THE 1997 NATIONAL SURVEY OF U.S. PUBLIC LIBRARIES AND THE INTERNET:

FINAL REPORT

For:

Office for Information Technology Policy
American Library Association
1301 Pennsylvania Avenue, Suite 403, NW
Washington, DC 20004
(202) 628-8421
http://www.ala.org/oitp/
and

National Commission on Libraries and Information Science
1110 Vermont Ave., Suite 820, NW
Washington, DC 20005
(202) 606-9200
http://www.nclis.gov

By:

John Carlo Bertot <bertot@umbc.edu>
Assistant Professor
Department of Information Systems
Baltimore, Maryland 21250

Charles R. McClure <cmcclure@mailbox.syr.edu>
Distinguished Professor
School of Information Studies
Syracuse University
Syracuse, NY 13244

Patricia Diamond Fletcher <fletcher@umbc.edu>
Assistant Professor
Department of Information Systems
University of Maryland Baltimore County
Baltimore, Maryland 21250

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Office for Information Technology Policy
American Library Association
1301 Pennsylvania Avenue, Suite 403, NW
Washington, DC 20004
(202) 628-8421
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The success of the 1997 national survey of public libraries and the Internet is due largely to the many public librarians who completed and returned the survey questionnaire. The high response rate to the survey indicates the continued i nterest on the part of the public library community in the use and development of the Internet. To those librarians that completed the questionnaires, we thank you very much.

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John Carlo Bertot
Charles R. McClure
Patricia Diamond Fletcher

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CONTENTS

INTRODUCTION

Public libraries have made remarkable progress in connecting to the Internet. The first national study conducted in 1994 (McClure, Bertot, and Zweizig, 1994) found that 20.9% of public libraries in the

United States had some type of connection to the Internet. The 1996 study (Bertot, McClure, and Zweizig, 1996) found that 44.4% of public libraries had a connection to the Internet. And the 1997 data reported here found that 72.3% of public libraries have an Internet connection. This is a significant effort on the part of the nation's public libraries to participate in the evolving global networked environment. [Note: This study collected data from public library *systems*, not *branches*. The state of public library connectivity at the branch level is unknown. According to the National Center for Education Statistics (1997), there are 8,921 public library systems in the U.S. Of these systems, 1,454 (16.3%) had branches (see Figure 21 later in this report).]

The 1996 national study showed that although public library Internet connectivity is increasing, there is a great deal of variation in the public library's type of Internet connection, technology infrastructure, and the provision of public access services by library population of legal service area and region (Bertot, McClure, and Zweizig, 1996). The variation in connectivity continues from data reported in the 1997 survey. In addition, these differences in connectivity raise a number of important issues related to public access and universal service that will require careful assessment and discussion.

Clearly there is a rapidly changing environment for public libraries. The findings presented later in this study show increased sophistication in public libraries' use of the Internet. They show significant amounts of resources being redeployed by public libraries to establish and maintain an information infrastructure to support the use of the Internet and other information technologies. Findings also suggest that defining and computing Internet-related costs for public libraries are quite complicated and will require additional research (see Appendix A).

Policy initiatives at the federal level also continue to affect the public library's transition into the networked environment. In addition, state networks continue to evolve that support a range of public library networked services (Bertot and McClure, 1996b; McClure and Bertot, 1997a). At the local level, a range of collaborative strategies appear to be developing to provide public access to the Internet through public libraries.

This report provides a wealth of information related to public libraries' connection to, use of, and costs associated with the Internet. The findings presented later in this report suggest that there are numerous strategies and approaches for providing Internet-based services and resources to the public; there are numerous models for designing and deploying information technologies to provide access and services; there are multiple approaches and a range of different costs associated with providing these services that depend on local, situational factors that are very difficult to generalize; and that the diversity of public library Internet connectivity configurations, services, and costs will continue to increase as libraries strive to provide network-based services in a rapidly evolving policy and technology context. The American Library Association has published an Executive Summary of results from this study that can be used to inform local communities of key findings and issues (American Library Association, 1997).

Public libraries are making significant and widespread advances to both connect to the Internet and provide a range of networked-based services and resources to their communities. But smaller and rural libraries have not been able to keep pace with their larger urban and suburban cousins. Moreover, the ability of some communities to support an adequate information infrastructure to provide the public with sophisticated networked-services also varies considerably. Indeed, as of this survey, only 9.2% of public library systems provide graphical Web public access services at the main/central library and all branches (see Figure 27 later in this report). Public libraries will continue to be challenged to provide high-quality access and services to the networked environment.

