

# Developing Specialized Graduate Curricula for Health Information Professionals: Integrated Findings of a Scoping Review and an Employer Survey

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With the aim of informing specialized graduate curriculum development, this two-phase study seeks to identify and bridge gaps in expectation and preparation between and among employers of health information professionals (HIPs), aspiring HIPs, and library and information science (LIS) graduate curricula. Building upon a scoping review of emerging HIP professional roles, an online survey further explored what professional competencies and qualifications employers in various health information organizations expected or desired of entry-level HIPs. The integrated findings of these two phases revealed that the training that HIPs receive in LIS graduate programs may not accurately reflect employers' priorities and expectations: While research and professional associations identified the same general skill sets as important, employers also valued competencies such as instructional experience, web skills, "soft" and interpersonal skills, and particular subsets of discipline-specific knowledge as well as a foundation in the complex professional contexts that characterize health-sciences workplaces. These results indicate ways in which LIS programs might develop, adapt, and expand specialized graduate curricula and dynamic professionalization opportunities for students in order to better align learning outcomes with professional core competencies and employer expectations, and to better prepare students for both the technical and interpersonal demands of the job field.

**Keywords:** curriculum development, employer expectations, health information professionals, MLA Professional Competencies, specialized LIS curricula

In light of rapid health information technology innovations that affect biomedical research and clinical practice, evidence-based information support has become an increasingly sophisticated and specialized library service. Health information professionals (HIPs) are defined by the Medical Library Association (MLA) as "information professionals, librarians, or informaticists who have special knowledge in quality health information

resources” (MLA, 2017, para. 2). As a diverse group of medical librarians and other information specialists working to meet dynamic health information needs, HIPs must be equipped for constantly emerging and evolving professional roles and responsibilities. The MLA (2017), therefore, framed the fundamental roles, practices, and skill sets common to HIPs as six core professional competencies.

Meanwhile, it is arguable that graduate HIP curricula, as well as specializations available (or, often, unavailable) within library and information science (LIS) programs have failed to keep pace for library students pursuing HIP careers through Master of Library Science (MLS), Master of Library and Information Science (MLIS), or Master of Science in Library and Information Science (MSLIS) programs in the United States and Canada. Based on this premise, this two-phase study poses two research questions:

RQ1: What potential discrepancies exist among professional expectations for entry-level HIPs?

RQ2: What steps might LIS programs take to better prepare their students for jobs in health information fields?

As the core training component for a professional field whose coursework is seldom offered to undergraduate students, master’s-level LIS education “lays the foundations for the future workforce, and must do so in the context of current and likely future needs of employers” (Ritchie et al., 2010, p. 277). It is therefore incumbent upon LIS educators to be apprised of and responsive to employer needs, which association statements such as the MLA Core Competencies attempt to encompass. However, these broad statements may not cover less concrete but equally important skills or attributes, such as individual initiative or cultural sensitivity. To close the gap between professional competencies and these more amorphous traits, first-hand input from HIP employers as well as the field’s published literature can prove tremendously useful.

This study was therefore designed as a sequential two-phase project: first, a scoping review of scholarly publications on the topic of HIP roles

#### KEY POINTS:

- The diversity of emerging HIP roles identified in this study indicates an urgent need to develop and update specialized LIS curricula for HIPs in order to help them meet fulfill employer needs, the MLA professional competencies, and other desirable qualifications.
- LIS programs should make ongoing efforts to integrate HIP competencies and employer expectations into specialized HIP curricula to improve students’ job preparedness and understanding of the professional landscape.
- Findings from this two-phase study constitute a step toward bridging potential gaps across health information research, HIP practice, and LIS education.

and skills; and second, a survey of current HIPs and other relevant professionals at HIP-employing institutions on the competencies and attributes expected of entry-level HIPs. It is hoped that the integrated findings of the two phases will illuminate terminological and curricular gaps between researchers and employers; once clarified, these gaps can be bridged to better align preparatory specialized graduate curricula, pre-professional training, and learning outcomes with the MLA Core Competencies and employer expectations.

### Literature review

Existing literature on HIP skills uses a variety of similar but inconsistent terminology to identify its subjects, making a cohesive overview of the field elusive. The review below combines discussions about employer expectations of HIPs, beginning by examining the ways in which HIPs have attempted to define their own roles and proceeding through studies of existing sets of professional competencies. It then considers how graduate programs have (or have not) integrated those competencies into their curricula before turning to important but often-overlooked transferable, interpersonal skills.

### Defining HIP roles

To address gaps in educational and professional support for HIPs, some scholars in library science, education, and medicine have advocated extending the librarian's role into that of the informationist. Davidoff and Florance (2000) proposed expanding then-marginal clinical librarianship programs to better meet the medical profession's information needs, citing the "chronic, and increasing, budgetary constraint on medical libraries" as a reason for such promising programs being cut or underfunded by medical institutions, and they proposed establishing a national program modeled on clinical librarianship to train and credential health information specialists called informationists (pp. 996–997). Further articulating the educational needs of informationists from a library science perspective, Detlefsen (2002) suggested that curricula should entail training similar to that of specialized medical librarians: training in medical databases, journals, and other web resources; health records; technological tools and devices; and the particular information needs and behaviors of health-care professionals and researchers.

