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Postprint of Case Studies of North American Libraries' Response to Major Public Health Emergencies in the Past Century

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Abstract

[Purpose/Significance] Responding to major public health emergencies constitutes an important component of emergency services in North American libraries, and research and analysis of typical cases of emergency measures implemented by North American libraries can provide valuable reference for the development of future emergency service mechanisms in libraries. [Method/Process] From a historical perspective spanning different periods, this study selects and analyzes typical cases of public libraries, academic libraries, special libraries, and library associations in North America responding to three major epidemic infectious diseases—the 1918 influenza pandemic, the 2003 SARS outbreak, and the 2019 COVID-19 pandemic—and reviews the characteristics of emergency services provided by North American libraries in response to major public health emergencies. [Results/Conclusion] Throughout history, North American libraries have provided information services that met the needs of their contemporary social contexts during major public health emergencies, assuming roles such as implementers of community epidemic prevention, disseminators of health information, protectors of vulnerable populations, and strong supporters of scientific research in the "battle against the epidemic." In terms of library management concepts, service methods, and emergency mechanisms—including remote library operations, digital transformation, cross-boundary integration, and a "unified global approach" to epidemic prevention—these experiences offer valuable insights for future emergency service management models in libraries.

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Full Text

A Typical Case Study of North American Libraries Responding to Major Public Health Emergencies in the Past Century

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Abstract:
[**Purpose/Significance**] Responding to major public health emergencies constitutes an important component of emergency services in North American libraries. Research and analysis of typical cases of emergency measures implemented by these libraries can provide valuable references for the development of future emergency service mechanisms in libraries. [**Method/Process**] From a historical perspective, this study selected and analyzed typical cases of public libraries, university libraries, professional libraries, and library associations in North America responding to three major epidemic diseases: the 1918 influenza pandemic, the 2003 SARS outbreak, and COVID-19. The study employed literature review, expert interviews, and case study methods to examine service approaches and types across different library categories, exploring the emergency service models of North American libraries in different historical periods. [**Result/Conclusion**] Throughout history, North American libraries have provided information services that met the epidemic prevention and information needs of diverse reader groups within their contemporary social contexts. These libraries have assumed roles as community epidemic prevention implementers, health information disseminators, protectors of vulnerable groups, and strong supporters of scientific research in the "war against epidemics." Their operational concepts, service methods, and emergency mechanisms—including remote opening, digital transformation, cross-field integration, and a "unified global chessboard" approach to epidemic prevention—offer important insights for future library emergency service management models.

Keywords: North America; library; major public health emergency; influenza; SARS; COVID-19
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Introduction

Over the past century of world history, North American libraries have consistently met the epidemic prevention and information needs of diverse reader groups whenever global infectious disease outbreaks have occurred [1]. North America has experienced three major public health emergencies: the 1918 influenza pandemic during World War I, when American library emergency services were marked by the dual demands of wartime information and psychological support for epidemic prevention; the 2003 SARS outbreak, when North

American libraries began providing public health information via the Internet, initiating innovative practices for librarians' involvement in social epidemic information organization and dissemination; and the COVID-19 pandemic since 2019, which has given rise to a normalized service model of "closed but operational" against the backdrop of rapidly evolving global network information environments.

To explore the strategies, characteristics, and roles of North American libraries in responding to major public health emergencies across different historical periods, this study comprehensively examined typical cases from public libraries, professional libraries, university libraries, and library associations in North America. Using literature review, expert interviews, and case study methodologies, the research analyzed service approaches and types across library categories to investigate emergency service models during these crises.

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2. North American Libraries in Major Public Health Emergencies

2.1 The 1918 Influenza Pandemic In 1918, a massive outbreak of influenza of unknown origin shocked the world and rapidly spread to the United States, China, Spain, the United Kingdom, and numerous other countries. By 1920, approximately one billion people had been infected globally. With inadequate medical and health conditions at the time, the death toll exceeded 40 million, including over 500,000 in the United States alone [2]. As fatalities mounted, the U.S. government implemented strict surveillance and isolation measures, forcing many libraries to restrict access or close entirely after executing isolation orders. Within just a few months, libraries transformed from sanctuaries into health hazards [3]. Library books were considered breeding grounds for bacteria, and some library staff fell ill or even died [4].

Even after reopening, libraries had to limit borrowing due to staff shortages and increased user demand, resulting in an average 10% decline in circulation. The Kansas City Public Library and Seattle Public Library closed due to quarantine measures, while some professional library meetings in Iowa were suspended [4]. The Oregon Portland Library remained open but removed seating to prevent gatherings. The New York Public Library never closed, but usage dropped sharply. Table 1 summarizes the opening status of selected North American public libraries during the 1918 pandemic.

