription drug manufacturer's website that provided both risk and benefit information for the manufactured prescription drug. These websites included only manufacturers' websites with DTC drug product information for consumers. Also, the website had to have its own specific local navigation, including a homepage and additional pages lower in the website hierarchy. More than 125 prescription drugs were searched to find a sample of 20 prescription drug websites that met the criteria described above.

The 20 manufacturer DTC prescription drug advertisement websites were viewed using the Netscape Navigator 4.6 browser from March 20 to 23, 2001 for Sample 1 and using the Internet Explorer 5.5 browser on July 8–9, 2003 for Sample 2. Recorded during the assessment were the:

1. Number-of-clicks to the benefit information from the home page,
2. Number-of-clicks to the risk information from the home page,
3. Number-of-clicks to the risk information from the benefit information,
4. Number-of-clicks to the benefit information from the risk information,
5. Whether the site required scrolling to see the benefit information,
6. Whether the site required scrolling to see the risk information,
7. Whether the site had the risk and the benefit information on the same page, and
8. Whether the site required the use of a Portable Document Format (PDF) file reader to read the risk information.

Risks were defined as the information that provided the side effects and contraindications associated with the prescription drug. Benefits were defined as the information that described what the prescription drug is used for.

A click was defined as a manual response given by depressing a mouse button and was required to activate a link to another page within a website's hierarchy. Number-of-clicks to the risks and benefit information was defined as the minimum number of pages or links that were required to reach the page that contained the risk or benefit information from the home page. Number-of-clicks to the risk from benefit information was defined as the minimum number of pages or links that were required to reach the page that contained the risks from the benefit information. Number-of-clicks to the benefits from the risk information was defined as the minimum number of pages or links that were required to reach the page that contained the benefits from the risk information.

The need to scroll was based on whether information was initially visible on a 15-inch (23.3 cm) diagonal monitor, set at 1024 × 768 dpi resolution with the browser window maximized. Scrolling was considered required if the information was on the page, but was located below the viewable fold.

RESULTS

Tables 3 (March 2001) and 4 (July 2003) present the drug websites examined for Sample 1 and 2, respectively. The drug manufacturer information is given in the first column with the remaining columns constituting the measures described in the Method section.

Sample 1. The results indicated that the number-of-clicks required to find the risks from the home page ranged from 0 to 5 ($M = 2.05$, $SD = 1.23$), whereas the number-of-clicks required to find the benefits from the home page ranged from 0 to 4 ($M = 1.50$, $SD = 0.95$). Analysis indicated that significantly more clicks were required to find the risk information from the home page than the benefit information, t (19) $= 2.94$, $p < .01$.

Seventy-five percent of the prescription drug websites presented the risk and benefit information on separate pages. Forty-five percent of the websites placed the benefit information closer to the home page than the risk information (defined as requiring more clicks to find the risks). Scrolling was required significantly more often to find the risk information ($M = 0.60$, $SD = 0.50$) than to find the benefit information ($M = 0.20$, SD = .41), t (19) = 2.99, $p < .01$.

Sample 2. The results indicated that significantly more clicks were required to find the risks information from the home page than the benefit information, t (19) = 3.49, $p < .01$. The number-of-clicks to find risks from home page ranged from 0 to 4 ($M = 1.35$, $SD = .69$), whereas the number-of-clicks required to find the benefits from the home page ranged from 0 to 2 ($M = 0.5$, $SD = 0.15$).

Sixty-five percent of the prescription drug websites presented the risk and benefit information on separate pages. Sixty percent of the websites placed the benefit information closer to the home page than the risk information (defined as requiring more clicks to find the risks). Scrolling was also required significantly more often to find the risk information ($M = 0.65$, $SD = 0.49$) than to find the benefit information ($M = 0.10$, $SD = 0.31$), t (19) = 4.82, $p < .0001$.

Between Samples. Sample 2 (conducted in 2003) should significantly more manufacturer DTC prescription drug websites with benefits closer to the home page versus risks compared to Sample 1 (conducted in 2001), t (19) = 2.18, $p < .05$. Sample 2 required significantly less clicks to reach the benefits from the home page compared to Sample 1, t (19) = 4.10, $p < .001$. Also, Sample 2 required significantly less clicks to reach the risks from the home page compared to Sample 1, t (19) = 2.41, $p < .05$.

DISCUSSION

Study 2 provides a description of the manner in which prescription drug manufacturers provide benefit and risk information on DTC prescription drug websites. Overall, the results from this study indicated that risk information was more difficult to access than benefit information. However, a trend from Sample 1 to Sample 2 was found that indicated that both benefits and risks are being placed closer to the homepage but that the risks were still being made less accessible than benefits.

FDA regulations for the presentation of information in DTC drug advertisements require a fair of risk and benefit information (4). However, the trends found in the current research suggest this is not necessarily the case with DTC website advertisements for prescription drugs.

