



April 2016

LIBRARY SERVICES FOR THOSE WITH DISABILITIES

Additional Steps Needed to Ease Access to Services and Modernize Technology

Accessible Version

Why GAO Did This Study

NLS, within the Library of Congress (LOC), provides free audio and braille materials for U.S. citizens and residents who cannot read standard print due to visual and other disabilities. In fiscal year 2016, the NLS program received about \$50 million in federal funds to provide these materials through a national network of libraries. The House report accompanying the fiscal year 2016 legislative branch appropriations bill included a provision for GAO to review NLS's users and the technology it employs to meet their needs.

GAO examined (1) the characteristics of NLS users and the steps NLS is taking to ensure eligible individuals' access and awareness, and (2) how NLS provides materials and the extent to which it is considering emerging trends in technology. GAO reviewed relevant federal laws and regulations, NLS documents, and administrative data; interviewed NLS officials, librarians from 8 of the 101 network libraries selected for geographic diversity and a range in the number of users, and officials from research and advocacy groups and assistive technology companies; and reviewed literature on NLS-eligible populations and trends in assistive technologies.

What GAO Recommends

Congress should consider authorizing NLS to provide its users devices for reading electronic braille files. In addition, GAO recommends that NLS re-examine its eligibility certification requirements, evaluate its outreach, and assess alternative approaches to delivering audio content. LOC generally agreed with these recommendations.

View [GAO-16-355](#). For more information, contact Daniel Bertoni at (202) 512-7215 or bertonid@gao.gov.

LIBRARY SERVICES FOR THOSE WITH DISABILITIES

Additional Steps Needed to Ease Access to Services and Modernize Technology

What GAO Found

The National Library Service for the Blind and Physically Handicapped (NLS) is primarily used by older adults with visual disabilities, and NLS has taken some steps to ensure eligible users' access to and awareness of available services. In fiscal year 2014, about 70 percent of the program's 430,000 users were age 60 and older and almost 85 percent had visual disabilities, according to the most recent NLS data available at the time of GAO's review. Federal regulations establish eligibility for NLS services for people with a range of disabilities. However, medical doctors must certify eligibility for people with reading disabilities such as dyslexia, which is not required for those with visual or physical disabilities. According to officials from network libraries and other stakeholder groups, the requirement for a doctor's certification is an obstacle to accessing services because of additional steps and costs to the individual. These officials and stakeholders said other professionals, such as special education teachers, are also positioned to certify eligibility for applicants with reading disabilities. GAO has previously noted the importance of disability programs keeping pace with scientific and medical advances. However, the certification requirement has remained largely unchanged for more than 40 years. NLS has taken steps to inform eligible groups about its services, such as partnering with other organizations that serve these groups, developing a new website, and distributing an outreach toolkit to network libraries. However, NLS has no plans to evaluate which outreach efforts have resulted in new users in order to ensure resources are used effectively—a key practice identified previously by GAO.

NLS offers materials to its users in a range of formats, but its efforts to adopt new, potentially cost-saving technologies are hampered by limitations in both its statutory authority and its analyses of alternatives. Users may choose to receive, through the mail, audio materials on digital cartridges or hard copy braille documents. Users may also choose to download audio and braille files from an NLS-supported website. During fiscal year 2014, 86 percent of users chose to receive audio materials on digital cartridges, according to NLS data. NLS officials said they would like to provide users with devices for reading electronic braille files, a faster and less bulky approach than braille documents, and per the agency's July 2015 analysis, could become more cost effective with technological advances. However, federal statute does not authorize NLS to use program funds to acquire and provide braille devices as it does for audio devices, which prevents the agency from taking advantage of technology that has the potential to reduce costs. NLS is also examining new technologies for audio materials but has not fully assessed available alternatives. For example, NLS is considering supplementing its collection of human-narrated audio materials with text-to-speech (i.e., synthetic speech) materials, which some evidence suggests could be produced more quickly and at a lower cost. However, NLS has not comprehensively compared the text-to-speech option to its current approach in order to make a decision on whether to move forward, as called for by GAO best practices for alternatives analysis. Without this analysis, NLS may miss an opportunity to meet its users' needs more efficiently and cost effectively.

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Abbreviations

ACS	American Community Survey
BARD	Braille and Audio Reading Download system
IDEA	Individuals with Disabilities Education Act
LOC	Library of Congress
NCLD	National Center for Learning Disabilities
NFB	National Federation of the Blind
NHIS	National Health Interview Survey
NLS	National Library Service for the Blind and Physically Handicapped
USPS	United States Postal Service

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April 4, 2016

The Honorable Shelley Moore Capito
Chairman
The Honorable Brian Schatz
Ranking Member
Subcommittee on Legislative Branch
Committee on Appropriations
United States Senate

The Honorable Tom Graves
Chairman
The Honorable Debbie Wasserman Schultz
Ranking Member
Subcommittee on Legislative Branch
Committee on Appropriations
House of Representatives

The National Library Service for the Blind and Physically Handicapped (NLS), within the Library of Congress (LOC), provides free, accessible reading materials for those who cannot read standard print. A substantial number of Americans have difficulty reading standard printed material due to visual and other types of disabilities. For example, according to one estimate, nearly 21 million Americans are blind or have visual disabilities.¹ Others may have trouble holding or handling a book due to conditions such as quadriplegia or paper allergies. The inability to read can have a significant impact on an individual's education, work capacity, and full integration in society. The program was authorized in 1931², and it received about \$50 million in federal funding in fiscal year 2016. U.S. citizens and residents with sufficiently severe visual or physical disabilities or reading disabilities resulting from organic dysfunction such as dyslexia and other learning disabilities are eligible for the NLS program. Headquartered in Washington, D.C., NLS operates in conjunction with a national network of state and local libraries that conduct outreach,

¹Centers for Disease Control and Prevention, *Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2012* (Hyattsville, MD: February 2014).

²Pub. L. No. 71-787, 46 Stat. 1487.

determine eligibility, and distribute reading materials. In addition, the United States Postal Service (USPS) receives funds to cover the costs of mailing these materials. The House report accompanying the fiscal year 2016 legislative branch appropriations bill included a provision for GAO to review NLS's services, including its user base and the technologies it has in place to meet users' needs.³

We examined: (1) the characteristics of NLS's users and the steps NLS is taking to ensure those eligible are aware of and have access to its services, and (2) how NLS provides materials to users and the extent to which it is considering emerging trends in technology.

To address these objectives, we reviewed relevant federal laws and regulations, as well as NLS documents including procedures, strategic planning documents, studies by external contractors on NLS's outreach and its braille program, and assessments of network library performance. We reviewed NLS administrative data for fiscal years 2010 through 2014, the most recent available at the time of our review, on the number of users, user demographics, and formats in which materials were provided. We assessed the reliability of these data by interviewing cognizant NLS officials and reviewing related documentation, and found the data to be sufficiently reliable for our reporting objectives. Additionally, we interviewed officials from NLS, LOC, and USPS. We also interviewed staff at 8 of NLS's 101 network libraries about topics including user demographics and NLS technologies. We interviewed librarians in the District of Columbia, Georgia, Illinois (two libraries), Massachusetts (two libraries), Oklahoma, and Washington state. We selected these libraries to achieve diversity in geographic location, number of users, and outreach practices. For example, we included some libraries that had piloted new outreach materials from NLS or changed their organizational structure in recent years. We also interviewed officials from a number of external stakeholder groups, including research and advocacy organizations for relevant disabled populations; other organizations that provide accessible reading materials; private companies that produce assistive technology for those with visual disabilities; and the CNIB Library, a private non-profit

³See H.R. Rep. No. 114-110 (2015), which accompanied H.R. 2250, 114th Cong.

library in Canada for those with visual and other disabilities.⁴ Finally, we reviewed select articles and reports on the demographics of NLS-eligible populations and trends in assistive technologies for these populations. To assess NLS's efforts to ensure access to its services and consider technological trends, we used criteria previously identified by GAO in the areas of disability evaluation, outreach, and alternatives analysis, as well as criteria for internal controls in the federal government.

We conducted this performance audit from June 2015 through April 2016 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

NLS operates a program that provides free reading materials for residents and citizens of the United States and its territories as well as U.S. citizens residing abroad who are generally unable to read standard print because of a visual or physical disability. Under its authorizing statute, the program may provide reading materials in braille, audio, and other formats, and since the 1940s, may provide devices for reproducing audio recordings.⁵ The types of materials that NLS provides include books, magazines, music scores and materials for music instruction. In addition, NLS users have access to over 400 state, national, and international audio and braille newspapers through Newsline, a telephone and internet-based

⁴ Specifically, we interviewed officials from these research and advocacy organizations: American Council of the Blind, American Foundation for the Blind, National Federation of the Blind (NFB), Blinded Veterans Association, National Center for Learning Disabilities (NCLD), and the Center for Applied Special Technology. We also interviewed officials from these organizations that provide accessible reading materials: American Printing House for the Blind, Bookshare, Learning Ally, and National Braille Press. We also interviewed officials from the private sector technology companies HIMS, Inc. and HumanWare.

⁵ Under federal law, it is not an infringement of copyright for authorized entities, including NLS, to reproduce and distribute certain published literary works in specialized formats for the use of blind and other persons with disabilities. 17 U.S.C. § 121.

service.⁶ The Free Matter for the Blind and Other Physically Handicapped Persons program, administered by USPS, assists NLS in circulating materials to its users. In fiscal year 2016, USPS had a budget of approximately \$55.1 million for free delivery of mail in the NLS program and certain other purposes. USPS delivered 43.9 million pieces of mail through the program during fiscal year 2015.