Occurring during World War I, the pandemic exacerbated wartime chaos, with fear of both disease and war permeating the air. Library emergency services manifested in three primary areas: First, supporting community epidemic prevention by repurposing library buildings for epidemic-related projects, such as providing meeting spaces and work areas for volunteers [3]; second, providing wartime information to meet increased demand from new immigrants for war-related information services; and third, offering learning spaces where reading

activities helped dispel the psychological shadows of war, particularly for residents of major urban centers who began recognizing the value of libraries.

The St. Louis Public Library exemplifies these efforts. During the initial outbreak, it closed all reading rooms and meeting halls in its main building and branches, prohibiting entry for those under sixteen. Children, eager to read, gathered at library entrances morning and evening, asking adults to borrow books on their behalf. St. Louis librarians provided nearly 800 books daily, with one branch even displaying a truckload of books at its entrance for children to borrow. As the epidemic spread rapidly, the library was forced to close entirely. After closure, adults became more dependent on library services, prompting the library to set up a desk at the entrance displaying popular reference books for adult readers [4]. The library's opening and closing deeply affected every reader during wartime, strengthening their reliance on library services.

2.2 The 2003 SARS Outbreak In March 2003, SARS spread globally, with 8,422 confirmed cases and 919 deaths across 32 countries and regions, from Southeast Asia to Australia, Europe, and North America [5]. On March 14, the United States activated its National Emergency Operations Center [6], and on April 23, the WHO listed Toronto as a SARS-affected area, placing Ontario under a public health emergency. During the SARS crisis, North American libraries created special columns on their websites, posting SARS-related information and links to inform readers about prevention recommendations and guidelines for library resource usage during the special period. Specific service methods are shown in Table 2 .

Library associations played crucial roles during this period. The American Library Association and the Canadian Library Association held multiple conference calls [7] and decided to proceed with their annual conference in Toronto from June 19-25, 2003, discussing how to address SARS challenges to the North American library community [8]. The conference initiative "Librarians Without Borders" not only guided epidemic response efforts at the time but also laid the foundation for future North American library exchanges and cooperation [9]. Association activities continued uninterrupted, with the American Library Association and Canadian Publishers Association planning to hold book exhibitions as scheduled, considering the needs and expectations of the library community, over 140 publishers, and 20,000 exhibitors [10].

During the SARS outbreak, North American libraries successfully pioneered innovative practices for librarians' involvement in social epidemic information organization and dissemination. In the early stages, SARS represented not only a health crisis but also an information crisis [11], posing significant challenges to health information institutions. As the virus's transmission methods were initially unclear, Toronto became a focal point of controversy regarding whether the epidemic was under control and whether travel to the city was safe. Citizens wanted to know how to protect themselves and their families. Libraries provided public health information via the Internet. The Toronto Public Library,

for example, offered health information services including print and electronic resources, as well as telephone and email reference services for those unable to visit in person. The Toronto Public Health System Library sent epidemic prevention information to emergency call centers [12]. This successful practice of librarian involvement in epidemic information dissemination laid the foundation for the improvement of North American library health information service networks and future collaboration between libraries and the medical industry during major public health emergencies.

2.3 The 2019 COVID-19 Pandemic COVID-19, which emerged in 2019, spread with extreme speed and transmissibility to over 200 countries and regions worldwide, with North America becoming one of the most severely affected areas. On January 31, 2020, with nearly 10,000 confirmed cases globally, the United States declared COVID-19 a "public health emergency" (PHE). By March 15, global cases exceeded 150,000, and by April 1, 30 U.S. states had declared "major disaster" status. Confirmed cases exploded globally, reaching over 10 million by June 30, with more than 500,000 deaths, including over 2.58 million confirmed cases in the United States and over 100,000 in Canada [13].

During the COVID-19 pandemic, North American libraries promptly implemented various cleaning, disinfection, and safety measures, such as providing hand sanitizer and cleaning supplies and disinfecting books and computer keyboards daily. The American Library Association posted news, policies, education, and guidelines for libraries responding to the pandemic on its website. The Association of Research Libraries updated COVID-19 news and resources daily to help librarians carry out prevention and control efforts [19]. Beyond physical health, libraries also cared for readers' mental health. The Vancouver Public Library established physical and mental health columns, linking to professional organizations such as the Canadian Health Foundation, British Columbia Psychological Association, Canadian Mental Health Association, and Mental Health Commission of Canada to help people experiencing fear, grief, stress, anxiety, or loneliness due to COVID-19 [20].

