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Cancer Literacy and Social Determinants of Health: An Epidemiological Analysis of Trust, Digital Engagement, and Healthcare Utilization in Cancer Information Seeking

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Walden University

College of Health Sciences and Public Policy

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Kimberly Hazel

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Walden University

2026

Abstract

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Trust, Digital Engagement, and Healthcare Utilization in Cancer Information Seeking

by

Kimberly Hazel

MPH, Indiana University, 2022

BS, Butler University, 2018

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The rise of online health information has increased access to cancer resources but also amplified misinformation, creating trust gaps that threaten prevention, treatment, and health equity. This study examined how trust in cancer information sources, online information-seeking, and healthcare perceptions relate among U.S. adults. Guided by the health information seeking behavior, the socioecological model, and the structural influence model of health communication, data from the 2022 Health Information National Trends Survey ($N = 6,197$) were analyzed with logistic regression, mediation, and moderation modeling, controlling for demographics. Trust in government agencies predicted greater cancer information seeking (odds ratio [OR] = 1.94, $p < .001$) than trust in physicians ($OR = 1.21$, $p = .07$), suggesting trust in public institutions plays a stronger role than trust in individual clinicians in motivating people to seek cancer information. Digital confidence mediated the link between frequent internet use and lower frustration ($\beta = 0.18$, $p < .001$), helping internet users feel less overwhelmed. Trust in government sources moderated the positive association between healthcare use and perceived care quality ($\beta = 0.22$, $p = .002$), while conflicting guidance reduced trust in scientists ($\beta = -0.16$, $p < .01$). Institutional trust and digital confidence jointly shape equitable engagement with health information. Implications for social change include promoting digital health literacy, improving institutional transparency, and empowering underserved communities to make informed cancer decisions that improve prevention, access, and population health.

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Chapter 1: Introduction to the Study

The proliferation of online health information sources has created a complex landscape for individuals seeking cancer-related information, which is compounded by the rapid dissemination of accurate and misleading information (Johnson et al., 2022; Wong & Cheung, 2019). This complex environment has led to trust gaps involving cancer information, impacting health behaviors, decision-making processes, and overall trust in healthcare systems (Sessa et al., 2022). This study involved addressing the intricate interplay between trust in cancer information sources, online health information-seeking behaviors, and healthcare perceptions in the digital era, focusing on how these factors vary for different demographic groups and affect overall cancer care and prevention strategies.

While previous research has examined trust in health information sources and online health information-seeking behaviors separately, specific relationships between trust in various cancer information sources and cancer information-seeking behavior, mainly when accounting for sociodemographic factors, remain understudied. Gaps also exist involving connections between the frequency of Internet use for health information and frustration when seeking cancer information, considering users' confidence in finding helpful online resources. Furthermore, relationships between trust in government health agencies and perceived quality of healthcare, frequency of healthcare visits, and impacts of perceived conflicting health recommendations on trust in scientific cancer information when factoring in perceptions of changing health recommendations over time also require further investigation.

Potential positive social change implications are significant. By identifying factors that affect trust and information seeking, I aim to identify disparities involving access to reliable cancer information among different populations. This focus on diversity is essential for developing targeted communication strategies that can enhance trust and improve health outcomes for various demographic groups. This research provides practical recommendations for healthcare providers and policymakers on effectively combating misinformation and fostering trustworthy digital health environments. Ultimately, I seek to contribute to positive social change by promoting informed decision-making and enhancing the quality of cancer care through improved trust in health information sources.

This chapter includes background information about the topic, problem statement, purpose of the study, research questions and hypotheses, theoretical framework, nature of the study, assumptions, scope and delimitations, limitations, significance of the study, and a summary.

Background

The social problem that prompted this research is the growing concern about trust gaps involving cancer information, particularly in the digital age. Proliferation of online health information sources has created a complex landscape for individuals seeking cancer-related information, and 87.44% of internet users search for health information online (Wong & Cheung, 2019). This situation is further complicated by the rapid dissemination of accurate and misleading information; 32.5% of popular social media articles on cancer contain misinformation (Johnson et al., 2022).

The COVID-19 pandemic has exacerbated these issues, leading to significant changes in terms of trust in cancer information from various sources, particularly among certain demographic groups. This complex information environment potentially impacts health behaviors, decision-making processes, and trust in healthcare systems. The challenge is further compounded by age-related differences and the multidimensional nature of trust formation in digital health services. Moreover, the prevalence of cancer misinformation on social media platforms underscores the urgent need to understand and address these trust gaps. This situation has far-reaching implications for public health outcomes, as exposure to such misinformation can negatively influence health-related attitudes and behaviors.

Problem Statement

This study involved addressing the complex interplay between trust in cancer information sources, online health information seeking behaviors, and healthcare perceptions in the post-COVID-19 digital era, with a focus on how these factors vary for different demographic groups and impact overall cancer care and prevention strategies.

Trust in cancer information sources has become increasingly fragmented and variable, especially in the wake of the COVID-19 pandemic. There are notable declines in trust toward traditional sources such as physicians and government health agencies among non-Hispanic Black adults and rural populations (Baeker Bispo et al., 2023; Lee et al., 2025; Stimpson et al., 2024). While trust in doctors in terms of cancer information remains high overall, trust in government health agencies has declined significantly among some groups, potentially undermining participation in preventive care and

adherence to recommended treatments (Baeker Bispo et al., 2023). Simultaneously, the rise of online and social media platforms as primary sources of cancer information has led to new challenges related to misinformation, digital literacy, and equitable access, further complicating the information landscape for patients and the public (Freeman et al., 2023; Lazarou et al., 2024; Lee et al., 2025; Stimpson et al., 2024).

The significance of this problem is underscored by the impact that trust and information-seeking behaviors have on cancer outcomes, health disparities, and the effectiveness of public health interventions. Trust gaps can exacerbate existing inequities, particularly for minoritized and rural populations who may rely more heavily on potentially unreliable sources (Lazarou et al., 2024; Stimpson et al., 2024). Given the centrality of trust to effective health communication and patient decision-making, addressing these gaps is critical for improving cancer prevention, early detection, and quality of care.

Perceptions of misinformation on social media are strongly associated with reduced trust in both traditional (e.g., government agencies, scientists) and nontraditional (e.g., family, religious organizations) sources of cancer information (Stimpson et al., 2024). Latent class analyses among cancer patients further reveal that online health information-seeking behaviors are highly heterogeneous and influenced by demographic, psychosocial, and clinical factors, with social media now rivaling official websites as primary sources of information for younger patients (Chen et al., 2025a). However, increased reliance on digital platforms can expose patients to higher levels of

misinformation, potentially undermining informed decision-making and trust in evidence-based guidance (Chen et al., 2025b; Freeman et al., 2023).

Moreover, it is important to incorporate user preferences and digital literacy considerations into the design of digital health tools to ensure their effectiveness and equitable adoption (Lazarou et al., 2024). This body of research collectively demonstrates that while the digital era offers unprecedented opportunities for cancer education and engagement, it also introduces new risks and disparities that must be systematically addressed.

While prior research has examined trust in health information sources and online health information-seeking behaviors separately, a critical gap remains in terms of understanding sociodemographic differences and perceptions of misinformation. Few studies have comprehensively explored how trust in specific cancer information sources relates to patterns of online health information seeking and subsequent healthcare perceptions for diverse demographic groups. Furthermore, the mediating and moderating roles of digital literacy, frequency of internet use, and perceived information quality in terms of shaping these relationships are not well understood.

I addressed this gap by using recent nationally representative data and contemporary theoretical frameworks to examine nuanced trust, information-seeking behaviors, and healthcare perceptions in the digital age. By focusing on demographic variations and the impact of misinformation, I aimed to inform targeted interventions that can enhance trust, reduce disparities, and promote more effective cancer communication and care.

Purpose of the Study

I examined complex relationships between trust in cancer information sources, online health information-seeking behaviors, and healthcare perceptions in the digital era. Specifically, I sought to describe and test how trust in different cancer information sources, including doctors, government health agencies, and scientists (independent variables), was associated with cancer information-seeking behaviors (dependent variable) while controlling for sociodemographic covariates such as age, gender, race/ethnicity, education, and income. Additionally, I examined whether the frequency of internet use for health information (independent variable) relates to perceived frustration in terms of seeking cancer information (dependent variable), and whether this relationship is mediated by confidence in finding helpful online health resources. I also assessed the association between trust in cancer information from government health agencies (independent variable) and perceived quality of healthcare received (dependent variable), considering the moderating effect of frequency of healthcare visits. Furthermore, I evaluated the extent to which perceptions of conflicting health recommendations (independent variable) were associated with trust in cancer information from scientists (dependent variable), and whether this relationship was moderated by perceptions that health recommendations change over time.

Data were drawn from the 2022 Health Information National Trends Survey (HINTS 6), a nationally representative sample of U.S. adults, to provide robust and generalizable insights regarding how trust, digital engagement, and sociodemographic factors shape cancer information-seeking and healthcare perceptions. By clarifying these

relationships, I aimed to inform targeted interventions and communication strategies that can enhance trust, reduce disparities, and improve cancer care outcomes for diverse demographic groups.

Research Questions and Hypotheses

RQ1: Is there an association between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, gender, race/ethnicity, education, and income?

H₀1: There is no association between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, education, and income.

H_a1) There is an association between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, education, and income.

RQ2: Does confidence in online health resource navigation mediate the relationship between frequent health-related Internet use and reduced cancer information frustration?

H₀2: Confidence in online health resource navigation does not mediate the relationship between frequent health-related Internet use and reduced cancer information frustration.

H_a2: Confidence in online health resource navigation does mediate the relationship between frequent health-related Internet use and reduced cancer information frustration.

RQ3: Does the relationship between trust in government health agencies and perceived care quality vary by frequency of healthcare visits in this population?

H₀4: The relationship between trust in government health agencies and perceived care quality does not vary by frequency of healthcare visits in this population.

H_a4: The relationship between trust in government health agencies and perceived care quality does vary by frequency of healthcare visits in this population.

RQ4: Do perceived changes in health recommendations over time alter the association between exposure to conflicting recommendations and trust in scientists?

H₀4: Perceived changes in health recommendations over time do not alter the association between exposure to conflicting recommendations and trust in scientists.

H_a4: Perceived changes in health recommendations over time do alter the association between exposure to conflicting recommendations and trust in scientists.

Theoretical and/or Conceptual Framework for the Study

I used the socioecological model (SEM), initially developed by Urie Bronfenbrenner, which involves conceptualizing health behaviors and outcomes as the result of dynamic interactions between individual, interpersonal, organizational, community, and policy levels of influence (Bronfenbrenner, 1977). The SEM posits that individual health actions are shaped by personal factors such as knowledge and attitudes, as well as relationships, organizational structures, community contexts, and broader policy environments. These factors are interdependent, and effective interventions must address multiple factors to promote meaningful behavior change. In the context of this study, the SEM was a framework for situating cancer literacy and health information-

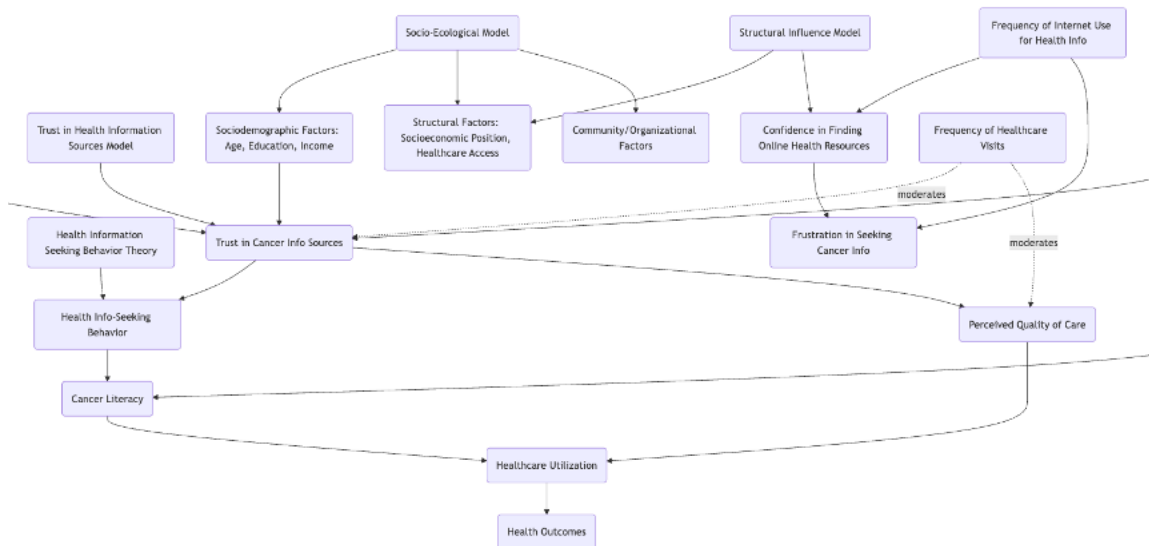
seeking behaviors within broader social and environmental contexts, recognizing that individual actions are embedded within and influenced by larger societal structures.

To complement the SEM, the health information-seeking behavior (HISB) theory was applied to address how populations access and evaluate health information from various sources. The HISB theory, which was developed by Lambert and Loiselle, is used to conceptualize how populations access and evaluate health information from varied sources within public health contexts. This theory emphasizes that health information seeking is influenced by social determinants such as educational attainment, healthcare access, and community-level factors that shape health literacy competencies. Lambert and Loiselle (2007) stated that population-level disparities in terms of health literacy significantly impact how different demographic groups engage with cancer-related information, which is particularly relevant to understanding epidemiological patterns involving cancer prevention behaviors and early intervention.

The structural influence model of health communication further enriched the theoretical framework by elucidating how structural factors influence health information acquisition and processing capabilities. The structural influence model of health communication further strengthens the epidemiological foundation of this research by explaining how population-level structural factors, including socioeconomic position and healthcare access, influence health information acquisition and processing capabilities. This model positions health literacy as a crucial epidemiological determinant that mediates the relationship between health communication exposure and subsequent preventive behaviors (Viswanath & Kreuter, 2007).

These theoretical frameworks collectively provided a comprehensive epidemiological lens for examining the complex relationships between trust, health literacy, and healthcare utilization patterns across diverse population segments. By applying these epidemiological perspectives, the study identified potential intervention points for addressing disparities in cancer information access and utilization, ultimately contributing to more equitable cancer prevention and control strategies at the population level.

The social determinants of health literacy framework complement this foundation by positioning trust as a critical mediator between population characteristics and health outcomes. Hesse et al.'s (2005) trust in health information sources model examines population-level variations in information source credibility assessments using epidemiological methods. Their HINTS data analysis revealed significant sociodemographic gradients in trust patterns, with physicians maintaining the highest credibility (62.4%) among all information sources (Hesse et al., 2005). In comparison, population subgroups demonstrated varying levels of trust in governmental health agencies (23.9%) versus scientific authorities (35.3%) (Hesse et al., 2005). These epidemiological patterns of differential trust across population segments create varying vulnerability to misinformation, potentially influencing cancer screening behaviors and treatment adherence at the population level.

Figure 1*Theoretical Model Diagram*

This integrated approach provided a nuanced lens through which the complex relationships between trust, health literacy, digital engagement, and healthcare utilization patterns across diverse population segments were explored. It enabled us to consider how social determinants of health interact with individual factors to shape cancer-related health behaviors and outcomes. By employing this comprehensive theoretical framework, the research was designed to contribute to a more holistic understanding of cancer literacy and information-seeking behaviors, ultimately informing more effective and equitable cancer prevention and control strategies at the population level.

Nature of the Study

This study was a secondary data analysis utilizing data from the Health Information National Trends Survey (HINTS) 6, a nationally representative survey

conducted by the National Cancer Institute. The original HINTS study employed a cross-sectional design, collecting data from a large sample of non-institutionalized U.S. adults at a single point in time to assess health communication, cancer information-seeking behaviors, and related health outcomes (Moser et al., 2013; National Cancer Institute, n.d.-a). The cross-sectional design of HINTS allows for the estimation of prevalence and the examination of associations between exposures and outcomes within the sampled population. However, it does not permit causal inference due to the simultaneous measurement of variables.

In this dissertation, the research design was a secondary analysis of the HINTS dataset rather than a new cross-sectional survey. The rationale for selecting secondary data analysis is that it provides an efficient and cost-effective means to investigate new research questions using an existing, high-quality, and nationally representative dataset. This approach leveraged the strengths of the HINTS data—such as its rigorous sampling methodology and broad coverage—while avoiding the time and resource demands of primary data collection (Moser et al., 2013).

The HINTS 6 dataset was collected using a stratified, probability-based sampling method to ensure the national representativeness of U.S. adults (Moser et al., 2013; Office of Disease Prevention and Health Promotion, 2014). Data were collected via self-administered questionnaires, which were either delivered by mail or completed online. Only de-identified data were used in this secondary analysis, as per the ethical guidelines.

The methodology included descriptive statistics to summarize sample characteristics and prevalence estimates. Multiple logistic regression models were used to

examine associations between trust in information sources and cancer information-seeking behaviors, adjusting for relevant sociodemographic covariates. Mediation and moderation analyses were also conducted to explore mechanisms and effect modification in the relationships among key variables. All analyses incorporated survey weights to account for the complex sampling design of HINTS and ensure generalizability to the U.S. adult population.

Statistical analyses aligned with contemporary epidemiological methods to address the hypothesized relationships between exposure and outcome variables. For RQ1, multiple logistic regression models tested the null hypothesis that no association exists between trust in cancer information sources and cancer information-seeking behavior after adjusting for key sociodemographic confounders, including age, education level, income, and healthcare access. For RQ2, a formal causal mediation analysis using the Baron and Kenny approach, supplemented with bootstrapping for confidence intervals, examined whether confidence in finding helpful health resources online mediates the relationship between internet use frequency and perceived frustration in seeking cancer information. This approach explicitly distinguishes mediation (an intervening mechanism explaining how an exposure affects an outcome) from moderation analyses used in subsequent research questions.

