A QUANTITATIVE STUDY: PUBLIC PERCEPTIONS OF MEDICAL LIBRARIANS AND IMPLICATIONS FOR COMMUNICATION AND PRACTICES

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ABSTRACT

The purpose of this research study is to investigate and assess whether medical librarians, clinical medical librarians, medical informationists, etc. (referred to collectively as “medical librarians”) have an obligation beyond their particular institutional role to, or aspirationally should, provide the public with medical literature that has the potential to improve an individual’s health or the public health. The survey will examine the opinions of members of the United States (U.S.) public regarding the practices of medical librarians as these practices pertain to health promotion, patient care, medical education, and clinical research.

The research design for this study is a single-phase quantitative perspective (Creswell, 2006 Joyner et al., 2013). Quantitative data was collected in a survey (Joyner et al., 2013; Visser et al., 2000). The study had a total of 415 viable responses.

Overall, the researcher believes that the most significant findings pertained to the education and gender gaps. 51.8% of participants with less than a bachelor’s degree are aware of medical librarians, while 74.5% with a bachelor’s degree or higher reported awareness. Perhaps the individuals who need the most help navigating the complex U.S. health system are unaware of a potentially valuable resource. 41.1% of participants identifying as male have consulted a medical librarian for their own or for their family members’ health information-seeking needs while only 18.2% of respondents identifying as female have done so. No significant difference in the means of the two genders presented with regard to willingness to consult a medical librarian. This suggests that attempts should be made to increase consultations with women.

Medical librarians are responding with initiatives to decrease the substantial inequality in information accessibility and health literacy of U.S. individuals. The

work of these professionals is important, and the data resulting from this study indicates a positive public perception of medical librarians. However, it also suggests their work might not be visible to, and that there may be a gap in trust for, those who might require the services of medical librarians the most.

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CHAPTER ONE
INTRODUCTION AND GENERAL INFORMATION

Introduction

The purpose of this research study is to investigate and assess whether medical librarians, clinical medical librarians, medical informationists, etc. (hereinafter referred to collectively as "medical librarians") have an obligation beyond their particular institutional role to, or aspirationally should, provide the public with medical literature that has the potential to improve an individual's health or the public health.[1,2] The survey will examine the opinions of members of the United States (U.S.) public regarding the practices of medical librarians as these practices pertain to health promotion, patient care, medical education, and clinical research. Health promotion will be defined in Chapter One - Operational Definitions.

Chapter One will provide an overview of the evolving role of medical librarians in the clinical setting and the challenges that the U.S. healthcare system has posed for these librarians. It also will introduce this research study and the supporting survey. The survey will be an online, cross-sectional, population-based instrument administered through Amazon's Mechanical Turk (MTurk), which is a "crowdsourcing marketplace." MTurk is

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[1] For the purposes of this study, the term "public" incorporates, but is broader than individuals identified as "health consumer(s), who are "any person[s] who uses health information or is interested in some aspect of healthcare" while a patient is "someone who is already part of the healthcare system, already have been diagnosed with a disease or condition…" (Huber & Keefner, 2014).

[2] The Journal of the Medical Library Association identified over ten (10) roles associated with medical librarians: embedded librarian, systematic review librarian, emerging technologies librarian, continuing medical education librarian, grants development librarian, data management librarian, digital librarian, metadata librarian, scholarly communication librarian, and translational research librarian (Huber & Keefner, 2014).

utilized by businesses (i.e., Pinterest, etc.), researchers, etc. to outsource virtual tasks to distributed participants (Amazon, n.d.).[3]

Operational Definitions

The following have been operationally defined for this research study:

1. The *clinical medical librarian* (CML) is a "health sciences librarian who participates on clinical rounds[,]" Morning Report, and weekly patient conferences (Brown, 2004; Demas & Ludwig, 1991). Similar to the medical librarian, the CML engages in research, but they also contribute more directly to patient care and medical education (Demas & Ludwig, 1991). CMLs are often found in hospitals, medical schools, nursing schools, and academic medical centers (Stribling, 2020). Although some consider the CML role to be too expensive and labor-intensive (Demas & Ludwig, 1991), the CML integrates library services, specifically literature searches, into patient care (Wagner & Byrd, 2012), which mitigates the time, cost, and expertise associated with clinicians performing the task (Wagner & Byrd, 2012). The CML also enhances treatment team training and experience (Wagner & Byrd, 2012). This will be discussed in detail in Chapter Two, the Literature Review.
2. *Information and Communication Technology* (i.e., ICT) includes numerous types of digital services that have generally been divided into four domains: (1) management systems (electronic health records (EHRs) or electronic medical

[3] Studies promote the reliability and validity of MTurk's results from participants of the U.S. population (Goodman, Cryder, & Cheema, 2013). MTurk appears to yield valid data (Buhrmester, Talaifar, & Gosling, 2018). A small percentage of researchers (i.e., Berinsky, Huber, & Lenz, 2012; Goodman & Paolacci, 2017) have questioned MTurk's accurate representation of the population as compared to Internet-based panels; however, most researchers agree that it does not present a skewed perspective of the U.S. population (Buhrmester, Kwang, & Gosling, 2011). MTurk was also recommended by the University of Tennessee, Knoxville's OIT Statistical Consultant for use for this study's survey.

records (EMRs)); (2) communication systems (email, mobile phones, telemedicine, and telecare systems); (3) computerized decision support systems (automated systems which can be accessed from varying devices that back health professionals' decision-making and assist these health professionals in providing guidance within relevant guidelines); and, (4) information systems (Web-based resources and eHealth information sources) (Mair, et al., 2009). ICT accessibility and availability, particularly broadband access for rural Americans, is receiving national and state-level political and legislative attention (Bage, 2004; ICT, 2005). The "digital divide" is pertinent (Bage, 2004; Ragnedda & Muschert, 2013) as the information "haves" and "have-nots" (hopefully) merge (Bage, 2004). The *digital divide* or *great divide* describes the growing gap between the segment of the U.S. population with no access to a computer or to the Internet and those wealthy, middle-class, young, and urban dwellers with such access (Stanford, n.d.). Those with no access frequently are low-income, rural, disabled, and/or elderly individuals (Stanford, n.d.).

3. *Evidence-based healthcare and evidence-based decision making,* is, according to the Department of Health and Human Services' Agency for Healthcare Research and Quality (2018), the "use of the best available evidence together with a clinician's expertise and a patient's values and preferences in making healthcare decisions." Cochrane produces systematic reviews of medical research to advise clinicians on well-formulated questions, such as "can antibiotics help in alleviating the symptoms of a sore throat?" (Cochrane, n.d.b; Wagner & Byrd, 2012).[4] U.S. data depict a bleak picture, however, regarding evidence-based health communications – minorities, rural residents, and low-income community members have unequal access (Linnan et al., 2004). Trained in information resources and information seeking, medical

[4] Cochrane, formerly known as the Cochrane Collaboration, is a U.K. based charity, which was formed to promote evidence-based health care/medicine (Cochrane, n.d.a; Hill, 2000).

librarians teach evidence-based online searching to health sciences practitioners (Brown, 2004).

4. Per the World Health Organization (WHO, 2020a), *health* is a "state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."
5. *Health disparities* are "differences that exist among specific population groups… in the attainment of full health potential" (Weinstein et al., 2017). These disparities can be measured by mortality, burden of disease, etc. (Weinstein et al., 2017). Existing initiatives by medical librarians, etc. exist to mitigate these disparities (Wallace & Behringer, 2020). This will be discussed in Chapter Two - the Literature Review.
6. According to the U.S. government (i.e., Health Resources & Service Administration), *health literacy* is the ability to "obtain, process, and understand" basic health information (HRSA, 2019). Health information is used by the individual to make healthcare decisions. Similar to evidence-based healthcare and evidence-based decision making, low health literacy is associated with the elderly, minority groups, and low-income persons (HRSA, 2019).
7. *Health promotion* is increased facilitation of "[individual] control over their own health" (WHO, 2020a). It incorporates three elements: (1) good governance for health – "government departments to make health a central line of government policy;" (2) health literacy – individual "knowledge, skills and information to make healthy choices;" and (3) healthy cities – "strong leadership and commitment at the municipal level" (WHO, 2020b).
8. *"Informationist"* emerged as a term in 2000 from Davidoff and Florence in an editorial in the *Annuals of Internal Medicine* (Brown, 2004). Clinical medical librarians and clinical informationists contribute to "patient care, medical education[,] and clinical research[,] … having information-seeking skills [and] knowledge of informatics and the clinical subject area" (Brown, 2004). The informationist is paid and based in the clinical department (Brown, 2004), and

a healthcare practitioner like a nurse or physician can train in medical informatics and information-seeking skills to transition to the role of clinical or medical informationist (Brown, 2004). Similar to a CML, the medical informationist attempts to positively affect the patient care team vis-à-vis knowledge and literature (Brown, 2004). The medical informationist is embedded in the docent team (i.e., medical student teaching unit), but is not necessarily specifically tasked with patient care (Federer, 2013; Stribling, 2020).

9. *Medical librarians* do not participate in clinical rounds. Instead, they focus on presenting medical information to support patient care, education, and research/publication (SJSU, n.d.). The role of the medical librarian in patient care is the subject of debate (LOC, 2013). This will be discussed in Chapter Two - the Literature Review.
10. The terms *research* and *literature* are used interchangeably in this study. "Research [is] a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge" (HIPPA, as quoted in Nass, et al., 2009). As used in this study, the term "research" encompasses biomedical, epidemiological, and health services research as well as studies into health-influencing factors, including behavioral, social, and economic (Nass, et al., 2009).
11. According to the American Association of State Colleges and Universities (AASCU, as quoted in Stover, 2016), *stewardship* is a commitment to build "direct, two-way interaction with communities and other external constituencies through the development, exchange, and application of knowledge, information, and expertise for mutual benefit." In the context of this study, "[librarians generally] can help their communities by working with them in more and varied way[s]" (AASCU, as quoted in Stover, 2016).
12. *Patient activation* is a patient's willingness to "own" and manage their health and healthcare (Luo & Park, 2013). Patient activation is related to encouraging health outcomes (Greene & Hibbard, 2012). This trend could be rooted in the

American Hospital Association's 1973 "Patient's Bill of Rights," which stated, "the patient has the right to receive from his physician complete current information concerning his diagnosis, treatment and prognosis in language the patient can be reasonably expected to understand" (American Hospital Association, as quoted in Spatz, 2014).

13. *Public health* is defined as "the science of protecting and improving the health of people and their communities" (CDC Foundation, 2020).
14. A *public library* meets the following criteria: "an organized collection of printed or other library materials, or a combination thereof; paid staff; an established schedule in which services of the staff are available to the public; the facilities necessary to support such a collection, staff, and schedule, and is supported in whole or in part with public funds" (ALA, 2019).
15. *Special libraries* are locations outside the typical library setting, including corporations, hospitals, law firms, advertising agencies, etc. (ALA, 2020b). The Medical Library Association (MLA) is a group specialization for special libraries (ALA, 2020b).

The Healthcare Industry

Healthcare (and social assistance) is a significant share of the U.S. economy; 17.1 percent of GDP in 2017, a greater percentage of national GDP than in other large, advanced economies (WHO, 2019). Healthcare-related revenue in the U.S. in 2019 totaled $2.9 trillion (Spitzer, 2020). Health (and medical) insurance in 2019 in the U.S. totaled $1.1 trillion (Curran, 2020). Supporting this massive and growing (2.2 percent and 2.9 percent annually, respectively) U.S. health industry are medical librarians/medical informationists and clinical medical librarians (Curran, 2020; Spitzer, 2020).

The U.S. Bureau of Labor Statistics ("BLS") reports the number of librarian jobs in 2019 to be 146,500 (U.S. BLS, 2020a). **Table 1.1.** in **Appendix A** reports the distribution of

these numbers; the American Library Association ("ALA") reports this number to be 166,164 (American Library Association, 2018).

The 2019 median pay for a librarian in the U.S. is $59,500 annually (U.S. BLS, 2020a). This is approximately 15 percent less than the median annual wage for a healthcare practitioner (i.e., $68,190) in 2019 (U.S. BLS, 2020b). The median salary of a health educator is $45,830 (Spatz, 2014). Compare these to the reported median annual wage, $39,810, for the entire U.S. economy (U.S. BLS, 2020b). This general median wage is, however, more than the median salary for library assistants and technicians, which is $26,330 (Spatz, 2014).

The typical entry-level education of a librarian is a master's degree in library or information sciences (ALA, 2020; Medical Library Association, n.d.). The attributes of an effective librarian include: (1) technical literacy, (2) research competence, (3) service orientation, (4) management abilities, (5) leadership qualities, and (6) organizational knowledge (Anderson, 1989). The education of a healthcare practitioner ranges from a high school diploma or equivalent (i.e., home health aide) to an M.D. or Au.D. (i.e., physician, audiologist, etc.) (U.S. BLS, 2020b). Medical libraries may be located in an academic office building or (preferably) a medical center (Oelschlegel et al., 2018; Peterson et al., 2020). Successful marketing plans of medical libraries can expand their respective outreach, which entails "reach[ing] as many people as possible" (Grabeel et al., 2019).

Statement of the Problem

There is apparently no published literature that focuses on the public's perception of the role of medical librarians (i.e., medical librarians, clinical medical librarians, medical informationists, etc.). Literature exists pertaining to the "impact and value of providing consumer health information" to health consumers, which is favorable (Pifalo et al., 1997), as well as the "community perceptions and utilization of a consumer health center" located in a public library (Ports et al., 2015). At a time when changes to the practice of medicine have resulted in decreased patient consultation times and when connection to the internet

has provided unprecedented public access to complicated or potentially inaccurate or unreliable medical and health-related literature, the role of the medical librarian may come under increasing reference pressures. A barrier to medical librarians providing superior service is the public's perception of self-sufficiency vis-à-vis Internet-searching (Joseph, 2018). When "Dr. Google" is consulted, the U.S. public may consider the intermediary (i.e., medical librarian) redundant (Joseph, 2018).

This research study expands upon existing literature that discusses the roles and responsibilities of medical librarians. There is a relatively significant body of literature that examines the role of medical librarians as clinical medical librarians and clinical informationists, roles in which they contribute to patient care, medical education, and clinical research (Brown 2004). Existing literature also considers the role that medical librarians have played in supporting policy development (Droese & Peterson, 2006) and that they should play in promoting social justice (Martin, 2019). There also are data assessing the extent to which public librarians provide consumer health information services (Linnan, 2004) and considering how best to prepare these librarians for health-related reference requests (Luo, 2013). This study, however, focuses on the public's perception of the role of medical librarians in health promotion, about which no readily identifiable literature appears to currently exist.

Purpose and Objectives

The major purpose of this research study is to survey and assess U.S. public understanding of the medical librarian, specifically as it pertains to promotion, patient care, medical education, and clinical research. It will investigate and assess whether medical librarians have an obligation beyond their particular institutional role to, or aspirationally, should, provide the public with medical literature that may improve an individual's health or the public health. The following objectives have been identified as important for the successful completion of this research:

1. To survey U.S. public perceptions of medical librarians as they pertain to promotion, patient care, medical education, and clinical research.
2. To compare the U.S. public perceptions of medical librarians as they pertain to promotion, patient care, medical education, and clinical research by demographic data including race, ethnicity, gender, and education.
3. To gain an understanding of the relationship between the existing literature, the roles and responsibilities of medical librarians, and the results of the survey of the perception of members of the U.S. public and their preferences regarding these positions, with a view to offering guidance or proposals, if appropriate, regarding any alignment between the two.
4. To consider the implications of U.S. public perceptions for marketing, education, and communication strategies.

The specific research questions addressed in this study include:

1. Does the U.S. public believe that medical librarians should be included in medical treatment teams?
2. Does it influence public perception if the librarian may or may not have a health and/or science background?
3. Do members of the U.S. public believe that medical librarians should distribute medical literature to the public?
4. What channels does the U.S. public believe these librarians should utilize to distribute medical literature to the public?
5. Are the U.S. public's awareness, behavior, intention, and preference affected by demographic data including race, ethnicity, gender, and education?

History

Healers and medicine men have existed since the beginning of recorded history (Thomson et al., 2020). Collections of medical writings emerged as early as 2000 B.C. in ancient civilizations such as the Assyrians and Babylonians and were stored in

places of worship and medical libraries (Jastrow, 1913). The staff of these libraries are known as the “Keepers of Sacred Books” (Birchette, 1973).