However, many librarians have questioned Davidoff and Florance's (2000) differentiation of the informationist role from that of trained clinical librarians. For example, Cooper (2011) directly compared the roles of informationists and medical librarians and uncovered differences between their work styles and work products, with informationists tending to be embedded within narrower, more topic-specific domains than are medical librarians; informationists' more specific domains of knowledge might also require correspondingly specific training in such areas as technical writing, health systems, and/or biostatistics. The National Network

of Libraries of Medicine (NNLM) takes a more expansive view, defining the informationist role as one that merges “the knowledge and expertise of a healthcare professional with the information retrieval skills of a librarian” (NNLM, n.d., para. 1). Rankin, Grefsheim, and Canto (2008) noted that—despite the need for, and support of, informationist programs by organizations such as the MLA and the National Library of Medicine (NLM)—the definition of the role itself is inconsistent even within the profession. Overall, academic interest in informationists, as distinct from health sciences librarians, has waned over the past decade, and few LIS programs have added informationist specializations to their curricula.

### Professional expectations and general competencies

Working from the MLA’s core values, the Task Force to Review MLA Competencies for Lifelong Learning and Professional Success set out to determine practices, roles, and skill sets common to HIPs. It articulated the following competencies: (1) information services, (2) information management, (3) instruction and instructional design, (4) leadership and management, (5) evidence-based practice and research, and (6) health information professionalism (MLA, 2017). The parameters of this task force limited the professional competency statement to delineating skills that “can be observed, measured, and taught” (para. 1). Harder to define but still crucial are certain intangible attributes that enhance one’s ability to perform HIP roles. Indeed, the report acknowledges the importance of “personal attributes that contribute to professional success” and points readers to the *MLA Code of Ethics for Health Sciences Librarianship* for guidance (MLA, 2017, para. 1). While helpful in defining ethical approaches to and practices of health sciences librarianship, its statements are formulated strictly around actions rather than dispositions; they ultimately provide little elaboration beyond the broader principles articulated in the *ALA Core Values of Librarianship* (MLA, 2010, paras. 3–5).

To gain a more holistic view of the competencies and skills recommended by professional health organizations, Eldredge, Morley, Hendrix, Carr, and Bengtson (2012) assembled a compendium of specific competency statements from 27 national medical organizations in order to assess the skills and qualifications required of degreed HIPs. They observed a tendency within these competency statements toward greater explicitness and comprehensiveness with each version, noting that if “earlier versions made only passing reference to library and informatics skills, the newer versions . . . almost invariably incorporate elements that place higher expectations on students to master these library or informatics skills” (Eldredge et al., 2012, p. 35). Wu and Li (2008) and Cooper and Crum (2013) respectively conducted content analyses to analyze the language, skills, and roles identified within job descriptions posted in search of health sciences librarians, which clarify changing HIP expectations and competencies. However, the question of whether LIS programs meet these increasingly robust and stringently defined professional needs remains unanswered.

### Integrating professional competencies into specialized graduate curricula

In turn, it has become common for LIS programs to draw upon competencies outlined by professional associations when developing curricula. Lester and Van Fleet (2008) examined LIS schools' citation of various association competency statements in curriculum development and planning, finding that the MLA competencies were cited second most often, behind only those of the Special Libraries Association—yet just 14 of the 55 schools examined cited them. Polger (2010) noted the disjuncture between the generalized knowledge base that graduate curricula typically provide and the need for specialized competencies in HIP positions. Integrating professional competencies more closely with specialized graduate curricula may provide a way to close this gap. Kim (2015) examined an LIS curriculum development project and concluded that competency-based education (CBE) can serve as a sustainable approach to help bridge gaps between the curriculum and professional expectations for entry-level librarian jobs. In light of the many observed gaps of this nature in HIP contexts, CBE may be a particularly effective option for LIS programs that offer health information–related coursework or specializations.

### Transferable skills and cultural awareness

Falling outside of the MLA's observable and measurable competencies, ambiguous yet valuable transferable or soft skills may encompass attitudes and qualities in addition to abilities (Matteson, Anderson, & Boyden, 2016). Frequently cited examples include “sociability, self-management, communication skills, ethics, diversity sensitivity, teamwork skills, problem-solving or critical thinking abilities, customer service competencies, emotional intelligence, and leadership” (Matteson et al., 2016, p. 75). In library settings, important soft skills range from listening skills to curiosity to adaptability (Cobb, Meixelsperger, & Seitz, 2015). Philbrick (2012) identified the competencies that health sciences library graduates need by surveying the skills desired by employers and current professionals; the study concluded that personal competencies, including transferable skills, are just as important as professional competencies and should be fostered by managers and educators (p. 145). Martin (2013) revealed pressing needs for teamwork, communication, and a proactive mindset in HIPs in addition to technical expertise. Some of these transferable skills may also be inferred from documentation other than competency statements, such as statements of professional values and ethics.

While transferable skills are important for all LIS professionals, understanding particular health-care issues and risks for marginalized groups is crucial for HIPs. HIPs may also have social responsibilities, implicit or overt, in fostering a hospitable environment that makes their space a “cultural hub”—a feat that requires collaborative work and diplomacy with faculty and administrators alike for librarians (Harris, Mayo,

Prince, & Tooe, 2013). More broadly, HIPs' responsibilities may include providing culturally diverse services and materials such as collections, guides, outreach, and training (Mi & Zhang, 2017). However, where the HIPs themselves may gain the training and skills to provide such services remains unclear. In a recent survey (Mi & Zhang, 2017), 93.1% of health sciences librarian respondents reported viewing cultural competency as important to their roles, but 49.7% reported having no past training or coursework in it. Morris and Hawkins (2016, p. 20) concurred that "various aspects of a person's social identity can strongly influence that person's information-seeking behavior and (or) use of library services." On this basis, they asserted that contemporary medical librarians would benefit from specialized training, though no consensus has been reached as to whether such training should occur in LIS curriculum or in continuing education contexts.