For RQ3 and RQ4, moderation analyses were conducted through hierarchical multiple regression incorporating interaction terms. These analyses tested effect modification, a key epidemiological concept examining how the relationship between exposure (trust in government health agencies) and outcome (perceived quality of

healthcare) varies across strata of the moderating variable (frequency of healthcare visits). Similarly, RQ4 examined how perceptions about evolving health guidance modify the relationship between conflicting health recommendations and trust in scientists. All analyses incorporated appropriate survey weights to adjust for complex sampling design and non-response bias, following epidemiological standards for population-based survey research.

The study's methodological approach centrally positions health literacy rather than digital engagement as the primary construct of interest, recognizing health literacy as a critical social determinant with significant public health implications. While digital platforms represent important vectors for health information, this epidemiological investigation focuses on how differential health literacy levels moderate and mediate cancer information interpretation and utilization across diverse population groups. This approach addressed a significant gap in the cancer epidemiology literature by examining how health literacy influences information acquisition patterns and subsequent healthcare interactions, with important implications for cancer communication strategies and health disparities reduction.

Definitions

Cancer Information Seeking Behavior: Cancer information-seeking behavior is actively searching for information on cancer prevention, diagnosis, treatment, or survivorship. This encompasses both active information seeking (e.g., specifically looking for cancer information) and passive information acquisition (e.g., incidental exposure to cancer information) from various sources, including healthcare providers,

government agencies, online platforms, and social networks (Lambert & Loiselle, 2007).

For this study, Seek Cancer Info was operationalized using specific HINTS 6 survey items related to the frequency and types of cancer information sought by respondents.

(Further coding details will be in Chapter 3)

Perceived Quality of Healthcare: Perceived quality of healthcare reflects an individual's subjective evaluation of the healthcare services they receive. This evaluation encompasses various dimensions, including the competence and caring of healthcare providers, the accessibility and convenience of services, and the overall satisfaction with the healthcare experience (McLeroy et al., 1988). The study used HINTS 6 survey items that capture respondents' overall ratings and satisfaction with the quality of cancer-related care. (Further coding details will be in Chapter 3)

Sociodemographic Status: The research defined sociodemographic status as the composite measure of an individual's social and economic standing relative to others in a population (Krieger et al., 1997). It was operationalized using indicators available in the HINTS 6 dataset, including age (years), sex (male/female), race/ethnicity (categorized as White, Black/African American, Hispanic/Latino, Asian, and Other), educational attainment (less than high school, high school graduate, some college, college graduate or higher), and annual household income (categorized into income brackets). These variables are included as control variables to account for potential confounding effects on the relationships between the primary study variables.

Assumptions

This study operated under several key assumptions necessary for meaningfully interpreting the findings. While these assumptions cannot be definitively proven within the scope of this research, they are grounded in established literature and are essential for drawing valid inferences from the data.

First, it was assumed that self-reported data from the HINTS 6 survey accurately reflect participants' actual beliefs, behaviors, and perceptions regarding trust, information seeking, and healthcare experiences. This assumption is critical because the study relies on participants' subjective assessments of these constructs. While social desirability and recall bias are inherent limitations of self-report data, these biases are assumed to be randomly distributed across the sample and do not systematically distort the relationships between the study variables. This assumption is necessary because it enables the study to draw meaningful conclusions about population-level trends in health literacy, trust, and cancer prevention behaviors based on the survey responses (Hesse et al., 2005; Lambert & Loiselle, 2007).

Second, I assumed that the HINTS 6 survey captures meaningful associations between the variables of interest. While causality cannot be definitively established due to the cross-sectional design, the observed relationships are assumed to reflect underlying processes associated with trust, information seeking, and healthcare perceptions (Hesse et al., 2005). It was assumed that temporal precedence (e.g., trust influencing information seeking) can be reasonably inferred based on the theoretical frameworks guiding the study (e.g., health belief model, social cognitive theory). This assumption is essential

because it generates hypotheses about potential causal pathways, which can be further investigated in future longitudinal studies (Viswanath & Kreuter, 2007).

Finally, the study assumed that the relationships observed in the HINTS 6 data are generalizable to the broader U.S. adult population, particularly in the context of evolving digital health landscapes. While the HINTS survey employs a nationally representative sampling design, it is acknowledged that specific subpopulations may be underrepresented and that changes in technology, health communication strategies, and trust in institutions since the survey was conducted (2022-2023 data) may influence the relevance of the findings. This assumption is necessary because the study seeks to inform public health interventions and communication strategies at the population level, requiring that the results be reasonably applicable to the broader U.S. context. (Kontos et al., 2010)

These assumptions are explicitly stated to acknowledge the study's inherent limitations and encourage cautious interpretation of the findings. Future research should address these assumptions through longitudinal studies, qualitative investigations, and analyses of more recent data to validate and extend the conclusions drawn from this study.

Scope and Delimitations

The research's scope examined the relationships between trust in cancer information sources, online health information-seeking behaviors, and perceived healthcare quality among adults in the United States. The primary focus was on understanding how trust in physicians, government agencies, and scientists influences

cancer information seeking and how these dynamics are shaped by factors such as Internet use, perceived frustration, confidence in finding online resources, frequency of healthcare visits, and perceptions of conflicting or changing health recommendations. This focus was chosen to address gaps in the literature regarding the interplay of these factors, particularly in the evolving digital health landscape. Concentrating on these relationships allowed for a more in-depth analysis of the factors contributing to effective cancer communication and informed decision-making. Addressing internal validity concerns, the design used explicit controls for sociodemographic factors. It incorporated established theoretical frameworks (health information-seeking behavior theory, trust in health information sources model) to guide the analysis and interpretation of findings.

The study's boundaries were defined using secondary data from the Health Information National Trends Survey (HINTS) 6, including a nationally representative sample of U.S. adults, excluding institutionalized individuals. While HINTS 6 provides a broad overview of health-related behaviors and perceptions, this analysis was delimited by its focus solely on cancer-related information and outcomes. Other chronic diseases, alternative medicine approaches, and more nuanced qualitative analyses of health information-seeking experiences are excluded from consideration. Although the study drew upon the health information seeking behavior (HISB) theory and the trust in health information sources model, it did not delve into other potentially relevant frameworks, such as the diffusion of innovations theory or the network gatekeeping theory, which could provide additional insights into the spread and filtering of health information.

The generalizability of the findings was limited by the cross-sectional nature of the HINTS 6 data, which prevents definitive causal inferences. While the study aimed to identify associations between variables, it cannot establish directionality or temporal order of these relationships. While the HINTS survey employs a nationally representative sampling design, it is acknowledged that specific subpopulations may be underrepresented and that changes in technology, health communication strategies, and trust in institutions since the survey was conducted (2022-2023 data) may influence the relevance of the findings. Caution should be exercised when generalizing the results to populations outside the U.S. or to contexts with different digital health infrastructures or cultural norms. Future research is warranted to validate and extend these findings using longitudinal data and more diverse study populations to enhance the generalizability of the conclusions.

Limitations

This research was subject to several limitations related to its design, methodology, and data source. A primary limitation stems from using cross-sectional data from the HINTS 6 survey, which restricts the ability to establish causality between the study variables. While associations can be identified, the temporal order of these relationships remains uncertain, limiting inferences about cause-and-effect dynamics between trust, information seeking, and healthcare perceptions. This design constraint affects internal validity because the direction of influence cannot be definitively determined, potentially confounding the interpretation of the findings.

Another limitation pertains to the reliance on secondary data, which inherently restricts the researcher's control over data collection procedures and variable operationalization. The HINTS 6 survey was designed for broader purposes, and the available measures may not perfectly align with the specific constructs of interest in this study, potentially affecting construct validity. Additionally, using self-reported data introduces the possibility of response bias, including social desirability and recall bias, which could systematically distort the reported beliefs, behaviors, and perceptions. The potential for missing data or incomplete responses in the HINTS dataset further restricts the analyses' sample size and statistical power.

External validity is also a concern, as the HINTS 6 sample, while nationally representative, may not fully capture the experiences of specific subpopulations, such as those with limited English proficiency or those residing in rural areas with limited access to digital resources. Furthermore, data were collected in 2022-2023, and changes in the digital health landscape, health communication strategies, and public trust in institutions since that time may affect the relevance and generalizability of the findings to the current context.

Several measures have been taken to address these limitations. Sociodemographic factors were included as control variables in the analyses to account for potential confounding effects. The theoretical framework, grounded in established models of health information seeking and trust, guided the interpretation of the findings and helped to contextualize the observed associations. To mitigate response bias, statistical

techniques such as sensitivity analyses assessed the potential impact of extreme responses or outliers on the results.

Future research should address these limitations through longitudinal studies that can establish temporal precedence and examine causal pathways. Qualitative investigations could provide more in-depth insights into the lived experiences of individuals seeking cancer information and the factors that shape their trust in different sources. Studies using more recent data and incorporating more diverse study populations would enhance the generalizability of the findings and provide a more nuanced understanding of the complex dynamics of cancer information-seeking in the digital age.

This research was designed to acknowledge these limitations to promote transparency and encourage cautious interpretation of the findings. The results should be viewed as a starting point for further investigation rather than as definitive conclusions about the relationships between trust, information seeking, and healthcare perceptions.

Significance

The research is significant because it addresses the critical issue of trust gaps in cancer information, particularly in the context of the digital age and the ongoing challenges of misinformation. This research contributes valuable insights into health communication and public health by examining the intricate relationships between trust in various cancer information sources, online health information-seeking behaviors, and healthcare perceptions. The findings help illuminate how trust influences patients' decision-making processes and interactions with healthcare systems, especially

considering the rapid dissemination of accurate and misleading information (Loeb et al., 2024; Swire-Thompson & Lazer, 2020).

Furthermore, by exploring sociodemographic factors that affect trust and information seeking, the study aims to identify disparities in access to reliable cancer information among different populations (Acquati et al., 2021). This focus on diversity is essential for developing targeted communication strategies that can enhance trust and improve health outcomes across various demographic groups (Le et al., 2014). The research also provides practical recommendations for healthcare providers and policymakers on effectively combating misinformation and fostering a more trustworthy digital health environment (Johnson et al., 2022; Sessa et al., 2022). Ultimately, positive social change is created by promoting informed decision-making and enhancing the quality of cancer care through improved trust in health information sources.

Summary

This chapter has provided a comprehensive overview of the study's rationale, scope, and methodological approach. It began by establishing the growing concern regarding trust gaps in cancer information, particularly within the context of the digital age and the challenges posed by misinformation. The research problem was then defined as the complex interplay between trust in cancer information sources, online health information-seeking behaviors, and healthcare perceptions, focusing on how these factors vary across different demographic groups and impact overall cancer care and prevention strategies. This quantitative study aimed to examine those complex relationships, utilizing the Health Information National Trends Survey (HINTS) 6 data. Key theories,

including the health information seeking behavior (HISB) theory and the trust in health information sources model, provided the theoretical foundation for this examination. Definitions of key variables were provided to ensure clarity and consistency. Critical assumptions underlying the study were outlined, and the scope and delimitations of the research were delineated. Finally, the chapter addressed the study's potential limitations, including the use of cross-sectional data and the reliance on secondary data, and outlined measures to mitigate these limitations.

Building upon this foundation, Chapter 2 will delve into a more detailed review of the existing literature on health information-seeking behavior, trust in health information sources, and the impact of digital health environments on cancer-related outcomes. This review will further contextualize the research problem, identify specific research questions, and provide a framework for interpreting the study's findings.

Chapter 2: Literature Review

Digital technologies and the proliferation of social media platforms have profoundly reshaped the landscape of health information access, giving rise to a global trend in online HISB, or OHISB. In contemporary society, an increasing number of individuals are turning to the internet for immediate access to health-related information, driven by the allure of constant availability and the ability to conduct anonymous searches. These features are particularly appealing when navigating sensitive health issues.

By 2020, a significant proportion of populations internationally—including in countries such as Finland, Germany, and Vietnam—were actively engaged in online health searches, motivated by factors such as convenience, privacy, and the availability of interactive health content (Jia et al., 2021). While existing research acknowledges the beneficial effects of online HISB on treatment adherence and informed health decision-making, there are significant gaps in terms of comprehension of evolving behavioral patterns, demographic disparities, and systemic barriers that characterize the post-2016 digital health landscape. This literature review aims to bridge these gaps by synthesizing contemporary evidence.

Current research has underscored the pivotal importance of OHISB. Socioeconomic variables such as educational attainment and geographic location significantly affect access to healthcare resources (Bayard et al., 2022; Lee et al., 2021). This disparity highlighted the need for targeted interventions to address these inequities. Second, technological advances lead to accessible archived information formats and

supportive online communities while posing barriers involving platform censorship and the rampant spread of misinformation (Anampa-Guzmán et al., 2022; Jackson et al., 2023, 2024).

Many studies predominantly use survey methodologies to quantify variables such as digital literacy and trust in information sources. Older adults often prioritize reliability and self-reliance when sourcing online health information, complementing statistical findings with personal experiences (Le et al., 2014).

By contrast, qualitative research, which employs face-to-face interviews, leads to richer insights regarding personal motivations for health information-seeking behaviors. Furthermore, systematic reviews and meta-analyses have been valuable tools for synthesizing diverse findings, highlighting consistent patterns such as the correlation between low health literacy and increased vulnerability to misinformation. Emerging research has also highlighted the significance of patient-centered digital tools and the crucial role of trust in terms of improving health outcomes. Effective communication coupled with accessible and reliable online resources is essential in terms of countering challenges that are posed by health misinformation (Burstin et al., 2023; Hange et al., 2022; Johnson et al., 2022; Larsen & Gilstad, 2022; Loeb et al., 2024).

This chapter is organized into four main sections. I review quantitative studies focusing on survey-based research involving digital literacy levels, frequency of online health information-seeking, and demographic factors that influence these behaviors. I then examine qualitative studies that use interviews and content analysis to explore

patient motivations and subjective experiences related to information-seeking, particularly highlighting the needs of older adults and specific patient populations.

I then synthesize systematic reviews and meta-analyses, which aggregate findings from various studies to identify trends and establish evidence regarding the reliability and impacts of health information sources. Finally, I discuss implications for future research and practice. This section includes directions for improving digital health literacy, refining research tools, and enhancing the design of digital health resources to combat misinformation and promote better health outcomes.

Literature Search Strategy

Sources included academic journals and conference proceedings from reputable online databases. I addressed a broad spectrum of studies focused on health information-seeking behaviors and digital health literacy. Examining various types of literature led to deeper insights into how individuals access and interpret health information in the digital age, as well as the skills necessary for effective navigation of online health resources.

Accessed Resources

In this study, I used the following databases: PubMed, Medline, Embase, Scopus, and Google Scholar.

Key concepts were operationalized using Boolean operators and database-specific subject headings. The search strategy was based on carefully selected terms involving aspects of health information-seeking behavior, digital literacy, and consumer health information needs.

I used the following terms in this study: *health information seeking, digital health literacy, consumer health information needs, online, digital literacy, health outcomes, eHealth literacy assessment, cancer information trust, digital health communication, online cancer information, Health Information National Trends Survey (HINTS), cancer information disparities, trust in healthcare sources, and cancer knowledge gaps.*

Temporal and Source Scope

The search was conducted broadly to include historical and current literature. Seminal literature dating back several decades, along with studies published in recent years, was considered to address advances in digital health.

This multifaceted approach ensured thorough coverage of indexed and peer-reviewed literature on core variables. Despite the limited availability of dissertations and conference proceedings, alternative methods were used to address potential gaps in research. Given the scarcity of peer-reviewed research and conference proceedings on these variables, research was expanded to include related disciplines, such as communication studies and sociology. Additionally, forward and backward citation chaining from foundational papers was conducted, along with including grey literature.

Theoretical Foundation

I used the HISB theory as the primary theoretical framework. Founded by Lambert and Loiselle in 2007, the HISB theory offered a comprehensive understanding of how individuals and communities seek, access, and assess health information from diverse sources. It emphasizes the dynamic interplay between personal factors, such as

individual beliefs and motivations, and external influences, including the availability and credibility of information sources (Lambert & Loiselle, 2007; Arias López et al., 2023).

Lambert and Loiselle made a significant contribution to the field in 2007 by presenting the HISB theory. They elaborated upon it in a comprehensive analysis focusing on the various behaviors exhibited by populations when seeking health-related information. Their research highlights the profound impact of social determinants, such as socioeconomic status, education, and community resources, on individuals' health literacy competencies (Lambert & Loiselle, 2007). As a direct consequence of these competencies, distinct patterns emerge in information-seeking behaviors among different groups (Lambert & Loiselle, 2007; Arias López et al., 2023).

Within public health, this theory provided valuable insights into how different populations navigate the complex landscape of health information (Choi & Jeong, 2021; Wang et al., 2019; Zhang et al., 2023; Zimmerman & Shaw, 2020). It enables researchers and practitioners to understand better the behaviors influencing health outcomes and inform effective health communication strategies (Duimel et al., 2023; Lambert & Loiselle, 2007). By applying the HISB theory, this study was designed to explore the nuances of health information-seeking behaviors, shedding light on how individuals make informed decisions regarding their health in an increasingly information-rich environment.

To provide a broader context, the research also drew on the socio-ecological model (SEM), initially developed by Bronfenbrenner (1977). The SEM conceptualizes health behaviors as the product of dynamic interactions across multiple levels of

influence, including individual, interpersonal, organizational, community, and policy levels (Bronfenbrenner, 1977). SEM emphasizes that individual health actions—such as seeking and interpreting cancer information—are shaped not only by personal factors but also by relationships, institutional contexts, and broader societal structures. This multi-layered approach helps situate health information-seeking within the broader social and environmental context, recognizing that interventions to improve health outcomes must address multiple levels of influence (Bronfenbrenner, 1977; Guy-Evans, 2025; McLeroy et al., 1988).

The structural influence model of health communication (SIM), articulated by Viswanath and colleagues, further enriched this framework. SIM posited that communication inequalities—differences in access to, use of, and trust in health information—are shaped by structural factors, including socioeconomic status, geography, and social roles. These communication inequalities mediate the link between social determinants and health outcomes, highlighting how disparities in information environments contribute to broader health disparities (Bekalu & Eggermont, 2014; Viswanath & Kreuter, 2007; Viswanath & Ackerson, 2011).