The development of medical schools, and later printing, resulted in an increased creation, and storage of, medical research (Birchette, 1973). Medical societies flourished. These societies led to increased collaboration and increased production of medical literature.

Medical libraries proliferated in the 1960s, one impetus for which was the 1962 *Surgeon General’s Conference on Health Communications*. This conference also was the inspiration for legislation known as the Medical Library Assistance Act of 1965 (42 U.S.C. § 286, et. seq.; Stribling, 2020). This Act sought additional federal funding for libraries (Stribling, 2020). The 1965 *Report of the President’s Commission on Heart Disease, Cancer and Stroke* demanded increased distribution of health research to providers and to the public and transferred financial support to the National Library of Medicine (Stribling, 2020).

However, in 1983 and 1984, the funding situation changed. Pursuant to the Healthcare Financing Administration Act (HCFA), hospitals were no longer required to have libraries in order to receive federal reimbursement for Medicare and Medicaid patients (Stribling, 2020). This Act also prohibited the classification of libraries as medical education costs (Stribling, 2020). In 1990, the “Agenda for Change” suggested the classification of libraries as “information management,” which is the classification maintained today (Stribling, 2020).

Medical research and libraries have once again expanded with the proliferation of computers (Dexter et.al, 2019). For example, MEDLINE, the Medical Literature Analysis and Retrieval System Online, or MEDLARS Online, is a bibliographic database with a system of journal citations and abstracts for global biomedical research that was implemented in 1970 (Cooper, 2013; U.S. National Library of Medicine, 2016; Wermuth & Verplaetse, 2019). Accordingly, medical librarians were able to conduct computer-assisted searches (Cooper, 2013).

Today, medical libraries are fully integrated with computing. PubMed, accessible on the Web as of 1997, is a free resource to access MEDLINE's database (U.S. National Library of Medicine, 2011; U.S. National Library of Medicine, n.d.). PubMed adds over 500,000 citations each year to its database (Huber & Keefner, 2014). Over two (2) billion searches are performed in PubMed each year (Huber & Keefner, 2014).

History - Clinical Medical Librarians (CMLs)

In 1971, Gertrude Lamb, a librarian at University of Missouri-Kansas City (UMKC) School of Medicine, conceived of the CML (Brown, 2004; Demas & Ludwig, 1991). Lamb was observing teaching patterns during rounds and wanted to access the most up-to-date research (Demas & Ludwig, 1991). Lamb decided to add a librarian to fulfill the information needs of and provide literature reviews to the healthcare/docent (or instructor) team (Brown, 2004; Demas & Ludwig, 1991; Sullivan & Sarkis, 1987). The teams included docents/instructors, a Doctor of Pharmacy, dieticians, social workers, and the CML (Sullivan & Sarkis, 1987).

The original CML initiative at UMKC was funded by a National Library of Medicine (NLM) grant from 1972 to 1975 under Lamb's direction (Demas & Ludwig, 1991). Lamb relocated to Hartford Hospital in Connecticut in 1973 (Demas & Ludwig, 1991). Lamb then received a 2-year grant from the U.S. Public Health Services for two CMLs for the University of Connecticut Health Center Hospitals (Demas & Ludwig, 1991). Other CML formats and initiatives began developing in alternative locations (Demas & Ludwig, 1991).

Lamb identified a need for the librarian to be at the point-of-service, i.e., clinical rounds (Demas & Ludwig, 1991). This CML program was designed to support the information requirement of the healthcare team, i.e., physicians, nurses, etc., as well as patients (Demas & Ludwig, 1991). The CML would participate in 60-to-90 minutes of morning rounds (Demas & Ludwig, 1991), noting questions from the particular stakeholders and evaluating the value of researching specific questions – typically three-to-eight (Demas &

Ludwig, 1991) or participating in a one-hour Morning report – reviewing new and in-house cases to identify an information need or knowledge gap (Brown, 2004). Following rounds, the CML would spend approximately two hours querying databases to obtain the necessary documentation to answer the prioritized questions (Demas & Ludwig, 1991). Articles, bibliographies, and abstracts were then distributed to the team by the CML (Demas & Ludwig, 1991), PowerPoint presentations could be produced to highlight the literature (Brown, 2004). The CML would also take special requests similar to a Reference Desk Librarian from the patient care team for literature (Brown, 2004). In sum, the CML would connect the library and medical education by acquiring and disseminating information – leading by example – and providing visibility to and representation of the health science library (Demas & Ludwig, 1991).

Literature Attached to the Charts (LATCH) is complimentary to the CML program (Demas & Ludwig, 1991). Upon admission, relevant articles are attached to a patient's medical chart, facilitating accessibility and prioritization of acute cases (Demas & Ludwig, 1991). The records are retained in the library by the CML after the patient's discharge for future use (Demas & Ludwig, 1991).

Medical/health sciences libraries provide healthcare practitioners with information pertaining to prevention, diagnosis, and treatment (Demas & Ludwig, 1991), and the role of the CML was envisioned as augmenting these libraries (Demas & Ludwig, 1991). Chapter Two - the Literature Review will discuss the studies that have evaluated the efficiency, effectiveness, and efficacy of CML programs.

Significance

Health research is critical to U.S. society (Nass, et al., 2009). The term "health research" incorporates, but is not limited to,

1. "health providers,
2. healthcare administrators,

3. continuing education officers,
4. public or rural health officials,
5. faculty,
6. consumers,
7. health educators,
8. school nurses,
9. state and local health personnel" (Burroughs and Wood as quoted in Joseph, 2018).

It has been studied and demonstrated that medical research positively affects human health and longevity (Nass, et al., 2009). This results in a positive contribution to the U.S. economy (Nass, et al., 2009). Clinical trials, also a form of health research, are essential for the use of "drugs, vaccines, medical devices and diagnostics" in the U.S. (Nass, et al., 2009). Examples of the value of medical research include identifying disease trends, disease risk factors, healthcare costs, etc. (Nass, et al., 2009). These studies cumulatively have resulted in significant discoveries, developments, and improvements in healthcare and public health (Nass, et al., 2009).

Currently, the role and responsibility of medical librarians with regard to medical research is its access, review, and dissemination. Perhaps librarians do serve as gatekeepers of this information (Fister, 2014); some characterize the role of librarians as that of stewards in which they interact with their communities for mutual benefit (Stover, 2016). With its Department of Knowledge and Information Stewardship, the University of Cape Town, has even acknowledged this role within its departmental nomenclature (UCT, 2021).

McGinnis and Foege and later Mokdad et al. determined that "[approximately] half of all deaths that occurred in the U.S. in 2000 could be attributed to a limited number of largely preventable behaviors and exposures" (Mokdad et al. as quoted in Spatz, 2014). The leading causes of death as determined by these studies are associated with personal health choices, including tobacco use, poor eating habits, lack of physical exercise, and alcohol consumption (Spatz, 2014). Data and subsequent health promotion based

thereupon cannot alone change an individual's personal choices, but they can influence those choices (Spatz, 2014).

Limitations and Assumptions

The findings of this research study are subject to several limitations:

1. The findings may not be generalizable beyond the sample. Data do not confirm that the sample is representative of other populations. Therefore, readers should use caution when generalizing the research study's results. The author will, however, strive to put results in context concerning their generalizability.

2. The survey contains closed-ended questions. Closed-ended questions limit the study's participants to the choices on the survey form.

This research study's assumptions are as follows:

1. The survey instrument had a low rate of return as participants will complete the survey online. Response rates for non-probability panels are approximately 10% or less (Baker, 2010).

2. Participants self-identified with accurate demographic (i.e., gender) information.

3. Duplicate survey responses from participants were identified and discarded.

4. Participants completed the survey attentively, accurately, honestly, and to the best of their ability.

5. The data collected from the survey was accurately transcribed, compiled, measured, and retained.

6. The researcher distributing and conducting the survey maintained a lack of bias with no supervisory responsibility for any member of the study's population.

7. The survey and resulting interpretation of the findings focused on the most recent definition of medical librarians, clinical medical librarians, medical informationists, etc.

CHAPTER TWO
LITERATURE REVIEW

Introduction

Chapter One discussed the history and industry supporting medical librarians, clinical medical librarians, medical informationists, etc. It also introduced this research study and the supporting survey. Chapter Two will describe the process for, and the literature supporting, the research conducted for this study.

In order to design and complete this study, literature with very diverse content and professional perspectives was considered, addressing questions regarding: (1) the role that medical librarians have played in supporting policy development (Droese & Peterson, 2006); (2) the role that they should play in promoting social justice (Martin, 2019); (3) the extent to which public librarians provide consumer health information services (Linnan, 2004) and how best to prepare public librarians for health-related reference requests (Luo, 2013); (4) what ethical issues are relevant to medical librarians (Rothstein, 1993); (5) the effectiveness of CML programs (Demas & Ludwig, 1991; Federer, 2013; Wagner & Byrd, 2012); (6) the expanding role of the medical librarian (Blake & Pratt, 2006; Cooper & Crum, 2013; Pappas, 2012; Sullivan & Sarkis 1987); (7) the current state of collaboration between educators, librarians, and the public and distribution of research in the literature (Cobus, 2008; Ketchum, 2017; Walport & Brest, 2011); (8) and health literacy (Joseph, 2018). A literature review of each of these separate questions/topics follows.

1. The role that medical librarians have played in supporting policy development

Librarians, as “expert searcher[s]” and “knowledge broker[s],” are able to assist in determining “complex” benefit coverage decisions and health policy (Droese & Peterson, 2006). Librarians, as “expert searcher[s]” and “knowledge broker[s],” are able to assist in

determining “complex” benefit coverage decisions and health policy (Droese & Peterson, 2006). Medical librarians focus on knowledge transfer to “health policy knowledge workers,” i.e., program staff elected officials, and administrators, the medical librarians are cognizant of current political climates and cultural competence, which is considered to be important by their stakeholders (Droese & Peterson, 2006). There are numerous examples of this, e.g., in Massachusetts, medical librarians assisted with televised programming on pregnancy, and a medical librarian’s literature review was tied to the organizational outcome of effective post-partum care (Droese & Peterson, 2006).

Librarians working in health-related environments also have supported state Medicaid programs (Droese & Peterson, 2006), and Medicaid programs aid the poor and underserved (Droese & Peterson, 2006). Despite expanding enrollment and a reduced budget, Medicaid programs aspire to provide quality care (Droese & Peterson, 2006). This can reduce national health disparities (Droese & Peterson, 2006).

Librarians are also “expert searcher[s]” and “knowledge broker[s]” regarding the Affordable Care Act (ACA). Former President Barak Obama even stated libraries and/or librarians can support communities transitioning to the ACA (Johnson, 2015), as librarians have traditionally assisted patrons with completing public assistance forms (Vardell, 2015). For example, the Public Library Association currently partners with the non-profits Community Catalyst and Robert Wood Johnson Foundation to inform communities regarding health insurance enrollment vis-à-vis social media, tv, radio, etc. (Public Library Association, 2021). The State University of Iowa also provided a webinar to train-the-trainer, i.e., inform librarians regarding requests from the library’s customers regarding ACA (Iowa, 2013).

2. The role librarians should play in promoting social justice

According to Martin (2019), by providing evidence-based healthcare information, the librarian is an essential component of democracy. The librarian “connects… [the]

democratic principles and ideals of equal access to information and healthcare" (Martin, 2019). Social justice in medicine is ensuring high-quality medical care to ALL members of society equally (Ambrose et al., 2014; Braveman et al., 2011). Gender, racial, and ethnic disparities can lead to poor health outcomes (Egede, 2006; Weinstein et al., 2017).

The Liaison Committee on Medical Education (LCME) standard 7.6 – the medical school accreditation process for a MD degree – requires all faculty of a medical school in the United States and Canada "[to] ensure that the medical curriculum provides opportunities for medical students to learn to recognize and appropriately address biases in themselves, in others, and in the healthcare delivery process" (AAMC, 2020). Medical librarians can play a role in fulfilling this educational requirement by providing literature discussing these issues.

Despite the fact that over 75% of academic research librarians are white (Schonfeld & Sweeney, 2017) and are predominately women, ages 45–54 (ALA, 2007) and that only approximately 2.7% of the total enrollment of medical school students self-identified with a disability requiring accommodation (Meeks & Herzer, 2016), academic research librarians appear to have a strong desire to tackle critical healthcare issues that impact minority populations. For example, librarians chronicled HIV/AIDS and the opioid crises and distributed information to academics and the affected communities (Coleman, 2020; Norton et al., 2019). Analysis by librarians of the opioid crisis included collating and analyzing health information requests form customers/patrons (Grabeel & Moore, 2021). However, budget cuts threaten the librarian profession and library resources (ALA, 2021; Vermont, n.d.), potentially undermining the role that they play in health justice promotion.

Despite the Internet and Web's prevalence, 10% of U.S. adults do not use the Internet (Pew Research Center, 2019). A large portion of whom are individuals/households with less than $30,000 in annual income and/or less than a high-school education (Pew Research Center, 2019). A state-specific survey determined that identifying a credible source was the health consumer's greatest barrier to finding health specific information;

consumers, however, consider the library to be a reliable source (Oelschlegel, et al., 2006). Initiatives, i.e., Preston Medical Library, have identified a low technology way to obtain health information - telephone reference service - but found a low call rate for lower-income zip code populations (Oelschlegel, et al., 2009). Mitigating this health information disparity for low-income population is key barrier for medical librarians (Oelschlegel, et al., 2009).

3. The extent to which public librarians provide consumer health information services and how best to prepare public librarians for health-related reference requests

Public librarians, distinct from medical librarians, attempt to satisfy the health information requirements of library patrons, typically by “assisted” (i.e., active participation) Internet searching (Linnan et al., 2004). These requirements include questions concerning healthcare coverage eligibility, the human body, medical/health conditions, disease prevention and treatment, and fitness/diet/nutrition (Luo & Park, 2013). These inquires account for approximately 60% of a public librarian’s reference diligence (Wood et al., 2000), translating into approximately ten (10) health-related questions per week (Linnan et al., 2004).

Public librarians encounter three main challenges when serving the health information needs of library patrons: “[(1)] interpreting patrons' questions[,] [(2)] lack of knowledge about available and trusted/appropriate medical/health information sources,” and (3) lack of relevant library resources (Luo & Park, 2013). To mitigate this challenge, approximately 77% of public librarians request self-paced online training tutorials (Linnan et al., 2004; Luo & Park, 2013). Also, partnerships have been recommended between academic and public libraries to share resource access (Linnan et al., 2004). The MLA provides professional development opportunities to public librarians to equip them with the skills they need to respond to these requests, such as the “Consumer Health Information” specialization (CHIS) (MLA, 2021b) as well as mentoring, webinars, and blended courses

(MLA, 2021a). The Virginia Commonwealth Libraries Tompkins-McCaw Library for the Health Sciences (TML) have provided similar course offerings (Joseph, 2018). There are numerous examples of academic libraries partnering to provide course offerings for the CHIS specialization (TLA, 2010).

The research reports on several examples of these public-medical library collaborations. Wessel et al. (2003) discussed a workshop facilitated by an academic medical library in Pennsylvania that supported the knowledge of local public librarians regarding health services, and Zionts et al. (2010) described a partnership between a public library in Pennsylvania, healthcare experts, and the Medical Library Association (MLA) to provide training for public librarians. Similarly, in North Carolina, the “Health for Everyone in Libraries Project” was created by a partnership between the University of North Carolina, Chapel Hill’s public health (SPH) and library science (SILS) programs (Linnan et al., 2004).

Public libraries support their patrons, and their health information requirements in various ways, including print and electronic resources on consumer health (Chobot, 2002 as quoted in Luo & Park, 2013) and free computer and Internet connection (Malachowski, 2011 as quoted in Luo & Park, 2013), an integral tool for addressing health-related inquiries (Linnan et al., 2004). These supplement the human- reference services provided by public librarians (Luo & Park, 2013).

This service is not without obstacles. Public librarians are challenged to select the appropriate resources, to provide access for rural patrons, and to communicate with patrons who have difficulty with medical terminology, etc. (Luo & Park, 2013). There also are ethical dilemmas regarding the provision of medical literature and information versus dispensing medical advice (Luo & Park, 2013). The literature has advised against public librarians offering medical advice and instead suggested that these librarians focus on “social and community goals of producing a healthy society” (Henderson,1986).