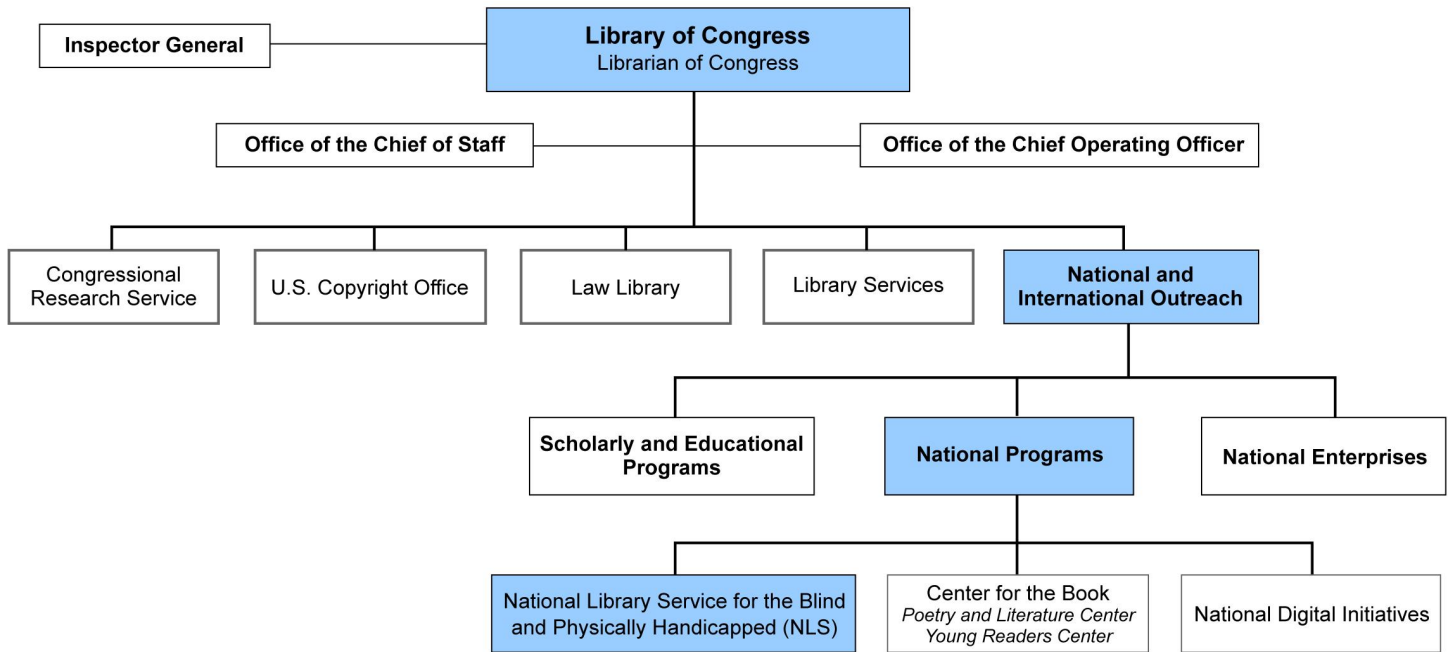
NLS's Structure and Administration

NLS is within the LOC's Office of National and International Outreach, under LOC's organizational structure effective Oct. 1, 2015 (see fig. 1). NLS receives its own congressional appropriation; however, LOC oversees the budget and activities of NLS and approves its budgeting decisions. For instance, if NLS's budgetary plan includes investing in a new technology initiative, it must submit a proposal for approval by LOC's Information Technology Steering Committee. LOC also oversees NLS's strategic planning process. NLS is currently in the process of developing its first comprehensive strategic plan, which NLS officials stated will be completed in fiscal year 2016.⁷ LOC will review this plan to ensure it aligns with LOC's overall strategic plan. In addition, LOC has oversight of NLS through processes such as monitoring, checks of internal control procedures, and performance management.

⁶In fiscal year 2016, the Library of Congress (LOC) received federal funding of approximately \$50.2 million for the program operated by NLS, which included \$650,000 that was specified to support a free newspaper service to blind and physically disabled residents. Regarding this latter amount, LOC has contracted with NFB, which operates Newsline with a combination of federal and state funds, to have NFB utilize those funds. According to NLS officials, NLS users qualify for the Newsline service because the qualification standards for both NLS and Newsline are identical, and eligible users can sign up for both services simultaneously.

⁷In the draft of this strategic plan, several broad priorities have already been identified, including increasing public awareness of the NLS program, increasing the quantity and variety of the materials available to users, and making options for the delivery of NLS reading materials more timely and user-friendly.

Figure 1: Organizational Structure of the Library of Congress



Source: Library of Congress. | GAO-16-355

Note: This figure is a simplified depiction of the relevant components of the Library of Congress's organizational chart.

Administration of the NLS program is shared between NLS headquarters and a national network of libraries and outreach centers. Headquarters is located in Washington, D.C., and its staff's functions and responsibilities include selection and production of reading materials, procurement of playback equipment, establishment of standards and assurance of quality products and services, and development, maintenance, and circulation of the specialized music collection. In addition, NLS relies on a network of 101 regional and sub-regional libraries and outreach centers to implement the program. Most states have one regional library participating in the network that is operated by the state or other entity. Some states also have sub-regional libraries that coordinate with the regional libraries to serve a specific geographical area, and are generally operated by public libraries. NLS network libraries conduct outreach to potential users; screen applicants for eligibility; provide customer service to users such as assistance with selecting an appropriate NLS device and identifying

preferred reading materials; store, maintain, and circulate NLS books and machines; and report to NLS on equipment, books, and users.⁸ The operating costs for these activities and services are not funded by NLS but rather by state, local, and other sources.

Populations Eligible for NLS

Under LOC regulations, the following four categories of individuals are eligible to access the NLS program:⁹

- **Blind**

This refers to persons whose visual acuity is 20/200 or less in the better eye with correcting glasses or who have a restricted field of vision.¹⁰

- **Visual Disability**

This refers to persons whose visual disability with correction prevents the reading of standard printed material.

- **Physical Limitation**

This refers to persons who are unable to read or unable to use standard printed material because of physical limitations.¹¹

- **Reading Disability Resulting From Organic Dysfunction**

This refers to persons who have a reading disability resulting from organic dysfunction that is severe enough to prevent them from reading printed material in a normal manner. An NLS factsheet states

⁸Additionally, there are Advisory and Outreach Centers that assist with outreach efforts on behalf of NLS and provide connectivity to the NLS automated circulation system; independent machine-lending agencies designated by NLS to circulate NLS devices; and two multistate centers that store and distribute playback equipment and supplies, specialized collections of materials, and back-up copies of the NLS collection.

⁹36 C.F.R. § 701.6.

¹⁰This category includes people whose wide diameter of visual field subtends an angular distance no greater than 20 degrees.

¹¹The term "physical limitation" is used in LOC's regulatory language. For the remainder of this report, all the disabilities in this category will be referred to as "physical disability."

such reading disabilities may include dyslexia, attention deficit disorder, autism, or developmental disabilities.¹²

Under the LOC regulations, a competent authority is required to determine the eligibility of all potential users. In cases of blindness, or visual or physical disabilities, a variety of professionals are permitted to certify an individual's eligibility, including doctors of medicine, registered nurses, therapists, social workers, and certain hospital staff, among others. In the absence of any of the competent authorities listed in the regulation, a professional librarian may approve eligibility. By contrast, in the case of those with a reading disability, the competent authority must be a doctor of medicine who may consult with colleagues in associated disciplines.

Estimates of the blind and visually disabled population vary widely, and the precise number who may be eligible for NLS is unknown. Estimates for this population are often based on self-reported information and rely on different definitions of blindness and visual disability. For example, according to the National Health Interview Survey (NHIS), in 2012 there were approximately 21 million adults ages 18 and older who reported that they had "trouble seeing."¹³ However, according to the American Community Survey (ACS), in 2013 there were approximately 7 million adults ages 18 and older who reported that they were blind or experienced "serious difficulty seeing."¹⁴

It is also difficult to estimate the number of people who would potentially qualify for the NLS program based on reading and physical disabilities. With regard to reading disabilities, a National Center for Learning Disabilities (NCLD) report estimated that in 2012 there were approximately 2.4 million public school students who qualified for special education programs under the Individuals with Disabilities Education Act

¹²The term "reading disability resulting from organic dysfunction" is used in LOC's regulatory language. For the remainder of this report, all the disabilities in this category will be referred to as "reading disability."

¹³Centers for Disease Control and Prevention, *National Health Interview Survey, 2012*.

¹⁴U.S. Census Bureau. *American Community Survey 2013, 1-Year Estimates (figure C18103)*. (Washington D.C.: 2015). Both the NHIS and ACS estimates report only numbers for non-institutionalized civilian adults and exclude those in long-term care facilities or prisons.

(IDEA) based on learning disabilities, and many of these students had reading disabilities specifically.¹⁵ In addition, according to the Survey of Income and Program Participation in 2010, there were at least 3.5 million adults ages 18 and older with learning disabilities, including reading disabilities such as dyslexia.¹⁶ Regarding physical disabilities, NLS officials said that the wide range in the types and severity of potentially qualifying conditions and the lack of centralized data make it difficult to estimate the population of potentially eligible users of the NLS program.

NLS Users Are Primarily Older Adults with Visual Disabilities, but NLS Efforts Are Not Ensuring Full Access and Awareness

¹⁵Candace Cortiella and Sheldon Horowitz, *The State of Learning Disabilities Report: Facts, Trends and Emerging Issues* (New York: National Center for Learning Disabilities, 2014).

¹⁶NCLD officials estimate that a much larger number of Americans—20 percent of adults and children—may have a learning disability. This estimate is based on a review of a number of research studies on this population.

