

Mitigating the infodemic of the pandemic: hospital librarians' enactment and development of information resilience in healthcare organisations

267

Received 15 December 2023
Revised 25 April 2024
Accepted 10 May 2024

Sara Ahlryd and Fredrik Hanell
*Department of Cultural Sciences, Linnaeus University,
Växjö, Sweden*

Abstract

Purpose – The challenges to healthcare caused by the COVID-19 pandemic forced hospital librarians to develop their abilities to cope with change and crises, both on a social level and an organisational level. The aim of this study is to contribute to knowledge about how hospital librarians developed library services during the pandemic and how these changes contributed to building information resilience in the healthcare organisation. This paper also seeks to explore how resilience theory, and specifically the concept information resilience, can be used within library and information science (in LIS) to investigate resilience in the library sector.

Design/methodology/approach – Nine semi-structured interviews with librarians were conducted at four different hospital libraries in four different regions in Sweden between March and May 2022. The empirical material was analysed through an interaction between the theoretical perspective and the empirical material through a thematic analysis. In each theme, specific resilience resources are identified and analysed as components of the information resilience developed by hospital librarians.

Findings – The results show that hospital librarians contribute to several different information resilience resources, which support information resilience in the healthcare organisation. Three aspects characterize the qualities of resilience resources: access, flexibility, and collaboration. The findings suggest that the framework for analysing information resilience used in this study is well suited for studying the resilience of libraries from both organisational and informational aspects.

Originality/value – The analysis of information resilience on an organisational level presents a novel way to study resilience in the library sector.

Keywords COVID-19 pandemic, Hospital libraries, Hospital librarians, Information resilience

Paper type Research paper

Introduction

The COVID-19 pandemic caused severe pressure on healthcare organisations across the world. During the first year of the pandemic, more than 1.5 million people worldwide died from the new corona virus [1]. While patients flooded the emergency units, healthcare professionals struggled to find effective treatments for the new virus. In the wake of the pandemic came what has been called an infodemic (Zarocostas, 2020), with high volumes of uncertain information being circulated. The need for reliable information about the new virus was urgent, but at the same time, scientific evidence was still in the process of being produced.

© Sara Ahlryd and Fredrik Hanell. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

The authors would like to thank the participants of the study and acknowledge the anonymous reviewers for their valuable comments.



As a part of the Swedish healthcare system, under law required to provide good and equal healthcare (SFS, 2017, p. 30), the main purpose of hospital libraries is to provide healthcare staff with the scientific information necessary to provide safe and equal healthcare (cf. Chaturvedi, 2017; Hanell and Ahlryd, 2023, cf. Sollenberger and Holloway, 2013). Given the role as providers of trusted, scientific information, hospital libraries were at the front line during the corona pandemic and the following infodemic. At the same time, hospital librarians experienced severe and swift changes to their organisations, and both demands and conditions for library services offered, due to the restrictions in place to stop the corona virus (Harnegie, 2021). The challenges to healthcare caused by the pandemic were combined with organisational changes forcing hospital librarians to develop their abilities to cope with change and crises, both on a social level and an organisational level. This study addresses how hospital librarians in Sweden managed change and how hospital libraries contributed to resilience in healthcare during the pandemic by developing and enacting information resilience. Resilience refers to the long-term ability to deal with different kinds of changes and disturbances while maintaining a positive trajectory of development (Norris *et al.*, 2008). As a key component of resilience, information resilience is defined as a process where adaptive information capacities are combined and utilized to enable functioning and adaptation following change and disruption. As pointed out by Norris *et al.* (2008), the scientific value of resilience as a notion (or a metaphor) is not found in easily captured and quantified measures, but rather in the way the notion may lead to new insights about how different adaptive capacities can be enhanced to increase the likelihood of adaptation. This reasoning motivates the use of resilience theory as a lens when analysing how challenges during crises are managed.

The pandemic situation escalated quickly in Sweden, as in the rest of the world. In the middle of March 2020, the public health authorities recommended the government to impose restrictions to control the spreading of the virus. Since many people, and especially elderly people within care-giving institutions, needed intensive healthcare the work situation of healthcare professionals became extremely pressured. The pandemic also caused difficulties for hospital libraries, affected by the governmental restrictions and the rapidly changing conditions of the healthcare organisations. Since people were to maintain social distancing, the hospital libraries were forced to close the libraries during several periods between 2020 and 2021 (Anderson *et al.*, 2020). The closing of the libraries affected both librarians and users who could not access the libraries as usual. The librarians were forced to find solutions to meet the users' need of library services, without meeting users at the library, and to provide scientific information that was in high demand from healthcare professionals.

Still fairly near the times of pandemic, some studies and reports on how hospital libraries met the early stages of the pandemic have been published (e.g. Harnegie, 2021; Teolis *et al.*, 2021; Weeks *et al.*, 2020), but to date, how hospital libraries re-structured their services during the pandemic years and the lessons learned for future disturbances have not been studied systematically. This paper seeks to contribute to this knowledge by drawing on resilience theory and employing the concept information resilience as a theoretical lens, to pose the main research question: *how can hospital libraries contribute to information resilience within the hospital organisation during a pandemic?* Additionally, to contribute to the theoretical development of resilience theory within library and information science (LIS), the paper also seeks to address the following question: *how can resilience theory and the concept information resilience be used withing LIS to inform an analysis of libraries' resilience with both an organisational and informational focus?*

This paper commences with a research overview presenting the role of hospital libraries and hospital librarians and how the pandemic affected them. After that, the theoretical perspective is introduced, with a focus on how resilience theory can be used to analyse how hospital libraries contribute to resilience development. In the following sections, we outline the research design

and then present results illustrating how information resilience is enacted in hospital libraries during the pandemic. The subsequent analysis investigates how the hospital librarians have adapted to the changes and how they contributed to the development of information resilience. The paper concludes with a discussion of how resilience theory can be used in LIS to further explore how libraries support the development of information resilience.

Hospital libraries and hospital librarians during the pandemic

Hospital libraries have been studied both in LIS and in other disciplines, primarily focusing on issues concerning scientific information seeking, their role in the parent organisation, and the pedagogical role of hospital librarians. Studies on hospital librarians often concentrate on professional development, specific issues like clinical librarianship, or the use of digital devices in search instructions. Since healthcare develops towards more research-intense activities, the hospital librarians acquire a more important role in the healthcare organisation (Sollenberger and Holloway, 2013). Consequently, hospital librarians work closer to healthcare professionals today and increase their collaboration with healthcare staff in different ways. To involve hospital librarians in healthcare teams results in faster interaction and more initiated collaboration (Chaturvedi, 2017; Willis and Gassaway, 2018).

The main activity for hospital libraries is to provide scientific medical information for healthcare staff, as well as supporting information seeking for healthcare professionals (Ahlryd and Hanell, 2024; Ayre *et al.*, 2015). Since healthcare today is focussed on evidence-based practice, there is an increasing need for scientific information, and hospital library services such as search instructions. Increasingly, librarians interact with healthcare professionals and collaborate with researchers in research groups (Murphy *et al.*, 2022). Hospital librarians also work together with medical doctors and methodological experts in health technology assessment (HTA), where evidence-based information is valued and treatments recommended (Ahlryd and Hanell, 2021). Most hospital libraries also maintain library services for patients, as well as the public. A well-known challenge for hospital librarians is visibility (Hanell and Ahlryd, 2023; Murphy *et al.*, 2022). Hospital librarians struggle with visibility issues in the healthcare organisation and continuously work to show their competencies and importance (Egeland, 2015).

During the last three years, several studies have been written by hospital librarians who report on hospital library services and activities developed during the pandemic, but findings from scientific studies are still lacking. Consequently, there is a gap in research concerning how hospital libraries managed the changes during the pandemic, and how these changes have contributed to transforming library services.