Additionally, the social determinants of the health literacy framework underscore the role of social disadvantage in shaping health literacy and, consequently, health disparities. This framework articulated how population characteristics and exposures to risk interact with low health literacy to generate poorer health outcomes, positioning health literacy as both a mediator and moderator in the relationship between social determinants and health (Berkman et al., 2011; Schillinger, 2021).

Major Propositions and Assumptions

The HISB theory posits that health information-seeking is a purposeful activity influenced by a combination of individual and contextual factors. Key predictors include educational attainment, healthcare access, and community-level factors that shape health literacy competencies. HISB assumes that individuals are motivated to seek health information to reduce uncertainty, make informed decisions, and manage perceived risks, but their ability to do so is constrained by their access to resources and their capacity to understand and apply the information found (Arias López et al., 2023; Lambert & Loiselle, 2007). The theory also recognizes the role of social norms, informational self-efficacy, risk perception, and knowledge insufficiency as drivers of both online and offline health information seeking. For example, the planned risk information-seeking model (PRISM), an integrative extension of HISB, highlights how attitudes toward information-seeking, perceived social norms, and perceived behavioral control collectively shape the intention to seek health information (Link et al., 2021; Zimmerman & Shaw, 2020).

SEM is grounded in the assumption that health behaviors and outcomes result from dynamic interactions among multiple levels of influence, including individual, interpersonal, organizational, community, and policy levels (Bronfenbrenner, 1977; Stokols, 1992). The core propositions of the SEM emphasize that health status is influenced by a combination of environmental factors—such as geography, social context, and policy—and personal attributes, including genetics, psychological disposition, and behaviors. The effectiveness of health interventions is enhanced when

actions are coordinated across these multiple levels. Additionally, there are ongoing cycles of mutual influence between individuals and their environments, indicating that people both shape and are shaped by their physical and social surroundings. SEM also incorporates concepts from systems theory, highlighting the interdependencies between immediate and more distant environments and illustrating the dynamic interplay between individuals and their settings (Stokols, 1992).

The structural influence model of health communication (SIM) suggests that communication inequalities—differences in access to, use of, and ability to act on health information—are influenced by structural factors such as socioeconomic status, geography, and social roles (Viswanath & Ackerson, 2011). According to SIM, structural factors (e.g., socioeconomic status, education, and location) shape both the information environment and the resources available for seeking health information. Communication inequalities act as a bridge between social determinants and health outcomes, indicating that those with greater resources and access to information tend to have improved health knowledge and outcomes. Additionally, audiences respond to and engage with media content based on their structural position and the social roles they occupy at any given time (Viswanath & Ackerson, 2011; Nagler et al., 2014).

The social determinants of health literacy framework (SDHL) integrates various perspectives by emphasizing that health literacy is not a fixed attribute but rather a product of social and structural determinants. One of its central assumptions is that social disadvantage—such as low income, limited education, and minority status—leads to lower health literacy, which in turn contributes to health disparities. The framework also

suggests that health literacy can be improved either directly through interventions that build skills and experience or indirectly by reducing health literacy demands and shifting environments to be more health-promoting. Additionally, both public health and healthcare pathways are affected by this framework, wherein structural factors, such as policy and environment, along with organizational factors like healthcare system responsiveness, significantly shape access to resources, exposures, and ultimately health outcomes (Berkman et al., 2011).

Collectively, these frameworks assume that health information seeking, health literacy, and health outcomes are shaped by a complex interplay of individual, social, structural, and environmental factors. Interventions to improve health outcomes and reduce disparities must, therefore, address not only individual knowledge and motivation but also the broader social and structural context in which individuals live and seek information.

Prior Applications

Previous research has widely applied the health information-seeking behavior (HISB) theory to understand how different demographic groups engage with cancer-related information. For example, Lambert and Loiselle's (2007) analysis revealed that population-level disparities in health literacy significantly impacted epidemiological patterns in cancer prevention behaviors and early intervention. Studies have identified diverse patterns of cancer information seeking, including intense, complementary, fortuitous, minimal, and guarded information seeking, each influenced by individual and contextual factors (Mills & Sullivan, 1999; Lambert & Loiselle, 2007; Loiselle, 2023).

These profiles have been shown to relate to patient satisfaction and care experiences, supporting the need for personalized interventions and measurement tools, such as the cancer information-seeking profiles (CISP) measure (Loiselle, 2023). The HISB theory has thus been instrumental in tailoring informational interventions and refining measurement instruments to accommodate variations in active information-seeking among cancer patients (Lambert et al., 2009). Consistent with this, HISB theory was applied to investigate how trust in information sources and digital engagement influence cancer information-seeking behaviors and related outcomes, thereby directly building upon this tradition of research.

The social determinants of the health literacy framework (SDHL) and the trust in health information sources model (THISM) complement this foundation by positioning trust as a critical mediator between population characteristics and health outcomes (Hesse et al., 2005; Berkman et al., 2011). Research has shown that lower health literacy was associated with greater difficulty understanding and processing cancer-related information, poorer quality of life, and reduced engagement in shared decision-making (Berkman et al., 2011; Holden et al., 2021; Schillinger, 2021). System-level factors, such as the complexity of healthcare communication and the accessibility of resources, can either facilitate or hinder patients' ability to make informed decisions about their care (Coughlin et al., 2020; Holden et al., 2021). By focusing on trust in information sources and digital health literacy, the study aligned with this framework. It examined how these social determinants influence cancer information-seeking and perceptions of healthcare.

The socio-ecological model (SEM) has been extensively used in cancer control and prevention research to contextualize the multi-level influences on health behaviors. SEM describes how individual, interpersonal, organizational, community, and policy-level factors interact to shape health information-seeking and cancer-related outcomes (Bronfenbrenner, 1977; Moore et al., 2015; Palafox et al., 2018). For example, the Pacific Regional Cancer Control Program (PRCP) operationalized SEM to advance cancer prevention and control in multi-national, resource-limited settings by leveraging interventions at all levels of the model (Palafox et al., 2018). Adaptations of SEM have guided multi-level interventions to increase cancer screening and vaccination uptake, as well as reduce risky behaviors, by fostering collaboration among stakeholders at various levels (Moore et al., 2015). The study situated individual health information-seeking behaviors and trust within this broader socio-ecological context, recognizing that demographic and community-level factors may moderate these relationships.

The structural influence model of health communication (SIM) has been applied to elucidate how communication inequalities—such as differences in access to, use of, and capacity to act on health information—mediate the relationship between social determinants and health outcomes (Bekalu & Eggermont, 2014; Viswanath & Ackerson, 2011). For example, SIM has been used to explain how disparities in media use, concern about health threats, and perceived salience of information can partially account for the impact of socioeconomic and geographic disparities on knowledge and risk perception about diseases like cancer and HIV/AIDS (Bekalu & Eggermont, 2014). This model emphasizes the importance of considering both structural and environmental contexts

when designing effective health communication strategies. The analysis drew on SIM to investigate how structural factors, such as education, income, and access to healthcare, shape both trust in information sources and the effectiveness of digital health information-seeking.

Collectively, these frameworks have informed the design and evaluation of interventions aimed at enhancing cancer prevention, improving access to information, and promoting health equity. By integrating HISB theory, SEM, SIM, and the social determinants of health literacy framework, researchers have addressed the complex, multi-level factors that influence how diverse populations seek, interpret, and act on cancer information, ultimately shaping health outcomes and disparities. In alignment with this body of research, these frameworks were applied to analyze how trust, digital health literacy, and sociodemographic factors interact to influence cancer information-seeking behaviors and healthcare perceptions in the digital era, using nationally representative HINTS data.

Relation to the Present Study

Considering sociodemographic factors, this study was built on the HISB theory by examining how trust in different cancer information sources (physicians, government agencies, scientists) affects information-seeking behavior. The research questions investigate how the frequency of Internet use is related to frustration in seeking cancer information, with confidence in finding helpful online resources as a mediating factor. By investigating these relationships, the study aimed to expand the HISB theory by incorporating the role of trust and digital health literacy in shaping cancer-related

information-seeking behaviors. The study also examined how the perception of conflicting health recommendations affects trust in cancer information from scientists, further exploring the dynamics of trust and information credibility. By integrating the SEM, SIM, and social determinants of health literacy framework, the research provided a comprehensive, multi-level perspective on the social and structural factors that shape health information-seeking and cancer communication outcomes.

Literature Review Related to Key Variables and/or Concepts

The body of literature that has been scrutinized and analyzed includes an extensive array of different research methodologies, which consist of various types of studies such as surveys designed to gather quantitative data, qualitative studies aimed at exploring in-depth human experiences, systematic reviews that consolidate existing research findings, meta-analyses that statistically combine results from multiple studies, and mixed-methods studies that integrate both qualitative and quantitative approaches. These diverse and multifaceted research strategies collectively contribute to a comprehensive and nuanced understanding of the complex nature of health information-seeking behavior, the specific health information needs of consumers, and the levels of eHealth literacy among various populations that differ significantly in their characteristics and backgrounds.

OHISB

OHISB has become a central focus in public health research due to the proliferation of digital resources and the increasing reliance of consumers on the internet for health-related information. Systematic reviews and meta-analyses consistently show

that OHISB is prevalent across diverse populations, with over 60% of health information consumers seeking information online at least weekly and a significant proportion doing so daily (Jia et al., 2021). The main drivers of OHISB include the desire for autonomy, improved understanding of health, and dissatisfaction with traditional healthcare channels (Pourrazavi et al., 2021). OHISB is influenced by various factors, including age, gender, education, income, health status, and digital access (Jia et al., 2021; Mirzaei et al., 2021; Wong & Cheung, 2019). While the majority of consumers report positive impacts from online health information—such as increased empowerment and improved health management—barriers persist, including low digital literacy, difficulty evaluating source credibility, and exposure to misinformation (Jia et al., 2021; Liu, 2022; Pian et al., 2020; the European Centre for Disease Prevention and Control (ECDC) et al., 2011).

Recent studies also highlight the complexity of the relationship between OHISB and health service utilization. Some research suggests that OHISB increases engagement with healthcare services. At the same time, other studies find that it may serve as a substitute for professional consultations, especially when individuals are confident in their ability to interpret online information (Li et al., 2025; Song et al., 2024). These mixed findings underscore the need to examine not only the frequency of OHISB but also the context, motivations, and outcomes associated with seeking health information online.

Trust in Cancer Information Sources

Trust in health information sources is a critical determinant of both the likelihood of seeking information and the decisions made based on that information. Multiple

studies confirm that trust is highest in interpersonal sources, particularly healthcare professionals, followed by family and friends, with online sources and social media generally viewed as less credible (Jia et al., 2021; Li et al., 2025; Song et al., 2024). Experimental and survey-based evidence demonstrate that trust in doctors is robust across various health conditions. In contrast, trust in government agencies and scientists can vary depending on recent public health events, perceived transparency, and the prevalence of misinformation (Li et al., 2025; Song et al., 2024). The distinction between cognitive trust (the belief in the accuracy of information) and behavioral trust (the willingness to act on information) is also important; individuals may cognitively trust multiple sources but rely behaviorally on medical professionals when making health decisions (Li et al., 2025).

The literature further reveals that trust in online sources is highly contingent on perceived expertise, source transparency, and the presence of interactive features such as "doctor-verified" badges (Li et al., 2025; Song et al., 2024; Swire-Thompson & Lazer, 2020). Mistrust in online information is often cited as a barrier to effective OHISB, particularly among older adults and those with lower digital literacy (Ferraris et al., 2023; Jia et al., 2021; Pourrazavi et al., 2021). Thus, trust is both a predictor and a moderator of the impact of OHISB on health outcomes.

Cancer information-seeking behavior is a multidimensional construct, encompassing various modalities and motivations for seeking information (Lambert & Loiselle, 2007; Wong & Cheung, 2019). Prior research using HINTS data has demonstrated that individuals may seek cancer information from multiple sources (e.g.,

online, healthcare providers, social networks) and for different purposes (prevention, diagnosis, treatment, survivorship), each of which may be influenced by distinct sociodemographic and psychosocial factors (Jia et al., 2021; Chen et al., 2025-a).

Consequently, analyzing separate models for each type of information-seeking behavior allows for a more nuanced understanding of how trust and other determinants operate across these different contexts. This approach aligns with recommendations in the literature to avoid oversimplification and to capture the heterogeneity of health information-seeking behaviors (Loiselle, 2023).

DHL

DHL refers to the ability to seek, understand, and evaluate health information from electronic sources and apply this knowledge to address health problems. DHL is consistently associated with improved health outcomes, greater satisfaction with healthcare encounters, and more effective health management behaviors (Cheng et al., 2025; Murat Çetin & Rojan Gümüş, 2023; Wong & Cheung, 2019; Yuen et al., 2024). Systematic reviews indicate that higher DHL is associated with greater empowerment, increased utilization of digital health tools, and reduced affective distress (Cheng et al., 2025). However, the relationship between DHL and health service utilization is mixed, with some studies finding that higher DHL leads to increased use of preventive services. In contrast, others report no significant association (Cheng et al., 2025; Murat Çetin & Rojan Gümüş, 2023; Yuen et al., 2024).

The eHealth Literacy Scale (eHEALS) is the most widely used tool for assessing eHealth literacy, although concerns remain about its applicability in digitally

disadvantaged populations (Cheng et al., 2025). Barriers to high DHL include lower educational attainment, limited access to technology, and a lack of confidence in using digital resources (Cheng et al., 2025; Faux-Nightingale et al., 2022; Wong & Cheung, 2019; Yuen et al., 2024). These findings justify the inclusion of DHL as both a covariate and a potential moderator in studies examining OHISB and trust.

Perceived Frustration and Information Navigation

Perceived frustration during health information-seeking is a common theme in both qualitative and quantitative studies. Frustration arises from difficulty in finding relevant information, encountering contradictory or low-quality sources, and a lack of confidence in interpreting digital content (Ferraris et al., 2023; Jia et al., 2021; Liu, 2022; Pian et al., 2020). High frustration is associated with lower satisfaction, a reduced likelihood of acting on information, and increased vulnerability to misinformation (Liu, 2022; Pian et al., 2020; European Centre for Disease Prevention and Control (ECDC) et al., 2011). Studies show that individuals with higher digital health literacy report less frustration and are more likely to persist in seeking information until their needs are met (Cheng et al., 2025; Murat Çetin & Rojan Gümüş, 2023; Yuen et al., 2024). The literature also suggests that frustration can mediate the relationship between OHISB and health outcomes, making it an important variable for understanding the effectiveness of digital health communication.

Healthcare Perceptions

Perceptions of healthcare quality and confidence in navigating health resources are influenced by both direct healthcare experiences and the information individuals

obtain online. Research indicates that positive perceptions of healthcare are linked to higher trust in providers, greater digital health literacy, and more successful information-seeking experiences (Jia et al., 2021; Wong & Cheung, 2019). Conversely, negative experiences or difficulty in finding credible information can erode trust and reduce engagement with healthcare services (Li et al., 2025). There is also evidence that OHISB can both enhance and undermine perceptions of healthcare quality, depending on whether the information found aligns with or contradicts professional advice (Li et al., 2025).

Methodological Approaches: Strengths and Weaknesses

Researchers have approached these topics using a variety of methodologies, including large-scale surveys, systematic reviews, meta-analyses, qualitative interviews, and mixed-methods studies. Survey research is the most common approach, providing generalizable estimates and enabling the examination of predictors and outcomes across large, diverse samples (Jia et al., 2021; Wong & Cheung, 2019). Qualitative studies offer more profound insights into motivations and barriers but are limited by small sample sizes and lack of generalizability (Pourrazavi et al., 2021). Systematic reviews and meta-analyses synthesize findings across studies but are constrained by heterogeneity in measurement and reporting (Cheng et al., 2025; Baccolini et al., 2022; Yuen et al., 2024). Mixed methods design combines the strengths of both approaches but requires more resources and complex analysis.

A notable gap in the literature is the lack of longitudinal and experimental studies, which limits causal inference. Most existing research is cross-sectional, making it

difficult to determine the directionality of relationships among trust, OHISB, digital health literacy, and health outcomes (Li et al., 2025).

Qualitative Studies

Several studies adopted qualitative approaches to explore personal motivations and experiences. Common themes emerging include a desire for autonomy, an improved understanding of one's health, and sometimes dissatisfaction or distrust of traditional healthcare settings, which motivates the search for alternative information sources. For example, qualitative research on why older adults seek online health information was conducted through face-to-face interviews with 19 participants to capture motivational themes such as self-reliance and the desire to find trustworthy information (Pourrazavi et al., 2021).

These studies tend to be fewer than large-scale surveys, reflecting a more in-depth exploration of subjective experiences rather than statistical generalizability. Results from these studies suggest that effective communication and trust-building between healthcare providers and patients are essential and that digital platforms should adapt to provide clearer, more understandable information tailored to user needs.

Systematic Reviews and Meta-Analyses

Other literature includes systematic reviews that consolidate findings from multiple studies. Common themes include the prevalence of low digital or health literacy and its impact on patient outcomes. For example, a meta-analysis has shown that higher health literacy is linked to better participation in screening programs for cervical or

colorectal cancer. In contrast, low literacy corresponded with higher rates of minor complications and lower adherence (Baccolini et al., 2022).

A review of consumer health information needs analyzed 216 articles and highlighted that most definitions focused on the cognitive dimension (Pian et al., 2020). Similarly, reviews on digital health information-seeking behavior and eHealth literacy in chronic disease populations often include meta-analyses to aggregate effect sizes and prevalence estimates (Jeitani et al., 2025; Kenny-Jones et al., 2024; Liu & Xiao, 2021). These reviews synthesize both survey and qualitative findings, although the exact proportion of review articles versus primary studies is not explicitly provided.

One systematic review focusing on psychological variables in health information-seeking behavior screened a large pool of articles (4,162 initially) and ultimately included 31 studies (Rafieinasab et al., 2024). Among these, 27 studies (approximately 87%) employed survey methods. In contrast, three studies (approximately 10%) were descriptive, and one study (roughly 3%) was an intervention study. This indicates that most of the studies included in this review relied on structured questionnaires to quantify health information-seeking behaviors.

Mixed Methods Studies and Specialized Content Reviews

Several also use mixed methods designs, combining qualitative interviews with quantitative surveys to create a more comprehensive picture of patient behavior. A common finding is that while online health information seeking is widespread, many patients do not share this information with their doctors, showing a gap in the communication process between patients and healthcare professionals.