Although libraries temporarily closed, all services continued to operate in new ways for the public. Emergency service methods are shown in Table 3 .

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3. Case Analysis of Emergency Services in North American Libraries During Major Public Health Emergencies

As public spaces with high foot traffic and close contact, libraries face high risks of cross-infection among patrons and between patrons and staff during infectious disease outbreaks. As the first point of contact for patrons seeking health information, North American libraries implemented effective measures to ensure patron health and safety, including protecting physical and mental health, enabling zero-contact book borrowing, providing 24/7 digital resources,

innovating online activities, and offering online teaching resources, giving rise to new remote service models.

3.1 Protecting Patron Physical and Mental Health In the early stages of the pandemic, the American Library Association promptly updated epidemic prevention resources, providing measures and guidelines for patrons to reduce infection risks and for library staff to disinfect workplaces. The Association of Research Libraries released new coronavirus news and resources, updating daily to help librarians implement COVID-19 prevention and control [19]. Beyond physical health, libraries also addressed mental health concerns. The Vancouver Public Library created physical and mental health columns, linking professional organizations to connect people in need with qualified mental health professionals and trained volunteers, offering digital resources, online seminars, and one-on-one video exchanges to help youth and elderly individuals cope with negative emotions [20]. The American Library Association compiled mental health resources, linking to the American Psychological Association and the Substance Abuse and Mental Health Services Administration, providing guidance on managing COVID-19-related fear and anxiety [14].

3.2 Zero-Contact Book Borrowing During the COVID-19 crisis, libraries eliminated due dates for returned items and library card expirations, implementing new remote service methods such as telephone reservations, scan-and-deliver, and zero-contact borrowing. These special measures helped resolve patrons' confusion about being locked out of libraries indefinitely. The Vancouver Public Library launched book pickup and delivery services, offering "takeout-style" borrowing for mobility-impaired and elderly patrons. Readers could submit requests online, librarians would select books or movies based on the requests, and patrons could collect materials at scheduled times and locations by presenting their library cards or ID [21]. The Sierra Madre Library provided paid telephone services and safe-distance book delivery [22]. Staff collected and organized requested materials, notified patrons by phone, and patrons would place their library cards on an outdoor table and wait in a designated area while staff, wearing gloves, verified the card and book numbers before delivering materials at a safe distance.

University libraries such as Harvard, the University of New Mexico, Cornell, and the University of Minnesota [23] offered HathiTrust services, providing digital copies of print materials and emergency temporary online access to copyrighted books. The Brooklyn Public Library recommended activities for patrons at home: reading e-books, browsing newspapers and magazines, listening to BPL podcasts, learning new languages, or acquiring new software, business, or creative skills [24].

3.3 24/7 Digital Resources The Iowa Library promoted online e-book and audiobook resources to patrons. The San Francisco Public Library promised

"free 24/7 access from home as if you were in the library" [25], allowing cardholders to freely use e-books, audiobooks, digital magazines, streaming movies, research databases, newspapers, and courses around the clock [26]. The New York Public Library offered over 300,000 free e-books and helped patrons obtain library cards or SimplyE digital reading cards, with digital resources including audiobooks and databases available to all age groups [27]. Harvard Library provided over 49,000 free books from Project Gutenberg [28]. The University of Minnesota Library offered unique and rich digital archival collections [23].

The Los Angeles Public Library provided 24/7 digital resource services including e-books, audiobooks, courses, newspapers, magazines, and TV, movie, and music streaming, along with internet and social media services [15]. Patrons could access library digital resources for free through various platforms like OverDrive's Libby [29]. Harvard's open access repository supported research by Harvard community members. The Digital Public Library of America opened its catalog of periodicals, indexes, and search engines, providing online access to books, maps, photos, audio, video, and other digitized historical materials from libraries, archives, and museums [30]. The University of Wisconsin-Madison Library provided remote access to e-books, journals, databases, and media, creating online video tutorials and guides, with its digital collections (UWDC) opening millions of images, books, maps, and records from Wisconsin and worldwide [31].