During the initial weeks of the pandemic, international library associations mobilized to meet the challenges presented by COVID-19 focusing on issues such as information provision, maintaining services, and workplace arrangements (Kosciejew, 2021). The pandemic created new challenges and barriers to providing hospital library services (Rhue, 2022), but the pandemic also sparked a profound digital development meeting these challenges with new digital solutions enabling hospital librarians to serve healthcare staff (Castek and Novak, 2020; Murphy *et al.*, 2022). Anderson *et al.* (2020) describe several “bottom-up” solutions due to the top-down decision to close hospital libraries. Digital forms of communication helped the hospital library to remain a relevant service for healthcare staff seeking scientific information in a time when access to information was urgent (Rhue, 2022; Chisita, 2020; Pauwels *et al.*, 2020). The digital skills of librarians expanded while offering continued support to researchers, students, and healthcare staff through virtual tours of the library, digital collaboration and expanded library chat service (Murphy *et al.*, 2022).

Hospital librarians also provided support for healthcare staff through identifying and compiling digital information resources on COVID-19 (Charney *et al.*, 2021; Pauwels *et al.*,

2020), aiming to provide collections of relevant and reliable resources for healthcare staff and researchers (Anderson *et al.*, 2020). Daily updated reports collecting information resources on COVID-19 were created in teams with clinicians and hospital librarians (Sullo and Brody, 2021), illustrating the necessity of close collaboration between healthcare professionals and librarians to distribute information quickly in times of crisis. Due to a lack of scientific evidence during the early stages of the pandemic, researchers wanted to share research results as quickly as possible and used information sources that were not always reviewed (Teolis *et al.*, 2021). This created a challenging situation for healthcare staff (Pauwels *et al.*, 2020), and consequently a crucial task for hospital librarians during the pandemic was to evaluate research and the quality of scientific information (Chisita, 2020).

Hospital librarians are likely to be involved in disaster management in their organisations, and to shoulder a central role when a crisis appears, since the need for information often increases during a crisis (Donahue and Featherstone, 2013; Teolis *et al.*, 2021). This makes disaster management a fruitful window to make visible the importance and relevance of how hospital library services contribute to healthcare (Teolis *et al.*, 2021), as well as hospital librarians' expertise in terms of finding and evaluating scientific information (Weeks *et al.*, 2020). Now we turn to a theoretical framework well-suited to analyse disaster management and crises: resilience theory.

Resilience theory and information resilience in library and information science

Resilience is often described as the ability to cope with change and building strong structures to handle changes in the environment (Norris *et al.*, 2008; Vårheim, 2016). Even though we currently see an increased interest in discussions concerning resilience within LIS (e.g. de Fremery *et al.*, 2022; Hansson, 2019), resilience has rarely been applied in LIS, and there is a need to further explore how different types of libraries can contribute to resilience (Vårheim, 2016).

Introducing resilience theory and discussing the small body of library research that applies resilience perspectives as well as possible future research agendas, Vårheim (2016) notes that resilience theory began within Physics. Early definitions of resilience typically focus on the re-establishment of equilibrium; later definitions focus on to what degree human systems can adapt to external forces that threaten or stress the system (Norris *et al.*, 2008; Vårheim, 2016). Analytically, two types of resilience can be distinguished: *general resilience* and *specified resilience*. Specified resilience concerns the capacity to manage certain specific and expected events (for example loss of electric power or earthquakes) while general resilience refers to a capacity to manage unexpected incidents, or general uncertainty (Folke *et al.*, 2010).

Resilience is of strategic importance for any community or organisation aiming to effectively navigate unexpected challenges (Grace and Sen, 2013). The concept of resilience has been used in LIS-research focussed on public libraries (see Grace and Sen, 2013; Vårheim, 2017) and information literacy (Lloyd, 2014, 2015). In these contexts, the derived concepts *social resilience*, *community resilience*, and *information resilience* have been applied to focus different aspects of resilience. Grace and Sen (2013) investigate how public libraries promote community resilience through outreach work. Related to community resilience is social resilience, which focus on individual or group capacities contributing to sustainable social relationships (Cacioppo *et al.*, 2011). In a seminal paper, Norris *et al.* (2008) theorize *community resilience* in the context of disasters. Resilience is defined as “a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance” (Norris *et al.*, 2008, p. 130), and consequently resilience is better understood as a process, rather than an outcome, and as adaptability, rather than stability. According to Norris and colleagues, resilience connected to disasters is similar to resilience in other types of collective strains. In organisational studies, resilience is often discussed in relation to uncertainty

(Frelas and Burnett, 2014). Dong (2023) identifies advance planning and a resilience-oriented environment as important ways to mitigate uncertainty in organisations. Organisational resilience has been discussed in the business community to understand how companies can establish resilient supply chains through flexibility, risk management, and open communication (Ponis and Koronis, 2012).

Resilience requires both specific resources and resources with specific attributes: *robustness*, *redundancy*, and *rapidity* (Norris *et al.*, 2008). Robustness describes the strength of a resource, and its durability over time. Redundancy refers to when different elements can be replaced in case of disruption, or put differently: when several options are available for solving a problem. Rapidity is associated with speed and how quickly a resource can be utilised. In summary, these dynamic attributes characterize resources functioning as adaptive capacities, and as such, the changing and interactive aspects of resilience-resources are highlighted. A resource may change over time but it can still provide a foundation for resilience, also when the resource only has one or two of these attributes. To provide two examples from resilience resources identified in this paper: the information resilience resource *Comprehensive covid-search string* is characterized by the attribute rapidity, since the resource can be accessed and used quickly; *Circulation of books*, on the other hand, is characterized by the attributes robustness and redundancy. This resilience resource is robust since it is strong (as in reliable) and functions in several scenarios, and it counteracts a variety of potential threats (caused by limited access to printed material). The resource has a high degree of redundancy given the diversity of printed material available from several hospital libraries allowing for more than one way to solve a problem.

In the context of community resilience, Norris *et al.* (2008) identify four primary types of adaptive capacities, or resilience-resources: *Economic development*, *Social capital*, *Information and communication*, and *Community competence*. Given the focus on *community* resilience, the categories *Social capital* and *Community competence* are brought to the fore. With the research interest of this paper, we place adaptive capacities associated with *Information and communication* at the centre of attention. Critical resources of this kind include trusted sources of information that also are functional in times of unexpected events, and capacities to develop a shared sense of meaning and reality. Consequently, we choose to use the notion of *information resilience* rather than community resilience.

Arguably, information resilience is first used in LIS-research in a study by Hersberger (2010) focusing on how libraries and information specialists can work to increase information resilience of individuals in stressful situations. Exploring how the notion of information resilience can be understood and used within LIS, Lloyd (2015) connects information resilience to information literacy and discusses how public libraries can support information resilience training. Specifically, information resilience is considered an outcome of information literacy practice taking into account how access to and use of information enables people to rebuild information landscapes and support transitions through uncertain and changing times (Lloyd, 2015). These studies have provided valuable insights into how information resilience can be conceptualized and used as a theoretical concept in LIS. However, in this paper we choose to explore information resilience on an *organisational* level, focusing on how hospital libraries contribute to information resilience within the hospital organisation during a pandemic. The organisational dimension of resilience describes the capacity of an organization to make decisions and manage and carry out critical functions during a crisis that contribute to increased robustness, redundancy and rapidity (cf. Bruneau *et al.*, 2003). Building on the definition of community resilience offered by Norris *et al.* (2008), we define information resilience as a process where adaptive information capacities are combined and utilized to enable functioning and adaptation after a disturbance. Next, the design of the study is outlined.

