Published in final edited form as:

Patient Educ Couns. 2017 June ; 100(6): 1111–1119. doi:10.1016/j.pec.2016.12.032.

Consumer Confusion between Prescription Drug Precautions and Side Effects

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Abstract

Objective: Multiple studies have identified consumers' difficulty correctly interpreting risk information provided about prescription drugs, whether in printed format or online. This study's purpose was to explore whether consumers can distinguish between prescription drug precautions and side effects presented on brand-name drug websites.

Methods: Participants ($n=873$) viewed fictitious drug websites that presented both precautions and side effects for one of four drugs, and they completed a survey assessing recall and comprehension. We coded open-ended recall data to identify whether drug precautions were mentioned and, if so, how they were interpreted.

Results: Approximately 15% of participants mentioned at least one drug precaution. The majority (59.7%) misinterpreted precautions as potential side effects. Participants who misinterpreted precautions rated the drugs as significantly more likely to cause side effects than participants who accurately interpreted the precautions. Age, education, literacy, and other factors did not appear to predict precaution interpretation.

Conclusion: At least some consumers are likely to interpret precautions on drug websites as potential side effects, which might affect consumer preferences, treatment decisions, and medication safety.

Practice Implications: Healthcare providers should be aware of this potential confusion, assess patients' understanding of precautions and potential side effects, and address any misunderstandings.

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Conflicts of Interest

The authors have no conflicts of interest to report.

Patient Identifying Information

We confirm that all patient/personal identifiers have been removed or disguised so that the patient(s)/person(s) described are not identifiable and cannot be identified through the details of the article.

Keywords

prescription drug; advertising; Internet; direct-to-consumer; risk communication; patient-provider communication; shared decision making

1. Introduction

Consumers in developed countries around the world increasingly seek health information online, with information about prescription drugs—including drug side effects—being one of the most commonly sought topics [1–7]. Although large government and commercial websites (e.g., [NIH.gov](https://www.nih.gov), [WebMD.com](https://www.webmd.com)) are the most popular sources of online drug information [6], brand-name drug websites (i.e., [DrugName.com](https://www.drugname.com)) are also a leading and frequently visited source [5–6, 8–9]. This is true even in countries that ban direct-to-consumer marketing of prescription drugs, because the Internet enables consumers in these countries to access brand-name drug websites [10]. More than two-thirds of search engine results for prescription drugs contain at least one link directing individuals to brand-name drug websites regardless of geographic location [11].

Brand-name drug websites typically contain the same information provided in hard-copy package inserts, and they are designed both to educate consumers about the drug as well as promote it [12–13]. However, evaluation of brand-name drug websites suggests that many sites do not present information in a balanced manner, often presenting information about benefits higher on the site and in larger font and placing risk information in less conspicuous locations [14–17]. Beyond brand-name drug websites, online health information in general has many limitations: Information is typically written at a high reading level and consumers scan information rapidly, with the average website visit lasting less than one minute [18–19].

Although little research has been conducted on consumers' understanding of the information presented on brand-name drug websites, previous research suggests that most consumers have difficulty comprehending this same information when it is presented in package inserts. Specifically, consumers struggle to interpret multiple elements of package inserts, including dosage, indication, method of administration, instructions for use, and warnings and contraindications [20–22]. This is especially true when consumers are older, take multiple medications, have lower literacy skills, and have limited English proficiency and when labels include medical terminology, multistep instructions, and distracting content (e.g., unrelated visuals) [22–29].

More alarmingly, few consumers know the potential side effects and warnings of their current prescription drugs, especially consumers who are older, take multiple medications, and have lower health literacy [30–33]. Even when presented with educational materials, such as medication guides or brief summary pages—which are designed to improve knowledge of drug risks—consumers have difficulty recalling risk information [34–36].

Given consumers' difficulty understanding and recalling risk information, one important area of concern is their potential confusion between drug precautions and drug side effects [37]. Precautions and side effects are often presented together in a drug's detailed risk

information, yet they contain very different messages. Precautions are a type of drug warning that directs consumers to tell their healthcare provider if they have a certain pre-existing health condition so that the dosage can be adjusted or contraindications can be avoided (e.g., tell your doctor if you have hypertension as your dosage may need to be adjusted). Conversely, side effects alert consumers to potential adverse events that might result from taking a medication (e.g., the drug may cause hypertension). Consumers who misinterpret precautions as side effects may be at greater risk for serious adverse reactions, incorrect dosing, and insufficient monitoring. Consumers who misinterpret side effects as precautions may unnecessarily avoid a medication, leading to poor illness management or less effective treatment. Despite these implications, no research has examined how likely consumers are to confuse these two types of risk information or how such confusion might affect consumer risk perceptions and behavior.