### Research design

In Phase 1 of this study, a scoping review identified emerging and evolving roles for HIPs. It posed two research questions: "How are the professional roles of HIPs and their work settings evolving based on research published since 2000?" and "How can those identified roles be mapped onto MLA's newly revised core competencies?" (Ma, Stahl, & Knotts, 2018, p. 433). Several established strategies for systematic literature review were employed to define the journal coverage from broad fields related to health information sciences, search queries tailored to individual databases' respective controlled vocabularies, and inclusion and exclusion criteria for relevance and specification. Surveyed journals spanned LIS, health professions, biomedicine, clinical practices, education, health information technology, health information research, and more. Examples of search queries and databases are shown in Table 1.

The queries retrieved 750 English-language experiential narratives and research articles published within peer-reviewed North American (US/Canada) journals between 2000 and 2018. To better isolate the research questions, the researchers selected a final group of 268 articles

**Table 1: Examples of major search queries and retrieved databases**

Search Queries	Databases
"health information professional" OR "medical librarian*" AND role	LISTA, Wilson, ScienceDirect
"health information professional" OR "medical librarian*" AND "roles and responsibilities"	ScienceDirect, EBSCO
"health sciences librarian*" AND role	LISTA, Wilson, ScienceDirect, EBSCO
("libraries, medical" [MeSH] AND "librarians"[MeSH]) AND "professional role"[MeSH]	PubMed

(a complete list of articles is attached as an appendix in Ma et al. [2018]), the content of which addresses HIPs' emerging and evolving roles and professional contexts. This published scoping review identified documented research on the nature and prominence of HIP roles that may play an important part in the evolution of specialized graduate curricula and learning outcomes. The findings of Phase 1 entailed the formulation of a visual model, replicated below as Figure 2, mapping the identified roles in relation to the MLA Core Competencies (Ma et al., 2018).

In Phase 2, the researchers designed an employer survey with the intent to illuminate the specialized knowledge base, subject area expertise, and other competencies that an entry-level HIP is expected to have attained through graduate library science study or other means. The survey used the model of HIP roles developed in Phase 1 as a reference point to investigate employer expectations about the nature of HIP roles, the duties and dispositions that LIS students should prepare themselves to fulfill in the profession, and steps that LIS programs might take to equip them to do so.

With IRB approval, the survey was administered using SurveyMonkey and distributed on MEDLIB-L, an email discussion list for medical librarian subscribers. The survey was also distributed in person at the 2017 annual MLA conference, prefaced by an introduction and summary of the survey and the study's aims. One qualification for the 72 recruited participants was (employer) experience of hiring entry-level health science librarians or HIPs in various professional contexts; participants included administrators, management, and incumbent librarians at academic, government, military, private, and nonprofit institutions.

The survey comprised eight questions (see Appendix), with both closed and open-ended questions addressing employer expectations and roles for entry-level HIPs at their respective institutions. Question topics ranged from respondent demographic information to desired traits of entry-level HIP candidates to job responsibilities to open-ended commentary on anything respondents felt noteworthy. The researchers compiled, coded, and analyzed the data, iteratively cross-checking their terminology and coding schema. Each survey response was considered as the unit of coding; coding techniques included open coding, axial coding, and concept mapping (Kazmer, Glueckauf, Schettini, Ma, & Silva, 2018, p. 637). The three coders employed an inductive and iterative approach to discuss and reach agreement to ensure coding quality. During open coding, the coders identified eight distinct concepts and categories (see Figure 3) in the survey data. In the axial coding process, the coders revisited and confirmed those categories and determined their relation to the nine categories identified (Figure 2) in the scoping review. The concept mapping stage then focused on evaluating the meanings and interconnections among those concepts and categories.

The findings were compared to Phase 1's findings, which entailed a visual model (Figure 2) ranking emerging HIP roles based on their

prominence within the literature from 2000 to 2018. In addition to the roles and skills named in the text of the survey itself, employers listed some less clearly defined traits. When analyzing the data, the researchers grouped together similar traits named by respondents and coded them as follows: (a) writing/communication, (b) adaptability/flexibility, (c) interpersonal skills, and (d) ability to work independently.

## Findings

In the discussion below, the researchers roughly preserve the survey's order, integrating discussion of responses to more closed questions (e.g., preferred/required credential for entry-level job candidates) with corresponding open-ended supplementary responses. It is divided into sections that focus respectively on HIP educational and experience requirements, expected roles and professional competencies for entry-level HIPs, and other desirable HIP qualifications as articulated in respondents' open-ended commentary.

### HIP educational and experience requirements

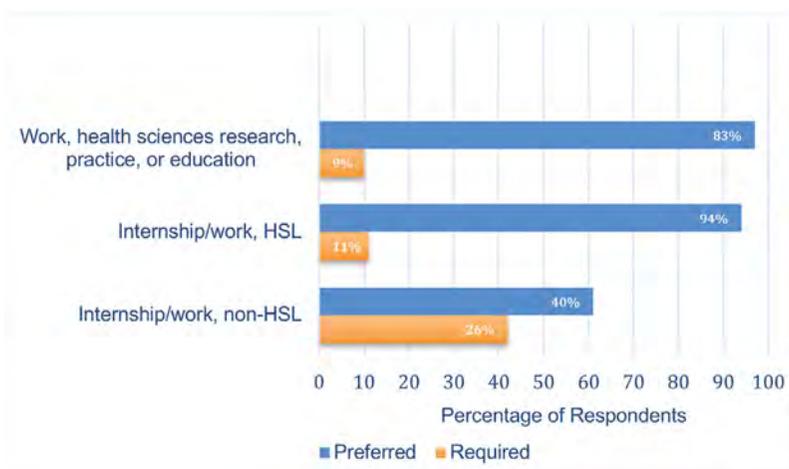
A variety of employers and institutions were represented among the survey responses. The 72 respondents self-identified as reference librarians, library managers and directors, liaison librarians, electronic resource librarians, and others; tenure with their current employer ranged from two months to over 25 years. Among respondents ( $N=35$ ), mean length of time with current employer was 8.5 years, and median length of time was 6 years, 10 months. Respondents reported being employed at academic institutions (33%); medical centers, hospitals, or clinics (33%); schools of medicine, nursing, or health sciences (11%); and other (22%) (see [Table 2](#)). Employing institutions varied in size from employing just one full-time librarian to more than 500; the median number of full-time librarians among those surveyed was four. The average number of patrons served annually varied accordingly, with estimates ranging from 300 to 136,000.