Older Adults with Visual Disabilities Make Up the Majority of Users, though an Eligibility Requirement May Limit Access of Potential Users with Reading Disabilities

In fiscal year 2014, about 430,000 individuals used the NLS program, with the majority being older individuals who were blind or had other visual disabilities.¹⁷ The majority of NLS users were aged 60 and over (about 70 percent), with almost 20 percent at least 90 years of age (see fig. 2). In addition, almost 85 percent of NLS users were either blind or had other visual disabilities resulting in their inability to read standard print (see fig. 3).¹⁸ NLS officials told us that the majority of users have age-related vision loss and therefore did not qualify for services until later in life. About 6 percent of NLS users had physical disabilities, which include multiple sclerosis and Parkinson's disease, according to officials we spoke with from network libraries. Another nearly 6 percent of users had reading disabilities. NLS guidance explains, and network library officials corroborated, that users' reading disabilities generally include dyslexia, autism, and traumatic brain injuries. In part because of their older age, many users have physical dexterity issues which compound their other disabilities, according to NLS officials. Although NLS does not track users' mobility or dexterity limitations as part of its annual data collection efforts, a survey of users and non-users NLS contracted for in 2013 indicated that almost half of users had limited mobility, and about a third had problems with manual dexterity.¹⁹

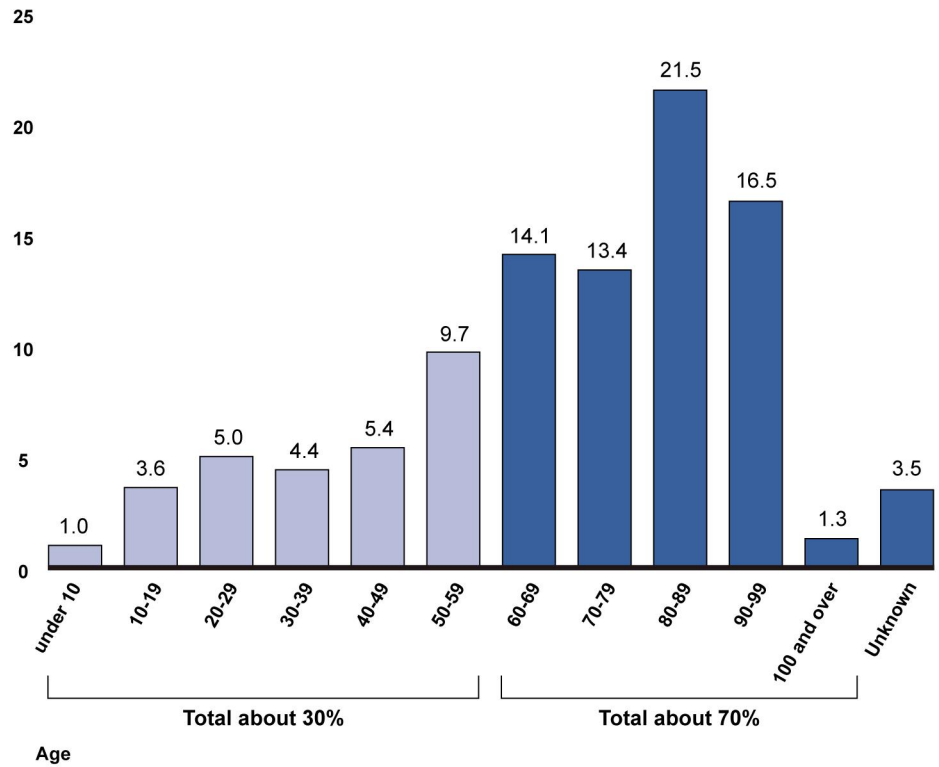
¹⁷NLS officials estimate that almost 200,000 additional people used the NLS program in fiscal year 2014 through loans to institutions such as nursing homes, schools, and hospitals.

¹⁸The specific types of disabilities that made users eligible for the NLS program remained consistent, with no type fluctuating more than 2 percent across the five fiscal years we reviewed (2010 through 2014).

¹⁹NLS contracted with ICF International to conduct a survey of current NLS users, former NLS users, and eligible non-users. The survey was conducted from March 11th to May 10th, 2013 and was offered in both web and telephone modes. Sample users were selected using a stratified random sampling approach and ICF determined that the results were generalizable to the full NLS user population. Completed responses were obtained from 2,517 individuals and the response rate for the sample of current NLS users was 28.9 percent (response rates could not be calculated for the other groups). See ICF Incorporated, L.L.C., *National Library Service for the Blind and Physically Handicapped (NLS) Talking Book and Braille Program Evaluation and Recommendations for Increased Patronage* (Virginia: June 28, 2013).

Figure 2: Age of NLS Users, on September 30, 2014

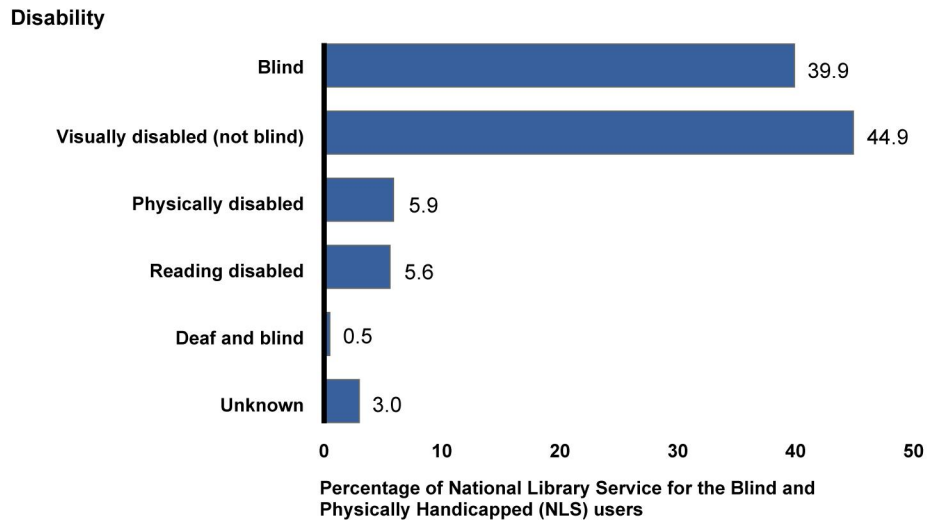
Percentage of users of National Library Service for the Blind and Physically Handicapped (NLS)



Source: GAO analysis of NLS data. | GAO-16-355

Note: These data are based on the number of users on Sept. 30, 2014, rather than a cumulative total for fiscal year 2014.

Figure 3: Distribution of Disabilities among NLS Users, on September 30, 2014



Source: GAO analysis of NLS data. | GAO-16-355

Note: These data are based on the number of users on Sept. 30, 2014, rather than a cumulative total for fiscal year 2014.

NLS's 2013 survey of users and non-users indicated that NLS users generally have retired from employment or are unemployed, have low or fixed incomes, and are more likely to live alone than non-users. In addition, 13 percent of the user respondents reported having served in the military.²⁰

The number of NLS users remained stable from fiscal year 2010 through fiscal year 2014, according to NLS data. NLS officials said they estimated about 10 percent turnover in their users each year. While they recruit new users, they said the number of older users who die each year generally results in the number of users staying about the same. Although NLS does not project user estimates for future years, the proportion of the U.S. population age 65 and older is expected to increase from 13 percent in

²⁰These data are not available over time as NLS does not conduct user surveys regularly. Although NLS inquires if applicants are veterans of U.S. military service, they do not track this data. Under LOC regulation, preference in providing reading materials and equipment must be given to the needs of the blind and other persons with disabilities who have been honorably discharged from the Armed Forces of the United States. 36 C.F.R. § 701.6(g).

2010 to more than 20 percent in 2050, which may increase the number of NLS's older users.²¹

While NLS serves individuals with a range of disabilities, an eligibility requirement specific to individuals with reading disabilities may hinder this group of potentially eligible users from accessing services. Specifically, the regulatory requirement that only doctors of medicine may certify a reading disability was cited as a barrier to services by staff with whom we spoke at 5 of the 8 network libraries, 2 organizations that provide similar services to NLS, and 2 organizations specializing in learning disabilities.²² This eligibility requirement, which originated in 1974 and has remained largely unchanged since, creates additional steps and costs for applicants with reading disabilities in comparison to other groups, and may hinder some individuals' access to services. For example, officials we spoke with from a network library said that many of their potential users have little money and live in rural areas that are far from doctors, which limits their ability to get the necessary certification.

Furthermore, a medical diagnosis is not necessary to determine if an individual has a reading disability, according to a number of groups we interviewed and the policies of other organizations that support people with these disabilities. According to staff we spoke with at two organizations specializing in learning disabilities, and 6 of the 8 network libraries, special education teachers and school staff are typically also knowledgeable about reading disabilities. Recognizing this, certification of reading disabilities is conducted by non-medical personnel for other disability services. For example, under IDEA educational services are provided to eligible children with disabilities, including learning disabilities, which may affect reading. However, IDEA does not require a doctor's certification of eligibility; this determination is instead made by the child's parents and a special education team generally comprised of the child's teacher and at least one other person qualified to conduct diagnostic examinations of children, such as a school psychologist or remedial reading teacher. In addition, two private organizations that, similar to NLS, provide individuals with alternatives to standard print materials, use

²¹GAO, *Older Adults: Federal Strategy Needed to Help Ensure Efficient and Effective Delivery of Home and Community-Based Services and Supports*, [GAO-15-190](#) (Washington, D.C.: May 20, 2015).

²²See 36 C.F.R. § 701.6(b)(2)(ii).

LOC regulations as guidance to determine the eligibility of individuals with disabilities except for reading disabilities. These organizations instead allow individuals who are deemed competent authorities for the other LOC eligibility categories by the organizations to certify for reading disabilities.

Although the eligibility requirement for those with reading disabilities may be inconsistent with other federal policies and with some entities' current practices, and potentially hinder access to services, NLS does not plan any modifications. Network libraries have formally recommended to NLS that it re-visit the requirement that a doctor certify the eligibility of those with reading disabilities. This is also consistent with our previous recommendations that agencies providing disability benefits and services should ensure they use up-to-date medical criteria, which reflect advances in medicine and technology and include consideration of non-medical evidence.²³ NLS officials said that changing the eligibility requirement for reading disabilities may lead to more users and increased costs. Two other organizations that provide similar services saw an increase in the number of users after they changed their certification requirements so non-medical personnel could certify eligibility. NLS has not estimated the potential demand for its services by those with reading disabilities, and so the actual effect on NLS services from revising the eligibility requirement is unknown.

NLS Is Initiating New Outreach Efforts, but Does Not Collect Information Needed to Evaluate Their Effectiveness

NLS's current users likely represent a small percentage of those eligible, but NLS has initiated new efforts to increase awareness and usage of its services. In 2014, NLS developed a plan for improving and expanding its outreach efforts. This plan is based, at least in part, on the recommendations from the 2013 survey of NLS users and non-users.²⁴ The efforts may help address outreach challenges reported to us by staff at the eight network libraries, including limited nationwide awareness, a lack of information in accessible formats, difficulty reaching the wide variety of potentially eligible populations, and a lack of guidance provided network libraries. NLS's efforts to improve outreach include:

²³GAO, *High Risk Series: An Update*, [GAO-15-290](#) (Washington, D.C.: Feb. 11, 2015).