The purpose of this exploratory study was to examine whether consumers can distinguish between drug precautions and drug side effects presented on brand-name drug websites. We presented consumers with one of four brand-name drug websites for fictitious prescription drugs, which contained information on both drug side effects and drug precautions. We then assessed consumer recall and interpretation of drug risk information. The ability of consumers to distinguish between drug precautions and drug side effects has important implications for treatment decision-making and patient safety. Specifically, we examined three research questions:

1. How likely are consumers to confuse drug precautions and drug side effects?
2. What types of individuals are most likely to confuse these concepts?
3. Does confusion between precautions and side effects influence drug risk perceptions?

2. Methods

2.1 Study Design

This study was nested within a set of larger experimental studies that examined how exposure to brand-name drug websites influences consumer knowledge as well as perceptions and behaviors related to prescription drugs. For the larger studies, we created websites for five fictitious prescription drugs indicated to treat seasonal allergies, high cholesterol, high blood pressure, acid reflux, and depression; and we tailored those websites for various experimental conditions that manipulated the location and format of risk information, the presence of patient testimonials, or the presence of animated videos. We randomly assigned study participants with the target illnesses to view these brand-name drug websites and then administered a brief online questionnaire assessing participant risk/benefit recall, risk/benefit perceptions, and other constructs related to the advertised drug.

For the study described in this paper, we examined only the control conditions (i.e., brand-name drug websites that mirrored industry practice) and did not include the experimental manipulations, because we wanted to assess consumer recall and perceptions from typical drug websites and did not want the experimental manipulations to confound the results. We

also excluded the depression population from this study because the depression website contained an extremely large volume of risk information, which made it very difficult to compare the depression website content against the stimuli for other illness populations.

2.2 Eligibility, Recruitment, and Screening

We recruited participants from GfK Custom Research's nationally representative online consumer panel of U.S. adults (KnowledgePanel®), which randomly samples individuals from the U.S. adult population using a combination of random digit dialing and address-based sampling [38–39]. We identified panelists who previously reported having one of the target illnesses (seasonal allergies, high cholesterol, high blood pressure, and acid reflux) and invited them to participate in the study. To enroll in the study, panelists had to respond to the invitation, consent to participate, complete a screener to confirm their eligibility (i.e., medically diagnosed with target illness and either still had it or had taken medication for it in the past 12 months), be able to view the assigned website, and complete the questionnaire. This resulted in a total sample size of 873 completed participants ($n=215$ seasonal allergies; $n=217$ high cholesterol; $n=232$ high blood pressure; $n=209$ acid reflux) in the control conditions.

2.3 Stimuli and Drug Precautions

During the study, we instructed participants to view a brand-name drug website for a fictitious prescription drug indicated to treat their illness—seasonal allergies (*Glistell*), high cholesterol (*Pexacor*), high blood pressure (*Plistaz*), or acid reflux (*Fentiva*). Each website had three pages: a homepage (Figure 1), a subpage on how the drug works (“About [DRUG X]”), and a subpage with tips for managing the illness (“Patients Taking [DRUG X]”). As with a real website, participants could navigate between the pages and were able to view the website for as long as desired; however, they could not return to the website once they moved to the questionnaire.

To mirror actual brand-name drug websites, the study websites contained information on both drug benefits and drug risks. Along with various side effects, the risk information on each website contained one to three drug precautions advising consumers to let their doctors know if they have certain pre-existing conditions (Table 1). We used the high cholesterol population as a validity check during analysis because the precaution (“Inform your doctor if you have any Asian heritage”) could not reasonably be interpreted as a drug side effect.