Approximately 86% of respondents reported that their institution employs entry-level health sciences librarians or equivalent HIPs; the rest of the respondents still shared their insights as HIPs or HIP employers. All respondents indicated that their institutions required entry-level HIPs to hold an MLS or equivalent. More than half (57%) stated that their institutions preferred a health sciences–related master's or bachelor's degree, and only one required a health sciences–related bachelor's degree. Four respondents (11%) indicated that the peer-reviewed, accomplishment-based credentialing from the Academy of Health Information Professionals (AHIP) was preferred. Some overlapping responses indicated either undetermined or uncertain views on the part of those respondents.

Beyond educational requirements and credentialing preferences, most employers preferred library internship or work experience—in health sciences environments or otherwise. As shown in [Figure 1](#), though only 11%

**Table 2: Employers' affiliated institutions**

Employers (N=35)	Percentage of respondents	Affiliated institutions
12	34%	universities and colleges
12	34%	medical centers, hospitals, or clinics
4	11%	schools of medicine, nursing, or health sciences
3	9%	combined academic medical centers or hospital libraries
1	3%	community teaching hospitals
1	3%	military medical centers
1	3%	non-profit health sciences education organizations
1	3%	government organizations



**Figure 1:** Preferred vs. required work experience or training of entry-level HIPs.  
**Note:** As multiple selections were allowed, response totals may exceed 100%.

and 26% of employers reported that their institutions required experience in a health sciences library or other libraries, respectively, 94% of employers preferred experience in a health science library, and 40% preferred experience in other libraries.

While many respondents named specialized health experience or education as desirable, some downplayed its importance, implying that employers may recognize the limited amount of specialized training possible within the typical one- or two-year MLS/MLIS/MSLIS timeframe. Employer comments included “we want new hires to come in with good library skills. We assume we can teach them the health/medical content on the job”; “[A] good basic graduate library education is usually what is

required”; and “many of our current medical librarians did not start out in the biomedical field or with specialized training, as most library schools don’t even offer it.” However, it cannot be assumed that all employers (or LIS programs) operate with identical conceptions of “good” basic library education. Program requirements vary significantly nationwide, and what one program considers integral another may relegate to elective status. Ambiguous responses such as “A science background might or might not be helpful” further demonstrate challenges in preparing students adequately for the HIP job market.

Respondents also differed regarding the duration and rigor of training for what they defined as entry-level HIPs. Several noted that at their institutions, such employees undertake progressively increasing responsibilities, with significant oversight and training throughout an initial period. According to one, the professional progression for entry-level librarians entailed being “placed in existing position then given increased oversight and guidance until more comfortable and knowledgeable.” Another employer observed that entry-level librarians “have responsibilities in a division, but generally only have very basic skills when they begin. We devote 2 years in getting them ‘up to speed.’ They initially give tours, answer basic reference questions, assist in teaching. After 18 months–2 years do they take on major responsibilities.” Other new HIPs, however, experience a condensed timeline. One librarian described being given “a couple of hours of orientation on various resources. As far as instruction, I gave my first instruction within 2 weeks of starting work. I was given the presentation from the former hospital librarian and told to edit it or create a new one. I watched my supervisor give the instruction lesson once and then was responsible for every class after that.”

### **Expected roles and professional competencies for entry-level HIPs**

A noticeable discrepancy between the reviewed literature and employers’ perspectives on some HIP roles appeared in the results of the two study phases (Figure 3). For example, survey respondents identified “informatics collaboration” as least important among the survey-provided options, whereas it was the third most frequently identified skill within the published literature. Similarly, “liaison or library outreach” was respondents’ highest-ranked skill but was only the fifth most cited within the literature. In Phase 1 of this study, nine emerging HIP roles and corresponding skill sets were ranked roughly based on the frequency and emphasis with which they appear in that phase’s extensive literature review. These roles and the MLA Core Competencies to which they correspond are represented in Figure 2. While reproducing full definitions would be impractical in the space of this paper, core associated duties for each role are excerpted below from Phase 1’s findings in Table 3. For complete definitions, see Ma et al. (2018).

In Phase 2, eight categories were identified through survey responses ranking the prominence of emerging roles and associated skills that