4. What ethical issues are relevant to medical librarians

When participating in treatment teams and healthcare delivery, medical librarians face unique ethical challenges. These librarians serve not only medical professionals in the healthcare setting, but they also serve laypersons, nonprofessionals, patients, and their families in the hospital setting (Rothstein, 1993). Laypeople are demanding more information about their clinical conditions (Greene & Hibbard, 2012), and they are becoming increasingly involved in healthcare decisions (Luo & Park, 2013). There no longer is the “blind dependence” on the physician of previous generations (Burnum, 1981). It is becoming easier to evaluate physicians, particularly regarding malpractice and negligence (Abraham, 1994). This has been attributed to an increase in scientific rationalism due to technology (Rothstein, 1993). Patients today want more autonomy in their healthcare decision-making (Greene & Hibbard, 2012).

Historically, medical libraries have been open exclusively to physicians and nurses (Bunge, 1999). The traditional physician-patient dynamic reportedly resulted in paternalism and beneficence, resulting in a disregard of the patient’s self-determination and autonomy in favor of the physician’s perspective of the best medical care as rooted in the Hippocratic oath (Nelson, 1978). Today, perhaps influenced by legal pressures, the paradigm has shifted to a more free flow of medical information that requires the patient’s informed consent (Rothstein, 1993). This patient autonomy is exemplified in the Patient’s Bill of Rights and the Patient Self-Determination Act (American Hospital Association, 1973; Omnibus Budget Reconciliation Act, 1990; Sawicki, 2016).

Today, some medical libraries are open to the public (Bunge, 1999). Insurance-related billing incentives for technical procedures have incentivized physicians to spend less time consulting with patients, which results in these patients seeking medical information elsewhere (WHO, 1999). If patients seek this information from a medical librarian, ethics must be considered in the provision of this service. The literature has evaluated the duty of a librarian versus a healthcare professional in this context (Rothstein, 1993).

There are various ethical standards that govern librarians, including the Library Bill of Rights, the Freedom to Read Statement, and the Freedom of Information Act, etc. (Hurych, 1987). These standards guide librarians to provide information accurately (Hurych, 1987). Additionally, in special library settings, such as medical libraries, librarians must recognize the ethical standards of the institution and the library (Ferguson & Mobley, 1984).

Medical librarians have a singular role and very distinct ethical obligations in the treatment setting, very different than those of their physician colleagues. When there are questions whether a librarian in a medical setting may have special duties to the patient or physician (Rothstein, 1993), it seems clear that the medical librarian's primary purpose is to provide "access to information to facilitate autonomous decision making, without regard to the use or consequences" (Rothstein, 1993). Physicians, on the other hand, must consider consequences; for example, a physician can determine that a suicidal patient is incompetent and requires medical assistance, but a librarian has no such authority (Rothstein, 193). Further, in some instances, a physician need not provide all pertinent information, including when asserting the therapeutic privilege, when the patient's consent cannot be provided, or in a public health emergency (Mielsel, 1979). Although Ferguson and Mobley (1984) contend that the therapeutic privilege could be extended to medical librarians, that assertion apparently has not been generally-accepted or tested. Ferguson and Mobley (1984) argue further that the librarian's foremost duty is to the institution, not to the library. Regardless of what particular obligations or privileges may be applicable, sensitivity and discretion are recommended for both the physician and the librarian in the treatment setting (Rothstein, 1993).

Both librarians and medical healthcare professionals may find that, at times, their professional ethical obligations conflict with their personal ethical or moral values. This has particular complications for librarians in libraries in religiously-affiliated hospitals, as described by Rothstein (1993). Religiously-affiliated hospitals account for approximately 20% of U.S. hospital beds (Stulberg et al., 2010). For example, medical guidelines or

literature might contradict the religious obligation to provide life-sustaining nutrients to an individual in a vegetative state (U.S. Conference of Catholic Bishops, 2018). Other specific procedures that may create such conflicts include, but are not limited to, abortion, birth control, tubal ligation, gender transition surgery, and physician-assisted death (Meyer, 2020; Meyer, 2019).

There does not appear to be any literature focused on a medical librarian's ethical obligations in this specific context or that report data on the prevalence of medical librarians who receive direct requests for medical research from patients or the public that implicate ethical concerns. In the relevant literature focusing on physicians, however, 19% of physicians experienced a conflict over religiously-based policies (Stulberg et al., 2010). Although there are no data reporting on similar experiences of medical librarians, it is not unreasonable to assume that these librarians might confront similar conflicts. In those circumstances, most physicians (i.e., 86%) recommended referring a patient to a non-religiously affiliated hospital (Stulberg et al., 2010). This preferred referral method might be increasingly challenging due to hospital consolidations, particularly in rural areas (Meyer, 2020). While some states have imposed narrow and limited context disclosures, there currently are no federal laws requiring hospitals to disclose the services that it does not provide due to its "religion- or conscience-based commitments" (Sawicki, 2016).

5. The effectiveness of CML programs

The results of studies of CML program effectiveness are predominately positive. While the literature does not systematically report a positive correlation between CML services with superior patient care and docent team performance, it does summarize the benefits of the CML service as providing "personal attention" and instruction (Wagner & Byrd, 2012). The problems include the difficulty of training the CML and the implications of this poor training (Wagner & Byrd, 2012).

Demas & Ludwig surveyed 40 clinical department heads (in internal medicine, pediatrics, and surgery) and health science library directors without access to a CML outreach service to ascertain:

- "acceptance and attitudes toward a CML program;
- importance of a CML in patient care, medical education, and research;
- influence on information-seeking patterns of healthcare professionals;
- ethical issues: librarian's rights to choose relevant articles, patient's rights, implications of (LATCH);[5]
- desirability of CML extension services: user education and end-user searching, database access on hospital floors [;and]
- cost considerations" (Demas & Ludwig, 1991).

The survey found strong support, but varying perceptions, between clinical department heads and health science library directors, particularly regarding the responsibility for funding (Demas & Ludwig, 1991). Notably, physician respondents of Demas & Ludwig's survey questioned the appropriateness of a CML providing literature or information directly to the patient or family but stated that the librarian is the docent team's preferred source of information (Demas & Ludwig, 1991).

At least one individual program evaluation reported positive results. For example, consider the University of California–Los Angeles (UCLA) Louise M. Darling Biomedical Library's "research informationist" program. That Library received a grant from the National Library of Medicine (NLM) to fund a librarian to join a UCLA research team as a "research informationist" (referred to as informationist) (Federer, 2013) to support the team's activities from project creation to final publication, specifically focusing on data management and curation (Federer, 2013). This informationist: (1) digitized and aggregated data and created metadata, (2) provided data preservation best practices, (3)

[5] LATCH, i.e., Literature Attached to the Charts, was introduced/discussed in the above section , "History – Clinical Medical Librarians (CMLs)."

and supported research. Final evaluation reported that the informationist became a "valuable and… essential member" of the UCLA research team (Federer, 2013).

6. The expanding role of the medical librarian

There are a variety of professional roles for medical librarians. Research conducted at the University of Michigan Comprehensive Cancer Center demonstrated that patients and families, despite prevalence of the Internet, are not able to find all health resources independently (Volk, 2007). Drawing upon the literature and job postings for the field of medical or health sciences librarianship, these roles include:

- Embedded librarian,
- Systematic review librarian,
- Emerging technologies librarian,
- Continuing medical education librarian,
- Grants development librarian,
- Data management librarian,
- Metadata librarian,
- Digital content librarian,
- Scholarly communication librarian, and
- Translational research librarian (Cooper & Crum, 2013).

"Clinical care is point of care librarianship (Pappas, 2012)." This librarian attends Morning Report to "learn the processes, thinking patterns, and common syndromes and diseases (Pappas, 2012)." Today, medical librarians create LibGuides – content management system for librarians – for the docent team (Pappas, 2012).

However, the role of CML can be adapted to that of an instructional librarian, an outreach librarian, and a consumer health librarian and can include supervising bibliographic managers (i.e., EndNote, etc.), teaching Blackboard, and providing service to rural practitioners, etc. (Cooper & Crum, 2013).

Librarians at medical facilities that are associated with universities can be hired at the assistant professor rank and pursue a tenure-track career (Pappas, 2012). Medical librarians who are present during medical rounds can help foster evidence-based medicine (EBM) in this setting (Pappas, 2012).[6]

Interestingly, Blake & Pratt (2006) note that academic research scientists, including, for the purpose of this study, medical librarians, engage in four critical tasks: retrieval, extraction, verification, and analysis, all of which are collaborative activities. Noticeably absent from this list of critical tasks are distributing health-related data and information and engaging in health promotion activities.

Medical librarians enter the field with diverse backgrounds, not all of which are science- or health-related. Of the CMLs at UMKC Health Sciences Library, only 25% had an undergraduate major in science (Sullivan & Sarkis, 1987). Few had experience with MEDLINE, the most popular bibliographic index (Blake & Pratt, 2006; Sullivan & Sarkis, 1987). During their tenure, however, the CMLs became more proficient discussing medicine with the docent team (Sullivan & Sarkis, 1987). These UMKC CMLs typically sought a non-traditional work-environment with “people” and “freedom” and left the CML position at UMKC to pursue a higher-paid position with more responsibility (Sullivan & Sarkis, 1987).

Expanding beyond the 2,645 estimated health sciences libraries in the U.S. (MLA, 2021c) are medical librarians pursuing an Academy of Health Information Professional (AHIP) certification vis-à-vis the Medical Library Association (MLA) (MLA, 2021d). This certification is peer-reviewed and portfolio-based (MLA, 2021d). It implies a standard of

[6] EBM was tangentially defined in “Operational Definitions” - *evidence-based health care* and *evidence-based decision making.* EBM contributes to patient care by promoting consistency of treatment and best outcomes, assisting in the establishment of national standards, and setting criteria to assess the medical practice affecting the individual (i.e., patient), city, and nation (Lewis & Orland, 2004; WHO, 2020b).

professional education, experience, and accomplishment (MLA, 2021d). As of 2014, there were over 1,100 medical librarians certified pursuant to its process (Huber & Keefner, 2014). Members of AHIP's five levels range from "provisional" to "distinguished" (Huber & Keefner, 2014).

7. The current state of collaboration between educators, librarians, and the public and distribution of research in the literature

Librarians in universities, etc. including health science liaison librarian roles, incorporate research. Funders of medical research seek to maximize its distribution (Walport & Brest, 2011). The United Nations recognizes the impact of the Internet and digital technology on the exchange of scientific ideas and the communication of knowledge (Ketchum, 2017). However, the infrastructure to support research diffusion, specifically the skills to manage and analyze data, has been found to be lacking in low- and middle-income countries, a finding that has been applied and generalized to the U.S. (Plewes & O'Connell, 2015). A funder summit, held in Washington D.C. in May 2010 to discuss this shortcoming, identified three concerns: (1) unequal access by researchers in "resource-poor settings," (2) potential risks to research participants, and (3) the expense and time commitment involved in data sharing (Walport & Brest, 2011). Funders recognized that a paradigm shift must occur to ensure that the reward and incentive for publication is equal to the reward and incentive for collecting and curating data (Walport & Brest, 2011). Also, the infrastructure to store, analyze, and preserve data needed to be developed (Wellcome Trust, 2011). This development is being tackled publicly by the U.S. government in data.gov, Department of Energy (DOE) Office of Scientific and Technical Information (OSTI), etc.

Medical librarian curricular design, specifically when, who, what to teach, etc., must take these information literacy, data analysis, and data preservation needs into consideration (Cobus, 2008). In the twenty-first century, all health science professionals, including medical librarians, must develop information literacy to be effective (Cobus, 2008). In the medical specialty library setting, a collaboration between public health faculty and medical

librarians must be developed and should incorporate evidence-based medicine principles, including how to analyze and present data, the substance of the “Public Health Code of Ethics,” etc. (Cobus, 2008). Models from University of North Carolina – Chapel Hill incorporated disseminating knowledge in the research life cycle (Ketchum, 2017), for example, including the regulatory process in the life cycle of clinical studies includes, although, not specifically defined in this literature (Ketchum, 2017). Partnerships exist at Simmons University and Harvard Medical School, etc. to train informationists (Simmons, 2020).

8. Health literacy

In addition to the definition of *health literacy* provided in Chapter One, the Institute of Medicine (2004) provided a definition in their landmark study *Health Literacy: A Perception to End Confusion*: “the degree to which individuals can obtain, process, and understand the basic health information … they need to make appropriate health definitions.”

Health literacy encompasses visual (i.e., graphs), computer, information (i.e., obtain and apply), and numerical or computational literacy (Joseph, 2018). The “(AHRQ) Health Literacy Universal Precautions Toolkit” provided by the Agency for Healthcare Research and Quality of the U.S. Department of Health and Human Services advised medical professionals to simplify communication (AHRQ, 2020) as a large proportion of the U.S. public does not understand physicians’ instructions regarding caring for themselves and/or consuming their prescribed medications (Joseph, 2018).

Less than 15 percent of U.S. adults have the health literacy skills required to navigate the U.S. healthcare system (U.S. Department of Education, 2006), and even these individuals' abilities may be compromised by stress or illness (AHRQ, 2020). Medical librarians have an opportunity to affect their institution’s health literacy (Oelschlegel et al., 2018). While developing their institutions’ collections, medical librarians must be mindful

of a health consumer's health literacy (Joseph, 2018). If the patient cannot understand the material, the material provides no value (Joseph, 2018).

Existing initiatives exist to decrease the substantial inequality in health literacy of U.S. individuals. The National Network of Libraries of Medicine encouraged libraries at the "Symposium on Community-based Health Information Outreach" in 2004 to connect with low literacy groups in new/visionary ways vis-à-vis community-based organizations to address literacy challenges (Peay & Rockoff, 2005; Ports et al., 2015). This has resulted in a consumer health library at a public library in Petersburg, Virginia, a center where community members can receive assistance from a certified Medical Library Association's Consumer Health Information Specialization program team member with their health information requests (Ports et al., 2015). Also, for example, a pilot project in rural eastern North Carolina exists to increase the health literacy of adolescents from seasonal farmworker families (Mendez et al., 2019). Lack of information accessibility (and poor health literacy) disproportionally affect the poor and disenfranchised in the U.S. (Oelschlegel et al., 2009). Hospital medical library stakeholders believe it is critical to the respective hospital's mission to provide consumer health information resources, including training staff regarding health literacy barriers (Shipman et al., 2009).

CHAPTER THREE
MATERIALS AND METHODS

Introduction

Chapter One provided an overview of the evolving role of medical librarians in the clinical setting. Chapter One also introduced this research study and the supporting survey, the major purpose of which is to investigate and assess whether medical librarians have an obligation beyond their particular institutional role to, or aspirationally should, provide the public with medical literature that may improve an individual's health or the public health. Chapter Two described the literature supporting the research conducted for this study. The underlying research for differing aspects of medical librarianship also was reviewed in Chapter Two.

The following objectives have been identified as important for the successful completion of this research:

1. To survey U.S. public perceptions of medical librarians as they pertain to promotion, patient care, medical education, and clinical research.
2. To compare the U.S. public perceptions of medical librarians as they pertain to promotion, patient care, medical education, and clinical research by demographic data including race, ethnicity, gender, and education.
3. To gain an understanding of the relationship between the existing literature, the roles and responsibilities of medical librarians, and the results of the survey of the perception of members of the U.S. public and their preferences regarding these positions, with a view to offering guidance or proposals, if appropriate, regarding any alignment between the two.
4. To consider the implications of U.S. public perceptions for marketing, education, and communication strategies.

Chapter Three will outline the proposed materials and methods to address these research objectives. It will include a description of: (1) research design, (2) population and sample, (3) instrumentation, (4) data collection, and (5) data analysis.

Research Design

The research design for this study is a single-phase quantitative perspective (Creswell, 2006; Joyner et al., 2013). This approach is derived from a positivist epistemology and is expressed numerically (Joyner et al., 2013). Quantitative data was collected in a survey (Joyner et al., 2013; Visser et al., 2000). The results of the quantitative research helped develop and/or inform the summarization and discussion of the survey results, i.e., the interpretation of the quantitative portion of this research study (Creswell, 2006). Chapter Four reports the quantitative results while Chapter Five draws on the literature and the researcher's expertise to offer analytical commentary on the findings and place them in context (Joyner et al., 2013; Sauro, 2015).