2.4 Data Collection

We collected data during a 13-week period (January 24 to April 25, 2013). As described earlier, we randomly assigned eligible participants to one of the experimental conditions, directed them to view a brand-name drug website for a fictitious prescription drug, and administered a brief online questionnaire assessing their risk/benefit recall, risk/benefit perceptions, and other constructs related to the drug. Prior to data collection, we cognitively tested and pretested the questionnaire to refine the questions and response options. The final questionnaire comprised 39 items. We disabled questionnaire navigation so that participants could not return to previous questions or amend previous answers because questions later in the survey provided clues about the correct answers to earlier questions.

2.5 Measurement and Coding

We measured unaided recall of website risk information by asking participants “What are the side effects and negative outcomes of [DRUG NAME]? Please list as many side effects and negative outcomes as you can remember.” We cognitively tested this question wording to confirm that consumers understood that we were asking about side effects. We then had two team members independently code participants’ open-ended responses to (1) determine whether participants recalled each side effect mentioned on the website (yes/no) and (2) catalogue other side effects and risks mentioned by participants that were not presented on the website. We further coded participant responses for precaution recall and, if they mentioned one of the drug precautions, for precaution interpretation.

For precaution recall, we coded participants into one of three categories based on their open-ended risk recall responses: (1) mentioned precaution, (2) did not mention precaution, or (3) skipped risk recall question. For the seasonal allergies population, we coded participants as mentioning a precaution if they referred to any of the three precautions presented on the *Glistell* website.

For precaution interpretation, we coded participants who mentioned a precaution into one of three categories: (1) accurately interpreted as a precaution, (2) misinterpreted precaution as a side effect, or (3) interpreted precaution in some other way that may or may not be correct (e.g., advertised drug interacts with medications for other illness, advertised drug is contraindicated for people who have other illness). For the seasonal allergies population, some participants fell into different categories across the three precautions. We first coded interpretation by individual precaution. We also examined interpretation within the entire seasonal allergies population. For this examination, we coded participants as ‘misinterpreted precaution as side effect’ if they misinterpreted any of the three precautions as a side effect. We coded participants as ‘accurately interpreted as a precaution’ if they accurately interpreted any of the three precautions but did not misinterpret any of the three as side effects.

We measured demographic variables of age, sex, race, ethnicity, and education. For exploratory purposes, we also asked questions assessing health literacy [40], current prescription drug use, time since diagnosis, illness knowledge and severity, perceived drug risk likelihood and severity, and web navigation skills [41]. For statistical tests, we recoded health literacy into a dichotomous variable of lower literacy (less than or equal to 4.0; response range 1.0–4.0) versus higher literacy (greater than 4.0; response range 4.5–5.0) based on response distribution. We also recoded time since diagnosis into a dichotomous variable of recent diagnosis (less than five years ago) versus distant diagnosis (five years ago or longer) based on response distribution. We used self-reported, subjective 5-point scales to assess illness knowledge and severity. To measure perceived drug risk likelihood, we asked participants to provide numerical answers ranging from zero to 100 to an open-ended question; to assess their perceived severity of the risk, we then asked them to rate on a 6-point scale how serious the risks would be if the drug did cause a person to have side effects or negative outcomes. Finally, we used a validated web navigation skills scale with four sub-items [41].

2.6 Data Analysis

We conducted all analyses in SPSS statistical software (version 23). We calculated participant characteristics, precaution recall, and precaution interpretation by running descriptive analyses on the overall sample and relevant subgroups. We conducted Chi-Square tests of independence to identify significant demographic differences between recall subgroups and to examine potential relationships between precaution interpretation and sex, race, education, health literacy, prescription drug use, and time since illness diagnosis. We conducted analysis of variance (ANOVA) tests to examine potential relationships between precaution interpretation and age, web navigation skills, illness knowledge, illness severity, perceived risk likelihood, and perceived risk severity. We also used a non-parametric independent samples Kruskal-Wallis test to examine the potential relationship between precaution interpretation and perceived risk likelihood, given that the risk likelihood data were not normally distributed. We set a significance threshold of $p=0.05$ for all statistical tests.

3. Results

3.1 Participant Characteristics and Precaution Recall

We enrolled a total of 873 participants in the experimental conditions examined in this study. Of those enrolled, 134 participants (15.3%) mentioned at least one precaution when asked to report drug side effects and negative outcomes. The remaining participants either did not mention any precautions ($n=655$; 75.0%) or skipped the question asking about drug risks ($n=84$; 9.6%).