Research design

In this study, we strived for the creation of a rich and nuanced empirical material entailing the librarians' experiences during the pandemic. Therefore, nine semi-structured interviews with librarians were conducted at four different hospital libraries in four different regions (A-D) in Sweden between March and May 2022. In region A, three interviews were conducted, and in region B, C and D two interviews in each region were conducted. In two regions the hospital libraries are allocated in several different locations at the hospitals, but they still belong to the same organisation. One of these regions has a medical e-library where healthcare staff have access to digital medical information resources, but no physical library. The librarians participating in the interviews were contacted by email and informed about the aim of the study. To secure informed consent, the invitation to participate included information about how participation was voluntary, and the option to withdraw from the study at any point. Additionally, the librarians were also informed about how the collected material would be used, and that confidentiality would be offered. The interviews were then conducted digitally via Zoom. During the interviews, we continually checked that we had established a common understanding together with the participants.

The interview guide addressed challenges during the pandemic, including access to information resources when libraries were closed, digital interaction with colleagues and healthcare staff, and how librarians understand the role of hospital libraries in supporting healthcare during crises. After completing the interviews, where empirical material was constructed through interpersonal interactions (Mishler, 1988), they were transcribed and carefully read. The empirical material was analysed through an interaction between the theoretical perspective and the empirical material. We strived for a starting point in the empirical material (cf. Charmaz, 2008), focusing on the librarians' narratives about their work during the pandemic. With a view on knowledge as socially constructed, the study aligns with a social constructivist perspective and focusses on accounts of social interaction and activities in these narratives.

In the first stage of the analysis, recurring themes from the interviews were identified and assigned tentative labels. Then the labels were refined through an iterative coding process where both researchers took turns analysing the material until each label described a unique theme collecting responses and adaptations to challenges during the pandemic (cf. Zhang and Wildemuth, 2017). Linking the empirical material to the analytical concepts from resilience theory, each theme collects accounts of how hospital libraries adapted and responded to the external forces of the pandemic and how hospital libraries contributed to information resilience within the hospital organisations. The first theme, *the closing of physical libraries*, collects narratives about access to the hospital libraries for healthcare staff. The second theme, *digital adaptation of teaching and supervision*, contains accounts of the librarians' development of digital teaching and how to provide digital competence for healthcare staff. This theme is closely linked to the next theme, *digital dissemination of scientific information*, that includes narratives about access and updates to scientific information concerning covid-19. The last theme identified, *digital collaboration*, collects accounts of different types of digital collaboration between librarians. In the second stage of the analysis, information resilience resources as well as their attributes robustness, redundancy, and rapidity (see Norris et al., 2008), were identified and related to the previously identified themes. This stage of the analysis allowed for a third round of analysis where the information resilience resources were categorized in terms of different qualities that describe how a resilience resource contribute to the development of information resilience within the hospital organisation during a pandemic. The qualities that characterize the resilience resources were synthesized into three main aspects: *access*, *flexibility*, and *collaboration*. We will return to these qualities and the three main aspects in the below analysis where the development of information resilience is discussed, but first, we present results from the first and second stages of the analysis focusing on how information resilience is enacted.

Results and analysis: enacting information resilience

During the pandemic, several major adaptations and changes were made at the hospital libraries. The changes mostly concern the modified work tasks of hospital librarians as the physical libraries were forced to close and new ways of providing hospital library services needed to be developed. In the empirical material, the librarians describe the pandemic as a challenging period that demanded rapid transitions. In this way, the empirical material offers a window into how hospital librarians used existing practices and socio-material resources, and developed new practices and resources, to provide hospital library services during the pandemic. Analysing the empirical material using resilience theory, we can learn how hospital libraries develop and enact information resilience.

The empirical material is structured thematically, beginning with the theme collecting accounts of the most tangible change for the hospital libraries: *the closing of physical libraries*. Next, the theme presenting accounts of *digital adaptation of teaching and supervision* follows, representing consequences caused by the severely constrained working environment following the closing of the physical libraries, and ways that hospital librarians used and developed digital tools to provide hospital library services. The next theme, *digital dissemination of scientific information*, reflects how the main mission of the hospital library – to provide healthcare staff with necessary scientific information – is re-interpreted and re-enacted during the pandemic. The last theme, *digital collaboration*, collects accounts focussed on how different collaborative efforts were developed, partly in response to challenges presented by closed physical libraries, different needs when it comes to dissemination of scientific information, and the opportunities offered by digital adaptation. In each theme, specific resilience resources are identified and analysed as components of the information resilience developed by hospital librarians.

The closing of physical libraries

For hospital libraries with a physical library normally open to patrons, the government restrictions during the pandemic including periodically closed libraries caused challenges. The closing of physical libraries strongly affected patients and the public, user groups that normally visit the physical library. As hospital libraries closed, librarians experienced that they lost contact with users (D:2, 220518). They thought it was strange that users should not be allowed in the library because “we work for our users” (D:2, 220518). At several libraries, healthcare staff could access the library with their key card even though the library was closed, although healthcare staff normally preferred to visit the library during opening hours. To allow healthcare staff in the library the librarians needed to convince the hospital and crisis management that library services are a prerequisite for healthcare. The primary user group of hospital libraries is healthcare staff, and during the pandemic, only this group was allowed into the library (B:1, 220419). Offering *access to library with key card*, this resilience resource is characterised by rapidity (cf. Norris *et al.*, 2008), enabling swift use of key cards to access the library room. Normally, the hospital library is often used as a waiting room by patients or visitors, offering a place of non-medical normality. Hospital libraries also often function as civic offices, serving patients and visitors with guidance and practical information and support. These types of use were no longer possible during the pandemic. In this way, the pandemic made visible the crucial function of hospital libraries for many users who are not healthcare staff (A:1, 220321).

Before the pandemic, librarians used to deliver books to hospitalised patients (A:3, 220331). Due to visit prohibition this service was cancelled, books were instead delivered by healthcare staff directly to the patients. Also, book deposits in waiting rooms ceased to reduce physical interactions. To circulate printed material ordered by healthcare staff, the libraries began to use the internal post system. To manage this “new” mode of circulation, one library

developed a feature in the library system allowing librarians to mark ordered books in the system and send them to users:

Everything was still going on, courses and things that people should do, and research and writing theses and whatever. So, in the beginning it was a little chaotic, but we managed to find solutions as time passed (D:2, 220518)

This re-discovered mode of book circulation was appreciated, and therefore became a permanent solution: “the word spread ‘I’ve heard that my colleague gets books sent to her office, can I also get that?’” (A:3, 220331). This resilience resource, the *circulation of books* through internal mail, is characterised by robustness and redundancy and enabled access to printed material throughout the pandemic.

The hospital library is part of the hospital organisation, and librarians are often organised as administrative personnel even though hospital librarians communicate with both staff and patients. Due to this organisational ambiguity, there were no specific guidelines for hospital libraries. In contrast, healthcare staff received detailed and regularly updated guidelines during the pandemic (cf. [Anderson et al., 2020](#)). Consequently, the library manager had to interpret the situation and assess reasonable precautions:

no one told us what to do so I had to write a proposal and then I had to check, is this reasonable, should we be included, and sometimes, yes, yes to masks and no to face shields (D:1, 220425)

In part as a necessary response to the ambiguity caused by the lack of clear decisions and guidelines for hospital librarians, a general *tolerance for uncertainty and change* developed during the pandemic, a key information resilience resource characterised by robustness in times of sudden changes (cf. [Norris et al., 2008](#)) that enables increased flexibility. The pandemic situation provoked librarians to come up with creative solutions for how to manage and maintain library services in times of crises, indicating how robustness is an attribute characterising this resilience resource. This tolerance for uncertainty and change developed as hospital libraries experienced opening-up and closing repeatedly:

as time went by and the more times we opened and closed and all that, the more it went on and ok, then we open, we don’t have to communicate this 10 days in advance (D:1, 220425).