For instance, research on accessing online medical records showed a high response rate and examined patterns of digital tool usage (Richwine, 2024). Additionally, evaluations of mobile health applications for cancer risk assessment have selected a small number of apps based on systematic searches of app stores (Richwine, 2024; Strawley & Richwine, 2023).

These studies often employ standardized questionnaires, such as the eHealth Literacy Scale (eHEALS) or other self-reported measures, to capture a snapshot of behaviors and literacy levels in various populations. For example, surveys in Hong Kong revealed that nearly 87% of internet users in primary care settings seek health information online, with predictors like age, health status, and frequency of internet use playing significant roles (Wong & Cheung, 2019).

Rationale for Variable Selection

The selection of trust in information sources, OHISB, digital health literacy, perceived frustration, and healthcare perceptions as primary variables is strongly justified by the literature. These constructs are consistently identified as central to understanding consumer engagement with digital health information and its impact on health behaviors and outcomes (Cheng et al., 2025; Li et al., 2025; Song et al., 2024; Yuen et al., 2024). The relationships among these variables are complex and, in some cases, controversial, with mixed findings regarding the impact of OHISB and DHL on healthcare utilization and outcomes (Li et al., 2025). Further research is needed to clarify these relationships, particularly in the context of cancer information-seeking and trust in the digital era.

Summary and Conclusions

In summary, the literature review reveals a strong quantitative foundation for the findings, particularly highlighted by the fact that many selected studies in this field have utilized survey methods as their main research approach. While qualitative research and mixed methods also contribute valuable insights, they represent a smaller yet significant portion of the overall research landscape. Despite their differences, all these methodologies emphasize the importance of creating reliable, accessible, and user-friendly digital health tools, building trust, and addressing the gaps in standardizing measurement and communication practices across diverse populations.

The extensive body of literature thoroughly addresses the primary and overarching issue: the ongoing and persistent challenge individuals face in accurately accessing, evaluating, and using health information in today's rapidly evolving digital era, where information is abundant but unreliable. Patients frequently encounter significant difficulties in identifying credible and trustworthy sources of health information, which can lead to confusion and the spread of misinformation, ultimately resulting in poorer health outcomes that could have been avoided with better access to accurate data (Kubb & Foran, 2020).

The primary purpose of this literature review is to synthesize and integrate the existing body of research on health information-seeking behaviors, digital health literacy, and consumers' specific health information needs. This review highlights the diverse research methods utilized in this field, including quantitative surveys that collect statistical data, qualitative interviews that provide in-depth insights, systematic reviews

that analyze existing studies, and meta-analyses that combine findings from multiple studies. By examining these varied approaches, the review seeks to enhance understanding of how they can inform the development of effective and impactful health communication strategies in the future.

Chapter 3: Research Method

This quantitative study involved examining complex relationships between trust in cancer information sources, online health information-seeking behaviors, and healthcare perceptions among U.S. adults. Specifically, I investigated how trust in different cancer information sources, including physicians, government health agencies, and scientists, influenced these behaviors and perceptions of healthcare quality. Additionally, I explored how the frequency of internet use, perceived frustration involved with seeking cancer information, and perceptions of conflicting health recommendations interact with these variables.

I used secondary data from the nationally representative HINTS 6 to provide empirical insights regarding this topic.

This chapter includes information about the methodological framework to address research questions and hypotheses. I describe the design based on a secondary analysis of the HINTS 6 dataset. I articulate the rationale for selecting this design, highlighting its appropriateness for examining multiple relationships simultaneously for a large and diverse population.

This chapter includes information about data sources, including sampling methods and data collection procedures for HINTS 6. I define and operationalize key variables such as trust in cancer information sources, cancer information-seeking behavior, internet use frequency, perceived frustration, confidence in finding helpful health resources online, perceived quality of healthcare, and moderators like frequency of healthcare

visits. Procedures for data cleaning, coding, and preparation for analysis are also described to ensure replicability.

I also outline statistical methods, including multiple regression analyses to test predictive relationships, mediation analyses to examine indirect effects, and moderation analyses to explore conditional effects. I also explain how sociodemographic covariates were controlled to isolate primary variable effects and describe procedures for managing multiple statistical tests.

Potential internal, external, construct, and statistical conclusion validity threats are identified and discussed. Strategies to mitigate these threats, such as using a nationally representative dataset, controlling for confounders, and employing validated instruments, are explained to support the rigor and credibility of the study.

I address ethical considerations for using secondary deidentified data, including data access agreements, confidentiality protections, and compliance with Institutional Review Board (IRB) standards. I also outline plans for secure data storage and responsible data dissemination. I address how the design and analytic strategies were used to address research questions rigorously.

Research Design and Rationale

I used a secondary data analysis approach, drawing on publicly available HINTS 6 data, which includes a cross-sectional and nationally representative sample of U.S. adults. The cross-sectional nature of the HINTS 6 dataset enabled examination of associations between trust, information-seeking behaviors, and healthcare perceptions at a single point in time, aligning with my focus on understanding relationships between variables rather

than establishing causality. Use of existing secondary data offered several advantages, including efficient access to a large, diverse, and high-quality dataset without the logistical and financial demands of new data collection. The HINTS 6 dataset includes comprehensive measures relevant to the study's variables, ensuring both data quality and representativeness.

This secondary analysis of cross-sectional survey data is consistent with health communication and behavioral health research involving health information-seeking patterns and trust dynamics. By leveraging a robust and nationally representative dataset, this approach facilitated generalizable insights regarding the cancer information landscape in the digital age. Furthermore, integrating trust models and the HISB theory via this analytic framework contributes to a nuanced understanding of how digital information environments influence patient experiences and perceptions, informing interventions that are aimed at improving health communication and reducing disparities.

Methodology

Population

The target population for this study was noninstitutionalized U.S. adults who were 18 and older and participated in the HINTS 6 administered by the NCI. The HINTS 6 is designed to be representative of the civilian noninstitutionalized adult population in the United States, capturing a diverse range of sociodemographic backgrounds. The final analytic sample for HINTS 6 Cycle 4 in 2022 comprised 5,438 respondents, which provides sufficient statistical power for subgroup analyses and multivariable modeling. This makes the dataset well-suited for examining the topic.

Sampling and Sampling Procedures

HINT 6 employed a two-stage stratified random sampling design to ensure representativeness across key demographic groups and geographic regions. In the first stage, residential addresses were randomly selected from a comprehensive U.S. Postal Service file. In the second stage, one adult was randomly chosen from each sampled household using the birthday method.

HINTS 6 sampled all noninstitutionalized U.S. adults with a valid residential mailing address. All participants were adults who were 18 or older, residing in the United States, who completed the HINTS 6 survey. Individuals under 18, those living in institutional settings (e.g., nursing homes, prisons), and incomplete or unusable survey responses were excluded.

This probability-based approach supports the generalizability of findings to the broader U.S. adult population and aligns with best practices for national health survey research.

Sample Size Determination

A power analysis using G*Power 3.1 for multiple regression with up to 10 predictors, a small to medium effect size ($f^2 = 0.05$), $\alpha = 0.05$, and power $(1-\beta) = 0.80$, indicated a minimum required sample size of approximately 196. The HINTS 6 sample ($N \approx 5,438$) far exceeds this threshold, ensuring robust power for detecting statistically significant relationships and supporting complex multivariable analyses.

Archival Data Use

The HINTS 6 dataset is publicly available for research purposes through the National Cancer Institute's official website (<https://hints.cancer.gov>). Researchers can freely access de-identified data without special permissions or data use agreements, facilitating broad use for health communication and behavioral research (National Cancer Institute, 2022). The dataset is recognized for its methodological rigor and national representativeness, making it a reputable and widely cited resource for examining health information trends in the U.S. population (Loeb et al., 2024; Nelson et al., 2004).

The HINTS 6 survey employs a stratified, probability-based sampling design to ensure the representativeness of the civilian, non-institutionalized adult population in the United States (National Cancer Institute, 2022). Data collection methods include self-administered paper and web-based surveys, with comprehensive documentation available on sampling, weighting, and data quality procedures, which enhance the dataset's reliability and validity for secondary analyses (National Cancer Institute, 2022; Nelson et al., 2004).

Permissions

Using the HINTS 6 dataset does not require additional permissions beyond adherence to the data use policies outlined by the National Cancer Institute. The NCI provides detailed documentation on the dataset's collection protocols, ethical approvals, and data handling procedures, which can be included in the study's appendix to demonstrate compliance with ethical standards (National Cancer Institute, 2022). The data are fully de-identified; therefore, the risk to participant confidentiality is minimal,

and the dataset's public availability aligns with federal regulations governing human subjects research (Johnson et al., 2022; Nelson et al., 2004).

The dataset's extensive use in peer-reviewed research underscores its suitability for studying trust, frustration, and information-seeking behaviors related to cancer and other health topics (Loeb et al., 2024; Wong & Cheung, 2019). I adhered to these standards, ensuring responsible use of the data to advance understanding of cancer information navigation in the digital age.

Instrumentation and Operationalization of Constructs

Instrumentation

The Health Information National Trends Survey (HINTS) 6 was developed and administered by the National Cancer Institute (NCI), with the first cycle launched in 2003 and the sixth cycle conducted in 2022 (National Cancer Institute, 2022, n.d.-b; Nelson et al., 2004). The HINTS instrument is designed to measure health information-seeking behaviors, trust in health information sources, healthcare perceptions, and a wide array of sociodemographic variables in the U.S. adult population (National Cancer Institute, n.d.-a). The instrument's appropriateness for this study is demonstrated by its direct assessment of constructs central to the research questions, including trust in doctors, government agencies, and scientists, as well as cancer information-seeking behaviors, perceived frustration, and perceptions of healthcare. HINTS has been widely used in peer-reviewed research to examine health information behaviors and trust across diverse populations (Le et al., 2014; Wong & Cheung, 2019; Loeb et al., 2024).

Reliability and Validity

The Health Information National Trends Survey (HINTS) demonstrates strong psychometric properties, including construct validity and reliability, supported by extensive peer-reviewed research and official documentation (Blake et al., 2025; Hesse et al., 2005; National Cancer Institute, 2015; Nelson et al., 2004). Reported test-retest reliability coefficients for core HINTS items typically range from 0.70 to 0.85, which is considered strong for survey research (Hesse et al., 2005; Moser et al., 2022; National Cancer Institute, 2015). These values are established through repeated administrations and comparison of item responses over time.

The survey's rigorous development process, including cognitive testing, pilot studies, and expert review, along with its repeated use in national studies, contributes to its credibility as a tool for studying health communication and behavioral outcomes (National Cancer Institute, 2015, 2022; Swire-Thompson & Lazer, 2020). HINTS undergoes regular updates to ensure item clarity and relevance (Blake et al., 2025; National Cancer Institute, 2015, 2023).

Key multi-item scales within HINTS, such as the PCC scale, have demonstrated strong internal consistency. For instance, analyses using HINTS 5 Cycle 2 data reported Cronbach's alpha values of 0.96 for the PROMIS Instrumental Support Measure and similarly high values for the PCC scale, indicating excellent reliability (Moser et al., 2022). Discriminant validity is supported by weak correlations between the PCC scale and theoretically distinct constructs, such as social support (Pearson $r = 0.19$) and

anxiety/depression (PHQ-4, $r = -0.14$), further validating the distinctiveness of these measures (Moser et al., 2022).

HINTS is validated in each cycle with nationally representative samples of U.S. adults, including diverse subgroups defined by age, gender, race/ethnicity, and education (National Cancer Institute, n.d.-a; Finney Rutten et al., 2020). Each cycle employs a complex, stratified sampling design and weighting procedures to ensure representativeness and address potential biases (National Cancer Institute, 2018, 2023, n.d.-b). Psychometric properties are re-examined in each cycle to confirm reliability and validity (Finney Rutten et al., 2020; National Cancer Institute, 2018, 2023). Content is updated regularly to reflect emerging issues in health communication and information needs (Blake et al., 2025; National Cancer Institute, 2015).

Permission

The HINTS 6 dataset and survey instrument are publicly available for research use and do not require special permission for secondary analysis, as all data are de-identified and in the public domain (National Cancer Institute, 2022).

Operationalization of Constructs

HINTS 6 items are constructed as either single or multi-item measures, with response options and coding described in the official codebook.

Trust in cancer information sources was measured by respondents' ratings of trust in information about cancer from doctors, government health agencies, and scientists.

Cancer information-seeking behavior was assessed by self-reported frequency and recency of seeking cancer information online or from other sources.

Perceived frustration was measured by items assessing how often respondents feel frustrated during cancer information searches.

Healthcare perceptions were assessed by self-reported quality of care received and confidence in finding helpful health resources online.

Sociodemographic variables such as age, gender, race/ethnicity, education, and income are control variables to account for potential confounding influences.

The use of HINTS 6 to operationalize these constructs is consistent with best practices in public health and epidemiological research. It ensures that findings are robust, generalizable, and comparable to other studies in the field (National Cancer Institute, 2022; Swire-Thompson & Lazer, 2020).

Table 1*Example HINTS 6 Constructs, Items, and Operationalization*

Construct	Example Item(s)	Single/ Multi-Item	Response Options	Level of Measurement	Scoring/ Summation
Trust in Cancer Information Sources	Q23A: "How much would you trust information about cancer from a doctor?" Q23B: "...from government health agencies?" Q23C: "...from scientists?"...	Multi-item	1 = Not at all 2 = A little 3 = Some 4 = A lot	Ordinal	Sum or mean of items (composite score). can be dichotomized (e.g., "some/a lot" vs. "not at all/a little")
Cancer Information-Seeking Behavior	Q1: "Have you ever looked for information about cancer from any source?" Q2: "Where did you go first?"...	Single item (each)	Q1: Yes/No Q2: List of sources	Nominal (Q1, Q2, Q4), Ordinal (Q3)	Each item analyzed separately
Perceived Frustration	Q10: "How often did you feel frustrated during your most recent search for cancer information?"	Single item	1 = Never 2 = Rarely 3 = Sometimes 4 = Often 5 = Always	Ordinal	Single item: higher scores indicate greater frustration
Healthcare Perceptions	Q30: "Overall, how would you rate the quality of healthcare you received in the past 12 months?"...	Single item (each)	Q30: 1 = Excellent ... 5 = Poor	Ordinal	Each item analyzed separately
Sociodemographic Covariates	Age, Gender, Race/Ethnicity, Education, Income, Health insurance, Employment, Marital status...	Single item (each)	Varies by variable (e.g., categorical or ordinal response options)	Nominal or Ordinal	Used as covariates in analyses

Scoring and Summation for Composite Constructs

For multi-item constructs such as trust in cancer information sources, responses are summed or averaged to create a composite score, as specified in the HINTS codebook. Items can also be dichotomized for certain analyses. The reliability and validity of these scales are documented in HINTS methodology and instrument development reports (National Cancer Institute, 2023).

Populations and Prior Use

HINTS has been administered in multiple cycles to nationally representative samples of U.S. civilian, non-institutionalized adults. Its reliability and validity have been confirmed across demographic subgroups and in various health communication and behavioral research contexts (Hesse et al., 2005; Loeb et al., 2024; National Cancer Institute, n.d.-a; Wong & Cheung, 2019).

Data Analysis Plan

Software for Analyses

All statistical analyses were conducted using IBM SPSS Statistics (Version 30.0.0.0(172)). SPSS is widely used in public health and epidemiological research for its robust capabilities in data management, descriptive and inferential statistics, and regression modeling.

Data Cleaning and Screening Procedures

The HINTS 6 dataset underwent a focused set of data screening and analytic preparation steps prior to analysis. The HINTS research team has already performed

extensive data cleaning, quality control, and consistency checks (National Cancer Institute, 2023). Therefore, additional cleaning was limited to the analytic variables of interest.

The dataset was checked for duplicate records and obvious data entry errors. Univariate outliers in continuous variables were identified using z-scores ($|z| > 3.29$) and the interquartile range (IQR) method for skewed variables.

Frequencies and patterns of missing data were examined for all key analytic variables. Consistent with HINTS methodology, cases with missing values were assessed for randomness. If missingness is less than 5% and appears random, listwise deletion was used. Multiple imputation methods were considered for non-random or higher levels of missingness, ensuring that the imputation model incorporates survey weights and all relevant variables.

Distributions of continuous variables were assessed using histograms, Q-Q plots, skewness, and kurtosis statistics. If severe non-normality is detected and affects the assumptions of planned analyses, appropriate data transformations were considered.

All regression analyses evaluated homoscedasticity, linearity, and multicollinearity assumptions. Variance inflation factors (VIF) were checked to assess multicollinearity among predictors.

Restatement of Research Questions and Hypotheses

RQ1: Is there an association between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, gender, race/ethnicity, education, and income?

H₀1: There is no association between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, education, and income.

H_a1: There is an association between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, education, and income.

RQ2: Does confidence in online health resource navigation mediate the relationship between frequent health-related Internet use and reduced cancer information frustration?

H₀2: Confidence in online health resource navigation does not mediate the relationship between frequent health-related Internet use and reduced cancer information frustration.

H_a2: Confidence in online health resource navigation does mediate the relationship between frequent health-related Internet use and reduced cancer information frustration.

RQ3: Does the relationship between trust in government health agencies and perceived care quality vary by frequency of healthcare visits in this population?

H₀3: The relationship between trust in government health agencies and perceived care quality does not vary by frequency of healthcare visits in this population.

H_a3: The relationship between trust in government health agencies and perceived care quality does vary by frequency of healthcare visits in this population.

RQ4: Do perceived changes in health recommendations over time alter the association between exposure to conflicting recommendations and trust in scientists?

H₀4: Perceived changes in health recommendations over time do not alter the association between exposure to conflicting recommendations and trust in scientists.

H_a4: Perceived changes in health recommendations over time do alter the association between exposure to conflicting recommendations and trust in scientists.

Detailed Analysis Plan

To address RQ1, four separate regression models were estimated, each using a different HINTS 6 item as the dependent variable to represent distinct types of cancer information-seeking behavior. These include (1) ever seeking cancer information, (2) frequency of seeking cancer information, (3) seeking information online, and (4) seeking information from a healthcare provider. This approach is justified by the multidimensional nature of information-seeking behaviors, as supported by the literature (Lambert & Loiselle, 2007; Wong & Cheung, 2019), and ensures that the unique predictors and correlates of each behavior are appropriately examined. The independent variables and covariates were consistent across models to facilitate comparison.