The results suggest that the risks are being placed at deeper levels ("more distant") of the website hierarchy than the benefit information. Web usability research has shown that information placed deeper in a website hierarchy is less likely to be seen (6). Furthermore, Vigilante and Wogalter (3) found that risk information placed lower in the website hierarchy is less likely to be seen and read by users. By placing risk information deeper in the hierarchy, manufacturers are indirectly giving more emphasis to benefit information by decreasing the likelihood of finding the risk information as it requires more links to access.

Other results indicate that users are required to scroll down a Web page to find the risk information more often than they would be required to scroll to find the benefit information. Web usability research has shown that information located further down on a Web page is less likely to be seen than information located at the top of a Web page (6,7). Furthermore, Vigilante and Wogalter (3) found that risk information is also less likely to be found if a user is required to scroll down a web page to view the information.

An additional finding of interest was that

TABLE 3

Drug Websites and Manufacturer Information (March 2001)

Drug Name	Manufacturer	Clicks to the Benefits from the Home Page	Clicks to the Risks from the Home Page
Aricept®	Pfizer	1	1
Betapace®	Berlex Laboratories	1	1
Biaxin®	Abbott Laboratories	2	2
Celexa®	Forest Pharmaceuticals	1	2
Cozaar®	Merck & Co., Inc.	2	3
Epogen®	Amgen Inc.	1	3
Fludara®	Berlex Laboratories	2	2
Fosamax®	Merck & Co., Inc.	1	3
Gabitril®	Abbott Laboratories	0	0
Humalog®	Eli Lilly and Company	4	5
Integrilin®	Key Pharmaceuticals	1	2
Nasacort®	Aventis Pharmaceuticals	3	3
Neupogen®	Amgen Inc.	2	2
Pravachol®	Bristol-Myers Squibb	1	1
Prilosec®	Astra Zeneca	1	2
Prozac®	Eli Lilly and Company	1	1
Rabavert®	Chiron Corporation	2	2
Taxol®	Bristol-Myers Squibb	1	0
Wellbutrin®	GlaxoSmithKline	1	2
Zyprexa®	Eli Lilly and Company	3	4

some websites required a PDF file reader to view the required full disclosure of risk information. The advantage of the PDF format is the ability to download a document with all the information in a set format. If that material is well designed then it can be useful to participants in hard-copy form. However, there are several disadvantages to using the PDF format to present risk information as it breaks several usability guidelines. PDF files are typically converted from documents intended for print (hardcopy) and not meant for online reading. Online presentation of such documents is typically dense and difficult to scan (8). In many cases, the PDF files were representations of detailed prescribing inserts that usually spanned several pages. Also, PDFs change the user experience in having a different "look" than that of Web pages, including different or no commands and menus and usually lacking in its own internal page navigation (9). Furthermore, PDFs are more likely to crash users' browsers by requiring a special PDF reader plug-in and by increasing download times, especially over a dial-up service (9).

The results indicate that risk information is not as accessible as benefit information on DTC website advertisements. Furthermore, website usability research has shown that if information is not easily accessible, users can become frustrated and leave a site without finding what they were looking for (7,8,10). Thus, by making risk

TABLE 3

Continued

Clicks to the Risks from the Benefits	Clicks to the Benefits from the Risks	Scroll to View the Benefits	Scroll to View the Risks	Risks and Benefits on the Same Page	PDF Required
0	0	no	yes	same	no
1	1	no	no	different	no
0	0	yes	yes	same	no
1	1	no	no	different	no
1	1	no	yes	different	no
1	2	no	yes	different	no
0	0	yes	no	same	no
1	3	no	no	different	no
0	0	no	yes	same	no
1	2	no	no	different	yes
1	2	yes	yes	different	yes
0	0	no	yes	same	no
1	1	no	yes	same	no
1	1	yes	yes	different	no
1	1	no	no	different	yes
1	1	no	yes	different	no
2	2	no	no	different	no
1	1	no	no	different	no
1	1	no	yes	different	no
1	1	no	yes	different	yes

information less accessible by requiring more clicks and scrolling, many of the manufacturers' OTC websites appear to be at variance with the intent of the FDA requirements for an equal balance of benefit and risk information in DTC prescription drug ads.

GENERAL DISCUSSION

The 1997 FDA Modernization Act has no specific regulations for manufacturers' DTC prescription drug advertisements on the World Wide Web (3). Current guidelines for the Web are being interpreted using regulations for broadcast and print media, which do not address the placement of information within a more complex environment as in a website's hierarchy.