The quantitative survey data was collected and analyzed prior to undertaking the Discussion in Chapter Five (Creswell, 2006). The interpretation augments the quantitative study to provide a more complete analysis; to consider complementary and synergistic efforts; and to promote more productive stakeholder interaction (Schmeltz, 2012).

The research results can be characterized as descriptive survey research to describe the librarian phenomenon and to study relevant attitudes (Joyner et al., 2013). Survey research encompasses "the collection of data from a sample of elements" (e.g., adult men and women, etc.) "drawn from a well-defined population" (e.g., all adult men and women, etc. in the U.S.) "through the use of a questionnaire" that, for this study, is designed to assess U.S. public opinions, perceptions, and attitudes of medical librarians (Joyner et al., 2013; Visser et al., 2000). Details of the study questionnaire and its design appear in the third section of Chapter Three, titled "Instrumentation - Constructing the Questionnaire."

All survey research results was collected in Amazon's Mechanical Turk (MTurk). MTurk does not require sophisticated software and is customizable (Barnhoorn et al., 2014). Users are capable of creating and publishing specialized surveys as well as collecting and analyzing survey results (Barnhoorn et al., 2014). Text questions and/or images can be added to MTurk's question blocks (Barnhoorn et al., 2014), and the results can be imported from MTurk to Statistical Package for the Social Sciences (SPSS), platforms that can read, aggregate, and manipulate the data contained in MTurk's comma-separated value (CSV) files (Barnhoorn et al., 2014). The CSV files was downloaded from the MTurk into IBM SPSS Statistics 28.0 (IBM Corp., 2021) for data analysis. Descriptive statistics (i.e., percentages, etc.) were used to summarize and present these data (Pounds, 2014).

Population and Sample

The target population (N = 255,200,373) for this survey research was all members of the U.S. public 18 years of age and older (U.S. Census Bureau, 2020). The minimum participant population is 370, based upon calculations that used a 5% margin of error; a ninety-five percent confidence level; and 0.5 standard deviation, or a 50% response distribution (Ary et al., 2010; Pounds, 2014).

This study used a type of non-probability sampling (Baker et al., 2013; Pounds, 2014). Convenience sampling is widely-accepted and is used across disciplines (Baker et al., 2010; Lovric, 2011; Pounds, 2014). While the results of non-probability sampling are statistically similar to the results of probability sampling (Lovric, 2011), this type of sampling is characterized by accessibility, i.e., the ease of which respondents are recruited (Baker et al., 2013).

There are disadvantages to selecting MTurk. It incentivizes respondents with tangible (i.e., money) and intangible (i.e., input and entertainment) rewards (Baker, 2010). Further, while respondents are selected for MTurk based upon demographic, personal

information, and successful completion of previous research studies (Baker, 2010), non-probability environments like MTurk have a significant coverage error as one-third of the U.S. adult population does not regularly access the Internet (Baker, 2010).

Nonprobability sampling also is subject to sampling bias (Baker et al., 2013), which occurs if individuals or members of the target population do not have an equal chance of inclusion or representation in the survey research (Baker et al., 2013; McCutcheon, 2008). Researchers typically avoid selection, exclusion, and non-participation biases systematic attempts to control and alleviate sampling bias in convenience samples (Baker et al., 2013; Radhakrishna & Doamekpor, 2008). When compared to traditional survey research methods (i.e., in person, etc.), MTurk also can produce varying results (Baker, 2010). It is likely that traditional methods are more accurate (Baker, 2010).

Another drawback to non-probability (convenience) sampling is possible non-response bias when respondents significantly differ from non-respondents (Baker et al., 2013; Qualtrics, 2013; Radhakrishna & Doamekpor, 2008). While an entire demographic can be neglected (Pounds, 2014), the response rate can indicate the generalizability of the survey research results (Radhakrishna & Doamekpor, 2008). Higher response rates, however, mitigate non-response bias (Lavrakas, 2007; Radhakrishna & Doamekpor, 2008).

For this research, all members of the U.S. public who are 18 years of age and older are eligible to participate in the survey, and all with an internet connection and willingness to participate in the distributed task workforce were recruited. An online survey was selected for recruitment due to a range of factors, including COVID constraints, the larger pool of potential participants, and the potential cost-savings when compared to mail and phone surveys (Pounds, 2014). Attempts were made to collect data from demographic groups that often are underrepresented in survey research, e.g., males and young adults (Krosnick, 1999). The researcher also took particular efforts to ensure that potential respondents did not view the survey or questionnaire as a sales pitch (Krosnick, 1999).

The survey research did not ask or collect any personal information or identifiers from participants, such as email address, name, social security number, or mailing address (U.S. Department of Commerce, 2010). The questionnaire records of participants will remain confidential. From an Institutional Review Board (IRB) perspective, it is possible that the following categories of "Vulnerable Participants" may choose to become a participant in the survey research: students; employees (i.e., research assistants) of the University of Tennessee, Knoxville; individuals whose primary language is not English; international persons; pregnant women; individuals with impaired or diminished decision making-capability; and individuals on probation, parole, or restricted by court order (Tennessee, 2012). While individual members from these categories of "Vulnerable Participants" all were eligible to participate in the questionnaire if a panel respondent; they were not the research study's target population.

Instrumentation – Constructing the Questionnaire: Themes, Questions, and Response Categories

The questionnaire used in this study was developed vis-à-vis a review of the literature and sources reviewed above that identify, interpret, and present survey research (Sax & Doran, 2016). Archived surveys and survey data sets were accessed to identify and modify relevant questions for the survey exercise (Visser et al., 2000).

The *Bulletin of the Medical Library Association's* archives contained surveys of health-care professionals and physicians at hospitals in the U.S. regarding the information services that they receive from medical librarians (King, 1987; LOC; 2013; Marshall, 1992). The survey review in *Bulletin of the Medical Library Association* incorporated the following specific surveys: "The Contribution of Hospital Library Information Services to Clinical Care: A Study in Eight Hospitals" and "The Impact of the Hospital Library on Clinical Decision Making: the Rochester Study" (King, 1987; LOC; 2013; Marshall, 1992).

The archives of the *Journal of Hospital Librarianship* were also consulted. This journal published “The Informationist: Ten Years Later” (Polger, 2010). Its focus was to collect data about the type of U.S. health institution in which survey respondents worked, the type of librarian services their institutions provided, the informationists’ academic backgrounds, and the informationists’ participation in clinical rounds (LOC; 2013; Polger, 2010).

The review also included a number of other surveys that studied such topics as CML efficacy (Demas & Ludwig, 1991); the utilization of medical and public libraries (Eakin et al., 1980); health training needs for disseminating health messages (Linnan et al., 2004; Luo & Park, 2013; Wessel et al., 2003); and the value of medical librarians (Marshall, 2013). Finally, archived material from ITHAKA S+R produced data that assessed stakeholder work processes (e.g., instructional practices, etc.); resource discovery and access; and library perception (e.g., the role of the library, etc.) by individual faculty, undergraduate, and graduate/professional students in U.S. institutions (ITHAKA S+R, 2021).

The questions that were selected for use in the study questionnaire were drawn from existing surveys from the reviewed archival material and were modified to address the specific research goals. To ensure that the answer choices were comprehensive and effective, the existing questions were also modified to mitigate any subtlety associated with the wording, grouping, and ordering of unambiguous questions (Visser et al., 2000).

The questionnaire contains twenty (20) closed-ended questions with rating tasks (Visser et al., 2000). Of the twenty (20) items, four (4) are demographic questions, e.g., gender, education, and race/ethnicity (ITHAKA S+R, 2021). There were four (4) items on the questionnaire that address U.S. public knowledge and awareness of medical librarians and nine (9) items that ask respondents their opinions regarding the roles and responsibilities of medical librarians (Demas, 1991). Two (2) attention checks were included (Abbey & Meloy, 2017), and one (1) behavior question was included. The

questionnaire does not include a section that pertains to the perceived adequacy of the health of an individual respondent.

At times, two response choices were offered (e.g., “yes” or “no”) (Visser et al., 2000). For some questions, respondents were offered “don’t know/not sure” and “decline to answer” response options in addition to the binary “yes” or “no” options (Visser et al., 2000). The “don’t know/not sure” response is offered for respondents who have no opinion, lack knowledge on the topic or issue, and/or do not understand the question (Visser et al., 2000). The “decline to answer” option is available to respondents who perceive the question as sensitive in order to mitigate emotional distress and agitation when completing the questionnaire in an online setting (Shoemaker, 2002; Tennessee, 2012). The primary goal of the question design was to maximize the validity and reliability of the data collected (Visser et al., 2000).

The survey research, shown in **Appendix B**, was distributed online and administered as described in the “Research Design” and “Population and Sample” sections of this Chapter.

A Consent Cover Statement appeared on one screen in the online version, and participants indicated consent by selecting “Yes” to this screening question. All questions in each section, i.e., demographics; knowledge; behavior and perception, also appeared on one online screen. The online version’s final screen states that “We thank you for the time that you spent taking this survey. We know that your time is valuable and very much appreciate your willingness to participate. Your response has been recorded.”

Knowledge Items

Despite widely-reported interest and investment in medical librarians, no literature could be found that focuses on the public’s perception of the role of these specialty librarians. Because these perceptions might provide important insights to those in the field and those

administering resources in order to meet public expectations, four (4) questions that measure the respondents' knowledge and awareness of medical librarians and public awareness of medical librarian research were crafted based upon two (2) existing survey sources. Although demographic questions typically appear first on surveys, knowledge and awareness questions were included first in this survey as to not undermine the survey "flow."[7] **Table 3.1.** on **Appendix C** lists the sources for knowledge questions.

Behavior Items

To measure the respondents' behavior and to statistically correlate to the respondents' perception of medical librarians, a question was designed to ascertain current and past actions regarding accessing a librarian. No existing survey source was identified as the basis for this question. However, federal government and consumer reports surveys were reviewed to inform the question type, i.e., behavior.

Table 3.2. in **Appendix D** illustrates the source for behavior and perception questions concerning respondents' willingness to consult a medical librarian.

Opinion and Perception Items

To measure the respondents' perception of medical librarians, four (4) existing survey and research sources provided the basis for six (6) of the relevant eight (8) questions. **Table 3.3.** on **Appendix E** lists the sources of the questions concerning respondents' opinions of the role and responsibilities of medical librarians.

Demographic Items

To measure the participants' demographics, one existing survey source provided the basis for all four (4) demographic questions. **Table 3.4.** in **Appendix F** sets forth the

[7] A definition of "medical librarians" was provided to the survey respondents.

relevant sources for demographic questions relating to participants' ethnicity, race, gender, and education.

Although demographic survey questions yield valuable information, this form of insight collection was not included in all of the surveys that this researcher reviewed. It was, however, included in this survey to ascertain: (1) the validity of the survey, (2) the possible response bias, (3) a potential target audience for medical librarian services, (4) potential trends, and (5) the respondent's profile development potential (Toor, 2020). It was also needed to answer Research question #5.

Attention Check(s)

To measure if the respondents are engaged in the survey, attention checks were included. Respondents who fail the attention check were excluded from data analyses (Fles, 2019). This is to prevent capturing bad data (Rays, 2019), i.e., participants who are not reading the question and are perhaps solely motivated to participate in the survey to receive the compensation. **Table 3.5.** on **Appendix G** lists the attention checks.

Validity and Reliability

Validity is the most critical consideration when developing and evaluating the results of the questionnaires (Ary et al., 2010). Validity is characterized by the instrument's ability to measure and interpret the proposed theory or the objective and/or purpose of the survey research (Ary et al., 2010). The validity of interpretations of the survey results is supported by the theoretical framework and constructs of previous research (Pounds, 2014).

Construct underrepresentation and construct-irrelevant variance threaten the interpretation and validity of questionnaires (Ary et al., 2010). Construct underrepresentation occurs if content or response-types are not included (or adequately

sampled) in the questionnaire (Ary et al., 2010); construct-irrelevant variance occurs if results are affected by uncontrolled, extraneous variables such as poorly worded or misleading questions (Ali & Ruit, 2015). Without interviewers present, it is critical for questions to be clear and accurate to participants (Pounds, 2014).

Reliability is consistency in measurement (Ary et al., 2010). The following factors impact questionnaire reliability: length; heterogeneity and ability of respondent groups; and objectivity of scoring (Ary et al., 2010).

Panel review and piloting can assist in interpreting the respondents' viewpoint of the validity and reliability of the survey instrument (Bowden et al., 2002). These tasks are discussed individually below.

Panel Review

The survey instrument was reviewed by a panel of four (4) experts prior to pilot-testing and general distribution (Donaldson, 2011; Pounds, 2014). The panel of experts was comprised of three (3) University of Tennessee, Knoxville professors, one (1) Medical Library Director, and one (1) Statistical Consultant with expertise in research design. The panel was asked to evaluate and provide feedback on the questionnaire's length, content, and clarity as well as its validity and reliability (Donaldson, 2011; Pounds, 2014). The panel review alleviated inaccurate participant responses due to poorly-worded questions (Pounds, 2014). The researcher incorporated any changes to the survey instrument prior to pilot-testing and general distribution (Donaldson, 2011).

Pilot-Test

Prior to general distribution, a soft launch/pilot-test study of the survey occurred (Donaldson, 2011; Teijlingen & Hundley, 2002). Convenience sampling was used for the pilot-test on MTurk (Ary et al., 2010; Donaldson, 2011).

The soft launch/pilot-test study served as a practice run to identify any survey errors, including errors with electronic distribution. As with panel review, the researcher incorporated any changes to the survey and/or electronic distribution prior to general distribution. The soft launch/pilot-test study occurred after the review of the survey by the panel of experts; it increased the likelihood of success in general distribution (Teijlingen & Hundley, 2002).

Data Collection

Distribution occurred after approval was received from the University of Tennessee, Knoxville IRB. The Consent Cover Statement explains the purpose of the research study and clearly stated that participation in the questionnaire is voluntary. Participants may stop or decline to answer at any time. The Consent Cover Statement provided contact information for the researcher and for the University of Tennessee IRB Compliance Officer for participants who require additional information. The Consent Cover Statement also is designed to engender respondents' trust (Dillman, 2007).

It took approximately three minutes for the participants to review the Consent Cover Statement. The questionnaire itself took approximately five-to-six minutes for participants to complete. Duplicate responses were not accepted.

Survey participant responses remained confidential during data analysis. MTurk (may) maintain(s) rosters of the participants in its panel of respondents, and it is theoretically possible for those with specialized skills to trace the IP address of respondents' computers. However, the researcher does not have these skills and made no attempt to ascertain the identity of participants.

Participants completed the questionnaire via MTurk and could do so on any computer or device from any location with an Internet connection. The survey was available on MTurk for approximately four weeks (Dillman, 2007). Non-respondents were not identified or

tracked (Donaldson, 2011). The questionnaire was accessible as early as September 2021.

Data Analysis

Quantitative Data Analysis

Once data collection was complete, the data was downloaded and stored securely on the researcher's personal server. The survey results were imported from MTurk and Qualtrics to SPSS (Barnhoorn et al., 2014), which can read, aggregate, and manipulate the data contained in MTurk's and Qulatrics' comma-separated value (CSV) files (Barnhoorn et al., 2014). Partially completed MTurk responses were not retained (Newman, 2014).

Descriptive statistics, i.e., percentages, etc., were used to summarize and present the collected data (Pounds, 2014). This partially satisfied the research objectives (Pounds, 2014). Frequency tables were also generated in SPSS (Pounds, 2014). Eight chi square, three t-test, one ANOVA, and one MANOVA for comparative demographic analysis was conducted (IBM, 2012).

Descriptive statistics calculated the percentage of the U.S. public who reported awareness of medical librarians. It also calculated and displayed the percentage of the U.S. public who report that they believe these specialty librarians should be included in the treatment team as well as the percentage who believe that it is important for medical librarians to have a health and/or scientific background. Categorical data (i.e., "yes" and "no") were described with frequencies and/or percentages (IBM, 2021a). Likert scale questions were analyzed vis-à-vis the mean (IBM, 2021b). For example, the mean is a 4.2 which might indicate something is important where 1 is not important and 5 is very important (IBM, 2021b).