Most study participants were female, White, older than 60 years of age, and had obtained a college degree (Table 2). Participants who mentioned at least one drug precaution were significantly more likely to have obtained a college degree than participants who did not mention a precaution ($\chi^2(3, n=789)=10.56, p=0.014$). However, there was no association between education level and number of risks recalled (i.e., more-educated participants did not naturally recall more risks than less-educated participants). There were no other significant demographic differences between the participants who mentioned a precaution and participants who did not, including any differences in sex, age, and race/ethnicity. Participants who were male, younger, less educated, and non-White were more likely to skip the risk recall question altogether.

The proportion of participants who mentioned at least one precaution differed by illness population. Almost one quarter of participants in the seasonal allergies population mentioned a precaution (22.8%), compared with lower proportions in the high blood pressure (20.1%), acid reflux (16.8%), and high cholesterol (7.9%) populations. However, because the risk information on the seasonal allergies website contained multiple precautions, these proportions are not directly comparable.

3.2 Precaution Interpretation

Of the 134 participants who mentioned at least one precaution in their open-ended response, only about one-fifth ($n=23$; 17.1%) interpreted the precautions accurately (e.g., “Tell your

doctor if you have liver disease,” “People with prostate enlargement or high blood pressure should consult their physician to take different dose of *Glistell*”). Conversely, almost two-thirds of participants ($n=80$; 59.7%) interpreted the precaution as a potential drug side effect (e.g., “May cause swelling of face, lips,” “Could raise blood pressure”). The remaining participants ($n=31$; 23.1%) interpreted the precautions in a way that went beyond the explicit instructions on the website, such as inferring that the advertised drug should not be taken by individuals with the pre-existing condition or that the advertised drug may interact with drugs used to treat the pre-existing condition (e.g., “Reacts with blood pressure meds,” “People with an overactive thyroid shouldn’t use it”).

As anticipated, the high cholesterol precaution (“Inform your doctor if you have any Asian heritage”) served as an effective validity check. No participants misinterpreted this precaution as a side effect (Figure 2). Among the other precautions, participants appeared more likely to misinterpret some as side effects than others.

3.3 Predictors of Interpretation

Among those who recalled a precaution, we examined whether any participant characteristics or demographics predicted misinterpretation of the drug precautions as side effects (Tables 3 and 4). However, the only characteristic associated with precaution interpretation was web navigation skills ($F(2, 131)=6.89, p=0.001$), with the results suggesting that participants who had weaker navigation skills were more likely to assign other interpretations to the drug precautions (e.g., interaction with current treatment, contraindication) than they were to interpret the precautions correctly ($\chi^2(52)=3.06, p=0.002$) or to interpret the precautions as side effects ($\chi^2(109)=3.09, p=0.009$). There were no significant associations between precaution interpretation and other characteristics, such as age, sex, education, health literacy level, current prescription drug use, or illness severity.

3.4 Precaution Interpretation and Perceived Risk

We also examined whether precaution interpretation influenced perceived risk of the advertised prescription drugs (Table 5). Interpretation was associated with perceived risk likelihood ($F(2, 131)=4.41, p=0.014$). Participants who misinterpreted precautions as side effects rated the drugs as significantly more likely to cause side effects than participants who accurately interpreted the precautions ($\chi^2(101)=3.08, p<0.001$). Because the perceived risk likelihood data were not normally distributed, we confirmed this finding with a non-parametric Kruskal-Wallis test ($p=0.006$). There was no relationship between precaution interpretation and the perceived severity of prescription drug side effects.

4. Discussion and Conclusion

4.1 Discussion

This study addresses a critical gap in the literature by providing an exploratory look at how consumers interpret drug precautions on brand-name drug websites, and the findings suggest that at least some consumers are likely to misinterpret precautions as potential side effects produced by the drug. Precaution recall was generally low in the overall sample, which was not surprising given that the question we asked focused on side effects. However, the 8% to

23% (depending on illness population) of participants who did mention a precaution were most likely to misinterpret it as a drug side effect. Conversely, only a small percentage of participants who mentioned a precaution accurately interpreted it as a precaution. This finding suggests that individuals who do notice precautions on drug websites may be likely to confuse the precautions with the side effects, perhaps because these two elements are not clearly labeled or separated within the risk information.

