

A 10-year follow-up survey of US academic libraries highlights the COVID-19 experience and greater interest in health information outreach

Jodi Jameson MLIS, AHIP, Associate Professor, Nursing Librarian¹ |

Lucy Duhon MLIS, MLW, Associate Professor, Collection Sharing Coordinator and Scholarly Communications Librarian²

¹Mulford Health Science Library, The University of Toledo, Toledo, Ohio, USA

²Carlson Library, The University of Toledo, Toledo, Ohio, USA

Correspondence

Jodi Jameson, Mulford Health Science Library, The University of Toledo, Toledo, OH, USA.

Email: jodi.jameson@utoledo.edu

[Correction added on 7 July 2022, after first online publication: Numbers in second paragraph of Quantitative Data section heading have been changed to match the numbers in Table 1.]

Abstract

Background: As follow-up to their previous survey on health information outreach (HIO) in 2010, the authors became interested in the evolving nature of HIO activities at academic libraries within the past decade.

Objectives: The aim of this study was to understand how HIO activities at academic libraries have evolved since 2010, especially considering the current COVID-19 pandemic.

Methods: An online survey, designed to collect quantitative data on general HIO activities and qualitative data specifically on COVID-19 information outreach, was distributed to over 1700 librarians at US general academic and academic health science libraries.

Results: Two hundred and fifty-five respondents completed the survey. Quantitative findings generally paralleled the 2010 results, except in a few areas. Most notably, a greater percentage of librarians in 2020 were participating in HIO (44%) than in 2010 (37%). Qualitative findings revealed that librarians are leveraging traditional information services and implementing innovative partnerships to promote reputable health information resources on COVID-19.

Discussion: Evidence suggests that further engagement and campus partnerships can enhance libraries' supportive roles as trustworthy purveyors of quality health information.

Conclusion: US academic librarians are increasingly engaging in HIO to support the health information needs of campus communities and should consider aligning outreach activities with national health goals.

KEYWORDS

consumer health information; health information needs; libraries, academic; libraries, health science; library outreach; research, qualitative; research, quantitative; surveys; United States of America (USA)

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INTRODUCTION

In the United States, general academic libraries and health science libraries both engage in some capacity and at some level in outreach activities regarding the provision of health information. Librarians engaged in outreach often deliver educational initiatives and informative programming for various user groups to help them access reliable health information resources for both research and consumer-oriented purposes (Burroughs, 2004; Clifton et al., 2012; Dutcher & Hamasu, 2005; Malone et al., 2017; Pomerantz et al., 2010; Sapp & Cogdill, 2010; Whitney et al., 2013). Health information outreach (HIO) activities have similarities to other programs, such as those specifically promoting digital health literacy, which the Network of the National Library of Medicine defines in part as 'the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem' and which includes the 'ability to discern reliable online health information' (National Institutes of Health, 2021). These programs are typically aimed at patients or consumers from the general public. HIO, with broad capabilities to reach a variety of users and settings, serves to promote health information literacy in general which is defined as 'the set of abilities needed to recognize a health information need, identify likely information sources and use them to retrieve relevant information, assess the quality of the information and its applicability to a specific situation, and analyze, understand, and use the information to make good health decisions' (Medical Library Association, 2009, as cited in Shipman et al., 2009, p. 294). While this definition is also aimed at patient care, its broader scope has implications for librarians working in academic settings with students as primary users.

HIO was conceived by the US National Library of Medicine for the purpose of 'improving the public's access to quality, reliable health information' through building 'awareness of quality resources. ... and providing information and training in their use' (Whitney et al., 2013, p. 138). HIO programs do not set out to assist individuals in making actual health decisions. In contrast to the other programs, HIO's 'focus is not on delivering specific content or health messages, but on equipping individuals with flexible knowledge and skills, thus enabling them to locate quality health information when they need it' (Whitney et al., 2013, p. 138). Therefore, HIO projects serve a dual purpose: that of building awareness about quality health information and that of demystifying the skills required to access it. Whereas health information literacy can be viewed as a set of formal skills, HIO can be thought of as a mechanism to develop and foster those skills in library users. A study by

Key Points

- Academic librarians should align their health information outreach (HIO) initiatives with national health goals.
- Librarians should continue to leverage and adapt traditional services to package and deliver quality health information in innovative and collaborative ways.
- Librarians should consider ways that they can take a more direct role in providing access to public health information.
- Librarians should remain proactive in considering students as a target group when delivering consumer health information, especially for mental health.
- Libraries should seek to be involved with their home institutions to maximise efforts in delivering HIO to campus constituencies.

Lee et al. (2021) found that health literacy has a positive impact on individuals' online health-related information seeking behavior.