Expectations on clear communication did increase with the general uncertainty caused by the pandemic, but as society had to cope with swift changes, hospital librarians and patrons gradually became used to changing routines. The most significant changes caused by the pandemic situation, for hospital libraries as well as for many other parts of society, would be the shift to a digital mode of work.

Digital adaptation of teaching and supervision

Overall, the rapid shift to digital forms of teaching, supervision, and meetings represents the main change for hospital libraries brought by the pandemic (A:3, 220331; B:1, 220419). This development, caused by the covid restrictions, brought challenges, but also new opportunities for the libraries.

The rapid changes in the pandemic situation demanded quick solutions and accelerated the digital development of hospital libraries. Most physical hospital libraries closed in the beginning of the pandemic due to the visit prohibition at hospitals. The transition to digital search instructions and digital teaching was initially impeded by technical shortcomings when working from home (B:1, 220419; B:2, 220422). Consequently, search instructions and teaching were cancelled since suitable digital solutions were lacking. To many librarians, some digital tools were also entirely new, and therefore a period of learning the new tools both for teaching and communication was necessary:

There was some trial and error also, you need to throw yourself out and then see what happens and bring some new experiences “this didn’t work out that well, how could it be done better and so on”, so yes, the development was really quick and we were not entirely [...] prepared actually, not that it would develop that fast (B:1, 220419)

Some librarians felt uncomfortable with the digital teaching methods and meeting bigger groups of healthcare staff digitally. Digital teaching brought certain pedagogical challenges to the librarians, such as how to structure lectures and manage group discussions. One librarian highlights the problems with digital workshops: “There are other challenges with the digital format. It’s not really the same dynamics, and more of a one-way communication” (A:2, 220322). There were also some difficulties concerning the immediate response from participants: “It’s also difficult to ensure if they actually keep up with what you’re talking about, when there are 30 persons on a screen [...] You try to check if they understand and keep up with your reasoning, but it’s not that easy” (A:3, 220331). To solve this challenge, one library included a tool for feedback through digital polls (D:2, 220518). At the medical e-library, used to working with digital tools for teaching and meetings, the librarians experienced a higher acceptance for digital forms of teaching from healthcare staff. The librarians believe that the main change caused by the pandemic ultimately concerns the healthcare staff: “we do have the same way [to communicate] with our colleagues via Zoom or similar tools, but on the other hand, healthcare I believe has become much, much better” (C:2, 220504). The digital adaptation among healthcare staff contributed to the information resilience resource *providing and developing digital competence*, which is characterised by redundancy (Norris *et al.*, 2008) since digital methods enable necessary teaching for several purposes to occur, albeit in a new format. With the digital format “there is [also] an advantage that they can share their screen and show what they are doing, and you can supervise in the meantime” (C:1, 220429).

As healthcare staff could participate in teaching from their offices, several librarians experienced that the digital tools afforded a more suitable and less stressful learning environment for the participants (D:2, 220518). Consequently, librarians continued to use digital tools also for on-site teaching. One library manager reflects on the significant changes in teaching brought by the pandemic:

There are four librarians active and leading ten persons each in a discussion, or about an issue or something like that, and then we all gather again. If anyone had told me that three years ago then we would probably not have understood that we could have done that [...]. And I think that we have seen a fantastic development, really, and you realise that this is just as good, it is entirely appropriate. Physical meetings are good but people in healthcare, they don’t have the time (D:1, 220425).

The *new digital pedagogical methods*, a versatile resilience resource characterised by redundancy, meant that search instructions and training could be made more accessible and not connected to individual librarians. This resource in turn paved the way for the resilience resource *digital search instructions and teaching*, characterised by rapidity, enabling flexible support for healthcare staff regardless of place. The increased accessibility enabled by digital tools was already before the pandemic obvious to the hospital librarians in region C, working at a medical e-library (C:1, 220429). According to these librarians, healthcare staff in this region have equal access to library services since they provide digital services. For physical hospital libraries, the use of digital tools for teaching and search instructions has become permanent, unless a physical meeting is requested (B:1, 220419; B:2, 220422).

Previous research shows that the work of hospital librarians tends to be invisible to other parts of healthcare organisations (Hanell and Ahlryd, 2023). During the pandemic, some librarians experienced a new openness to communicating library news through the web, thereby making the hospital library services more visible (A:1, 220321). On the other hand, due to crisis management, regular forms of digital communication were altered:

There were crisis management on all our hospitals and then the normal ways of communicating don't work as usual and of course we were not prioritised, it's not strange, you understand that, so it got quite complicated how to reach our users (D:2, 220518)

Some hospital librarians received questions concerning electronic identification services, necessary for booking vaccinations in Sweden. These needs raised questions about the digital competence among users and one librarian noted how "digital competence is a very important part, that became very clear during the pandemic" (A:1, 220321). The resilience resource *providing and developing digital competence* is characterised by redundancy and contributes to information resilience through increasing the digital competence of healthcare staff, librarians, and patients, enabling greater individual and organisational flexibility.

Digital dissemination of scientific information

The main task for hospital libraries is supporting healthcare staff with relevant scientific information necessary to provide safe and equal healthcare (e.g. [Anderson et al., 2020](#); [Ayre et al., 2015](#); [Hanell and Ahlryd, 2023](#)). The pandemic caused an increased interest in e-health and there are several examples of hospital librarians organising health information for healthcare staff and patients. In region D, the librarians compiled a covid specific website during the beginning of the pandemic (D:2, 220518). The librarians thought it was crucial that they compiled this information and presented it to healthcare staff by *updating the local covid website*, a resilience resource that provides rapid access to trusted information sources. Notably, providing and maintaining trusted sources of information is a critical adaptive capacity contributing to resilience ([Norris et al., 2008](#)). The local website worked as a guide for healthcare staff, presenting the resources in certain categories, for example searches and clinical decision support. The librarians collected covid-related searches, such as covid treatment or covid testing, and made these available.

Overall, *use of electronic scientific resources* increased sharply, representing a resilience resource characterised by rapidity and redundancy that facilitates quick and flexible access to trusted, scientific information. A librarian working with journal subscriptions and databases, noted that during "the pandemic year 2020 usage increased with around 30% and you usually think that normally, it increases with a few percent" (C:1, 220429). However, the hospital library in Region C did not see any increase in requests for search instructions or any increase in demands for ordering articles. This may in part be explained by *open access provided by publishers* during 2020 to scientific publications concerning covid-19. This resilience resource, characterised by rapidity, meant that the librarians' work tasks mainly concerned finding and presenting the most relevant scientific findings to healthcare staff in their region rather than issues concerning access (D:2, 220518).

In region B and C, where hospital libraries are not integrated with an HTA-unit, questions concerning covid were notably absent, despite the severe pandemic situation. In region A, where the hospital library is organised together with an HTA-unit serving several regions, the hospital librarians worked hard with searches concerning covid, particularly during the first year of pandemic. The librarians at the HTA-unit needed to switch focus from regular, and often long-term, HTA-practices with several search assignments to one extensive search assignment, lasting throughout 2020, with daily reports produced.

Given the high number of questions concerning covid during the first year of the pandemic the librarians associated with the HTA-unit had to present the latest updates as the development was very rapid (A:3, 220331). The main challenge for the librarians at the HTA-unit was to construct a search string that could retrieve all relevant articles on Covid-19. Normally, the librarians use MESH-terms when constructing search strings, but during the first year of the pandemic, no MESH-term categorizing articles on Covid-19 existed. In fact, even the vocabulary to describe the virus shifted:

It was SARS, COV-19, it was New Coronavirus, it was Wuhan-virus, it was – there was no, not even a vocabulary that was consistent. So, we put together a search string to try and cover all these different terms in use (A:3, 220331).