Almost all participants who recalled angioedema and liver disease misinterpreted those conditions as side effects of the advertised drugs. One possible explanation for this trend may be that angioedema and liver disease are commonly listed as side effects for advertised drugs (e.g., *Cialis* and *Lunesta*; *Cymbalta* and *Humira*), whereas the other pre-existing conditions mentioned in our precautions are likely to be less familiar to consumers as side effects. Additional research to explore precaution interpretation—especially through qualitative methods—could strengthen our understanding of this finding.

Our study also revealed that misinterpreting precautions as side effects may lead to inflated drug risk perceptions. Among study participants, those who misinterpreted precautions as side effects perceived the advertised drugs as more likely to cause side effects than those who accurately interpreted the precautions. This suggests that individuals who misinterpret precautions may be reluctant to consider drugs as a result of inaccurate risk perceptions.

Surprisingly, we did not find any demographic or personal characteristics that were associated with confusion between precautions and side effects. Despite previous literature demonstrating that age, literacy, and other factors are associated with difficulty understanding prescription drug labels and risk information [20–33], our study did not detect these differences when examining precaution interpretation. Given the study's exploratory nature and small sample size, the absence of demographic and psychographic predictors may be a result of limited statistical power or imprecise measurements. Future studies on this topic should use larger samples and create measurements specifically to assess precaution interpretation, which may reveal predictors of confusion between precautions and side effects.

There are four important limitations that should be considered when interpreting the findings of this exploratory study. First, the analytic sample size was small because we focused only on participants who mentioned drug precautions in unaided risk recall responses, and participant recall of precautions was generally low. A second, related limitation is that we cannot accurately categorize participants who did not mention drug precautions in their responses and thus cannot include them in our analytic sample. One possibility is that these participants did not notice or recall the precautions and, therefore, did not mention them on the questionnaire. Another possibility is that these participants correctly interpreted the precautions and, therefore, did not mention them when asked to name drug side effects and negative outcomes. Given that the precaution interpretation findings were derived from open-ended data, factors such as information salience, typing burden, and survey timing also may have limited the number of participants who mentioned precautions in their answers [42]. We recommend additional research with larger samples to see if the study's results can be replicated.

Third, because this exploratory study was nested within a larger study, we did not intentionally create measures to assess precaution recall and interpretation; rather, we explored this topic by examining unaided risk recall. Although the results for the high cholesterol population (“Inform your doctor if you have any Asian heritage...”) provide some confidence in the validity of our measures, the use of stronger, more-precise measures to assess precaution comprehension may reveal different results. A final limitation is that one of the six precautions did not include all of the same elements as the others. Specifically, the precaution about angioedema from the high blood pressure drug website did not provide reasoning for informing the doctor about having the condition (e.g., the potential need for a dosage change or special monitoring), as all of the other precautions did. It is possible that the absence of this information affected consumers’ interpretation of this precaution.

Using this exploratory study’s findings as a starting point, we strongly encourage additional research on how consumers interpret drug precautions on brand-name drug websites, and we recommend four areas of exploration. First, we recommend studies that employ larger sample sizes and more precise measurements to identify the true scope of consumer confusion between precautions and side effects. Such studies could provide valuable estimates about how often confusion occurs and whether precautions about pre-existing conditions that are commonly listed as side effects for advertised drugs are indeed more likely to be misinterpreted as side effects. Second, we recommend studies with larger sample sizes that examine potential predictors of misinterpretation. These studies should examine both personal factors (e.g., age, education, race, literacy) and website characteristics (e.g., risk information readability, organization, and complexity) to determine what factors might cause confusion between precautions and side effects. Third, we recommend qualitative research to explore consumer comprehension of drug precautions in more depth. Specifically, researchers should explore how familiar consumers are with the concept of drug precautions, how easily consumers can locate risk information on drug websites, and how consumers digest and process the risk information presented. Finally, we recommend research on the consequences of the precaution misinterpretation. Although this study found that individuals who misinterpret precautions as side effects perceive the drug as riskier, we do not know if those risk perceptions translate into a reduced willingness to take or ask about the drug. Consequently, we suggest examining the behavioral intentions of individuals who misinterpret precautions, such as their intention to ask healthcare providers about the drug and to take the drug as prescribed.