The result of the survey is likely too small to accurately characterize less populous groups (i.e., American Indian); so, no post-stratification and weighting after the minimum participant population is attained was conducted (Illinois, 2009; Lavrakas, 2008). The results instead were analyzed with one sample chi-square test in SPSS (IBM, 2021c). This is to test whether a categorical variable is consistent with a hypothesized population distribution derived from the U.S. Census Bureau (IBM, 2021c).

Analysis of Results

Because quantitative methods may not provide sufficient depth to inform future decision-making pertaining to medical librarians, an analysis of results was conducted to provide insight for more context-relevant and effective guidance (Weaver-Hightower, 2014). This form of analytical commentary is based upon interpretivism of the quantitative survey results vis-à-vis a critique and/or librarian recommendation(s) (Joyner et al., 2013). This researcher seeks to engage in analysis to add value to the quantitative component of this research on an observed societal phenomena (Boyatzis, 1998; Creswell, 2006).

The modified analysis of these data was intended to inform and potentially motivate. This research could be significant to all stakeholders in the medical library sector in three specific respects. Firstly, it may clarify U.S. public expectations and values with regard to their understanding of docent/medical teams and to their reference and health-related information promotion preferences. Secondly, it may provide critical data to inform the communication strategies of medical librarians as well as health-related libraries and facilities. Finally, it may also encourage governing bodies (i.e., libraries, professional associations, etc.) to amend and/or promulgate guidance that is more responsive to U.S. public concerns and interests.

CHAPTER FOUR
RESULTS

Introduction

Chapter One discussed the evolving role of medical librarians in the clinical setting. Chapter One also introduced this research study and the supporting survey, the major purpose of which is to investigate and assess whether medical librarians have an obligation beyond their particular institutional role to, or aspirationally should, provide the public with medical literature that may improve an individual's health or the public health. Chapter Two reviewed the literature supporting the research conducted for this study. Chapter Three outlined the materials and method. Chapter Three also included a description of: (1) research design, (2) population and sample, (3) instrumentation, (4) data collection, and (5) data analysis. Chapter Four provides detailed information about the results of the opt-in Amazon's Mechanical Turk (MTurk) survey. The survey was an online, cross-sectional, population-based instrument administered through MTurk, which is a "crowdsourcing marketplace." MTurk is utilized by businesses, researchers, etc. to outsource virtual tasks to distributed participants (Amazon, n.d.).

Table 4.1. in **Appendix H** outlines the survey questions designed to fulfil the research questions discussed in Chapter One.

To provide a foundation and to augment this alignment between research and survey questions, knowledge/awareness, behavior, and demographic questions were also distributed to the MTurk participants. Survey questions #1-4 address the knowledge/awareness the U.S. public has of medical librarians, and survey questions #5 and #10 reports if the U.S. public has ever used/ how likely to consult a medical librarian.

Analysis

Overall, 417 responses were received on MTurk; including the results of the pilot-test/soft launch as no adverse findings or errors in design were identified during this phase of the Internet survey. **Table 4.2.** on **Appendix I** reports the distribution of these numbers.

Of the 417 responses, 415 participants agreed to the Statement of Consent. The two participants who did not consent were not permitted to complete the survey. The two attention checks were also required questions. Participants who incorrectly answered the attention checks were not permitted to complete the survey. Their answers were not retained and collated for analysis in SPSS. Ten participants failed one of the two attention checks. Any other survey question the participants were permitted to decline to answer. The analysis in Chapter Four focuses on the answers received; not the participants, if any, who declined to answer. Partial responses were not collated and analyzed. The Valid Percent category eliminates the missing responses in the percentage calculation, so it can be generalized to the U.S. population. The frequency or N represents the count of the participants. The Valid categorization represents answers specified not including Don't Know/Not Sure or Decline to Answer.

Table 4.3. in **Appendix J** reports the frequency of racial identity responses of the participants. The majority of participants identified as White.

There is a significant difference in distribution of race in the sample and the actual U.S. population ($p<.001$), according to the U.S. Census Bureau. P representing the probability that the sample is consistent with the U.S. population. The sample is underrepresented in participants identifying as Black, American Indian, and multiple races. In the table in the Appendix, Observed N is equal to the actual number of participants in the sample, and Expected N=the projected number of participants if the sample population was consistent with the U.S. population.

Table 4.4. in **Appendix K** reports the discrepancy between sample and actual participant population for Question 17 which asks, “What is your race?” **Table 4.5.** in **Appendix L** displays the ethnicity of the participants. 81.6% of participants are not identifying as of Hispanic or Latino origin. The distribution of Hispanic did not significantly differ from the population (p=.978). **Table 4.6.** in **Appendix M** presents the discrepancy between the sample and actual participant population for Question 18 which asks, “Are you of Hispanic or Latino origin?”

The majority of the participants (66.6%) identified as Male. The Other category included an open text box; however, the participant who self-identified as Other did not specify their definition of Other. **Table 4.7.** in **Appendix N** reports the results of survey question #19: With what gender do you identify?

The U.S. Census Bureau records in 2021 50.8% female persons in the U.S. (U.S. Census Bureau, 2021). So, the expected results for the participant population is 50.8% female. However, more males than females responded to this survey (p<.001). The expected value based on the U.S. Census Bureau could not be calculated as no information for male and other was provided.

Table 4.8. in **Appendix O** depicts the education of the respondents. Cumulative Percent is the summation of Valid Percent. For example, (100-33.6=66.4) 66.4% of respondents have more than an associate degree. To compare education between the U.S. Census Bureau and the participant population, education was collapsed to less than a bachelor’s degree. There was a significant difference in the distribution of education between population and sample (p<.001). **Table 4.9.** in **Appendix P** depicts the U.S. Census Bureau reporting structure for question #20 (i.e., education). The anticipated number of participants with less than a bachelor’s degree is 281. The actual is 139. **Table 4.10.** on **Appendix Q** shows the discrepancy between the sample and actual participant population for Question 20 (i.e., education).

Table 4.11. in **Appendix R** details the findings of survey question #1-3.[8,9,10] For example, 67% of respondents are aware of medical librarians; but only 54% are aware medical librarians work on clinical floors. Of the 67.0% of participants who are aware of medical librarians, 62.8% identify as female, and 68.7% identify as male.[11] Participants identifying as Male, and female are equally aware. The chi-square test resulted in p=.482, which is not significant so, awareness does not differ by gender.[12]

The chi square test found a significant difference in the awareness of medical librarians by education level (chi square=21.59, df=2, p<.001). 51.8% of participants with less than a bachelor's degree are aware while 74.5% with a bachelor's degree or higher are aware. Therefore, participants with more degrees/education tend to be more aware of medical librarians.

The chi square test revealed no significant difference concerning race on awareness (p= .983).[13]

Pertaining to awareness of medical librarians, there is a significant difference between participants identifying as non-Hispanic or Latino and Hispanic or Latino, with Hispanics being more aware (chi square=21.346, df=2, p<.001). 89.5% of participants identifying as Hispanic or Latino are aware, while 61.9% of respondents identifying as non-Hispanic or

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[8] Survey question 1: Are you aware of medical librarians?
[9] Survey question 2: Are you aware that some medical librarians work on clinical floors in medical facilities (including hospitals)?
[10] Survey question 3: Are you aware that medical librarians can respond to consumer health questions from patients or family members?
[11] Due to the low response rate of participants identifying as trans-male, etc. the categorization of Male and Female was utilized for the comparative analysis.
[12] While 62.8% and 68.7% might seem to be a significant difference, this is a sample so there is variability. In this sample of 275 respondents for question #1, it represents a couple of individuals, if there would have been 10,000 participants in the sample the p value might have been significant.
[13] Due to the low response rate of participants identifying as Native American and Other, the categorization of Black, White, and Asian was utilized for the comparative analysis.

Latino are aware. 92% of respondents identifying as Hispanic or Latino in this study report having a bachelor's degree or higher.

Regarding survey question #4 which asks, "How do medical librarians deliver library services?" as depicted in **Table 4.12.** in **Appendix S**, in all instances (i.e., individuals come to the library, library staff deliver materials, etc.), less than half of the participants were aware of the medical librarian's current methods of delivery. Participants No responses were more likely than Yes responses on all of the response items (i.e., 75% - No).

In survey question #5, only 33.5% participants have consulted a medical librarian.[14] This is represented in **Table 4.13.** on **Appendix T**.

41.1% of participants identifying as male have consulted a medical librarian for their own or their family members' health information seeking needs while 18.2% of respondents identifying as female have consulted a librarian. This is a significant difference (chi square =21.577, df=2, p<.001), with more Males consulting than Females. Those with a bachelor's degree or higher are far more likely to have consulted a medical librarian than individuals without a bachelor's degree (p<.001). However, no significant difference regarding actual consultation exists for race (p=3.83). More participants identifying as Hispanic, or Latino are aware of medical librarians. So, it is not surprising to learn more participants identifying as Hispanic or Latino have consulted a medical librarian (p<.001). 75% of participants identifying as Hispanic or Latino have consulted while 24.1% of non-Hispanic or Latino have consulted.

[14] Survey question #5: Have you consulted a librarian for your own or your family members' health information seeking needs?

In survey question #10, the mean was 3.24 on a five-point scale; where 1 is almost never true and 5 is almost always true.[15] A 3.24 is between occasionally true and usually true. So, the participants will not always consult with a medical librarian but will sometimes. **Table 4.14.** in **Appendix U** confirms 27% of participants will occasionally consult while 23.1% of participants will usually consult.

The t-test revealed no significant difference in the means of the two genders presented for analysis (t=1.006, df=353, p=.315) regarding how likely is it that the Male or Female participant would meet with a medical librarian if given the chance. However, question #10 significantly differs by education (t=-3.094, df=300, p= .002). Those with less than a bachelor's degree are less likely (mean = 2.98) than those with a bachelor's or more (X=3.36) where 3 is occasionally true and 4 is usually true. There was no significant difference between races (F (2, 337)=1.202, p=.302). However, the participants identifying as Hispanic or Latino are more likely than the respondents identifying as non-Hispanic or Latino (t=3.258, df=352, p<.001) to if given the chance consult a medical librarian. Hispanic or Latino is 3.63 vs. non-Hispanic or Latino which is 3.14.

Survey question #7 is a Likert scale with 1 as strongly disagree and 5 as strongly agree.[16] The mean of the participants' responses is 3.98 which suggests the participants largely agree that the medical librarian should be included in the medical treatment team. 77.8% of participants believe the medical librarian should be included which is the sum of agree and strongly agree. This is presented on **Table 4.15.** in **Appendix V**.

[15] Survey question #10: If you or a family member were hospitalized, how likely is it that you would meet with a medical librarian if given the chance?
[16] Survey question #7: Do you believe that medical librarians should be included in the medical treatment team?

Over 70% of respondents to question #8-9 indicated it would affect their opinion if a medical librarian did not have an appropriate background which is represented in **Table 4.16.** to **4.17.** in **Appendix W** and **X**.[17,18]

Survey question #12 which asks, "How important is it for medical librarians to promote health literature for patients and family members?" is also a Likert scale with 1 as unimportant and 5 as strongly important. The mean of the participants' responses is 4.06 which suggests the participants find it important for medical librarians to promote health literature; 75.5% of participants find it important for medical librarians to promote health literature. This is presented on **Table 4.18.** on **Appendix Y**.

In question #13, the participants stated that it was important for medical librarians to promote health literature for patients and family members because: (1) it is easy for the librarian to do, (2) ability to reach a large number of people quickly, and a (3) member of the community; employed at an "anchor" institution.[19] The participants found it most critical due to the librarian's dissemination potential. This is displayed on **Table 4.19.** on **Appendix Z**.

Participants who stated in survey question #14 it was not important for medical librarians to promote health literature, said it was easy for the librarian to do.[20] The mean is equal to 2.75, and anything below a 3 participants disagree with, which is presented on **Table 4.20.** in **Appendix AA**. The participants also stated it is not a risk with potential exposure for the librarian's profession and institution. The participants slightly agreed with "cannot reach a large number of people quickly" and "not qualified to provide information," and were neutral on the remaining statements.

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[17] Survey question #8: Would it affect your opinion to know that the medical librarian may or may not have a health-related degree or background?
[18] Survey question #9: Would it affect your opinion to know that the medical librarian may or may not have a science degree or background?
[19] Survey question #13: If you believe it is important, why do you believe this?
[20] Survey question #14: If you believe it is not important, why do you believe this?

The researcher did not discover during the pilot test/soft launch that question #11 was created as a single-select as opposed to the proposed check all that apply. So, for question #11 participants selected their perceived most important information resource for a medical librarian to distribute during consultation. Overwhelming participants (n=205, 53%) wanted medical librarians to distribute an academic journal article during a meeting with themselves, the librarian, and/or a family member.

Table 4.21. in **Appendix BB** reviews survey question #11 which asks, "Regarding question ten (10), if you or a family member were hospitalized, and you agreed to meet with a medical librarian, what kind of information resources would you want the medical librarian to provide?" In question #11, there was an open entry text box for participants to record alternative information resources. The majority of the respondents who wrote-in an answer stated textbooks and journal articles (i.e., noting the single-select error).

For question #15, the mean is stated below in **Table 4.22.** in **Appendix CC**.[21] Anything below 3 the participants disagree with as an important channel of distribution for medical librarians. For example, respondents do not like TikTok and Instagram as a channel; anything above 3 the participants agree is an important channel for medical librarians like "anchor" institutions websites.

The MANOVA found a significant gender difference between Males and Females in their opinion regarding which channel medical librarians should utilize to distribute medical literature regarding public libraries, community meetings with community members, blogs, Twitter, Facebook, Instagram, and TikTok. Men prefer the abovementioned (i.e., public libraries, etc.) channels of delivery. See **Table 4.23.** in **Appendix DD**. There is no significant difference between the other answer options.

[21] Survey question #15: What channels do you believe these medical librarians should utilize to distribute medical literature to the public?

Participants with a higher education (i.e., bachelor's degree or higher) prefer with a statistical significance the answer options included in **Table 4.24.** in **Appendix EE** including public libraries, community meetings with community members, etc. There is no significant difference between the other answer options.

No significantly different means were identified in race with regard to preference in channels, and participants identifying as Hispanic, or Latino prefer all channels more than participants identifying as non-Hispanic or Latino ($p < .001$). See **Table 4.25.** in **Appendix FF**.

The next chapter includes a robust discussion on the interpretation of the survey's findings.

CHAPTER FIVE
CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

This study sought to survey and assess the U.S. public understanding of the medical librarian, specifically as it pertains to promotion, patient care, medical education, and clinical research. This study also sought to investigate and assess whether medical librarians have an obligation beyond their particular institutional role to, or aspirationally, should, provide the public with medical literature that may improve an individual's health or the public health. The percentage of the U.S. public who report awareness of medical librarians was calculated and displayed based upon the survey data. Calculations of the percentage of the U.S. public who report that they believe these specialty librarians should be included in the treatment team as well as of the percentage who believe that it is important for medical librarians to have a health and/or scientific background also are displayed.

Chapter Four discussed the results of the data analysis. The study had a total of 415 viable responses.[22] This number excludes the participants who did not complete the Statement of Consent. All respondents were over the age of 18. The majority of the participants identified as White (non-Hispanic, or Latino) males with a bachelor's degree.[23,24] Chapter Five discusses Key Findings from the survey. The granular analysis

[22] The viable responses included Amazon's MTurk master and non-master workers. The sample size was not large enough to conduct a segregated analysis of the master and non-master worker's responses. This is a potential limitation of the dataset.
[23] The participant who selected "Other" for the race question (#17) wrote in "NATIVE AMERICAN." The researcher erroneously assumed that "NATIVE AMERICAN" would be incorporated in the American Indian or Alaskan Native selection. It is the sincere hope of the researcher that she did not offend any participants with an insensitive, mislabeled, incomplete, or non-inclusive categorization.
[24] This demographic profile is consistent with other MTurk studies (Pew Research Center, 2016).

by survey question in Chapter Four informs the discussion in Chapter Five organized by survey category and research question.[25,26]

Key Findings

Knowledge

To provide a foundation and to augment the alignment between research and survey questions, knowledge/awareness questions were distributed to the MTurk participants. Survey questions #1-4 address the knowledge/awareness of the U.S. public of medical librarians.[27,28,29,30]

Over half of the respondents (n=278, 67%) in survey question #1 claim to be aware of medical librarians; less participants (n=223, 54%) in survey question #2 claim awareness of medical librarians working on clinical floors, and even fewer respondents (n=217, 52.4%) in survey question #3 acknowledge awareness of medical librarians responding to consumer health questions from patients or family members.[31] The number of participants stating awareness of medical librarians is significantly higher than the researcher anticipated. This is a potential limitation of the study.