Libraries demonstrate their collaboration in HIO efforts in a variety of ways, including leading health literacy initiatives for campus members, and performing outreach to special populations (Ansell, 2016; Barnes et al., 2010; Ramsey & Aagard, 2018). Other ways libraries assist in HIO is by assembling resource guides for their constituencies or by offering information literacy instruction in evaluating health information sources (Kurtz-Rossi & Duguay, 2010; Ladd et al., 2019; Westermann-Cicio, 2003). Academic libraries, being both centrally located and traditionally a beacon of trust on campus, are in a natural position to support students with a variety of information needs, including for health and well-being (Walton, 2018). Students do rely on libraries in general as important providers of health information, for example, 'through health websites, printed health publications, [and] public library classes, etc'. (Kim et al., 2018, p. 2). As demonstrated in the literature, home institutions have encouraged their libraries to think about expanding their role on campus (Adcock et al., 2019). Reflecting activities found in the existing literature, the investigators of the present study uncovered several top themes through which most academic libraries demonstrate their engagement in HIO. These broadly include access to information through resource guides; the creation of displays or exhibits; health information literacy instruction; and collaborative efforts with campus and community partners. For the scope of this study, the

authors define HIO as any library initiative that exists to educate patrons about reliable health information resources, which may be beyond patrons' awareness of means to access (Duhon & Jameson, 2013).

NATIONAL GUIDANCE

ACHA-NCHA

For over 20 years, the American College Health Association (ACHA) has conducted national research surveys (National College Health Assessments or NCHA) to assess the 'health habits, behaviors, and perceptions' of US's college students (ACHA, 2021a). This organisation most recently set national goals for healthier American college students by 2020 (ACHA, 2021b). Past ACHA-NCHA reports have indicated that students demonstrate a need for reliable health information resources (Duhon & Jameson, 2013; Hallyburton et al., 2008). Up through 2009, the survey regularly asked students about their sources of health information (Vader et al., 2011). Although the ACHA-NCHA reports no longer collect information on where students primarily obtain their health information, it currently does ask them to what extent they feel their schools value their health and well-being with the question, 'I feel that students' health and well-being is a priority at my college/university' (ACHA, 2020a, p. 2). The Fall 2019 undergraduate survey results revealed that 54% agreed or strongly agreed that their health and well-being was a priority at their college or university while 7% disagreed or strongly disagreed with this statement (ACHA, 2020b, p. 1). The Spring 2021 survey indicated that 65% agreed or strongly agreed this to be the case, with 8% percent disagreeing or strongly disagreeing (ACHA, 2021c, p. 3). It appears that campuses have made strides to address students' health concerns, perhaps spurred on by the COVID-19 pandemic. As health and well-being are integral to college student success, it would make sense for campus entities, including libraries, to assist in meeting that need through the provision of quality information.

Healthy People 2020 and beyond

Healthy People 2020 is a national initiative from the US Office of Disease Prevention and Health Promotion. In addition to a general goal of "improv[ing] the health literacy of the population," two of its defined topic areas are of potential relevance to library services from which collected data can be analysed: Educational and Community-Based Programs (ECBP) and Health

Communication and Health Information Technology (HC/HIT) (U.S. Department of Health and Human Services [USDHHS, 2022]). From the ECBP topic area, potentially relevant data includes the increasing proportion of college and university students who receive information from their institution about everything from unhealthy dietary patterns to inadequate physical activity. Other related ECBP goals might include increasing the proportion of worksites that offer employee health promotion programs, and increasing the practice of including evaluation of health sciences literature content to various medical programs (USDHHS, 2021a, 2021b)

From the HC/HIT topic area, two objectives hold specific relevance to academic libraries: that of 'increas[ing] the proportion of health-related websites that meet three or more evaluation criteria for disclosing information that can be used to assess information reliability' and 'increas[ing] the proportion of online health information seekers who report easily accessing health information' (USDHHS, 2021b). Relatedly, the HC/HIT objective of 'increas[ing] the number of State health departments that report using social marketing in health promotion and disease prevention programs' and also that of 'increas[ing] the proportion of schools of public health and accredited MPH programs that offer workforce development activities in social marketing for public health practitioners' could possibly offer academic or health science libraries opportunities for community and professional collaboration (USDHHS, 2021b).

In the news

The Gallup organisation recently published an opinion piece suggesting that higher education lead the charge for a 'cultural transformation with wellbeing as the foundation' for both students and the general population (Shushok & Matson, 2021). Reported mental health levels, in particular, have fallen to an abyss during the past 2 years, exacerbated by the COVID-19 pandemic (Brenan, 2020). Mental health (depression, stress, anxiety, etc.) was already found to be a major concern 10 years ago as identified by the ACHA-NCHA reports (Duhon & Jameson, 2013). Indeed, this trend is not dissipating, with mental health crises leading just recently to increased suicides and suicide attempts on college campuses (Carrasco, 2021; Svrluga & Anderson, 2021). Also, substance use and suicidal ideation increased during the COVID-19 pandemic among adults in the general population (Czeisler et al., 2020). There are many ways academic libraries can join the charge to continue to help their campus communities address mental and other health issues.