Using the *comprehensive covid-search string*, the librarians added search phrases for the question submitted and then returned the search results to the clinic or clinician asking. This search string became a resilience resource that enabled rapid and efficient searches, in effect strengthening information resilience by collaboration. The librarians primarily looked for clinical studies, but since peer-reviewed scientific articles were not available during the beginning of the pandemic, the librarians provided detailed instructions with the full search results indicating any pre-prints and non-reviewed articles. They also instructed clinicians on how to set up their own searches to stay updated on new publications. The comprehensive covid-search string represents the most comprehensive search assignment to date. To help specialists to get an overview of relevant publications among the enormous number of publications available, the librarians ran the main covid-search string every day and added terms for treatment or medicines, and then screened “hundreds of hits every day” (A:3, 220331).

The HTA-unit received detailed directions from the specialists on how to conduct these daily searches. For example, the librarians were instructed to focus on articles concerning medical treatment of hospitalized patients, only articles in English, and to exclude articles concerning traditional medicine unless published in a high-impact journal. The retrieved search results were then to be sorted in three categories of articles, a classification also mirroring the perceived quality of the publication type among the clinicians: (1) systematic reviews or meta-analyses concerning Covid-19 treatment; (2) studies of treatment using control groups, with at least 10 actively treated patients; (3) other publications (for example non-systematic reviews, letters, editorials, or studies without control groups).

Since the HTA-unit normally compiles comprehensive and rigorously assessed HTA-reports, where trained librarians and medical experts together provide a systematic review of research and offer recommendations to clinicians, reports from the HTA-unit come with certain expectations (see [Ahlryd and Hanell, 2021](#)). As the work of the HTA-unit shifted from comprehensive and rigorous HTA-reports to weekly updates on new scientific publications, it was crucial to describe the type of report and how the credibility could be assessed. This transparency was particularly important since there were almost no peer-reviewed publications available during the beginning of the pandemic. To bridge the gap between available relevant scientific information and the urgent need for information among clinicians, the librarians adopted a new practice:

Something we did during the pandemic was that we began looking in MedArchive for pre-prints, that were not peer-reviewed, that we then sometimes included with a warning: this is not reviewed yet, but this is what we have (A:3, 220331).

This practice marked a shift in the work of the librarians working for the HTA-unit as HTA-work normally is characterized by rigorous control. Before the pandemic, reports from the HTA-unit did not include any pre-prints or other publications that had not passed through peer-review and reviews by HTA-supervisors, who screen publications for bias or other irregularities.

This long-lasting and demanding search assignment lasted throughout 2020, with reports including *updates on new scientific publications* sent out daily. This resilience resource, characterised by rapidity, offered access to trusted and efficient dissemination of scientific information. For the librarians, this task was taxing, and efforts were made to instruct healthcare professionals to monitor new publications on their own, but in the end, the librarians felt obliged to provide this service given the extreme situation as “a way to sort this enormous excess of information coming every day” (A:3, 220331). While the pandemic search

assignment demanded a lot of work, the efforts was highly appreciated by healthcare staff. While much information work of hospital librarians is characterised by low visibility, HTA-work provides visibility and recognition from clinicians (see also Hanell and Ahlryd, 2023). The comprehensive search assignment and the daily updates on new scientific publications arguably offered substantial contributions to both the information resilience within the healthcare organisation as well as the visibility and legitimacy of the hospital library.

Digital collaboration

As described above, communication through digital channels increased during the pandemic. In region D, three hospital libraries collaborate closely, through e-mail and other digital tools, something that intensified during the pandemic. The library manager in Region D notes that the pandemic made conventional boundaries less tangible; when librarians started working from home the geographical location became less important. After the pandemic, several librarians divided their time between two hospitals with teaching and meetings conducted online. The pandemic made physical location and organisational boundaries less important, in turn enabling new forms of collaboration. Increased flexibility and being used to change leave hospital libraries less vulnerable in the face of unexpected events, as librarians are prepared for *movement between teams and libraries*. This resilience resource, characterised by robustness, offers improved flexibility among librarians and in the organisation, and is related to the resource *tolerance for uncertainty and change* identified above, but arguably more tangible.

The small numbers of librarians working at each library enable close contact between colleagues to share experiences from digital teaching and search instructions. During the pandemic, internal meetings and informal conversations also moved online; breakfast meetings on Teams every morning became a valuable arena for hospital librarians when colleagues worked from home “both socially and for work-routines” (D:2, 220518). Meetings between collaborating hospital libraries similarly moved online, with clear benefits for the librarians:

Earlier, we actually travelled to each other, and we were like “which hospital should we meet at now?”. It was a given and it took almost three hours every meeting, including travelling time and all that, so the consequences for those serving in the information desk were severe, but now you can actually go online and then it’s half the time (D:1, 220425).

Digital internal meetings may lack opportunities for informal conversation and socializing, but they save travel time, climate emissions, and the library manager in region D also argues that meeting online is more professional, since digital meetings tend to be better prepared and focussed. This resilience resource contributes to information resilience through enabling collaboration with increased participation and rapid exchange of information. Resilience resources that help create a shared sense of meaning and reality are critical for the development of resilience (Norris *et al.*, 2008), since this is necessary to manage quick and challenging changes. In region D, the library manager describes new forms of meetings between libraries in the region, to share information while having coffee in front of the computer (D:2, 220518). However, teaching collaboration was limited since the hospital libraries offered their own courses. On the other hand, in region A the digital development during the pandemic enabled significant opportunities for coordination between the different hospital libraries in the region (A:1, 220321, A:3, 220331):

Suddenly, employees from the whole region could participate in teaching, otherwise it might have been necessary to travel to [the larger cities] to participate (A:1, 220321).

The librarians experienced that regional collaboration accelerated due to the pandemic situation, and when courses target healthcare staff in the whole region, it is more likely that

they will be well-attended. Three different hospital libraries in region A developed new forms of collaboration for teaching, planning, and coordinating teaching activities together. They had not offered digital teaching previously, and during the pandemic, the new pedagogical methods enabled a close collaboration: “there is not that much work when you divide it on three libraries, even though there is access for everyone” (A:2, 220322). *Collaboration and coordination of teaching*, a resilience resource characterised by robustness, contributes to information resilience through enabling collaboration with increased efficiency, improved coordination, and division of labour when it comes to organising teaching activities.

Another venue for collaboration, internationally and nationally, developed during the pandemic concerning *sharing information on search assignments*. This resilience resource is created through national and global collaboration with significant efforts being made across the world to systematize, present, and share information about new medical research, for example through weekly newsletters covering current research findings (A:3, 220331). For the medical e-libraries, already used to digital collaboration, new forms of collaboration with *collegial sharing of information and best-practice* were developed, such as organised digital visits during the pandemic. These resilience resources concerned with information sharing are characterised by robustness as they contribute to information resilience by promoting trust between colleagues and collegial learning, in effect developing a shared sense of meaning and reality among hospital librarians (cf. Norris *et al.*, 2008). In effect, this sharing of information enables higher quality and efficiency in the work of hospital librarians.

Table 1 shows an overview over information resilience resources and their primary attributes, connected to each theme as described in the text above. Each resilience resource is marked with (G) or (S) to reflect the category general or specified resilience.

Next, we turn to a discussion of the findings theme by theme and a theoretically informed overview, organised by theme, collecting challenges for the hospital library during the pandemic and ways to manage these challenges.

Discussion: developing information resilience

Framing information resilience as a process where adaptive information capacities are combined and utilized to enable functioning and adaptation after a disturbance (cf. Norris *et al.*, 2008), we now return to the research questions of this study. To answer the first and empirically oriented research question (*How can hospital libraries contribute to information resilience within the hospital organisation during a pandemic*), we have synthesized the resilience resources, or the adaptive capacities, used and developed by the hospital librarians and identified in the above analysis and organised them according to theme. The identified resilience resources provide several examples of creativity in the face of disruption when librarians had to create and navigate new information landscapes (cf. Lloyd, 2015).