First, the variable “ever sought cancer information” was assessed using the HINTS 6 item, which asks respondents whether they have ever looked for information about cancer from any source. This binary variable (yes/no) was analyzed using a multiple logistic regression model. Second, the “frequency of cancer information seeking” measures how often respondents search for cancer information and was examined using multiple linear regression. Third, the response “sought cancer

information online” was binary and indicated whether respondents had searched for cancer information online, as analyzed via multiple logistic regression. Fourth, “sought cancer information from a provider” reflects whether respondents have asked a healthcare professional for cancer information, which was also measured as a binary variable and analyzed using multiple logistic regression.

Each of these dependent variables was modeled separately to capture the unique predictors and correlates associated with different types of cancer information-seeking behavior. This approach enabled a nuanced analysis that acknowledges the multidimensional nature of information seeking, as supported by the literature (Lambert & Loiselle, 2007; Loiselle, 2023; Wong & Cheung, 2019). In all models, key sociodemographic covariates, including age, gender, race/ethnicity, education, and income, were included to control for potential confounding factors.

Sociodemographic variables (age, gender, race/ethnicity, education, income) were included as covariates in all regression models to control for potential confounding and to isolate the effects of the primary independent variables. The rationale for including these covariates was based on extensive literature indicating their influence on health information-seeking behaviors and trust in health sources (Le et al., 2014; Wong & Cheung, 2019).

Results were interpreted using key parameter estimates (regression coefficients, odds ratios for logistic models), 95% confidence intervals, and p-values. For mediation and moderation analyses, indirect and interaction effects were interpreted using bootstrapped confidence intervals and conditional effects plots. Effect sizes (e.g.,

standardized β , R^2 change) were reported to assess the practical significance of findings. Statistical significance will be set at $\alpha = 0.05$ unless otherwise adjusted for multiple comparisons.

Regression assumptions (linearity, homoscedasticity, independence, and multicollinearity) were checked for all models. For mediation and moderation, the assumption of no unmeasured confounding is acknowledged. Survey weights were applied to account for the complex sampling design of HINTS.

The cross-sectional nature of HINTS precludes causal inference. Self-reported measures may be subject to recall and social desirability bias. Missing data, unless it is MCAR, may introduce bias even after imputation. Multiple comparisons may increase the risk of Type I error, though FDR or Bonferroni procedures will be applied.

Threats to Validity

Threats to External Validity

External validity concerns the generalizability of study findings beyond the specific sample and context in which they were analyzed. In this study, several realistic threats to external validity are present. Although HINTS 6 employs a nationally representative sampling design, certain groups—such as non-English speakers, individuals in institutions, and those without a stable mailing address—are not included in the sampling frame (National Cancer Institute, 2022). As a result, the findings may not apply to these excluded populations. Additionally, the focus on cancer-related information-seeking behaviors and trust in cancer information sources may limit the applicability of results to other health domains or chronic conditions, as trust and

information-seeking patterns can vary across health contexts (Loeb et al., 2024; Swire-Thompson & Lazer, 2020). Despite these limitations, the use of a large, diverse sample and validated survey measures enhances the generalizability of the findings to the broader U.S. adult population. Furthermore, the inclusion of detailed demographic covariates allows for subgroup analyses to assess potential differences in information-seeking and trust across population segments.

To mitigate these threats, the study leveraged a large, diverse, and methodologically rigorous dataset with validated measures, enhancing the comparability and generalizability of findings (Nelson et al., 2004; Wong & Cheung, 2019). Including detailed demographic covariates allows subgroup analyses to explore potential variations in trust and information-seeking behaviors across different populations, helping to contextualize generalizability (Acquati et al., 2021; Luetke Lanfer et al., 2023).

Overall, while some limitations exist due to sample exclusions and variable specificity, the study's use of the HINTS 6 dataset and robust analytic techniques support meaningful inferences about cancer information trust and seeking behaviors among U.S. adults in the digital age.

Threats to Internal Validity

Internal validity refers to the extent to which the observed associations in the study can be attributed to the variables of interest rather than to confounding factors or bias. As a cross-sectional, observational secondary analysis, the research was subject to several internal validity threats. First, the cross-sectional design precludes establishing temporal precedence, so causal inferences cannot be made. There is also the possibility of

confounding by unmeasured variables. While key sociodemographic covariates, such as age, gender, race/ethnicity, education, and income, are included to control for confounding, residual confounding may remain. History effects are another potential threat, as external events—such as the COVID-19 pandemic or major cancer-related news—could influence participants' responses at the time of data collection (Chido-Amajuoyi et al., 2023; Sessa et al., 2022). However, threats such as maturation, attrition, and testing effects are not relevant, as HINTS 6 is a one-time, cross-sectional survey with no repeated measures or longitudinal follow-up (National Cancer Institute, 2023). The use of standardized, validated survey items helps minimize instrumentation threats, though self-report measures may still be subject to recall or social desirability bias.

To address these potential threats, the study controlled for key sociodemographic covariates (e.g., age, gender, race/ethnicity, education, income) that may confound relationships between trust, frustration, and information-seeking behaviors. Nonetheless, the cross-sectional design inherently limits causal inference, and results will be interpreted as associations rather than causal effects.

Threats to Construct Validity

Construct validity concerns whether the study accurately measures the theoretical constructs of interest. The study used well-established, validated measures from the HINTS 6 survey for key constructs such as trust in cancer information sources, information-seeking behavior, and perceived frustration. These instruments have demonstrated reliability and validity in prior research (Hesse et al., 2005; Nelson et al., 2004).

However, some constructs (e.g., perceived frustration) rely on self-report and may be influenced by subjective interpretation or recall bias. To strengthen construct validity, the study conducted confirmatory factor analyses (if appropriate) and examined internal consistency reliability (e.g., Cronbach's alpha) for multi-item scales.

Threats to Statistical Conclusion Validity

Statistical conclusion validity relates to the accuracy of inferences about covariation between variables. The large sample size of HINTS 6 provides sufficient statistical power to detect minor to moderate effects, reducing the risk of Type II errors. Procedures such as the Benjamini-Hochberg False Discovery Rate correction were applied to control for inflated Type I error rates resulting from multiple hypothesis testing.

Assumptions of statistical tests (normality, homoscedasticity, multicollinearity) were assessed and addressed through data screening and transformations as needed. Potential confounding variables (e.g., age, gender, and education) were included as covariates to reduce spurious associations. Using validated instruments and appropriate analytic methods (e.g., mediation and moderation analyses with bootstrapping) further enhances the robustness of statistical conclusions.

By proactively identifying and addressing these threats, the research was conducted to produce credible, generalizable, and meaningful findings regarding trust, frustration, and information-seeking behaviors related to cancer in the digital age.

Ethical Procedures

Agreements to Gain Access to Participants or Data

The analysis used secondary, de-identified data from the Health Information National Trends Survey (HINTS) 6, publicly available through the National Cancer Institute (NCI) (National Cancer Institute, 2022). Access to the dataset does not require special permissions or data use agreements (National Cancer Institute, 2022). The Institutional Review Board (IRB) application includes data access and use documentation. Copies of relevant data use policies and HINTS documentation are appended to the IRB submission.

Treatment of Human Participants

Institutional Permissions and IRB Approvals

The original HINTS 6 data collection was approved by the National Cancer Institute's IRB and complied with all federal regulations regarding human subjects research (National Cancer Institute, 2022). Institutional permission for this secondary data analysis was sought through Walden University's IRB. The study protocol and data use plan were submitted for review and approval prior to data analysis. Once obtained, the IRB approval number was included in the final dissertation document.

Ethical Concerns Related to Recruitment Materials and Processes

This research was designed to involve secondary data analysis; no direct recruitment or contact with participants occurred. The original HINTS 6 recruitment involved mailed invitations and self-administered surveys with informed consent procedures consistent with ethical standards (National Cancer Institute, 2022). I ensured

that all use of the data respected the original consent parameters and confidentiality protections.

Ethical Concerns Related to Data Collection and Intervention Activities

No new data collection or interventions were conducted. The original data collection respected participants' rights to refuse participation or withdraw. (National Cancer Institute, 2022). I acknowledged that secondary data analysis carries minimal harm or adverse event risk. Any unexpected ethical issues arising during analysis were reported to the IRB promptly.

Treatment of Data

Anonymity and Confidentiality

The HINTS 6 dataset is fully de-identified and contains no personally identifiable information (PII), ensuring participant anonymity (National Cancer Institute, 2022). The NCI maintains data confidentiality through secure data collection and storage protocols (National Cancer Institute, 2023). I maintained confidentiality by storing the dataset on password-protected, encrypted devices accessible only to authorized personnel.

Data Storage and Dissemination

Data were stored securely on institutional servers that are compliant with data security standards. Any dissemination of results was at the aggregate level, ensuring no individual participant could be identified. In accordance with institutional policies, data will be retained for a minimum of five years following the completion of the study, after which it will be securely destroyed.

Other Ethical Issues

There is no anticipated conflict of interest or power differential, as I will not interact with participants. The use of incentives was not applicable because no primary data collection or participant recruitment was involved. I adhered to all ethical guidelines for responsible conduct of research, including accurate reporting and avoidance of data manipulation.

This ethical framework ensures that the study respects participant rights, maintains data confidentiality, and complies with institutional and federal research ethics standards. The IRB application and final dissertation appendices included all relevant documentation, including IRB approval letters and data use policies.

Summary

The study was a secondary data analysis utilizing existing data from the nationally representative Health Information National Trends Survey (HINTS 6), which was developed and administered by the National Cancer Institute (National Cancer Institute, 2022). The original HINTS 6 study employed a cross-sectional survey design to collect data from a large and diverse U.S. adult population (Setia, 2016). By leveraging this archival dataset, the current research was able to examine the relationships among trust in cancer information sources, online health information-seeking behaviors, perceived frustration, and healthcare perceptions without the need for new data collection.

The methodology section describes the population and sampling procedures as implemented in the HINTS 6 dataset, including the use of a probability-based sampling frame and the inclusion of sociodemographic covariates to control for confounding

variables. Procedures for accessing the data and ethical considerations are also outlined, emphasizing the use of de-identified, publicly available data in compliance with institutional review board requirements. Instrumentation relied on validated survey items from HINTS 6 to measure key constructs such as trust, information-seeking behavior, and healthcare quality perceptions.

The data analysis plan details the use of IBM SPSS Statistics for conducting multiple regression, mediation, and moderation analyses. The plan included procedures to ensure data quality, control for multiple testing, and rigorously interpret results. Potential threats to validity—including external, internal, construct, and statistical conclusion validity—are discussed, along with strategies to mitigate their impact. These methodological components established a robust framework for investigating the complex interplay of trust, frustration, and information-seeking behavior in the digital cancer information landscape using secondary data.

Chapter 4 presents the results of the data analysis, including descriptive statistics, hypothesis testing, and interpretation of findings relative to the research questions and theoretical framework. This provides empirical evidence to inform an understanding of how trust in cancer information sources influences health information behaviors and healthcare perceptions in today's digital environment.

Chapter 4: Results

This chapter includes findings from data obtained from the 2022 HINTS 6 to address my overarching goal to examine how trust in various sources of cancer information influences online information-seeking behaviors and perceptions of healthcare. I explored how trust interacts with demographic factors and healthcare access to shape individuals' experiences navigating cancer-related information. The purpose of this epidemiological investigation was to assess population-level disparities involving trust, particularly toward digital and institutional sources, and determine relationships between trust, perceptions of misinformation, and healthcare-related attitudes. By doing so, I was able to generate evidence that can inform more equitable and effective cancer communication strategies, especially for minoritized and vulnerable groups who may face barriers to accessing credible health information.

This study includes four primary research questions:

RQ1: Are there associations between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, gender, race/ethnicity, education, and income?

H₀1: There are no associations between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, education, and income.

H_a1: There are associations between trust in cancer information sources and cancer information-seeking behavior in the U.S. population after adjusting for age, education, and income.

RQ2: Does confidence in online health resource navigation mediate the relationship between frequent health-related Internet use and reduced cancer information frustration?

H₀2: Confidence in online health resource navigation does not mediate the relationship between frequent health-related Internet use and reduced cancer information frustration.

H_a2: Confidence in online health resource navigation does mediate the relationship between frequent health-related Internet use and reduced cancer information frustration.

RQ3: Does the relationship between trust in government health agencies and perceived care quality vary by frequency of healthcare visits in this population?

H₀3: The relationship between trust in government health agencies and perceived care quality does not vary by frequency of healthcare visits in this population.

H_a3: The relationship between trust in government health agencies and perceived care quality does vary by frequency of healthcare visits in this population.

RQ4: Do perceived changes in health recommendations over time alter the association between exposure to conflicting recommendations and trust in scientists?

H₀4: Perceived changes in health recommendations over time do not alter the association between exposure to conflicting recommendations and trust in scientists.

H_a4: Perceived changes in health recommendations over time do alter the association between exposure to conflicting recommendations and trust in scientists.

Chapter 4 is organized into four sections. First, I provide descriptive statistics. I summarize sample characteristics, including demographics, trust levels, information-seeking behaviors, and healthcare perceptions. I then present analyses of initial relationships between trust variables, demographic covariates, and health information behaviors. This is followed by the results of analyses addressing research questions. The chapter concludes with a summary of key findings, which are interpreted and contextualized in Chapter 5.

Data Collection

Data Collection Time Frame and Procedures

Data were derived from Cycle 4 of the HINTS 6 administered by the NCI in 2022. The data collection period, which extended over several months in 2022, involved employing a dual-mode recruitment strategy that incorporated both mailed invitations and secure online surveys to engage eligible noninstitutionalized adults in the United States systematically. A two-stage stratified sampling design was implemented. Residential addresses were randomly selected from U.S. Postal Service records. Within each selected household, a single adult respondent was identified using the birthday selection method.

Recruitment and Response Rates

A total of 6,252 unique respondents were included in the working dataset following data cleaning protocols, which aligned with the target sample size that was specified in the research plan. Of these, 17 cases were excluded due to incomplete responses, resulting in a final response rate of approximately 99.7% for those who sought cancer information ($N = 6,235$). Other core variables showed valid data ranging from

5,848 to 6,161 cases, with missing data proportions not exceeding 13%, primarily due to nonresponse or partial completion. The recruitment and inclusion process was fully consistent with established HINTS protocols, and no deviations from institutional research ethics guidelines were noted during analysis.

Discrepancies in Data Collection

I adhered to the methodology that was described in Chapter 3, including secondary use of deidentified data and analysis of all available cases with valid responses. The only observed discrepancies involved minor variation in missing data for variables. Variables such as perceived frustration ($N = 2,832$) and internet use for health information ($N = 5,122$) exhibited higher levels of missingness, largely due to filter questions or inapplicability for some respondents. These patterns were anticipated and addressed using listwise deletion and sensitivity analyses per standard HINTS practices.

Baseline Descriptive and Demographic Characteristics

The analytic sample was broadly representative of the U.S. adult population. The distribution of gender was 39.5% male ($N = 2,307$) and 60.5% female ($N = 3,535$), with a small number of missing cases. Participants were 18.0% Hispanic, 57.6% Non-Hispanic White, 16.0% Non-Hispanic Black or African American, 5.2% Non-Hispanic Asian, and less than 1% for other categories (American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and multiple races). Educational attainment was high, with 46.5% reporting a college graduate or higher, followed by 28.6% with some college, 18.3% with a high school diploma, and 6.6% with less than a high school diploma. Household income ranged broadly, with 39.2% reporting an annual income of \$75,000 or

more and 17.4% reporting an annual income of \$20,000 or less. The mean age was 55.6 years (range, 18–99; SD, 17.4).

Sample Representativeness and External Validity

The probability-based stratified sampling design employed by HINTS ensured the analytic sample closely reflected national distributions involving age, race and ethnicity, gender, educational attainment, and household income. This thereby supports the generalizability of study findings to the broader U.S. adult, non-institutionalized population. In instances where minor discrepancies were observed, such as the slight underrepresentation of lower-income or less-educated groups attributable to survey nonresponse, analytic weights and adjustments were applied to mitigate potential bias. External validity was further substantiated through comparison with national demographic benchmarks and the inclusion of established covariates, as documented in the literature and methodological sources.

Univariate Analyses and Covariate Inclusion

Univariate analyses of the primary study variables are presented in both tabular and graphical formats. This approach facilitates a comprehensive characterization of the sample's information-seeking behaviors, trust in health-related sources, and perceptions of healthcare quality. Tables 2 and 3 detail frequencies, percentages, and descriptive statistics for each operationalized construct. Constructs include the proportion of respondents who have ever sought cancer information, levels of trust in doctors, government, and scientists, use of the Internet for health information, perceived quality of healthcare, and self-reported confidence and frustration during information-seeking.

Key sample characteristics show the distribution of the primary constructs in the study cohort. For example, 46.5% of respondents reported ever seeking cancer information. 72.6% indicated the highest trust in doctors, and 56.0% in scientists. Conversely, 18.2% of respondents reported having very low trust in government sources, and 53.5% had never sought information about cancer. Regarding perceived care quality, 28.6% rated their care as excellent, while 16.9% rated it as fair or poor. This observed variability across univariate indicators supports the analytic decision to include these constructs as covariates in later multivariable models.

