APPLYING A MODEL OF RISK INFORMATION SEEKING TO A NEWLY DISCOVERED DRUG RISK

by

CHAKITA KENYOTTA WILLIAMS

(Under the Direction of SALLY ANN HUSTON)

ABSTRACT

Information seeking and processing behaviors among people with type 2 diabetes about a drug's risk, such as rosiglitazone cardiovascular risk, motivated this dissertation. To my knowledge, this study was the first to investigate this issue in the context of a drug risk that was discovered after a FDA approved drug was widely prescribed to individuals. The main purpose of the study was to determine predictors of health information seeking and processing among people with type 2 diabetes in regard to rosiglitazone's' cardiovascular risk. The study seeks to accomplish this by applying the Risk Information Seeking and Processing model to a drug risk that was identified after the drug had been prescribed to millions of people. The study tested hypotheses regarding the relationship between information insufficiency (the difference between knowledge held and knowledge needed about the risk), channel beliefs (TV news, newspapers, magazines), perceived information gathering capacity and their seeking and processing of information on rosiglitazone's cardiovascular risk. A quantitative online survey guided the data collection. A sample of 259 people with diabetes, provided by Qualtrics, was involved in the study. Respondents completed a questionnaire with items that were

adapted from previously published studies using the Risk Information Seeking and Processing Model. Hierarchical regression analysis was used to analyze the data. The findings suggest that the Risk Information Seeking and Processing Model remains applicable to a newly discovered drug risk like that of rosiglitazone cardiovascular risk. The results revealed that channel beliefs and perceived information gathering capacity are promising cognitive factors that risk communicators can influence in an attempt to improve information seeking and processing.

INDEX WORDS: Prescription drug; medication risk; risk communication; information seeking; information processing

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CHAPTER 1

INTRODUCTION

Purpose of the Study

Frequently, newly discovered risks related to medications are discussed in the media. People may suddenly stop taking their medication without seeking advice from a health care provider when they encounter these risk messages in the media. Stopping medication can be dangerous for the patient. For example, stopping type 2 diabetes medications can affect long-term blood sugar control thus increase the chance of complications like heart attacks, stroke, and blindness (Schectman et al., 2002). The factors that influence medication taking behaviors are not well understood. Effective risk communication should give people the motivation and perceived ability to seek for additional information about a drug risk from a doctor to avoid a patient stopping beneficial medication. Therefore, it is important to understand what motivates people to seek and process information about medication. This study addresses how people with type 2 diabetes reacted to the recent media coverage of the FDA announcements related to rosiglitazone, commonly called Avandia. In September 2010, the FDA announced that Avandia would have significant safety and labeling restrictions in the U.S. It was withdrawn from the European market due to its cardiovascular risks. Safety concerns about rosiglitazone first surfaced in May 2007 when the *New England Journal of Medicine* published a meta-analysis by Dr. Steven Nissen (2007) of the Cleveland Clinic, who reported an increased risk of myocardial infarction with rosiglitazone

(GlaxoSmithKline, 2010). After Nissen's study, Cohen et al. (2010) conducted a separate time series analysis of nationally representative physician office visit data from 1999 to 2009 and found a substantial decrease in the use of rosiglitazone during the FDA advisories that occurred between February 2007 and May 2008, while pioglitazone remained stable (Cohen, 2010). Starner et al. (2008) conducted a retrospective analysis of pharmacy claims to examine claims of rosiglitazone users as well as users of the other thiazolidinedione, pioglitazone. Their analysis examined the pharmacy claims of 9 commercial insurance plans before and after rosiglitazone's warnings were released to the public. Starner et al. (2008) found that although thiazolidinedione users did not alter their drug plan coverage, there was a 58.6% decrease in the use of rosiglitazone therapy from February 2007 through December 2007, the time frame in which the news release occurred. Starner et al.'s (2008) retrospective analysis also expressed that 1 in 5 rosiglitazone users indicated heightened cardiovascular risk, and rosiglitazone utilization declined by more than half in 2007. Cardiovascular disease is one of many common comorbidities of diabetes. However, Starner et al. (2008) primarily described trends in use of thiazolidinediones and identified claims with cardiovascular risk during the time frame that rosiglitazone's warnings were released to the public. More recently, Jain et al. (2012) commented on Starner et al. (2008) by stating "If prescribers reacted cautiously by assuming that the safety problems apply to all the drugs in the therapeutic class, the prescriptions for both pioglitazone and rosiglitazone should have similar decline." Jain et al. (2012) analysis extended the investigation of the use of rosiglitazone and pioglitazone after the cardiovascular risk warnings and concluded, similar to Starner et al. (2008), that response to the adverse news was limited to rosiglitazone. (Jain et al. 2012)

This study sought to examine issues related to the rosiglitazone cardiovascular risk and to examine the usefulness of the Risk Information Seeking and Processing Model for examining information seeking and processing among people with type 2 diabetes in the context of the rosiglitazone cardiovascular risk. Seeking and processing of information during a risk situation involving medications is of interest to health professionals because of its potential influence on behavioral and health outcomes. One such outcome is patients discussing information obtained with health care professionals about whether the risks outweigh the benefits of the medication before stopping a medication and another outcome is adherence to beneficial medication (Lambert and Loiselle, 2007). Adherence to type 2 diabetes medications is one of the key strategies in achieving long-term blood sugar control thus reducing the chance of complications like heart attacks, stroke, and blindness (Schectman et al., 2002). Policy makers are interested in how information about the safety of marketed drugs is communicated to the public. Advocates agree that a patient and his/ her physician should always discuss the evidence-based information on both the positive and negative effects of treatment before making a decision to continue or discontinue treatment based on the risk. It is important that medication risk information is disseminated to the public in a way that encourages them to seek and process information with the guidance of a health care professional. Longo et al. (2009) found that some patients search for information beyond conventional healthcare facilities, and a closer examination of this type of patient behavior can potentially enhance health risk communication from a variety of agencies like the FDA and CDC.

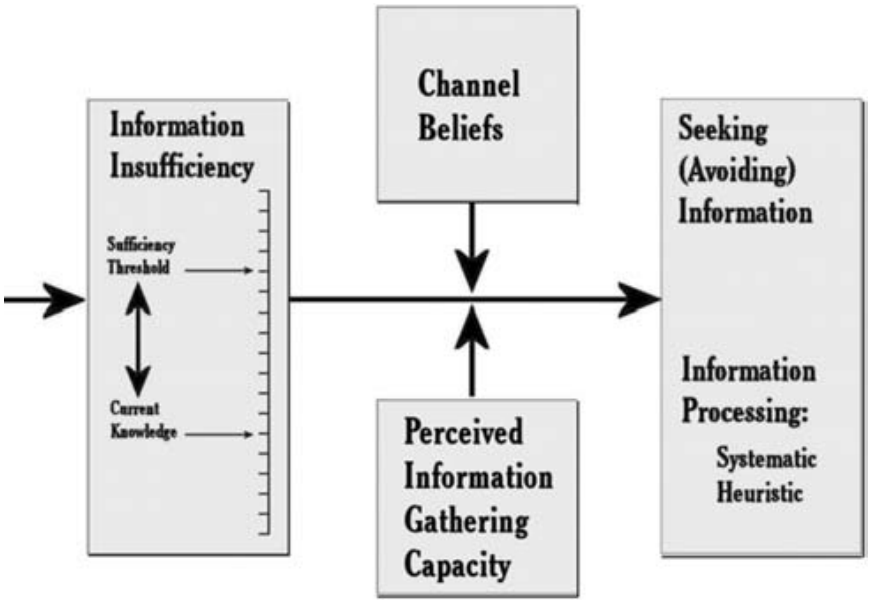
Innovation

This study is, to my knowledge, the first to apply The Risk Information Seeking and Processing Model (RISP) to a FDA approved drug risk discovered through post marketing studies. The Risk Information Seeking and Processing model has been applied to industrial and environmental risks like eating potentially contaminated fish, possible contamination of drinking water, and damaging river flooding (Kahlor et al., 2006; Griffin et al., 2008; ter Huurne et al., 2009). A significant number of studies about rosiglitazone cardiovascular risk have received heavy media attention. As regulatory agencies in the U.S. and Europe independently completed investigations on rosiglitazone, the FDA and the European Regulatory Agency separately made regulatory changes (Nissen & Wolski, 2007; 2010). The European Regulatory Agency removed the drug from the European market, while the FDA allowed it to remain on the market but with significant safety and labeling restrictions.

Regulatory measures, like those discussed above, help illuminate issues with information and dissemination of information with regards to drugs. The Risk Information Seeking and Processing Model states that information insufficiency, relevant channel beliefs, and perceived information gathering capacity will affect the extent to which people are motivated to seek and process risk information (Griffin et al., 1999). Griffin et al. (1999) also point out that indirect predictors such as perceived hazard characteristics, information subjective norms, affective response and individual characteristics affect people's information seeking behavior. It is important to know if this model can be applied to a prescription medication risk situation like the one explored in this study, which will further show the diversity in applicability of the model across

varying risk situations. Griffin et al. (2008) stated that current measurements for channel beliefs are an inconsistent predictor of information seeking and processing and could be improved with new measurement strategies. This study will add a new measurement to the current operationalization of the construct channel beliefs; media distort reality and the belief that the media provide useful cues. This study will add the new measurement, "confidence that media will bring all the information I need to know to my attention", to the current operationalization. As seen in Figure 1.1, the part of the model used for this study posits that the relationship between information insufficiency and seeking and processing behavior is moderated by channel beliefs and perceived information gathering capacity.

Figure 1.1: Hypothesized Relationships among Predictors of Risk Information Seeking and Processing Behaviors (Griffin et al., 1999)



Statement of Objectives

In this study of the Risk Information Seeking and Processing Model, people with type 2 diabetes taking an oral diabetes medication were surveyed to specifically test

elements of the model using, as an example, rosiglitazone cardiovascular risk. In the model, the size of the gap between the individual's current information about the risk and information needed to deal with the risk is termed information insufficiency. According to the model, perceived information gathering capacity and channel beliefs moderate the relationship between information insufficiency and information seeking and processing (ter Huurne et al., 2009; Griffin et al., 1999).

Examining the factors that influence health information seeking and processing related to risks associated with post marketing studies of medications is important. Risks discovered after a medication has been widely prescribed, such as the rosiglitazone cardiovascular risk, are both a public health and risk communication issue. Risk communication strategies should be developed with an understanding of factors that influence seeking and processing behaviors. Moreover, perceptions of information insufficiency may be vital motivators for information seeking concerning drug risks, and dissemination of information that reduces insufficiency perceptions prove extremely important. The RISP model can assist in this process. Policy makers can use this information to improve risk communication about post marketing studies related to medication that reaches the public through popular media like TV news, popular magazine, and newspapers. This study focused on how individuals seek and process information related to the rosiglitazone cardiovascular risk; however, this study does not address individuals' intentions to seek additional information from a health care professional. Instead, the data collected in this study can serve as a springboard for future studies and discussions that want to expand the investigation to health care professionals.

The specific aims of this project were to:

1. Determine the relationship between information insufficiency, channel beliefs, and perceived information gathering capacity and seeking and processing behaviors in regard to rosiglitazone cardiovascular risk among people with type 2 diabetes.
2. Determine if perceived information gathering capacity, and channel beliefs about newspapers, magazines, and TV news moderate or mediate the relationship between information insufficiency and information seeking and processing of people with type 2 diabetes with regard to rosiglitazone cardiovascular risk.

CHAPTER 2

LITERATURE REVIEW

The FDA approved rosiglitazone, a drug that was widely used to treat patients with type 2 diabetes mellitus, in 1999. Safety concerns related to rosiglitazone heightened in 2007. On May 21, 2007, Nissen and Wolski's meta-analysis on rosiglitazone was released online; the same day, the FDA released a safety warning on rosiglitazone. The July 30, 2007, conclusion of an FDA advisory committee meeting found that rosiglitazone increased cardiac ischemic risk. On August 14, 2007, thiazolidinedione, the drug class that includes rosiglitazone and pioglitazone, labels were updated with a black-box warning for heart failure. Finally, on November 14, 2007, the thiazolidinedione label was updated once more with a warnings and precautions section concerning rosiglitazone and coadministration of nitrate or insulin. Rosiglitazone's effect on cardiovascular morbidity and mortality remains uncertain

Health behavior frameworks such as the Health Belief Model (Janz et al. , 1984), Protection Motivation Theory (Prentice-Dunn et.al., 1986), Extended Parallel Process Model (Witte, 1992; 1994), Elaboration Likelihood Model (Petty & Cacioppo, 1981), and the Heuristic-Systematic Model (Eagly & Chaiken, 1993) provide guidance on risk communication, persuasive messages and health behavior changes (Springston, 2009). Likewise, much of the research in the area of health information seeking focuses on health promotion, persuasive messages for social marketing focused on changing behavioral risk factors, and disease self-management. For example, Elaboration

Likelihood Model explores how people attend to and interpret persuasive messages directed at them. In the Health Belief Model, susceptibility, severity, benefits, and costs offered a connective range for exploring people's health-related behavior through a socio-psychological theory (Rosenstock et al., 1988; Harrison et al., 1992). The Risk Information Seeking and Processing Model is used in this study because it "is concerned more with chronic responses to information not necessarily directed toward its users nor intended to be persuasive" (Griffin et al., 1999). For example, Longo et al. (2010) conducted a qualitative study using focus groups with people with diabetes and analyzed transcripts and notes from the focus groups to assess how people with diabetes look for and use health care information about their disease. Results from the focus groups that Longo et al. (2010) analyzed were that they articulated five characteristics some individuals with diabetes exhibited when trying to gather pertinent information about their health and healthcare; including (1) passive receipt of information through the media, (2) projection of disease as a means for justifying personal gathering of information, (3) an evaluation of information by patients' friends and family, (4) supplemental discussions with healthcare providers to reconcile inconsistent information, and (5) effective understanding of information.

Longo et al. (2010) discusses the two ways that patients participate in health information seeking. One way is through active seeking and the other is passive receipt of information. Longo et al. (2010) defines active seeking as patients trying to find specific information for an intended purpose and passive receipt of information as the "aspect of HISB, [health information seeking behavior], that is referred to as passive receipt of health information, by which patients acquire information unintentionally as a by-product

of daily life activities, such as television viewing or newspaper reading." Several factors influence health information seeking and patient outcomes.

When people encounter information about medication risks through the mass media, it can create a sense of uncertainty. People may feel that they don't know enough about the risk or they may question what the information means and this could lead to information seeking. Human behavior is a primary focus with much of social scientific research, where such research often investigates correlations between available information and potential ambiguities (Afifi & Weiner, 2004). Therefore, we are also concerned with health information seeking when people become interested in learning more about a health risk after mass media exposure. Among the most frequently encountered mass media, and therefore of interest in this study, are newspapers, magazines, and TV news. According to Niederdeppe et al. (2008), as health related news and access to said news grows, patients will increasingly encounter health information in the media, but there is little data on how many individuals further investigate the health information they receive. This gap illuminates important issues like the potential disparity between health knowledge and behavior.

Information seeking behavior is defined as "the purposive seeking for information as a consequence of a need to satisfy some goal" (Wilson, 2000). Information seeking can also be defined as a conscious effort to acquire information in response to a need or gap in knowledge (Case, 2007). As a social scientific concept, health information seeking remains only "partially developed" (Lambert & Loiselle, 2007). After critically examining the scientific literature from 1982 to 2006 on the concept of health information seeking behavior, Lambert and Loiselle (2007) explain that, at this point in

time, the concept does not have "distinct characteristics, delineated boundaries, and a clear description."

Scholars have become increasingly interested in health information seeking. Anker et al. (2011) reviewed the literature from 1978 to 2010 for methods and measures used to study active health information seeking. Anker et al. (2011) characterized a sample of 129 studies of health information seeking. Using the *PsychInfo* database, the authors noticed an "increasing linear trend over time, with 22.6% of studies occurring in the last five years" (2006-2010). Most of the studies focused on general health information seeking using cross sectional study designs.

Griffin et al. (1999) developed a model of risk information seeking and processing that "focuses on characteristics of individuals that might predispose them to seek and process information about health in different ways." In the current study, the Risk Information Seeking and Processing Model is applied to pharmaceutical safety and uses rosiglitazone's cardiovascular risk as an exemplar. This study explored how people are affected by information related to medication safety encountered through television, magazine articles, and newspaper articles. Future studies may expand on this study and focus on improvements in risk communication from pharmaceutical companies about post marketing studies related to medication that reaches the public through popular media like TV news, popular magazine, and newspapers. Furthermore, with regards to the risks that are discovered after medications have been marketed and prescribed widely to patients, this study could inform designing media kits and planning for channels of communications by FDA.

Survey of Rosiglitazone Drug Warnings

The earliest widespread warning regarding rosiglitazone derived from a meta-analytical study conducted by Nissen and Wolski in 2007, which was published online by New England Journal of Medicine. In their study, Nissen and Wolski (2007) amalgamated findings from 42 clinical trials, which performed rosiglitazone treatment tests. These studies incorporated a randomized control group using placebos and tested for myocardial infarction and cardiovascular-related deaths. According to their findings, groups receiving the rosiglitazone treatment displayed a 43% increase in the rate of myocardial infarction; groups receiving the placebo treatment showed no such increase. With these significant risk factors, Nissen and Wolski (2007) concluded that "patients and providers should consider the potential for serious adverse cardiovascular effects of treatment with rosiglitazone for type 2 diabetes." Though the findings were open to doubt because some researchers questioned the study design and interpretation of results (Diamond et al. 2007), their warning prompted a succession of other warnings related to the drug, including notifications to patients and providers by Safety, Notification, and Follow-Up (SNAFU) and an alert by the FDA.

Following the `Nissen and Wolski (2007) publication, the FDA released a warning regarding rosiglitazone on May 21, 2007. MedWatch cautioned healthcare professionals of "a potential safety issue" related to the antidiabetic drug Avandia (rosiglitazone). More specifically, the warning cited differing rates of ischemic cardiovascular adverse events, including fatal heart attacks, associated with Avandia. While the risks remained uncertain, MedWatch advised prescribers to exercise care in their treatment decisions for diabetic patients. Though the FDA issued the warning on the

heels of Nissen's meta-analysis, the FDA Commissioner, Andrew C. von Eschenbach, stated to the House Committee on Oversight and Government Reform that the FDA was already planning a course of action regarding the purported risks associated with the rosiglitazone drug before Nissen's publication, a decision that was separate from and planned prior to Nissen's meta-analysis. The FDA had separate data gathered from its own post-marketing studies. (Lofstedt, 2010)

The FDA's warning, having been released to both patients and providers, prompted other inquiries regarding the use of rosiglitazone. Orrico et al. (2010) investigated the clinical consequences of the FDA's safety alert, identifying through electronic medical records documentation review the percentage of patients who discontinued the rosiglitazone therapy following the warning, and whether the physician or the patient prompted that discontinuation of treatment. Moreover, Orrico et al. (2010) measured differences in baseline glycosylated hemoglobin values between the group of patients who continued the rosiglitazone treatment and the group who discontinued the treatment, also comparing the levels before and after the FDA's warning. Orrico et al.'s (2010) study found that 62% of the study population held safety concerns about rosiglitazone as a result of the alert. Even with widespread media reports on the rosiglitazone alert, the study population received further warnings from the SNAFU Committee about the rosiglitazone warnings. Orrico et al.'s (2010) study concluded that the increased patient and physician concern triggered by the rosiglitazone warnings did, in fact, influence patients and providers to discontinue rosiglitazone therapy. Table 2.1 presents a timeline of events related to rosiglitazone cardiovascular risk , starting with the 2007 Nissen meta analysis and continuing to present.

Risk Communication and Health Information Seeking

In her qualitative analysis of how physicians communicate changing risk of medication to patients, Ledford (2011) identified that physicians were concerned about the media's portrayal of prescription drug risks. Complex data are often presented in media reports but are not explained, leaving patients to deal with fear and uncertainty. Is it the content of media risk messages that influence people or the frequency? A correlation was found in biased media coverage of negative events, for example, the high frequency of reporting death from violence, and biased judgments of perceived risk. However, less dramatic causes of death, although occurring at the same frequency as violent deaths, were perceived as having less risk of death occurring (Slovic et al., 1987). The authors state that, "subtle differences in how risks are presented can have marked effects on perceptions and actions." People's perceptions of risks reported in the media are probably most influenced by both the number of reports given to a topic and the vivid characteristics of the articles (Wahlberg et al., 2000). Consequently, many empirical studies concentrate on, for example, pandemic threats and corresponding risks, while also providing strategic procedures, including those that are preventative, for managing public health in relation to such threats and potential risks (Leppin et al., 2009).

A recent qualitative study highlighted the importance of media communication about medication risks. Using a qualitative grounded theory approach, Ledford (2011) identified media exposure as a significant determiner in risk communication between

Table 2.1: Timeline of Events Related to Rosiglitazone Cardiovascular Risk

Date	Event
2007	*May*: New England Journal of Medicine publishes meta analysis by Dr. Steven Nissen of the Cleveland Clinic, reporting increased risk of myocardial infarction with rosiglitazone
	July: U.S. House Committee on Oversight and Government Reform Hearing evaluates the FDA assessment of rosiglitazone safety
	July: FDA advisory committee votes to keep drug on market
	October: European Medicines Agency (EMA) votes recommends new warnings for patients with ischemic heart disease
	November: FDA approves new boxed warnings addressing potential increases of myocardial ischemic events
2009	*March*: International Journal of Cardiology meta-analysis finds no risk of myocardial infarction
2010	*February*: U.S. Senate Finance Committee Report includes internal FDA safety report calling for drug to be withdrawn
	April: U.S. House Appropriations Subcommittee hearing assesses FDA handling of issue
	June: Archives of Internal Medicine publishes an updated meta analysis by Dr Nissen
	July: FDA advisory committee meeting held; majority vote to either withdraw the drug or restrict it severely
	July: European Medicines Agency (EMA) meets to discuss rosiglitazone
	September: FDA and EMA issue separate but coordinated announcements; Avandia will remain on the market in the U.S. with significant safety and labeling restrictions; and was withdrawn from the European market

physician and patient. Essentially, physicians categorized patients as communicatively active patients, ones already aware of changes in medication risks, and communicatively non-active patients, those with limited to no response to health information exposure, unaware of risk changes. Physicians customize the content and depth of risk communication to patients based on identified typology. The following is a sample physician narrative describing the case of Avandia for a communicative active patient:

> As far as the numbers needed to treat, the absolute risk reduction as opposed to the relative risk reduction, which is what got published from a meta analysis. So we spent a few minutes talking about generic things. It's a publication of a meta analysis looking back at a bunch of data. What I can't tell you is really what this risk means to you right now. What I can tell you is that we'll probably have a higher suspicion or less confidence in this medication and maybe all of these medications than we did because we're protecting you from bad outcomes. (Ledford, 2011)

In effect, patients' media exposure and responsiveness to risks presented in the media influenced the physician-patient discussion of changing prescription risks. Physicians identified that patients' media exposure complicated discussions about medication, contributing to information overload and negative feelings, requiring the physician to scan the media for information, and disturbing the trust relationship between the physician and the patient. Other studies have shown that, in time, some patients remember deceptive, or perceived as deceptive, information much better than in instances where substantiated information is being communicated (Hovland & Weiss, 1951).