4.2 Conclusion

This exploratory study demonstrates that at least some consumers are likely to misinterpret prescription drug precautions presented on brand-name drug websites as potential drug side effects, which might affect consumer preferences, treatment decisions, and medication safety. Healthcare providers should be aware of this potential confusion, ask patients about pre-existing conditions, and explain how these conditions might affect treatment. This study also should be considered a starting point for additional research into this important topic rather than a firm estimate of consumer misinterpretation of drug precautions.

4.3 Practice Implications

Healthcare providers should be aware that consumers in multiple countries encounter brand-name drug websites and that at least some of these consumers will misinterpret precautions listed on the sites as drug side effects. This misinterpretation might lead to inflated drug risk perceptions, thus affecting patient preferences and treatment decision-making. Confusing precautions and side effects also may lead patients not to mention important pre-existing conditions, which could result in incorrect dosing or adverse drug events.

Healthcare providers should be aware of the potential confusion between drug precautions and side effects, and they should proactively ask patients about important pre-existing conditions when discussing treatment options. If patients are reluctant to try a treatment because of potential side effects, providers also should probe patients about their specific concerns and ensure that risk perceptions align with actual drug risks.

Funding

This research was funded by a contract from the U.S. Food and Drug Administration (FDA), Office of Prescription Drug Promotion.

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Glistell Home About GLISTELL Patients Taking GLISTELL

Tired of Seasonal Allergies?

Ask your doctor about GLISTELL.

If you start sniffing and sneezing when spring, summer, or fall arrives in your area, you may suffer from seasonal allergies, also known as hay fever or allergic rhinitis. GLISTELL (torreladine) is a long-acting once-daily antihistamine combined with a decongestant. This time-released tablet can relieve the following common seasonal allergy symptoms: nasal congestion, runny nose; sneezing; itchy nose and throat; and watery, itchy, or red eyes.

What Does GLISTELL Do?

GLISTELL can relieve the symptoms of seasonal allergies such as runny nose; sneezing; itchy nose and throat; and watery, itchy, or red eyes.

What Risks Are Associated with GLISTELL?

A very serious allergic reaction to GLISTELL is rare. Seek immediate medical attention if you notice symptoms of a serious allergic reaction, such as a rash, severe dizziness, trouble breathing, or itching or swelling (especially around your face, tongue, or throat).

Figure 1.
Screenshot of Seasonal Allergies Website Homepage

Figure 2.
Interpretation by Precaution

Table 1.**Precautions Presented on Study Websites**

Health Condition		Precaution Statement
Seasonal Allergies [/]	Precaution 1	As a precaution, talk to your doctor before taking GLISTELL if you have high blood pressure... People with these conditions may need different doses of GLISTELL.
	Precaution 2	As a precaution, talk to your doctor before taking GLISTELL if you have...an overactive thyroid... People with these conditions may need different doses of GLISTELL.
	Precaution 3	As a precaution, talk to your doctor before taking GLISTELL if you have...an enlarged prostate. People with these conditions may need different doses of GLISTELL.
High Blood Pressure	Precaution 4	Before taking PLISTAZ, tell your doctor if you have ever had a reaction called angioedema. Angioedema causes swelling of the face, lips, tongue, and throat and may cause difficulty breathing.
Acid Reflux	Precaution 5	Before taking FENTIVA, inform your doctor if you have liver disease, as special tests may be required.
High Cholesterol	Precaution 6	People of Asian descent may absorb PEXACOR into their systems more rapidly than others. Inform your doctor if you have any Asian heritage, because your starting dosage may need to be adjusted.

[/]The Seasonal Allergies website included three precautions that were visible to all participants with the condition.