3.4 Innovative Online Activities During the pandemic, major North American libraries conducted rich online activities for children and adults, covering most regular library programs. These included not only storytimes, book clubs, English corners, job lectures, and vocational skills training, but also hands-on creative activities such as building blocks, plant cultivation, dissecting vintage keyboards, dismantling cassette tapes, making batteries from potatoes, homemade pizza, online creative competitions, Lego challenges, creative live sharing, virtual beer tastings, and cake decorating competitions [32]. The American Library Association's Public Programs Office organized STEM activities for children to do at home [32].

The Vancouver Public Library updated live activities daily, allowing patrons to participate in Zoom video conferences for online communication with librarians or watch recorded videos on Facebook [33]. The San Francisco Public Library offered numerous online learning opportunities including job skills training, one-on-one tutoring, and homework help [25]. The Brooklyn Public Library recommended activities for children and teens: listening to librarians' stories, learning about future career options, discovering different cultures, preparing for SAT and other exams, understanding climate change and other social issues, preparing materials for youth writing competitions, and learning about the 2020 census with family [24].

3.5 Providing Online Teaching Resources To prevent COVID-19 transmission, North American universities canceled face-to-face instruction and shifted to remote teaching. The American Library Association recommended keeping WiFi accessible during closures while providing hotspots, e-books, online magazines, and news for teachers and students engaged in online instruction [15]. The Association of College and Research Libraries' *Standards for Libraries in Higher Education* (2011) established professional guidelines for teaching resource development and services, providing industry-level guidance for libraries responding to emergencies [34].

University libraries established electronic reserves and course guides on their websites. The University of Waterloo Library created teaching support columns to facilitate online instruction, midterms, finals, and thesis defenses [35]. Harvard Library added "Working Off-Campus" and "Finding Resources Online" sections to its homepage, offering three specific services: help for teachers on conducting remote instruction, help for students on participating in remote courses, and help for administrative staff on remote work [36]. The Washington University Library, while closed, continued assisting faculty and students with remote access to online resources and 24/7 support, providing guidance on online education resources and "online training vs. equivalent courses" to ensure instructional continuity [37]. The University of Central Florida Library served remote teaching by providing remote teaching toolkits for faculty, remote learning toolkits for students, and remote work toolkits for administrative staff [38]. San Francisco Public Library youth services librarians supervised high school students' remote learning activities, including online courses and school assignments, while providing remote guidance on using library collections [39].

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4. Characteristics of Emergency Services in North American Libraries During Major Public Health Emergencies

Across different historical periods, North American libraries responding to major public health emergencies have assumed the roles of community epidemic prevention implementers, health information disseminators, protectors of vulnerable groups, and strong supporters of scientific research in the "war against epidemics."

4.1 Community Epidemic Prevention Implementers After closing, North American libraries dedicated their spaces, buildings, and staff to community epidemic prevention, becoming steadfast executors of government and community policies and playing invaluable roles in both online and offline community services. Libraries helped children, elderly individuals, students, homeless persons, and other community members access various epidemic prevention and life information. The San Francisco Public Library used some of its public spaces for emergency care facilities for children of frontline COVID-19 parents and low-income families, offering 120 emergency youth care slots

for students in grades 9-12 from medical worker and San Francisco epidemic prevention staff families [39]. The University of Wisconsin Library donated N95 masks and personal protective equipment (PPE) to the University of Wisconsin Medical School [40]. The Toronto Public Library lent 3D printers to hospitals to print face shields for medical staff [41]. The El Dorado County Library in California provided 700 face shields for medical workers and collaborated with the El Dorado Job Community Foundation to print face shields for local and county hospitals using its large 3D printing lab [42].

4.2 Health Information Disseminators Since the outbreak, American public and academic libraries have created COVID-19 resource columns on their websites, established epidemic prevention guides, and organized various online "epidemic combat" activities and health lectures. To ensure equal information access for different language groups, North American public libraries created bilingual webpages and provided COVID-19 prevention knowledge in multiple languages. The New York Public Library website offered links in Chinese, Polish, Japanese, Portuguese, Hindi, Pakistani, and other languages to publicize COVID-19 prevention and control information for New York citizens [43].

The American Library Association responded to COVID-19 misinformation by compiling authoritative news and providing reliable information sources and guides such as the World Health Organization and CDC [14]. The U.S. National Library of Medicine's MedlinePlus provided epidemic prevention information in English, Chinese, Spanish, and other languages, while the U.S. Public Health Media Library created a COVID-19 column with various digital resources and the Public Health Image Library provided epidemic prevention videos and images [44]. The Iowa Library recommended CDC social media toolkits, online press kits, and NPR children's coronavirus comics [16]. The San Francisco Public Library and Brooklyn Public Library advised patrons to seek the latest reliable information from vetted sources such as WHO, CDC, NYC Department of Health, and California Department of Public Health. The San Francisco Public Library's FAQ section promoted COVID-19 prevention measures: "Wash your hands with soap and water for at least 20 seconds; cover your coughs and sneezes; don't touch your face; try alternatives to handshakes like elbow bumps or waves; monitor your health and follow public health officials' instructions if you've recently returned from other countries, states, or regions; limit going out and avoid large gatherings…" [39].