Former studies on consumer health information seeking primarily took a situational approach in determining health information behavior. While some of these studies do investigate media and information-seeking, other studies do not; however, all of the studies use a situational approach. That is, researchers focused on the information needs specific to patients' health situation, such as the information search of AIDS patients, cancer patients, diabetes patients, and asthma patients. As stated earlier, one example of this is Longo et al. (2010) who assessed how people with diabetes look for and use health care information about their disease. Another example is Carlsson (2000) who evaluated the degree to which cancer patients sought information from nonmedical sources and found that patients used an active information-seeking strategy only to a limited degree. These patients sought information about cancer from the internet, medical books, and telephone help lines. He also reported higher rates of active information seeking among younger patients and those with higher levels of formal education. This study also concluded that the majority of patients used passive information-seeking strategies. Most patients responded to information about cancer when presented via television, radio, newspapers, and magazines. Huber and Cruz (2000) conducted a similar study, examining the information needs and information-seeking behaviors of the HIV/AIDS population. Their study explored and analyzed the types of information HIV positive individuals seek and the resources they consult, seeking to better facilitate information mediation for the HIV/AIDS community. Rees and Bath (2000) conducted another comparable study, a literature review of papers published between 1988 and 1998, exploring the information needs and information-seeking behavior of adult daughters whose mothers were diagnosed with early stages of breast cancer. The study

specifically charted the exchange of information between the daughters and the patients, and the daughters and the health-care professionals. Conclusions drawn were that information needs vary at different stages of disease and change with time, family members also desire information, women preferred verbal information from healthcare providers at diagnosis but are not always satisfied with the information, further from diagnosis, women preferred information from mass media that are perceived to be more accessible, and family members perceive a lack of information.

While these studies took a situation-specific approach in which the patients' health situation dictated his or her health information needs, they largely ignored the individual variables that impact health information seeking. In 2005, Dutta-Bergman examined the role of communicative and health consciousness and health-information seeking. Exploring interpersonal communication, community engagement, newspaper and magazine readership, television viewership, and internet used, Dutta-Bergman (2005) argued that communicative factors and activities served as a precursor to health-related motivation.

Dutta-Bergman (2005) grounded his theory on the findings and theories of other studies conducted on the effects of newspaper readership on society. Newspapers, which often cover a large array of health issues, have been recognized as reliable sources of health information to the public, indirectly having health enhancing effects. Dutta-Bergman (2005) drew from the concept of agenda-setting theory, in which it is argued that media agenda directly influences public agenda. According to McCombs and Shaw (2006), while mass media may not control public opinion, it very successfully dictates the public agenda of important issues. Applying this agenda-setting theory, Dutta-Bergman

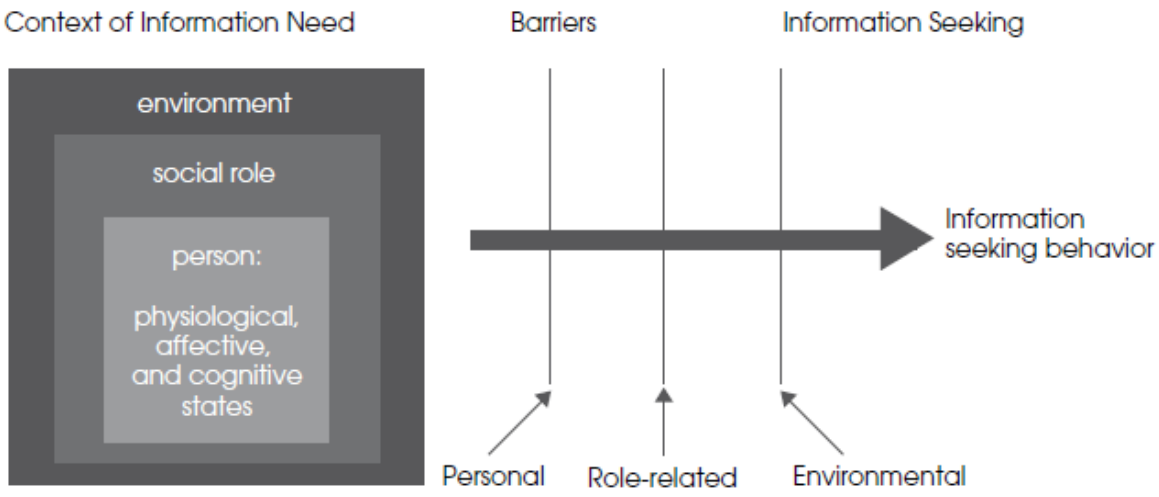
(2005) posited that newspapers and magazines, as established sources of health information, functioned as health-enhancing media. According to Dutta-Bergman (2005), newspapers, "by introducing issues of health in the public agenda, promotes health consciousness and subsequent health information search." Likewise, magazines "generate health consciousness by exposing the individual to a plethora of health information." Dutta-Bergman (2005) concluded that "the use of newspapers and magazine readership generated autonomous health information search by producing high levels of health consciousness in the reader." As such, the considerable and respected health information presented in newspapers and magazines effected health beliefs and behaviors in readers. Likewise, Johnson et al. (1993) describe a comprehensive model of information seeking that suggested that models of information seeking from mass media, such as magazines, should focus on purely communicative factors. The model postulates that four health-related factors- demographics, direct experiences, salience, and beliefs- determines two information carrier factors-perceptions of information carrier characteristics and utility-which, in turn, determine information seeking actions.

Information Seeking Models

Similar to Dutta-Bergman's study, Wilson (2000) applied a multidisciplinary perspective to the field of human information behavior. Wilson (2000) used a person-centered approach in his survey of information seeking and developed an information-seeking behavior model prompted by the individual's physiological, cognitive, and effective needs. According to Wilson (2000), "the context of any one of these needs may be the person, him or herself, or the role demands of the person's work or life or the environments (political, economic, technological, etc.) within which that life or work

takes place." Additionally, the "barriers that impede the search for information will arise out of the same set of contexts."

Figure 2.1: Wilson 1981 Model of Information-Seeking Behavior (ter Huurne, 2009)

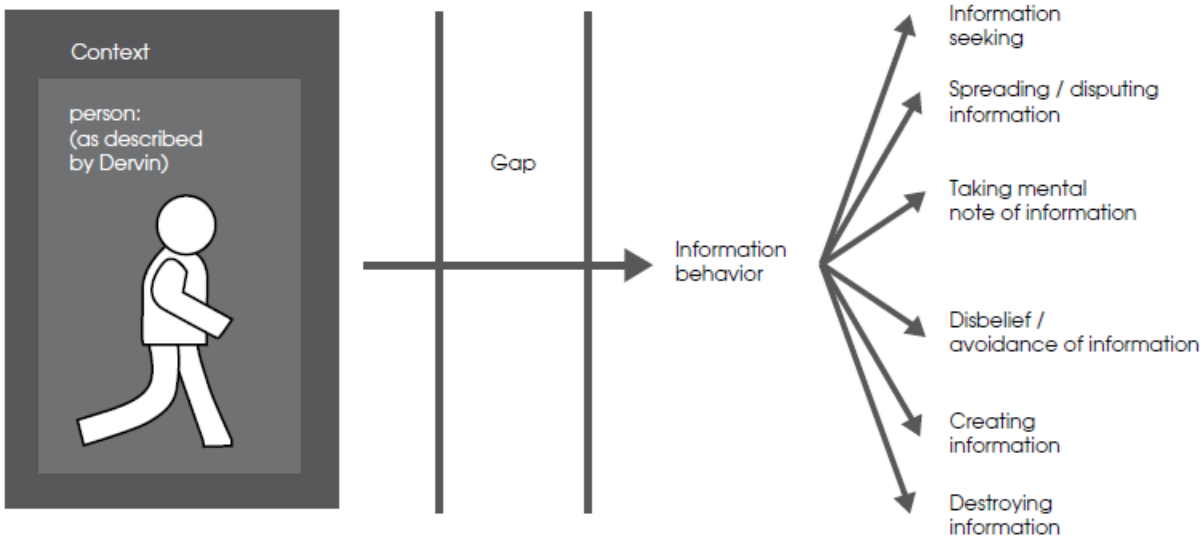


Dervin's (1998) Sense Making Theory identified four elements for implementation of the model: a situation in time and space that introduces the problem; a gap that differentiates between the contextual situation and the desired situation; an outcome or the consequences of the sense-making process; and a bridge or an attempt to close the gap between situation and outcome. In this sense-making approach, one's perceived knowledge may be inadequate to address the problem, prompting the person to fulfill his or her information needs or "cognitive gaps," as Dervin labeled them.

Godbold (2006) merged the theoretical bases of both Wilson's (1981) and Dervin's (1999) studies in an extended information-seeking behavior model. Replacing the concept of "barriers" with that of "gap," Godbold's proposed model demonstrated the notion of multi-directionality and illustrated how one's information behavior responds to a gap beyond information seeking. In Goldbold's model, a person stands before the gap and considers the gap and the need for sense making. (See Figure 2.1 and 2.2) Thereafter,

the person decides on a course of action, drawing from a multitude of options to achieve sense making.

Figure 2.2: Godbold's Extended Model of Information-Seeking Behavior (ter Huurne, 2008)



Risk Information Seeking and Processing

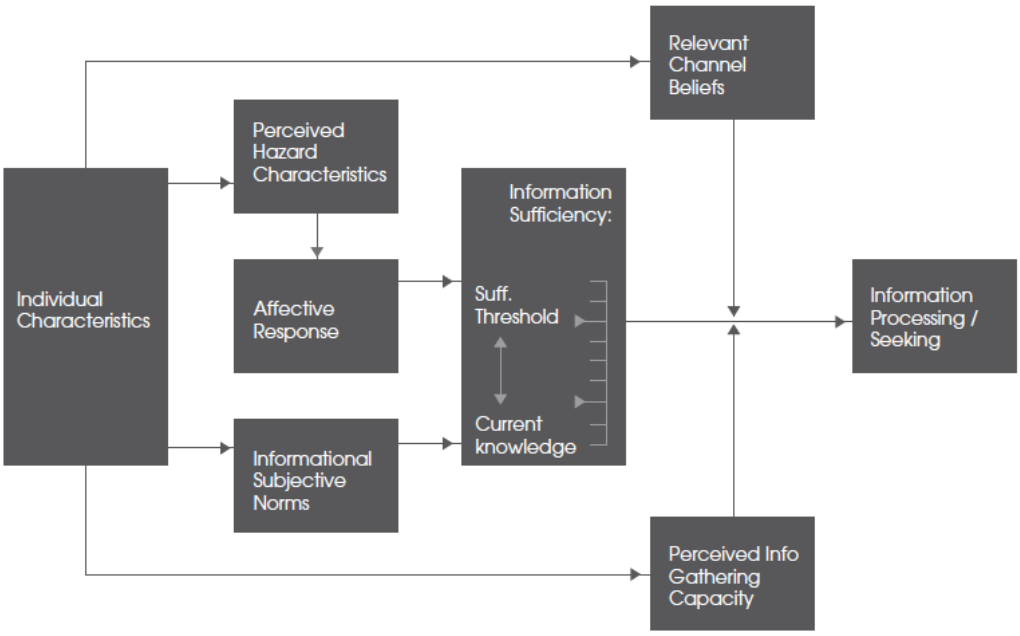
Information gaps do not account for the entire process of information seeking. Many factors play a role in information seeking, including satisfying the need for information and the availability and accessibility of information sources. According to Wilson (2000), many individuals make decisions without complete information or based on beliefs. As a result, barriers present in the process of information gathering may exhaust one's motivation to seek information and, therefore, negate information seeking altogether. In spite of the models of information seeking such as Godbold's extended model, there are still a small number of models and theories as well as unexplored concepts in relation to risk information-seeking behavior in the field of information

science. Griffin et al. (1999) developed one of the first risk information seeking and processing models (Figure 2.3). Griffin et al. (1999) "developed a model of risk information seeking and processing and apply it to understanding how individuals respond to health risks" by adapting components from Eagly and Chaikens (1993) Heuristic Systematic Model and Ajzens Theory of Planned Behavior (Ajzen, 1988).

Key Model Components

The RISP model begins with a set of variables representing individual characteristics of respondents, for example, demographic, sociocultural, political philosophy, and experiences with the hazard. Key to the model is the notion of information insufficiency. Griffin, Dunwoody, and Neuwirth (1999) propose that information insufficiency is the point where an individual makes a decision concerning information seeking and processing behavior. Information Insufficiency represents an inadequate supply of information. The strong desire to acquire all the perceived knowledge needed to deal with the risk motivates individuals to process risk related information more systematically and less heuristically and do more active, nonroutine seeking of information. Otherwise stated, when the amount of information an individual currently has about a risk is less than the knowledge the individual needs to deal with the risk, the individual will exert more effortful information seeking and processing.

Figure 2.3: The Model of Risk Information Seeking and Processing (ter Huurne, 2008)



Channel beliefs refer to the individual's beliefs about channels such as newspapers, magazines, and TV news. Examples of such beliefs could be that the media represent special interest groups or that they are accurate and responsible. Two factors represent channel beliefs in the model; media distort reality and the belief that the media provide useful cues for processing the information (ter Huurne et al., 2009; Griffin et al., 1999). Griffin et al. (1999) suggests " that information sufficiency motivations and information processing capacity might interact with beliefs about variuos channels of risk communication to influence the ways in which people seek and process information". However, most work with channel beliefs in the RISP model remains exploratory. For that reason, this study will add a new factor to channel beliefs; the belief that an individual is confident that the channel will bring all the information I need to know to my attention.

Perceived information gathering capacity is a form of self efficacy (Bandura, 1982) and perceived behavioral control (Ajzen, 1991) in performing the information seeking. "Information gathering capacity reflects an individuals perceived ability to perform the information seeking and processing steps necessary for the outcome he or she desires, especially when an outcome requires more cognitive effort and nonroutine gathering of information." (Griffin et al. 1999)

The RISP model proposes that informational subjective norms, " a person's perceptions that relevant others believe he or she should (or should not) perform a particular behavior motivates the desire for information sufficiency". (Griffin et al. 1999) Otherwise stated, subjective norms influence an individuals seeking and process behavior by way of the effects on information sufficiency (perceived information needed to deal with the risk). "Informational subjective norms have been found relate positively to information insufficiency, as the model suggests, but they have also found to have a direct, positive relationship with more active information seeking and processing" (Griffin et al., 2005; Kahlor et al. 2006)

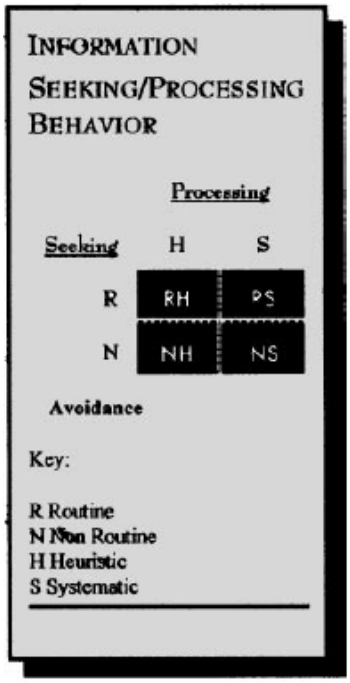
Borrowing from "fear appeals" literature (Witte, 1994) emotional response to risk, termed affective response, is important to measure because "research indicates that emotional reactions influence both heuristic and systematic processing". (Griffin et al. 1999) Griffin et al, (1999) emphasizes worry, anger, and uncertainty as it relates to health risks. In an attempt to reassert control over a risk an individual might employ more effortful seeking and processing styles.

The RISP model proposes that affective responses result from risk perceptions, referred to formally as perceived hazard characteristics. One aspect of risk perceptions is

trust. Trust is measured in two ways in the model "trust in media is considered part of relevant channel beliefs while trust in risk management and scientific institutions is part of perceived hazard characteristics" (Griffin et al. 1999) Three elements of risk perceptions or perceived hazard characteristics used in the RISP model are risk judgement, personal efficacy, and institutional trust.

Seeking and Processing Behavior: The model discusses four types of seeking and processing outcomes, Routine Heuristic, Non Routine Heuristic, Routine Systematic, and Non Routine Systematic. (See Figure 2.4) Routine heuristic, the most likely outcome, relates to running across risk information during habitual use of a media source and thinking about it only superficially, for example, running across a story in the while reading the evening newspaper. Routine systematic relates to running across risk information during habitual use of a media source and thinking about the information more deeply.

Figure 2.4: Information Seeking and Processing Behavior (Griffin R.J. et. al. 1999)

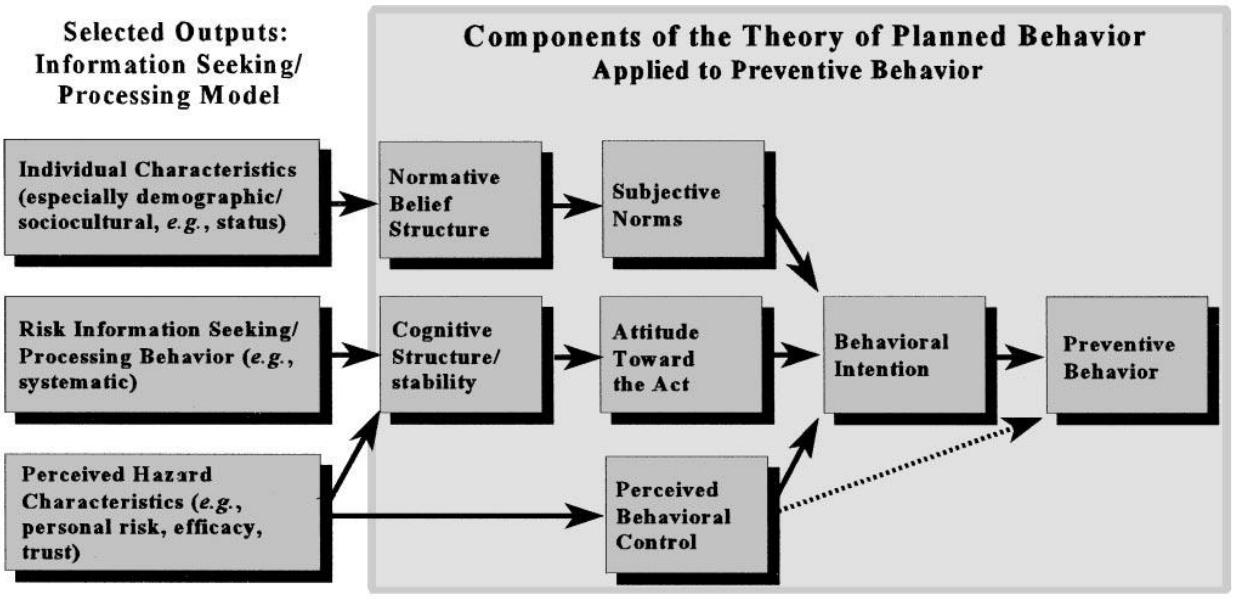


Non routine heuristic involves seeking information about the risk beyond the routinely encountered sources and processing the information superficially, for example, calling the doctor to get advice they plan to follow. Non routine systematic, the least likely outcome, relates to seeking information beyond routine sources and thinking about it more deeply. An example of non routine systematic would be getting a second opinion from another doctor (ter Huurne, 2009; Griffin, 1999).

Griffin et al. (1999) state, "Individuals who actively seek information about risk-related behaviors and who process these message more intensively [systematic processing] will bring more behavior beliefs….to their judgments about performing the

behavior." Systematic processing leads one to "ultimately develop attitudes and even behaviors in regards to the risk that are more resistant to change."

Figure 2.5: Integration of RISP and TPB (Griffin R.J. et. al. 1999)



Risk Information Seeking and Processing and Theory of Planned Behavior

The final component of the risk information seeking and processing integrates information processing with behavioral attitudes and beliefs. (See Figure 2.5) The Theory of Planned Behavior is a theory that attempts to explain and predict human behavior. It posits that one's attitude (A) toward the behavior, subjective norms (SN) towards a behavior, and Perceived Behavioral Control (PBC) about a behavior all work together to determine someone's behavioral intention (BI). If medication adherence can be considered a health behavior, as seen in the figure above, seeking and processing behaviors during a risk situation involving medications can potentially influence ones attitude toward the behavior. Although we are not examining adherence itself, there is

overwhelming empirical support for the notion that attitudes towards behaviors will predict that behavior (Ajzen 1991; Eagly & Chaiken, 1993; Kim & Hunter, 1993; Kraus, 1995).

While the occasion for future research in risk communication remains wide, the risk information seeking and processing model has created a niche for studies investigating how individuals respond to health-risk warnings. Furthermore, the model shows promise of enriching findings in relation to information seeking as a whole, not just risk information processing. Still, the gaps in risk research remain open, particularly in regards to risk information seeking behavior. This study seeks to contribute to the closing of that gap by investigating a new situation and, potentially, improving the measurement of the construct channel beliefs.

The risk information seeking and processing model proposes that "the perceived gap between what someone knows and what he or she needs to know motivates a person to devote more cognitive effort to processing messages about the behavior" (Griffin et al., 1999). For example, if an individual who has diabetes happens to come across a story about rosiglitazone cardiovascular risk in the evening newspaper through heuristic processing, the individual will skim through the article, superficially attend to the message, and may or may not call a doctor to get advice. The model adds that beliefs about the channel and perceived gathering capacity from the channel could affect seeking and processing styles people employ. People who believe that newspapers are often inaccurate might be more likely to look for more information and actively process the information (Nonroutine/Heuristic). As another example, an individual believing that

newspapers tend to sensationalize stories to attract readership (channel bias) may use more effortful seeking and processing to avoid being manipulated by the media.