Table 2.**Participant Demographics by Precaution Recall**

Characteristic	Mentioned Precaution (n=134)	Did Not Mention Precaution (n=655)	Skipped Question (n=84)	Total Sample (n=873)
Sex				
Male	46 (34.3%)	260 (39.7%)	43 (51.2%)	349 (40.0%)
Female	88 (65.7%)	395 (60.3%)	41 (48.8%)	524 (60.0%)
Age				
18–29 years	1 (0.7%)	38 (5.8%)	10 (11.9%)	49 (5.6%)
30–44 years	12 (9.0%)	66 (10.1%)	9 (10.7%)	87 (10.0%)
45–59 years	38 (28.4%)	203 (31.0%)	25 (29.8%)	266 (30.5%)
60+ years	83 (61.9%)	348 (53.1%)	40 (47.6%)	471 (54.0%)
Education				
Less than high school	2 (1.5%)	11 (1.7%)	2 (2.4%)	15 (1.7%)
High school	7 (5.2%)	91 (13.9%)	12 (14.3%)	110 (12.6%)
Some college	40 (29.9%)	220 (33.6%)	40 (47.6%)	300 (34.4%)
College degree or higher	85 (63.4%)	333 (50.8%)	30 (35.7%)	448 (51.3%)
Race / Ethnicity ^I				
White	119 (88.8%)	562 (85.8%)	65 (77.4%)	746 (85.4%)
Black	12 (9.0%)	77 (11.8%)	14 (16.7%)	103 (11.8%)
Other race	5 (3.7%)	39 (6.0%)	7 (8.3%)	51 (5.8%)
Hispanic	9 (6.7%)	25 (3.8%)	1 (1.2%)	35 (4.0%)

^IParticipants were permitted to select more than one racial group. Sum of percentages may exceed 100%.

Table 3.

Precaution Interpretations by Participant Characteristics (Categorical)

Characteristic	Precaution Interpretation			x ² Statistic	p-value
	Accurate Recall	Interpreted as Side Effect	Other Interpretation		
Sex					
Male	3 (6.5%)	32 (69.6%)	11 (23.9%)	5.78	<i>p</i> =0.056
Female	20 (22.7%)	48 (54.5%)	20 (22.7%)		
Race					
White	20 (16.8%)	70 (58.8%)	29 (24.4%)	0.92	<i>p</i> =0.632
Non-White	3 (20.0%)	10 (66.7%)	2 (13.3%)		
Education					
No college degree	7 (14.3%)	29 (59.2%)	13 (26.5%)	0.76	<i>p</i> =0.683
College degree or higher	16 (18.8%)	51 (60.0%)	18 (21.2%)		
Health Literacy					
Lower literacy	1 (3.4%)	19 (65.5%)	9 (31.0%)	5.27	<i>p</i> =0.072
Higher literacy	22 (21.0%)	61 (58.1%)	22 (21.0%)		
Prescription drug use					
Current	13 (14.4%)	59 (65.6%)	18 (20.0%)	5.12	<i>p</i> =0.275
Previous	7 (20.0%)	18 (51.4%)	10 (28.6%)		
Never	3 (33.3%)	3 (33.3%)	3 (33.3%)		
Time Since Diagnosis					
Less than five years ago	5 (17.2%)	18 (62.1%)	6 (20.7%)	0.13	<i>p</i> =0.937
Five years ago or longer	18 (17.1%)	62 (59.0%)	25 (23.8%)		

Table 4.

Precaution Interpretation by Participant Characteristics (Continuous)

Characteristic	Precaution Interpretation			F Statistic	p-value
	Accurate Recall	Interpreted as Side Effect	Other Interpretation		
Age (mean years)	58.6	61.7	61.3	0.73	$p=0.486$
Web Navigation Skills (mean skill level)	5.83	5.46	4.68	6.89	$p=0.001$
Illness Knowledge (mean knowledge score) ^I	4.04	3.96	3.65	2.06	$p=0.131$
Illness Severity (mean) ^I	3.17	2.80	2.97	1.63	$p=0.200$

^I Self-reported, subjective 5-point scales were used to assess illness knowledge and severity.

Table 5.

Drug Risk Perceptions by Precaution Interpretation

Perceived Risk Measure	Precaution Interpretation			F Statistic	p-value
	Accurate Recall	Interpreted as Side Effect	Other Interpretation		
Risk Likelihood (mean) ¹	13.43	30.38	26.74	4.41	<i>p</i> =0.014
Risk Severity (mean) ²	3.43	3.94	3.55	1.51	<i>p</i> =0.226

¹ Perceived drug risk likelihood was measured using an open-ended question requesting a numerical response between 0–100.

² Perceived drug risk severity was measured using a 6-point scale ranging from '1 = not at all serious' to '6 = very serious.'