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[25] The survey categories are included in Chapter Three: Instrumentation - Constructing the Questionnaire.
[26] The research questions are included in Chapter One: Purpose and Objectives.
[27] Survey question #1: Are you aware of medical librarians?
[28] Survey question #2: Are you aware that some medical librarians work on clinical floors in medical facilities (including hospitals)?
[29] Survey question #3: Are you aware that medical librarians can respond to consumer health questions from patients or family members?
[30] Survey question #4: How do medical librarians deliver library services? (Please select one or more answers.)
[31] The participants of this survey research were correct, as the number of medical librarians who actually go to the clinical floors is not a high percentage in the profession. Most medical librarians are employed at anchor institutions.

There are other surveys on MTurk and alternative crowdsourcing platforms which reject participants if they do not answer a specific question in a particular way. For example, another researcher might have eliminated and denied compensation to a participant if the respondent answered “no” to the question of “are you aware of medical librarians?” If the researcher were to re-conduct this study, the researcher would add language to the survey informing participants that they would not be eliminated or denied compensation for answering any question other than the consent and attention checks in a particular way. Without this language, these results might be skewed towards data indicating increased participant knowledge due to a desire to receive compensation as opposed to actual awareness.

In survey question #4, less than half of the participants were aware of the current methods by which medical librarians deliver services to their stakeholders (“current methods of deliver”). The two methods of delivery most widely selected in the survey (n=177, 42.7%) were “library staff deliver materials” and “library staff consult with staff/physicians in their offices”. The least acknowledged (n=131, 31.6%) was “individuals come to the library”. These findings could indicate that libraries need better marketing/advertising, such as signage. However, this is also a potential limitation of the study. This study was conducted during the COVID-19 pandemic. It is possible participants were less aware of individuals physically visiting the library because the respondents anticipated potential closures or accessibility issues in hospitals or freestanding libraries. If the researcher re-conducted this survey, the researcher would attempt to account for any influence that the ongoing pandemic might exert on delivery methods for medical librarians.

Two survey questions (i.e., survey question #2 and #4) were designed to ascertain participants’ awareness of medical librarians working on clinical floors.[18,20] There is a discrepancy in these results. Less participants (n=223, 54%) claimed awareness in question #4 (n=172, 41.4) than in question #2 (n = 223, 54%).[18,20] This is another possible limitation of the study. It reiterates the researcher’s concern that these results might be

skewed to suggest an increased participant knowledge due to a desire to receive compensation rather than actual awareness.

Disregarding this potential limitation, over half of the respondents (n=278, 67%) claimed to be aware of medical librarians. Since awareness is already high (i.e., 67%), additional resources might be needed if medical librarians were to be more promoted to the U.S. public. For example, if the existing pool of medical librarians have a full-capacity workload, increasing exposure could lead to burn-out, missed or delayed requests, etc. A follow-up survey could seek to determine if actual medical librarians and/or medical professionals like hospital administrators and/or physicians want to increase the exposure that medical librarians have to the public.

This is not to disregard the potential benefit that medical librarians provide to their stakeholders.[32] Questioning whether exposure should be increased is merely acknowledging economic trade-offs like budget. It is outside of the scope of this researcher's knowledge (and, to the researcher's knowledge, the existing literature) to determine if the majority of medical libraries would increase staffing levels if additional requests from customers were made or if it would merely strain the existing staff. The speculative correlation between increased awareness and increased budget/staffing would require a potential follow-up study.

With regard to comparative demographics, participants identifying as male and those identifying as female are equally aware of medical librarians. 51.8% of participants with less than a bachelor's degree are aware of medical librarians, while 74.5% with a bachelor's degree or higher reported awareness. Therefore, participants with more degrees/education tend to be more aware of medical librarians, and, thus, promotion of

[32] In fact, in the 1992 and 2013 follow-up Rochester study, the majority of physicians modified a patient's course of treatment due to library-provided information (National Library of Medicine, 2017).

medical librarian services might be more effective if aimed at those without college degrees.[33]

89.5% of participants identifying as Hispanic or Latino are aware of medical librarians, while 61.9% of respondents identifying as non-Hispanic or Latino are aware. 92% of respondents identifying as Hispanic or Latino in this study report having a bachelor's degree or higher; reinforcing the correlation between formal education and awareness.

It is possible that the successful integration of liaison programs on college campuses and the physical presence of a library at a university increases awareness for participants. Essentially, the "routine" of engaging with the library during a college experience potentially carries forward with the participants during their future endeavors. A follow-up study could seek to determine how those with a college education become aware of medical librarians.

The implications of these data vis-à-vis health literacy are concerning. Health literacy is discussed in the Literature Review. Medical librarians, the health administration, and their stakeholders should consider whether it is a responsibility of their professions to increase awareness among those with less formal education. The appropriate methods for doing this are discussed below, however, while allowing the status quo regarding low public health literacy and awareness is possible, some might posit that allowing non-college educated individuals to be underserved as compared to their college educated peers is unethical. This is a larger conversation among those involved in healthcare generally, including among medical librarians. While the findings of this research study arguably implicate the language of Code of Ethics for Health Sciences Librarianship that states that "[t]he health sciences librarian promotes access to health information for all', the language is broad (MLA, 2010).

[33] The response from participants with a bachelor's degree led the researcher's Thesis Committee to seek to determine how many of the participants had graduate degrees or even medical degrees. This could also account for the increased awareness.

Behavior

Survey question #5 reports if the U.S. public has ever consulted a medical librarian. This behavior question was distributed to MTurk participants to provide a foundation and to augment the alignment between research and survey questions. Over half of the participants (n = 270, 65.1%) said "no" to previously consulting a medical librarian for their own or for their family members' health information-seeking needs; n=139, 33.5% said "yes."

In 2015, Pew Research Center reported that 46% of persons aged 16 or more visited a public library (or bookmobile) in the previous year (Pew Research Center, 2015a). Consulting a medical librarian is even less frequent by roughly 13% than a regular visit to the library; based upon a very speculative assumption that equates visiting a library with consulting a librarian; no data on the percentage of the U.S. population who consult a reference/librarian were identified. Conversely, as the least acknowledged (n=131, 31.6%) mode of delivery for medical librarianship was "individuals come to the library", perhaps physical structures have less visibility than the librarians who work in them.[34]

Concerning demographics, 41.1% of participants identifying as male have consulted a medical librarian for their own or for their family members' health information-seeking needs, while 18.2% of respondents identifying as female have consulted a librarian.[35]

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[34] As stated above, this study was conducted during the COVID-19 pandemic. It is possible participants of this study's survey were less aware of individuals physically visiting the library because the respondents anticipated potential closures or accessibility issues in hospitals or freestanding libraries. While visits to physical libraries may have decreased during the pandemic, virtual visits/interactions have certainly increased (Howes et al., 2021). For example, the Southern Illinois University Medical Library used new technologies like ConnectWise (i.e., remote control of a computer) to service customers remotely (Howes et al., 2021).

[35] The finding that more participants identifying as male than female have consulted a medical librarian contradicts the adjacent research indicating that females pursue more frequently information online regarding their health; although, typically males are more engaged Internet consumers than females (Hallyburton & Evarts, 2014).

This is surprising, especially considering that men tend to die younger than women, and men suffer from more illnesses during their lifetime (Harvard, 2019). A follow-up study to this research could be to test the potential negative correlation between an individual's personal health/well-being and that individual's consultation of a medical librarian. This finding is also "odd" as it runs counter to the documented stereotype that men seek help from others, especially from professionals, less often than women (Jackson, 2011). While not specific to responding to online surveys, research has been conducted on male and female honesty (Jung & Vranceanu, 2017), however, taken at "face value," it is possible that research studying the role of men in households versus women could indicate, in this instance, that self-identifying men perceive themselves to be the head of their household and (Pew Research Center, 2017), as such, are responsible for seeking guidance on their and their family's health information needs with medical librarians.

Study respondents with a bachelor's degree or higher are more likely to have consulted a medical librarian than individuals without a bachelor's degree. This is likely due to their increased awareness. No significant difference regarding actual consultation exists among respondents by race, although more participants identifying as Hispanic, or Latino have consulted a medical librarian. This is also likely due to increased awareness associated with the high percentage of college-educated Hispanic, or Latino respondents. A follow-up study could seek to ascertain if Hispanics or Latino participants without a college education have similar awareness and behavior.

Opinion and Perception

Survey question #10 captures how likely the U.S. public is to consult a medical librarian. This opinion and perception question was distributed to MTurk participants to provide a foundation and to augment the alignment between research and survey questions. Participants stated that they will not always consult with a medical librarian but sometimes will (X=3.24). This finding indicates that some participants (29.9%) who have not yet consulted a medical librarian (question #5) would be willing to do so. This has implications

that could increase awareness beyond 67% and could potentially strain the resources of the profession. Essentially, if more of the U.S. public had an opportunity to consult a medical librarian, they would do so. This has strong implications for budgeting and reinforces the need for medical librarians to find support from their institutions, professionally and financially, if there were increased public awareness.

No significant difference in the means of the two genders presented for willingness to consult a medical librarian. However, those with less than a bachelor's degree are less likely than those with a bachelor's or higher to consult a medical librarian. This is not surprising as public trust (including possibly with library staff) decreases with income inequality (Association for Psychological Sciences, 2014), and "the more you learn, the more you earn" (Bureau of Labor Statistics, 2018). An unwillingness to consult also could be attributed to a general fatigue with navigating the U.S.'s complex medical system. A potential follow-up study with possibly interviews might seek to determine why those without a bachelor's degree are unwilling to consult. Another cause might be a participant's perception of lack of qualification/appropriate background of the medical librarian. This is discussed in more detail in the section below that expands on Research question #2.

Although there was no significant difference between races in willingness to consult, the participants identifying as Hispanic, or Latino are more likely than the respondents identifying as non-Hispanic or Latino to consult a medical librarian if given a chance. This is most likely attributed to the confounding result of the high number of Hispanic, or Latino participants with a bachelor's degree or higher.

Research question #1[36]

In survey question #7, 77.8% of participants believe that medical librarians should be included in the medical treatment team.[37] This might indicate that the U.S. population acknowledges a need for assistance in navigating the U.S.'s complex healthcare system, a not surprising result given that less than 15 percent of U.S. adults have the health literacy skills required to navigate the U.S. healthcare system (U.S. Department of Education, 2006) and even these individuals' abilities may be compromised by stress or illness (AHRQ, 2020). The availability of assistance vis-a-vis librarians in hospitals prior to 1986 was mandated by law. However, expense cuts in the Healthcare Financing Administration in 1986 and The Joint Commission in 1993 eliminated this regulation (National Library of Medicine, 2017). The responsibility of all those in the medical and allied professions, including medical librarians, as well as those who interact therewith, must advocate for change regarding increased requirements and support for hospitals and medical centers for assistance by librarians and libraries in supporting the U.S. public in health literacy and the medical treatment team.

This gives rise to the discussion pertaining to potential liability for medical librarians (Eakin et al., 1980).[38] Physicians have medical malpractice insurance; librarians, by interpreting medical diagnosis and assisting individuals and/or their family members, potentially could be subjected to a lawsuit (Gray, 1989). Librarians are increasingly concerned about this (Mika & Shuman, 1988). For example, an individual could ask a librarian for literature after

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[36] Research question #1: Does the U.S. public believe that medical librarians should be included in medical treatment teams?

[37] Survey question #7: Do you believe that medical librarians should be included in the medical treatment team?

[38] In a patient information prescription form (which is used at Vanderbilt University Medical Center), health professional tells the medical librarian exactly what type of information to give the patient (Calabretta, 2002 & Williams et al., 2001). That way, it is the health professional's opinion upon which the librarian can rely when providing the information, not the consumer, removing liability concerns (Williams et al., 2001). It also provides an "interpretive loop"; the patient can return to the prescriber with questions about anything the patient does not understand in the material.

a self-diagnosis on bronchitis then follow the recommended treatment guidelines discussed in the literature provided by the librarian when the individual actually has lung cancer. The individual could die due to lack of treatment. Guidelines pertaining to disclosure and interpretation of advice specifically for customers with low health literacy would need to be developed, as possibly would insurance.

Research question #2[39]

In survey question #8 and #9, over 70% of respondents indicated it would affect their opinion about whether a medical librarian should be included on the treatment team if the librarian did not have an appropriate background.[40,41] Participants favored a health-related degree to a science degree by 3.4%. This finding could affect the recruitment and hiring of medical librarians. If customers and their family members are more comfortable with health-related degrees prior to the ALA master's program, hiring committees must take this into consideration while evaluating candidates. Conversely, not all physicians have health-related or science degrees prior to attending medical school. For example, a physician might have an undergraduate degree in History but have completed the prerequisite courses outside of their degree program or while simultaneously enrolled in their undergraduate degree program for medical school. It is possible the MLA, who likely has a better idea of what training medical librarians actually need than the U.S. public does, could consider requiring prerequisite courses, or an employer might require prerequisite courses prior to the start date or within one to two years of beginning employment.

[39] Research question #2: Does it influence public perception if the librarian may or may not have a health and/or science background?
[40] Survey question #8: Would it affect your opinion to know that the medical librarian may or may not have a health-related degree or background?
[41] Survey question #9: Would it affect your opinion to know that the medical librarian may or may not have a science degree or background?

This might seem like a burdensome hurdle for the potential medical librarian. However, trust in the profession is critical to providing a high level of service. This finding suggests then that if medical librarians were promoted further, helping the public understand the nature of their education and training could further improve trust. It is also possible that a disclaimer regarding the medical librarian's education is necessary when directly providing services to a member of the public or a family member or when publicizing a librarian's MLA AHIP accreditation.[42,43] This could prevent erroneous and potentially libelous assumptions on behalf of the customer and their family. For example, the medical librarian could state… "I have an undergraduate degree in __X__ and an ALA master's; I do not have a health or science degree or background. My specialty is information retrieval." An interesting follow-up would be to survey the assumption/perception of the U.S. public regarding librarians and their educations, including the undergraduate degrees of medical librarians. It is worth noting that over half of the respondents of this survey (n=275, 66.4%) have bachelor's degree. The researcher assumed that these respondents therefore valued education/degrees. A customer without a degree might not value the medical librarian's degree to the same extent as an individual with a degree.

Research question #3[44]

Research question #3 queries whether members of the U.S. public believe that medical librarians should distribute medical literature to the public. Survey question also #12, 13,

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[42] However, there are some hospital librarians who do not have the MIS or the MLA AHIP accreditation.

[43] The MLA AHIP certification is introduced in Chapter Two, Section #6, The expanding role of the medical librarian. This certification is peer-reviewed and portfolio-based (MLA, 2021d). It implies a standard of professional education, experience, and accomplishment (MLA, 2021d). As of 2014, there were over 1,100 medical librarians certified pursuant to its process (Huber & Keefner, 2014). Members of AHIP's five levels range from "provisional" to "distinguished" (Huber & Keefner, 2014). It helps medical librarians develop and keep up to date on key competencies in medical reference services.

[44] Research question #3 Do members of the U.S. public believe that medical librarians should distribute medical literature to the public?

and 14 are also pertinent to this research question.[45,46,47] The responses suggest the participants believe it is important for medical librarians to promote health literature for patients and their family members because: (1) it is easy for the librarian to do, (2) they have the ability to reach a large number of people quickly, and (3) they are members of the community; employed at an "anchor" institution. 75.5% of participants find it important for medical librarians to promote health literature. The preferred channels of delivery for promotion are discussed in the next section (i.e., a more detailed analysis of Research question #4). The participants who do not think it is librarian's a duty to engage in this promotion believe the medical librarian "cannot reach a large number of people quickly" and are "not qualified to provide information," which is also relevant to the discussion in Research question #2 regarding the public's awareness of the medical librarian's background and training.