In the first theme, *the closing of physical libraries*, two practical and concrete resilience resources are employed: *providing access for healthcare staff to library with key card*, and *circulation of books via internal mail*. These resources offer healthcare staff access to both the library room, and the opportunity to use library services independently, as well as access to printed books despite geographical distance. In this way, challenges, and barriers to providing hospital library services caused by the pandemic (see also Rhue, 2022) are countered with practical measures. Additionally, a resource connected to both psychological and organisational aspects is *tolerance for uncertainty and change*, essentially capturing the quality of flexibility among the staff.

The second theme, *digital adaptation of teaching and supervision*, includes three resilience resources. First, the adaptation to a new distribution form through *digital search instructions*

Theme	Resource	Attribute
The closing of physical libraries	Tolerance for uncertainty and change (G) Circulation of books (G)	Robustness Robustness, redundancy
Digital adaptation of teaching and supervision	Access to library with key card (G) Digital search instructions and teaching (G) New digital pedagogical methods (G) Providing and developing digital competence (G)	Rapidity Rapidity Redundancy Redundancy
Digital dissemination of scientific information	Open access provided by publishers (G) Use of electronic scientific resources (G) Updating local covid website (S) Comprehensive covid-search string (S)	Rapidity Redundancy, rapidity Rapidity Rapidity
Digital collaboration	Updates on new scientific publications (S) Movement between teams and libraries (G) Digital internal meetings (G) Collaboration and coordination of teaching (G) Collegial sharing of information and best-practice (G) Sharing information on search assignments (S)	Rapidity Robustness Rapidity, robustness Robustness Robustness Robustness

Source(s): Table by authors

Table 1.
Overview of
information resilience
resources and their
attributes

and teaching affords new ways to support healthcare staff. The adaptation of digital methods enabled hospital librarians to remain relevant partners in supporting access to scientific evidence during the pandemic (Chisita, 2020). Second, use of the new digital distribution form is developed through *new digital pedagogical methods*. Third, the hospital librarians developed new means for *providing and developing digital competence*.

In the third theme, *digital dissemination of scientific information*, five different resilience resources are identified. Two are directly concerned with access to scientific publications: *general open access provided by publishers*, enabling easier access to scientific information, and *use of electronic scientific resources*, providing access to e-books instead of printed books. Through *updating the local covid website* hospital librarians contributed to a trusted information source by continuously evaluating and publishing new scientific information about Covid-19 (see also Charney et al., 2021; Chisita, 2020; Pauwels et al., 2020). Since the lack of research on covid-19 in the beginning of the pandemic caused an interest in articles not peer-reviewed, this resource became important to healthcare staff following the demands for an evidence-based healthcare (cf. Teolis et al., 2021). The development of a *comprehensive covid-search string* created a resilience resource enabling more efficient searches, in particular for the HTA-work. Lastly, *daily or weekly updates on new scientific publications* meant that the HTA-unit instead of providing the conventional comprehensive HTA-reports offered swift and brief reports on a daily or weekly basis, paying particular attention to describing the type of report made and how to assess the credibility and scientific impact. Previous research shows that the need for information increases during a crisis, creating an even more central role for hospital librarians during the pandemic (Donahue and Featherstone, 2013).

The fourth theme, *digital collaboration*, includes five identified resilience resources. The first is a *readiness to move between teams and libraries*, describing both a measure of flexibility among librarians as well as more flexible organisation in part made possible by the second resource, *digital internal meetings*. Through digital internal meetings, collaboration and sharing of information is facilitated – across previous geographical and/or organisational barriers. This brings us to the third resource, *collaboration and coordination of teaching*, enabling efficiency and better quality through coordinating teaching efforts, and the fourth resource, *collegial sharing of information and best-practice*. Through collegial sharing of

information and good advice, trust between colleagues is developed as well as collegial learning – both important for other resilience resources to function. Lastly, a specific form of information sharing, namely *sharing information on search assignments*, affords specific collegial learning and better efficiency and quality in supporting healthcare staff with complex search tasks. Overall, the pandemic provoked a quick digital development and transition for hospital libraries and several examples of new digital solutions and ways of working are found in our material, as well as in previous studies (Castek and Novak, 2020; Murphy *et al.*, 2022).

To answer the second, and theoretically oriented, research question (*How can resilience theory and the concept information resilience be used within LIS to inform an analysis of libraries' resilience with both an organisational and informational focus?*) we begin by stating that the information resilience resources outlined above are combined and linked together to meet certain specific challenges (in particular the closing of physical libraries) or to enable certain new practices (such as digital teaching and supervision). For example, *digital internal meetings* facilitate both better collaboration and coordination of teaching, as well as the development of new digital pedagogical methods. To further our analytical understanding of libraries' resilience, from both an organisational and informational perspective, we also need to attend to the nature of specific information resilience resources. Norris *et al.* (2008) assert that resilience requires both specific resources and resources with specific attributes, namely robustness, redundancy, and rapidity. The attribute robustness refers to strength and ability to handle disorder without significant resource deterioration. Redundancy entails the degree of substitutability if disruption or resource deterioration occurs. Rapidity refers to how quickly a certain resource can be accessed and used. Furthermore, resilience resources can be categorized in terms of general or specified resilience, depending on whether the capacity includes managing general uncertainty and the unexpected, or specific and expected events (Folke *et al.*, 2010).

In Table 2, we present an overview of the identified information resilience resources organised according to three aspects characterizing the resources' main contribution to information resilience: *access*, *flexibility*, and *collaboration*. Primary attribute and quality (how a certain resource contributes to information resilience) are described, and each resilience resource is marked with (G) or (S) to reflect the category general or specified resilience. Vårheim (2016, p. 2) describes resilience as reinforced human systems adjusting to external constraints "through learning processes, modifying or changing systems and thereby strengthening the response to factors threatening system survival". With the below overview, we show how the information resilience resources employed by the hospital librarians can be described with three aspects that together contribute to "system survival": *access*, *flexibility*, and *collaboration*. *Securing continued access to trusted sources of information* despite external constraints is a key component of information resilience (cf. Norris *et al.*, 2008, see also Anderson *et al.*, 2020); connected to both robustness and redundancy, several resilience resources provide *better flexibility* in how work is organised, for example through avoiding dependency on individual librarians and increased readiness to transcend organisational and practical barriers; *learning and collaborating together* to rapidly develop new ways of teaching, searching and providing access to information resources illustrates how (information) resilience resources contribute to develop a shared sense of meaning and reality (Norris *et al.*, 2008) and increased trust between colleagues.

Concluding remarks

Our findings show how the accelerated transition of hospital library services to digital forms as a response to the pandemic situation represents the main change of the pandemic years (cf. Castek and Novak, 2020; Murphy *et al.*, 2022). Hospital librarians found themselves in a new

Aspect	Quality	Resource	Attribute	Theme
Access	Access to printed books	Circulation of books (G)	Robustness, redundancy	The closing of physical libraries
	Access to library room	Access to library with key card (G)	Rapidity	The closing of physical libraries
	Access to scientific information	Open access provided by publishers (G)	Rapidity	Digital dissemination of scientific information
	Access to scientific information	Use of electronic scientific resources (G)	Redundancy, rapidity	Digital dissemination of scientific information
	Trusted, efficient dissemination of scientific information	Updates on new scientific publications (S)	Rapidity	Digital dissemination of scientific information
Flexibility	Flexible staff	Tolerance for uncertainty and change (G)	Robustness	The closing of physical libraries
	Support for healthcare staff regardless of place	Digital search instructions and teaching (G)	Rapidity	Digital adaptation of teaching and supervision
	Search instructions and training more available and not connected to individual librarians	New digital pedagogical methods (G)	Redundancy	Digital adaptation of teaching and supervision
	Increased digital competence among healthcare staff, librarians, and patients	Providing and developing digital competence (G)	Redundancy	Digital adaptation of teaching and supervision
Collaboration	Flexibility among librarians and in the organization	Movement between teams and libraries (G)	Robustness	Digital collaboration
	More efficient searches	Comprehensive covid-search string (S)	Rapidity	Digital dissemination of scientific information
	Increased participation, rapid exchange of information	Digital internal meetings (G)	Rapidity, robustness	Digital collaboration
	Efficiency, improved coordination and division of labor	Collaboration and coordination of teaching (G)	Robustness	Digital collaboration
	Trust between colleagues, collegial learning	Collegial sharing of information and best-practice (G)	Robustness	Digital collaboration
	Collegial learning, increased quality in support for healthcare staff, efficiency	Sharing information on search assignments (S)	Robustness	Digital collaboration