Both motivation and cognitive capacity are required for systematic processing of risk information. Even if one has sufficient motivation for systematic processing, the heuristic systematic model postulates that he or she may still not engage in such processing if cognitive capacity is inadequate. This means that any number of factors is operating to limit cognitive resources, such as time constraints, knowledge constraints, or the presence of simultaneous processing tasks. Someone might desire more information about rosiglitazone cardiovascular risk. However, one's perception of his/her ability to gather this information through routine channels might seem overwhelming and impossible. Thus, the individual is likely to employ Non Routine Heuristic processing in which individuals expend extra effort to go beyond their routine information channels to gather information or contact sources whose messages they plan to process uncritically, like calling a doctor to get advice they plan to follow. They simply gather information and make a simple decision about the information's validity.

Information insufficiency motivates information seeking, and this is done by decreased confidence in the current level of knowledge or a desire for more information. Moreover, motivating systematic processing may occur by reducing one's actual confidence in one's knowledge about the rosiglitazone cardiovascular risk , or increasing one's desired confidence in one's knowledge about the rosiglitazone cardiovascular risk , or both, in order to lead him or her to systematically process the risk. For example, perceiving a risk as more personally relevant (a diabetes patient with multiple co-morbities like heart disease taking rosiglitazone) should increase one's level of *desired*

confidence in one's knowledge about the rosiglitazone cardiovascular risk. Griffin et al. (1999) proposes two types of systematic processing outcomes, (1) a person happens to run across a story in the evening newspaper and processes it more deeply and critically (2) a person goes beyond routine channels like the evening newspaper and instead searches for more information on the Food and Drug Administration website and processes it more deeply and critically. Systematic processing involves further research or inquiry to determine the information's validity. Attitudes developed after this type of processing usually are relatively lasting. (Griffin R.J. et. al. 1999). The Heuristic-Systematic model maintains that heuristic and systematic processing may co-occur.

In addition to the cognitive capacity and motivational factors mentioned above, the affective state of an individual has been shown to have a strong influence on the type of information processing that occurs. Research in this area has yet to reveal a consistent pattern of findings. However, fear could be aroused in a situation, especially when information is encountered through mass media. Clearly, future research is needed to determine the factors that moderate affect's influence on systematic processing in the context of a risk related to medication use after marketing and the mechanisms that underlie these effects.

Information processing was examined by Kahlor et al. (2003) by sending a magazine article about the risk of consuming contaminated fish to respondents with a request for the respondents to read it. The respondents were later asked questions about how they processed the information they read. In the current study, magazine articles are one of the channels being explored as it relates to applying the risk information seeking and processing model to rosiglitazone cardiovascular risk. Recall that the risk

information seeking and processing model proposes that the relationship between information insufficiency and information seeking and processing was moderated by channel beliefs and perceived ability to gather information from the channel. Information sufficiency can only predict whether systematic or heuristic processing will occur. Relevant channel beliefs and perceived information gathering capacity help predict the extent to which systematic or heuristic processing will occur. Relevant channel beliefs are perceptions of a particular information channel, for example, the belief that media channels are biased, present distorted information or sensationalize risk. Also, the definition of perceived information gathering capacity includes ones perceived ability to find information about the risk if so desired. Kahlor, et al. (2003), however, treated these variables as controls and hypothesized that the more information the individual feels he/she needs to deal with the risk of consuming contaminated fish, the more likely the individual will use the systematic processing style. Kahlor et al. (2003) found that as the gap between information held and information needed to deal with the risk increased so did systematic processing of the magazine article. People who encounter risk messages about medication in the media can be expected to exhibit similar processing strategies to those applied in Kahlor et al.'s (2003) study. The gap has been shown to motivate systematic processing in risks of consuming contaminated fish, and this study will look to see if it holds true in the situation of medication risks, which is different because it involves learned intermediaries (doctors).

Improving Risk Communication

This project aims to examine issues related to rosiglitazone cardiovascular risk and to examine the usefulness of the risk information seeking and processing model for

examining information seeking and processing in the context of rosiglitazone cardiovascular risk. Future studies may expand on this study and focus on improvements in risk communication from pharmaceutical companies about post marketing studies related to medication that reaches the public through popular media like TV news, popular magazine, and newspapers. Furthermore, with regards to the risks that are discovered after medications are on the market for significant periods time, this study could inform designing media kits and planning for channels of communications by FDA.

This research will apply the Risk Information Seeking and Processing Model to risk situations in which drug risks are discovered after the drug has been used by millions of people worldwide. Information insufficiency is the gap in information between the knowledge that people currently have about the risk and what they believe they need to deal with the risk. The exemplar used to investigate this risk was persons with type 2 diabetes with regard to rosiglitazone cardiovascular risk.

Research Questions and Hypotheses

RQ1: Is there a relationship between information insufficiency, channel beliefs, and perceived information gathering capacity and seeking and processing behaviors with regards to rosiglitazone cardiovascular risk among people with type 2 diabetes?

Hypotheses 1: Information Insufficiency will be positively related to Information Seeking.

Hypotheses 2: Information Insufficiency will be positively related to Systematic Processing.

Hypotheses 3: Information Sufficiency will be negatively related to Heuristic Processing.

Hypotheses 4: Channel Beliefs will be positively related to Information Seeking.

Hypotheses 5: Channel Beliefs will be positively related to Systematic Processing.

Hypotheses 6: Channel Beliefs will be negatively related to Heuristic Processing.

Hypotheses 7: Perceived Information Gathering Capacity will be positively related to Information Seeking.

Hypotheses 8: Perceived Information Gathering Capacity will be positively related to Systematic Processing.

Hypotheses 9: Perceived Information Gathering Capacity will be negatively related to Heuristic Processing.

RQ2: Do Channel Beliefs and Perceived Information Gathering Capacity moderate the relationship between Information Insufficiency and Information Seeking and Processing?

RQ3: Do channel Beliefs and Perceived Information Gathering Capacity mediate the relationship between Information Insufficiency and Information Seeking and Processing?

CHAPTER 3

METHODS

Introduction

A cross-sectional internet administered survey of people with type 2 diabetes taking an oral diabetes medication was used to explore elements of the Risk Information Seeking and Processing Model. Rosiglitazone cardiovascular risk was used as the exemplar. Survey questions were developed from the literature and are described below under Measures. A pre test using a convenience sample of UGA College of Pharmacy Faculty and Graduate students was conducted to explore how questions were understood, to determine if questions made sense, and to obtain an estimate of how long it would take to complete. After revisions based on in-person feedback, a pilot test was completed via Qualtrics®. Pilot testing was undertaken by 10% of the target population who received the full survey. The questionnaire was administered to the pilot subjects in exactly the same way as it would be administered in the main study. The University of Georgia Institutional Review board reviewed and approved the project.

Population Description and Sample Selection

Qualtrics® provided a representative survey panel of people with diabetes. Survey panels provided by Qualtrics® were used to initially identify people with type 2 diabetes. Qualtrics® (800-340-9194) at http://www.qualtrics.com is an online survey company that has software for designing, distributing, and evaluating survey results. Patients were included in the survey who self-identified as having been diagnosed by a physician with

type 2 diabetes and who indicated they were: at least 35 years old and had at least 1 prescription for an oral glucose control medication. The study excluded patients aged < 35 years and those with type 1 diabetes. Potential study participants were invited to participate in the study via email. The survey comprised 44 questions, with several broad sections: 1) introduction, 2) health -history information (physician diagnosed diabetes, cardiovascular disease, type of diabetes (type 1 or type 2), diabetes medication use), 3) information channels used for health related information, 4) risk information seeking and processing variables (current knowledge of rosiglitazone cardiovascular risk, information sufficiency threshold, channel beliefs, perceived information gathering capacity and seeking and processing behaviors), and 5) demographic variables (age, education, ethnicity, income). Those willing to participate were instructed to click on an email link and complete the online survey. Their participation involved completing the online questionnaire. The questionnaire took approximately, 30 minutes to complete and participation was voluntary. Participants were informed they are free to choose not to participate or stop taking part at anytime without giving any reason, and without penalty or to skip any questions. All potential study participants received three contacts by email (recruitment email and questionnaire, thank you/reminder and replacement questionnaire, and a final reminder and replacement questionnaire) spaced approximately 1 or 2 weeks apart from each other. Total duration of participation was 33 -35 minutes. Qualtrics® was able to determine who had already responded and not send the solicitation email to them again.

Sample Size Expectations

Multiple regression analysis with all significance tests at $\alpha = 0.01$ was performed. Since the variables in the study have not been studied in the context of a drug risk discovered after the drug had been used by millions of people worldwide, a medium effect size was assumed to calculate the total sample size. Cohen, 1992, describes the necessary N for power of 0.80 when doing a multiple regression/correlation analysis and perform all the significance tests at $\alpha = 0.01$. We had a set of five independent variables for which Cohen, (1992) indicates that the required sample size is 126. We originally had 13 independent variables but we were able to summarize those into 5 because instead of looking at each channel separately, (TV, Magazine, Newspapers). We were able to combine the three channels into one channel belief variable. With respect to the dependent variables, using the correlation matrix, we saw a strong correlation between each type of media channel (TV, Magazine, Newspapers). Since the correlation was high, each channel measured the same piece of information. So we combined the three channels (TV, Magazines, Newspapers) for each channel belief factor (distort, validity, and confidence) and used the mean of all three channels for each channel belief factor.

Measures

The survey questions used in the study were adapted from previous studies using the Risk Information Seeking and Processing model where the constructs from the model have already been operationalized and some new questions were added to improve the measurement of channel beliefs. The survey comprised 44 questions, with several broad sections: 1) introduction, 2) health -history information (physician diagnosed diabetes, cardiovascular disease, type of diabetes (type 1 or type 2), diabetes medication use), 3)

information channels used for health related information, 4) risk information seeking and processing variables (current knowledge of rosiglitazone cardiovascular risk , information sufficiency threshold, channel beliefs, perceived information gathering capacity and seeking and processing behaviors), 5) demographic variables (age, education, ethnicity, income).

Health History Variables

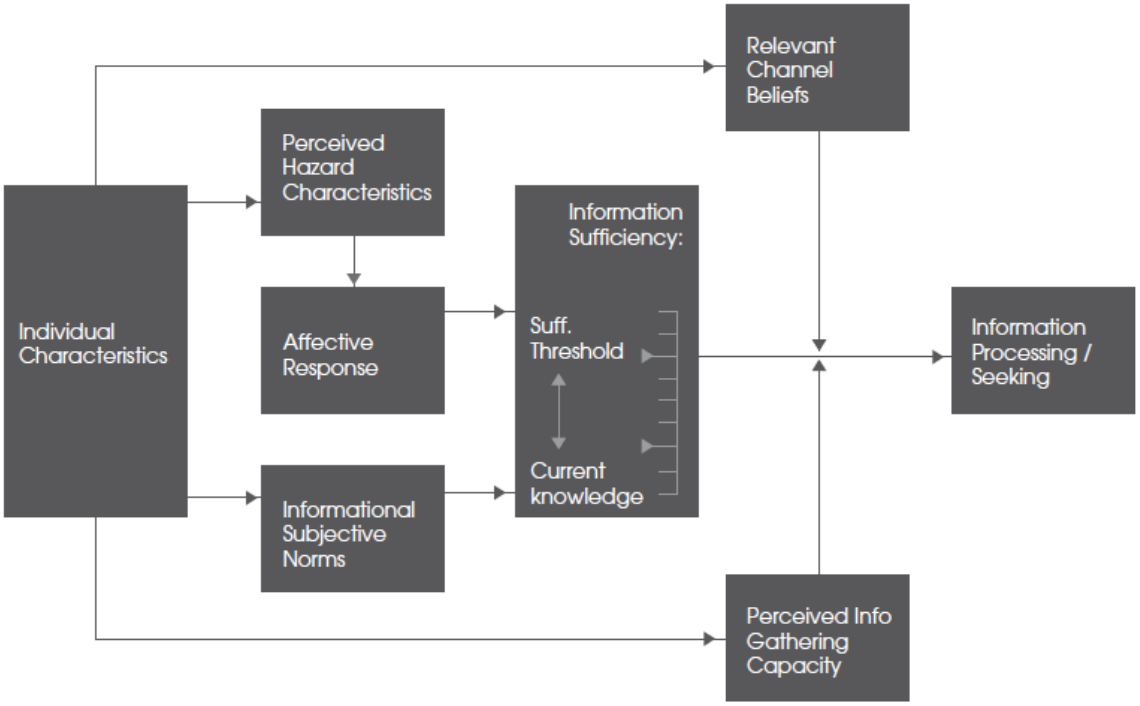
Respondents were asked whether they have cardiovascular (heart) disease and if a doctor told them they have diabetes. Those who answered that a doctor told them they had diabetes were then asked the length of time since the doctor first diagnosed diabetes, the type of diabetes, whether the respondent takes insulin and/or oral medications for diabetes. If the respondent answered that they take medication by mouth to lower their blood sugar, they were asked a series of questions specific to pioglitazone and rosiglitazone. Respondents who took medication by mouth for diabetes were asked if they had ever taken any medication with rosiglitazone in it, when did they first take medication with rosiglitazone in it, if they had stopped any medication with rosiglitazone in it, why they stopped using rosiglitazone (on their own or a doctor told him/her to stop, other), and when had they stopped using the medication with rosiglitazone in it. The same questions were asked of pioglitazone medication users. Respondents were asked if they had heard about the rosiglitazone cardiovascular risk .

Risk Information Seeking and Processing Variables

The construct measures, current knowledge, information sufficiency threshold, channel beliefs, perceived information gathering capacity, and information seeking and processing were assessed for the three media channels (newspaper, magazines, and TV

news). (See Figure 3.1) Current knowledge and information sufficiency threshold were assessed with one hundred point

Figure 3.1: The Risk Information Seeking and Processing Model (ter Huurne, E. 2008).



scales where 0 means nothing and 100 means everything. Channel beliefs, perceived information gathering capacity, and information seeking and processing variables were assessed with five-point scales with 1 being strongly disagree and 5 being strongly agree. Questions were derived from published applications of the risk information seeking and processing and related study constructs and adapted for use in the present study. (Griffin et. al., 2008)

Self report variables "current knowledge" about rosiglitazone cardiovascular risk and the "information sufficiency threshold" were used to measure "information

insufficiency". Information insufficiency refers to the gap between knowledge held and knowledge needed to deal with the risk.

Channel belief was measured with eight channel belief items (three media distort, three media validity, two media attention) for each channel studied (newspapers, magazines, TV news). An example of a media distort question was "Newspapers give information in a way that is shocking or exciting on purpose" (1=strongly disagree to 5= strongly agree). An example of a media validity question was "When the same information appears in more than one newspaper, I'm more likely to believe it" (1=strongly disagree to 5= strongly agree). The six items which represent beliefs that media distort information and media provide audiences with cues about the validity of information they contain are commonly used in the literature related to the Risk Information Seeking and Processing Model. However, channel beliefs have often been the weaker and an inconsistent predictor of seeking and processing risk information. (Griffin et al., 2005; Kahlor et al. 2006) This study added a new measurement to the current operationalization of the construct channel beliefs; media distort reality and the belief that the media provide useful cues. The new measurement was media attention. An example of a media attention question was "I am confident that articles in newspapers will bring important issues to my attention." (1=strongly disagree to 5= strongly agree) (Griffin et. al., 2008).

Perceived information gathering capacity for each channel (newspapers, magazines, TV news) was assessed with five questions. Four positively worded questions and one negatively worded question were adapted from previous risk information seeking and processing studies about flood risks (Griffin et. al., 2008) The

negatively worded question "It is hard for me to get useful information about rosiglitazone (Avandia) causing an increase risk of heart attacks or death from newspapers" (1=strongly disagree to 5= strongly agree) was reverse scored. Focusing on perceived ease or difficulty gathering information about the risk, perceived information gathering capacity was also assessed with positively worded questions like "I would know where to go to get information about rosiglitazone (Avandia) causing an increase risk of heart attacks or death in newspapers" (1=strongly disagree to 5= strongly agree) (Griffin et. al., 2008).

Information seeking was measured with two positively worded questions and three negatively worded questions adapted from previous risk information seeking and processing studies about flood risks. (Griffin et. al., 2008) An example of a positively worded question is "I try to learn more about rosiglitazone (Avandia), causing an increase risk of heart attacks or death" (1=strongly disagree to 5= strongly agree). The negatively worded question was "Gathering information about rosiglitazone (Avandia), causing an increase risk of heart attacks or death is a waste of time" (1=strongly disagree to 5= strongly agree) was reverse scored (Griffin et. al., 2008).

Information processing was measured with eight items adapted from previous risk information seeking and processing studies about flood risks. (Griffin et. al., 2008) Four items assessed systematic processing and four items assessed heuristic processing. An example of a question assessing systematic processing was "I am likely to stop and think about information in newspapers, TV news, or magazines concerning rosiglitazone (Avandia) causing an increase risk of heart attacks or death" (1=strongly disagree to 5= strongly agree). An example of a question assessing heuristic processing was "When I

read or hear about rosiglitazone (Avandia), causing increase risks of heart attacks or death, I rarely spend much time thinking about it " (1=strongly disagree to 5= strongly agree) (Griffin et al., 2008).

Data Collection and Entry

Data collection involved a pre test that was conducted to finalize the survey questions and format. The pre test provided feedback about whether the survey's wording and clarity was apparent to all respondents, whether the questions meant the same thing to all respondents, the time to take the survey and how difficult items were to complete. The pre test involved a convenience sample of UGA College of Pharmacy Faculty and Graduate Students. Based on the results of the pre testing, the revisions to survey were made. Additionally, a pilot test was completed via Qualtrics ® with the revised survey. Pilot testing was undertaken by 10% of the target population who received the full survey. The pilot test explored the entire process so that the researchers were assured that the survey was ready for implementation. The questionnaire was administered to the pilot subjects in exactly the same way as it would be administered in the main study.

Since no problems were detected the final survey was administered via Qualtrics ® online survey software tool. Using Qualtrics ® software, an email with a link in the email to access and complete the questionnaire (Implied consent**)** was sent to people with type 2 diabetes based on the inclusion and exclusion criteria mentioned above. Study participants received three contacts by email (recruitment email and questionnaire, thank you/reminder and replacement questionnaire, and a final reminder and replacement questionnaire). Contacts were made approximately 1 to 2 weeks apart (Schaefer &

Dillman, 1998). Each email took about 1 minute to read and the email stated that the total duration of participation would take between 33 to 35 minutes. Qualtrics ® was able to determine who had already responded and not send the solicitation email to them again. The collected data were used for data analysis.

Data Analysis

Prior to the main data analysis, the data were screened and issues were resolved such as accuracy of data, missing data, assessment of assumptions for analysis, transformations, outliers, and correlations to check for multicollinearity. As with any multiple regression, estimation of regression coefficients are impossible if two or more X variables are co-linear. The data were analyzed to see if any co-linearity among explanatory variables exists. A correlation matrix was displayed to show correlations between variables. Demographic and health history variables were assessed to see how they compared with other variables. The data were analyzed using hierarchical multiple regression.

To test the hypotheses, the dependent variables (seeking and processing behavior) were regressed on the following blocks of variables in an order informed by the Risk Information Seeking and Processing Model: (1) the three channel beliefs factors (2) perceived information gathering capacity (4) current knowledge (5) information sufficiency threshold (6) significant demographic and hazard characteristic variables. Regression models were developed for each hypothesis to demonstrate how the independent variables might predict the dependent variable (the relationship between the independent variables and the dependent variables).

CHAPTER 4

RESULTS

Survey Response

The invitation to participate in the survey was emailed to a Qualtrics Panel and 828 people responded. Of the total who responded to the email, 259 people met the inclusion criteria and were allowed to complete the survey. The people who completed the survey were included in the analysis.

General Descriptive Statistics

The mean (standard deviation) age of the study sample was 58 (9.3) years with age range of 36 to 80 years. There were slightly more men than women in the study (53.3% vs. 46.7%). The sample comprised 83% Caucasians, 8.5% African American, 1.2% Asian, 1.5% Native-Americans, and 3.9% Hispanic. (Table 4.1)

The sample was mostly educated, with 65% having community college or higher and 33% of the sample having vocational school education or less. Approximately 10% of the people had post graduate work, 20% had completed college and 35.5% had some college education. Household incomes among respondents were high, with 21.2% having incomes of $75,000 or more per year, 20.1% between $50,000 to $75,000, 23.9% between $30,000 to $50,000 and 30% with income lower than $30,000 per annum. (Table 4.1)

Half of the respondents (50%) were diagnosed with type 2 diabetes for greater than or equal to 10 years. Approximately 54% of respondents had cardiovascular

disease. All patients (100%) had ever used pioglitazone, 38% had ever used rosiglitazone and 61% had heard of the rosiglitazone cardiovascular risk.(Table 4.1)

Table 4.1: Distribution of Sample Characteristics

Characteristics	**Statistic**
N	259
Age, years; mean ± sd (range)	58.0 ± 9.3 (36, 80)
Gender; n (%)	
Female; n (%)	121 (46.7)
Male; n (%)	138 (53.3)
Education; n (%)	
Less than High School	10 (3.9)
High School Graduate/GED	59 (22.8)
Some College	109 (42.1)
College Graduate	54 (20.8)
Post-graduate Work	27 (10.4)
Income ($)	
< 15,000	25 (9.7)
15,000 – 29,999	53 (20.5)
30,000 -49999	62 (23.9)
50,000 – 74,999	52 (20.1)
≥ 75,000	55 (21.2)
Unknown (Prefer not to say)	12 (4.6)

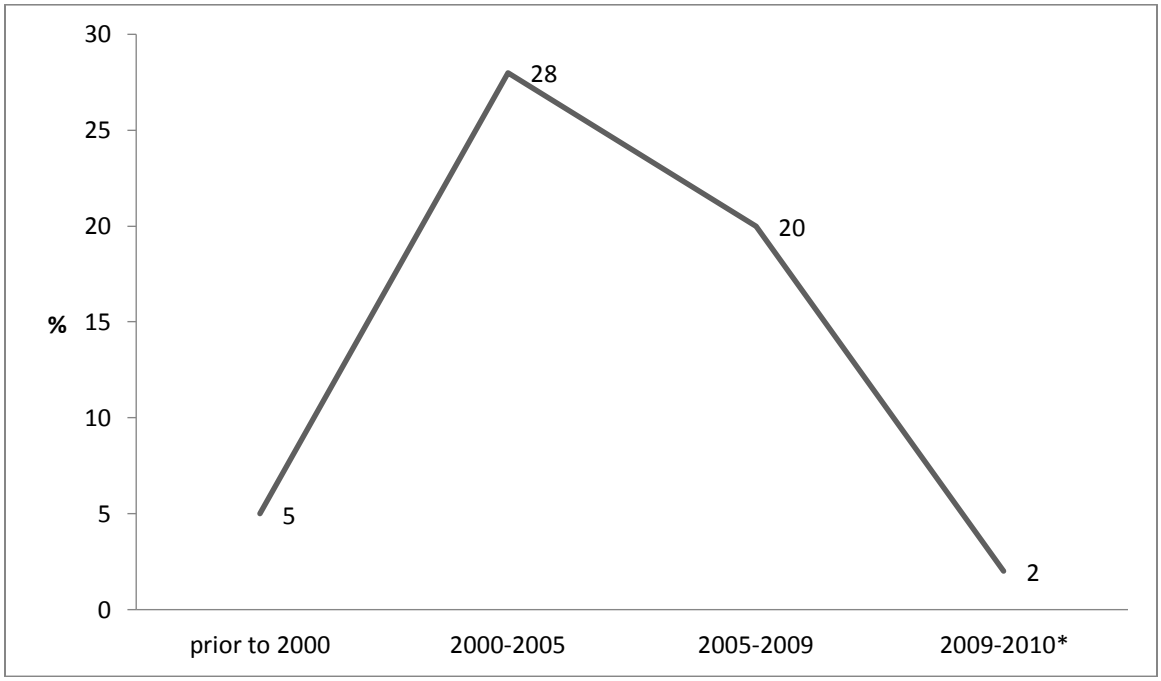
Characteristics	Statistic
Race/Ethnicity; n (%)	
African American	22 (8.5)
Hispanic	10 (3.9)
Asian /Oriental	3 (1.2)
Caucasian	215 (83.0)
Native American	4 (1.5)
Other	5 (1.9)
Cardiovascular Disease, yes; n (%)	140 (54.1)
Time of first diagnosis of type 2 diabetes	
Less than 1 year	6 (2)
1 - < 5 years	51 (20)
5 - < 10 years	72 (28)
≥ 10 years	130 (50)
Inject Insulin, yes; n (%)	91 (35.1)
Ever use medication with pioglitazone in it, yes; n(%)	259 (100)
Ever use medication with rosiglitazone in it, yes; n(%)	98 (38)
Heard of Rosiglitazone Cardiovascular Risk, yes; n (%)	158 (61.0)

Descriptive Statistics of Health Status and Medication Taking Behavior

In assessing the distribution of duration of having diabetes based on an affirmative response to the question "How long ago did a doctor first tell you that you have diabetes?" the data suggests that the incidence of diabetes in this study sample was

greatest during 2000-2005 (28%) followed by 2005-2009 (20%). Figure 4.1 is a graphical display of incidence of diabetes of the study sample over time.