STUDY PURPOSE AND KEY RESEARCH TOPICS

Overall, the purpose of this study was to obtain descriptive information about the nation's public library connectivity, use, and costs related to the Internet. As suggested below, there are large areas where detailed information related to public libraries' connections, uses, and costs are essential for both policymakers and for improved planning at the local library level. Thus, this study had to limit its attention to the following key areas:

• Budget spent on Internet-related services over time in such areas as communications, system, software, training, content, and planning infrastructure enhancements (technology and physical) to engage in Internet services;

• Technology deployment information technology (IT) infrastructure (e.g., multi-media workstations, telecommunications services) to provide Internet-related services, unique library electronic resource development and service provision (e.g., Web servers) ; and

• Social issues- percentage of connected public libraries that serve rural/urban areas.

Such data can provide policy makers, various stake-holder groups, and the library community with the ability to study the relationships between public library Internet-related costs, services, IT infrastructure, and types of populations served for public library electronic networked services. The data reported here contribute to the ongoing effort to address these issues and topics for the public library community as well as for a range of policy makers at the federal, state, and local settings.

Efforts are, however, underway to better describe public libraries' connections, uses, costs, and services (especially in economically defined geographic areas) related to the Internet. Data reported here is one first step. Ongoing efforts by the National Center for Educational Statistics (NCES) and the National Commission on Libraries and Information Science (NCLIS), and state library agencies, through the Federal State Cooperative System (FSCS), are attempting to incorporate public library data collection in their national surveys. The Office for Information Technology Policy (OITP) of the American Library Association (ALA) is working with the Florida State University to better describe public library outlets in terms of the poverty level of the community they serve. And most recently, the Gates Library Foundation has indicated an interest in working with public libraries to improve their Internet use and services provision <http://www.glf.org/>. OITP's home page <http://www.ala.org/oitp/> describes other efforts as well.

THE FEDERAL POLICY ENVIRONMENT

The Federal policy environment is continually evolving and requires policy makers, stakeholder groups, and library professionals to make decisions that can affect the ability of public libraries to transition to and actively participate in the developing National Information Infrastructure (NII). Space does not permit a detailed review of those policy initiatives, but the following are especially important.

The Telecommunications Act of 1996

The Telecommunications Act of 1996 (P.L. 104-104) (TCA) was the first significant legislative overhaul to the Communications Act of 1934. The TCA essentially updated a variety of key aspects of the telecommunications industry, creating a more market-driven industry that relied on competition to foster lower telecommunications rates throughout the nation (Mueller, 1997).

The universal service provision of the TCA specifically directed the Federal Communications Commission (FCC) to create a discount structure for telecommunications services for schools, libraries, and rural health care institutions (P.L. 104-104, Section 254). Based on the broad guidelines established by the TCA, the FCC issued its final universal service rulemaking on May 7, 1997. In this ruling, the FCC created a (FCC, 1997, Section X):

• $2.25 billion annual discount fund for schools and libraries; and

• Telecommunications discount structure ranging from 20%-90% for telecommunications services (defined as telecommunications conduits--e.g., leased-lines, internal wiring, and Internet connectivity). The discount rate a school or library can receive depends on the percentage of students on school lunch programs and the location (urban/rural) of the school or library.

The universal service provisions of the TCA, and the FCC implementation of those provisions, are aimed specifically at increasing connectivity of schools and libraries to the Internet.

The TCA (P.L. 104-104) has the promise of both introducing competition in the telecommunications industry as well as providing preferential rates for public libraries, schools, and health care institutions. But, a key issue in this National policy context is that of Universal Service.(1) The goal of public libraries to provide universal service to the public for access to the Internet is one that has received much attention and discussion during recent years. But as this discussion and policy debate continues, there is little agreement on what constitutes "universal service" and what types of "services" constitute basic and advanced services. What is known, however, is that connectivity to the Internet alone is *not* the provision of networked services (e.g., Web-based resources). Thus, policy makers should not confuse public library Internet connectivity with the degree to which public libraries provide networked-based services.