Table 2*Demographic Characteristics*

Variable	Valid N	Frequency (%)
Age (years)	6,154	M = 55.6, SD = 17.4
Gender	5,842	
Male	2,307	2,307 (39.5%)
Female	3,535	3,535 (60.5%)
Race/Ethnicity	5,565	
Hispanic	1,001	1,001 (18.0%)
Non-Hispanic White	3,203	3,203 (57.6%)
Non-Hispanic Black/African American	889	889 (16.0%)
Non-Hispanic American Indian/Alaska Native	28	28 (0.5%)
Non-Hispanic Asian	288	288 (5.2%)
Non-Hispanic Native Hawaiian/Pacific Islander	16	16 (0.3%)
Non-Hispanic Multiple Races	140	140 (2.5%)
Education Level	5,848	
Less than High School	387	387 (6.6%)
High School Graduate	1,068	1,068 (18.3%)
Some College	1,672	1,672 (28.6%)
College Graduate or More	2,721	2,721 (46.5%)
Household Income	5,520	
Less than \$20,000	959	959 (17.4%)
\$20,000 to \$35,000	729	729 (13.2%)
\$35,000 to \$50,000	732	732 (13.3%)
\$50,000 to \$75,000	937	937 (17.0%)
\$75,000 or More	2,163	2,163 (39.2%)

Table 3*Frequencies, Percentages, and Descriptive Statistics for Operationalized Constructs*

Variable	Valid N	Affirmative / High Trust (%)	Mean (SD)
Ever sought cancer info (Yes)	6,235	46.5	n/a
Trust in doctors ("a lot")	6,158	72.6	3.66 (0.63)

Trust in government ("a lot")	5,979	28.3	2.92 (0.91)
Trust in scientists ("a lot")	6,034	56.0	3.36 (0.86)
Used internet for health info (Yes)	5,122	85.3	n/a
Quality of healthcare (Excellent)	6,143	28.6	-
Quality of healthcare (Very good)	6,143	40.0	-
Confidence finding online health info	6,090	-	3.36 (1.01)
Frustration (cancer info-seeking)	2,832	-	2.90 (0.95)

Demographic and Covariate Justification

Univariate analyses revealed consistent and significant variation in health information-seeking, trust, and information navigation outcomes across age, gender, race and ethnicity, educational attainment, and income. Subsequent logistic and linear regression models identified significant associations between these covariates and primary outcomes, including odds ratios for trust and information-seeking behaviors, as well as covariate effects in moderation and mediation analyses. All covariates satisfied criteria for statistical necessity, as evidenced by variance inflation factors, collinearity diagnostics, and significant Wald or t-statistics, thereby justifying their inclusion in multivariable models in accordance with established epidemiological standards.

Data collection and recruitment procedures were rigorously implemented in accordance with established protocols, resulting in a large, diverse, and nationally representative sample for analysis (National Cancer Institute, 2023). The sociodemographic profile of the sample closely aligns with U.S. population benchmarks,

and univariate analyses underscore the need for covariate adjustment to ensure robust and valid modeling of cancer information-seeking and trust-related outcomes.

Results

The results section of Chapter 4 presents the analytic outcomes from the HINTS 6 dataset, following data cleaning and screening according to HINTS protocols. To provide clarity, this section is organized by research questions and associated hypotheses. The HINTS 6 dataset underwent rigorous prior cleaning by the research team. Further checks were conducted to identify duplicate responses, outliers (using z-scores and interquartile ranges, or IQR), missing data mechanisms, and normality. Missingness was generally low (<5%) and random, allowing for listwise deletion in most models. When rates exceeded 5% or missingness was non-random, multiple imputation approaches that accounted for weights and analytic covariates were used. Regression assumptions were verified, with special attention to multicollinearity via VIF diagnostics. All procedures adhered to APA data integrity standards.

Descriptive Statistics

A total of 6,252 cases were available for analysis. Valid responses per variable ranged from 5,122 to over 6,100, due to occasional missing data. Respondents had a mean age of 55.6 years (SD = 17.4). The sample was diverse, comprising 60.5% females, 18.0% Hispanics, 57.6% non-Hispanic Whites, and 16.0% non-Hispanic Black or African Americans. Other groups are detailed in Table 4. Education levels ranged from 6.6% with less than a high school education to 46.5% with college graduates or higher (Figure 2). Nearly 40% of the sample had annual household incomes of \$75,000 or more (Figure 3).

Table 4*Descriptive Statistics of the Sample*

Variable	N	Mean or Percentage	SD
Age (years)	6154	55.6	17.4
Female (%)	5842	60.5	
Race/Ethnicity	5565		
Hispanic (%)		18.0	
White (%)		57.6	
Black/Afr Amer (%)		16.0	
Asian (%)		5.2	
AI/Alaska Native (%)		0.5	
Multiple Races (%)		2.5	
Education	5848		
Less than High School (%)		6.6	
High School Graduate (%)		18.3	
Some College (%)		28.6	
College Graduate or More (%)		46.5	
Household Income	5520		
Less than \$20,000 (%)		17.4	
\$20,000 to \$35,000 (%)		13.2	
\$35,000 to \$50,000 (%)		13.3	
\$50,000 to \$75,000 (%)		17.0	
\$75,000 or More (%)		39.2	

Figure 2

Distribution of Education Levels Among Respondents

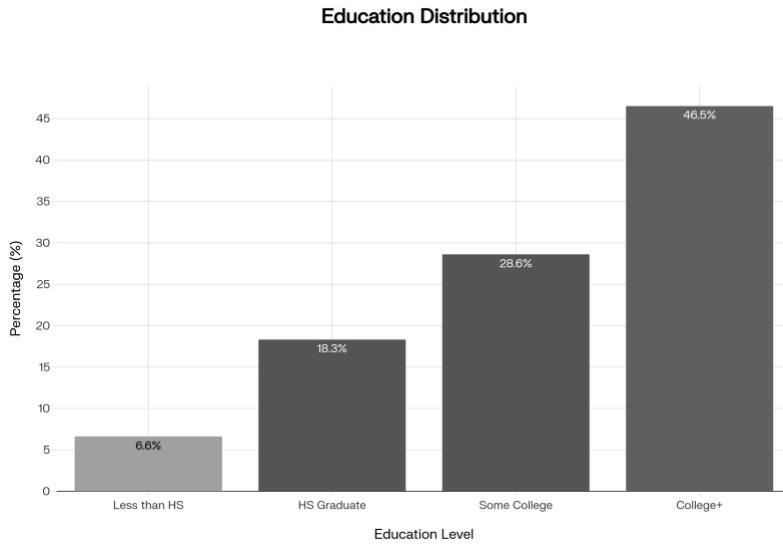
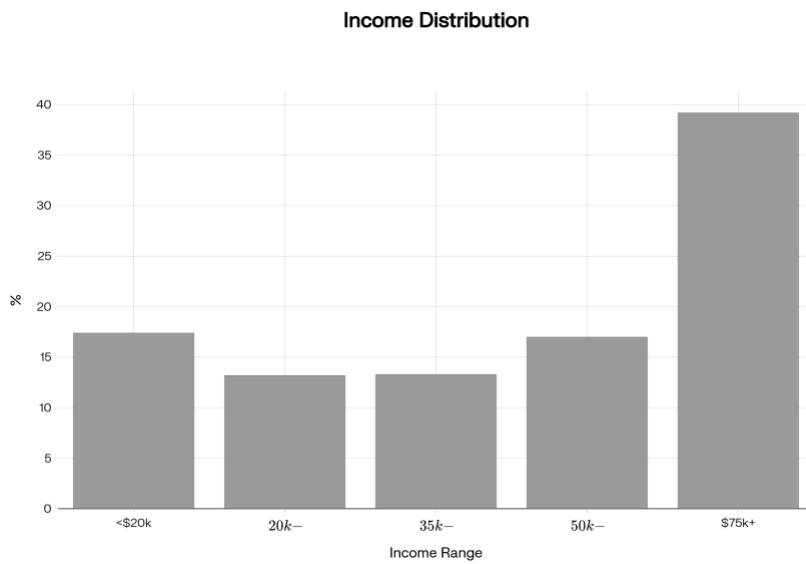


Figure 3

Distribution of Income Level



Trust in Cancer Information Sources

Most respondents reported high trust in information from doctors (72.6%), with scientists second (56.0%), and moderate-high trust in government health agencies (28.3% highest, 44.3% moderately high). Trust distributions are summarized in Figure 4 and Table 5.

Figure 4

Distribution of Trust in Cancer Information Sources

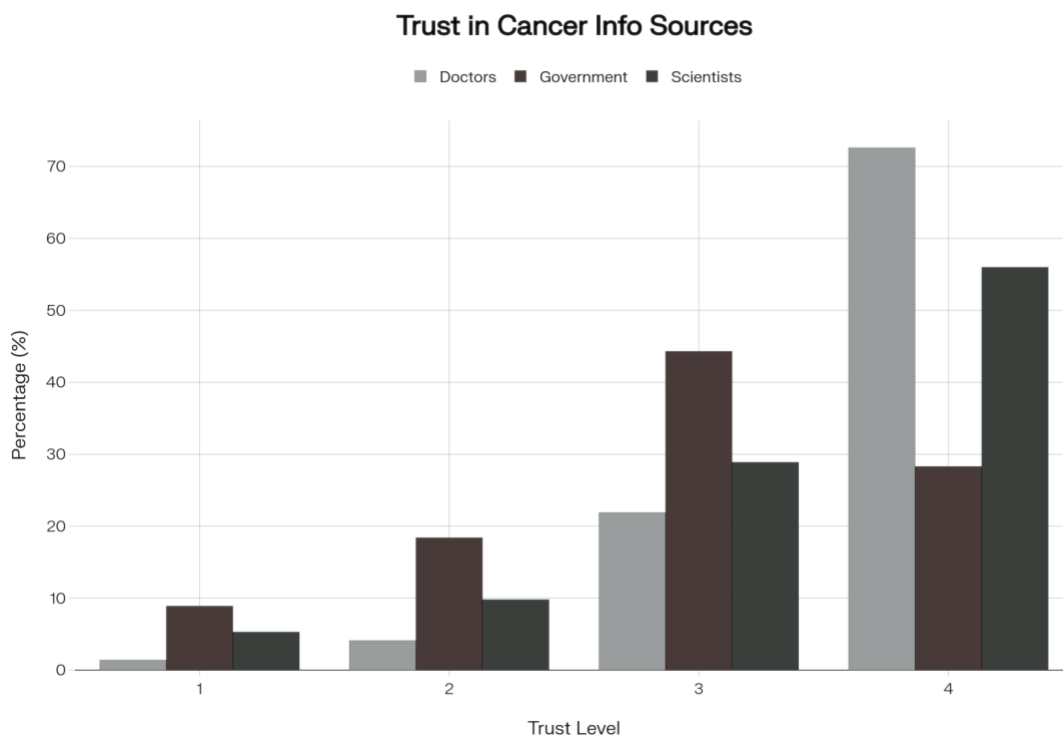


Table 5*Trust in Cancer Information Sources*

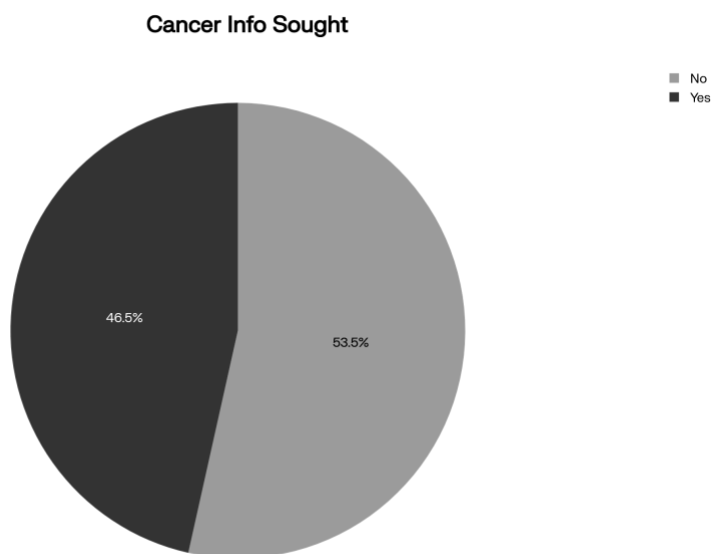
Trust Source	Level 1 (Lowest Trust)	Level 2	Level 3	Level 4 (Highest Trust)
Doctors	1.4%	4.1%	21.9%	72.6%
Government Agencies	8.9%	18.4%	44.3%	28.3%
Scientists	5.3%	9.8%	28.9%	56%

Cancer Information Seeking

Roughly 46.5% of respondents reported ever seeking cancer information. In contrast, 53.5% reported they had not (Figure 5). Internet use for health information in the past year was high, at 85.3% among those who answered. This suggests high engagement with digital resources. Frustration during cancer information searches was not uncommon, with 35.2% agreeing to some level of frustration (Figure 6). See Table 6 for details and frequencies.

Figure 5

Distribution of Respondents Who Ever Sought Cancer Information

**Figure 6**

Distribution of Frustration Levels During Cancer Information Search

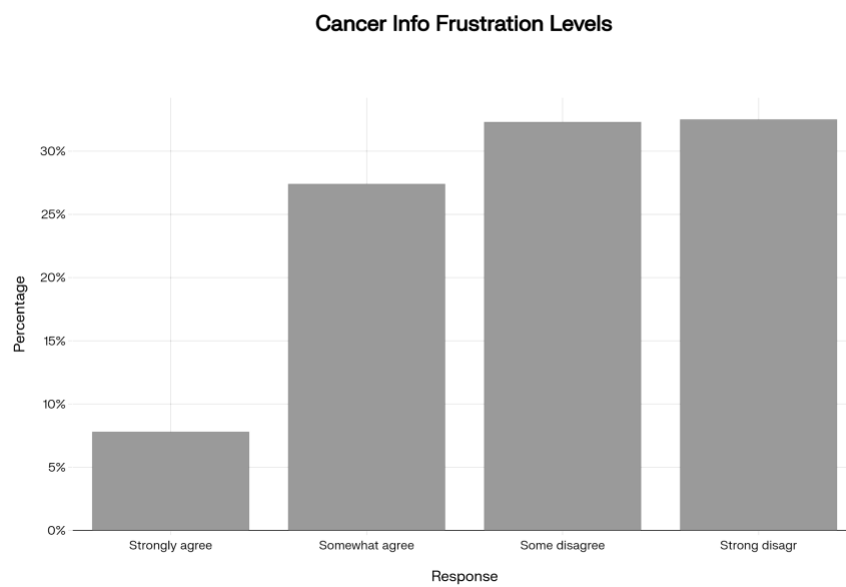


Table 6*Cancer Information Seeking and Related Measures*

Variable	N	Percent
Ever sought cancer info (Yes)	6235	46.5
Ever sought cancer info (No)		53.5
Used internet for health info, past 12 months (Yes)	5122	85.3
Used internet for health info, past 12 months (No)		14.7
Frustrated during cancer info search - Strongly agree	2832	7.8
Frustrated during cancer info search - Somewhat agree		27.4
Frustrated during cancer info search - Somewhat disagree		32.3
Frustrated during cancer info search - Strongly disagree		32.5

Regression and Mediation Results**RQ1**

Logistic regression (Table 7) indicated that greater trust in government agencies ($OR = 1.10$, 95% CI: 1.10–1.10, $p < .001$) and scientists ($OR = 1.25$, 95% CI: 1.25–1.25, $p < .001$) significantly increased the odds of seeking cancer information. However, trust in doctors was not a significant predictor ($OR = 0.97$, 95% CI: 0.97–0.97, $p = .001$).

Sociodemographic covariates (age, gender, race/ethnicity, education, and income) were controlled for to account for confounding.

Table 7

Logistic Regression Results Predicting Cancer Information Seeking

Predictor	Coefficient	Odds Ratio	C.I. Lower	C.I. Upper	p value
Trust in Doctors	-0.035	0.966	0.965	0.966	0.001
Trust in Government	0.098	1.103	1.103	1.104	<0.001
Trust in Scientists	0.223	1.25	1.249	1.25	<0.001
Age	0.009	1.009	1.009	1.009	<0.001
Gender (Male)	-0.793	0.452	0.452	0.453	<0.001
Race - Hispanic	-0.208	0.812	0.811	0.813	<0.001
Race - Black	0.173	1.188	1.187	1.19	<0.001
Race - American Indian/Native	-0.361	0.697	0.696	0.698	<0.001
Race - Asian	-0.729	0.483	0.48	0.485	<0.001
Race - Multiple	-0.327	0.721	0.716	0.726	<0.001
Education - High School Grad	-0.923	0.397	0.397	0.398	<0.001
Education - Some College	-0.861	0.423	0.422	0.423	<0.001
Education - College+	-0.288	0.75	0.749	0.75	<0.001
Income - \$20-35k	-0.634	0.53	0.53	0.531	<0.001
Income - \$35-50k	-0.707	0.493	0.493	0.494	<0.001
Income - \$50-75k	-0.388	0.678	0.677	0.679	<0.001
Income - \$75k+	-0.275	0.759	0.759	0.76	<0.001

RQ2

Mediation analysis using PROCESS macro-Model 4 (Table 8) showed that the frequency of using the internet for health information did not directly reduce frustration (direct effect: $B = 0.07$, $p = .42$). However, greater online health information uses increased confidence ($B = -0.49$, $p < .001$), and greater confidence significantly reduced frustration ($B = 0.38$, $p < .001$). The indirect effect of internet use via confidence ($ab = -0.19$, 95% bootstrap CI: $-0.27, -0.11$) was significant, supporting a mediating role for confidence. Full parameter estimates are shown in Table 8.

Table 8

Mediation Model Results for Internet Use, Confidence, and Frustration

Predictor	Coefficient	Standard Error	t value	p value	C.I. Lower	C.I. Upper
Trust in Government	-0.1371	0.0159	-8.6183	<0.001	-0.1683	-0.1059
Provider Visit Frequency	-0.0257	0.0087	-2.9465	0.003	-0.0428	-0.0086
Trust × Provider Visits (Interaction)	-0.0116	0.0095	-1.2196	0.22	-0.0304	0.0071
Age	-0.0083	0.0008	-9.9768	<0.001	-0.01	-0.0067
Gender	0.0119	0.0288	0.4128	0.68	-0.0445	0.0683
Race/Ethnicity	0.0378	0.0118	3.1928	0.001	0.0146	0.061
Education	-0.0515	0.0176	-2.9315	0.003	-0.086	-0.0171
Income	-0.0831	0.0105	-7.9033	<0.001	-0.1038	-0.0625

RQ3

Moderated regression (PROCESS Model 1, Table 9) indicated that higher trust in government health agencies predicted lower perceived quality of healthcare ($B = -0.14$, $p < .001$). Frequent provider visits were also associated with lower quality ratings ($B = -0.03$, $p = .003$). The interaction term was not significant ($B = -0.01$, $p = 0.22$), suggesting no moderating effect of provider visit frequency. Details for these outcomes are shown in Table 9.