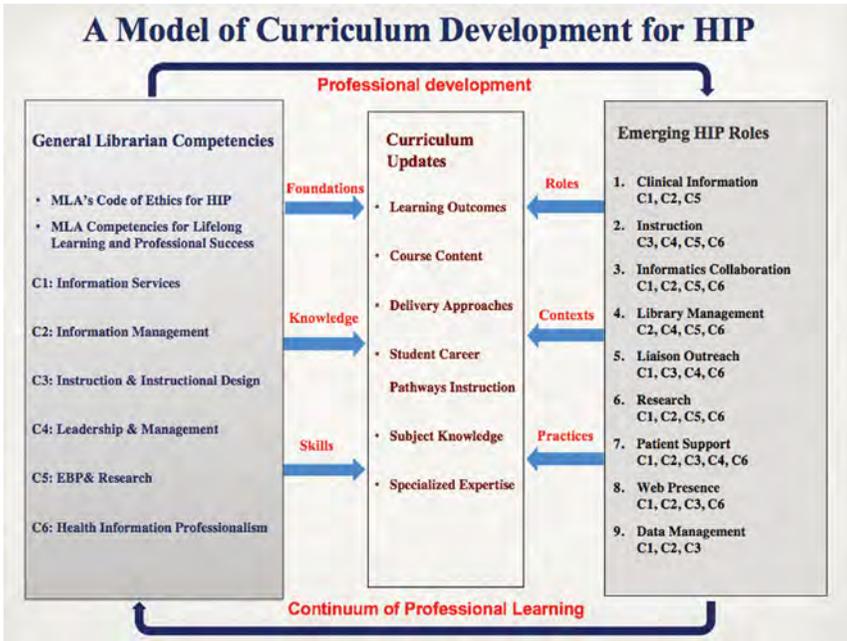
**Table 3: Emerging HIP roles with core associated duties**

Role	Core duties
1. clinical and medical information provision	evidence-based medicine (EBM), rounds/morning report, search support, real-time information searches, nurse support, institutional decision making
2. instruction, reference, and medical education	information literacy, continuing medical education, group and individual instruction, in-person and virtual or remote reference services, curriculum development, subject guides
3. informatics collaboration	electronic medical records, health informatics, biomedical informatics, clinical informatics, consumer health informatics information retrieval, knowledge management
4. library management	electronic resources, archives, collection development or management, technical services, programming, facility management and planning, outreach, publicity, negotiation
5. liaison, outreach, and inclusion	point-of-need information, instruction, continuing education, rounds or morning report institutional review, public health, cultural competency, equity and inclusion, information ethics
6. research and scholarly publishing	EBM practice, biomedical expertise, expert searching, reference, scholarly communications, writing skills, systematic review, citation management, copyright and intellectual property
7. patient support and advocacy	reference, expert searching, knowledge brokerage, information literacy, health care policy support, policy development, cultural competency, political climate, outreach, LGBTQ (lesbian, gay, bisexual, trans, queer) competency
8. web presence and scholarly communications	metadata, electronic resources, technical support, website planning and management, online publishing
9. data management	EMR compatibility and interoperability, archive management, data management, copyright and intellectual property, Web content management

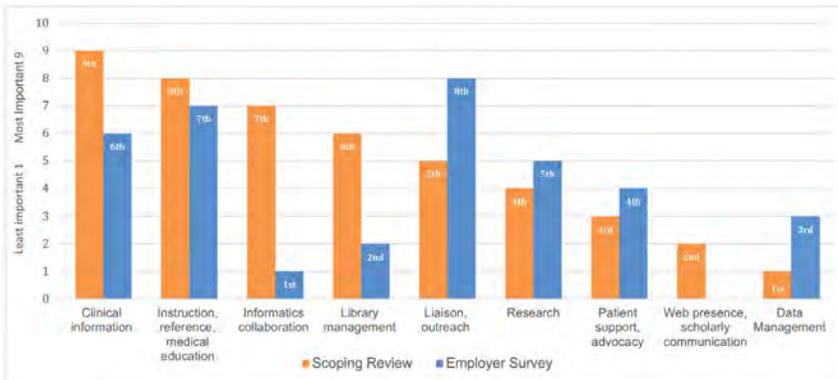
*Note:* Adapted from Ma et al. (2018).

graduating library students should be equipped to perform: (1) liaison or library outreach, (2) online instructor in clinical, research, and education settings, (3) biomedical informationist, (4) systematic reviewer or grant writer, (5) patient advocate or instructor, (6) data manager, (7) informatician (non-medical informatics contexts), and (8) EMR/EHR librarian.

While some discrepancies emerged, employers also echoed the importance of many roles and responsibilities found in the literature. Among job duties for entry-level HIPs, instruction, reference, and medical education



**Figure 2:** A model of curriculum development for HIP: Mapping the HIP roles to MLA professional competencies from Phase 1 of the study.



**Figure 3:** Emerging HIP roles ranked in the two phases of study.

were the second most frequently cited skills named by employers and the scoping review alike. Clinical information provision also ranked highly for both groups. Responsibilities varied widely across employers; while one response listed “reference and instruction” as entry-level HIPs’ only responsibilities, another stated that they are expected to do “just about everything.” One employer questioned the survey’s categorization of

roles: “Doing Systematic Reviews IS VASTLY DIFFERENT than writing Grants . . . These are not the same and should not be together in questions! [*sic*].” This strong assertion where no other respondents demurred speaks to the difficulty faced by LIS programs in preparing students for emerging roles about which employers hold broadly differing views, as the varying experiences and expectations for new HIPs elucidated in the survey responses show.

Entry-level HIP competencies employers prioritized were a demonstrated readiness for, or commitment to, the continuum of professional education and development, and maintenance and integration of core competencies in professional services. Other valued competencies were ranked in descending order of importance: (1) transferable competencies of general library information management and services, (2) specialized health information knowledge base and skill sets suited to the evolving, innovative clinical practice, research, and education of biomedicine and health sciences, and (3) core professional values of promoting informed decisions in health care, best available health information resources, and excellent professional services.

Specific qualifications most cited by respondents were web skills such as website development and web services, as well as teaching experience, such as online and in-person instruction and individual reference work. Respondents expressed preferences for transferable skills and dispositions in various forms: task-oriented skills such as “prioritization and multi-tasking, writing and communication, ability to work independently” and attitudinal attributes such as “adaptability and flexibility, interpersonal skills, and social and emotional intelligence.” Four respondents expressed a preference that candidates possess AHIP credentials. AHIP membership requires an ALA-accredited MLS/MLIS/MSLIS or non-library science master’s degree plus demonstrated health information skills. LIS students, therefore, are automatically precluded, putting them at a distinct disadvantage even for entry-level roles.