Figure 4.1: Chart displaying responses to "How long ago did a doctor first tell you that you have diabetes?"



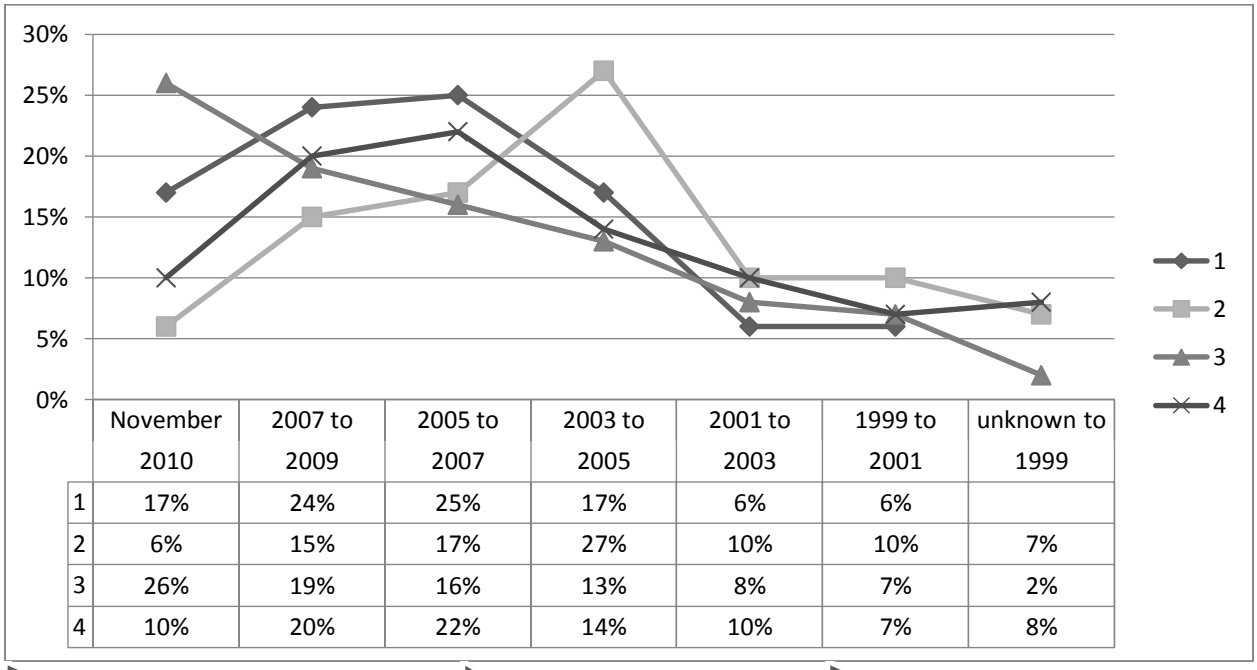
Note: x axis = years and y axis = percent of respondents
*for the year 2010 the data were up to November (not the full year)

Figure 4.2 displays when respondents started and stopped either rosiglitazone or pioglitazone. There was a steady increase over time of patients stopping a medication with pioglitazone in it, with the highest at 2009 – November 2010 (26%). The starting and stopping patterns of respondents taking rosiglitazone have fluctuated over time. However, there has been an upward trend of patients stopping rosiglitazone from 2001 to 2007, steady from 2007 to 2009 and then a drop 2009 to November 2010. The starting patterns of respondents taking pioglitazone have fluctuated over time but have an upward trend until 2007–2009 and then drop in 2009 to November 2010. Trends of respondents

first taking a medication with rosigliatzone in it peaks at 2003 to 2005 and begins a downward trend until 2009 to November 2010. (Figure 4.2)

Additionally, when asked, “Did you stop taking any of the medication with pioglitazone in it?” 119 (46%) of the study participants answered “yes”, 126 (49%) answered “no” and 14 (5%) were “unsure”. Twenty-nine (22%) of the study participants indicated that they stopped taking the medicine with pioglitazone in it on their own; 85 (64%) of participants indicated that they were told by a doctor to stop; 1 (1%) was told by family and/or friends; 7(5%) indicated “Other” and 11(8%) of participants were unsure why they stopped taking the medicine with PIO in it. When asked “Did you stop taking any of the medication with rosiglitazone in it?”, 71 (83%) of participants who had ever taken ROSI said “yes”, 14 (16%) said “no”, and 1(1%) was unsure. The pattern of why participants stopped taking medication with rosiglitazone in it, were as follows: 10 (14%) stopped on their own; 57 (79%) stopped because a doctor told them to stop; 2 (3%) indicated “other” and 3 (4%) were unsure.

Figure 4.2: Chart of starting and stopping medication with TZD in it and timeline of ROSI events



	November 2010	2007 to 2009	2005 to 2007	2003 to 2005	2001 to 2003	1999 to 2001	unknown to 1999
1	17%	24%	25%	17%	6%	6%	
2	6%	15%	17%	27%	10%	10%	7%
3	26%	19%	16%	13%	8%	7%	2%
4	10%	20%	22%	14%	10%	7%	8%

2010

- ***Febryary:*** U.S. Senate Finance Committee Report includes internal FDA safety report calling for drug to be withdrawn
- ***April***: U.S. House Appropriations Subcommittee hearning assesses FDA handling of issue
- ***June:*** Archives of Internal Medicine publishes an updated meta analysis by Dr. Nissen
- ***July***: FDA advisory committee meeting held; majority vote to either withdraw the drug or restrict it severly
- ***July:*** EMA meets to discuss rosiglitazone
- ***September:*** FDA and EMA issue separate but coorinated announcements: Avandia will remain on the market in the U.S. with significant safety and llabeling restrictions; and was withdraw[illegible] the European market

2009

- ***March***: International Journal of Cardiometa-analysis finds no risk of myocardial infraction

2007

- ***May***: New England Journal of Medicine Published meta analysis by DDr. Steven Nissen of the Cleveland Clinic, reporting increased risk of myocardial infraction with rosiglitazone
- ***July***: U.S. House Committee on Oversight and Government Reform Hearing evaluates the FDA assessment of rosiglitazone safety
- ***July :*** FDA advisory committee votes to keep drug on market
- ***October***:European Medicines Agency (EMA) votes recommens new warnings for patentient with ischemic heart disease
- ***November:*** FDA approves new boxed warnings addressing potential increases of myocarial ischemic events

Note: x axis = years and y axis = percent of respondents; TZD = Thiazolidinedione; ROSI = rosiglitazone PIO= pioglitazone; 1=When did you stop taking a medication with ROSI in it?; 2=When did you first take a medication with ROSI in it?; 3=When did you stop taking a medication with PIO in it?; 4= When did you first take a medication with PIO in it?

Health Information Channels for People with Diabetes

Fifty-eight percent of respondents reported most often getting health related information from a doctor. Twenty-one percent of respondents reported most often getting health related information from the internet but *not* including online news from newspapers, magazines, or TV news (Table 4.2). Getting health information from TV news (online or television version) (8%) and pharmacists (6%) ranked third and fourth, respectively.

Table 4.2: People with Diabetes Health Information Channels

Question: "Where do you most often get health related information?"	
Physician/Doctor n(%)	149(58)
Internet but Not on-line news from newspapers, magazines, or TV n(%)	55(21)
TV news (on-line or television access) n(%)	21(8)
Pharmacist n(%)	16(6)
Newspaper (on-line or paper version) n(%)	7(3)
Magazines (on-line or paper version) n(%)	4(2)
Other n(%)	2(1)
Books (on-line or paper version) n(%)	2(1)
Friends and Family members n(%)	3(1)
Seminar and/or Classes n(%)	**0(0)**

The gap between knowledge held and knowledge needed to deal with the risk indicates information insufficiency. According to the RISP model, information insufficiency regarding a risk will motivate people to seek information outside of their routine patterns. Table 4.3 provides a summary distribution of the response pattern of study participants' routine relative to reading a newspaper, watching TV news or reading a magazine. Sixty-seven percent of respondents reported reading a newspaper at least once a week. Magazines were read at least once a week by 45.2% of respondents. Seventy-one percent of respondents report watching TV news daily, with 88% watching TV news at least once a week.

Table 4.3: People with Diabetes' Use of Newspapers, TV news, and Magazines (N=259)

	Never	**Once a Month**	**2-3 Times a Month**	**Once a Week**	**2-4 Times a Week**	**Daily**
I read Newspapers n(%)	47 (18.1%)	21 (8.1%)	17 (0.4%)	43 (16.6%)	35 (13.5%)	96 (37.1%)
I watch TV news n(%)	17 (6.6%)	5 (1.9%)	7 (2.7%)	15 (5.8%)	31 (12.0%)	184 (71.0%)
I read Magazines n(%)	52 (20.1%)	51 (19.7%)	39 (15%)	46 (17.8%)	44 (17.0%)	27 (10.4%)

Theoretical Construct Variables

The means and standard deviations for the items composing the direct theoretical construct indicators for the entire sample are presented in Table 4.4. Items collected for the direct theoretical indicators comprised: one current knowledge item, one information sufficiency threshold item, eight channel belief items (three media distort, three media validity, two media attention), five perceived information gathering capacity items, five information seeking items and eight information processing items (four heuristic and four systematic). The measurement scales for all measures ranged from one being the most negative to five being the most positive.

On a scale of 0 to 100, where 0 means nothing and 100 means everything, the mean level of current knowledge about rosiglitazone cardiovascular risk for respondents was 38.2. Given a standard deviation of 31.1 for current knowledge about rosiglitazone cardiovascular risk, it implies that there was a large variable in the response. People felt that the amount of information they needed to deal with the risk was 65.71. (Table 4.4)

On a scale of 1 to 5 where 1= Strongly Disagree and 5 = Strongly Agree , for news channel beliefs, on average, the respondent's scores were near neutral for "Newspapers give information in a way that is shocking or exciting on purpose" (Mean = 3.44, SD = 0.98), "Newspapers have news stories that are just a series of unconnected events that don't add up to much" (Mean = 2.97, SD = 0.98), "When the same information appears in more than one newspaper, I'm more likely to believe it." (Mean = 3.42, SD = 0.95), "Stories in newspapers with numbers seem more real or true than those without." Mean = 3.20, SD= 0.90), "Individual news items about a topic in newspapers may seem like bits and pieces, but in the long run they form a meaningful pattern." Mean = 3.32, SD = 0.80), "I am confident that articles in newspapers will bring all the

information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention" (Mean = 2.51, SD = 1.03), and "I am confident that articles in newspapers will bring important issues to my attention." (mean = 3.07, s.d. = 1.03). The question "Newspaper reporters clearly show bias when they like or dislike someone or something." had almost an "agree" response (Mean = 3.7, SD = 0.98).

Similarly, for TV news channel beliefs, "TV news have news stories that are just a series of unconnected events that don't add up to much" (Mean = 3.03, SD = 0.966), When the same information appears on more than one TV news, I'm more likely to believe it."(Mean = 3.36, SD = 1.01), "Stories in TV news with numbers seem more real or true than those without."(Mean = 3.17, SD = 0.97), "Individual news items about a topic on TV news may seem like bits and pieces, but in the long run they form a meaningful pattern." (Mean = 3.26, SD = 0.84), "I am confident that TV news will bring all the information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention"(Mean = 2.64, SD = 1.08), and "I am confident that TV news will bring important issues to my attention." (Mean = 3.17, SD = 1.09) were close to neutral. However, the response was close to "agree" for questions "TV news give information in a way that is shocking or exciting on purpose" (Mean=3.77, SD=0.928) and "TV news reporters clearly show bias when they like or dislike someone or something."(Mean=3.61, SD=0.943) However, for magazine news beliefs, on average, the respondents were neutral for all three media domains (distort A-C, validity A-C, and attention A-B).

In assessing the response distributions for the various domains of perceived information gathering capacity, the data suggest the following. The respondents were

neutral for newspaper perceived information gathering capacity questions "If I wanted to, I could easily get all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers" (Mean = 2.56, SD = 1.12), "it is hard for me to get useful information about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers" (Mean = 2.99, SD = 1.14), "I would know where to go to get information about ROSI (Avandia) causing an increase risk of heart attacks or death in newspapers" (Mean = 2.79, SD = 1.07), and " If I wanted to seek information about ROSI (Avandia) causing an increase risk of heart attacks or death in the next month from newspapers, I could." (Mean = 2.80, SD = 1.06). The respondents were close to "agree" for the question "It is mostly up to me whether I seek information about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers.". (Mean=3.73, SD=0.990) Similar patterns were seen for TV news and magazine perceived information gathering capacity.

Table 4.4: Descriptive Statistics on the Theoretical Construct Indicators (N=259)

Construct	Mean	S.D.
Current Knowledge	38.20	31.12
Information Sufficiency (Knowledge Needed)	65.71	34.12
Channel Beliefs		
News Channel Beliefs		
Media Distort A	3.44	0.98
Media Distort B	3.71	0.98
Media Distort C	2.97	0.98
Media Validity A	3.42	0.95
Media Validity B	3.20	0.90
Media Validity C	3.32	0.80
Media Attention A	2.51	1.03
Media Attention B	3.07	1.03
TV News Channel Beliefs		
Media Distort A	3.77	0.92
Media Distort B	3.61	0.94
Media Distort C	3.03	0.96
Media Validity A	3.36	1.01
Media Validity B	3.17	0.97
Media Validity C	3.26	0.83
Media Attention A	2.64	1.08
Media Attention B	3.17	1.094

Construct	Mean	S.D.
Magazine Channel Beliefs		
Media Distort A	3.18	0.96
Media Distort B	3.36	0.94
Media Distort C	3.01	0.89
Media Validity A	3.21	0.94
Media Validity B	3.15	0.96
Media Validity C	3.18	0.96
Media Attention A	2.83	1.01
Media Attention B	3.14	1.04
Perceived Information Gathering Capacity		
News Gathering Capacity		
Gathering Capacity A	2.56	1.12
Gathering Capacity B	2.79	1.06
Reverse Coded Gathering Capacity C	2.99	1.14
Gathering Capacity D	3.73	0.99
Gathering Capacity E	2.80	1.06
TV News Gathering Capacity		
Gathering Capacity A	2.75	1.10
Gathering Capacity B	2.78	1.03
Reverse Coded Gathering Capacity C	2.89	1.13
Gathering Capacity D	3.60	0.98
Gathering Capacity E	2.78	1.10

Construct	Mean	S.D.
Magazine Gathering Capacity	2.75	1.10
Gathering Capacity A	2.86	0.98
Gathering Capacity B	2.91	0.96
Reverse Coded Gathering Capacity C	3.00	1.01
Gathering Capacity D	3.56	0.97
Gathering Capacity E	2.91	0.97
Information Seeking		
Information Seeking Reversed A	3.68	1.09
Information Seeking Reversed B	3.85	1.02
Information Seeking Reversed C	3.75	1.05
Information Seeking D	3.34	1.33
Information Seeking E	3.18	1.32
Information Processing		
Systematic Information Processing A	3.60	1.23
Systematic Information Processing B	3.95	1.26
Systematic Information Processing C	3.33	1.21
Systematic Information Processing D	2.87	1.17
Heuristic Information Processing A	3.10	1.26
Heuristic Information Processing B	2.84	1.17
Heuristic Information Processing C	3.02	1.18
Heuristic Information Processing D	2.81	1.18

Construct	Mean	S.D.
Newspaper Channel Beliefs Media Distort	3.37	0.80
Newspaper Channel Beliefs Media Validity	3.31	0.70
Newspaper Channel Beliefs Media Attention	2.79	0.93
Newspaper Prcvd Information Gathering Capacity	3.02	0.67
TV News Channel Beliefs Media Distort	3.47	0.78
TV News Channel Beliefs Media Validity	3.26	0.78
TV News Channel Beliefs Media Attention	2.91	0.97
TV News Prcvd Information Gathering Capacity	2.96	0.72
Magazine Channel Beliefs Media Distort	3.18	0.80
Magazine Channel Beliefs Media Validity	3.18	0.80
Magazine Channel Beliefs Media Attention	2.98	0.95
Magazine Prcvd Information Gathering Capacity	3.05	0.61
Information Seeking	3.56	0.83
Systematic Information Processing	3.44	0.95
Heuristic Information Processing	2.94	0.92
Current Knowledge	38.20	31.12
Information Sufficiency (Knowledge Needed)	65.71	34.12

Note: Media Distort: Newspapers give information in a way that is shocking or exciting on purpose; Media Validity: When the same information appears in more than one newspaper, I'm more likely to believe it.; Media Attention: I am confident that articles in newspapers will bring important issues to my attention.; Reverse Coded Perceived Information Gathering Capacity: It is hard for me to get useful information about rosiglitazone (Avandia), causing an increased risk of heart attacks or death from newspapers; Perceived Information Gathering Capacity: I would know where to go to get information about rosiglitazone (Avandia), causing an increased risk of heart attacks or

death from the magazine; Information Seeking: I try to learn more about rosiglitazone (Avandia), causing an increased risk of heart attacks or death; Information Seeking Reversed: Gathering information about rosiglitazone (Avandia), causing an increased risk of heart attacks or death is a waste of time; Systematic Processing: I am likely to stop and think about information in newspapers, TV news, or magazines concerning rosiglitazone (Avandia), causing an increased risk of heart attacks or death.; Heuristic Processing: When I read or hear about rosiglitazone (Avandia) causing increase risks of heart attacks or death, I rarely spend much time thinking about it.
All scales range from 1 = most negative to 5 = most positive; Current Knowledge and Information Sufficiency (knowledge needed) ranged from 0 = nothing to 100 = everything.

Results for reliability (Cronbach's alpha) indicate that all study variables were reliably measured. Results show that all scales demonstrated good internal consistency except perceived information gathering capacity (Table 4.5). Removing any items did not result in a significant increase in the internal consistency of the scales. Constructs were calculated as described in Chapter 3, under the measurement section. The perceived information gathering capacity for each channel (newspaper, TV news, magazine) measured only 0.597, 0.69, and 0.598 respectively, indicating that the measure may not be quite as reliable as desired.

Table 4.5: Theoretical Construct Reliability for the Entire Sample (N = 259)

Channel Beliefs Construct	Number of items	Cronbach 's Alpha
Newspaper Channel Beliefs Media Distort	3	0.743
Newspaper Channel Beliefs Media Validity	3	0.690
Newspaper Channel Beliefs Media Attention	2	0.755
Newspaper Prcvd Information Gathering Capacity	5	0.597
TV News Channel Beliefs Media Distort	3	0.763
TV News Channel Beliefs Media Validity	3	0.767
TV News Channel Beliefs Media Attention	2	0.750
TV News Prcvd Information Gathering Capacity	5	0.690
Magazine Channel Beliefs Media Distort	3	0.818
Magazine Channel Beliefs Media Validity	3	0.829
Magazine Channel Beliefs Media Attention	2	0.821
Magazine Prcvd Information Gathering Capacity	5	0.598
Information Seeking	5	0.745
Systematic Information Processing	4	0.780
Heuristic Information Processing	4	0.766

Correlations are presented in Table 4.6. For newspaper, as a channel for information, the data suggest that distort was significant and negatively correlated with confidence ($r=-0.173$; $p<0.01$) and perceived information gathering ($r=-0.142$; $p<0.05$).

Validity was positively correlated with confidence ($r=0.433$; $p<0.01$) and perceived information gathering ($r=0.272$; $p<0.01$). Confidence is positively correlated with perceived information gathering capacity ($r=0.564$; $p<0.01$). However, for TV news channel beliefs, distort though significantly correlated with validity ($r=0.127$; $p<0.05$) and perceived information gathering capacity ($r=0.130$; $p<0.05$), the correlation was not negative but positive, opposite to the finding in newspaper channel beliefs. The negative correlation between distort and confidence ($r=-0.086$, ns) observed by newspaper channel beliefs was also found in the magazine channel beliefs. However, the correlation between distort and perceived information gathering capacity was not significant for magazines.