Background

Due to their participation and involvement in HIO at their own institution (The University of Toledo), the authors became interested in what other libraries were doing to promote the use of reliable health information in an academic library setting. The results of this research were published in 2013 (Duhon & Jameson, 2013). The University of Toledo (UToledo) is a comprehensive, public, metropolitan university in Toledo, Ohio in the mid-western region of the United States. With a current student population of over 17,000, including both undergraduate and graduate students (University of Toledo [UT], 2021a), UToledo offers over 250 degree programs encompassing the arts, business, education, engineering, humanities, law, medicine, natural sciences, nursing and pharmacy (UT, 2022). Part of the university's mission is to improve 'the human condition in the region and the world' (UT, 2022). In the university's Strategic Plan for 2017–2022, enhancing mental health is listed as one of the 'high impact and evidence-based strategies' for improving 'undergraduate student success, retention and degree completion' (UT, 2017). Additionally, for faculty and staff, 'creating a culture of wellness' is listed among the plan's action points to achieve the goal of employee work–life balance (UT, 2017).

The University Libraries at UToledo consists of the Carlson Library (located on the university's Main Campus) and the Mulford Health Science Library (located on the Health Science Campus). The Carlson Library employs 35 full-time personnel and the Mulford Library employs 9 full-time personnel. Mulford is affiliated with the University of Toledo Medical Center (UTMC), an academic teaching hospital. Librarians at the University Libraries hold faculty status and support the research, teaching, and learning needs of the campus community by providing reference and research consultation, information literacy instruction, and collection development services.

To contribute to the organisational culture of wellness, University Libraries faculty and staff have coordinated and participated in a variety of HIO initiatives including those sponsored by the university. Over the course of a decade from 2006 to 2016, library faculty and staff hosted an informational, educational and interactive table at an annual Halloween-themed campus health fair. This campus and community outreach event afforded librarians an opportunity to promote library resources for reliable consumer health information. Printed information was distributed at the table and visitors were invited to learn about library resources via information presented on a large poster, test their knowledge through an interactive quiz or game, and collect prizes in the form of

library promotional products (pens, magnets, tote bags, etc.).

Although the health fair was discontinued by the university in 2016, librarians at UToledo have continued to pursue ways to educate and inform users about quality information resources for health and wellness through exhibits, events, and online library guides (LibGuides), such as those maintained for Consumer Health (<http://libguides.utoledo.edu/ConsumerHealth>) and COVID-19 (<http://libguides.utoledo.edu/cvd19>). These guides provide links to resources, databases, and web sites for the current best available information. The COVID-19 LibGuide is an intersection of consumer health information, evidence-based clinical information from scientific research evidence, and data and statistics from various agencies.

Additionally, the archives and special collections unit of the University Libraries has hosted local history exhibits on health-related topics, including Medicine on the Maumee, which explored the history of health care in the region, and From Institutions to Independence, an exhibit on the history of individuals with disabilities (University of Toledo Libraries, 2022). Other exhibits hosted by the University Libraries have included some from the US National Library of Medicine's travelling exhibits programme which feature topics drawn from historical collections on medicine, society, arts and culture (National Library of Medicine, 2021).

For over 15 years, the Mulford Library on the Health Science Campus has hosted a student, faculty and staff artist showcase. The showcase provides the campus community with an opportunity to share their creativity, and for others to view the artwork in between classes or during study breaks. In 2021, due to the COVID-19 pandemic, the showcase was on display virtually (<http://libguides.utoledo.edu/hscart>). In pre-pandemic times, an in-person artist showcase reception for this event featured a different speaker each year with a connection to the arts and medicine. Recent speakers have included a medical professor discussing visual literacy and medical diagnostic acumen; an ophthalmologist sharing his research on eye diseases of famous artists and how this affected their unique style; and a nurse and cancer survivor who utilised art therapy to cope with her disease.

Other special events are regularly hosted by the libraries during exam times to provide supportive resources for students, encompassing everything from therapy dog visits to De-Stress Stations and Zen Zones with resources, games, and mindfulness-based activities to reduce exam anxiety. The Carlson Library recently opened a family room, which affords students a private place to work while keeping their children safely

TOUGH TOPICS



Everything you want to know, but don't really want to ask.

Abortion	HQ767-767.4	Homelessness	HV4505
Addiction	RC563-568	Infertility	RC889
Alcoholism	RC564.7-565.6	LGBTQ	LC2574
Anxiety	RC531	Loss of a Child or Parent	BF575.G7
Bankruptcy	KF1524	Mental Health/Self Help	BF637
Cancer	RC262	Mental Illness	RC454
Child Custody	KF547-554	Miscarriage	RG648
Child Sexual Abuse	HV6570	Post-Traumatic Stress	RC552
Cutting/Self-Harm	RC552.S4	Pregnancy	RG551
Depression	RC537	Race and Racism	E184
Divorce	HQ811-960.7	Rape	HV6558
Drug Abuse	HV5800	Self-Esteem	RC489
Eating Disorder	RC552.E18	Sexual Harassment	HQ1237
Family Violence	HV6626	STDs	RC200
HIV/AIDS	RA606.5	Suicide	HV6548
Hidden/Learning Disabilities	LC4704-4818.5	Traumatic Brain Injury	RC387.5

As Librarians, we're not here to judge, we're here to help.

Additional resources can be found in our digital collection, available through UTMOST.

FUELING TOMORROWS



FIGURE 1 'Tough Topics' poster

occupied (UT, 2021b). Another recent initiative is targeted signage in the book stacks, directing students to locate helpful books on 'Tough Topics' by call number (Figure 1). These topics relate to mental health or physical wellness, including addiction, anxiety, depression, drug abuse, eating disorders, HIV/AIDS, suicide, and others.