### Other desirable HIP qualifications

Additional desired attributes and knowledge areas ranged from highly specialized technical skill sets to transferable skills and general dispositions. Cited skills specific to the medical field included knowledge of NLM cataloging standards and medical databases, familiarity with the roles of different medical professionals, and an understanding of health-care administration.

While Phase 1’s findings evince the importance of teaching HIP core competencies and professional roles, one of the most striking themes that emerged within Phase 2’s survey responses was the demand for something that cannot be taught in academic programs: interpersonal skills. Many respondents expressed a desire for professional flexibility and self-awareness in their candidates, wishing them to be “emotionally and

culturally competent,” as one put it, or “able to fit in culture.” HIPs often find themselves “working with different types of people,” one respondent noted, while another affirmed that “Our library provides very high touch services to a demanding set of patrons.” Successful future HIPs, then, must be able to navigate the nuances of complex professional settings. HIPs do not act as lone experts but serve as liaisons between many other colleagues and patrons. Perhaps for these reasons, “liaison or library outreach” topped respondents’ list of priorities (Figure 3).

HIPs must also mediate and foster relationships among various medical professionals and public stakeholders. “Understanding of physicians’ [and . . .] nurses’ role” appeared as a desired qualification for one respondent. Another cited the “ability/flexibility to integrate into a variety of setting [*sic*]” as an essential skill, along with “flexibility, willing to take on new duties as they are encountered.” Similarly, HIPs should be prepared to adapt to workplaces that range from large teams to solo work; one employer named a preference for “team experience” while another noted a need for professional experience: “solo librarian—students are not prepared for this role.” Although the scoping review rated library management skills more highly than did survey respondents, aspiring HIPs should be aware of the management, marketing, and leadership skills that corporate health environments demand. One employer emphasized various management strategies that HIPs need in a work environment attended by numerous, complex budgetary considerations: “How to do budgets, how to negotiate, how to show return on investment, how to demonstrate value of library services to a hospital’s bottom line, persuasive techniques.” Others emphasized the importance of versatility for HIPs, covering duties as diverse as providing reference assistance to the public as well as searching specialized databases. The above responsibilities demand transferable skills such as adaptability, leadership, and cultural awareness along with highly technical cataloging and processing competencies.

While some skills discussed herein map back onto the core HIP competencies articulated in Phase 1, it is nevertheless important that library students be apprised of the wide range of interpersonal skills and qualifications that future employers might seek but that are elusive in LIS curricula.

## Discussion

In the following discussion, the combined implications of the findings from both phases of this study are considered. Even where discrepancies arise between the reviewed literature (Phase 1) and the HIP/HIP employer survey responses (Phase 2), clear gaps in LIS education and preparation for HIP roles appear. Based on observed gaps, the discussion proposes measures to update and/or specialize LIS curricula for aspiring HIPs and provide students with cross-disciplinary/integrated learning opportunities that give them the practical experience that employers desire; outline points of terminological difficulty across relevant fields;

and offer a summative set of recommendations for LIS programs to better prepare aspiring HIPs for a challenging, protean job market.

### **Needs for developing and updating specialized graduate curricula**

The study findings indicate an urgent need to update specialized graduate curricula for HIPs according to the identified evolving HIP roles, required core professional competencies, and other desirable qualifications. Indeed, to keep pace with the rapid technological advances and continual institutional changes within biomedical research and clinical practice, LIS programs should seek to realign their specialized graduate curricula and learning outcomes to match evolving roles and expectations for HIPs and employers.

As academic programs recognize the diverse emerging roles for HIPs, curricula can better represent core competencies. The embedded, interdisciplinary nature of their roles means that HIPs often act as partners, collaborators, and liaisons rather than as simple sources of information. Curricular learning outcomes should emphasize transferable competencies of library information management and services; specialized health information knowledge and skill sets that adapt to changes in clinical practice, biomedical research, and education; and core professional values of promoting informed decisions in health care and facilitating access to health information resources. Accordingly, curricular learning activities should prepare students to commit to the continuum of professional learning and development that enables them to provide core services to and support informed health decisions by professionals, educators, students, researchers, and the general public.

### **Motivating individualized student learning goals and work-integrated learning**

The broad range of professional roles and qualifications for entry-level HIPs notwithstanding, it is important to advise students to develop achievable individual learning goals and match those goals to suitable career opportunities. As the diverging priorities between research findings and employer expectations in this study make apparent, employers, researchers, and academic or professional institutions respond according to their own independently defined sets of criteria in addition to those expressed in professional competency statements. In preparing LIS graduates for the job market and entry-level roles in the field, competency-based learning activities focusing on particular professional skills (e.g., instruction, web development, or data management) can be tailored to enable aspiring HIPs to cultivate specialized professional interests and skill sets. Such competencies tend to connect directly to the needs of employers as enumerated in job postings and anecdotally by both practitioners and employers. LIS program faculty and administrators should therefore continuously integrate these competencies and expectations into specialized graduate curricula while also remaining abreast of changes in the professional field

to ensure that students receive adequate opportunities to become competitive candidates.

HIP roles may be difficult to define and prepare students for in part because they cross so many disciplinary and professional boundaries. While not all of the qualifications that these findings elucidate can be easily integrated into traditional academic curricula, specialized graduate curricula should encourage and facilitate work-integrated learning and practical experience through course fieldwork or site visit assignments, community-engaged course projects, and pre-professional training or practicum opportunities. Integrated learning activities that match students' individual learning and career goals can expand their general library knowledge and skills, help them understand professional responsibilities and competencies, and advance their practical and transferable skills. For instance, coursework related to serving diverse patrons, cultural awareness, and the socioeconomic landscape of public health would enhance students' required skill sets and knowledge base.