The FCC is in the process of developing rules to implement the universal service provisions mandated in the *Telecommunications Act of 1996* (P.L. 104-104, Section 254). Libraries and schools may receive special attention to promote affordable access to the Internet and the availability to Internet services. Section 254b offers the following principles to advance universal service:

• **Quality and rates**: Quality services should be available at just, reasonable, and affordable rates.

• **Access to advanced services**: Access to advanced telecommunications and infor-mation services should be provided to all regions of the Nation.

•**Access in rural and high cost areas**: Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services . . . that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonable comparable to rates charged for similar services in urban areas.

• **Equitable and nondiscriminatory contributions**: All providers of telecommunications services should make an equitable and non-discriminatory contribution to the preservation and advancement of universal service.

• **Access to advanced telecommunications services for schools, health care, and libraries**: Elementary and secondary schools and classrooms, health care providers, and libraries should have access to advanced telecommunications services as described in subsection (h).

• **Additional principles**: Such other principles as the Joint Board and the Commission determine are necessary and appropriate for the protection of the public interest, conve-nience, and necessity and are consistent with this Act.

Later, in section (B) of the universal services provision, the law states "all telecommunications carriers serving a geographic area shall . . . provide such services to elementary schools, secondary schools, and libraries for educational purposes at rates less than the amounts charged for similar services to other parties."

Such language raises complicated issues. For example, the 1997 data provided in this report suggests that approximately 27.7% of public libraries that serve 9.2% of the population remain to be connected to the Internet as of May 1997 (see Figure 10).[(2)] The data also show that these public libraries have small communities, typically 5,000 or under, and oftentimes are located in rural areas. For a host of reasons, the costs to connect the last 27.7% of public libraries and the costs for those libraries to provide networked services, are likely to be significant. At what point is it possible to say that public libraries are providing "universal service" to the public? at a 75% connectivity rate? when 90% provide Web-based information resources and services?

As the FCC and the Joint Board develop rules to implement these and other universal services provisions, it is important to recognize that serious discrepancies already exist in the provision of Internet connectivity and services through public libraries. At issue are the:

(1) Mechanisms to provide universal service to schools and public libraries;

(2) Rates through which such services shall be offered; and

(3) Level of service, both in terms of connectivity and content, schools and public libraries shall have access to via the Internet/evolving National Information Infrastructure (NII).

The extent to which the TCA, for states, local communities, and the public library community can resolve these discrepancies has yet to be determined. Indeed, the FCC, through the Joint Board, issued recommendations that provide for a sliding scale of discounts for public libraries and schools ranging from 20 to 90 percent that is dependent on an institution's poverty rate as measured through the percentage of students on school lunch programs and its urban/rural status. The final distribution and awards of these discounts remain unclear as this report is written.

The Library Services and Technology Act

On September 30, 1996, the President signed into law the Library Services and Technology Act (P.L. 104-208) (LSTA). LSTA marked a change in the direction of federally-funded library initiatives over its predecessor the Library Services and Construction Act (LSCA) in several key ways:

• LSTA consolidates portions of the Higher Education Act that related to a variety of national level library needs;

• LSTA is now administered by the Institute for Museum and Library Services (IMLS);

• LSTA applies to nearly all types of libraries, not just public libraries;

• LSTA increases the emphasis on electronic networking activities; and

• LSTA requires states to evaluate and report on the impact of LSTA-funded initiatives.

Taken together, these key components of LSTA create a new federal-state-library funding environment that emphasizes collaboration, performance, and technological innovation.

As this report is being written, the IMLS has proposed draft guidelines for 1998 National Leadership Grants <http://www.ims.fed.us/guidelines/natlead.pdf>. There are subtle but important differences between the funding guidelines proposed by IMLS and those traditionally produced under the LSCA. Since funds made available through the National Leadership Grants will have an important impact as a catalyst to move public libraries (and other organizations) into the networked environment, the final version of these guidelines is an important policy issue.

The Government Performance and Results Act

Espousing the virtues and needs of effective and efficient government requires that citizens and federal government managers alike benchmark government services against some performance measure(s) and/or indicator(s). In a step towards developing such performance measures, the Congress passed the Government Performance and Results Act (P.L. 103-62) (GPRA). The GPRA stresses the need to improve federal pro-gram effectiveness and public accountability by promoting a new focus on results, service, and customer satisfaction.