4.3 Protectors of Vulnerable Groups North American libraries have served as protectors of vulnerable groups during global public health crises. As shelters reached capacity or closed during the pandemic, libraries became informal daytime shelters for homeless or housing-unstable individuals. California Governor Gavin Newsom stated early in the pandemic that he expected 60,000 homeless individuals in California alone could contract coronavirus [45]. The director of the Marshall County Memorial Library in Tennessee and president of the Association for Rural and Small Libraries, Pearson, noted: "The library

is full of elderly people. We don't have more homeless shelters or other places for them to stay during the day." Seattle librarian D. Brixey, who has worked in public and academic libraries for 20 years, said they lend not only books but also baking materials, power tools, and general supplies—all necessities of life [45].

Libraries provide free resources and services including internet access, epidemic prevention materials, and psychological counseling for children, elderly individuals, economically disadvantaged persons, and low-income families, serving as a "protective umbrella" for the spiritual lives of vulnerable groups. The American Library Association advocates for equal information access for all, helping impoverished and homeless individuals overcome barriers to information acquisition and library use regarding education, employment, and housing, and urging state library agencies to address issues of illiteracy, isolation, discrimination, and prejudice [46]. The Rochester Public Library in Minnesota opened a telephone hotline and provided daytime shelters for homeless individuals [23]. The Los Angeles Public Library provided information on jobs, food, and housing near library branches to help homeless residents transition to stable, independent living [47]. The Surrey and Burnaby libraries offered free access to food and home delivery information services for people in home isolation, low-income groups, or those with physical vulnerabilities [33].

4.4 Strong Supporters of Scientific Research in the "War Against Epidemics" To support scientific research in the "war against epidemics," American public libraries, academic libraries, and research institutions have opened COVID-19 research findings, opened medical data websites, and established academic navigation guides. The U.S. National Library of Medicine launched a special column publishing COVID-19 clinical research data [48]. The Harvard Library Office for Scholarly Communication tracked COVID-19 research in Harvard's open access repository DASH, providing researchers with remote resource access guides for coronavirus research [49]. The Washington University Library website linked to COVID-19 updates from various campus libraries, coronavirus fact data resources, and COVID-19 research guides [37].

American libraries collaborated with professional databases and commercial websites such as PubMed, Elsevier, ProQuest, Wiley, IGI Global, and ACS Publications to provide remote open access services. The ProQuest Public Health Database, medical databases, and nursing academic resource databases opened access to news information and research results on the novel coronavirus [50], while Wiley freely opened over 5,000 research articles related to COVID-19 to support diagnosis, treatment, and prevention [51].

5. Implications of Emergency Services in North American Libraries During Major Public Health Emergencies

5.1 The Role of Library Value in Major Public Health Emergencies As major infectious diseases spread rapidly through complex transmission routes, North American libraries implemented various closure methods to protect patron and staff health. Notably, library closures immediately created chain reactions in surrounding communities. During the 1918 pandemic, local St. Louis newspapers recorded that "once residents could not access the library, they realized its value" [4]. As R. Salazar, director of the San Antonio Public Library and president of the Public Library Association, stated, "When patrons consider the library as the center of their lives, they discover how important it is" [45].

Under the severe strain of rapidly spreading COVID-19, North American libraries prioritized patron and staff health and safety above all else. Harvard Library made protecting the physical health of patrons and staff its primary principle for epidemic response [52], with the deputy director and university librarian Martha Whitehead stating: "We pride ourselves on putting users first and have always strived to provide the best service for our community" [53]. The San Francisco Public Library website declared: "Your health and safety is our priority" [53], while the Los Angeles Public Library stated: "Protecting your safety is our top priority" [15]. The British Columbia provincial government website wrote: "Public libraries are the heart of diverse communities" [33]. These statements demonstrate that libraries play important roles during major public health emergencies and continue to gain recognition, as evidenced by the U.S. Stafford Act's inclusion of library value during disasters.