### **Clarifying terminology confusion and inconsistency**

The confusing cluster of similar terms surrounding HIPs and debates about their interchangeability across health information researchers, HIPs, and LIS educators makes the definition of HIP roles a complex undertaking. The term "HIPs" is often used synonymously with "health science librarians" and is identified by professional organizations such as the MLA and AHIP as a library-specific term; in practice, however, it can encompass a more diverse range of health information specialists, such as health information management technicians. Health information management (HIM) is a much broader field that includes a range of non-library-based health information experts. Phase 2 of this study focuses on a library-centered selection of HIPs by posing questions that examine the ways in which LIS educational practices may or may not be meeting future HIPs' needs, but not all HIPs necessarily arrive in the profession with a library background.

As discussed above, informationists are sometimes viewed as a more highly specialized type of health sciences librarianship, while others dispute this distinction. Regardless, the two roles are similar enough to be considered together in studies of HIPs, since both roles rely upon a deep understanding of specific health knowledge embedded into broader medical professional contexts.

Regardless of whether they term themselves HIPs, informationists, or librarians working within health informatics, LIS students who are training for careers supporting health professionals would benefit from an education that recognizes the diversity of professional roles and skills required in their field. For example, the professional roles that emerged from the literature review in Phase 1 include embedded roles working with clinicians (as an informationist might) as well as the ability to handle

specialized research inquiries (crucial for virtually any HIP). Similarly, the survey responses from Phase 2 indicate both employer-specific and general professional competencies (e.g., the ability to use a field-specific database vs. possessing a strong foundation of clinical health knowledge). The specificity of survey responses indicates that, to an extent, HIPs' professional roles are defined less by professional associations and more by the demands of particular employers. As not all HIPs will be able to anticipate these precise needs early in their careers, LIS programs must work to ensure that future HIPs understand the various skill sets that employers expect, and to prepare them with a strong foundation of clinical and medical knowledge. Additionally, the survey results highlight the importance of continuing professional development for current HIPs: Health-care services, resources, and organizations are continually changing, and even established professionals must work to keep pace with changes in the field.

### Research limitations

Findings from the two phases of this project reveal the wide range of professional roles, competencies, and skill sets expected of new HIPs. While a larger-scale or more in-depth extension of surveys or interviews with HIP employers would undoubtedly continue to reveal more desirable qualifications for newly degreed HIPs, the range of answers represented in this study illustrates the changing, sometimes contradictory expectations that HIPs face.

At the same time, this survey was distributed to HIPs and other professionals at HIP-employed institutions who participated in a professional association for health sciences librarians, and the survey questions explicitly focused upon the skills of LIS students and graduates. Expanding the scope of the survey to investigate early-career HIPs' non-library educational and professional backgrounds might also reveal additional qualifications or meaningful work experiences absent from this survey due to the questions' directional nature. Additionally, expanding the survey's reach to include non-library HIPs could provide a wider, more balanced view of prominent roles and skills and illuminate underrecognized gaps in LIS programs' approaches to HIP education.

Even though several survey respondents remarked upon the need for this study in bridging the gaps across health information research, HIP practice, and LIS education, not all 72 respondents answered every question. Terminological confusion and inconsistency were identified as among the main reasons for those incomplete surveys; not all respondents might have been familiar with the definitions of core competencies as articulated by the MLA and in the academic literature, or with their relation to individual workplaces. Further, some of the discrepancies between the literature review and the survey invite speculation—notably, the prominence of “Web Presence and Scholarly Communication” in the former and its absence in the latter. Much of the literature reviewed in Phase 1 was written by librarians in academic settings, which may influence the terminology used or

the ways in which the authors categorize and quantify job roles. It is also unclear to what extent those HIPs and HIP employers who participated in the survey are familiar with or active in the language that their respective institutions use in writing job postings and position descriptions, and their responses may not fully reflect their institutions' actual practices, policies, or expectations. Continued examination of these variables might be facilitated through future analyses of job postings, position descriptions, and/or surveys of entry-level HIPs with direct questions about their actual job duties.

Because the survey was conducted prior to the publication of the first phase of the study, moreover, the literature review articulates nine emerging roles while the survey, based on an earlier version of the literature review, offers only eight. However, these eight roles nonetheless align closely with those from the literature review as shown in Figure 3, the later addition of the Web Presence and Scholarly Communication role notwithstanding. Responses to the survey's open-ended questions also repeatedly asserted the importance of web skills.

### **Recommendations**

Based on the combined findings of both phases of this study, the researchers offer the following summative recommendations for specialized HIP curriculum design and delivery:

1. Realignment of specialized HIP curricula with updated professional core competencies is essential to developing or adapting course learning outcomes for specialized HIP curricula.
2. Enhancing general LIS training in library management and services, with an emphasis on instruction and embedded information services, will lay solid foundations for entry-level HIPs' professional preparation and continuing education.
3. The emerging and evolving professional roles identified in evidence-based clinical practice, innovative research and education of biomedicine and health sciences are substantial and informative for students as they set adaptable and attainable learning objectives and career goals, for which individual HIP curricula may lack strong support.
4. Integrating dynamic and contextualized course learning activities that are often restricted in specialized curriculum design and delivery can encourage and facilitate personalized cross-disciplinary and/or work-integrated learning for students.
5. Motivating students to attain specialized health information knowledge base and skill sets but not overlook the wide range of transferrable "soft skills"—employer expectations and desired attributes—and to consequently set goals to meet those expectations can improve student employability and professional growth.
6. Alerting students to the varied, inconsistent terminology in job roles and expectations will encourage students to explore and

consider a broad range of resources, opportunities, and pathways when determining their educational and career goals.