Specifically, the GPRA requires federal agencies to establish program-based performance goals for agency program areas that are quantifiable, objective, and measurable. Agencies must also create perfor-mance indicators that can measure and/or assess the outputs, service levels, and outcomes of agency program activities.

The GPRA, therefore, requires each federal agency to have a clear mission that describes the purpose and function of the agency, develop set of outcome-oriented objectives that serve to attain the agency mission, and develop a set of quantifiable performance indicators and measures that will assist program

managers determine whether and the extent to which their programs achieve program objectives and support the agency mission.

GPRA has a substantial impact on the IMLS and, subsequently, LSTA. LSTA was created as a performance- and results-based initiative. There is likely to be continued emphasis on states receiving federal money to be able to demonstrate and measure specific outcomes from federally funded projects. Given this environment, the evaluation of public libraries and statewide networks receiving federal monies is likely to require a range of data that may not be currently available.

Restructuring of the Government Printing Office

There has been an ongoing effort to update Title 44 of the *U.S. Code* which provides the legislative basis for the operation of the Government Printing Office (GPO) and the Federal Depository Library Program (FDLP). Public libraries have long been a key point for citizens' access to government information through the FDLP, as well as directly to a range of agency information. During 1997 there has been a concerted effort to consider how best such a revision to Title 44 and restructuring of the GPO and FDLP could be accomplished. Indeed, as of December 1997 there is draft legislation being developed to effect such changes.

With increased use of Web sites by federal agencies to disseminate government information and provide a range of agency services, public libraries will need to take on increased responsibilities for providing access to that information and those se rvices. As shown by the data in this report, while over 70% of public library systems are connected to the Internet, there is less information available as to the public libraries' ability to identify, access, disseminate, manipulate, and manage the huge expanse of Web-based and other electronic information resources.

Thus, the public library community will need to monitor closely the efforts to revise Title 44 of the *U.S. Code* and otherwise restructure the GPO and the FDLP. Indeed, as the policy issues within this area become clearer, the restructuring may provide public libraries with an excellent opportunity to better formalize their roles and responsibilities related to providing public access to federal government information.

Overview

The policy areas identified briefly above do not do justice to the range of policy initiatives currently being debated that affect public libraries and their role in the NII. For example, other topics currently being discussed include:

• Copyright and intellectual property rights;

• Encryption;

• Role of the National Telecommunications and Information Agency (NTIA) as a funding agency for NII initiatives;

• Censorship and First Amendment rights in the NII; and

• Privacy.

This list is illustrative only, and readers should note that many of these issues have international implications. Increasingly, the policy issues related to the development of the NII will have significant impact on libraries of all types--and especially public libraries. The data reported here, while not related directly to some of these policy areas do provide an important beginning point to develop a national database of public library information that can be used to debate these and other information policy issues. Such debates, and the need for national data related to those debates, will only continue in importance as they affect public library development.

MOVING BEYOND CONNECTIVITY

There is a great deal of electronic networking activity occurring in public library, statewide, and K-12 environments. These innovative and creative initiatives demonstrate what can happen when federal, state, and local governments, community-based stakeholder groups, and private sector organizations collaborate to create new means of working together, do more with less, and reduce the overlap of services. In doing so, network creators assume that such initiatives will provide better networked services and promote greater citizen prosperity, productivity, and education at all levels through the effective and efficient use of advanced networking technologies (Office of the Vice President, 1993; National Information Infrastructure Advisory Committee, 1995).

Many organizations in general, and public libraries in particular, have built significant networks and connected to the Internet as part of the evolving National Information Infrastructure (NII). As of spring 1997, 72.3% of public library systems have some type of Internet connection, as compared to 20.9% in 1994 (McClure, Bertot, and Zweizig, 1994). The overall public library level of Internet connectivity varies greatly, however, by the population public library systems serve, with 1997 data suggesting that public library systems in larger population areas having significantly higher (100% for libraries with population of legal service areas of greater than one million) rates of Internet connectivity than public library systems in smaller population areas (56.3% for libraries with population of legal service areas of less than 5,000). There is also a significant difference in public library system connectivity between urban (86.9% for central city libraries) and rural (66.0% for non central city libraries) libraries. Thus, public library Internet connectivity is not equal nor even throughout the nation. The degree to which the Joint Board of the FCC can help to alleviate these discrepancies with the Universal Service Fund (USF) remains to be seen.