²⁴ICF Incorporated, L.L.C., *Talking Book and Braille Program Evaluation and Recommendations for Increased Patronage*.

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- Increasing electronic recruitment methods: NLS has established additional electronic resources, including website announcements and advertisements through social media. For example, NLS developed a Facebook page and is developing a new website. These changes may increase nationwide awareness of services, which staff at 5 of the 8 libraries told us was needed.
 - Producing more information in accessible formats: NLS is developing videos for its website as well as talking guides on how to use its services. These guides are being developed specifically for older individuals to explain processes step by step. Previously, information on services was mostly provided via brochures and posters.
 - Fostering more partnerships: NLS is increasing communications with other organizations that serve its eligible populations. In October 2014, NLS sent e-mails to 300 organizations identified as serving people who may be eligible for its services, with the goal of partnering with these organizations and conducting outreach through them. According to officials, 150 organizations responded to this email and agreed to work with NLS. For example, veterans service organizations agreed to ensure veterans are informed about the program and encouraged to take advantage of its services.
 - Providing an outreach toolkit for network libraries: NLS recently released a toolkit providing guidance and materials such as customized posters and a webinar for librarians on how to effectively conduct outreach through partnerships, media, social media, and events. Staff at 6 of the 8 network libraries told us they wanted more guidance and assistance from NLS on outreach efforts such as these.

While NLS is making efforts to improve outreach, it has not collected information necessary to evaluate these efforts. NLS's plan and ongoing efforts to improve outreach address a number of best practices for outreach that we have previously identified, such as researching the target audience, identifying stakeholders, obtaining feedback, and using multiple approaches.²⁵ However, NLS has not developed a plan for assessing its outreach efforts, also a best practice we previously

²⁵GAO, *Social Security Disability: Additional Outreach and Collaboration on Sharing Medical Records Would Improve Wounded Warriors' Access to Benefits*, [GAO-09-762](#) (Washington, D.C.: Sept. 16, 2009).

identified.²⁶ Generally, NLS officials told us they will judge the success of these new outreach efforts by determining whether there have been increases in the overall number of users, the number of users in particular target categories, and the number of visits to their website. However, these measures will not inform NLS as to which efforts directly resulted in new NLS users, which would help NLS allocate resources to those that are most cost-effective. Although staff we interviewed at 3 of the 8 network libraries said they have tracked how users heard about their services for this purpose, NLS does not obtain such data centrally.

NLS Offers Materials in a Range of Formats, but Statutory and Other Limitations Impede Adoption of Potentially Cost-Saving Technologies

NLS Provides a Range of Reading Formats, but Most Users Choose to Receive Audio Materials Through the Mail

NLS offers its users several options for receiving both audio and braille reading materials, and the vast majority of NLS users choose to receive audio materials, primarily in the form of digital cartridges sent through the mail. NLS users may receive audio materials through the mail on digital cartridges or cassettes, download audio files from the Internet, receive hard copy braille documents through the mail, or download braille files from the Internet. According to NLS administrative data, almost 90 percent of NLS users received digital cartridges during fiscal year 2014, with the majority playing these cartridges on specialized audio devices provided by NLS, and a much smaller number using other, commercially-available devices.²⁷ (See fig. 4.) About a third of NLS users continued to

²⁶Such a plan would be consistent with best practices and communication strategies recommended to NLS as part of a market research study issued in 2014.

²⁷NLS only provides users its own specialized players, not commercially-available devices, according to agency officials.

receive cassettes through the mail, although this format is being phased out.²⁸ Downloading from the Internet was less popular than receiving materials through the mail, with only about 10 percent of NLS users downloading audio materials through NLS's online Braille and Audio Reading Download (BARD) system.²⁹ BARD enables eligible users to search for and select audio files for immediate download rather than wait to receive materials through the mail. These files may be transferred to a digital cartridge and played on NLS's specialized device, or downloaded directly to and played on a variety of commercially available devices, such as smartphones. A much smaller proportion of NLS users chose to receive braille materials, whether in hard copy or downloaded from BARD and read on a refreshable braille device that converts an electronic text file into braille characters.³⁰

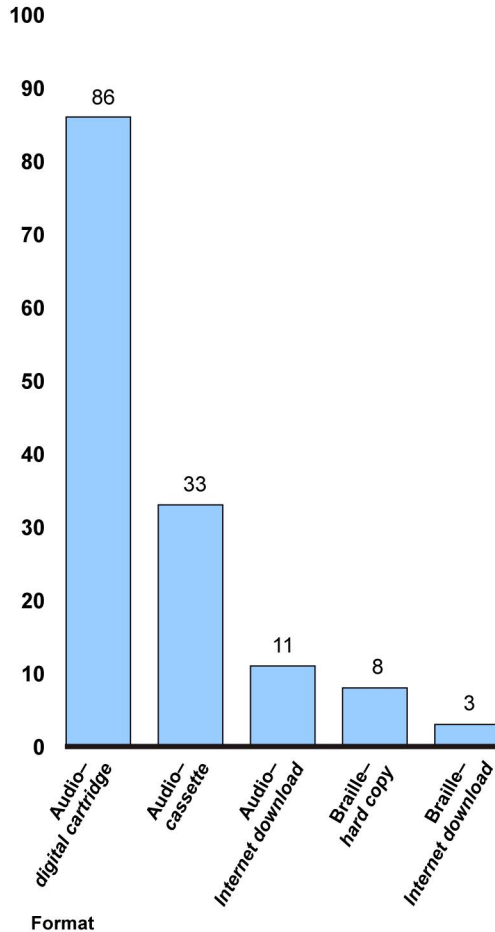
²⁸Before moving to its digital cartridges and players starting in 2009, NLS provided analog cassettes and cassette players. NLS is phasing out this technology and converting analog recordings to digital, but some users still listen to cassettes for certain content that is not yet available digitally.

²⁹BARD was introduced in 2007, and was upgraded in 2013 to consolidate two separate systems for downloading braille and audio materials. We do not report data for fiscal years prior to 2014 due to a change in how NLS reports data on downloads. According to NLS officials, prior to fiscal year 2014, NLS's data for audio downloads through BARD represented the number of users with BARD accounts who could potentially download materials. Starting with fiscal year 2014, according to NLS officials, the agency reported the number of users who actually downloaded audio materials. As a result of this change, trend data on the percentage of NLS users downloading materials through BARD are misleading.

³⁰Refreshable braille devices, currently available commercially, rely on piezoelectric technology, meaning electric currents raise and lower plastic pins that form braille characters. After one line has been read, the display is refreshed to provide the next line of characters. As discussed later in this report, NLS does not provide its users with such devices.

Figure 4: Percentage of NLS Users Accessing Reading Materials, by Format, Fiscal Year 2014

Percentage of National Library Service for the Blind and Physically Handicapped (NLS) Users



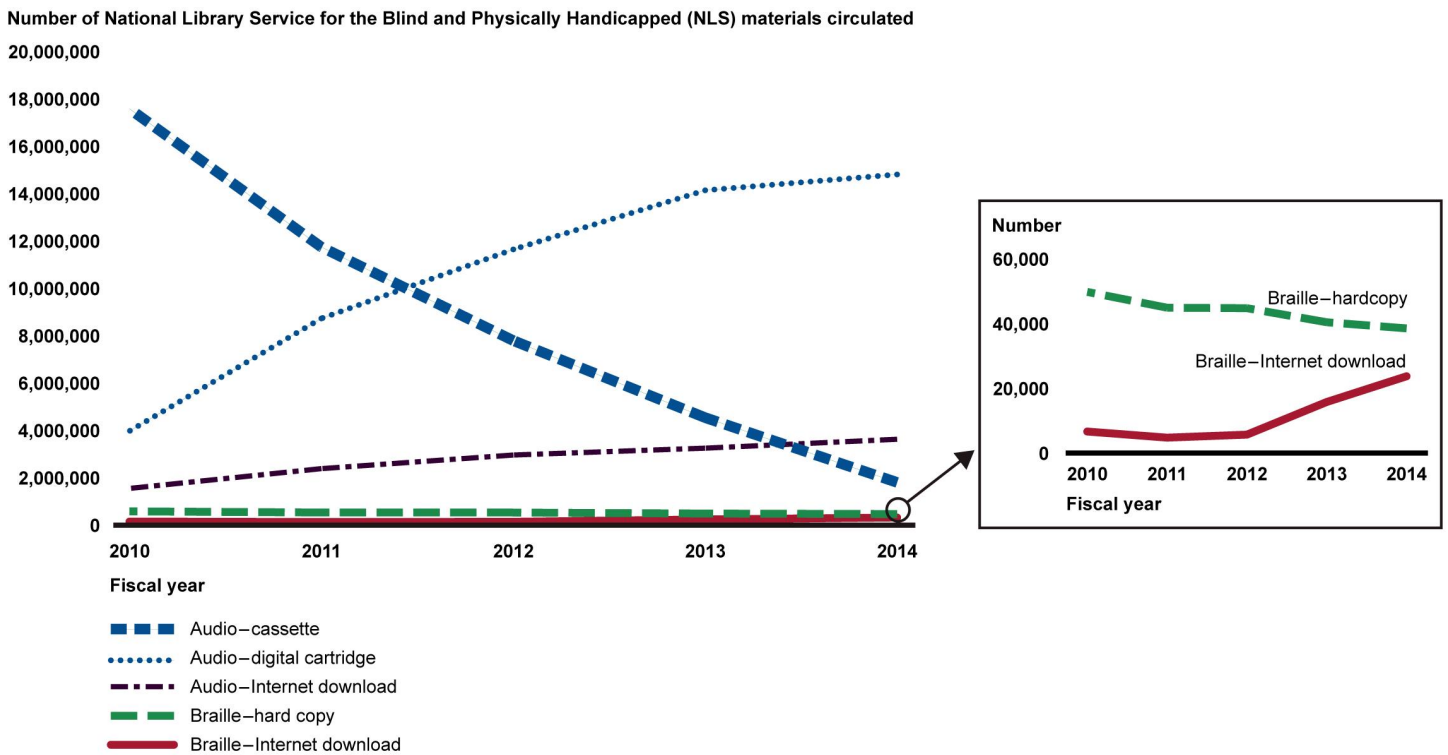
Source: GAO analysis of NLS data. | GAO-16-355

Note: Percentages do not add to 100 because NLS users may access reading materials through multiple formats during a fiscal year. This figure includes only users who were served in the United States by regional and sub-regional libraries. It excludes miscellaneous services, musical materials, and any materials sent to U.S. citizens living in another country.