Information seeking did not significantly correlate with any of the channel beliefs, perceived information gathering capacity for newspapers, TV news, and magazines. Systematic information processing was significantly and positively correlated with all three media channel beliefs (newspaper, TV news and magazines), perceived information gathering capacity, and information seeking. Heuristic information processing was significantly and positively correlated with all three media channel beliefs (newspaper, TV news, and magazines), perceived information gathering capacity and systematic information processing and negatively correlated with information seeking.

Table 4.6 Correlations for the Entire Sample

Factor	F1	F2	F3	F4	F5	F6	F7	F8	F9
Newspaper									
Channel Beliefs									
F1 Distort	1								
F2 Validity	.035	1							
F3 Confidence	-.173**	.433**	1						
F4 PIGP (News)	-.142*	.272**	.564**	1					
TV News									
Channel Beliefs									
F5 Distort	.621**	.137*	-.006	-.118	1				
F6 Validity	.022	.726**	.454**	.285**	.127*	1			
F7 Confidence	-.055	.412**	.616**	.454**	.065	.551**	1		
F8 PIGP(TV)	.001	.316**	.429**	.503**	.130*	.436**	.709**	1	

Notes: PIGP= Perceived Information Gathering Capacity; ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

Factor	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Magazine												
Channel Beliefs												
F9 Distort	.650**	.055	-.047	-.063	.590**	.083	.067	.142*	1			
F10 Validity	.009	.786**	.397**	.239**	.148**	.781**	.455**	.359**	.080	1		
F11 Confidence	-.123*	.479**	.667**	.469**	.036	.548**	.681**	.504	-.086	.560**	1	
F12 PIGP(Mag)	.074	.324**	.425**	.594**	.148*	.365**	.461**	.592**	.022	.355**	.582**	1

Notes: PIGP= Perceived Information Gathering Capacity; ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

Factor	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15
F13	-.08	.10	.00	.06	-.05	.04	.02	-.01	-.13*	.04	.04	.02	1		
Information Seeking															
Information Processing															
F14 Systematic	.13*	.35**	.27**	.31**	.22**	.338**	.39**	.35**	.09	.31**	.34**	.31**	.51**	1	
F15 Heuristic	.18**	.24**	.29**	.14*	.24**	.28**	.28**	.25**	.18**	.21**	.24**	.19**	-.38**	.14**	1

Notes: PIGP= Perceived Information Gathering Capacity; **Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

Developing the Study Models

T-test analysis found that for people with Cardiovascular Disease (CVD), information seeking is significantly greater than those without CVD (Mean: 3.60 vs. 3.40; P-value = 0.043). See Table 4.7. Systematic Information Processing is not significantly different between people with and without CVD, thus CVD is not a significant predictor of Systematic Information Processing. For people who do not have CVD, Heuristic Information Processing is significantly higher than those with CVD (Mean: 2.99 vs. 2.78; P-value = 0.026). The findings suggest that people who have CVD do not think about Rosiglitazone Cardiovascular Risk (RCR) any more deeply than those without CVD. Based on the Systematic Information Processing results, people with CVD and those without CVD may all think about RCR equally deeply.

The variable "How long ago did a doctor first tell you that you have diabetes?" is categorical with four levels. The Tukey method was used to compare each group to each other to determine which groups are significantly different from which other groups in the event that the overall ANOVA test was significant. The overall P-values were not significant for "How long ago did a doctor first tell you that you have diabetes?" in predicting Information Seeking or Information Processing (Systematic or Heuristic), p=0.738, 0.888, and 0.977, respectively.

T tests were used to test the significance of those who ever EVER used ROSI vs. those who had never used ROSI. Those who have taken (Ever used ROSI) ROSI had a significantly higher mean for information seeking scores (mean: 3.74 vs. 3.39; P-value = 0.001) than never users. ROSI ever use was very significant for predicting Systematic Information Processing such that those who have taken ROSI had higher mean systematic

information processing scores than never users (mean: 3.62 vs. 3.15; P-value = 0.000). Heuristic information processing scores were not significantly different for ROSI ever use vs. ROSI never use.

Since there were 2 choices, t tests were used to analyze Heard of RCR (prior knowledge) where 1 means "yes, heard of risk" and 0 means "no" or "unsure". Prior knowledge was a significant predictor of Information seeking. Those with prior knowledge have higher information seeking scores than those who did not have prior knowledge (mean: 3.59 vs. 3.38; p-value = 0.027), and therefore they are more likely to seek information. Prior knowledge was nearly significant, for predicting Systematic Information Processing. Those with prior knowledge had higher mean Systematic Information Processing scores than those without prior knowledge (mean: 3.37 vs. 3.20; p-value = 0.074). Prior knowledge was not significant for predicting Heuristic Information Processing.

Table 4.7: Selected Sample Characteristics

Characteristic	N	Information Seeking (Mean ± SD)	Information Processing (Mean ± SD)	
			Systematic	Heuristic
CVD				
Yes	140	3.60±0.72**	3.31±0.69	2.78±0.755
No	119	3.40±.80	3.30±0.81	2.99±0.81**
Ever used ROSI				
Yes	86	3.74±0.82**	3.62±0.73**	2.86±0.92
No	173	3.39±0.71	3.15±0.71	2.88±0.72
Heard of RCR				
Yes	158	3.59±0.81**	3.37±0.73	2.83±0.81
No	101	3.38±0.67	3.20±0.77	2.95±0.76

Notes: *p≤ .05

For Demographic Variables, a t-test was used to test the effect of gender on the responses. ANOVA was used for Ethnicity, Education, Income, and Read for fun. Finally, a linear regression was used for Age. The dependent variables for each of these comparisons were Information Seeking and Information Processing (Systematic and

Heuristic). The demographic variables were not significantly different for any of the dependent variables.

Some Risk Information Seeking and Processing Model (RISP) researchers used the difference of Information Sufficiency Threshold (Knowledge Needed) and Current Knowledge as a Knowledge Gap. More commonly, RISP researchers have used regressed change rather than calculating a difference score between current knowledge and knowledge needed to represent information insufficiency. This Gap has been thought to represent how much knowledge an individual felt they needed to deal with a risk. In the Risk Information Seeking and Processing Model, this Gap was used to learn about information seeking and processing behaviors of respondents. However, the two variables Current Knowledge and Information Sufficiency Threshold could have separate effects on the outcome variable, as it is not necessarily implied that the difference between them is the best predictor for any of the responses (in other words, one's current knowledge may impact the responses separately from the difference between current knowledge and knowledge needed). (See Table 4.11, 4.12, 4.13) Therefore, all three variables, Information Sufficiency Threshold (Knowledge Needed), Current Knowledge, and the difference between these (subtracting one from the other) or Information Insufficiency (GAP) were explored using ordinary least squares regression. The difference scores may not demonstrate a practically important measurement especially if current knowledge and information sufficiency threshold correlate with each other.

Final Regression Model Development

Final models were created in several ways. (See Tables 4.8 to 4.10) First, two approaches were used – Backward and stepwise method to see if the method of selecting

the best subset of predicators of the response variables made a difference. Backward selection involved including all the variables in the model and perform a backward selection technique based on significance of P-values (remove the least significant variables one at a time) until all variables remaining in the model were significant. Stepwise selection involved including variables one at a time based on significance, and variables are added or removed from the model one at a time based on significance in order to determine which variables should be included in a final model.

Next, hierarchical models (Table 4.11 to 4.18) were created to learn how particular variables can affect the proportion of variance that is accounted for once other variables are already considered in the model and whether or not they are significant. This was to test models according to specific hypotheses. For example, to predict information seeking, first the channel belief variables enter the model; of these, in the output, none are significant. Next, gathering capacity enters the model; still nothing is significant. Next current knowledge enters the model, and not only is current knowledge significant but now mean belief that all channels (newspaper, TV news, magazines) distort information becomes significant (that is, once you account for current knowledge, distortion is also a significant predictor of mean Information Seeking). Next Information Sufficiency Threshold enters the model, and is also significant. Finally, Cardiovascular Disease (CVD), Ever Taken Rosiglitazone (ROSI), and Prior Knowledge of Risk (Heard of RCR) enter the model, and none are additionally significant. This same procedure was followed for each of the dependent variables (Information Seeking and Processing (Systematic, Heuristic)).

Table 4.8 Backward and Stepwise Regression Model Summaries for Information Seeking

	Backward			*Stepwise*		
Predictor	β ± SE	*P*	$IR^2(\Delta R^2)$	β ± SE	*P*	$IR^2(\Delta R^2)$
Channels Distort Information	-0.185 ± 0.064 Beta = -0.166	0.004	0.199 (-0.014) Model R^2=0.185	-0.185 ± 0.064 Beta = -0.166	0.004	0.133 (0.052) Model R^2=0.081
Current Knowledge	0.004± 0.002 Beta = 0.179	0.004		0.004 ± 0.002 Beta = 0.179	0.004	
Knowledge Needed	0.007 ± 0.001 Beta = 0.320	≤0.001		0.007 ± 0.001 Beta = 0.320	≤0.001	

Notes: Dependent Variable: Information Seeking; CVD=Cardiovascular Disease; ROSI=Rosiglitazone β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.9 Backward and Stepwise Regression Models Summaries for Systematic Information Processing

	Backward			*Stepwise*		
Predictor Variables	β ± SE	*p*	$IR^2(\Delta R^2)$	β ± SE	*P*	$IR^2(\Delta R^2)$
Channels Distort Information	0.126±0.056 Beta=0.116	0.026	0.375 (-0.008) Model R^2=.367			0.193 (-0.146) Model R^2=0.047
Channels Provide Validity Cues	0.148±0.068 Beta = 0.138	0.031		0.210±0.061 Beta = 0.196	0.001	
Confidence in Information from Channels	0.128±0.72 Beta = 0.142	0.078				
Perceived Information Gathering Capacity	0.168±0.094 Beta = 0.126	0.074		0.254±0.077 Beta = 0.190	0.001	
Cardiovascular Disease						
Ever used ROSI	0.209±0.093 Beta = 0.132	0.025				
Heard of RCR						

Current Knowledge	0.005±0.002 Beta = 0.190	0.003		0.007±0.001 Beta = 0.273	≤0.001	
Knowledge Needed	0.004±0.001 Beta = 0.191	0.001		0.004±0.001 Beta = 0.201	≤0.001	

Notes: Dependent Variable = Systematic Information Processing; CVD=Cardiovascular Disease; ROSI=Rosiglitazone β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.10 Backward and Stepwise Regression Model Summaries for Heuristic Information Processing

Predictor Variables	*Backward* β ± SE	*P*	$IR^2(\Delta R^2)$	*Stepwise* β ± SE	*P*	$IR^2(\Delta R^2)$
Channel Distort Information	0.319±0.065 Beta = 0.277	≤0.001	0.218 (-0.017) Model R^2=0.201	0.319±0.065 Beta = 0.277	≤0.001	0.099(-0.102) Model R^2=-0.003
Channel Provide Validity Cues						
Confidence in Information from Channels	0.324±0.054 Beta = 0.342	≤0.001		0.324±0.054 Beta = 0.342	≤0.001	
Perceived Information Gathering Capacity						
Cardiovascular Disease	-0.179±0.090 Beta = -0.113	0.047		-0.179±0.090 Beta = -0.113	0.047	
Ever used ROSI						
Heard of RCR						

Current Knowledge						
Knowledge Needed	-0.003±0.001 Beta = -0.141	0.016		-0.003±0.001 Beta = -0.141	0.016	

Notes: Dependent Variables = Heuristic Information Processing; CVD=Cardiovascular Disease; ROSI=Rosiglitazone β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Hierarchical Multiple Regression

The tables below shows the outcomes of the multiple regressions run to calculate the relationships between the predictor variables and the dependent variables of information seeking, heuristic information processing, and systematic information processing.

Table 4.11: Coefficients for Information Seeking using GAP and RISP Variables

Predictor Variables	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta	Model 3 β ± SE (p)	Beta
Information Insufficiency (GAP)	0.002 ± 0.001 (0.118)	0.097	0.002 ± 0.001 (0.086)	0.108	0.002 ± 0.001 (0.122)	0.097
Perceived Information Gathering Capacity			0.88 ± 0.072 (0.223)	0.076	0.094 ± 0.086 (0.275)	0.082
Channels Distort Information					-0.089 ± 0.061 (0.145)	-0.092
Channels Provide Validity Cues					0.137 ± 0.076 (0.072)	0.125
Confidence in Information from Channels					-0.080 ± 0.067 (0.237)	-0.096

Notes: Model 1: Information Insufficiency (GAP) = Knowledge Needed minus Current Knowledge; Model 2: Model 1 + Perceived Information Gathering Capacity; Model 3: Model 2 + Channels Distort Information + Channels Provide Validity Cues + Confidence in Information from Channels; Dependent Variable: Information Seeking

Table 4.12: Coefficients for Systematic Information Processing using GAP and RISP Variables

Predictor Variables	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta	Model 3 β ± SE (p)	Beta
Information Insufficiency (GAP)	-0.001 ± 0.001 (0.668)	-0.027	0.000 ± 0.001 (0.786)	0.016	0.000 ± 0.001 (.817)	0.013
Perceived Information Gathering Capacity			0.347 ± 0.067 (≤0.001)	0.310	0.253 ± 0.077 (0.001)	0.226
Channels Distort Information					0.150± 0.054 (0.006)	0.160
Channels Provide Validity Cues					0.278 ± 0.068 (≤0.001)	0.259
Confidence in Information from Channels					0.051 ± 0.060 (0.395)	0.063

Notes: Model 1: Information Insufficiency (GAP) = Knowledge Needed minus Current Knowledge; Model 2: Model 1 + Perceived Information Gathering Capacity; Model 3: Model 2 + Channels Distort Information + Channels Provide Validity Cues + Confidence in Information from Channels; Dependent Variable: Systematic Information Processing; CVD=Cardiovascular Disease; ROSI=Rosiglitazone β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.13 Coefficients for Information Seeking using Current Knowledge and Knowledge Needed

Predictor Variables	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta
Current Knowledge	0.007± 0.001 (≤0.001)	0.286	0.004 ± 0.002 (0.006)	0.172
Knowledge Needed			0.007 ± 0.001 (≤0.001)	0.299

Notes: Model 1: Current Knowledge; Model 2: Current Knowledge + Knowledge Needed; Dependent Variables: Information Seeking

Table 4.14: Regression Coefficients for Information Seeking using Current Knowledge and Knowledge Needed based on RISP

Predictor	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta	Model 3 β ± SE (p)	Beta	Model 4 β ± SE (p)	Beta
Channels Distort Information	-0.129±0.070 (0.067)	-0.116	-0.131±0.071 (0.064)	-0.118	-0.163 ± 0.068 (0.17)	-0.146	-0.195 ±0.065 (0.003)	-0.175
Channels Provide Validity Cues	0.110±0.086 (0.202)	0.100	0.109±0.086 (0.204)	0.100	0.96 ± 0.082 (0.243)	0.088	0.056±0.079 (0.475)	0.051
Confidence in Information from Channels	-0.033±0.071 (0.641)	-0.036	-0.053±0.090 (0.557)	-0.057	-0.100 ± 0.086 (0.248)	-0.109	-0.056±0.083 (0.498)	-0.061
Perceived Info			0.042±0.117 (0.721)	0.031	-0.017±0.113 (0.882)	-0.012	-0.080±0.108 (0.458)	-0.059

Gathering Capacity								
Current Knowledge					0.008±0.002 (≤0.001)	0.314	0.005±0.002 (0.002)	0.201
Knowledge Needed							0.007±0.001 (≤0.001)	0.322

Notes: Model 1: Confidence + Distort + Validity; Model 2: Model 1 +Perceived Information Gathering Capacity; Model 3: Model 2 + Current Knowledge; Model 4: Model 3 + Knowledge Needed; Dependent Variables: Information Seeking; CVD=Cardiovascular Disease; ROSI=Rosiglitazone β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.15: Regression Coefficients for Heuristic Information Processing with Current Knowledge and Knowledge Needed based on RISP

Predictor	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta	Model 3 β ± SE (p)	Beta	Model 4 β ± SE (p)	Beta
Channels Distort Information	0.283±0.067 (≤0.001)	0.246	0.283±0.067 (≤0.001)	0.246	0.286 ± 0.067 (≤0.001)	0.248	0.305 ±0.067 (≤0.001)	0.265
Channels Provide Validity Cues	0.090±0.081 (0.271)	0.079	0.090±0.082 (0.271)	0.079	0.091 ± 0.082 (0.267)	0.080	0.114±0.081 (0.159)	0.101
Confidence in Information from Channels	0.265±0.068 (≤0.001)	0.280	0.267±0.085 (0.002)	0.281	0.270 ± 0.086 (0.002)	0.286	0.245±0.085 (0.004)	0.258

Perceived Info Gathering Capacity			-0.003±0.111 (0.977)	-0.002	0.002±0.112 (0.988)	0.001	0.039±0.111 (0.728)	0.028
Current Knowledge					-0.001±0.002 (0.675)	-0.025	0.001±0.002 (0.542)	0.039
Knowledge Needed							-0.004±0.001 (0.004)	-0.183

Notes: Model 1: Confidence + Distort + Validity; Model 2: Model 1 +Perceived Information Gathering Capacity; Model 3: Model 2 + Current Knowledge; Model 4: Model 3 + Knowledge Needed; Dependent Variable: Heuristic Information Processing; CVD=Cardiovascular Disease; ROSI=Rosiglitazone β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.16: Regression Coefficients for Information Seeking using Current Knowledge, Knowledge Needed, RCR, CVD, Ever Used ROSI based on RISP

Predictor	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta	Model 3 β ± SE (p)	Beta	Model 4 β ± SE (p)	Beta	Model 5 β ± SE (p)	Beta
Channels Distort Information	-0.129±0.070 (0.067)	-0.116	-0.131±0.071 (0.064)	-0.118	-0.163 ± 0.068 (0.017)	-0.146	-0.195 ±0.065 (0.003)	-0.175	-0.189±0.065 (0.004)	-0.170
Channels Provide Validity Cues	0.110±0.086 (0.202)	0.100	0.109±0.086 (0.204)	0.100	0.096±0.082 (0.243)	0.088	0.056±0.079 (0.475)	0.051	0.050±0.079 (0.531)	0.045
Confidence in Information from Channels	-0.033±0.071 (0.641)	0.071	-0.053±0.090 (0.557)	-0.057	-0.100 ± 0.086 (0.248)	-0.109	-0.056±0.083 (0.498)	-0.061	-0.047±0.083 (0.570)	-0.052

Perceived Info Gathering Capacity			0.042±0.117 (0.721)	0.031	-0.017 ± 0.113 (0.882)	-0.012	-0.080±0.108 (0.458)	-0.059	-0.078±0.108 (0.473)	-0.057
Current Knowledge					0.008±0.002 (≤0.001)	0.314	0.005±0.002 (0.002)	0.201	0.004 ±0.002 (0.028)	0.176
Knowledge Needed							0.007±0.001 (≤0.001)	0.322	0.007±0.001 (≤0.001)	0.311
CVD									0.087±0.091 (0.340)	0.057
Ever used ROSI									0.083±0.108 (0.442)	0.051
Heard of RCR									-0.009±0.106 (0.932)	-0.006

Notes: Model 1: Confidence + Distort + Validity; Model 2: Model 1 + Perceived Information Gathering Capacity; Model 3: Model 2 + Current Knowledge; Model 4: Model 3 + Knowledge Needed; Model 5: Model 4 + CVD + Ever used ROSI + Heard of RCR;

Dependent Variable: Information Seeking; CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.17: Regression Coefficients for Systematic Information Processing using Current Knowledge, Knowledge Needed, CVD, Ever used ROSI, Heard of RCR based on RISP

Predictor	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta	Model 3 β ± SE (p)	Beta	Model 4 β ± SE (p)	Beta	Model 5 β ± SE (p)	Beta
Channels Distort Information	0.182±0.062 (0.004)	0.166	0.168±0.061 (0.007)	0.154	0.136 ± 0.058 (0.019)	0.125	0.117 ±0.057 (0.040)	0.107	0.127±0.056 (0.025)	0.116
Channels Provide Validity Cues	0.191±0.076 (0.012)	0.178	0.189±0.075 (0.012)	0.176	0.175±0.070 (0.013)	0.163	0.151±0.069 (0.029)	0.141	0.149±0.068 (0.030)	0.139
Confidence in Information from Channels	0.258±0.063 (≤0.001)	0.288	0.134±0.078 (0.88)	0.149	0.086 ± 0.074 (0.246)	0.095	0.112±0.072 (0.123)	0.125	0.120 ±0.072 (0.099)	0.133
Perceived Info Gathering Capacity			0.270±0.102 (0.009)	0.203	0.211 ± 0.096 (0.029)	0.158	0.172±0.095 (0.069)	0.129	0.165±0.094 (0.079)	0.124
Current Knowledge					0.008±0.001 (≤0.001)	0.327	0.006±0.001 (≤0.001)	0.257	0.005 ±0.002 (0.002)	0.225

Knowledge Needed							0.004±0.001 (≤0.001)	0.198	0.004±0.001 (0.001)	0.194
CVD									-0.075±0.079 (0.339)	-0.050
Ever used ROSI									0.226±0.093 (0.016)	0.143
Heard of RCR									-0.108±0.091 (0.237)	-0.071

Notes: Model 1: Confidence + Distort + Validity; Model 2: Model 1 + Perceived Information Gathering Capacity; Model 3: Model 2 + Current Knowledge; Model 4: Model 3 + Knowledge Needed; Model 5: Model 4 + CVD + Ever used ROSI + Heard of RCR; DV: Systematic Information Processing; CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.18: Regression Coefficients for Heuristic Information Processing using Current Knowledge and Knowledge Needed, CVD, Ever used ROSI, Heard of RCR based on RISP

Predictor	Model 1 β ± SE (p)	Beta	Model 2 β ± SE (p)	Beta	Model 3 β ± SE (p)	Beta	Model 4 β ± SE (p)	Beta	Model 5 β ± SE (p)	Beta
Channels Distort Information	0.283±0.067 (≤0.001)	0.246	0.283±0.067 (≤0.001)	0.246	0.286 ± 0.067 (≤0.001)	0.248	0.305 ±0.067 (≤0.001)	0.265	0.304±0.066 (≤0.001)	0.264
Channels Provide Validity Cues	0.090±0.081 (0.271)	0.079	0.090±0.082 (0.271)	0.079	0.091±0.082 (0.267)	0.080	0.114±0.081 (0.159)	0.101	0.119±0.081 (0.141)	0.105
Confidence in Information from Channels	0.265±0.068 (≤0.001)	0.280	0.267±0.085 (0.002)	0.281	0.270 ± 0.086 (0.002)	0.286	0.245±0.085 (0.004)	0.258	0.230±0.085 (0.007)	0.243
Perceived Info Gathering Capacity			-0.003±0.111 (0.977)	-0.002	0.002 ± 0.112 (0.988)	0.001	0.039±0.111 (0.728)	0.028	0.032±0.111 (0.769)	0.023
Current Knowledge					-0.001±0.002 (0.675)	-0.025	0.001±0.002 (0.542)	0.039	0.002 ±0.002 (0.242)	0.092

Knowledge Needed							-0.004±0.001 (0.004)	-0.183	-0.004±0.001 (0.006)	-0.174
CVD									-0.157±0.093 (0.092)	-0.099
Ever used ROSI									0.013±0.110 (0.907)	0.008
Heard of RCR									-0.163±0.108 (0.131)	-0.101

Notes: Model 1: Confidence + Distort + Validity; Model 2: Model 1 + Perceived Information Gathering Capacity; Model 3: Model 2 + Current Knowledge; Model 4: Model 3 + Knowledge Needed; Model 5: Model 4 + CVD + Ever used ROSI + Heard of RCR; Dependent Variable: Heuristic Information Processing; CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Results for Research Questions and Hypotheses

The first grouping of hypotheses (H1, H2 and H3) forecasts that the size of the "gap" between people with diabetes' current knowledge and perceived informational needs would be positively associated with information seeking and systematic processing, while also being negatively associated with heuristic processing. The relationship between information insufficiency and information seeking (beta = 0.003, p = 0.010) was significant, which does support H1. The relationship between information insufficiency and systematic processing (beta = 0.001, p = 0.393) was not significant, which does not support H2. The relationship between information insufficiency and heuristic processing (beta=-0.004,p = 0.001) was significant, which does support H3. (See Table 4.19) On a scale of 0 to 100 where 0 means knows nothing and 100 maens knows everything there is to know, the mean level of current knowledge about rosiglitazone cardiovascular risk for respondents was 38.2. Given a standard deviation of 31.1 for current knowledge about rosiglitazone cardiovascular risk, it implies that there was a large variable in the response. People felt that the amount of information they needed to deal with the risk was 65.71, with standard deviation of 34.12. The large difference between the average scores for current knowledge and sufficiency threshold means that the typical person with diabetes perceives a large cognitive need for additional information on the topic. Additionally, those who had ever used rosiglitazone were more likely to have more effortful seeking (beta = 0.208, p = 0.001)and processing (beta = 0.302, $p \leq 0.001$) of the risk information.