The notion of universal service, however, implies some baseline or minimal level of Internet *services* to which the federal government assures the public it can access and use. For example, the government could assure the public that they are entitled to, minimally, professional assistance in how to use the information superhighway and obtain basic government services via the superhighway.

Existing policy definitions of universal service fail to differentiate between requirements for first providing access (connectivity), and then, determining what, if any, *services* should be made universally available. Furthermore, they often fail to recognize that providing access, say a 56kbps line to a local public library, may still not provide appropriate *services* from the public library if, in fact, that 56kbps line has 22 public access workstations on it. Furthermore, access to information *resources* is not provision of networked *services*. National goals related to "connectivity" alone may be short-sighted. NII goals to provide a range of government services (United States Advisory Council on the National Information Infrastructure, 1996) to the public will require better connectivity at public libraries than 28.8kbps modems.

As discussed elsewhere, (McClure and Bertot, 1997b) public libraries exist in a range of very different environments using multiple types of connections, receiving various types of state and local assistance and working in consortia, and serving communities that oftentimes vary considerably from library to library. In this context, the key issue now is less the degree to which the nation's public libraries are connected, but rather:

• The degree to which specific levels of connectivity (e.g., 28.8kbps versus a T1 leased-line) affect services development and the extent and types of Internet-based services that public libraries can provide given that connection;

• The extent to which public library Internet connectivity and Internet-based services meet community information needs;

• How public library information technology infrastructures are evolving, their costs, the degree to which these infrastructures integrate various electronic and networked services, and how these infrastructures are being funded; and

• The specific criteria necessary to assess when universal service to the public has been accomplished as per the *Telecommunications Act of 1996*.

Although information on connectivity, use, and costs -- as reported in this study--are important, policymakers and the public library community may need to reassess the types of national data that will be required in the future to continue the discussion of the role of public libraries in the NII and the evolving global networked environment.

The next section presents the 1997 study methodology and findings.

STUDY RESULTS

The study gathered data from a national sample of public libraries concerning the current level of public library involvement with the Internet. The data collection occurred between May and July 1997. The purpose of this study was to: (1) Provide policy makers, researchers, and library professionals with

longitudinal data that measured changes in public library Internet involvement since the first and second *Public Library* Internet studies (Bertot, McClure, and Zweizig, 1996; McClure, Bertot, and Zweizig, 1994); (2) Identify costs for public library Internet services, and describe the relationship between costs and Internet service provision; (3) Establish baseline data for library telecommunications and public Internet access infrastructure; (4) Assist public libraries develop IT plans that incorporate electronic networked services, to include the means through which to apply for the universal service discounts; and (5) Identify public library roles and capabilities in the evolving NII.

Methodology

Unlike the 1994 and 1996 studies which used the same public library sample, the 1997 study drew a new library sample that differed in three significant ways:

- It used a larger sample size of 2,000 public library systems, rather than the sample of 1,500 in the previous studies;
- It did not use the region strata (Midwest, Northeast, South, or West), but rather a metropolitan status strata of CC=Central City (Urban), NC=Metropolitan Area, but not within central city limits (Suburban), NO=Not in a Metropolitan Area (Rural); and
- It used redefined population of legal service area strata of million+, 500,000-999,999, 100,000-499,999, 25,000-99,999, 5,000-24,999, and less than 5,000, rather than million +, 500,000-999,999, 250,000-499,999, 100,000-249,999, 50,000-99,999, 25,000-49,999, 10,000-24,999, 5,000-9,999, and less than 5,000.

The new sample does provide for comparative analysis of 1994, 1996, and 1997 data along the population of legal service area strata, with some adjustments. It also allows for overall findings comparisons. Where possible, therefore, the analysis provides longitudinal data.

Survey Instrument Development

The study team based the initial draft of the survey instrument on the form used in 1996, making modifications to reflect the current Internet technology and policy environment, Internet cost factors, and public library management issues. In addition, an Advisory Board for this study provided suggestions for topics to address concerning public library involvement with the Internet. The 1997 survey incorporated key questions from the 1994 and 1996 surveys to provide longitudinal data for 1994-1996 public library Internet involvement changes. In March 1997, the Advisory Board reviewed a draft of the survey instrument. The study team used the comments from the Board, OITP staff, and NCLIS staff to produce a second version of the survey instrument.