Research question #4[48]

Research question #4 addressed in survey question #11 and #15 asks what channels the U.S. public believes these librarians should utilize to distribute medical literature to the public.[49,50] Participants reported preferring that medical librarians distribute information on "anchor" institutions website (i.e., hospital, etc.). This is a potential limitation of the dataset. Because this was an online survey, participants assumably were comfortable

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[45] Survey question #12: How important is it for medical librarians to promote health literature for patients and family members?
[46] Survey question #13: If you believe it is important, why do you believe this? (Please select one or more answers.)
[47] Survey question #14: If you believe it is not important, why do you believe this? (Please select one or more answers.)
[48] Research question #4: What channels does the U.S. public believe these librarians should utilize to distribute medical literature to the public?
[49] Survey question #11: Regarding question ten (10), if you or a family member were hospitalized, and you agreed to meet with a medical librarian, what kind of information resources would you want the medical librarian to provide?
[50] Survey question #15: What channels do you believe these medical librarians should utilize to distribute medical literature to the public?

online, a fact that might not be generalizable to those in the U.S. population who do not access information or conduct transactions as readily or frequently online. Accordingly, while medical librarians can attempt to reach the internet savvy segment of the population on, for example, their institutions' websites, it is important for the medical librarian to attempt to reach the non-Internet U.S. public via different channels. However, this finding indicates that medical libraries might warrant becoming a more prominent feature on an institution's website, with a larger allocation of resources (i.e., budget) to distribute information thereon.

Although participants also favored academic journal articles as a channel, medical librarians serving customers generally avoid providing this medium given that the language is too technical (MLA, 2022b). Medical librarians appear to take great care to provide appropriately targeted medical and other health-related information to the public, referring them to websites such as the National Library of Medicine's MedLinePlus and those dedicated to specific conditions such as the American Cancer Association as well as to books intended for consumers, including Susan Weiner's Diabetes: 365 Tips for Living Well and David L. Cram's Understanding Parkinson's Disease: A Self-Help Guide. (MLA, 2022b). The Medical Library Association, however, cautions its members to provide access to a range of materials but to "avoid suggesting diagnoses and recommending particular health professionals or procedures" (MLA, 2002b).

Regarding the comparative demographic analysis for other channels of delivery, men prefer social media like Twitter, Facebook, Instagram, and TikTok for information delivery.[51] Historically, women use more social networking sites than men, but, as of 2015, a similar percentage of men and women reported using social media (Pew Research Center, 2015b). According to this MTurk study participants with a higher education (i.e., bachelor's degree or higher) also prefer social media. This is consistent

[51] Currently, medical librarians' utilization of social media is dependent on institutional restrictions, for example, its social media policies.

with the existing literature. As of 2019, 64% of high school graduates or less use social networking sites, compared to 79% of people with a bachelor's or higher (Statista, 2019). No significantly different means were identified in race with regard to preference in channels if information delivery, and participants identifying as Hispanic, or Latino prefer all channels more than participants identifying as non-Hispanic or Latino, likely due to their higher education levels.

Research question #5[52]

Research question #5 encapsulated in survey question #17 through #20 seeks to determine whether the U.S. publics' awareness, behavior, intention, and preference are affected by demographic data, including race, ethnicity, gender, and education.[53,54,55,56] The answer to this question has been addressed in the previous sections. Overall, the researcher believes that the most significant findings pertained to the education and gender gaps. 51.8% of participants with less than a bachelor's degree are aware of medical librarians, while 74.5% with a bachelor's degree or higher reported awareness. Perhaps the individuals who need the most help navigating the U.S.'s complex health system are unaware of a potential resource. 41.1% of participants identifying as male have consulted a medical librarian for their own or for their family members' health information-seeking needs while only 18.2% of respondents identifying as female have done so. No significant difference in the means of the two genders presented with regard to willingness to consult a medical librarian. This suggests that attempts should be made to target women for consultations.

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[52] Research question #5: Are the U.S. public's awareness, behavior, intention, and preference affected by demographic data including race, ethnicity, gender, and education?
[53] Survey question #17: What is your race? (Please select one or more answers.)
[54] Survey question #18: Are you of Hispanic or Latino origin?
[55] Survey question #19: With what gender do you identify?
[56] Survey question #20: What is the highest level of school you have completed or the highest degree you have received?

Conclusion

This research study sought to investigate and assess whether medical librarians have an obligation beyond their particular institutional role to, or aspirationally should, provide the public with medical literature that has the potential to improve an individual's health or the public health. By means of a twenty (20) question survey distributed on Amazon's MTurk platform it analyzed the U.S. public's knowledge, behavior, opinion, perception, and comparative demographics. It also examined the opinions of members of the U.S. public regarding the practices of medical librarians as these practices pertain to health promotion, patient care, medical education, and clinical research.

The research produced a number of interesting findings. For example, participants with a bachelor's degree or higher are more aware of medical librarians and are more likely to consult a medical librarian. Also interesting, more than double the number of self-identifying men have consulted a medical librarian than those respondents who self-identified as women. All of the findings must be considered with caution and may not be generalizable beyond the sample for several reasons: (1) this survey contained closed-ended questions, (2) the results had a low rate of return, and (3) the results contained potentially inaccurate information due to a sole desire of respondents to participate solely for the purpose of receiving the nominal compensation for completing the survey.

While the survey results potentially are not generalizable, the results provide data in an area where there apparently is no published literature that focuses on the public's perception of the role of medical librarians. These data on U.S. public expectations and values with regard to their understanding of docent/medical teams and to their reference and health-related information promotion preferences also may inform the communication priorities and strategies of medical librarians, public librarians, and health-related libraries and facilities. Finally, it may also encourage governing bodies (i.e., libraries, professional associations, etc.) to amend and/or promulgate guidance that is more responsive to U.S. public health literacy deficits and concerns and interests thereabouts.

These impacts are not insignificant given that one of the MLA's core values is public awareness of high-quality health information as well as access to high-quality health information (MLA, 2022a). At least some have advocated for a proactive role for medical librarians in the promotion of health literacy (Ports et al., 2015). Literature exists pertaining to the "impact and value of providing consumer health information" to health consumers, which is favorable (Pifalo et al., 1997). At a time when 35% of U.S. adults report using the Internet to self-diagnosis their individual or their family member's medical conditions (Pew Research Center, 2013), coupled with decreased patient consultation times, the "steward" or "gatekeeper" of this information, the medical librarian, may come under increasing reference pressures (Fister, 2014; Stover, 2016). The "patient information prescription" from a health professional certainly is more effective than the public's personal "Dr. Google" search (Calabretta, 2002; Joseph, 2018; Williams et al., 2001).

The health literacy deficit in this situation is stark since, despite the Internet and Web's prevalence, 10% of U.S. adults do not use the Internet (Pew Research Center, 2019), so "Dr. Google" is not even available to them. A large portion of those who do not use the Internet are individuals/households with less than $30,000 in annual income and/or less than a high-school education (Pew Research Center, 2019). The data from this research is consistent with this existing data, as participants in this survey with a bachelor's degree or higher are more aware of medical librarians and are more likely to consult a medical librarian. This potential gap in service has implications for medical librarians regarding poor health literacy, something the profession is trying to remedy (Ports et al., 2015).

Lack of information accessibility (and poor health literacy) disproportionally affect the poor and disenfranchised in the U.S. (Oelschlegel et al., 2009). Medical librarians are responding with initiatives to decrease this substantial inequality in health literacy of U.S. individuals. For example, a pilot project in rural eastern North Carolina was developed by medical health information professionals to increase the health literacy of adolescents from seasonal farmworker families (Mendez et al., 2019). The work of these professionals is important, and the data resulting from this study indicates a positive public perception

of medical librarians. However, it also suggests their work might not be visible to, and that there may be a gap in trust for, those who might require the services of medical librarians the most.

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APPENDIX

Appendix A: Table 1.1.

Table 1.1. Number of U.S. Librarians

	Librarian	**Other Paid Staff**	**Total Paid Staff**
Academic Libraries	26,606	59,154	85,751
Public Libraries	46,808	90,043	136,851
Public School Libraries	78,570	47,440	126,010
Private School Libraries	14,090	3,770	17,860
Bureau of Indian Education School Libraries	90	80	170
Total	166,164	200,478	366,642

Appendix B: Survey Research

Screening Question

Are you 18 years of age and/or older?

- ☐ Yes
- ☐ No

Consent Cover Statement

INTRODUCTION

You are invited to participate in a research study. The purpose of this study is to examine the opinions of the U.S. public regarding the role of medical librarians, clinical medical librarians, and medical informationists (referred to collectively as "medical librarians") as these opinions pertain to health promotion, patient care, medical education, and clinical research in the United States.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

If you agree to participate, you will be asked to complete a short questionnaire. The questionnaire will ask for demographic information (i.e., ethnicity, race, age, gender, and education); information regarding your understanding and interpretation of the term librarian; and your opinions about the importance of health promotion.

It will take approximately five-to-six-minutes to complete the questionnaire. You may skip or decline to answer any question. The research study is for adults 18 years of age and older.

RISKS

Although there always are risks of data breaches, all survey responses will be stored in a password-protected electronic format and will be made available only to persons conducting the research. No identifying information such as names, email addresses, or IP addresses will be collected or retained by the researcher. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

BENEFITS

There are no direct benefits offered by the researcher – Chelsea Jacobs (cjacobs4@vols.utk.edu) – to participants. Benefits (if any) will be administered by MTurk. The results of this study could encourage institutions and individuals to promulgate guidance, marketing, education, and communication strategies that are more responsive to the U.S. public regarding the work of medical librarians.

CONFIDENTIALITY

The information will be kept confidential. No personally identifiable information will be collected. No attempt will be made by the researcher to ascertain the identity of

participants. No reference will be made in oral or written reports which could link participants to the study.

CONTACT INFORMATION
If you have questions at any time about the study or the procedures (or if you experience adverse effects as a result of participating in this study), you may contact the researcher, Chelsea Jacobs (cjacobs4@vols.utk.edu). If you have questions about your rights as a participant, you may contact the University of Tennessee IRB Compliance Officer at utkirb@utk.edu or (865) 974-7697.

PARTICIPATION
Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty. If you withdraw from the study before data collection is completed, your data will be omitted from the study results.

CONSENT
I have read the above information. I have received a copy of this form. Do you wish to participate? Yes or No?

Survey

Definition:

Medical librarians, clinical medical librarians, and medical informationists (referred to collectively as "medical librarians") will be defined for the purpose of this survey as librarians who contribute to patient care, medical education, and clinical research.

I – KNOWLEDGE/AWARENESS

1. Are you aware of medical librarians?

- ☐ Yes
- ☐ No
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

2. Are you aware that some medical librarians work on clinical floors in medical facilities (including hospitals)?

- ☐ Yes
- ☐ No
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

3. Are you aware that medical librarians can respond to consumer health questions from patients or family members?

- ☐ Yes
- ☐ No
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

4. How do medical librarians deliver library services? (Please select one or more answers.)

- ☐ Individuals come to the library
- ☐ Library staff deliver materials
- ☐ Library staff consult with staff/physicians in their offices
- ☐ Library staff work on clinical floors
- ☐ Library staff make "rounds" with clinical staff
- ☐ Hybrid model (mix of all of the above)
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

II – BEHAVIOR

5. Have you consulted a librarian for your own or your family members' health information seeking needs?

- ☐ Yes
- ☐ No
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

A - ATTENTION CHECK

6. If you are actively engaged in this survey instrument, please select "Strongly Agree."

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Undecided
- ☐ Agree
- ☐ Strongly Agree
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

III – OPINION AND PERCEPTION

7. Do you believe that medical librarians should be included in the medical treatment team?

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Undecided
- ☐ Agree
- ☐ Strongly Agree
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

8. Would it affect your opinion to know that the medical librarian may or may not have a health-related degree or background?

- ☐ Yes
- ☐ No
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

9. Would it affect your opinion to know that the medical librarian may or may not have a science degree or background?

- ☐ Yes
- ☐ No
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

10. If you or a family member were hospitalized, how likely is it that you would meet with a medical librarian if given the chance?

- ☐ Almost Never True
- ☐ Usually Not True
- ☐ Occasionally True
- ☐ Usually True
- ☐ Almost Always True
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

11. Regarding question ten (10), if you or a family member were hospitalized, and you agreed to meet with a medical librarian, what kind of information resources

would you want the medical librarian to provide? (Please select one or more answers.)

- ☐ Textbook
- ☐ Academic journal article
- ☐ Wikipedia
- ☐ Blog
- ☐ Twitter
- ☐ Facebook
- ☐ Instagram
- ☐ TikTok
- ☐ Other. Please specify. Leave open-ended
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

12. How important is it for medical librarians to promote health literature for patients and family members?

- ☐ Unimportant
- ☐ Slightly Important
- ☐ Moderately Important
- ☐ Important
- ☐ Very Important
- ☐ Don't Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

13. If you believe it is important, why do you believe this? (Please select one or more answers.)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Easy for the librarian to do	☐	☐	☐	☐	☐
Ability to reach a large number of people quickly	☐	☐	☐	☐	☐
Member of the community; employed at an "anchor" institution	☐	☐	☐	☐	☐
Don't Know/Not Sure [DK]	☐	☐	☐	☐	☐
Decline to Answer [DA]	☐	☐	☐	☐	☐

14. If you believe it is not important, why do you believe this? (Please select one or more answers.)

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Not easy for the librarian to do	☐	☐	☐	☐	☐
Cannot reach a large number of people quickly	☐	☐	☐	☐	☐
Not an “anchor” in the community	☐	☐	☐	☐	☐
Risk to reveal confidential information	☐	☐	☐	☐	☐
Risk reflecting poorly on the librarian and their profession	☐	☐	☐	☐	☐
Not qualified to provide information	☐	☐	☐	☐	☐
Don’t Know/Not Sure [DK]	☐	☐	☐	☐	☐
Decline to Answer [DA]	☐	☐	☐	☐	☐

15. What channels do you believe these medical librarians should utilize to distribute medical literature to the public?

	Never	Rarely	Sometimes	Often	Always
Public libraries	☐	☐	☐	☐	☐
Community agencies	☐	☐	☐	☐	☐
Community meetings with community members	☐	☐	☐	☐	☐
Professional conferences with fellow researchers and academics	☐	☐	☐	☐	☐
“Anchor” institutions website (i.e., hospital, etc.)	☐	☐	☐	☐	☐
Teaching community members and emerging researchers vis-à-vis curriculum design and assessment	☐	☐	☐	☐	☐
Blogs	☐	☐	☐	☐	☐
Twitter	☐	☐	☐	☐	☐
Facebook	☐	☐	☐	☐	☐
Instagram	☐	☐	☐	☐	☐
TikTok	☐	☐	☐	☐	☐
Don’t Know/Not Sure [DK]	☐	☐	☐	☐	☐
Decline to Answer [DA]	☐	☐	☐	☐	☐

B - ATTENTION CHECK

16. If you are actively engaged in this survey instrument, please select “Agree.”

- ☐ Strongly Disagree
- ☐ Disagree
- ☐ Undecided
- ☐ Agree
- ☐ Strongly Agree
- ☐ Don’t Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

IV – DEMOGRAPHICS

17. What is your race? (Please select one or more answers.)

- ☐ White
- ☐ Black or African American
- ☐ Asian
- ☐ Native Hawaiian or other Pacific Islander
- ☐ American Indian or Alaskan Native
- ☐ Multiple races
- ☐ Other
- ☐ Don’t Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

18. Are you of Hispanic or Latino origin?

- ☐ Yes
- ☐ No
- ☐ Don’t Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

19. With what gender do you identify?

- ☐ Male
- ☐ Female
- ☐ Trans-Male
- ☐ Trans-Female
- ☐ Other
- ☐ Don’t Know/Not Sure [DK]
- ☐ Decline to Answer [DA]

20. What is the highest level of school you have completed or the highest degree you have received?

- ☐ No formal schooling completed
- ☐ Nursery school to 8th grade
- ☐ Some high school, no diploma
- ☐ High school graduate, diploma, or the equivalent (for example: GED)
- ☐ Some college credit, no degree
- ☐ Trade/technical/vocational training
- ☐ Associate degree
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Professional degree
- ☐ Doctorate degree
- ☐ Decline to Answer [DA]

Appendix C: Table 3.1.

Table 3.1. Sources for knowledge questions

Questionnaire Number	Question	Source(s)
1	Are you aware of medical librarians?	Polger, 2010.
2	Are you aware that some medical librarians work on clinical floors in medical facilities (including hospitals)?	Polger, 2010.
3	Are you aware that medical librarians can respond to consumer health questions from patients or family members?	Harris, 2005.
4	How do medical librarians deliver library services?	Harris, 2005; Polger, 2010.

Appendix D: Table 3.2.