Table 4.19: Regression of Risk Information Seeking and Processing using Information Insufficiency, CVD, Ever used ROSI, and Heard of RCR

Predictor	*Information Seeking*		*Systematic Information Processing*		*Heuristic Information Processing*	
	β ± SE (*P*)	*Beta*	β ± SE (*P*)	*Beta*	β ± SE (*P*)	*Beta*
Information Insufficiency	0.003 ± 0.001 (0.010)	0.167	0.001 ± 0.001 (0.393)	0.054	-0.004 ± 0.001 (0.008)	-0.176
Cardiovascular Disease	0.090 ± 0.096 (0.351)	0.059	-0.085 ± 0.093 (0.363)	-0.057	-0.159 ± 0.101 (0.116)	-0.101
Ever used ROSI	0.338 ± 0. 103 (0.001)	0.208	0.479 ± 0.100 (≤0.001)	0.302	-0.004 ± 0.109 (0.973)	-0.002
Heard of RCR	0.171 ± 0.104 (0.102)	0.109	0.080 ± 0.101 (0.429)	0.052	-0.168 ± 0.109 (0.126)	-0.104

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

The second grouping of hypotheses (H4, H5 and H6) predicts a positive relationship between people with diabetes channel beliefs in regard to rosiglitazone cardiovascular risk and people with diabetes level of information seeking and systematic processing. The relationship between channel belief distort and information seeking (beta =-0.145, p = 0.034) was significant. The relationship between the channel beliefs validity (beta =0.079, ns) and confidence (beta=-0.008, ns) in media and information seeking were insignificant. The relationship between channel belief distort (beta =0.175, p = 0.003), validity (beta =0.176, p = 0.016), and confidence (beta =0.261, $p \leq 0.001$) and systematic information processing was significant. The relationship between channel belief distort (beta =0.299, $p \leq 0.001$) and confidence (beta =0.234, p = 0.001) and heuristic information processing was significant. The relationship between the channel beliefs validity (beta =0.115, ns) and heuristic information processing were insignificant. (See Table 4.20) There was a difference between the average scores for media distort reality (mean = 3.34, s. d. = 0.79), media provide validity cues to the processing of the information (mean = 3.25, s. d. = 0.76), and media will bring important issues to my attention (mean = 2.89, s. d. = 0.95). This means that the typical person with diabetes believes that media distorts reality and provide some validity cues to the processing of the information but disagree that media will bring important issues to their attention. The findings suggest that these channel beliefs will lead people with diabetes to use both heuristic and systematic processing strategies. Researchers have suggested that a combination of processing strategies may produce better decisions than systematic alone.

Table 4.20: Regression of Risk Information Seeking and Processing using Information Insufficiency, Channel Beliefs, CVD, Ever used ROSI, and Heard of RCR

	Information Seeking		*Systematic Information Processing*		*Heuristic Information Processing*	
Predictor	β ± SE (*P*)	Beta	β ± SE (*P*)	Beta	β ± SE (*P*)	Beta
Information Insufficiency	0.004 ± 0.001 (0.006)	0.178	0. 002 ± 0.001 (0.151)	0.083	-0.004 ± 0.001 (0.007)	-0.163
Channel Beliefs Distort	-0.145 ± 0.068 (0.034)	-0.130	0.175 ± 0.059 (0.003)	0.160	0.299 ± 0.066 (≤0.001)	0.259
Validity	0.079 ± 0.083 (0.343)	0.072	0.176 ± 0.072 (0.016)	0.163	0.115 ± 0.080 (0.154)	0.101
Confidence	-0.008 ± 0.070 (0.914)	-0.008	0.261 ± 0.061 (≤0.001)	0.291	0.234 ± 0.067 (0.001)	0.247
Cardiovascular Disease	0.079 ± 0.096 (0.410)	0.052	-0.091 ± 0.084 (0.278)	-0.061	-0.157 ± 0.093 (0.091)	-0.099
Ever used ROSI	0.330 ± 0.103 (0.002)	0.203	0.453 ± 0.090 (≤0.001)	0.286	-0.022 ± 0.099 (0.823)	-0.013
Heard of RCR	0.193 ± 0.104 (0.065)	0.123	0.076 ± 0.091 (0.401)	0.050	-0.192 ± 0.100 (0.057)	-0.119

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

The third set of hypotheses (H7, H8 and H9) predicts a positive relationship between people with diabetes perception of their capacity to gather information and people with diabetes levels of information seeking and systematic processing.

No significant relationship was found in the data between gathering capacity and information seeking (beta 0.022, ns). There was a significant relationship found in the data between perceived information gathering capacity and systematic (beta 0.480, $p \leq 0.001$) and heuristic (beta 0.322, $p \leq 0.001$) processing. (See Table 4.21) The mean for perceived information gathering capacity hovered around the neutral point (mean = 3.01, s. d. = 0.67) This means that most people with diabetes are grouped around a neutral mean score of capacity, and therefore the majority reports feeling neutral about being able to gather appropriate and useful information on the risk. The significant associations between perceived information gathering capacity and information processing suggest that people with diabetes will use both heuristic and systematic processing strategies. Researchers have suggested that a combination of processing strategies may produce better decisions than systematic alone.

Table 4.21: Regression of Risk Information Seeking and Processing using Information Insufficiency, Perceived Information Gathering Capacity, CVD, Ever used ROSI, and Heard of RCR

	Information Seeking		*Systematic Information Processing*		*Heuristic Information Processing*	
Predictor	β ± SE (*P*)	*Beta*	β ± SE (*P*)	*Beta*	β ± SE (*P*)	*Beta*
Information Insufficiency	0.004 ± 0.001 (0.010)	0.167	0. 001 ± 0.001 (0.281)	0.064	-0.004 ± 0.001 (0.008)	-0.170
Perceived Information Gathering Capacity	0.022±0.082 (0.792)	0.016	0.480±0.074 (≤0.001)	0.360	0.322 ± 0.084 (≤0.001)	0.229
Cardiovascular Disease	0.091±0.096 (0.347)	0.059	-0.065±0.087 (0.455)	-0.043	-0.146 ± 0.098 (0.140)	-0.092
Ever used ROSI	0.336±0.104 (0.001)	0.207	0.434±0.093 (≤0.001)	0.274	-0.034 ± 0.106 (0.749)	-0.020
Heard of RCR	0.170±0.104 (0.105)	0.109	0.062±0.094 (0.509)	0.041	-0.180 ± 0.107 (0.093)	-0.111

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

The second research question of the study is to determine whether channel beliefs and perceived information gathering capacity moderate the relationship between information insufficiency and information seeking and processing among people with diabetes in regards to the rosiglitazone cardiovascular risk? No significant relationships were found to indicate a moderation relationship between channel beliefs and perceived information gathering capacity with information seeking, systematic information processing or heuristic information processing. (See Table 4.22 and 4.23) The relation between information insufficiency and information seeking and processing does not depend on channel beliefs or perceived information gathering capacity. The strength or direction of the significant relationship between information insufficiency and information seeking and processing does not depend on the values of channel beliefs and perceived information gathering capacity. Adding channel beliefs and perceived information gathering capacity did not improve our understanding of the relationship between information insufficiency and information seeking and processing. Channel beliefs and perceived information gathering capacity simply makes a more complete model that predicts information seeking and processing more successfully.

Table 4.22: Regression of Risk Information Seeking and Processing using Information Insufficiency, Channel Beliefs, and Interaction

	Information Seeking		*Systematic Information Processing*		*Heuristic Information Processing*	
Predictor	β ± SE (*P)*	*Beta*	β ± SE (*P)*	*Beta*	β ± SE (*P)*	*Beta*
Information Insufficiency	0.007±0.009 (0.408)	0.343	0.003 ± 0.008 (0.689)	0.148	-0.003± 0.008 (0.683)	-0.156
Channel Beliefs Distort	-0.083±0.083 (0.323)	-0.074	0.180 ± 0.073 (0.014)	0.165	0.212 ± 0.080 (0.008)	0.184
Validity	0.038±0.100 (0.707)	0.034	0.154 ± 0.087 (0.079)	0.143	0.217± 0.095 (0.023)	0.192
Confidence	-0.006±0.084 (0.939)	-0.007	0.289 ± 0.073 (≤0.001)	0.322	0.222 ± 0.080 (0.006)	0.235
Cardiovascular Disease	0.089±0.098 (0.363)	0.058	-0.089 ± 0.085 (0.301)	-0.059	-0.186 ± 0.093 (0.047)	-0.117
Ever used ROSI	0.311±0.104 (0.003)	0.192	0.452 ± 0.091 (≤0.001)	0.285	0.001 ± 0.100 (0.995)	0.000
Heard of RCR	0.199±0.104 (0.058)	0.127	0.076±0.091 (0.407)	0.050	-0.198±0.100 (0.048)	-0.122
Information Insufficiency * Distort	-0.002±0.002 (0.251)	-0.347	0.000 ± 0.002 (0.842)	-0.054	0.003 ± 0.002 (0.122)	0.433
Information	0.001±0.002	0.202	0.001±0.002	0.135	-0.003±0.002	-0.513

Insufficiency * Validity	(0.518)		(0.630)		(0.077)	
Information Insufficiency * Confidence	0.000±0.002 (0.901)	-0.031	-0.001±0.002 (0.491)	-0.151	0.001±0.002 (0.729)	0.079

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Table 4.23: Regression of Risk Information Seeking and Processing using Information Insufficiency, Perceived Information Gathering Capacity, and Interaction

Predictor	*Information Seeking*		*Systematic Information Processing*		*Heuristic Information Processing*	
	β ± SE (*P*)	*Beta*	β ± SE (*P*)	*Beta*	β ± SE (*P*)	*Beta*
Information Insufficiency	0.004±0.006 (0.524)	0.176	0.007 ± 0.005 (0.159)	0.362	0.008± 0.006 (0.205)	0.348
Perceived Information Gathering Capacity	0.024±0.099 (0.808)	0.018	0.538±0.089 (≤0.001)	0.404	0.429±0.100 (≤0.001)	0.305
Cardiovascular Disease	0.091±0.097 (0.349)	0.059	-0.069±0.087 (0.425)	-0.046	-0.154±0.098 (0.118)	-0.097
Ever used ROSI	0.336±0.104 (0.001)	0.207	0.436 ± 0.093 (≤0.001)	0.275	-0.031±0.105 (0.771)	-0.018
Heard of RCR	0.170±0.105 (0.105)	0.109	0.063±0.094 (0.505)	0.041	-0.179±0.106 (0.093)	-0.111
Information Insufficiency * Perceived Information Gathering Capacity	0.000±0.002 (0.967)	-0.011	-0.002 ± 0.002 (0.233)	-0.306	-0.004 ± 0.002 (0.053)	-0.531

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

The third research question is to determine whether channel beliefs and perceived information gathering capacity mediate the relationship between Information Insufficiency and Information Seeking and Processing. Baron & Kenny (1986) method for testing mediation was used. It involves analyzing a series of regressions. The relation between the predictor and criterion variable should be reduced (to zero in the case of total mediation) after controlling the relation between the mediator and criterion variables. No significant relationships were found to indicate a mediation relationship between channel beliefs and perceived information gathering capacity with information seeking, systematic information processing or heuristic information processing. (See Table 4.24) This means that channel beliefs and perceived information gathering capacity do not explain why or how information insufficiency and information seeking and processing are related. There is a significant relationship between information insufficiency and information seeking and processing. This relationship remains even after controlling for channel beliefs and perceived information gathering capacity. Adding channel beliefs and perceived information gathering capacity did not improve our understanding of the relationship between information insufficiency and information seeking and processing. Channel beliefs and perceived information gathering capacity simply makes a more complete model that predicts information seeking and processing more successfully.

Table 4.24: Comparisons of Selected Regressions of Risk Information Seeking and Processing to Test Mediated Relationships

Predictor	*Information Seeking*		*Systematic Information Processing*		*Heuristic Information Processing*	
	β ± SE (*P)*	*Beta*	β ± SE (*P)*	*Beta*	β ± SE (*P)*	*Beta*
Information Insufficiency	0.003 ± 0.001 (0.010)	0.167	0.001 ± 0.001 (0.393)	0.054	-0.004 ± 0.001 (0.008)	-0.176
Cardiovascular Disease	0.090 ± 0.096 (0.351)	0.059	-0.085 ± 0.093 (0.363)	-0.057	-0.159 ± 0.101 (0.116)	-0.101
Ever used ROSI	0.338 ± 0. 103 (0.001)	0.208	0.479 ± 0.100 (≤0.001)	0.302	-0.004 ± 0.109 (0.973)	-0.002
Heard of RCR	0.171 ± 0.104 (0.102)	0.109	0.080 ± 0.101 (0.429)	0.052	-0.168 ± 0.109 (0.126)	-0.104

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

Predictor	*Information Seeking*		*Systematic Information Processing*		*Heuristic Information Processing*	
	β ± SE (*P)*	Beta	β ± SE (*P)*	Beta	β ± SE (*P)*	Beta
Information Insufficiency	0.004 ± 0.001 (0.006)	0.178	0. 002 ± 0.001 (0.151)	0.083	-0.004 ± 0.001 (0.007)	-0.163
Channel Beliefs Distort	-0.145 ± 0.068 (0.034)	-0.130	0.175 ± 0.059 (0.003)	0.160	0.299 ± 0.066 (≤0.001)	0.259
Validity	0.079 ± 0.083 (0.343)	0.072	0.176 ± 0.072 (0.016)	0.163	0.115 ± 0.080 (0.154)	0.101

Confidence	-0.008 ± 0.070 (0.914)	-0.008	0.261 ± 0.061 (≤0.001)	0.291	0.234 ± 0.067 (0.001)	0.247
Cardiovascular Disease	0.079 ± 0.096 (0.410)	0.052	-0.091 ± 0.084 (0.278)	-0.061	-0.157 ± 0.093 (0.091)	-0.099
Ever used ROSI	0.330 ± 0.103 (0.002)	0.203	0.453 ± 0.090 (≤0.001)	0.286	-0.022 ± 0.099 (0.823)	-0.013
Heard of RCR	0.193 ± 0.104 (0.065)	0.123	0.076 ± 0.091 (0.401)	0.050	-0.192 ± 0.100 (0.057)	-0.119

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

	Information Seeking		*Systematic Information Processing*		*Heuristic Information Processing*	
Predictor	β ± SE (*P)*	*Beta*	β ± SE (*P)*	*Beta*	β ± SE (*P)*	*Beta*
Information Insufficiency	0.004 ± 0.001 (0.010)	0.167	0. 001 ± 0.001 (0.281)	0.064	-0.004 ± 0.001 (0.008)	-0.170
Perceived Information Gathering Capacity	0.022±0.082 (0.792)	0.016	0.480±0.074 (≤0.001)	0.360	0.322 ± 0.084 (≤0.001)	0.229
Cardiovascular Disease	0.091±0.096 (0.347)	0.059	-0.065±0.087 (0.455)	-0.043	-0.146 ± 0.098 (0.140)	-0.092
Ever used ROSI	0.336±0.104 (0.001)	0.207	0.434±0.093 (≤0.001)	0.274	-0.034 ± 0.106 (0.749)	-0.020

Heard of RCR	0.170±0.104 (0.105)	0.109	0.062±0.094 (0.509)	0.041	-0.180 ± 0.107 (0.093)	-0.111

Notes: CVD=Cardiovascular Disease; ROSI=Rosiglitazone; RCR=Rosiglitazone Cardiovascular Risk; β=unstandardized coefficient; SE=Standard Error; p=significance; RISP=Risk Information Seeking and Processing Model

CHAPTER 5

DISCUSSION

The primary purpose of this study was to understand how people with diabetes look for and think about risk information related to the rosoglitazone cardiovascular risk. Consequently, our aim was to gain a better understanding of factors such as the gap between knowledge held and knowledge needed to deal with the risk (Information Insufficiency), channel beliefs about media who might report the risk and people's capacity to seek and process the risk information. In the paragraphs that follow, first, the best fitting models for predicting the outcome variables using backward and stepwise regression techniques will be stated. Backward and Stepwise regressions produced identical models except in predicting Systematic Information Processing where stepwise tended to be more conservative because it had fewer significant variables. Second, models for predicting the outcome variables using hierarchical regression analysis will be stated for each outcome variable. The significant predictors for the outcome variables using hierarchical regression techniques were identical to the significant predictors for the outcome variables using backward and stepwise regression techniques. However, there was a difference in the variables predicting heuristic information processing when using the backward regression analysis technique versus the hierarchical regression analysis technique. Finally, the results from the hypothesis testing are summarized. This chapter summarizes the conclusions drawn from the analysis and hypotheses testing.

The Risk Information Seeking and Processing models posits that the difference between current knowledge and knowledge needed to deal with the risk is the respondents perceived need for additional information about the risk, termed Information Insufficiency. In the following paragraphs, the words gap and information insufficiency are used interchangeably to describe the difference between current knowledge and knowledge needed. As stated earlier, the two variables current knowledge and knowledge needed could have separate effects on the outcome variable, as it is not necessarily implied that the difference between them is the best predictor for any of the outcome variables, in other words, one's current knowledge may impact the outcome variables separately from the gap (difference between current knowledge and knowledge needed). We tested this by using the predictors current knowledge and knowledge needed separately in the stepwise, backward and hierarchical regressions. We compared the results of stepwise, backward, and hierarchical regression where the predictors current knowledge and knowledge needed are placed in the regression analysis separately to the regression analysis used for the hypothesis testing where the gap, the difference between current knowledge and knowledge needed, was used in the regression analysis.

First, I will state the best fitting model for predicting information seeking. Backward, stepwise, and hierarchical regression techniques all produced the same. models. When describing the stepwise, backward and hierarchical regressions current knowledge and knowledge needed were used separately in the analysis. When describing the hypothesis testing, the difference between current knowledge and knowledge needed was used in the regression analysis. The standardized betas and p values were compared

for each predictor variable. The most important variable for predicting information seeking was determined based on the larger standardized beta.