Over the last 5 years, the majority of materials circulated to NLS users each year have been either digital cartridges or cassettes, although the number of items downloaded through BARD has been gradually increasing (see fig. 5). The number of digital cartridges has increased substantially since they were introduced in 2009, while the number of cassettes has declined as they are phased out. Meanwhile, the number of

audio files downloaded annually from BARD more than doubled between fiscal years 2010 and 2014. Among braille materials, there has been a shift away from hard copy to electronic braille.

Figure 5: Number of NLS Reading Materials Circulated to Users, by Format, Fiscal Years 2010-2014



Source: GAO analysis of NLS data. | GAO-16-355

Note: This figure includes only users who were served in the United States by regional and sub-regional libraries. It excludes miscellaneous services, musical materials, and any materials sent to U.S. citizens living in another country. Also, this figure does not include analog discs, as fewer than 100 discs were circulated annually to users in recent years.

Most users' preference for receiving materials through the mail and playing them on an NLS-provided specialized audio device appears to be linked to their level of comfort with technology and their access to the Internet, according to interviews and survey data. NLS designed the digital cartridges and players that provide users with audio books and magazines to be easy to see and handle for those with visual and other

disabilities.³¹ The program's mainly older users feel comfortable with NLS's specialized audio player because it is user friendly, according to staff at all 8 network libraries we contacted. For example, librarians in one state said many users like NLS's player because it is durable and easy to use, and many—especially those who lost their vision later in life—do not feel as comfortable using commercially available audio devices. At the same time, younger NLS users—a minority of the customer base—may prefer to use other devices, such as smartphones, to access NLS audio materials, according to staff we spoke with at 6 of the 8 network libraries. Staff in one library said younger users tend to be more sophisticated in their use of technology, and prefer to use smaller, mainstream devices rather than the NLS player. (See fig. 6 for an image of NLS's standard and advanced players and the commercial audio device which as of August 2015 had more registered NLS users than any other commercially available device.)

Figure 6: NLS Specialized Audio Players and a Commercially Available Audio Device



Source: GAO. | GAO-16-355

³¹For example, the NLS player has no functions other than playing digital cartridges and has built-in audio instructions. NLS offers both a standard and an advanced version of the device; the advanced version has some additional features, such as bookmarking and navigating, which allow users to skip to different parts of an audio book.

Furthermore, some users lack Internet access or do not feel comfortable downloading files from the Internet. According to NLS's 2013 user survey, about 40 percent of those not using BARD cited lack of Internet access as a reason. Staff at all 8 network libraries told us that many of their NLS users lack access either to the Internet or a computer. For example, staff in one library told us many of their NLS users have low incomes, or are older with fixed incomes, and many, especially in more rural areas, lack the high-speed Internet connection needed for BARD. According to NLS's 2013 user survey, about 50 percent of sampled users who do not use BARD said they lacked the computer skills to do so. Similarly, staff in all 8 network libraries we contacted said the process of downloading files from BARD onto a computer, and then transferring them to a cartridge that can be played on an audio device, is challenging for some users. For example, staff in one library said users have difficulty figuring out which folder to save downloaded files into on their computers. Recognizing this, NLS officials told us they expect in summer 2016 to introduce a new software application known as Media Manager intended to simplify the process of downloading from BARD onto a computer by handling a number of the steps automatically.

Meanwhile, the much lower use of braille compared to audio among NLS's customer base may, in part, reflect the rate of braille use among blind people in the United States overall as well as characteristics of NLS users. The precise number of blind and visually impaired people who use braille in the United States is not known, according to a study on braille by LOC's Federal Research Division³², as well as officials from two national organizations that produce braille materials and an assistive technology company we contacted. However, according to the LOC study, several estimates suggest that the proportion of blind and visually impaired Americans who use braille may be about 10 percent.³³ According to a research and advocacy group for the blind and an organization that produces braille materials, braille use declined after many blind students were moved from specialized schools for the blind, which are more likely

³²LOC Federal Research Division, *The Current State of Braille Literacy and Electronic Assistive Braille Technologies* (Washington, D.C: September 2014).

³³The study cites, for example, data indicating that approximately 14 percent of visually impaired students used braille as their primary or secondary form of reading during fiscal year 2014, and a study from the 1990s that found less than 10 percent of blind and visually impaired adults used braille.

to teach braille, into public schools.³⁴ Another factor that has impeded the wider use of braille, according to an organization that provides braille materials and an assistive technology company we contacted, has been the high cost of refreshable braille devices, which sell for \$1,000 to \$2,000 at a minimum. Beyond reflecting braille use in the wider population, NLS users' low use of braille may also reflect the specific demographics of the NLS population. Individuals who lose their vision later in life may be less likely to learn braille than those who were blind at an early age, according to staff from one library we contacted and a 2012 NLS report.³⁵

NLS's Efforts to Adopt New Technologies Are Hampered by Limitations in Its Statutory Authority and Analyses of Alternative Approaches

NLS is considering whether to adopt several new technologies for delivering braille and audio content to its users which have the potential to improve services and reduce costs. However, in one case—providing refreshable braille devices to its users—NLS's efforts are hampered by limitations in its authorizing statute, among other factors. In two other cases—developing an audio player with Internet connectivity and adding synthetic speech materials to its audio collection—the agency has not taken steps to assess the potential cost savings resulting from alternative approaches.

Refreshable Braille Devices

Promoting braille is one of the broad goals included in NLS's draft strategic plan for 2016 to 2020, and the agency believes providing braille electronically will help achieve that goal. According to a 2012 NLS report,³⁶ braille is the literacy medium for those who are blind and visually impaired, as unlike audio, it is a direct corollary to print and displays features of print, such as capitalization and punctuation. This view is consistent with those of several other organizations we contacted, including a research and advocacy organization serving people who are blind. There is also some evidence suggesting that blind people have

³⁴According to the U.S. Department of Education, as a result of IDEA—the precursor to which was enacted in 1970—the majority of children with disabilities are now educated in neighborhood classrooms with peers who do not have disabilities.

³⁵Library of Congress, *Report of the National Library Service for the Blind and Physically Handicapped* (Washington, D.C.: September 2012).

³⁶LOC, *Report of the National Library Service for the Blind and Physically Handicapped*.

better employment outcomes if they use braille.³⁷ NLS officials told us they believe that the ability to loan refreshable braille devices could attract more users to NLS. The agency has cited several advantages of this technology compared to hard copy braille, including that it is less bulky to store and transport and can be delivered more quickly to users.³⁸ (See fig.7 for images of a 13-volume hard copy braille book in NLS’s collection and an example of a refreshable braille device.)

Figure 7: Hard Copy Braille Book and a Refreshable Braille Device



Sources: GAO (hard copy braille book) and HIMS, Inc (refreshable braille device). | GAO-16-355

³⁷LOC Federal Research Division, *The Current State of Braille Literacy and Electronic Assistive Braille Technologies*.

³⁸LOC, *Report of the National Library Service for the Blind and Physically Handicapped*.

However, NLS is currently unable to provide refreshable braille devices to its users due to statutory language that limits its use of appropriated funds. Since the 1930s, the statute has authorized NLS to use appropriated funds to provide braille materials to its users. However, the statute does not allow NLS to use such funds to provide users with devices for reading electronic braille files.³⁹ Although the statute did not originally allow NLS to provide users with any playback equipment, in the 1940s it was amended to allow NLS to provide devices for playing audio materials. In 2015, the LOC submitted a request to the Committee on House Administration and the Senate Committee on Rules and Administration to amend the law to allow it to use appropriated funds to provide playback equipment for formats in addition to audio recordings, including refreshable braille devices. In November 2015, legislation was introduced in the House of Representatives that would amend the law to allow NLS to use appropriated funds to purchase and provide to its users playback equipment for braille materials, among other things.⁴⁰

The current cost of refreshable braille devices makes them cost-prohibitive for NLS; however, emerging technology may soon change that. As previously noted, several sources indicate that the current cost for these devices is about \$1,000 to \$2,000 at a minimum.⁴¹ According to one study we reviewed, the current technology used in these devices is effective, but it is also expensive to produce, in part because it relies heavily on manual assembly.⁴² However, efforts are underway to develop new refreshable braille technology that could significantly reduce the cost of these devices. For example, a consortium of organizations has supported research on refreshable braille technology and, according to one organization that has been involved in the effort, plans to unveil a

³⁹The statute authorizes the use of appropriated funds for the provision of “books published either in raised characters, on sound-reproduction recordings, or in any other form,” and for “reproducers for such sound-reproduction recordings” (i.e., audio playback equipment), but contains no such authorization for the use of appropriated funds for the provision of other types of reproducers, such as refreshable braille devices. 2 U.S.C. § 135a.

⁴⁰H.R. 4093, 114th Cong.

⁴¹For example, the LOC Federal Research Division study examined several devices that ranged in cost from about \$1,500 to about \$3,600.

⁴²Graham Bogda, Brendan Vishoot, Carl Grider, and David Schroeder, “Design and Testing of a Low-Cost Refreshable Braille Actuation Technology,” *Journal of Engineering Technology* (Spring 2011).

prototype device in 2016 that could cost as little as \$300.⁴³ NLS hired a consultant to examine the potential costs and benefits associated with providing braille through lower-cost refreshable braille devices rather than hard copy. The resulting report, delivered in July 2015, found that the total annual cost of NLS's current approach—including the costs for NLS to produce hard copy braille documents, for network libraries to store them, and for USPS to deliver them—is about \$17 million. It found that if the cost of refreshable braille devices were to come down to about \$400, then the total annual cost of an alternate approach in which NLS loans these devices to its users, and hard copy braille is largely replaced by electronic braille, could be about \$7 million—a savings of almost \$10 million per year compared to the current approach. According to standards for internal control in the federal government, agencies should identify, analyze, and respond to changes that may create the risk of not successfully fulfilling their missions, including changes in the technological environment.⁴⁴ As long as its statute does not allow NLS to use appropriated funds to provide refreshable braille devices, NLS will not be able to take advantage of technological advances that could potentially help it fulfill its mission more cost efficiently.