Objectives

The purpose of this study is to understand HIO activities at academic libraries in the United States within the context of users' health information-seeking behaviours. A secondary objective is to learn how HIO initiatives have evolved at academic libraries since the researchers' initial

survey was conducted a decade ago, especially considering new health topics of concern to campus communities, primarily the COVID-19 pandemic. The authors' previous study demonstrated that the role of traditional academic libraries, in the context of HIO, was evolving. Most librarians surveyed felt it was appropriate to engage in HIO efforts, but they acknowledged facing many barriers preventing them from doing so. Results from the 2010 survey indicated that collaboration with campus or community partners was one way to increase visibility and successfully engage in HIO (Duhon & Jameson, 2013).

METHODOLOGY

Data collection

To gather both quantitative and qualitative data, the authors distributed a 15-item descriptive survey instrument online in Qualtrics to prospective participants. The survey, adapted from the previous 2010 instrument, asked participants about library users' health information-seeking behaviour as well as their library's level of involvement in HIO activities (Appendix). Following IRB approval, the survey was distributed and made available from December 2020 through February 2021.

Like the 2010 survey, the authors sampled libraries at academic institutions similar to their own. With the assistance of two staff members, the co-investigators generated a comprehensive list of prospective participants from general academic and academic health science libraries of 4-year institutions derived from published, publicly available directories, and as necessary examined web pages to identify one contact email per institution (e.g. the Head of Reference Services or the Library Director). To align the final sample with a profile matching the respondents of the 2010 survey, several categories of libraries were excluded - such as special libraries (e.g. dental, veterinary), 2-year college libraries, and religious institutions (e.g. Bible colleges, seminaries). Online directories consulted included: American Library Directory (as a free, registered user—<http://www.americanlibrarydirectory.com>), Carnegie Classifications (<https://carnegieclassifications.iu.edu/>), and National Network of Libraries of Medicine Members Directory (<https://nmlm.gov/members/directory>). Individuals were contacted by email and invited to participate in the survey. The recruitment email was also sent widely to professional library association listservs (MEDLIB-L, ILI-L, COLLIB-L, and ULS) which may have prompted a few responses from libraries that did not fit the initial sample inclusion criteria. The final sample of participants consisted of librarians at US general academic libraries and academic health science libraries either affiliated or

unaffiliated with a hospital or medical centre, as well as a small number of 'other' libraries.

Data analysis

Data from survey respondents ($n = 255$) were analysed using quantitative and qualitative methods. Responses to closed-ended questions, analysed quantitatively with frequency statistics, provided information on respondents' library demographics, perceptions of library users' health information-seeking behaviours, and HIO activities. The final survey item ('If your library has provided health information outreach for COVID-19 resources, briefly describe these initiatives') provided qualitative data on respondents' HIO activities during the ongoing COVID-19 pandemic. Responses to this question were analysed thematically using Gibbs' method of qualitative coding (Gibbs, 2018).

RESULTS

Demographics

Among the 1751 participants solicited via direct email, 255 responded to the survey, resulting in a 14% response rate from this aggregate. Two hundred and ten respondents identified as a particular library type, and three quarters were librarians from general academic libraries ($n = 161$). Academic health science library respondents ($n = 49$) represented institutions affiliated with a hospital ($n = 24$) or unaffiliated with a hospital ($n = 25$). These demographics were similar proportionally to the 2010 survey across all three library types (Duhon & Jameson, 2013). A small number of respondents from 'other' libraries ($n = 7$) also completed the survey and 38 respondents chose not to identify their library type. Many respondents were from libraries with nine or fewer full-time employees ($n = 97$). Other respondents represented libraries with full-time employee figures of 10–29 ($n = 65$), 30–49 ($n = 22$), 50–69 ($n = 5$), 70–99 ($n = 9$), and 100 or more ($n = 18$). Most respondents were from academic institutions with enrolment of less than 10,000 full-time students ($n = 162$).

Quantitative data

Similar to their 2010 survey (Duhon & Jameson, 2013), the authors asked a series of questions related to librarians' perceptions of users' health-information seeking behaviours encompassing a variety of patron groups (faculty, health

care professionals, public patrons, staff, and students). Not every respondent answered every question. Respondents' answers revealed patterns of perceived information-seeking among various patron groups, including reasons why users sought health information (Table 1).

Some general patterns were unchanged since the 2010 survey. As in 2010, most respondents in 2020 ($n = 187$) also indicated that students sought health information for 'class assignments'. In addition, faculty were again perceived to be the most likely patron group ($n = 153$) to seek health information for 'support for classroom and/or clinical teaching' followed closely with 'research for publication' ($n = 146$). Also similar to 2010, campus staff were perceived among respondents ($n = 74$) to seek health information for a 'personal health concern' nearly as much as public patrons ($n = 79$). Most 2020 survey respondents, like those in 2010, also answered 'do not know' when asked how *often* patrons of all types sought information for personal health reasons.