The best fitting model for predicting information seeking using the backward and stepwise regression techniques includes the belief that media distort reality (beta = -0.166 p=0.004), perceived current knowledge (beta = 0.179 p=0.004) and knowledge needed to deal adequately with the risk (beta = 0.320 and $p \leq 0.001$). (See Table 4.8) The proportion of variation explained by the predictors in predicting Information Seeking was solid (R^2= 0.185). The significant beta coefficients for predicting information seeking using the hierarchical regression analysis technique were media distort reality (beta = -0.170 p=0.004), perceived current knowledge (beta = 0.176 p=0.028) and knowledge needed to deal adequately with the risk (beta = 0.311 and $p \leq 0.001$). (See Table 4.16) This means that those who believe that media distort reality will be less likely to participate in active information seeking, while the current level of knowledge and knowledge needed about the risk will influence more effortful seeking. The hypotheses testing used the gap in the regression analysis versus current knowledge and knowledge needed separately as is used the in backward, stepwise, and hierarchical regression techniques. The significant beta coefficients for predicting information seeking using the gap in the regression analysis were the gap (difference) between current knowledge and knowledge needed (beta = 0.167, p = 0.010), media distort reality (beta =-0.130, p = 0.034), and ever used ROSI (beta = .208, p = 0.001). (See Tables 4.19, 4.20, 4.21)

The best fitting model for predicting systematic information processing using the backward and stepwise regression techniques includes the belief that media distort reality (beta = 0.116, p=0.026), media provide validity cues for processing the information (beta

= 0.138, p = 0.031), perceived current knowledge (beta = 0.190, p=0.003) and knowledge needed to deal adequately with the risk (beta = 0.191, p=0.001), and ever used ROSI (beta = 0.132, p = 0.025). (See Table 4.9) The proportion of variation explained by the predictors in predicting systematic information processing was solid (R^2= 0.367). The significant beta coefficients for predicting systematic information processing using the hierarchical regression analysis technique were media distort reality (beta = 0.116, p=0.025), media provide validity cues for processing the information (beta = 0.139, p = 0.030), perceived current knowledge (beta = 0.225 p=0.002) and knowledge needed to deal adequately with the risk (beta = 0.194 and p=0.001) and ever used ROSI (beta = 0.143, p=0.016). (See Table 4.17) The hypotheses testing used the gap in the regression analysis versus current knowledge and knowledge needed separately as is used the in backward, stepwise, and hierarchical regression techniques. The significant beta coefficients for predicting systematic information processing using the gap in the regression analysis was media distort reality (beta = 0.160, p = 0.003), media provide validity cues for processing the information (beta = 0.163, p = 0.016), confident that media will bring important issues to my attention (beta = 0.291, p≤ 0.001), perceived information gathering capacity (beta = 0.360, p ≤ 0.001) and ever used ROSI (beta = 0.274, p≤0.001). (See Tables 4.19, 4.20, 4.21)

The best fitting model for predicting heuristic information processing using the backward and stepwise regression techniques includes the belief that media distort reality (beta = 0.277, p≤0.001), confident that media will bring important issues to my attention (beta = 0.342, p ≤ 0.001), knowledge needed to deal adequately with the risk (beta = -0.141, p=0.016), and CVD (beta = -0.113, p = 0.047).(See Table 4.10) The proportion of

variation explained by the predictors in predicting heuristic information processing was solid ($R^2 = 0.201$). The significant beta coefficients for predicting heuristic information processing using the hierarchical regression analysis technique were media distort reality (beta = 0.264, $p \leq 0.001$), confident that media will bring important issues to my attention (beta = 0.243, p = 0.007), and knowledge needed to deal adequately with the risk (beta = -0.174 and p=0.006). (See Table 4.18) The hypotheses testing used the gap in the regression analysis versus current knowledge and knowledge needed separately as is used the in backward, stepwise, and hierarchical regression techniques. The significant beta coefficients for predicting heuristic information processing using the gap in the regression analysis were the gap (difference) between current knowledge and knowledge needed (beta = -0.176, p = 0.008), media distort reality (beta =0.259, $p \leq 0.001$), confident that media will bring important issues to my attention (beta = 0.247, p = 0.001), and perceived information gathering capacity (beta = 0.229, $p \leq 0.001$). (See Tables 4.19, 4.20, 4.21)

All three variables current knowledge, knowledge needed, and the difference between current knowledge and knowledge needed were a significant predictor for information seeking. The most important of these three knowledge variables in predicting information seeking is knowledge needed to deal adequately with the risk. Consistent with the model, respondents who sensed a greater amount of knowledge needed to deal with the risk was associated with seeking and processing the information more actively. Current knowledge and knowledge needed to deal adequately with the risk are almost equally relevant in predicting systematic information processing.

Perceived information gathering capacity is a significant predictor of both systematic and heuristic processing but it is much more relevant to the prediction of systematic information processing. Contrary to the RISP model, perceived information gathering capacity was not a significant predictor of information seeking. Respondents who had ever used rosiglitazone (Avandia) also were associated with more effortful and active seeking and processing of the information. This is because respondents who have ever used rosiglitazone (Avandia) have high involvement in the risk situation since they have directly ingested the drug that may be associated with a new adverse drug reaction.

The only channel belief factor that was significant in predicting information seeking was media distort reality, whereas all of the channel belief factors were significant in predicting systematic information processing. Channel beliefs have much more of an impact on information processing than on information seeking. Since, channel beliefs have been inconsistent predictors of seeking and processing risk information, we improved the measurement of channel beliefs by adding a new factor which is confident that media will bring important issues to my attention. The new factor along with the original channel beliefs proved to be significant in predictors of information processing.

Sometimes, people stop taking their medication when they hear about a new adverse event regarding a medication. If patients stop taking their medication without consulting a doctor to help them weigh risks and benefits, bad outcomes can occur. Effective risk communication should produce an informed patient who can adequately weigh risks and benefits. Fifty eight percent of respondents in this study reported most often getting health related information from a doctor. Twenty-one percent of

respondents most often get health related information from the internet. Only 8% of respondents in our study, report getting health related information from a pharmacist. Our study revealed that the most important factor to influence information seeking is knowledge needed to deal adequately with the risk. FDA may help people by broadcasting news alerts about new adverse events that are identified to motivate information seeking and systematic processing. People who sensed a greater amount of knowledge needed to deal with the risk will seek for information more actively, for example, from a doctor. FDA may help patients and providers by providing information to doctors about risk and benefits. Likewise, FDA may train doctors on how to deliver the information to patients in a way that can improve the trust relationship between the physician and the patient, thereby enhancing patient care. FDA may also help by providing guidance to industry on how to deliver product information to patients and providers during a risk situation. Communicating risk when a new adverse drug risk is identified may be improved by investing resources in addressing the knowledge needed by people because people will respond with more effortful seeking when they need more knowledge to deal with a risk. Ideally, people will actively seek information from the FDA website, their doctor or pharmacist.

Channel beliefs and perceived information gathering capacity have much more of an impact on systematic information processing than on information seeking. People may believe that FDA website, their doctor, or pharmacist will be the best resource for information during a risk situation but if people don't know how to find the information through these channels they may default to a more accessible channel, like the media. An educational campaign, through TV news, can provide information to people regarding

channels which do not distort reality but provides validity cues for processing the information, and provides all the information that people need to know during a drug risk situation. The educational campaign can help people identify where to seek information. A far reaching low literacy educational campaign focused on educating people about where to find drug safety information would be useful to enhance people's perceived ability to gather new knowledge about a risk. The educational campaign should, most importantly, equip people with the perceived ability to perform the processing steps necessary for the desired outcome. Our study found that 71% of people with diabetes watch TV news daily. TV news would provide the best way to educate people about channels of risk information to influence beliefs that people have about said channels and people's perceived information gathering capacity from said channels.

From a theoretical perspective, this research outlines a potential extension of the RISP model in regards to drug risks or new adverse drug reactions that are identified after a drug has been prescribed to millions of people. From a practical perspective, it provides guidance on how to better communicate with patients about said drug risks.

Once a drug is widely prescribed and under diverse conditions, for example, concurrent use with other drugs, new adverse drug reactions, other than those in the approved drug labeling, may be identified. FDAs current thinking on communication to the public of drug safety information can be found in the March 2012 draft guidance on the topic. The primary post marketing tool used to communicate drug safety information to health professionals and patients is the *Drug Safety Communication* (DSC) posted on the FDA Web site (http://www.fda.gov/Drugs/DrugSafety/ucm199082.htm)

FDA intends to communicate "any drug safety information that has the potential to alter the benefit-risk analysis for a drug in such a way as to affect decisions about prescribing or taking the drug", even if it has not been fully analyzed or confirmed. The draft guidance states " FDA recognizes the potential public health implications of providing emerging drug safety information, and we are particularly concerned about possible unintended consequences, such as inappropriate modification or discontinuation of useful treatment. We attempt to anticipate and address these possible consequences through our risk communications by (1) describing the nature of a safety concern and what is known about its relationship to a particular drug and (2) making recommendations for the healthcare professionals and patients about how to monitor for and manage the concern."
(http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM295217.pdf)

FDA explains in the draft guidance that "At times, decisions to communicate about drug safety issues are affected by information the public has received from sources other than FDA, such as the mainstream media. In these cases, the safety of a particular drug or drug class may be publicly questioned based on information provided by these other sources that may be incorrect, incomplete, or misleading. In such cases, FDA may issue a statement or engage in other methods of communication to clarify or correct information and respond to public interest."
(http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM295217.pdf)

FDA also explains "FDA strives to keep all communications clear and understandable. We also consider elements of human behavior in our communication. We realize, for instance, that risk information provided without context may alarm patients, causing them to discontinue needed medication. With all drug safety communications, FDA now makes a concerted effort to communicate the benefits of a drug along with its risk. Whenever possible and appropriate, when we communicate drug safety information, we include specific advice to patients who use the drug on its safe and effective use to facilitate discussions with their health care practitioners." (http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM295217.pdf)

The draft guidance explains how the FDA develops and disseminates risk information about drugs. Applying a theoretical framework such as Risk Information Seeking and Processing model that integrates behavioral determinants would be helpful in developing effective risk communications strategies. Driffin, Neuwirth, Dunwoody, and Giese (2004) explain that "to develop a truly useful understanding of the role and effects of risk communication, researchers and practitioners must pay more attention to the communication and information-evaluative behaviors of audiences of risk messages." In order words, researchers should first understand determinants of health behavior so that the risk communication is more coordinated with people's beliefs and attitudes and consequently, influence the proper behavior in response to the risk.

This dissertation explored the relationship between risk information seeking and processing and the discovery of a new drug risk through the media after a drug had been widely prescribed to millions of patients. Effective communication must be based on an

understanding of how patients seek and process drug risk information. An understanding of information seeking involves identifying individuals beliefs, for example, the perceptions people have about risk information channels and perceived ability to get information.

Griffin and colleagues specify two dimensions for the variable "channel beliefs". One involves "media beliefs" that focus on coverage; specifically, do media tend to exaggerate or sensationalize the news? Is media coverage biased? Do the media tend to run stories that appear unconnected? The other dimension is "validity cues" that measure peoples' use of media, as well as general attitudes towards the information presented- namely, do people tend to believe information that appears in more than one place? Do they prefer stories with statistics? Does media coverage tend to fit into "meaningful patterns" in the end, even though short-term coverage may appear unconnected? We attempted to add a new dimension to "channel beliefs", namely, confidence in media. For example, "I am confident that articles in newspapers will bring important issues to my attention." Perceptions people have about information channels can facilitate the use of routine information sources or motivate people to consult non-routine sources.

General measurements for perceived information gathering capacity involved asking respondents to rate on a likert scale the extent of their agreement with questions like: "If I wanted to, I could get all the information I need about this topic." When new adverse drug reactions, other than those in the approved drug labeling, are identified, patients need to feel confident in being able to find sufficient information to deal with the risk and make informed decisions. Patients need to know where to go for information and consider information to be readily available and accessible.

One fundamental component of risk communications is often a dissemination of information through avenues and in ways that the general population finds accessible (Atman et al., 1994). As technology improves so will diagnostic accuracies. Some interactive technologies may be able to identify and analyze distinctive risks while appropriating this information through a variety of media platforms (Bostrom, 2003). Dutta-Bergman (2004), suggested that broadcast outlets with an entertainment orientation are better suited for prevention campaigns. Such channels provide suitable sites for entertainment-education. On the other hand, print media, interpersonal networks, and the Internet are better suited for communicating about health issues to the health-active consumer segment. Strategic efforts are needed to improve the quality of medical news reporting by the media, and to provide guidance for patients to understand their disease and interpret such information better (Chen & Siu, 2001)

The current study examined how people with diabetes look for and think about drug risk information after passively encountering information in newspaper, magazines, or TV news. The long term goal of this research is to improve risk communication in this area. Additionally, this research could inform designing media kits and planning for channels of communications by FDA. This research was focused on people with diabetes and rosiglitazone cardiovascular risk, but it is likely applicable to other diseases that have drugs that come up with new serious risks after the drug has been marketed to the public. This could be a likely future research area.

Conclusion

Of the three variables current knowledge, knowledge needed to deal adequately with the risk and the gap or difference between current knowledge and knowledge needed

to deal adequately with the risk, the most important of these variables in predicting information seeking is knowledge needed to deal adequately with the risk. All three variables (current knowledge, knowledge needed to deal adequately with the risk and the gap or difference between current knowledge and knowledge needed to deal adequately with the risk) are equally relevant in predicting systematic information processing. Perceived information gathering capacity is a significant predictor of both systematic and heuristic processing but it is much more relevant to the prediction of systematic information processing. Contrary to the RISP model, perceived information gathering capacity was not a significant predictor of information seeking. Channel beliefs have much more of an impact on information processing than on information seeking. Since, channel beliefs have been inconsistent predictors of seeking and processing risk information, we improved the measurement of channel beliefs by adding a new factor which is confident that media will bring important issues to my attention. The new factor along with the original channel beliefs proved to be significant predictors of information processing.

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APPENDICES

Pilot Diabetes Survey

This study is designed to learn how people with diabetes look for and think about medication risk information discovered after the medication is already on the market. This study will use the drug class containing Rosiglitazone (Avandia) and PIOglitazone (Actos). The names of the medications are hard to spell and even harder to pronounce so in the survey we will refer to them as ROSI and PIO, respectively. It will take about 35 to 45 minutes to finish this survey. Answer the questions as best you can based on what you know now. What you say to us will be kept confidential. If you have any questions about this study, feel free to contact the researchers at:

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Cardiovascular Disease includes high blood pressure, high cholesterol, heart disease, heart attacks, or stroke. If you have had ONE or MORE of these, please answer yes to question.

1. Has a doctor told you that you have cardiovascular (heart) disease?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

Diabetes is a disease with high blood sugar levels. Another name for blood sugar is blood glucose. Treatment is needed to reach normal blood sugar levels. The treatments could be a diet and exercise plan, oral medications, or insulin.

2. Has a doctor told you that you have diabetes?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

3. How long ago did a doctor first tell you that you have diabetes?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 5 years (2)
- ❍ 5 years or more, but less than 10 years (3)
- ❍ 10 years or more (4)
- ❍ Unsure (5)

4. What type of diabetes do you have?
- ❍ Type 1 (1)
- ❍ Type 2 (2)
- ❍ Unsure (3)

5. Do you inject insulin?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

6. Do you currently or have you EVER taken medication by mouth to lower your blood sugar?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

PIO (pioglitazone/Actos) is a medication you take by mouth to lower the blood sugar in patients with type 2 diabetes (adult onset diabetes). The next questions are about medications with PIO in it.

7. Have you EVER (now or in the past) taken any ONE or MORE of the following medications with PIO in it? Please check all that apply.

- ❑ Actos (PIO) (1)
- ❑ Actoplusmet (PIO and metformin in one pill) (2)
- ❑ Actoplusmet XR (extended release PIO and metformin in one pill) (3)
- ❑ Duetact (PIO and glimepiride (Amaryl) in one pill) (4)
- ❑ Unsure (5)
- ❑ I have not taken a medication with PIO in it. (6)

8. When did you FIRST take a medication with PIO in it?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)
- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

9. Did you stop taking ANY of the medication with PIO in it?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

10. Did you stop it on your own or did you stop because a doctor told you

- ❍ I stopped taking it on my own. (1)
- ❍ A doctor told me to stop taking the medicine with PIO in it. (2)
- ❍ Other (3)
- ❍ Unsure (4)

11. When did you stop taking a medication with PIO in it?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)

- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

ROSI (rosiglitazone/Avandia) is a medication you take by mouth to lower the blood sugar in patients with type 2 diabetes (adult onset diabetes). The next questions are about medications with ROSI in it.

12. Have you EVER (now or in the past) taken ONE or MORE of the following medications with ROSI in it? Check all that apply?

- ❑ Avandia(ROSI) (1)
- ❑ Avandamet (ROSI and metformin in one pill) (2)
- ❑ Avandaryl (ROSI and glimepiride (Amaryl) in one pill) (3)
- ❑ Unsure (4)
- ❑ I have not taken a medication with ROSI in it. (5)

13. When did you FIRST take a medication with ROSI in it?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)
- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

14. Did you stop taking ANY of the medication with ROSI in it?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

15. Did you stop it on your own or did you stop because a doctor told you?
- ❍ I stopped taking it on my own. (1)
- ❍ A doctor told me to stop taking the medicine with PIO in it. (2)
- ❍ Other (3)
- ❍ Unsure (4)

16. When did you stop taking a medication with ROSI in it?
- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)
- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

17. Before now, have you heard that taking ROSI (Avandia) causes an increase risk of heart attacks or death?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

18. When and where did you first hear about this risk?

19. If you have heard about this risk more than one time, please list when and where for each time you can remember.

20. Now, we would like you to tell us HOW MUCH you know about the risk of ROSI (Avandia) causing an increase risk of heart attacks or death. Please choose a number between 0 and 100, where 0 means that you know nothing about this risk and 100 means you know everything you could possibly know about this risk. Make your best guess.
_____ Current Knowledge (1)

21.Based on your own needs, please tell me how much you think you should know about the risk of ROSI (Avandia) causing an increase risk of heart attacks or death to sort out the issue. Of course, you might feel you need the same, more, or possibly even less information. How much

information would be good enough for you, 0 means nothing and 100 means everything? Make your best guess.

_____ Knowledge Needed (1)

22. Which of the following do you use most often to get health related information?

- ❍ Books (on-line or paper version) (1)
- ❍ Magazines (on-line or paper version) (2)
- ❍ Friends and Family members (3)
- ❍ Newspaper (on-line or paper version) (4)
- ❍ TV news (on-line or television access) (5)
- ❍ Internet but Not on-line news from newspapers, magazines, or TV (6)
- ❍ Seminar and/or Classes (7)
- ❍ Other (8)

23. Please tell me how frequently you read newspaper articles and magazine articles or watch TV news.

	Once a Month (1)	2-3 Times a Month (2)	Once a Week (3)	2-3 Times a Week (4)	Daily (5)
I read Newspapers..... (1)	❍	❍	❍	❍	❍
I watch TV news..... (2)	❍	❍	❍	❍	❍
I read Magazines..... (3)	❍	❍	❍	❍	❍

The following are statements that people have made about information from newspaper articles, TV news and popular magazine articles. Even if you don't use one of these sources very often, please let us know what you think about them. Show how much you agree with each of the following statements by indicating a number between "1" and "5" where "1" means that you Strongly Disagree with the statement and "5" means you Strongly Agree with the statement.
24. The following statements are about NEWSPAPERS ONLY.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Newspapers give information in a way that is shocking or exciting on purpose (1)	❍	❍	❍	❍	❍
Newspaper reporters clearly show bias when they like or dislike someone or something. (2)	❍	❍	❍	❍	❍
Newspapers have news stories that are just a series of unconnected events that don't add up to much (3)	❍	❍	❍	❍	❍
When the same information appears in more than one newspaper, I'm more likely to believe it. (4)	❍	❍	❍	❍	❍
Stories in newspapers with numbers seem more real or true than those without. (5)	❍	❍	❍	❍	❍
Individual	❍	❍	❍	❍	❍

news items about a topic in newspapers may seem like bits and pieces, but in the long run they form a meaningful pattern. (6)					
If I wanted to, I could easily get all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers. (7)	❍	❍	❍	❍	❍
It is hard for me to get useful information about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers. (8)	❍	❍	❍	❍	❍
I would know where to go to get information about ROSI (Avandia) causing an increase risk of heart attacks or death in newspapers. (9)	❍	❍	❍	❍	❍
It is mostly up to me whether I seek information	❍	❍	❍	❍	❍

about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers. (10)					
If I wanted to seek information about ROSI (Avandia) causing an increase risk of heart attacks or death in the next month from newspapers, I could. (11)	❍	❍	❍	❍	❍
I am confident that articles in newspapers will bring all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (12)	❍	❍	❍	❍	❍
I am confident that articles in newspapers will bring all the information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (13)	❍	❍	❍	❍	❍
I am confident that articles in	❍	❍	❍	❍	❍

newspapers will bring important issues to my attention. (14)					

25. The following statements are about TV NEWS ONLY.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
The TV news gives information in a way that is shocking or exciting on purpose (1)	❍	❍	❍	❍	❍
The TV news reporters clearly show bias when they like or dislike someone or something. (2)	❍	❍	❍	❍	❍
The TV news have news stories that are just a series of unconnected events that don't add up to much (3)	❍	❍	❍	❍	❍
When the same information appears in more than one TV news show, I'm more likely to believe it. (4)	❍	❍	❍	❍	❍
Stories with numbers in the TV news seem more real or true than those without. (5)	❍	❍	❍	❍	❍
Individual news items about a topic, in the TV news, may seem like bits and pieces, but in the long run	❍	❍	❍	❍	❍

they form a meaningful pattern. (6)					
If I wanted to, I could easily get all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death from the TV news. (7)	❍	❍	❍	❍	❍
It is hard for me to get useful information about ROSI (Avandia) causing an increase risk of heart attacks or death from the TV news. (8)	❍	❍	❍	❍	❍
I would know where to go to get information about ROSI (Avandia) causing an increase risk of heart attacks or death on the TV news. (9)	❍	❍	❍	❍	❍
It is mostly up to me whether I seek information about ROSI (Avandia) causing an increase risk of heart attacks or death from the TV news. (10)	❍	❍	❍	❍	❍
If I wanted to seek	❍	❍	❍	❍	❍

information about ROSI (Avandia) causing an increase risk of heart attacks or death in the next month from the TV news, I could. (11)					
I am confident that articles in the TV news will bring all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (12)	❍	❍	❍	❍	❍
I am confident that articles in the TV news will bring all the information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (13)	❍	❍	❍	❍	❍
I am confident that articles in the TV news will bring important issues to my attention. (14)	❍	❍	❍	❍	❍

26. These statements are about MAGAZINE ARTICLES ONLY

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
The magazines give information in a way that is shocking or exciting on purpose. (1)	❍	❍	❍	❍	❍
Magazine reporters clearly show bias when they like or dislike someone or something. (2)	❍	❍	❍	❍	❍
The magazines have news stories that are just a series of unconnected events that dont add up to much. (3)	❍	❍	❍	❍	❍
When the same information appears in more than one magazine, Im more likely to believe it. (4)	❍	❍	❍	❍	❍
Stories with numbers in magazines seem more real or true than those without. (5)	❍	❍	❍	❍	❍
Individual news items about a topic in magazines may seem like bits and pieces, but in the long run they form a	❍	❍	❍	❍	❍

meaningful pattern. (6)					
If I wanted to, I could easily get all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death from the Magazine. (7)	❍	❍	❍	❍	❍
It is hard for me to get useful information about ROSI (Avandia) causing an increase risk of heart attacks or death from the magazines. (8)	❍	❍	❍	❍	❍
I would know where to go to get information about ROSI (Avandia) causing an increase risk of heart attacks or death from the magazine. (9)	❍	❍	❍	❍	❍
It is mostly up to me whether I seek information about ROSI (Avandia) causing an increase risk of heart attacks or death from the magazines. (10)	❍	❍	❍	❍	❍
If I wanted to seek	❍	❍	❍	❍	❍

information about ROSI (Avandia) causing an increase risk of heart attacks or death in the next month from the magazines, I could. (11)					
I am confident that articles from the magazines, will bring all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (12)	❍	❍	❍	❍	❍
I am confident that articles from the magazines will bring all the information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (13)	❍	❍	❍	❍	❍
I am confident that articles from the magazines will bring important issues to my attention. (14)	❍	❍	❍	❍	❍

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
I tune out information about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
I go out of my way to avoid learning more about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
Gathering information about ROSI (Avandia) causing an increase risk of heart attacks or death is a waste of time.	❍	❍	❍	❍	❍
I try to learn more about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
I will go out of my way to get more information about ROSI (Avandia)causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
I am likely to stop and think about information in	❍	❍	❍	❍	❍

newspapers, TV news, or magazines concerning ROSI (Avandia) causing an increase risk of heart attacks or death.					
If I need to act on the matter of ROSI (Avandia) causing an increase risk of heart attacks or death, the more viewpoints I get the better.	❍	❍	❍	❍	❍
I read or listen to most of the information about ROSI (Avandia) causing an increase risk of heart attacks or death, even though I may not agree with its way of thinking or feeling about it.	❍	❍	❍	❍	❍
I know why or how ROSI (Avandia) may cause an increase risk of heart attacks or death after thinking about this topic.	❍	❍	❍	❍	❍
When I read or hear about ROSI (Avandia) causing increase risks of heart attacks or death, I rarely spend much time	❍	❍	❍	❍	❍

thinking about it.					
There is far more information in newspapers, TV news, or magazines on ROSI (Avandia) causing an increase risk of heart attacks or death than I personally need.	❍	❍	❍	❍	❍
I focus only on a few key points when I read or hear about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
The advice of one expert is enough for me if I need to act on ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
	❍	❍	❍	❍	❍

The following statements are about the Avandia-ROSI Medicines Access Program. Please indicate how much you agree with the statement.