Audio Player with Wireless Connectivity

NLS is in the preliminary stages of developing an audio player with wireless connectivity that could download audio directly from BARD, an approach that it believes would improve services for users and potentially reduce overall costs to the federal government. NLS officials said users would benefit from a device capable of downloading audio materials directly from the Internet because they would receive content faster than receiving digital cartridges through the mail. As noted above, there are obstacles to the wider use of BARD among NLS's customer base, but an NLS-provided audio player with wireless connectivity could mitigate some of these issues. Specifically, such a device would eliminate the multi-step process now required to download BARD files to a computer and then transfer them onto NLS's audio player. Staff we spoke with in 5 of the 8 network libraries commented that downloading audio files directly to an NLS player would be simpler than the current process. In addition, NLS is

⁴³An organization that produces braille materials told us new technologies being considered to bring down the cost of refreshable braille include pneumatics—i.e., pushing air through bendable tubes to raise braille characters—and ceramic materials that change shape.

⁴⁴GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

considering how it might address another obstacle—lack of Internet access—by providing not just the audio player but also the required Internet connectivity.⁴⁵ At the time of our review, the goal of providing users with a device capable of connecting directly to the Internet was included in NLS’s draft strategic plan, and NLS officials said they were in the process of hiring a business analyst and project manager to more fully assess the business case for moving forward with this effort. LOC officials told us they expect NLS to submit a proposal for this initiative to LOC’s Information Technology Steering Committee during fiscal year 2016.

As it considers moving forward with this effort, NLS is leaning toward designing its own next generation, specialized player, but it has not fully assessed the costs and benefits of designing its own player versus using a commercially available player. NLS officials said that, in their experience, the existing commercially-available players lack the durability needed for NLS’s purposes, may not be suitable for users with physical disabilities, and are expensive. Libraries for those with visual impairments in some other countries, meanwhile, have found that commercially available audio players can meet their users’ needs. For example, the CNIB Library, which provides free reading materials to those with visual and other disabilities in Canada, does not provide its own specialized device to users but instead helps them acquire commercially-available devices when they cannot afford to do so. CNIB officials said they chose this approach because it was less expensive than developing their own player, and also commented that it offers users a range of choices to meet their needs. Some libraries for the blind in Europe and Asia also purchase commercially-available audio players for library users, according to two assistive technology companies we contacted. NLS officials told us they have not ruled out using a commercially-available device as their next generation player, and while they have not yet analyzed this option, they plan to explore it further through requests for information and market research. We have previously found it is important for agencies to thoroughly analyze alternatives, including their relative costs and benefits, so they consistently and reliably select the project

⁴⁵NLS has started to examine the costs of its current approach versus supporting wireless delivery for its users, and officials believe that wireless delivery may be less expensive than mail delivery through the Free Matter for the Blind and Other Physically Handicapped Persons program. NLS officials estimate that the majority of the cost of the Free Matter for the Blind program is associated with distribution of NLS materials.

alternatives that best meet mission needs.⁴⁶ In a 2007 report, we found that when NLS developed its current digital audio player, it did not sufficiently consider the option of acquiring a commercially-available device designed specifically for those who are blind or have physical disabilities, and we recommended that NLS develop and document analyses of alternatives including commercial products.⁴⁷ At that time, NLS did not act on our recommendation and take steps to consider commercial products. We continue to believe that without such an assessment, NLS runs the risk of not choosing the most cost-effective approach for providing its next generation of audio players.

Text-to-speech

Although NLS has relied exclusively on human narration to provide audio materials,⁴⁸ text-to-speech—i.e., synthetic, computer-generated speech—may be acceptable to many NLS users, according to interviews and survey data. According to several organizations we contacted that serve those with visual impairments and two studies we reviewed, the sound quality of text-to-speech has improved over time. For example, one study found that while not quite equivalent to natural human speech, state-of-the-art text-to-speech is becoming more natural-sounding, with appropriate phrasing and pacing.⁴⁹ In addition, evidence suggests that many NLS users may be willing to listen to text-to-speech materials. According to NLS's 2013 user survey, almost 80 percent of sampled NLS users were willing to listen to text-to-speech audio materials. While staff at 4 of 8 network libraries we contacted said NLS users prefer human narration, staff in all 8 libraries said using text-to-speech is a viable option

⁴⁶GAO, *DOE and NNSA Project Management: Analysis of Alternatives Could Be Improved by Incorporating Best Practices*, [GAO-15-37](#) (Washington, D.C.: Dec. 11, 2014).

⁴⁷GAO, *Talking Books for the Blind*, [GAO-07-871R](#) (Washington, D.C.: June 12, 2007).

⁴⁸NLS uses recording studios to produce about two-thirds of the new audio books it adds to its collection each year, according to NLS officials. The other one-third are obtained free of charge from commercial publishers of audio books. NLS has agreements with several publishing houses to receive their new audio books.

⁴⁹David Evans and John Reichenbach, "Need for Automatically Generated Narration," *BooksOnline '12* (October 2012). Another study found that people with visual impairments were more likely to accurately comprehend text-to-speech than sighted people, probably because those with visual impairments—especially older people—have more experience with text-to-speech. Konstantinos Papadopoulos, Evangelia Katemidou, Athanasios Koutsoklenis, and Eirini Mouratidou, "Differences Among Sighted Individuals and Individuals with Visual Impairments in Word Intelligibility Presented via Synthetic and Natural Speech," *Augmentative and Alternative Communication*, Vol. 26(4) (December 2010).

for certain types of NLS reading materials. In Canada, the CNIB uses text-to-speech for the front and back matter of the books it produces, and expects to incorporate more text-to-speech into its collection in the future. The CNIB website also has a link to a nonprofit organization that provides audio books primarily in text-to-speech format to those with visual and other disabilities, helping its users gain access to a collection of over 250,000 audio books. In addition, one assistive technology company told us that libraries for the blind in Europe regularly use text-to-speech for newspapers and magazines, and they often use it initially for best-selling novels so they can provide these quickly to their users.

NLS officials are considering whether to supplement NLS's audio collection with text-to-speech materials, but they have not assessed the costs and benefits of doing so, nor have they included moving forward with text-to-speech content as an objective in the agency's draft strategic plan. NLS officials told us they might in the future use text-to-speech for certain types of reading materials for which human narration is less critical, such as reference materials, cookbooks, bibliographies, and endnotes. They said an advantage of text-to-speech materials is that they can be produced more quickly than human-narrated materials: Officials said it takes 3 to 4 months to record a book with human narration. Also, it may be less expensive to produce text-to-speech materials. Officials said it costs, on average, about \$3,600 to record a book with a human narrator, and in fiscal year 2014 the agency spent \$10.5 million on such recording. In contrast, they said it costs \$75 to convert an audio book provided by a commercial publisher to NLS's format, and they estimated that producing text-to-speech books might cost about the same. However, although NLS officials said they have done some preliminary experimentation to understand the high-level challenges of producing text-to-speech materials, and have hired a contractor to develop software for converting digital text files to text-to-speech files that meet NLS's specifications, they have not made a decision about whether to move forward with text-to-speech. Furthermore, they have not yet comprehensively assessed the option of incorporating text-to-speech compared to relying solely on human narration, an assessment called for by best practices we previously identified for alternatives analysis.⁵⁰ Thus, NLS lacks information about an initiative that has the potential to deliver content more quickly and cost effectively.

⁵⁰[GAO-15-37](#).

Conclusions

The NLS program provides accessible reading materials to those who cannot read standard print due to visual, physical, and other disabilities. Eighty-five years after the program was established, NLS is providing an important service to many older and visually-disabled adults, but it is also missing opportunities to meet the needs of all groups eligible for services. For example, the regulatory requirement that a medical doctor must certify eligibility for individuals with reading disabilities treats this group differently than other populations and creates an obstacle to receiving services. Likely because this requirement has remained largely unchanged for the past 40 years, it is inconsistent with currently accepted practices. Additionally, while NLS's new outreach efforts have the potential to enhance awareness of its services among some eligible groups, NLS's failure to evaluate these efforts means officials are unable to target funds to those efforts determined to be the most cost-effective, or make adjustments to those that are less effective.

Looking ahead, NLS is considering emerging technologies to meet user needs. Yet there are factors both beyond and within NLS's control that may prevent the adoption of potentially cost-saving alternatives. For example, without a change in federal law, NLS will have to forego the opportunity to provide braille in a more modern and potentially cost-effective manner by distributing refreshable braille devices to its users. Further, in the area of audio materials, NLS lacks the information it needs to make informed choices about whether and how to proceed with adopting certain new technologies. For example, if NLS continues its plan to design a specialized audio player that connects to the Internet, without assessing the alternative of instead providing commercially available devices to its users, the agency may potentially invest in a less cost-effective option. Similarly, absent a comprehensive comparison of adding text-to-speech materials to its audio collection versus continuing to rely only on human narration, NLS may not make an informed decision about whether to move forward with a technology that has the potential to decrease the time and costs of providing new materials to users.

Matter for Congressional Consideration

To give NLS the opportunity to provide braille in a modernized format and potentially achieve cost savings, Congress should consider amending the law to allow the agency to use federal funds to provide its users playback equipment for electronic braille files (i.e., refreshable braille devices).

Recommendations for Executive Action

1. To ensure that it provides all eligible populations access to its services and that its eligibility requirements are consistent with currently accepted practices, the Library of Congress should re-examine and potentially revise its requirement that medical doctors must certify eligibility for the NLS program for those with a reading disability caused by organic dysfunction.
2. To ensure funds are directed to the most cost-effective outreach efforts, NLS should evaluate the effectiveness of its outreach efforts, including the extent to which different outreach efforts have resulted in new users.
3. To help it determine the most cost-effective approach for its next audio player, NLS should comprehensively assess the alternatives of designing its own specialized audio player versus providing commercially available players to its users.
4. To help it determine whether to supplement its collection of human-narrated audio materials with text-to-speech materials, NLS should thoroughly assess the text-to-speech option versus continuing to provide only human-narrated materials.