5.2 Digital Reading and Remote Consultation as the Safest and Most Convenient Antidote With many libraries forced to close and patrons unable to access physical materials, North American libraries utilized advanced network technologies to conduct online reference consultations and provide extensive digital content and robust remote digital services. From increased streaming digital reading to hosting online reading conferences, from online reference consultations [54] to digital collection access, from asking librarians questions to remote teaching information, from Zoom subscriptions to developing podcasts and online debates, digital reading and remote consultation became the safest and most convenient antidotes.

Harvard Library saw weekly emails to librarians increase from 92 to 149 compared to the same period last year, while chat interactions with librarians rose from 46 to 166—nearly a fourfold increase [55]. The University of New Mexico Library completed over 700 chat services during March and April, with 36% from graduate students, 14% from faculty, and the majority from undergraduates, while also answering 1,659 library FAQs [56]. Harvard Library opened e-book purchasing services for faculty and students, while Scribd provided patrons with free access to millions of e-books, audiobooks, and magazine articles

[57]. As Scribd founder and CEO T. Adler stated in a declaration: "Reading can provide incredible comfort: it can reduce anxiety, make us feel more successful, and even happier" [57].

5.3 Cloud Service Models with Temporal-Spatial Separation Enable Rapid Implementation of "Internet + Library" The COVID-19 pandemic spurred the largest-scale online service in world history, suddenly and comprehensively testing libraries' ubiquitous service concepts and making information space an important survival space for patrons. A new model of remote library opening emerged in North America, including zero-contact delivery (curbside delivery), the HathiTrust project, online seminars, themed book displays, free mobile WiFi services (bookmobile), and scan-and-deliver services [41]. These emergency online services enabled remote borrowing of physical resources and seamless access to digital resources. This cloud service model, unrestricted by time or space, rapidly implemented the "Internet + Library" concept, transforming library service objects from temporal-spatial unity to separation and shifting patron information acquisition from passive to active.

Open learning shortened regional differences in digital resources, with massive and fragmented knowledge resources providing methods and pathways for patrons to actively obtain information resources. Patron behavioral data, temporal flexibility, social network relationships, and resource sharing [58] facilitated dynamic information acquisition, making lifelong learning service a new industry norm. New research topics emerged, including open access intellectual property protection, elimination of digital divides, mobile emergency services, digital resource preservation, classified management of librarians and patrons, and scientific decision-making in resource acquisition based on precise data, process data, and multi-dimensional data.

5.4 Cross-Border Collaboration and a "Unified Global Chessboard" Approach to Epidemic Prevention Become Trends Epidemics know no borders, and cross-border collaboration among libraries, medical institutions, and historical research institutions, along with a "unified global chessboard" approach to epidemic prevention, has become an unstoppable trend [59]. As early as 2001, Ontario public libraries in Canada developed a strategic vision statement that repeatedly mentioned the importance of public libraries to citizen health and well-being [11]. In recent years, collaborative projects between North American medical and library communities have increased. For example, in 2007, Washington State University Library in Pullman published an online collection titled "The 1918 WSU Influenza Pandemic," containing 114 precious materials from university archives describing the 1918 pandemic's impact on the university [60]. Virginia Tech and the National Library of Medicine in Bethesda, Maryland, held a 1918 pandemic seminar to promote research, education, and public service, while the NLM History of Medicine Division collaborated with Virginia Tech's history department on historical epidemic research [61].

Librarians possess unique advantages and potential value in providing, disseminating, and evaluating the best health epidemic prevention electronic information, particularly medical librarians who can use professional medical knowledge and resources to judge information quality. The library community has gradually become a cross-border collaborator with the medical and historical research communities. As the saying goes, "Stones from other hills can polish jade." Over the past century, world history has undergone major changes, and the library community has experienced unprecedented rapid transformation driven by overwhelming new technological revolutions. For over 100 years, libraries have kept pace with major changes in human information technology, continuously advancing with the times and innovating themselves. The iteration of new knowledge dissemination pathways such as co-construction and sharing, group learning, and network communities confirms that libraries are growing organisms [62]. Traveling through the tunnel of time, from public libraries, professional libraries, and university libraries to library consortia, examining the service concepts, service models, and service mechanisms of North American libraries in responding to major public health emergencies throughout history can not only witness the responsibilities and missions of physical libraries, digital libraries, and virtual libraries in different historical periods but also provide references for China's library community to formulate emergency plans, management schemes, service standards, and effectiveness evaluation systems for responding to major public health emergencies.

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Note: Figure translations are in progress. See original paper for figures.

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