Board members each pre-tested the second draft of the survey instrument with at least five librarians of the type who would receive the final questionnaire. By April 7, 1997, the study team received 32 completed pretest instruments along with comments from the Board members. The study team finalized the survey instrument on April 14, 1997, and mailed out the final survey to participating public libraries during the first week of May 1997 with a request for response by May 23, 1997 (see Appendix B for a copy of the final survey instrument).

Survey Procedures

This study employed a number of techniques to increase the likelihood of prompt response from libraries:

•Sending a postcard via first-class mail to sampled libraries one week before the survey mailing to alert the library director that the survey would be coming. The postcard explained the importance of a prompt response and asked the library director to notify the survey office if a survey was not received as of May 7, 1997 (see Appendix B for a copy of the postcard);

•Sending each state FSCS Data Coordinator a survey packet that included a letter describing the survey to encourage study participation, a copy of the survey, and a list of their respective state's sampled libraries prior to the mailing of the library survey;

•Sending a cover letter on ALA stationary and signed by both ALA president Mary Somerville and NCLIS chairperson Jeanne Hurley Simon along with the survey. The letter explained the purpose of the survey and stressed the importance of prompt response (see Appendix B for a copy of the letter);

•Providing notices in pertinent library and ALA, NCLIS, and PLA literature to announce the conduct of the survey;

•Mailing surveys via first-class mail with a first-class stamp affixed to the return envelope;

•Performing a second mailing of the survey in June 1997 to 500 selected non-responding libraries to increase the response rate within certain metropolitan status and population of legal service area strata;

•Faxing each state library agency with non-responding libraries a list that included the names of non-responding libraries in early June 1997. The fax asked for assistance in increasing the response rate. The FSCS State Data Coordinators proved especially helpful in increasing the survey's response rate;

•Staying in contact with and providing frequent study updates to FSCS State Data Coordinators through a listserv established specifically for Data Coordinators.

•Making the survey available on a Web site in Adobe PDF format so that those libraries with access to the Web could download a copy of the survey for completion;

•Returning respondent phone call and e-mail queries concerning survey questions and procedures; and

•Faxing and mailing additional copies of the survey to libraries requesting replacement surveys.

The cooperation of the state library agencies was instrumental in the ability of the researchers to obtain a high response rate in a matter of a few months. Indeed, many state librarians sent participating libraries

separate letters requesting library participation in the study.

Sampling and Data Analysis Procedures

With assistance from NCES, the researchers drew a weighted sample of public library administrative units. The sample was selected from the Public Library Data 1994 Universe File of public libraries maintained by NCES (NCES, 1997). According to the Universe File, there are 8,921 public library systems in the United States.

Based on the above technique, a sample was drawn of 2,000 public library systems. A total of 1,426 surveys were returned, for a response rate of 71.3%.

In drawing the original sample, the public library Universe File was stratified by library legal service population class (the legal service population classes were as follows: million+, 500,000-999,999, 100,000-499,999, 25,000-99,999, 5,000-24,999, and less than 5,000) and, within legal service population class, by three metropolitan status codes (the metropolitan status groupings were as follows: CC=Central City [Urban], NC=Metropolitan Area, but not within central city limits [Suburban], NO=Not in a Metropolitan Area [Rural]). The sample was selected by NCES using a systematic probability proportional to size sampling procedure, the measure of size being the square root of library legal service area. (For more detailed information on the sampling technique used in this study and the drawing of the sample from the NCES Public Library Universe File, contact Steven Kaufman at NCES or John Bertot at the University of Maryland Baltimore County).

This sampling method assigns each sampled library a weight to reflect its contribution to the estimates for the population stratum to which it belongs. The sample included all larger libraries (those servings populations above 100,000), and thus those libraries each received a weight of one. Libraries serving smaller communities received larger weights to the degree that the proportion of their stratum sampled was smaller. Furthermore, after determining the final response rate, adjustments were made to the weights within sampling strata to allow national estimates that compensated for non-responding libraries.