Table 2. Overview of information resilience resources organised according to aspects and quality

Source(s): Table by authors

environment during the pandemic, where they needed to find their way through unpredictable difficulties. In the unexpected circumstances caused by the pandemic, we find that hospital librarians through developing and employing resilience resources providing access, flexibility, and collaborative learning contribute to information resilience within the healthcare organisation, in essence enabling people to rebuild and navigate new

information landscapes in times of uncertainty and change (cf. Frelas and Burnett, 2014; Lloyd, 2015). Most of the resilience resources have a general utility and should prove to make hospital libraries more robust and useful in the future, and better prepared for coming challenges – pandemic or otherwise. Additionally, the information resilience resources outlined above will likely improve the visibility of hospital libraries within hospital organisations and the trusted sources of information they offer, something that previous research frames as a main challenge for hospital libraries (Hanell and Ahlryd, 2023). For practitioners and policy makers, these insights should be considered when hospital library services are planned and developed, in terms of staff planning, media resources and library activities.

For future resilience-oriented research within LIS, the above analysis of information resilience presents a novel way to study resilience in the library sector, that takes into account the capacity of an organisation to make decisions and carry out critical functions during a crisis (cf. Bruneau *et al.*, 2003). Previous LIS-research on resilience typically focus on individuals or on communities: Lloyd (2015) analyses information resilience by focusing on individuals' information practices, whereas Vårheim (2017) and Grace and Sen (2013) analyse resilience through emphasising the library community's role in contributing to resilience. Adding to these analytical approaches, the present study contributes to knowledge about information resilience by analysing resilience on an organisational level, thus analytically positioning information resilience inbetween previous individually focussed studies and community-focussed research. Our findings suggest that using information resilience as a lens and utilizing the framework for analysing information resilience developed in this study is fruitful for studying the resilience of libraries from both organisational and informational aspects. Similar to Vårheim (2016), we see a need for future studies that develop the use of resilience theory within LIS further by studying other forms of libraries and other types of unexpected disturbances thereby adding to our knowledge of how libraries may contribute to information resilience.

Note

1. <https://www.who.int/data/stories/the-true-death-toll-of-covid-19-estimating-global-excess-mortality>

References

- Ahlryd, S. and Hanell, F. (2021), "Documentary practices of hospital librarians in evidence-based medicine: the example of health technology assessment in Swedish healthcare", *Proceedings from the Document Academy*, Vol. 8 No. 2, doi: [10.35492/docam/8/2/12](https://doi.org/10.35492/docam/8/2/12).
- Ahlryd, S. and Hanell, F. (2024), "Information literacy practices of hospital librarians in an era of evidence-based medicine", in Kurbanoglu, S., Spiranec, S., Boustany, J., Ünal, Y., Şencan, İ., Kos, D., Grassian, E., Mizrahi, D. and Roy, L. (Eds), *Information Experience and Information Literacy. ECIL 2023. Communications in Computer and Information Science*, Springer, Cham, Vol. 2042, pp. 223-235.
- Anderson, I., Grahm, H. and Vikingson, A. (2020), "Library liabilities in the time of corona: three hospital libraries' experiences at the heart of the pandemic in Sweden", *Journal of EAHIL*, Vol. 16 No. 3, pp. 25-30, doi: [10.32384/jeahil16419](https://doi.org/10.32384/jeahil16419), available at: <http://ojs.eahil.eu/ojs/index.php/JEAHIL/article/view/419>
- Ayre, S., Barbrook, J., Engel, C., Lacey, P., Phul, A., Stevenson, A. and Toft, S. (2015), "Measuring the impact of information skills training: survey of health libraries in England", *Health Information and Libraries Journal*, Vol. 32 No. 1, pp. 50-60, doi: [10.1111/hir.12079](https://doi.org/10.1111/hir.12079).
- Bruneau, M., Chang, S.E., Eguchi, R.T., Lee, G.C., O'Rourke, T.D., Reinhorn, A.M., Shinozuka, M., Tierney, K., Wallace, W.A. and Von Winterfeldt, D. (2003), "A framework to quantitatively

- assess and enhance the seismic resilience of communities”, *Earthquake Spectra*, Vol. 19 No. 4, pp. 733-752, doi: [10.1193/1.1623497](https://doi.org/10.1193/1.1623497).
- Cacioppo, J.T., Reis, H.T. and Zautra, A.J. (2011), “Social resilience: the value of social fitness with an application to the military”, *American Psychologist*, Vol. 66 No. 1, pp. 43-51, doi: [10.1037/a0021419](https://doi.org/10.1037/a0021419).
- Castek, J. and Novak, A. (2020), “Hospital library puts a digital spin on outreach during pandemic”, *Journal of Hospital Librarianship*, Vol. 20 No. 4, pp. 368-375, doi: [10.1080/15323269.2020.1823306](https://doi.org/10.1080/15323269.2020.1823306).
- Charmaz, K. (2008), “Constructionism and the grounded theory method”, in Holstein, J.A. and Gubrium, J.F. (Eds), *Handbook of Constructionist Research*, Guilford, New York, pp. 397-412.
- Charney, R., Spencer, A. and Tao, D. (2021), “A novel partnership between physicians and medical librarians during the COVID-19 pandemic”, *Medical Reference Services Quarterly*, Vol. 40 No. 1, pp. 48-55, doi: [10.1080/02763869.2021.1873617](https://doi.org/10.1080/02763869.2021.1873617).
- Chaturvedi, K. (2017), “Evidence-based library and information practice & educational needs of health librarians: national and international trends”, *DESIDOC Journal of Library and Information Technology*, Vol. 37 No. 1, pp. 24-29, doi: [10.14429/djlit.37.1.10653](https://doi.org/10.14429/djlit.37.1.10653).
- Chisita, C.T. (2020), “Libraries in the midst of the coronavirus (COVID-19): researchers experiences in dealing with the vexatious infodemic”, *Library Hi Tech News*, Vol. 37 No. 6, pp. 11-14, doi: [10.1108/lhtn-03-2020-0022](https://doi.org/10.1108/lhtn-03-2020-0022).
- de Fremery, W., Buckland, M.K. and Le Deuff, O. (2022), “Resilient information science”, *Proceedings of the Association for Information Science and Technology*, Vol. 59 No. 1, pp. 559-560, doi: [10.1002/pr2.626](https://doi.org/10.1002/pr2.626).
- Donahue, A. and Featherstone, R. (2013), “New roles for hospital librarians: a benchmarking survey of disaster management activities”, *Journal of the Medical Library Association*, Vol. 101 No. 4, pp. 315-318, doi: [10.3163/1536-5050.101.4.014](https://doi.org/10.3163/1536-5050.101.4.014).
- Dong, B. (2023), “A systematic review of the organizational resilience literature and future outlook”, *Frontiers in Business, Economics and Management*, Vol. 8 No. 3, pp. 86-89, doi: [10.54097/fbem.v8i3.7728](https://doi.org/10.54097/fbem.v8i3.7728).
- Egeland, M. (2015), “Hospital librarians: from consumer health to patient education and beyond”, *Journal of Hospital Librarianship*, Vol. 15 No. 1, pp. 65-76, doi: [10.1080/15323269.2015.982944](https://doi.org/10.1080/15323269.2015.982944).
- Folke, C., Carpenter, S.R., Walker, B., Scheffer, M., Chapin, T. and Rockström, J. (2010), “Resilience thinking: integrating resilience, adaptability and transformability”, *Ecology and Society*, Vol. 15 No. 4.
- Frelas, M. and Burnett, S. (2014), “Resilience: a knowledge-based perspective”, working paper series, Vol. 7 No. 1, Aberdeen Business School, Robert Gordon University, Aberdeen.
- Grace, D. and Sen, B. (2013), “Community resilience and the role of the public library”, *Library Trends*, Vol. 61 No. 3, pp. 513-541, doi: [10.1353/lib.2013.0008](https://doi.org/10.1353/lib.2013.0008).
- Hanell, F. and Ahlryd, S. (2023), “Information work of hospital librarians: making the invisible visible”, *Journal of Librarianship and Information Science*, Vol. 55 No. 1, pp. 70-83, doi: [10.1177/09610006211063202](https://doi.org/10.1177/09610006211063202).
- Hansson, J. (2019), *Educating Librarians in the Contemporary University: An Essay on iSchools and Emancipatory Resilience in Library and Information Science*, Library Juice Press, Sacramento.
- Harnegie, M. (2021), “COVID snapshot: how medical libraries and staff adapt to deliver services during a pandemic”, *Journal of Hospital Librarianship*, Vol. 21 No. 2, pp. 173-183, doi: [10.1080/15323269.2021.1904184](https://doi.org/10.1080/15323269.2021.1904184).
- Hersberger, J. (2010), “Resilience theory, information behaviour and social support in everyday life”, *paper presented at the Proceedings of the Canadian Association for Information Science*, University of New Brunswick and St Thomas University, Fredericton, New Brunswick, June 2-4.