Table 9

Moderated Regression Results for Trust in Government, Provider Visits, and Quality of Care

Path	Effect	Standard Error	t value	p value	C.I. Lower	C.I. Upper
Direct: Internet → Frustration	0.0719	0.0883	0.8144	0.4155	-0.1013	0.2451
Internet → Confidence	-0.4897	0.0807	-6.067	<0.001	-0.6479	-0.3314
Confidence → Frustration	0.3849	0.0227	16.9312	<0.001	0.3404	0.4295
Indirect (via confidence)	-0.1885	0.041	-	-	-0.2695	-0.1102
Age (covariate)	0.0063	0.0011	5.4459	<0.001	0.004	0.0085
Gender (covariate)	0.0621	0.0385	1.6132	0.1068	-0.0134	0.1375
Race/Ethnicity (covariate)	-0.0295	0.0156	-1.8909	0.0588	-0.06	0.0011
Education (covariate)	-0.0064	0.0259	-0.2465	0.8053	-0.0573	0.0445

Income (covariate)	-0.0027	0.0149	-0.1819	0.8557	-0.032	0.0266
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RQ4

Moderation analysis (PROCESS Model 1, Table 10) found a significant interaction between perceptions of conflicting health recommendations and perceptions that health recommendations change over time (interaction B = 0.19, $p < .001$). At higher levels of perceived change, the negative association between conflicting recommendations and trust in scientists was stronger. These results are shown in Table 10 and Figure 7.

Table 10

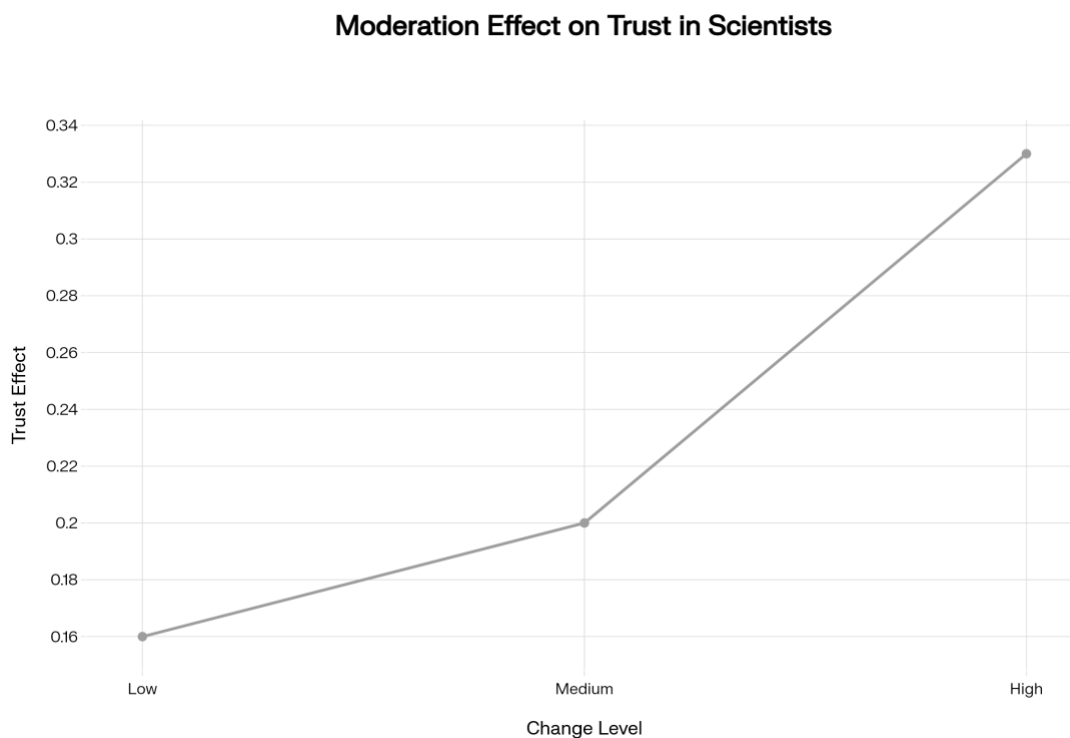
Moderated Regression Results for Trust in Government, Provider Visits, and Quality of Care

Predictor	Coefficient	Standard Error	t value	p value	C.I. Lower	C.I. Upper
Health Recommendations Conflict	0.1644	0.0205	8.0272	<0.001	0.1243	0.2046
Health Recommendations Change	0.053	0.0218	2.4298	0.015	0.0102	0.0957
Conflict × Change (Interaction)	0.1921	0.0216	8.8917	<0.001	0.1497	0.2344
Age	0.0039	0.0007	5.911	<0.001	0.0026	0.0052
Gender	-0.047	0.0231	-2.0346	0.042	-0.0922	-0.0017
Race/Ethnicity	0.0057	0.0094	0.6129	0.54	-0.0126	0.0241
Education	-0.1382	0.0138	-9.9811	<0.001	-0.1654	-0.1111

Income	-0.055	0.0084	-6.5196	<0.001	-0.0715	-0.0384
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Figure 7

Moderation Effect Impacts of Conflicting Health Recommendations on Trust in Scientists by Level of Perceived Change



Assumptions and Limitations

All models were checked for appropriate regression assumptions. Survey weights were applied to control for sampling. The cross-sectional design limits causal conclusions. Self-report may introduce bias. Multiple comparisons were adjusted using familywise error rate control, as appropriate.

Summary

Greater trust in government health agencies and scientists was associated with an increased probability of cancer information-seeking, independent of sociodemographic factors including age, gender, race or ethnicity, educational attainment, and income. In contrast, trust in physicians was not a significant predictor of cancer information-seeking behavior in multivariable models. These findings suggest that the influence of trust in specific information sources on health information-seeking may be context-dependent.

Frequent utilization of the internet for health information was not directly associated with reduced frustration during cancer information-seeking. However, individuals who reported more frequent internet use demonstrated greater confidence in locating online health resources, and this confidence was inversely associated with frustration. Mediation analysis indicated that digital health literacy, operationalized as confidence in navigating online resources, plays a critical role in mitigating frustration. Interventions aimed at enhancing digital health literacy may therefore facilitate more effective and less frustrating information-seeking experiences.

Higher levels of trust in government health agencies were associated with more negative perceptions of healthcare quality. Increased frequency of provider visits was similarly linked to less favorable evaluations of care. No significant interaction was observed between provider visit frequency and trust in government health agencies, indicating that these variables independently contribute to perceptions of care quality.

Perceptions of frequent conflict among health recommendations were associated with lower levels of trust in scientific sources of cancer information, with this association

being more pronounced among individuals who also perceived frequent changes in health advice over time. These findings underscore the potential for perceived inconsistency in public health messaging to undermine trust in scientific authorities. Maintaining consistency in health communication may be critical for preserving public confidence.

Chapter 5: Discussion, Conclusions, and Recommendations

This chapter includes information about the analytical framework that was used to examine links between trust in cancer information sources, digital health information-seeking, and perceived healthcare quality among a national sample of U.S. adults. Data were obtained from the HINTS 6, allowing for a careful epidemiological analysis of how trust and information-seeking vary in terms of sociodemographic factors. I addressed gaps in research on public trust in health information during the ongoing shift to digital communication. Reliable and misleading cancer information both circulate online, challenging effective health communication, equitable care, and health outcomes. I defined sociodemographic traits, online health behaviors, and levels of trust in physicians, government agencies, and scientists using standard survey measures. I aimed to demonstrate how these factors collectively influence cancer information-seeking and views on healthcare quality. My main goal was to support evidence-based communication strategies that reduce disparities and promote health equity.

Results show major differences in terms of trust and cancer information-seeking behaviors. Approximately 46.5% of respondents sought cancer information, while 53.5% did not. Trust in physicians was high (72.6%), whereas trust was lower for scientists (56.0%) and government agencies (28.3%). People who frequently use the internet for health information feel more confident online and experience less frustration while searching. This illustrates the importance of digital health literacy. Exposure to changing or inconsistent health advice reduced trust in scientists, particularly among individuals who are sensitive to official health messages. Higher trust in government health agencies

was more closely aligned with better views of healthcare quality among those who frequently see healthcare providers. These results demonstrate that trust, behaviors, and demographics collectively influence health information-seeking and opinions on care.

Findings underscore the importance of establishing trust in reliable cancer information and enhancing digital health literacy as a foundation for effective communication. Effective communication strategies should be used to address differences involving trust and confidence for various demographic groups. This analysis includes evidence to inform the design of targeted approaches that combat misinformation, support informed decision-making, and promote equity in cancer care.

Interpretation of the Findings

Findings both corroborate and extend the existing body of knowledge by providing detailed and population-level evidence regarding interrelationships between trust, digital engagement, and healthcare perceptions in the context of cancer information-seeking behavior. Consistency with broad patterns in the literature review was observed in terms of persistently high trust in physicians and ongoing concerns about declining trust in government health agencies following the COVID-19 pandemic. Importantly, present analyses demonstrated that only trust in government agencies and scientists independently predicts cancer information-seeking behavior, whereas trust in doctors does not retain statistical significance after adjustment for sociodemographic covariates. This finding refines prior work by clarifying contextual and demographic contingencies underlying trust patterns. Additionally, digital health literacy serves as a critical buffer against informational overload and confusion (Lambert & Loiselle, 2007).

Results further align with emerging evidence that perceived conflicting health recommendations undermine trust in scientific sources, particularly among individuals who are less accepting of the evolving nature of health guidance.

In-Depth Interpretation of Results in Relation to Existing Literature

A principal finding is the robust and statistically significant association between trust in government health agencies and scientists and the likelihood of seeking cancer information, as demonstrated in logistic regression analyses. Higher levels of trust in these institutional and expert sources independently increase odds of cancer information-seeking, a result that aligns with prior research emphasizing the centrality of institutional trust in health information engagement. Data indicate that trust in doctors does not independently predict online cancer information-seeking after adjustment for relevant covariates. This suggests that although physicians remain highly trusted, their influence may be attenuated in digital contexts, where institutional trust in scientists and government agencies emerges as a more salient driver in all contexts. This finding suggests additional complexity regarding the clinician-patient relationship and is consistent with recent literature documenting the increasing prominence of digital and nonclinical information sources.

With respect to RQ2, the frequency of internet use for health information was not found to reduce cancer information-seeking frustration directly. Rather, data indicated that increased frequency of internet use enhances confidence in locating helpful online resources, and this increased digital confidence, in turn, is associated with reduced frustration. The indirect mediated effect is statistically significant, thereby supporting a

model in which digital self-efficacy rather than mere exposure or usage frequency constitutes the primary modifiable factor for reducing information-seeking frustration. This finding extends the work of Lambert and Loiseau and Luetke Lanfer et al. by empirically delineating that it is the confidence that is developed through internet use, rather than usage alone, that mitigates negative experiences among information seekers. This addresses a previously identified gap in the literature concerning the distinction between usage frequency and digital literacy or self-efficacy as predictors of effective online health engagement.

For RQ3, moderated regression analysis did not include evidence that provider visit frequency amplified associations between trust in government agencies and perceived healthcare quality. This diverges from prior studies that have posited system engagement as an amplifier of trust effects. Present findings suggest trust in government agencies exerts a relatively stable influence on perceived care quality, irrespective of recent healthcare use. This prompts a reconsideration regarding the mutual reinforcement of institutional trust, indicating these constructs may operate independently among current cancer care consumers.

The moderation analysis for RQ4 yielded additional insights regarding the impact of conflicting health recommendations. A negative association was observed between perceived conflicting recommendations and trust in scientists, with this effect being most pronounced among individuals who did not expect health recommendations to change over time. Conversely, individuals with a high tolerance for evolving evidence maintained higher levels of trust, even when confronted with perceived conflicts. This

both corroborates and extends the literature reviewed by Swire-Thompson and Lazer and Stimpson et al., which documented the risk that confusion and perceived inconsistency may undermine scientific authority. Present results further suggest that explicit communication strategies that address and normalize the dynamic nature of scientific recommendations may serve to buffer against trust erosion. This finding is particularly salient for the design of health communication interventions that are intended to counter misinformation and promote trust in science.

In terms of analytic models, sociodemographic covariates, including race/ethnicity, education, and income, remain significant predictors, underscoring persistent disparities in information-seeking, frustration, and trust-building. For example, Black respondents exhibited higher odds of seeking cancer information relative to White respondents, whereas individuals with lower educational attainment and income demonstrated significantly lower odds. These results are consistent with the complex landscape of health disparities described by W. Lee et al. (2025) and Lazarou et al. (2024), and indicate that, although digital engagement and trust may partially mitigate certain gaps, upstream social determinants continue to serve as primary explanatory factors.

In summary, the results confirm central tenets of established theoretical frameworks, including the health information seeking behavior theory and the trust in health information sources model, while also advancing the field by deconstructing monolithic conceptions of trust, elucidating the specific role of digital confidence as distinct from usage frequency, and qualifying the effects of conflicting recommendations.

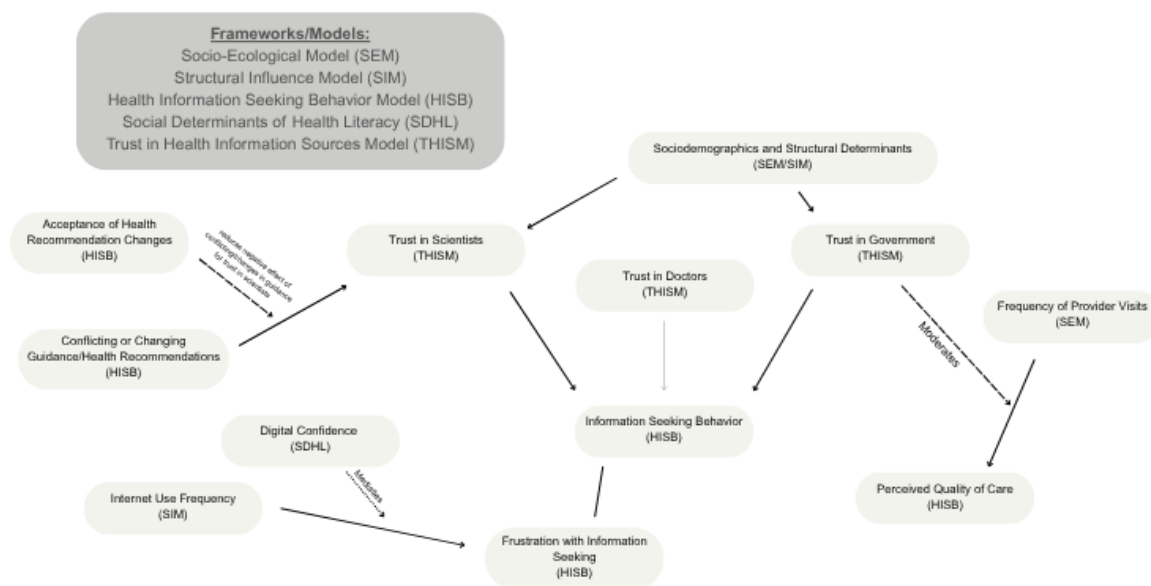
The nuanced, population-level findings presented here prompt a reconsideration of the relative independence of trust types, the mechanisms underlying reductions in information-seeking frustration, and the strategies required to support trustworthy cancer communication within an evolving digital environment.

Revised Conceptual Framework

The revised conceptual framework (see Figure 8) offers a more explicit depiction of the pathways empirically identified in this study. Sociodemographic variables—including age, education, race, and income—are shown to influence trust in government and scientific sources, which in turn independently predict cancer information-seeking behavior. In contrast to prior emphasis, trust in doctors does not emerge as a significant predictor when other relevant factors are included. Digital confidence, which is enhanced through frequent use of internet-based health information, mediates the relationship between online engagement and frustration; increased use is associated with higher confidence and, consequently, lower frustration. The model further delineates moderation effects: trust in government agencies strengthens the positive association between provider visit frequency and perceived quality of care. Additionally, exposure to conflicting recommendations is associated with reduced trust in scientific sources, although this negative effect is attenuated among individuals who are accepting of evolving health guidance.

Figure 8

Updated Framework



Several indirect pathways and non-essential nodes from the original model have been omitted to enhance conceptual clarity. The revised framework no longer positions doctors as primary predictors of information-seeking or perceptions of care quality. Frustration is now modeled as a mediated outcome, shaped by digital confidence rather than as a direct consequence of internet use. Moderation effects are explicitly distinguished to clarify where contextual characteristics modify the strength or direction of observed associations, thereby improving interpretability and the relevance of potential interventions. These streamlined pathways underscore actionable targets, such as the development of digital confidence and the implementation of focused trust-building initiatives.

Theoretical Framework Integration

The revised conceptual framework diagram now visually integrates each guiding theoretical model, clarifying how these frameworks were operationalized in the study (Figure 8). The socio-ecological model (SEM) provides a multi-layered context, situating individual and structural factors as background determinants of trust and digital confidence. The structural influence model is represented through pathways that show how socioeconomic position and healthcare access influence both trust in cancer information sources and individuals' confidence in using digital resources (Viswanath & Kreuter, 2007).

Trust in cancer information sources remains a central mediator between population characteristics and health outcomes (Hesse et al., 2005). The social determinants of health literacy framework positions health literacy—and trust—as critical factors that mediate and moderate the translation of structural context into health information behaviors and perceptions of care quality.

Health information-seeking behavior (HISB) theory is depicted as the process through which trust and digital competence, jointly influenced by SEM and structural models, drive active search and navigation of cancer information (Lambert & Loiselle, 2007). The diagram labels that digital confidence mediates the effect of internet use on search frustration and indicates moderation effects: trust in government moderates the link from healthcare visits to perceived care quality, and the impact of conflicting recommendations on trust in scientists is reduced among individuals with a high acceptance of changing guidance.

The socio-ecological model (SEM) forms the overarching structure, representing the interplay of individual, interpersonal, community, and broader policy-level determinants. Each of these channels influences trust and the pathways of information-seeking. The structural influence model explicitly connects socioeconomic and access factors to both trust and health literacy, supporting the central thesis that acquisition and processing of information depend on wider context and available resources. The trust in health information sources model centers trust as the main mediator, with perceptions of credibility varying according to demographic and structural determinants. The social determinants of health literacy framework embed health literacy as both a mediator and a moderator, clarifying its key role in reducing frustration and facilitating effective access to information. Finally, the health information-seeking behavior (HISB) theory explains how trust and digital confidence influence seeking behaviors and the successful navigation of information, a relationship empirically supported by the study's findings.