Additional results indicated some departures from the 2010 survey data on patron health information-seeking. One of the most significant findings of the 2010 survey was that 'personal health concern' ranked as the second perceived reason that students across all three library types sought health information (Duhon & Jameson, 2013). However, in 2020, 'personal health concern'

dropped in ranking from second to fifth among perceived reasons that students seek health information. The 2020 survey also queried respondents about the specific types of personal health information that users are perceived to seek, with the top three responses being 'treatments' ($n = 104$), 'diseases' ($n = 101$) and 'diet/nutrition' ($n = 82$). This mirrored the 2010 responses (Duhon & Jameson, 2013) except that 'diet/nutrition' replaced 'drugs' as the third most prevalent response.

The survey also asked participants questions regarding their library's HIO activities. When asked 'How much of a need do you perceive for librarians at your library to provide HIO?', respondents' answers in 2020 were similar proportionally to the 2010 survey (Table 2). Most of the respondents to this question were from general academic libraries ($n = 139$), a third of whom perceived 'little need' to deliver HIO, and close to half of whom perceived a 'moderate' to 'high need'. In response to whether or not they actually participated in delivering HIO, answers for 'yes' and 'no' were more evenly divided in 2020 than in 2010 (Figure 2). This finding is a departure from the 2010 survey wherein over half of all respondents indicated that they had *not* participated in HIO (Duhon & Jameson, 2013). Overall, quantitative survey data in 2020 revealed that over half of survey respondents ($n = 161$) perceived at least some

TABLE 1 Top three reasons librarians perceive patrons to seek health information, 2010 and 2020

Patron type	2010 ($n = 346$)	2020 ($n = 255$)
Students	1. Class assignments, 96% (333)	1. Class assignments, 73% (187)
	2. Personal health concern, 43% (157)	2. Evidence-based practice, 44% (111)
	3. Evidence-based practice, 42% (152)	3. Patient care, 29% (73)
Faculty	1. Support for classroom and/or clinical teaching, 78% (280)	1. Support for classroom and/or clinical teaching, 60% (153)
	2. Research for publication, 77% (277)	2. Research for publication, 57% (146)
	3. Evidence-based practice, 47% (169)	3. Evidence-based practice, 42% (106)
Staff	1. Personal health concern, 60% (209)	1. Personal health concern, 29% (74)
	2. Do not know, 23% (80)	2. Do not know, 26% (66)
	3. Support for classroom and/or clinical teaching, 13% (44)	3. Do not seek health information, 13% (33)
Health care Professionals	1. Do not know, 39% (133)	1. Patient care, 24% (62) Do not know, 24% (62)
	2. Patient care, 35% (120)	2. Evidence-based practice, 23% (59)
	3. Evidence-based practice, 34% (114)	3. Do not seek health information, 21% (53)
Public	1. Personal health concern, 62% (218)	1. Personal health concern, 31% (79)
	2. Do not know, 29% (100)	2. Do not know, 23% (59)
	3. Class assignments, 13% (47)	3. Do not seek health information, 22% (55)

TABLE 2 Perceived need for health information outreach by library type, 2010 and 2020

	General academic libraries		Academic health science libraries affiliated with a hospital or medical centre (HLh)		Academic health science libraries unaffiliated with a hospital or medical centre (HLu)	
	2010	2020	2010	2020	2010	2020
High need	4% (10)	10% (14)	33% (14)	35% (7)	21% (7)	33% (6)
Moderate need	27% (74)	38% (53)	55% (23)	35% (7)	24% (8)	39% (7)
Little need	45% (122)	38% (53)	7% (3)	20% (4)	30% (10)	28% (5)
No need	16% (42)	8% (11)	2% (1)	5% (1)	18% (6)	—
Do not know	8% (22)	6% (8)	2% (1)	5% (1)	6% (2)	—
Answered question	100% (270)	100% (139)	99% (42) ^a	100% (20)	99% (42) ^a	100% (18)

Note: Bold values indicate the relative majority response per library type.

^aSome percentages may not total 100 due to rounding.

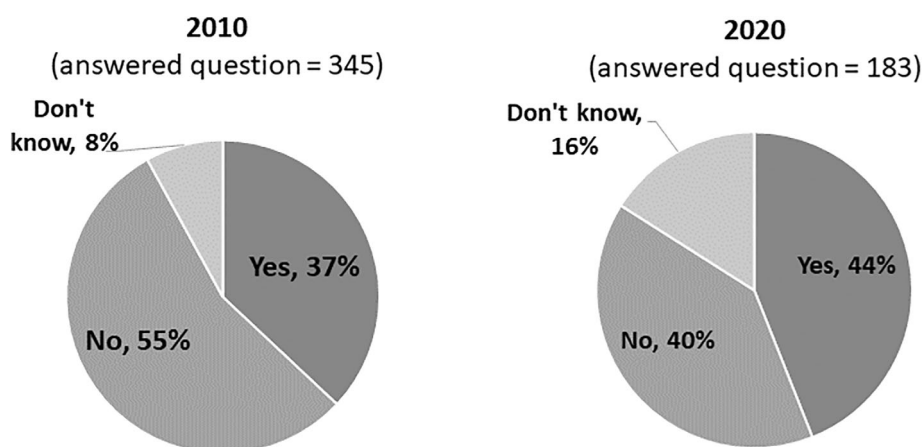


FIGURE 2 Librarian participation in health information outreach, 2010 and 2020

need for HIO at their library, and that respondents were divided almost equally among those who did ($n = 80$) and did not ($n = 74$) participate. Most of the respondents who perceived a need for HIO at their library indicated that their library fulfilled that need at an 'average' ($n = 79$) to 'above average' ($n = 28$) level.