Agency Comments and Our Evaluation

We provided a draft of this report to LOC for its review and comment, and also provided relevant excerpts to USPS. In its written comments, included in our report as appendix I, LOC generally agreed with our recommendations and noted steps it plans to take to address them. For example, LOC agreed to reexamine and potentially revise its requirement that only medical doctors may certify NLS eligibility for people with reading disabilities to authorize other qualified persons to make such a certification. NLS has not predicted the increase in its users that may result from such a change, but it is exploring enhancements to its technological infrastructure that would support the increased demand for services that may result. With regard to our recommendation to evaluate its outreach efforts, LOC said it will look into implementing a new process for collecting data from network libraries on how NLS program users were referred to the program, as well as other ways of measuring the efficacy of various outreach approaches. Regarding our recommendations related to exploring new technologies, LOC indicated that NLS will thoroughly study various alternatives as it begins the process of developing the next generation of audio players, including the advantages and disadvantages of designing an NLS-specific player compared to using a commercially available player. LOC also indicated that NLS is exploring the use of text-to-speech technology as a way to expand its offerings, and NLS will introduce this technology through a pilot program and solicit feedback

from users and network libraries to assess their acceptance of this approach. LOC and USPS also provided technical comments, which we incorporated as appropriate.

We are sending copies of this report to appropriate congressional committees, the Librarian of Congress, the Director of NLS, and other interested parties. In addition, this report will also be available at no charge on GAO's website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at 202-512-7215 or bertonid@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff members who made key contributions to this report are listed in appendix II.



Daniel Bertoni
Director, Education, Workforce, and Income Security Issues

Appendix I: Comments from the Library of Congress



THE LIBRARIAN OF CONGRESS

March 11, 2016

Mr. Daniel Bertoni
Director
Education, Workforce, and Income Security Issues
Government Accountability Office
441 G Street NW
Washington, DC 20548

E-mail: bertonid@gao.gov

Dear Mr. Bertoni:

Thank you for the opportunity to comment on the March 2016 draft Government Accountability Office (GAO) report, *LIBRARY SERVICES FOR THOSE WITH DISABILITIES: Additional Steps Needed to Ease Access to Services and Modernize Technology* (GAO-16-355). We appreciate the Congress's engagement with the Library of Congress, and its direction to GAO to conduct this study. I extend my thanks to you and your team for your work in planning, conducting, and reporting on this assignment. The National Library Service for the Blind and Physically Handicapped (NLS) takes very seriously the need to reach all potential patrons and the need to judiciously capitalize on technological advances to improve service to people with print disabilities. We particularly appreciate GAO's support for the proposal to amend NLS's authorizing statute to permit distribution of refreshable braille devices.

Your study and report will provide valuable insight and guidance with which NLS can improve its service. The Library's comments on GAO's "Recommendations for Executive Action" follow.

Certification of Persons with Reading Disabilities

NLS serves people with reading disabilities, as noted in the report. However, in order to comply with NLS's enacting legislation, which specifically states that the service is "for the use of the blind and for other physically handicapped residents of the United States," the regulation at 36 C.F.R. 701.6 addresses reading disabilities in the context of organic dysfunction. NLS's informational material explains: "The following groups of individuals are not automatically eligible: those who have learning disabilities, dyslexia, attention deficit disorder, attention deficit-hyperactivity disorder, chronic-fatigue syndrome, autism, functional illiteracy, or developmental disabilities, unless accompanied by a specific visual or physical disability." See <http://www.loc.gov/nls/reference/guides/readingdisabilities.html>. In accordance with 36 C.F.R. 701.6, a doctor of medicine must certify organic dysfunction.

Since the 1970s, when 36 C.F.R. 701.6 was promulgated, the social and scientific thinking has changed regarding the causation and diagnosis of learning disabilities. The Library therefore agrees that it is sensible to reexamine and potentially revise the requirement that medical doctors must certify eligibility for NLS's program for those with a reading disability caused by organic dysfunction, to authorize other qualified persons to make such certification.

Currently, approximately six percent of NLS patrons are certified by medical professionals as having an organically-based reading disability. NLS anticipates that broadening the types of people who are deemed

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qualified to certify eligibility will lead to relaxed standards for what constitutes “organic dysfunction,” and NLS has not officially predicted the increase to NLS readership that may result. However, it does seem clear that aside from NLS, stakeholders affected by this change would include current NLS patrons, people with reading disabilities, network libraries, and publishers.

A preliminary survey of libraries in Europe serving individuals with print disabilities indicates that those who serve people with reading disabilities such as dyslexia report that from 30-65 percent of their patron base have reading disabilities. Bookshare and Learning Ally, which serve this population in the United States without requiring medical certification, report that 75-80 percent of their respective patrons are served on the basis of reading disabilities. Such figures would indicate a potential to triple or quadruple the number of people served by NLS. Even if this number only doubled, NLS as it stands today would not have the equipment, books, or infrastructure capacities to accommodate the needs of the expanded readership. Additional resources would be required at the national, state, and local levels to accommodate such an influx.

Further, a significant increase in users of the program would likely create substantially higher demands on the information technology infrastructures used to support the Braille and Audio Reading Download (BARD) website and, eventually, to support wireless delivery of NLS materials directly to patrons. For that reason, NLS has begun the process of building a new infrastructure with these key challenges in mind.

This infrastructure will need to support the Internet delivery of NLS materials to patrons via a next-generation Internet-capable player. NLS intends to use the cloud for this infrastructure, leveraging the cloud’s built-in advantages in the areas of cost, availability, reliability, and scalability. NLS intends to leverage commercially available cloud services as much as possible, such as in the area of media delivery and mobile virtual networks. NLS also intends to leverage the ability of the Internet to allow tight communication between network library computer systems and the NLS infrastructure, which should allow the automation of currently manual tasks.¹

These efforts are intended to accommodate higher volumes of service and also reduce wherever possible the service burden on network libraries. Significantly greater efficiencies created by the new infrastructure’s architecture will allow NLS to remain at current staffing levels while providing higher volumes of materials for its patron base.

Assessment of Outreach Efforts

NLS recognizes the need for more effective outreach to potential users of the service. For that reason NLS has, following earlier GAO guidance, taken a multi-faceted approach to outreach over the last two years. However, as the report also notes, NLS does not have a comprehensive plan to evaluate the efficacy of those efforts. In order to evaluate the extent to which different outreach efforts have resulted in new users, NLS believes it will need referral source data on all new users. Mechanisms are not in place to collect specific referral source data from the 101 cooperating network libraries currently processing registrations for the NLS service. NLS has not, to date, required network libraries to report referral source, and although some libraries do gather this information, many do not. No libraries gather this information at the granular level required to differentiate among various outreach efforts. NLS is evaluating current

¹ The manual tasks that may be automated include, without limitation, applying for BARD access (NLS patrons) and approving BARD applications (NLS staff); loading monthly download statistics from BARD into the Library’s circulation systems; data entry tasks associated with selecting new books to be produced by NLS; and providing help desk support to NLS patrons.

efforts in terms of web page visits, but acknowledges that this is not a direct corollary to new patron registration.

NLS is currently in the process of upgrading its Patron Information and Machine Management System (PIMMS), which gathers data from the network library circulation systems. In order to have a comprehensive referral source data collection program, changes in local circulation systems as well as library processes and PIMMS programming would be required. After the current PIMMS conversion is complete, NLS will look into implementing a referral source data collection process. NLS will also investigate other ways of measuring the efficacy of various outreach approaches, including the extent to which different outreach efforts have resulted in new users.

Evaluation of Commercially Available Players

As noted in the report, only ten percent of NLS patrons are using commercial devices to read NLS materials. For the majority of NLS patrons, the NLS-provided player is preferred over commercial devices due to its simplicity of use and its durability. In addition, the maintenance on NLS players overall has been low; and because the players are standardized, NLS is able to provide standardized training materials and comprehensive technical and maintenance support to libraries and volunteer repair groups throughout the United States and its territories.

NLS also has made provisions for individuals who prefer to use other devices such as smartphones, tablets, and specialized third-party devices to access BARD and to play NLS talking books. NLS has created apps for both Android and iOS devices, to download and play talking books. NLS has also cooperated with vendors who want to make their products capable of playing encrypted NLS books or to directly search BARD and download books. These efforts have guaranteed a wide range of choices for NLS patrons who prefer not to use the NLS-provided players. At the same time, NLS is able to provide a free public library service to all eligible users regardless of their physical, financial or technological resources.

As NLS begins the process of developing the next generation of talking book services, it will thoroughly study alternatives, including the pros and cons of designing an NLS-specific player versus using commercial players in the program. As NLS develops infrastructure to support the next generation of talking book services, NLS will ensure that the design adheres to applicable standards which will insure interoperability with a variety of devices. Thus, NLS will be positioned to implement whichever option that studies determine will bring the best value to both NLS and its patrons. In addition, going forward, NLS fully intends to continue to support mainstream and specialized third-party devices in order to accommodate patron preferences.

Use of Text to Speech

Text to speech (TTS) is an extremely valuable tool for blind and severely visually impaired persons in accessing information. The technology has improved tremendously in the past ten years (and continues to improve), resulting in nearly natural speech patterns. A talking book created using TTS technology would, we believe, be less expensive than a human-narrated book.²

Despite the strides that have been made in TTS technology, a TTS book does not yet come close to approximating the experience provided by human narration. Although TTS is clear and understandable

² Factors that will affect the overall cost of providing TTS include, without limitation, software development, purchase, or license; development and implementation of work processes, including quality assurance protocols; and the amount of human intervention needed.

Appendix I: Comments from the Library of Congress

4

for most people, it is monotonous, rendering text without expression, variety, or nuance. The experience for the listener is flattened, and is thus significantly inferior to that of a human-narrated experience. NLS is a public library service, and the vast majority of the collection is intended for leisure reading. The leisure reading experience is based on storytelling and is thus enhanced by skillful narration, with appropriate expression, nuance, characterization, and clarity. In our media-rich world, the flattened expression of a TTS book read for leisure would not provide a wholly satisfactory experience for NLS patrons. Indeed, just as actors become very important storytellers through film, talking book narrators fulfill the same role for audio book readers. Notably, no commercial audio producers have offered books recorded in text-to-speech.