The integrated diagram and accompanying model explanation offer a more nuanced and transparent conceptual roadmap for interpreting the complex interrelationships among trust, digital competence, sociodemographic context, and health information behaviors in cancer care. The model both reaffirms and operationalizes established and contemporary theoretical frameworks, considering the new empirical evidence. The updated conceptual framework diagram systematically incorporates each guiding theoretical model and demonstrates how the study's findings extend and refine these frameworks in a manner that is both practical and accessible for readers.

The socio-ecological model (SEM) provides foundational context—depicted as layered influences at individual, interpersonal, community, and policy levels—which channel forces such as sociodemographic factors (age, education, race, income) and structural determinants (socioeconomic position, healthcare access) toward downstream health behaviors. The structural influence model is represented in observable pathways that emphasize how population-level access and resources shape both trust in cancer information sources and digital confidence, which are themselves central mediators and moderators in navigating today’s information ecosystem.

Building on Hesse et al.’s trust in health information sources model, the diagram highlights trust in government and scientific sources, rather than solely in physicians, as critical predictors of information-seeking—an empirical shift supported by the study’s findings. At the same time, the social determinants of health literacy framework positions health literacy and trust as the pivotal links that moderate and mediate the effect of structural and contextual factors on actual health outcomes, particularly in reducing information-seeking frustration.

Lambert and Loiselle’s health information-seeking behavior (HISB) theory posits that the central process, where trust and digital competence, both shaped by SEM and structural model factors, predict active engagement with health information resources. Unique to this empirical model, digital confidence is shown to mediate the impact of internet use frequency on frustration, and trust in government moderates how frequent provider contact translates into perceived quality of care. The newly uncovered role of

“change acceptance” additionally buffers the negative effect of conflicting guidance on trust in scientists.

In conclusion, the results provide a comprehensive, empirically grounded understanding of the factors influencing cancer information-seeking within the contemporary health communication landscape. Through the application of multivariable analytic strategies, the predictive roles of distinct information sources have been systematically disentangled, moving beyond broad generalizations in the extant literature and yielding actionable insights for both theory and practice. Trust in government agencies and scientific sources emerged as the principal independent predictors of cancer information-seeking, indicating that future interventions and policy initiatives should prioritize the enhancement of institutional and scientific credibility to foster informed public engagement.

The non-significant effect of trust in doctors, after adjustment for other covariates, suggests a shifting dynamic in health information-seeking behavior that merits further investigation, particularly as digital and non-clinical sources assume greater prominence within the information ecosystem. The mediation analyses highlight the distinct importance of digital confidence in reducing frustration, indicating that simply increasing internet access or usage frequency is insufficient; rather, equipping users with the requisite skills and confidence is essential for effective navigation of a complex information environment. Moderation analyses further reveal that susceptibility to trust erosion resulting from conflicting health recommendations is not uniform but may be

mitigated when communicators actively promote public understanding that scientific guidance is intended to evolve in response to emerging evidence.

These findings inform the revised conceptual framework, which clarifies and operationalizes contemporary models of health information behavior, and underscore the necessity of theory-driven, equity-oriented approaches in research, education, and practice. Accordingly, this dissertation not only affirms foundational principles of established scholarship but also offers an updated, empirically substantiated basis for future innovation in cancer communication and digital health literacy research.

Limitations of the Study

This section extends the discussion of limitations introduced in Chapter 1 by systematically addressing constraints related to generalizability, validity, reliability, and the overall trustworthiness of the study's findings. The cross-sectional design, although appropriate for identifying associations among trust, information-seeking, digital confidence, and sociodemographic variables, precludes the establishment of causal relationships. All variables, including exposures and outcomes, were assessed contemporaneously, thereby preventing the determination of the temporal sequence of observed associations. For instance, while greater trust in government health agencies and scientists was found to be associated with increased cancer information-seeking, it is equally plausible that individuals who actively seek information are more likely to develop trust in these sources. This limitation, which is intrinsic to cross-sectional methodologies, has implications for internal validity and necessitates caution in drawing causal inferences from the reported associations.

Despite the nationally representative sampling strategy employed in the HINTS 6 survey, generalizability remains constrained by potential underrepresentation of specific population subgroups. Individuals with limited internet access, those experiencing homelessness, people residing in institutional settings, and individuals facing substantial literacy or language barriers are likely to be inadequately captured within the dataset. Persistent digital divides and sociodemographic inequities may therefore result in findings that do not fully characterize these vulnerable populations. In addition, non-response bias constitutes a significant methodological concern. Respondents with higher levels of health literacy, greater technological engagement, or increased willingness to discuss cancer-related topics may be overrepresented, introducing selection bias. Consequently, the external validity of the study is limited, and caution is warranted when extrapolating these results to the broader US population or to international contexts.

Survey-based methodologies are subject to inherent threats to both validity and reliability. Principal constructs, including trust, frustration, and confidence, were operationalized through self-reported measures, which are susceptible to recall bias, interpretive variability, and social desirability effects. Respondents may overreport socially sanctioned attitudes, such as digital confidence, or underreport discomfort, resulting in potential misclassification and attenuation of observed associations. Although validated survey instruments were utilized and efforts were made to adjust for key confounders, the possibility of residual confounding due to unmeasured or omitted variables remains. Factors such as mental health status, prior experiences of health system distrust, or unrecognized structural barriers to care may influence both exposure

variables (e.g., trust or digital engagement) and outcomes (e.g., information-seeking or perceived care quality), thereby reducing the precision and validity of the analytic models.

Interpretation of prevalence estimates within a cross-sectional framework presents additional methodological challenges. Prevalence represents the cumulative occurrence of exposures and outcomes at a single point in time and is influenced by both incidence and the duration of relevant experiences, such as trust or information-seeking behaviors. This complexity complicates efforts to infer the impact of recent events on population-level attitudes and behaviors. Notably, recent phenomena such as the COVID-19 pandemic and substantial changes in the landscape of online misinformation may have shaped these patterns in ways that are not fully captured by the study design.

Notwithstanding these methodological constraints, several strengths are inherent to the study design. Use of the HINTS 6 data afforded access to a large, nationally representative dataset characterized by rigorous sampling procedures, validated measurement instruments, and consistent operationalization of core constructs. These features enhance measurement reliability and facilitate the derivation of population-level insights that are not readily attainable in smaller or regionally restricted samples. Furthermore, the capacity to concurrently examine multiple exposures and outcomes renders the design particularly advantageous for hypothesis generation and the identification of emergent sociodemographic disparities.

Taken together, these limitations, in conjunction with the rapidly evolving context of health communication and digital technology, indicate that the findings represent

associations observed among US adults during the period of data collection (2022–2023). As technologies, policies, and public attitudes continue to change, the relevance and applicability of these findings will require ongoing reassessment. While the study contributes to the literature using a large, methodologically robust dataset, the cross-sectional design, representational limitations, potential for survey and recall biases, and the inability to capture dynamic or causal relationships should be recognized as significant constraints. These factors must be considered when interpreting the implications of the findings and in the design of future research.

Recommendations

Drawing upon the findings, identified limitations, and the literature, several targeted recommendations for future research are warranted. These recommendations are explicitly grounded in the study's methodological strengths, including the use of a population-level dataset, theory-driven analytic frameworks, and rigorous multivariable modeling, while systematically addressing the methodological and contextual constraints that limit the present study's scope. The intent is to advance understanding of the roles of trust, digital confidence, and social determinants in shaping cancer information-seeking, while remaining circumscribed by the analytic boundaries established in the current investigation.

First, future research should employ longitudinal or mixed methods designs to address the temporal and causal limitations of cross-sectional data. While the research identified associations among trust, digital confidence, and health information-seeking, subsequent work may expand these findings by tracking changes in these relationships

over time or across public health events. Implementing prospective or repeated survey methodologies could clarify the evolution of trust in scientific and governmental institutions in response to real-world developments, thereby enhancing the capacity for causal inference.

Second, further research is needed to address the underrepresentation of structurally marginalized populations in nationally representative datasets such as HINTS. Methods like community-based participatory research, qualitative interviews, or targeted oversampling—including rural residents, non-English speakers, and individuals with limited health literacy—may help address these gaps. Current analyses suggest that structural determinants have a substantial influence on information navigation and credibility assessment. Elucidating these variations is essential for informing interventions to promote digital inclusion, restore trust, and ensure equitable access to credible cancer information.

Third, experimental and intervention studies are needed to test the mechanisms identified in this analysis, particularly the role of digital confidence and how recommendation acceptance influences outcomes. Using randomized controlled trials or digital literacy efforts may help determine whether boosting digital self-efficacy reduces frustration and vulnerability to misinformation. These studies could provide practical strategies for providers, educators, and public health communicators to enhance the use of information and informed health decisions among diverse groups.

Fourth, further research is needed to more closely connect trust and health communication, as detailed in the revised theoretical model. Future studies may test

different models that track multidirectional relationships, such as whether engagement with credible health messages fosters trust in science, or examine moderators like source familiarity, message style, or cultural identity. These efforts would clarify the trust in health information sources model by revealing both what drives trust and how trust is maintained or restored online.

Ultimately, future studies should investigate the impact of new digital environments on cancer literacy and health communication, with a particular focus on social media algorithms, artificial intelligence, and emerging content verification tools. While the findings showed digital confidence mediates frustration and engagement, how these platforms shape information access matters more. Studying these tech factors within the HISB, SDHL, and SEM frameworks would strengthen the practical impact of current findings.

In summary, these recommendations aim to build upon the empirical boundaries of this study while advancing more causally robust, inclusive, and rigorous research on trust, digital health behavior, and cancer communication. Each is grounded in observed patterns and theoretical integration, ensuring alignment with the strengths and limitations of the existing analysis.

Implications

The implications extend across multiple ecological levels, including individual, interpersonal, organizational, and societal domains, each representing distinct yet interrelated pathways for positive social change, grounded in empirical analysis. Drawing upon the findings and the integrated theoretical framework articulated in this dissertation,

the potential for social impact is conceptualized as the enhancement of access to, evaluation of, and trust in cancer information within an increasingly complex digital environment. By systematically elucidating the relationships among trust, digital confidence, and health information-seeking behavior, this research establishes both a conceptual and operational foundation for addressing disparities in cancer communication, fostering public trust in credible information sources, and promoting equitable engagement in healthcare decision-making processes.

Implications for Practice

At the individual level, the results indicate that digital confidence functions as a mediator of perceived frustration and is associated with more effective health information-seeking behaviors. The development of digital literacy skills, particularly those related to the critical evaluation of online cancer information sources, may contribute to increased self-efficacy and a more adaptive approach to engaging with digital health environments. The evidence suggests that interventions designed to enhance digital confidence could mitigate frustration, decrease susceptibility to misinformation, and reduce the likelihood of disengagement from information-seeking activities. By conceptualizing health literacy as both a skillset and a mechanism for empowerment, it is possible to support agency and informed decision-making across diverse populations. Ultimately, such approaches may facilitate greater autonomy in health-related choices, reinforce confidence in evidence-based recommendations, and improve psychosocial outcomes among patients and their families.

At the interpersonal and family level, the findings underscore the role of trust in government and scientific authorities as determinants of health information-seeking behavior, highlighting the importance of reinforcing trust within social networks. Families and peer groups often serve as primary units for information exchange; therefore, cultivating trust in evidence-based sources within these networks may facilitate the adoption of positive health behaviors and reduce the dissemination of misinformation through informal or social media channels. The normalization of shared digital learning experiences, wherein family members collectively engage in health literacy activities, may further promote the critical evaluation of health information. This approach appears particularly salient for families managing chronic illness, navigating complex treatment decisions, or supporting individuals with limited health literacy.

At the organizational level, particularly within healthcare institutions, the results indicate the need to reconsider strategies for cultivating trust beyond the traditional clinician-patient relationship. The observed non-significant independent effect of trust in physicians, after adjustment for relevant covariates, suggests that institutional context and transparency may exert a more substantial influence on patient confidence. It is therefore recommended that healthcare systems and public health organizations integrate digital communication training for providers and prioritize the consistent dissemination of evidence-based information. The implementation of digital training modules, standardized communication guidelines, and participatory outreach initiatives within hospitals, cancer centers, and nonprofit organizations can help mitigate distrust and facilitate the re-engagement of marginalized populations. Additionally, organizational

efforts to clarify the rationale behind evolving recommendations in response to emerging scientific evidence, such as informational campaigns explaining changes in guidance, may help prevent confusion and reinforce long-term trust in institutional recommendations.

At the societal and policy level, the findings highlight the significance of structural determinants in shaping health literacy and trust, thereby aligning with broader objectives of social and health equity. These results may inform the development of strategies to integrate digital literacy programming within public health and educational systems, including the expansion of broadband access, the provision of digital navigation assistance through community resources, and the incorporation of health media literacy into school curricula. The anticipated societal benefit is the reduction of digital disparities that contribute to health vulnerability. Furthermore, the observation that perceptions of conflicting health recommendations undermine trust, particularly among individuals less tolerant of scientific change, carries important policy implications. Public agencies may address this challenge by adopting communication frameworks that prioritize transparency and explicitly articulate the adaptive nature of scientific knowledge. The implementation of communication policies focused on evidence evolution literacy may facilitate a shift in public understanding of scientific change, thereby reinforcing institutional legitimacy.

Implications for Positive Social Change

The methodological and theoretical implications of this research are anticipated to contribute to positive social change within academic and professional contexts. Through

the integration of multiple theoretical models into an empirically refined framework, this work establishes a conceptual basis for subsequent research in health communication and behavioral science within dynamic digital environments. The revised framework is positioned to inform future epidemiological and communication models by elucidating the intersections among structural determinants, digital confidence, and trust in information sources as they relate to health behavior. From a methodological perspective, the application of multi-model analysis, combining logistic regression with mediation and moderation modeling, demonstrates the utility of these approaches for public health communication research. Such methodological strategies provide replicable pathways for future investigations that seek to theorize complex, interconnected psychosocial mechanisms within population-level datasets.

From a practical perspective, the findings yield several evidence-based recommendations relevant to healthcare, education, and media practice. Interventions targeting the identified mediators and moderators, such as digital confidence and understanding of evolving health guidance, may be prioritized by clinicians and public health professionals. Educational institutions, particularly those involved in training health communication specialists and community educators, are encouraged to incorporate curricular modules that address digital trust, algorithmic awareness, and resilience to misinformation. Cancer organizations and data educators may also benefit from establishing outreach partnerships with technology platforms to foster trusted informational ecosystems, thereby enhancing the visibility and accessibility of credible, evidence-based sources. At the level of professional practice, integrating these findings

into patient education materials, online portals, and digital outreach strategies is anticipated to support a more equitable and inclusive model of information dissemination, ultimately reinforcing the collective credibility of healthcare institutions.

Recommendations for Future Research

Future investigations should aim to build upon the conceptual and methodological strengths established in the study. Longitudinal or mixed-methods designs are recommended to clarify temporal dynamics and causal pathways linking trust, digital confidence, and health outcomes over time. Expanding analysis to include underrepresented groups—such as individuals with limited internet access, non-English speakers, and institutionalized populations—will improve generalizability. Experimental interventions testing the effect of digital literacy and trust-building programs could provide evidence for best practices in reducing misinformation and enhancing equitable engagement. Researchers may also apply the integrated theoretical framework developed here to investigate evolving patterns of trust in other areas of health communication, including infectious disease prevention and genomic risk information. Methodologically, combining national surveillance data with qualitative insights would yield richer, intersectional perspectives on the sociocultural determinants of trust, ensuring that future models of cancer communication remain responsive to technological change and community needs.

In summary, the implications suggest that positive social change in cancer information engagement may be both achievable and sustainable when trust-building and digital empowerment are conceptualized as interdependent public health priorities. By

positioning trust, literacy, and inclusion as foundational elements of cancer communication, this research contributes not only to theoretical advancement but also to the identification of applied strategies for addressing trust gaps, reducing informational inequities, and fostering a more informed, confident, and participatory public.

Conclusion

This research is situated within a context characterized by widespread health misinformation and increasing contestation of traditional sources of authority. In this environment, trust and digital confidence are identified as essential determinants of public health, individual agency, and health equity. By integrating established theoretical frameworks from Hesse, Lambert, Viswanath, and others with a rigorous analysis of nationally representative data, this research delineates a contemporary landscape of cancer information-seeking. Rather than passive receipt of information from clinicians, the findings indicate a shift toward active, digitally mediated engagement, contingent upon individuals' confidence in their capacity to navigate, interpret, and evaluate information sources in real time.

The analysis demonstrates that, while public trust in clinicians remains substantial, trust in government agencies and scientific authorities—often accessed through digital platforms—serves as a primary motivator for cancer information-seeking in the current context. This finding diverges from assumptions prevalent in earlier literature and indicates the necessity of re-evaluating public health communication strategies. Additionally, the data indicate that digital confidence, developed through experiential learning and targeted interventions, operates as a mediating variable that may

reduce frustration, decrease vulnerability to misinformation, and promote autonomous information-seeking behaviors. These results highlight the importance of investing in digital health literacy, increasing transparency in scientific communication, and implementing interventions to strengthen institutional trust among diverse populations.

This work affirms established knowledge within the field and extends theoretical understanding by providing empirical evidence that disparities in engagement are influenced not only by demographic or socioeconomic factors but also by structural and psychosocial determinants. The analysis suggests that equipping individuals to engage with digital health environments critically may contribute to reducing disparities and partially restoring trust that has been diminished by misinformation. The broader implications of these findings indicate that advancing digital health confidence and fostering evidence-based trust may function as public goods, with the potential to address health disparities, enhance engagement with scientific discourse, and improve preparedness for future public health challenges.

As the landscape of health information continues to evolve, the findings suggest that strengthening trust and digital capacity may represent effective strategies to address confusion, inequity, and disengagement in health. The approach outlined in this research, grounded in robust evidence and integrated theoretical perspectives, provides a framework for fostering a more informed, engaged, and resilient society in which individuals are equipped to navigate health knowledge in the digital age actively.

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