Qualitative data

Open-ended responses ($n = 76$) to the final survey item ('if your library has provided health information outreach for COVID-19 resources, briefly describe these initiatives') provided qualitative data on librarians' involvement in HIO activities during the ongoing COVID-19 pandemic. Various themes emerged from the data, some more prevalent than others. Some respondents' answers corresponded to more than one theme. Themes, with selected quotes from respondents, are summarised below in descending order of prevalence.

Theme 1: Resource guides

Most respondents indicated that *resource guides* ($n = 43$) were created to provide access to reliable COVID-19 health information resources. Most commonly, these guides were created for online access, often with the content management system LibGuides, as described by these responses:

'Custom libguide creation to combat misinformation regarding COVID-19'.

'We created a COVID-19 guide that includes campus and community resources as well as how to evaluate the information folks are finding on the web'.

'Early in the pandemic one of our librarians created a libguide about Covid-19 that compiled publicly available resources'.

'The Science & Engineering Librarians created a LibGuide with COVID-19 resources, including collections of academic papers, plain-language resources, comics and images'.

Other respondents added resource links to library webpages:

'We provided patrons (nursing students and faculty) with Covid-19 links to EBSCO Covid 19 Medical portal, and also Nursing Reference Center Plus'.

Theme 2: Public health collaboration

To further extend their reach in delivering health information, librarians engaged in *public health collaboration* ($n = 16$) with other entities, both on campus and in the community. As observed in the following comments, creative examples of outreach were achieved through collaboration:

'Before lockdown in March 2020, we hosted a COVID19 information booth at the public library'.

'Set up all campus teach in about vaccinations'.

'The nursing librarian assisted nursing and public health students in working with the city's public health department to create a social media campaign to promote mask-wearing'.

'We are going to start providing information in person to the public at our two vaccination locations'.

Theme 3: Displays/exhibits

Traditional physical *displays or exhibits* ($n = 11$) were also noted by some respondents as a common outreach modality for COVID-19 information:

'Our Student Affairs placed CDC flyers and handouts about COVID-19 precautions in several strategic areas of our library'.

'We display health information on digital signage but discourage lingering or offering hand-outs'.

'We have placed consumer level information on COVID-19 out in our public spaces and clinics'.

Theme 4: Public health guideline adherence

Importantly, respondents indicated that their libraries played a role in promoting and enforcing COVID-19 *public health guideline adherence* ($n = 9$). The following quotes illustrate how libraries implemented policies and practices for student safety and health:

'Heavy signage and visual displays and physical barriers and disinfecting supply kits and traffic management'.

'Posted the library's 'Plan for a Healthy Fall Semester' of changed library policies related to COVID-19'.

'The only COVID 'resources' we have provided are signs in the library saying to stay 6 feet apart and to wear a mask'.

Theme 5: Social media/news updates

Respondents also made use of *social media and news updates* ($n = 7$) to inform users of the latest COVID-19 information, as described in the following comments:

'Social media posts with CDC, state and local Health Department information'.

'The Library's blog adds relevant sources of information/news'.

'we have not really engaged in outreach pertaining to COVID other than to let people know about changes to library policies on social media due to pandemic restrictions'.

Theme 6: Information literacy instruction

Some librarians provided *information literacy instruction* ($n = 5$) to educate users on accessing and navigating the wide spectrum of public health resources and literature being published on a daily basis during the COVID-19 pandemic:

'... embedded in a[n] interdisciplinary online class that was offered to students and the community. Created a LibGuide for the course'.

'Held online workshops on navigating COVID-19 information resources'.

'Library instruction for the Health Promotion and Wellness students and a summer workshop for incoming freshmen on reliable COVID-19 information'.

Theme 7: COVID-19 literature collections

A small number of respondents curated *COVID-19 literature collections* ($n = 3$) to highlight current research. This respondent specifically created a database to feature the work of local researchers:

'Compiled a database of COVID publications by healthcare researchers in our state; made available on the website'.

Theme 8: Reference services

Only two respondents indicated that their libraries utilised reference services as a mechanism for COVID-19 HIO and to support student research:

'General consultation, faculty research consultations'.

'We have definitely had our fair share of students who have looked for research pertaining to COVID-19, but this has been more in scholarly pursuit - for assignments, rather than as a pointed outreach from the library'.