27. Please indicate how much you agree with the statement.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
I know about the program that clinicians and patients now must enroll, called the Avandia-ROSI Medicines Access Program, to prescribe and receive ROSI. (1)	❍	❍	❍	❍	❍
I know that Avandia-ROSI will not be available at retail pharmacies after mid-November 2011 and that patients will have to fill their prescriptions by mail order through certified pharmacies. (2)	❍	❍	❍	❍	❍

28. Which of the following did you read or hear about the program that clinicians and patients now must enroll, called the Avandia-ROSI Medicines Access Program, to prescribe and receive ROSI?

- ❍ Books (on-line or paper version) (1)
- ❍ Magazines (on-line or paper version) (2)
- ❍ Friends and Family members (3)
- ❍ Newspaper (on-line or paper version) (4)
- ❍ TV news (on-line or television access) (5)
- ❍ Internet but Not on-line news from newspapers, magazines, or TV (6)
- ❍ Classes (7)
- ❍ Other (8)
- ❍ Not Applicable (9)

29. Have you heard of any other risks related to taking ROSI (Avandia) or PIO (Actos)?

- ❍ Yes (1)
- ❍ No (2)

Please provide your details below:

Gender

- ❍ Male (1)
- ❍ Female (2)

Age

_____ Age (1)

Ethnic Group

- ❍ White (Non-Hispanic) (1)
- ❍ Hispanic (2)
- ❍ African-American (3)
- ❍ Native American-Indian (4)
- ❍ Asian/Oriental (5)
- ❍ Other (6)

What is your highest grade or level of education you have completed? (Mark only one answer)

- ❍ 8th grade or less (1)
- ❍ Some high school (grade 9-12) (2)
- ❍ High school diploma or GED (3)
- ❍ Vocational school (4)
- ❍ Community/Technical College or some college (5)
- ❍ College degree (6)
- ❍ Professional or graduate school experience (7)

What is your estimated annual household income?

- ❍ Less than $15,000 (1)
- ❍ $15,000 to $29,000 (2)
- ❍ $30,000 to $49,000 (3)
- ❍ $50,000 to $74,999 (4)
- ❍ $75,000 or more (5)
- ❍ Prefer not to say (6)

How many books do you have in your home?

- ❍ None (1)
- ❍ 1 to 5 (2)
- ❍ 6 to 10 (3)
- ❍ 11 to 19 (4)
- ❍ 20 or more (5)

How often do you read for fun?

- ❍ Never (1)
- ❍ Several Times a Year (2)
- ❍ Several Times a Month (3)
- ❍ Several Times a Week (4)
- ❍ Daily (5)

Informational and Invitation Letter

March 20, 2011

Dear Member,

You are invited to help with a study on an important health topic: looking for and thinking about newly discovered risk information about drugs that are already on the market. This study is conducted by Dr Sally Huston (706-542-1040) and Chakita Williams (850-217-1525), at the Department of Clinical & Administrative Pharmacy, University of Georgia. The objective of the study is to improve newspaper, magazine, and TV news risk communication about newly discovered post-marketing drug risks.

Your participation will involve completing an on-line questionnaire at the link below. It should only take 20 to 30 minutes to do it. Your involvement is voluntary. You may choose not to participate or stop taking part at anytime without penalty or loss of benefits to which you are otherwise entitled.

The benefits of participating in the survey are that you may find it helpful to think through the issues of looking for and thinking about newly discovered risk information about drugs that are already on the market. There are no foreseeable psychological, social, legal economic or physical risks or discomfort from participating.

By completing the questionnaire, you are agreeing to contribute to this research project. Internet communications are insecure and there is a limit to the confidentiality that can be guaranteed due to the technology itself. However once the materials are received by the researcher, standard confidentiality procedures will be employed. All internet responses will be transmitted in encrypted format and password protected.

If you have any questions about this research project, please feel free to call Chakita Williams at 850-217-1525 or send an e-mail to williach@mail.rx.uga.edu and Dr Sally Huston at 706-542-1040 or send an email to shuston@mail.rx.uga.edu . Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu.

Please click on the link below to continue

Survey Cover Letter

March 20, 2011

Dear Member,

You are invited to help with a study on an important health topic: looking for and thinking about newly discovered risk information about drugs that are already on the market. This study is conducted by Dr Sally Huston (706-542-1040) and Chakita Williams (850-217-1525), at the Department of Clinical & Administrative Pharmacy, University of Georgia. The objective of the study is to improve newspaper, magazine, and TV news risk communication about newly discovered post-marketing drug risks.

Your participation means finishing the on-line questionnaire at the link below. It should only take 20 to 30 minutes to do it. Your involvement is voluntary. You may choose not to participate or stop taking part at anytime without penalty or loss of benefits to which you are otherwise entitled.

The benefits of participating in the survey are that you may find it helpful to think through the issues of looking for and thinking about newly discovered risk information about drugs that are already on the market. There are no foreseeable psychological, social, legal economic or physical risks or discomfort from participating. However, although unlikely, if you have experienced an adverse event related to your medication, mental distress and discomfort may occur.

By completing the questionnaire, you are agreeing to contribute to this research project. There is a limit to the confidentiality that can be guaranteed due to the technology itself. All internet responses will be transmitted in encrypted format and password protected.

Pertinent questions about the research project should be addressed to the researchers. Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu.

Please click on the link below to continue

Diabetes Survey

This study is designed to learn how people with diabetes look for and think about medication risk information discovered after the medication is already on the market. This study will use the drug class containing Rosiglitazone (Avandia) and PIOglitazone (Actos). The names of the medications are hard to spell and even harder to pronounce so in the survey we will refer to them as ROSI and PIO, respectively. It will take about 35 to 45 minutes to finish this survey. Answer the questions as best you can based on what you know now. What you say to us will be kept confidential. If you have any questions about this study, feel free to contact the researchers at:

Chakita Williams Phone: 850-217-1525

E-mail: williach@mail.rx.uga.edu

Dr. Sally Huston Phone: 706-542-1040

Email: shuston@mail.rx.uga.edu

Cardiovascular Disease includes high blood pressure, high cholesterol, heart disease, heart attacks, or stroke. If you have had ONE or MORE of these, please answer yes to question 1.

1.Has a doctor told you that you have cardiovascular (heart) disease?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

Diabetes is a disease with high blood sugar levels. Another name for blood sugar is blood glucose. Treatment is needed to reach normal blood sugar levels. The treatments could be a diet and exercise plan, oral medications, or insulin.

2. Has a doctor told you that you have diabetes?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

3. How long ago did a doctor first tell you that you have diabetes?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 5 years (2)
- ❍ 5 years or more, but less than 10 years (3)
- ❍ 10 years or more (4)
- ❍ Unsure (5)

4. What type of diabetes do you have?
- ❍ Type 1 (1)
- ❍ Type 2 (2)
- ❍ Unsure (3)

5. Do you inject insulin?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

6. Do you currently or have you EVER taken medication by mouth to lower your blood sugar?
- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

PIO (pioglitazone/Actos) is a medication you take by mouth to lower the blood sugar in patients with type 2 diabetes (adult onset diabetes). The next questions are about medications with PIO in it.

7. Have you EVER (now or in the past) taken any ONE or MORE of the following medications with PIO in it? Please check all that apply.

- ❑ Actos (PIO) (1)
- ❑ Actoplusmet (PIO and metformin in one pill) (2)
- ❑ Actoplusmet XR (extended release PIO and metformin in one pill) (3)
- ❑ Duetact (PIO and glimepiride (Amaryl) in one pill) (4)
- ❑ Unsure (5)
- ❑ I have not taken a medication with PIO in it. (6)

8. When did you FIRST take a medication with PIO in it?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)
- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

9. Did you stop taking ANY of the medication with PIO in it?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

10. Did you stop it on your own or did you stop because a doctor told you

- ❍ I stopped taking it on my own. (1)
- ❍ A doctor told me to stop taking the medicine with PIO in it. (2)
- ❍ Other (3)
- ❍ Unsure (4)

11. When did you stop taking a medication with PIO in it?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)

- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

ROSI (rosiglitazone/Avandia) is a medication you take by mouth to lower the blood sugar in patients with type 2 diabetes (adult onset diabetes). The next questions are about medications with ROSI in it.

12. Have you EVER (now or in the past) taken ONE or MORE of the following medications with ROSI in it? Check all that apply?

- ❑ Avandia(ROSI) (1)
- ❑ Avandamet (ROSI and metformin in one pill) (2)
- ❑ Avandaryl (ROSI and glimepiride (Amaryl) in one pill) (3)
- ❑ Unsure (4)
- ❑ I have not taken a medication with ROSI in it. (5)

13. When did you FIRST take a medication with ROSI in it?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)
- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

14. Did you stop taking ANY of the medication with ROSI in it?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

15. Did you stop it on your own or did you stop because a doctor told you?

- ❍ I stopped taking it on my own. (1)
- ❍ A doctor told me to stop taking the medicine with PIO in it. (2)
- ❍ Other (3)
- ❍ Unsure (4)

16. When did you stop taking a medication with ROSI in it?

- ❍ Less than 1 year (1)
- ❍ 1 year or more, but less than 3 years (during this time the Haiti earthquake and Michael Jackson's death occurred) (2)
- ❍ 3 years or more, but less than 5 years (during this time the Virginia Tech school shooting and Heath Andrew Ledger's death occurred) (3)
- ❍ 5 years or more, but less than 7 years (during this time Hurricane Katrina and release of The Da Vinci Code film occurred) (4)
- ❍ 7 years or more, but less than 9 years (during this time the invasion of Iraq that started the Iraq War occurred) (5)
- ❍ 9 years or more, but less than 11 years (during this time is the September 11, 2001 attacks on the World Trade Center occurred) (6)
- ❍ 11 years or more (during this time was the Year 2000 problem (also known as the Y2K problem, the Millennium bug, or simply Y2K)) (7)
- ❍ Unsure (8)

17. Before now, have you heard that taking ROSI (Avandia) causes an increase risk of heart attacks or death?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

18. When and where did you first hear about this risk?

19. If you have heard about this risk more than one time, please list when and where for each time you can remember.

20. Now, we would like you to tell us HOW MUCH you know about the risk of ROSI (Avandia) causing an increase risk of heart attacks or death. Please choose a number between 0 and 100, where 0 means that you know nothing about this risk and 100 means you know everything you could possibly know about this risk. Make your best guess.
_____ Current Knowledge (1)

21.Based on your own needs, please tell me how much you think you should know about the risk of ROSI (Avandia) causing an increase risk of heart attacks or death to sort out the issue. Of course, you might feel you need the same, more, or possibly even less information. How much information would be good enough for you, 0 means nothing and 100 means everything? Make your best guess.

_____ Knowledge Needed (1)

22. Which of the following do you use most often to get health related information?

- ❍ Books (on-line or paper version) (1)
- ❍ Magazines (on-line or paper version) (2)
- ❍ Friends and Family members (3)
- ❍ Newspaper (on-line or paper version) (4)
- ❍ TV news (on-line or television access) (5)
- ❍ Internet but Not on-line news from newspapers, magazines, or TV (6)
- ❍ Seminar and/or Classes (7)
- ❍ Other (8)

23. Please tell me how frequently you read newspaper articles and magazine articles or watch TV news.

	Once a Month (1)	2-3 Times a Month (2)	Once a Week (3)	2-3 Times a Week (4)	Daily (5)
I read Newspapers..... (1)	❍	❍	❍	❍	❍
I watch TV news..... (2)	❍	❍	❍	❍	❍
I read Magazines..... (3)	❍	❍	❍	❍	❍

The following are statements that people have made about information from newspaper articles, TV news and popular magazine articles. Even if you don't use one of these sources very often, please let us know what you think about them. Show how much you agree with each of the following statements by indicating a number between "1" and "5" where "1" means that you Strongly Disagree with the statement and "5" means you Strongly Agree with the statement.

24. The following statements are about NEWSPAPERS ONLY.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
Newspapers give information in a way that is shocking or exciting on purpose (1)	❍	❍	❍	❍	❍
Newspaper reporters clearly show bias when they like or dislike someone or something. (2)	❍	❍	❍	❍	❍
Newspapers have news stories that are just a series of unconnected events that don't add up to much (3)	❍	❍	❍	❍	❍
When the same information appears in more than one newspaper, I'm more likely to believe it. (4)	❍	❍	❍	❍	❍
Stories in newspapers with numbers seem more real or true than those without. (5)	❍	❍	❍	❍	❍
Individual	❍	❍	❍	❍	❍

news items about a topic in newspapers may seem like bits and pieces, but in the long run they form a meaningful pattern. (6)					
If I wanted to, I could easily get all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers. (7)	❍	❍	❍	❍	❍
It is hard for me to get useful information about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers. (8)	❍	❍	❍	❍	❍
I would know where to go to get information about ROSI (Avandia) causing an increase risk of heart attacks or death in newspapers. (9)	❍	❍	❍	❍	❍
It is mostly up to me whether I seek information	❍	❍	❍	❍	❍

about ROSI (Avandia) causing an increase risk of heart attacks or death from newspapers. (10)					
If I wanted to seek information about ROSI (Avandia) causing an increase risk of heart attacks or death in the next month from newspapers, I could. (11)	❍	❍	❍	❍	❍
I am confident that articles in newspapers will bring all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (12)	❍	❍	❍	❍	❍
I am confident that articles in newspapers will bring all the information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (13)	❍	❍	❍	❍	❍
I am confident that articles in	❍	❍	❍	❍	❍

newspapers will bring important issues to my attention. (14)					

25. The following statements are about TV NEWS ONLY.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
The TV news gives information in a way that is shocking or exciting on purpose (1)	❍	❍	❍	❍	❍
The TV news reporters clearly show bias when they like or dislike someone or something. (2)	❍	❍	❍	❍	❍
The TV news have news stories that are just a series of unconnected events that don't add up to much (3)	❍	❍	❍	❍	❍
When the same information appears in more than one TV news show, I'm more likely to believe it. (4)	❍	❍	❍	❍	❍
Stories with numbers in the TV news seem more real or true than those without. (5)	❍	❍	❍	❍	❍
Individual news items about a topic, in the TV news, may seem like bits and pieces, but in the long run	❍	❍	❍	❍	❍

they form a meaningful pattern. (6)					
If I wanted to, I could easily get all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death from the TV news. (7)	❍	❍	❍	❍	❍
It is hard for me to get useful information about ROSI (Avandia) causing an increase risk of heart attacks or death from the TV news. (8)	❍	❍	❍	❍	❍
I would know where to go to get information about ROSI (Avandia) causing an increase risk of heart attacks or death on the TV news. (9)	❍	❍	❍	❍	❍
It is mostly up to me whether I seek information about ROSI (Avandia) causing an increase risk of heart attacks or death from the TV news. (10)	❍	❍	❍	❍	❍
If I wanted to seek	❍	❍	❍	❍	❍

information about ROSI (Avandia) causing an increase risk of heart attacks or death in the next month from the TV news, I could. (11)					
I am confident that articles in the TV news will bring all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (12)	❍	❍	❍	❍	❍
I am confident that articles in the TV news will bring all the information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (13)	❍	❍	❍	❍	❍
I am confident that articles in the TV news will bring important issues to my attention. (14)	❍	❍	❍	❍	❍

26. These statements are about MAGAZINE ARTICLES ONLY

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
The magazines give information in a way that is shocking or exciting on purpose. (1)	❍	❍	❍	❍	❍
Magazine reporters clearly show bias when they like or dislike someone or something. (2)	❍	❍	❍	❍	❍
The magazines have news stories that are just a series of unconnected events that dont add up to much. (3)	❍	❍	❍	❍	❍
When the same information appears in more than one magazine, Im more likely to believe it. (4)	❍	❍	❍	❍	❍
Stories with numbers in magazines seem more real or true than those without. (5)	❍	❍	❍	❍	❍
Individual news items about a topic in magazines may seem like bits and pieces, but in the long run they form a	❍	❍	❍	❍	❍

meaningful pattern. (6)					
If I wanted to, I could easily get all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death from the Magazine. (7)	❍	❍	❍	❍	❍
It is hard for me to get useful information about ROSI (Avandia) causing an increase risk of heart attacks or death from the magazines. (8)	❍	❍	❍	❍	❍
I would know where to go to get information about ROSI (Avandia) causing an increase risk of heart attacks or death from the magazine. (9)	❍	❍	❍	❍	❍
It is mostly up to me whether I seek information about ROSI (Avandia) causing an increase risk of heart attacks or death from the magazines. (10)	❍	❍	❍	❍	❍
If I wanted to seek	❍	❍	❍	❍	❍

information about ROSI (Avandia) causing an increase risk of heart attacks or death in the next month from the magazines, I could. (11)					
I am confident that articles from the magazines, will bring all the information I need about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (12)	❍	❍	❍	❍	❍
I am confident that articles from the magazines will bring all the information I need to know about ROSI (Avandia) causing an increase risk of heart attacks or death to my attention. (13)	❍	❍	❍	❍	❍
I am confident that articles from the magazines will bring important issues to my attention. (14)	❍	❍	❍	❍	❍

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
I tune out information about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
I go out of my way to avoid learning more about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
Gathering information about ROSI (Avandia) causing an increase risk of heart attacks or death is a waste of time.	❍	❍	❍	❍	❍
I try to learn more about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
I will go out of my way to get more information about ROSI (Avandia)causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
I am likely to stop and think about information in	❍	❍	❍	❍	❍

newspapers, TV news, or magazines concerning ROSI (Avandia) causing an increase risk of heart attacks or death.					
If I need to act on the matter of ROSI (Avandia) causing an increase risk of heart attacks or death, the more viewpoints I get the better.	❍	❍	❍	❍	❍
I read or listen to most of the information about ROSI (Avandia) causing an increase risk of heart attacks or death, even though I may not agree with its way of thinking or feeling about it.	❍	❍	❍	❍	❍
I know why or how ROSI (Avandia) may cause an increase risk of heart attacks or death after thinking about this topic.	❍	❍	❍	❍	❍
When I read or hear about ROSI (Avandia) causing increase risks of heart attacks or death, I rarely spend much time thinking about it.	❍	❍	❍	❍	❍

There is far more information in newspapers, TV news, or magazines on ROSI (Avandia) causing an increase risk of heart attacks or death than I personally need.	❍	❍	❍	❍	❍
I focus only on a few key points when I read or hear about ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
The advice of one expert is enough for me if I need to act on ROSI (Avandia) causing an increase risk of heart attacks or death.	❍	❍	❍	❍	❍
	❍	❍	❍	❍	❍

The following statements are about the Avandia-ROSI Medicines Access Program. Please indicate how much you agree with the statement.

27. Please indicate how much you agree with the statement.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
I know about the program that clinicians and patients now must enroll, called the Avandia-ROSI Medicines Access Program, to prescribe and receive ROSI. (1)	❍	❍	❍	❍	❍
I know that Avandia-ROSI will not be available at retail pharmacies after mid-November 2011 and that patients will have to fill their prescriptions by mail order through certified pharmacies. (2)	❍	❍	❍	❍	❍

28. Which of the following did you read or hear about the program that clinicians and patients now must enroll, called the Avandia-ROSI Medicines Access Program, to prescribe and receive ROSI?

- ❍ Books (on-line or paper version) (1)
- ❍ Magazines (on-line or paper version) (2)
- ❍ Friends and Family members (3)
- ❍ Newspaper (on-line or paper version) (4)
- ❍ TV news (on-line or television access) (5)
- ❍ Internet but Not on-line news from newspapers, magazines, or TV (6)
- ❍ Classes (7)
- ❍ Other (8)
- ❍ Not Applicable (9)

29. Have you heard of any other risks related to taking ROSI (Avandia) or PIO (Actos)?

- ❍ Yes (1)
- ❍ No (2)

Please provide your details below:

Gender

- ❍ Male (1)
- ❍ Female (2)

Age

_____ Age (1)

Ethnic Group

- ❍ White (Non-Hispanic) (1)
- ❍ Hispanic (2)
- ❍ African-American (3)
- ❍ Native American-Indian (4)
- ❍ Asian/Oriental (5)
- ❍ Other (6)

What is your highest grade or level of education you have completed? (Mark only one answer)

- ❍ 8th grade or less (1)
- ❍ Some high school (grade 9-12) (2)
- ❍ High school diploma or GED (3)
- ❍ Vocational school (4)
- ❍ Community/Technical College or some college (5)
- ❍ College degree (6)
- ❍ Professional or graduate school experience (7)

What is your estimated annual household income?

- ❍ Less than $15,000 (1)
- ❍ $15,000 to $29,000 (2)
- ❍ $30,000 to $49,000 (3)
- ❍ $50,000 to $74,999 (4)
- ❍ $75,000 or more (5)
- ❍ Prefer not to say (6)

How many books do you have in your home?

- ❍ None (1)
- ❍ 1 to 5 (2)
- ❍ 6 to 10 (3)
- ❍ 11 to 19 (4)
- ❍ 20 or more (5)

How often do you read for fun?

- ❍ Never (1)
- ❍ Several Times a Year (2)
- ❍ Several Times a Month (3)
- ❍ Several Times a Week (4)
- ❍ Daily (5)