Study 1 suggested a trend for potential consumers strongly preferring manufacturers' DTC prescription drug websites, compared to several other sources of drug information. These findings substantiate the impact of manufacturers' DTC prescription drug websites on consumers' searches for information about a prescription drug. Recent research has shown that older adults are increasingly using the Internet (11,12). In 1995, a survey of Internet users reported that only 3% to 5% of the users were older adults and users were predominately high income males with higher educational achievements (13). Although the overall percentage of older adults using the Internet is currently is still relatively low, senior citizens (greater than 64

TABLE 4

Drug Websites and Manufacturer Information (July 2003)

Drug Name	Manufacturer	Clicks to the Benefits from the Home Page	Clicks to the Risks from the Home Page
Aricept®	Pfizer	1	2
Betapace®	Berlex Laboratories	2	2
Biaxin®	Abbott Laboratories	2	2
Celexa®	Forest Pharmaceuticals	0	0
Cozaar®	Merck & Co., Inc.	0	2
Epogen®	Amgen Inc.	0	2
Fludara®	Berlex Laboratories	0	1
Fosamax®	Merck & Co., Inc.	0	4
Gabitril®	Abbott Laboratories	1	1
Humalog®	Eli Lilly and Company	1	1
Integrilin®	Key Pharmaceuticals	0	1
Nasacort®	Aventis Pharmaceuticals	0	1
Neupogen®	Amgen Inc.	0	2
Pravachol®	Bristol-Myers Squibb	1	1
Prilosec®	Astra Zeneca	0	0
Prozac®	Eli Lilly and Company	0	1
Rabavert®	Chiron Corporation	0	1
Taxol®	Bristol-Myers Squibb	1	0
Wellbutrin®	GlaxoSmithKline	0	1
Zyprexa®	Eli Lilly and Company	1	2

years) are one of the fastest growing demographics of Web users (12). Recent research by Morrell et al.(13) has shown that the older adults who do use the World Wide Web are primarily interested in looking for health care information. These findings further suggest that an increasing number of older adults will be using the Internet as a source of health care information.

The results of Study 2 suggest that some manufacturers may be placing risks further away (eg, by requiring more clicks and scrolling), thereby making them more difficult to access. These results suggest that website designers may be giving higher priority to benefit information compared to risk information. Given the FDA regulations indicating the need for fair balance of presentation, accessibility of risk information should be balanced with respect to the benefit information and so should require an equal number-of-clicks to access the respective information.

Furthermore, the highly variable methods of presenting risks in the sampled websites indicates a need for basic standards on Web presentation of risk and benefit information in DTC prescription drug websites. This might involve more specific guidelines adopted by drug manufacturers or established through government regulation. A substantial amount of human-computer interaction research already exists that could facilitate finding ways to balance the presentation of risk and benefit information. Human-computer interaction usability princi-

TABLE 4

Continued

Clicks to the Risks from the Benefits	Clicks to the Benefits from the Risks	Scroll to View the Benefits	Scroll to View the Risks	Risks and Benefits on the Same Page	PDF Required
1	1	no	yes	different	no
0	0	yes	yes	same	no
0	0	yes	yes	same	yes
0	0	no	yes	same	no
2	2	no	yes	different	yes
2	2	no	yes	different	no
1	1	no	yes	different	no
4	4	no	yes	different	yes
0	0	no	yes	same	no
0	0	no	yes	different	no
1	1	no	yes	different	yes
1	1	no	no	same	no
2	2	no	yes	different	no
0	0	no	no	same	no
0	0	no	no	same	no
1	1	no	no	different	no
1	1	no	yes	different	no
1	1	no	no	different	no
1	1	no	no	different	no
1	1	no	no	different	no

ples of consistent presentation of navigation and content are examples that could make users' tasks easier (5,14,15).

Not only is research needed to examine how different user groups (eg, older adults, chronically ill patients, etc.) use the Internet and other sources to find prescription drug information, there is also a need to determine if there are any differences with respect to different categories of drugs such as biologics and over-the-counter drugs.

FUTURE RESEARCH AND LIMITATIONS

This study did not specifically examine certain groups such as older adults, chronically ill patients, persons with low socio-economic status, and low English-language skills and, as such, could limit its generalizability to these groups. These specific groups are important because they may have difficulties in accessing information, particularly on the Internet. Research is needed to examine what particular problems each of these individual groups may have in using the Web for acquiring prescription drug and other health care information.

A random sample of prescription drugs from a recent PDR was used. This method of sampling allowed an unbiased selection of prescription drugs and as a technique has the characteristics of face validity, reliability, and replicability. This method was also employed to help ensure that a range of prescription drugs were examined, not just the top selling prescription drugs. Additional methods of choosing the sample of manu-

facturers' DTC prescription drug websites could be employed in future research, such as examining websites of the most prescribed drugs and those with the greatest advertising budget.

With these limitations in mind, future research is needed to help the FDA develop design guidelines for the presentation of prescription drug information on the World Wide Web. These guidelines could further facilitate the finding of relevant information on manufacturers' DTC prescription drug websites.

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