DISCUSSION

Quantitative data from the current survey generally revealed consistent patterns with the survey conducted a decade ago, suggesting a reliability of the study across time. In both surveys, students were perceived to seek health information primarily for class assignments, faculty for classroom teaching, and staff and public patrons were perceived almost equally to seek information primarily for personal health concerns. Notably, the need for information on 'personal health concern' decreased by roughly 50% for staff and public patrons between 2010 and 2020, even while remaining the highest ranked reason for seeking health information among both groups. Another major difference between the two surveys was found in the ranking of 'personal health concern' as a perceived reason students across all three library types seek health information. Between 2010 and 2020, 'personal health concern' dropped in ranking from second to fifth, with 'evidence-based practice' and 'patient care' now ranking higher as perceived reasons students seek health information. A potential explanation for this drop in ranking and for the apparent decreased need for information on personal health concerns is that users may be likely to seek this type of information on their own, rather than seek a librarian's assistance. Indeed, research has indicated that with the convenience of smartphones and internet access, users frequently take a do-it-yourself approach when searching for information on symptoms, diagnoses, and treatments (Gesser-Edelsburg et al., 2019). This point further underscores the importance of libraries' roles in providing resources and services to combat the cycle of misinformation and to empower users with tools to evaluate health information for quality and reliability (Li et al., 2016; Sun et al., 2019). In contrast, there was much more consistency in the 'top three' rankings for faculty.

There was also remarkable consistency between 2010 and 2020, with respect to the top several reasons librarians perceived patrons to seek health information: 'treatments' and 'diseases' were among top three responses for both time periods studied, while 'diet/nutrition' edged out 'drugs' for the third spot in 2020. Finally, the two studies found a proportionally similar need for librarians to provide HIO; however, the 2020 study found that slightly more librarians were perceived to be actively filling that need than in 2010. Earlier survey results revealed a considerable gap between what libraries perceived they needed to do for HIO versus what they were actually doing to participate in HIO (Duhon & Jameson, 2013). In contrast, the current survey results illustrate that this gap is not quite as wide as it once was.

Prevalent qualitative themes that emerged from the final open-ended survey question were related to packaging and delivering information on COVID-19 through resource guides ($n = 43$) and displays or exhibits ($n = 11$). Librarians were found to provide traditional services for COVID-19 information outreach, yet demonstrated examples of innovative collaboration and partnerships with other professionals on-campus and in the community ($n = 16$). This finding provides evidence in support of libraries' continued traditional roles which are highly adaptable to constantly evolving information needs in the face of a global pandemic. Similar findings were recently reported in a study on academic medical health science libraries' roles in meeting users' COVID-19 information needs (Yu & Mani, 2020).

As demonstrated by the responses to the current survey, and as evident in the literature, HIO is becoming a common activity in academic and health science libraries, although there is room for further engagement. This activity is increasing just as there is a rising need across the United States, in particular, for student mental health support services. In recent years, mental health has become an increasingly urgent public health issue. The hidden and often still uncomfortable nature of issues surrounding mental health make them much more challenging for libraries to address in a sensitive manner. In light of the COVID-19 pandemic, a recent nationwide study recognised the urgent need to better understand college students' mental health concerns, and the resulting need for improved mental health services (Kim et al., 2022). Recent reports mentioned previously have called attention to the increased suicide risk corresponding with the COVID-19 pandemic. The authors' own library has begun to take steps to provide information to support mental health concerns and other difficult topics (see Figure 1 for an example), but it is not clear how many of the respondents of the current survey planned to increase their HIO efforts for mental health as a result of the pandemic. In addition to providing information about COVID-19 in general, perhaps more libraries in the coming months and years will pivot to recognise and address the potential long-term effects of the pandemic experience on student mental health and promote targeted health information resources accordingly.

LIMITATIONS

The most obvious limitation to this study was likely its launch during the COVID-19 pandemic; this undoubtedly influenced the response rate, which was only two-thirds the rate received in 2010 despite several reminders and a broad approach to distribution. Besides likely staff

shortages, the pandemic year also seemed to provide fertile ground for numerous online surveys and so perhaps respondents also experienced survey fatigue. Although the authors specifically targeted prospective respondents through direct e-mail, additional survey recruitment e-mails sent widely to professional library listservs may have resulted in data submitted by some respondents not matching the desired sample. In addition, the study was conducted in the United States, therefore results may not be generalizable to other countries.

CONCLUSIONS

This study aimed to gain a broad understanding of the evolving nature of HIO at U.S. general academic and academic health science libraries since the authors' previous survey in 2010 (Duhon & Jameson, 2013). Quantitative data revealed similarities and differences in HIO activity during the decade-long period from 2010 to 2020. Librarians' perceptions of patrons' health information needs remained generally consistent since 2010, with the exception of 'personal health concern' dropping in ranking among students' health information needs. Survey responses for 2010 and 2020 were also proportionally similar regarding librarians' perceived needs to deliver HIO at their institutions. Yet, 2020 survey data found a slightly greater percentage of librarians were actively filling that need by participating in HIO as compared to 2010. This finding suggests that librarians are taking increased initiative to act upon the need for HIO delivery in academic settings. Given the context of the ongoing COVID-19 pandemic at the launch of the 2020 survey, the authors also gathered qualitative data on librarians' HIO efforts in promoting reputable COVID-19 information resources. Common themes illustrate that librarians are making great strides in delivering COVID-19 information to their campus communities by implementing traditional information services (i.e., resource guides) and participating in innovative partnerships to educate and inform patrons.