- Kosciejew, M. (2021), "The coronavirus pandemic, libraries and information: a thematic analysis of initial international responses to COVID-19", *Global Knowledge, Memory and Communication*, Vol. 70 Nos 4/5, pp. 304-324, doi: [10.1108/gkmc-04-2020-0041](https://doi.org/10.1108/gkmc-04-2020-0041).
- Lloyd, A. (2014), "Building information resilience: how do resettling refugees connect with health information in regional landscapes—implications for health literacy", *Australian Academic and Research Libraries*, Vol. 45 No. 1, pp. 48-66, doi: [10.1080/00048623.2014.884916](https://doi.org/10.1080/00048623.2014.884916).
- Lloyd, A. (2015), "Stranger in a strange land; enabling information resilience in resettlement landscapes", *Journal of Documentation*, Vol. 71 No. 5, pp. 1029-1042, doi: [10.1108/jd-04-2014-0065](https://doi.org/10.1108/jd-04-2014-0065).
- Mishler, E.G. (1988), *Research Interviewing: Context and Narrative*, Harvard University Press, Cambridge, MA.
- Murphy, J.E., Lewis, C.J., McKillop, C.A. and Stoeckle, M. (2022), "Expanding digital academic library and archive services at the University of Calgary in response to the COVID-19 pandemic", *IFLA Journal*, Vol. 48 No. 1, pp. 83-98, doi: [10.1177/03400352211023067](https://doi.org/10.1177/03400352211023067).
- Norris, F.H., Stevens, S.P., Pfefferbaum, B., Wyche, K.F. and Pfefferbaum, R.L. (2008), "Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness", *American Journal of Community Psychology*, Vol. 41 No. 1, pp. 127-150, doi: [10.1007/s10464-007-9156-6](https://doi.org/10.1007/s10464-007-9156-6).
- Pauwels, N.S., De Meulemeester, A., Romagnoli, A., Buysse, H. and Peleman, R. (2020), "Medical and health informatics services during and after the COVID-19 pandemic should be virtual, tailored, responsive and interactive: a case study in Belgium", *Health Information and Libraries Journal*, Vol. 38 No. 1, pp. 66-71, doi: [10.1111/hir.12330](https://doi.org/10.1111/hir.12330).
- Ponis, S.T. and Koronis, E. (2012), "Supply chain resilience? Definition of concept and its formative elements", *The Journal of Applied Business Research*, Vol. 28 No. 5, pp. 921-935.
- Rhue, D.J. (2022), "Hospital libraries: past, present and future", *Medical Reference Services Quarterly*, Vol. 41 No. 3, pp. 296-303, doi: [10.1080/02763869.2022.2097850](https://doi.org/10.1080/02763869.2022.2097850).
- SFS (2017), *Hälsa- Och Sjukvårdsdrag*, Socialdepartementet, Stockholm, p. 30.
- Sollenberger, J.F. and Holloway, R.G. (2013), "The evolving role and value of libraries and librarians in health care", *The Journal of the American Medical Association*, Vol. 310 No. 12, pp. 1231-1232, doi: [10.1001/jama.2013.277050](https://doi.org/10.1001/jama.2013.277050).
- Sullo, E. and Brody, S. (2021), "Providing information to support COVID-19 pandemic response: academic medical librarians' roles in creating an intelligence report", *Medical Reference Services Quarterly*, Vol. 40 No. 1, pp. 23-34, doi: [10.1080/02763869.2021.1873613](https://doi.org/10.1080/02763869.2021.1873613).
- Teolis, M., Poletti, E., Creazzo, J., Steele, F., Castelli, D. and Mokonyama, J. (2021), "Hospital librarians meet the challenges of the COVID-19 pandemic", *Medical Reference Services Quarterly*, Vol. 40 No. 4, pp. 408-420, doi: [10.1080/02763869.2021.1987805](https://doi.org/10.1080/02763869.2021.1987805).
- Vårheim, A. (2016), "A note on resilience perspectives in public library research: paths towards research agendas", *Proceedings from the Document Academy*, Vol. 3 No. 2, 12, doi: [10.35492/docam/3/2/12](https://doi.org/10.35492/docam/3/2/12), available at: <https://ideaexchange.uakron.edu/docam/vol3/iss2/12>
- Vårheim, A. (2017), "Public libraries, community resilience, and social capital", *Information Research*, Vol. 22 No. 1, CoLIS paper 1642.
- Weeks, A., Houk, K., Nugent, R., Corn, M. and Lackey, M. (2020), "UNLV health sciences library's initial response to the COVID-19 pandemic: how a versatile environment, online technologies, and liaison expertise prepared library faculty in supporting its user communities", *Medical Reference Services Quarterly*, Vol. 39 No. 4, pp. 344-358, doi: [10.1080/02763869.2020.1826197](https://doi.org/10.1080/02763869.2020.1826197).
- Willis, C.A. and Gassaway, J. (2018), "Implementing a patient portal: the role of a hospital librarian", *Journal of Consumer Health on the Internet*, Vol. 22 No. 2, pp. 177-187, doi: [10.1080/15398285.2018.1451153](https://doi.org/10.1080/15398285.2018.1451153).

Zarocostas, J. (2020), "How to fight an infodemic", *The Lancet*, Vol. 395, p. 676, 10225, doi: [10.1016/S0140-6736\(20\)30461-x](https://doi.org/10.1016/S0140-6736(20)30461-x).

Zhang, Y. and Wildemuth, B.M. (2017), "Qualitative analysis of content", in Wildemuth, B.M. (Ed.), *Applications of Social Research Methods to Questions in Information and Library Science*, Libraries Unlimited, Santa Barbara, CA, pp. 318-329.

Corresponding author

Sara Ahlryd can be contacted at: sara.ahlryd@lnu.se