TTS technology is, however, useful and appropriate for certain types of materials that are both factual and not typically read for long periods of time, such as indexes, endnotes, bibliographies, cookbooks, reference books, and similar materials.

With these considerations in mind, NLS is exploring the introduction of TTS into its programs in order to expand its offerings. While NLS intends to continue its human-narrated approach for the core collection of leisure materials, NLS is planning a second-tier approach for those who are willing to use it. To accomplish this, NLS plans to include TTS technology in its next-generation talking book player so that a text-based book can be rendered effectively. Currently, NLS is negotiating with several major publishers to acquire e-text versions of their titles for this purpose. NLS will introduce TTS-based talking books via a pilot program in conjunction with which NLS will solicit feedback from patrons and network libraries to assess their acceptance of this approach.

Thank you again for your work in preparing this report, and for the opportunity to comment on the draft. Please let us know if you have any follow-up questions.

Sincerely,



David S. Mao
Acting Librarian of Congress

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Inspector General, Library of Congress

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Director, National and International Outreach, Library of Congress

Dr. Eugene Flanagan
Director, National Programs, National and International Outreach, Library of Congress

Ms. Karen Keninger
Director, National Library for the Blind and Physically Handicapped, National Programs,
National and International Outreach, Library of Congress

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Daniel Bertoni, 202-512-7215 or bertonid@gao.gov

Staff Acknowledgments

In addition to the contact named above, individuals who contributed to this report include Rachel Frisk, Assistant Director; Lorin Obler, Analyst-in-Charge; Nora Boretti, Leia Dickerson, Holly Dye, Alexander Galuten, Melissa Jaynes, Tammi Kalugdan, Bob Kenyon; Kaelin Kuhn, Dainia Lawes, Sheila McCoy, Almeta Spencer, and Walter Vance.

Appendix III: Accessible Data

Agency Comment Letter

Text of Appendix I: Comments from the Library of Congress

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March 11, 2016

THE LIBRARIAN OF CONGRESS

Mr. Daniel Bertoni Director

Education, Workforce, and Income Security Issues Government
Accountability Office

441 G Street NW Washington , DC 20548

E-mail: bertonid@gao.gov Dear Mr. Bertoni:

Thank you for the opportunity to comment on the March 2016 draft Government Accountability Office (GAO) report, LIBRARY SERVICES FOR THOSE WITH DISABILITIES : Additional Steps Needed to Ease Access to Services and Modernize Technology (GAO-16-355). We appreciate the Congress's engagement with the Library of Congress, and its direction to GAO to conduct this study. I extend my

thanks to you and your team for your work in planning, conducting, and reporting on this assignment. The National Library Service for the Blind and Physically Handicapped (NLS) takes very seriously the need to reach all potential patrons and the need to judiciously capitalize on technological advances to improve service to people with print disabilities. We particularly appreciate GAO's support for the proposal to amend NLS's authorizing statute to permit distribution of refreshable braille devices.

Your study and report will provide valuable insight and guidance with which NLS can improve its service. The Library's comments on GAO's "Recommendations for Executive Action" follow.

Certification of Persons with Reading Disabilities

NLS serves people with reading disabilities, as noted in the report. However, in order to comply with NLS's enacting legislation, which specifically states that the service is "for the use of the blind and for other physically handicapped residents of the United States," the regulation at 36 C.F.R. 701.6 addresses reading disabilities in the context of organic dysfunction. NLS's informational material explains: "The following groups of individuals are not automatically eligible: those who have learning disabilities, dyslexia, attention deficit disorder, attention deficit-hyperactivity disorder, chronic-fatigue syndrome, autism, functional illiteracy, or developmental disabilities, unless accompanied by a specific visual or physical disability." See <http://www.loc.gov/nls/reference/guides/readingdisabilities.html>. In accordance with 36 C.F.R. 701.6, a doctor of medicine must certify organic dysfunction.

Since the 1970s, when 36 C.F.R. 701.6 was promulgated, the social and scientific thinking has changed regarding the causation and diagnosis of learning disabilities. The Library therefore agrees that it is sensible to reexamine and potentially revise the requirement that medical doctors must certify eligibility for NLS's program for those with a reading disability caused by organic dysfunction, to authorize other qualified persons to make such certification.

Currently, approximately six percent of NLS patrons are certified by medical professionals as having an organically-based reading disability. NLS anticipates that broadening the types of people who are deemed

qualified to certify eligibility will lead to relaxed standards for what constitutes "organic dysfunction," and NLS has not officially predicted the increase to NLS readership that may result. However, it does seem clear that aside from NLS, stakeholders affected by this change would include current NLS patrons, people with reading disabilities, network libraries, and publishers.

A preliminary survey of libraries in Europe serving individuals with print disabilities indicates that those who serve people with reading disabilities such as dyslexia report that from 30-65 percent of their patron base have reading disabilities. Bookshare and Learning Ally, which serve this population in the United States without requiring medical certification, report that 75-80 percent of their respective patrons are served on the basis of reading disabilities. Such figures would indicate a potential to triple or quadruple the number of people served by NLS. Even if this

number only doubled, NLS as it stands today would not have the equipment, books, or infrastructure capacities to accommodate the needs of the expanded readership. Additional resources would be required at the national, state, and local levels to accommodate such an influx.

Further, a significant increase in users of the program would likely create substantially higher demands on the information technology infrastructures used to support the Braille and Audio Reading Download (BARD) website and, eventually, to support wireless delivery of NLS materials directly to patrons. For that reason, NLS has begun the process of building a new infrastructure with these key challenges in mind.

This infrastructure will need to support the Internet delivery of NLS materials to patrons via a next-generation Internet-capable player. NLS intends to use the cloud for this infrastructure, leveraging the cloud's built-in advantages in the areas of cost, availability, reliability, and scalability. NLS intends to leverage commercially available cloud services as much as possible, such as in the area of media delivery and mobile virtual networks. NLS also intends to leverage the ability of the Internet to allow tight communication between network library computer systems and the NLS infrastructure, which should allow the automation of currently manual tasks. /1/

Footnote 1: "The manual tasks that may be automated include, without limitation, applying for BARD access (NLS patrons) and approving BARD applications (NLS staff); loading monthly down load statistics from BARD into the Library's circulation systems; data entry tasks associated with selecting new books to be produced by NLS; and providing help desk support to NLS patrons."

These efforts are intended to accommodate higher volumes of service and also reduce wherever possible the service burden on network libraries. Significantly greater efficiencies created by the new infrastructure's architecture will allow NLS to remain at current staffing levels while providing higher volumes of materials for its patron base.

Assessment of Outreach Efforts

NLS recognizes the need for more effective outreach to potential users of the service. For that reason NLS has, following earlier GAO guidance, taken a multi-faceted approach to outreach over the last two years. However, as the report also notes, NLS does not have a comprehensive plan to evaluate the efficacy of those efforts. In order to evaluate the

extent to which different outreach efforts have resulted in new users, NLS believes it will need referral source data on all new users. Mechanisms are not in place to collect specific referral source data from the 101 cooperating network libraries currently processing registrations for the NLS service. NLS has not, to date, required network libraries to report referral source, and although some libraries do gather this information, many do not. No libraries gather this information at the granular level required to differentiate among various outreach efforts. NLS is evaluating current

Page 3

efforts in terms of web page visits, but acknowledges that this is not a direct corollary to new patron registration.

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Data Tables

Data for Figure 2: Age of NLS Users, on September 30, 2014

Age	under 10	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100 and over	Unknown
Percentage of users of National Library Service for the Blind and Physically Handicapped (NLS)	1	3.6	5	4.4	5.4	9.7	14.1	13.4	21.5	16.5	1.3	3.5

Source: GAO analysis of NLS data. | GAO-16-355

Data for Figure 3: Distribution of Disabilities among NLS Users, on September 30, 2014

Disability	Percentage of National Library Service for the Blind and Physically Handicapped (NLS) users
Blind	39.9
Visually disabled (not blind)	44.9
Physically disabled	5.9
Reading disabled	5.6
Deaf and blind	0.5
Unknown	3

Source: GAO analysis of NLS data. | GAO-16-355

Data for Figure 4: Percentage of NLS Users Accessing Reading Materials, by Format, Fiscal Year 2014

Format	Percentage of National Library Service for the Blind and Physically Handicapped (NLS) Users
Audio– digital cartridge	86
Audio– cassette	33
Audio– Internet download	11
Braille– hard copy	8
Braille– Internet download	3

Source: GAO analysis of NLS data. | GAO-16-355

Data for Figure 5: Number of NLS Reading Materials Circulated to Users, by Format, Fiscal Years 2010-2014

Fiscal Year	Audio–cassette	Audio–digital cartridge	Audio–Internet download	Braille–hard copy	Braille– Internet download
2010	17,497,873	3,890,762	1,466,567	497,887	66,590
2011	11,658,362	8,645,919	2,302,392	449,095	47,798
2012	7,708,964	11,560,524	2,877,134	447,631	57,045
2013	4,454,502	14,055,833	3,167,402	404,189	157,910
2014	1,720,036	14,725,915	3,542,639	385,301	237,326

Source: GAO analysis of NLS data. | GAO-16-355

Related GAO Products

Library of Congress: Strong Leadership Needed to Address Serious Information Technology Management Weaknesses. [GAO-15-315](#). Washington, D.C.: March 31, 2015.

High Risk Series: An Update, [GAO-15-290](#). Washington, D.C.: Feb. 11, 2015.

DOD and NNSA Project Management: Analysis of Alternatives Could Be Improved by Incorporating Best Practices. [GAO-15-37](#). Washington, D.C.: Dec. 11, 2014.

Social Security Disability: Additional Outreach and Collaboration on Sharing Medical Records Would Improve Wounded Warriors' Access to Benefits. [GAO-09-762](#). Washington, D.C.: Sept. 16, 2009.

Talking Books for the Blind. [GAO-07-871R](#). Washington, D.C.: June 12, 2007.

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