Table 3.2. Sources for behavior questions

Questionnaire Number	Question	Source(s)
5	Have you consulted a librarian for your own or your family members' health information-seeking needs?	Written by the researcher to satisfy the research study's major purpose.

Appendix E: Table 3.3.

Table 3.3. Sources for opinion and perception questions

Questionnaire Number	Question	Source(s)
7	Do you believe that medical librarians should be included in the medical treatment team?	Demas, 1991.
8	Would it affect your opinion to know that the medical librarian may or may not have a health-related degree or background?	Marshall, 2013.
9	Would it affect your opinion to know that the medical librarian may or may not have a science degree or background?	Marshall, 2013.
10	If you or a family member were hospitalized, how likely is it that you would meet with a medical librarian if given the chance?	Chaudhuri & Christofides (n.d.). Suggestion by the researcher's Graduate Committee.
11	Regarding question ten (10), if you or a family member were hospitalized, and agreed to meet with a medical librarian, what kind of information resources would you have wanted the medical librarian to provide? (Please select one or more answers.)	Chaudhuri & Christofides (n.d.). Suggestion by the researcher's Graduate Committee.
12	How important is it for medical librarians to promote health literature to patients and family members?	Eakin, 1980.
13	If you believe it is important, why do you believe this? (Please select one or more answers.)	Written by the researcher to satisfy the research study's major purpose.
14	If you believe it is not important, why do you believe this? (Please select one or more answers.)	Lagu, 2008; Miller, 2008. Primarily written by the researcher to satisfy the research study's major purpose.
15	What channels do you believe these medical librarians should utilize to distribute medical literature to the public?	Eakin, 1980; Cobus, 2008; Joseph, 2018,

Appendix F: Table 3.4.

Table 3.4. Sources for demographic questions

Questionnaire Number	**Question**	**Source(s)**
17	What is your race?	ITHAKA S+R, 2021 Inclusion, Diversity, and Equity.
18	Are you of Hispanic or Latino origin?	ITHAKA S+R, 2021 Inclusion, Diversity, and Equity.
19	With what gender do you identify?	ITHAKA S+R, 2021 Inclusion, Diversity, and Equity.
20	What is the highest level of school you have completed or the highest degree you have received?	ITHAKA S+R, 2021 Inclusion, Diversity, and Equity.

Appendix G: Table 3.5.

Table 3.5. Sources for attention check(s) questions

Questionnaire Number	Question	Source(s)
6	If you are actively engaged in this survey instrument, please select "Strongly Agree."	Abbey & Meloy, 2017 Suggestion by the OIT Statistical Consultant.
16	If you are actively engaged in this survey instrument, please select "Agree."	Abbey & Meloy, 2017 Suggestion by the OIT Statistical Consultant.

Appendix H: Table 4.1.

Table 4.1. Alignment of research questions and questionnaire questions

Research question:	**Survey question(s):**
1. Does the U.S. public believe that medical librarians should be included in medical treatment teams?	7. Do you believe that medical librarians should be included in the medical treatment team?
2. Does it influence public perception if the librarian may or may not have a health and/or science background?	8. Would it affect your opinion to know that the medical librarian may or may not have a health-related degree or background?
	9. Would it affect your opinion to know that the medical librarian may or may not have a science degree or background?
3. Do members of the U.S. public believe that medical librarians should distribute medical literature to the public?	12. How important is it for medical librarians to promote health literature for patients and family members?
	13. If you believe it is important, why do you believe this?
	14. If you believe it is not important, why do you believe this?
4. What channels does the U.S. public believe these librarians should utilize to distribute medical literature to the public?	11. Regarding question ten (10), if you or a family member were hospitalized, and you agreed to meet with a medical librarian, what kind of information resources would you want the medical librarian to provide?
	15. What channels do you believe these medical librarians should utilize to distribute medical literature to the public?
4. Are the U.S. public's awareness, behavior, intention, and preference affected by demographic data including race, ethnicity, gender, and education?	17. What is your race? (Please select one or more answers.)
	18. Are you of Hispanic or Latino origin?
	19. With what gender do you identify?
	20. What is the highest level of school you have completed or the highest degree you have received?

Appendix I: Table 4.2.

Table 4.2. Distribution of results

Type of Distribution	**Date**	**Responses Received**	**Type of respondent**
Pilot-test/soft launch	September 2, 2021 - September 9, 2021	30	Master worker[57]
Phase 1 general distribution	September 9, 2021 – October 5, 2021	152	Master worker
Phase 2 general distribution	October 26, 2021	185	Non-master worker
Phase 3 general distribution	November 2, 2021- November 3, 2021	50	Non-master worker

[57] Master workers are designated by Amazon's MTurk as a qualification of participant who has consistently performed tasks across a large number of requesters with a high degree of success (Amazon Mechanical Turk, 2018). MTurk charges an additional fee for the use of these master workers. As of October 5, 2021,152 of 340 master workers responded to this survey. This response rate was below Amazon's projected date/rate. Amazon's only suggestion for increasing the response rate was to increase the compensation. As the compensation for this survey was already above market rate ($1.00 for five minutes); the researcher amended the IRB application to include non-master workers who had not previously completed the survey.

Appendix J: Table 4.3.

Table 4.3. Survey question #17: What is your race?

		Frequency	**Valid Percent**
Valid	White	334	81.3
	Black or African American	31	7.5
	Asian	33	8.0
	American Indian or Alaskan Native	1	.2
	Multiple races	9	2.2
	Other	3	.7
	Total	411	100.0

Appendix K: Table 4.4.

Table 4.4. Discrepancy between sample and actual participant population for Question 17[58]

	Observed N	Expected N	Residual
White	334	313.6	20.4
Black or African American	31	55.1	-24.1
Asian	33	24.2	8.8
American Indian or Alaskan Native	1	5.3	-4.3
Multiple races	9	11.5	-2.5
Other	3	1.2	1.8
Total	411		

[58] Survey question #17: What is your race?

Appendix L: Table 4.5.

Table 4.5. Survey question #18: Are you of Hispanic or Latino origin?

		Frequency	Valid Percent
Valid	Yes	76	18.4
	No	336	81.6
	Total	412	100.0
Missing	Don't Know/Not Sure [DK]	1	
	Decline to Answer [DA]	1	
	System	1	
	Total	3	
Total		415	

Appendix M: Table 4.6.

Table 4.6. Discrepancy between sample and actual participant population for Question 18[59]

	Observed N	Expected N	Residual
Yes	76	76.2	-.2
No	336	335.8	.2
Total	412		

[59] Survey question #18: Are you of Hispanic or Latino origin?

Appendix N: Table 4.7.

Table 4.7. Survey question #19: With what gender do you identify?

		Frequency	Valid Percent
Valid	Male	275	66.6
	Female	137	33.2
	Other	1	.2
	Total	413	100.0

Appendix O: Table 4.8.

Table 4.8. Survey question #20: What is the highest level of school you have completed or the highest degree you have received?

		Frequency	Valid Percent	Cumulative Percent
Valid	No formal schooling completed	1	.2	.2
	Some high school, no diploma	2	.5	.7
	High school graduate, diploma, or the equivalent (for example: GED)	43	10.4	11.1
	Some college credit, no degree	42	10.1	21.3
	Trade/technical/vocational training	14	3.4	24.6
	Associate degree	37	8.9	33.6
	Bachelor's degree	219	52.9	86.5
	Master's degree	47	11.4	97.8
	Professional degree	4	1.0	98.8
	Doctorate degree	5	1.2	100.0
	Total	414	100.0	
Missing	System	1		
Total		415		

Appendix P: Table 4.9.

Table 4.9. U.S. Census Bureau reporting structure for question #20[60]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than a bachelor's degree	139	33.5	33.6	33.6
	Bachelor or higher	275	66.3	66.4	100.0
	Total	414	99.8	100.0	
Missing	System	1	.2		
Total		415	100.0		

[60] Survey question #20: What is the highest level of school you have completed or the highest degree you have received?

Appendix Q: Table 4.10.

Table 4.10. Discrepancy between sample and actual participant population for Question 20[61]

	Observed N	Expected N	Residual
Less than a bachelor's degree	139	281.1	-142.1
Bachelor or higher	275	132.9	142.1
Total	414		

[61] Survey question #20: What is the highest level of school you have completed or the highest degree you have received?

Appendix R: Table 4.11.

Table 4.11. Survey question #1-3

	Yes		**No**		**Don't Know/Not Sure**	
	Count	%	Count	%	Count	%
Are you aware of medical librarians?	278	67.0%	113	27.2%	24	5.8%
Are you aware that some medical librarians work on clinical floors in medical facilities (including hospitals)?	223	54.0%	163	39.5%	27	6.5%
Are you aware that medical librarians can respond to consumer health questions from patients or family members?	217	52.4%	166	40.1%	31	7.5%

Appendix S: Table 4.12.

Table 4.12. Survey question #4: How do medical librarians deliver library services?

	Yes		**No**	
	Count	%	Count	%
Individuals come to the library	131	31.6%	284	68.4%
Library staff deliver materials	177	42.7%	238	57.3%
Library staff consult with staff/physicians in their offices	177	42.7%	238	57.3%
Library staff work on clinical floors	172	41.4%	243	58.6%
Library staff make “rounds” with clinical staff	103	24.8%	312	75.2%
Hybrid model (mix of all of the above)	136	32.8%	279	67.2%

Appendix T: Table 4.13.

Table 4.13. Survey question #5: Have you consulted a librarian for your own or your family members' health information seeking needs?

	Frequency	Percent	Valid Percent
Yes	139	33.5	33.5
No	270	65.1	65.1
Don't Know/Not Sure	6	1.4	1.4
Total	415	100.0	100.0

Appendix U: Table 4.14.

Table 4.14. Survey question #10: If you or a family member were hospitalized, how likely is it that you would meet with a medical librarian if given the chance?

		Frequency	Percent	Valid Precent
Valid	Almost Never True	29	7.0	8.1
	Usually Not True	64	15.4	18.0
	Occasionally True	112	27.0	31.5
	Usually True	96	23.1	27.0
	Almost Always True	55	13.3	15.4
	Total	356	85.8	
Missing	Don’t Know/Not Sure [DK]	58	14.0	
	Decline to Answer [DA]	1	.2	
	Total	59	14.2	
Total		415	100.0	

Appendix V: Table 4.15.

Table 4.15. Survey question #7: Do you believe that medical librarians should be included in the medical treatment team?

		Frequency	Percent	Valid Percent
Valid	Strongly Disagree	4	1.0	1.0
	Disagree	12	2.9	3.0
	Undecided	73	17.6	18.2
	Agree	212	51.1	52.9
	Strongly Agree	100	24.1	24.9
	Total	401	96.6	100.0
Missing	Don’t Know/Not Sure	14	3.4	
Total		415	100.0	

Appendix W: Table 4.16.

Table 4.16. Survey question #8: Would it affect your opinion to know that the medical librarian may or may not have a health-related degree or background?

		Frequency	Percent	Valid Percent
Valid	Yes	276	66.5	73.8
	No	98	23.6	26.2
	Total	374	90.1	100.0
Missing	Don’t Know/Not Sure	41	9.9	
Total		415	100.0	

Appendix X: Table 4.17.

Table 4.17. Survey question #9: Would it affect your opinion to know that the medical librarian may or may not have a science degree or background?

		Frequency	Percent	Valid Percent
Valid	Yes	269	64.8	70.4
	No	113	27.2	29.6
	Total	382	92.0	100.0
Missing	Don’t Know/Not Sure	32	7.7	
	Decline to Answer	1	.2	
	Total	33	8.0	
Total		415	100.0	

Appendix Y: Table 4.18.

Table 4.18. Survey question #12: How important is it for medical librarians to promote health literature for patients and family members?

		Frequency	Percent	Valid Percent
Valid	Unimportant	8	1.9	2.0
	Slightly Important	27	6.5	6.8
	Moderately Important	63	15.2	15.8
	Important	136	32.8	34.1
	Very Important	165	39.8	41.4
	Total	399	96.1	100.0
Missing	Don’t Know/Not Sure [DK]	16	3.9	
Total		415	100.0	

Appendix Z: Table 4.19.

Table 4.19. Survey question #13: If you believe it is important, why do you believe this?

	N	Mean
Easy for the librarian to do	365	3.89
Ability to reach a large number of people quickly	366	4.12
Member of the community; employed at an “anchor” institution	354	3.91

Appendix AA: Table 4.20.

Table 4.20. Survey question #14: If you believe it is not important, why do you believe this?

	N	Mean
Not easy for the librarian to do	8	2.75
Cannot reach a large number of people quickly	7	3.71
Not an “anchor” in the community	8	3.13
Risk to reveal confidential information	8	3.25
Risk reflecting poorly on the librarian and their profession	8	2.88
Not qualified to provide information	8	3.75

Appendix BB: Table 4.21.

Table 4.21. Survey question #11: Regarding question ten (10), if you or a family member were hospitalized, and you agreed to meet with a medical librarian, what kind of information resources would you want the medical librarian to provide?

		Frequency	Percent	Valid Percent
Valid	Textbook	71	17.1	18.3
	Academic journal article	205	49.4	53.0
	Wikipedia	33	8.0	8.5
	Blog	6	1.4	1.6
	Twitter	12	2.9	3.1
	Facebook	27	6.5	7.0
	Instagram	19	4.6	4.9
	Other. Please specify.	14	3.4	3.6
	Total	387	93.3	100.0
Missing	Don't Know/Not Sure [DK]	27	6.5	
	Decline to Answer [DA]	1	.2	
	Total	28	6.7	
Total		415	100.0	

Appendix CC: Table 4.22.

Table 4.22. Survey question #15: What channels do you believe these medical librarians should utilize to distribute medical literature to the public?

	N	Mean
"Anchor" institutions website (i.e., hospital, etc.)	386	4.19
Professional conferences with fellow researchers and academics	389	4.05
Teaching community members and emerging researchers vis-à-vis curriculum design and assessment	392	3.87
Public libraries	390	3.83
Community agencies	385	3.83
Community meetings with community members	381	3.67
Blogs	386	3.29
Twitter	381	3.07
Facebook	384	2.98
Instagram	378	2.87
TikTok	377	2.66

Appendix DD: Table 4.23.

Table 4.23. The Mean of Males and Females for significantly different answer options in survey question #15[62]

	Male	**Female**
Public libraries	X = 4.09	X = 3.78
Community meetings with community members	X = 3.97	X = 3.70
blogs	X = 3.66	X = 3.17
Twitter	X = 3.55	X = 2.91
Facebook	X = 3.44	X = 2.80
Instagram	X = 3.30	X = 2.80
TikTok	X = 3.23	X = 2.56

[62] Survey question #15: What channels do you believe these medical librarians should utilize to distribute medical literature to the public?

Appendix EE: Table 4.24.

Table 4.24. The Mean of education for significantly different answer options in survey question #15[63]

	Less than a Bachelor's degree	Bachelor or higher
Public libraries	X = 3.54	X = 4.21
Community meetings with community members	X = 3.65	X = 4.00
“Anchor” institutions website (i.e., hospital, etc.)	X = 4.16	X = 4.43
blogs	X = 3.06	X = 3.72
Twitter	X = 2.73	X = 3.64
Facebook	X = 2.63	X = 3.55
Instagram	X = 2.47	X = 3.52
TikTok	X = 2.32	X = 3.36

[63] Survey question #15: What channels do you believe these medical librarians should utilize to distribute medical literature to the public?

Appendix FF: Table 4.25.

Table 4.25. The lacking statistically significant different preference for race for survey question #15[64]

	Hispanic or Latino	**Non-Hispanic or Latino**
Public libraries	X = 4.63	X = 3.85
Community agencies	X = 4.42	X = 3.91
Community meetings with community members	X = 4.67	X = 3.70
Professional conferences with fellow researchers and academics	X = 4.58	X = 4.12
"Anchor" institutions website (i.e., hospital, etc.)	X = 4.82	X = 4.24
Teaching community members and emerging researchers vis-à-vis curriculum design and assessment	X = 4.62	X = 3.88
Blogs	X = 4.43	X = 3.29
Twitter	X = 4.55	X = 3.07
Facebook	X = 4.49	X = 2.95
Instagram	X = 4.39	X = 2.88
TikTok	X = 4.39	X = 2.71

[64] Survey question #15: What channels do you believe these medical librarians should utilize to distribute medical literature to the public?

VITA

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