## Conclusion

This study indicates daunting challenges particular to LIS students pursuing HIP careers and to LIS programs endeavoring to help students become competitive job candidates. Such curricula would do well to seek out ways to offer students not just courses on pedagogy but also opportunities to practice instruction, whether through coursework, practicums, or other forms of engaged learning activities. Meanwhile, LIS faculty and administrators—especially those in advisory roles—should familiarize themselves with emerging roles and employer expectations for entry-level HIPs so that they can effectively counsel students early on in their studies; for example, students who are pursuing a HIP career should be informed of particularly desirable qualifications among employers. Students, too, should be encouraged to research job expectations and, when possible, find relevant pre-professional learning opportunities within and beyond the curriculum. By updating specialized graduate curricula to meet the expectations made explicit within core competency statements and those that can be gleaned by examining emerging roles, LIS schools can facilitate a clearer pathway into the profession for future HIPs. This study's findings constitute a step toward bridging the potential gaps across health information research, HIP practice, and LIS education.

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## Appendix: Survey Instruments

### A Survey of Online Graduate Library Curriculum Development for Health Information Professionals (HIPs)

Thank you for taking the time to complete this survey! Please answer the following questions to the best of your ability.

1. Can you tell us a little about yourself?
  - a. Job Title: \_\_\_\_\_
  - b. Time with the Current Employer: Years \_\_\_\_\_ Months \_\_\_\_\_
  - c. Work experience and educational background: \_\_\_\_\_
  - d. Are you a member of any professional associations related to health science librarianship/or human resources (HR)?
    - o Yes, If Yes, please list the name of all associations:  
\_\_\_\_\_
    - o No
  
2. Can you tell us a little about your library?
  - a. A library affiliated with:
    - o Academic Institutions, e.g., Universities, Colleges
    - o School of Medicine/Nursing/Health Sciences
    - o Medical Center/Hospital/Clinic
    - o Research Center/Medical Lab of Biomedicine or Health Sciences
    - o Other specialized libraries—please specify
  - b. Number of full-time librarians employed
  - c. Approximate number of patrons served annually
  - d. Does your institution employ the entry level of Health Sciences Librarians or comparable positions?
    - o Yes
    - o No
  - e. If Yes, please briefly describe the typical job responsibilities for the entry-level librarian position(s) within your library
  
3. What kind of educational credential(s) do you look for in an entry-level librarian candidate at your library? (select all that apply)

EDUCATIONAL CREDENTIAL	REQUIRED	PREFERRED
Master's degree in Library & Information Science (or equivalent)	<input type="checkbox"/>	<input type="checkbox"/>
Health sciences related-Master's degree qualifying candidate for the position	<input type="checkbox"/>	<input type="checkbox"/>
Non-health sciences related-Master's degree qualifying candidate for the position	<input type="checkbox"/>	<input type="checkbox"/>

(Continued)

EDUCATIONAL CREDENTIAL	REQUIRED	PREFERRED
Health sciences related-Bachelor's degree	<input type="checkbox"/>	<input type="checkbox"/>
Non-health sciences related-Bachelor's degree	<input type="checkbox"/>	<input type="checkbox"/>
Other degrees or certificates not listed here, please specify _____	<input type="checkbox"/>	<input type="checkbox"/>

4. What kind of work experience/training do you look for in a candidate? (Check all that apply)

WORK EXPERIENCE/TRAINING	REQUIRED	PREFERRED
Internship/work experience in a non-health sciences related library	<input type="checkbox"/>	<input type="checkbox"/>
Internship/work experience in a health sciences related library	<input type="checkbox"/>	<input type="checkbox"/>
Work experience in health sciences related research, practice, or education	<input type="checkbox"/>	<input type="checkbox"/>
Others, please specify: _____	<input type="checkbox"/>	<input type="checkbox"/>

5. According to importance in hiring decisions, how would you rank the four groups of competencies for an entry-level health sciences librarian from a candidate pool of newly graduated library students?

Please number the competency groups 1–4, with 1 being the most important, 2 being the next most important, etc.

- Transferrable competencies of general library information management and services
  - Specialized health information knowledge base and skill sets that are suited to the fast-growing and innovative clinical practice, research, and education of biomedicine and health sciences
  - Core professional values of promoting informed decisions in healthcare, best available health information resources, and excellence of professional services
  - Demonstrated readiness for and commitment to the continuum of professional education and development to update and integrate core competencies into professional services.
6. According to importance in hiring decisions, how would you rank the emerging diverse roles of HIPs and those associated skills that a library student should be familiar with and equipped to perform? Please number the roles 1–8, with 1 being the most important, 2 being the next most important, etc.
- Biomedical Informationist
  - Systematic reviewer/grant writer

- c. Online instructor
- d. Data science manager
- e. Informatician
- f. EMR/HER librarian
- g. Patient advocate/instructor
- h. Liaison/outreach

7. Can you specify five additional preferred or desired job responsibilities/roles within HIPs NOT listed in Q6 that are essential in preparing a library school student for the versatile, innovative, and challenging professional contexts and practice of HIPs?

Please rank your answers by importance, with 1 being the most important and 5 being the least important.

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_
- (4) \_\_\_\_\_
- (5) \_\_\_\_\_

8. Please add any additional comments or ideas you have about how to implement and enrich specific core competencies of HIPs within online curricula to best prepare students for the emerging roles, professional settings, and innovative practices within the field.

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Thank you for taking the time to share your views about the core competencies that are essential to the development of online curricula of HIPs. (Select the 'next page arrow' to submit your responses.)