Overall, this study demonstrates that not only do librarians perceive a need for HIO, but they are increasingly acting upon that need by engaging in HIO activities for both consumer-oriented and research-based health information, including for COVID-19. Findings confirm the necessary role of general academic and academic health science librarians as purveyors of quality health information, especially during times of a global health crisis. Indeed, recent research has concluded that higher education institutions should provide programming to support students' COVID-19 health information needs (Hsu, 2021). Despite evidence in this study that students'

personal health concern information needs were not perceived as highly as previously, evidence in the literature suggests there is a great need currently to support young adults' mental health information concerns specifically (Kim et al., 2022). Future research could explore ways that US librarians are aligning efforts with national health goals, such as the recently launched Healthy People 2030 objectives (which include personal and organizational health literacy goals) and ACHA's Healthy Campus (USDHHS, 2021c; ACHA, 2021b). Academic librarians should become aware of these objectives and determine which ones best align with unique issues among college-age populations (e.g. binge drinking) to use as a focal point for future HIO initiatives.

ACKNOWLEDGEMENTS

The authors extend thanks and appreciation to library staff members Cathy Bukowski, Michella Hill and Lisa Meyer for their assistance in compiling the survey sample, and to Judson Lohman for his design of the 'Tough Topics' poster.

FUNDING INFORMATION

The authors received no funding for the research and authorship of this manuscript.

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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How to cite this article: Jameson, J., & Duhon, L. (2022). A 10-year follow-up survey of US academic libraries highlights the COVID-19 experience and greater interest in health information outreach. *Health Information & Libraries Journal*, 1–17. <https://doi.org/10.1111/hir.12446>

APPENDIX A: SURVEY INSTRUMENT

1 In which type of library do you work? (If 'Other', please specify)

- General Academic Library
- Academic Health Science Library unaffiliated with a hospital or medical centre
- Academic Health Science Library affiliated with a hospital or medical centre
- Other (please specify) _____

2. How many full-time students (FTE) are enrolled at your particular campus?

- 999 or fewer
- 1000-2999
- 3000-9999
- 10,000-19,999
- 20,000 or more

3. How many full-time employees work at your library? (This includes all classifications and statuses)

- 9 or fewer
- 10-29
- 30-49
- 50-69
- 70-99
- 100 or more

4. Select the health science programs at your institution. (Select all that apply. If 'Other', please specify)

- Medicine
- Nursing
- Occupational therapy
- Pharmacy
- Physical therapy
- Physician assistant studies
- Public health
- None
- Do not know
- Other (please specify)

_____.

5. To the best of your knowledge, for what reasons do the following patrons seek health information at your library?
(For each patron type, select all that apply.)

	Class assignments	Evidence-based practice	Patient care	Personal health concern	Research for publication	Support for classroom and/or clinical teaching	Do not seek health information	Do not know
Students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faculty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health care professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public patrons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. By your best estimate, how often do the following patrons consult your library for information about a personal health concern?

	Never	Seldom	Sometimes	Often	Do not know
Students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faculty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Healthcare professionals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public patrons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. At your library, what types of information do you perceive that your patrons typically seek when researching a personal health concern? (Select all that apply. If 'Other', please specify.)

- Alternative and complementary medicine
- Definitions of medical terminology
- Diet/nutrition
- Diseases
- Drugs
- Fitness/exercise
- Health care facilities
- Health news
- Physicians
- Signs and symptoms
- Support groups
- Treatments
- None
- Do not know
- Other (please specify) _____

8. How much of a need do you perceive for librarians at your library to provide health information outreach?

- High need
- Moderate need
- Little need
- No need
- Do not know

9. If you perceive a need for health information outreach, how well do you think librarians at your library fulfil that need?

- Above average
- Average
- Below average
- Poor
- Do not know
- N/A

10. Do librarians at your library participate in health information outreach?

- Yes
- No
- Do not know

11. If you answered 'No', please explain why (otherwise skip).

_____.

_____.

_____.

12. What types of health information outreach do librarians at your library participate in? (Select all that apply. If ‘Other’, please specify.)

- Community health fair/event
- Disseminating plain language health information materials
- Displays or exhibits within the library
- Institutionally-sponsored health fair/event off-campus
- Institutionally-sponsored health fair/event on-campus
- Publicising resources via website, blog, or social media
- Training on the use of quality consumer/patient health information resources
- Visits to health care professionals for library training
- None
- Do not know
- Other (please specify) _____

13. Which groups do librarians at your library target for health information outreach? (Select all that apply. If ‘Other’, please specify)

- Faculty
- Health care professionals
- Public (including consumers/patients from the community)
- Staff
- Students
- None
- Do not know
- Other (please specify) _____

14. Which groups do librarians at your library collaborate with to provide health information outreach? (Select all that apply. If ‘Other’, please specify)

- Academic departments
- Campus organisations or clubs
- Local hospitals or health care facilities
- Off-campus or community organisations
- Student or employee health/fitness centre
- Student or employee medical clinic
- None
- Do not know
- Other (please specify) _____

15. If your library has provided health information outreach for COVID-19 resources, briefly describe these initiatives. (If not, please feel free to share any other HIO efforts or initiatives undertaken at your library)