Figure 1- Survey Response Rate

In order to produce a national estimate, it is necessary to adjust and sum the weights for the libraries that furnished a value. This provided a nationally estimated count of the libraries with that value. For example, to estimate the number of libraries with an Internet connection (question 4 on the 1997 survey), the adjusted weights of all responding libraries that indicated they had some type of an Internet connection were summed.(3) Percentages were then calculated in the conventional way.

Any estimates to be derived in the future from this data set will need to follow these same procedures of computing estimates from the weights. Direct calculations from the sample data will not produce correct estimates.

Because the weights were determined within the population and metropolitan status strata, it is possible to make estimates for the population and metropolitan status levels and through aggregation for the national level. Because of the sample size and the weighting procedure, estimates cannot be made for individual states or for other classes that might be of interest, such as consortia or library systems. The sample design was constructed in this manner in order to keep the sample size as small as possible and to allow a rapid reporting of data in this dynamic research area. Producing estimates at the state level would require such a large sample size that it would approach the population of libraries and would lose the

advantage of a quick response survey.

Figure 2- Number of Public Libraries by Population of Legal Service Area and Metropolitan Status Code

It is possible to infer the quality of the estimates from the sample quality achieved as shown in Figure 1 and from the close match between estimates of expenditures from this sample and population data reported by NCES (1997). However, readers should keep in mind that the quality of estimates is directly related to the numbers of libraries providing responses. In producing national estimates, the re-weighting of responding public library data compensates for non-responding public libraries. The questions skipped or left blank by responding public libraries, however, do affect the national estimates. Overall response within question response rates is not included, though, due to the weighted sample--one library response does not correspond to one library estimate--making the calculation of a within-question response rate impractical.

It is possible, however, to provide approximates of the number of public library systems in each of the strata (see Figure 2). Such estimates are more readily possible for the population of legal service area strata than the metropolitan status strata due to the nature of the Universe File and the File's classification of library administrative units (see Appendix C for a more detailed discussion of this issue). Indeed, due to the nature of the Universe File, it is not possible to determine the metropolitan status assignments for 297 public library systems.

Longitudinal Comparisons

To make direct comparisons between the 1996 and 1997 data, a set of key questions was asked in a similar and/or identical fashion (see Figure 3). Other questions are not comparable with 1994 or 1996 data because of modifications in the questions made to reflect changes in public library Internet involvement and technology.

Due to space and time considerations, this report does not present all possible 1994-1997 data comparisons. Rather, the report depicts selected comparative data.

Figure 3. 1994-1997 Longitudinal Data

Readers should note that the survey collected data from library systems, not branches. While only 16.3% of library systems have branches (NCES, 1997), 75% of those that do serve population of legal service areas of greater than 25,000. Thus, a substantial portion of the U.S. population is served by library systems with branches. Internet connectivity at the branch level is unknown at this time.

Quality of Data

An analysis of respondents indicated no non-response bias. The survey results are representative of national demographics indicating excellent representation of the broader public library population (see Figures 1 and 4). As shown in Figure 4, public library operating expenditures and FTEs have increased since the most recent 1994 data provided by NCES.

Some Public Library Demographics

Public library expenditures and number of employees vary by both population of legal service area and metropolitan status. As library population of legal service area increases, so does the number of full-time equivalents (FTEs) and operating expenditures. The national average of FTEs is 19.3, with the average public library having operating expenditures last fiscal year of $632,948.19 (see Figure 4). These figures closely match those found by NCES (1997), providing additional verification of the quality of the data.

Figure 4- Library FTEs and Operating Expenditures by Population of Legal Service Area and Urban/Rural Status

Figure 4 also clearly shows that, as library population of legal service area increases, so too does the average number of library FTEs and the average operating expenditures. Figure 4 indicates, however, that the distribution of public library operating expenditures, as well as the number of FTE staff, is not even across metropolitan areas. Operating expendi-tures for the last fiscal year and FTEs were greatest in urban (CC) libraries, followed by suburban (NC) libraries, and rural (NO) libraries.

Accessing the Internet

This section of the report presents findings concerning motivations and factors affecting public library involvement with the Internet.

Factors Affecting Public Library Involvement with the Internet

Figure 5- Factors Affecting Library Internet Connectivity by Population and Urban/Rural Status for Non-Connected Libraries

Several factors affect library involvement with the Internet for connected and non-connected public libraries. As Figure 5 indicates, non-connected public libraries consider all identified factors to be important in determining public library Internet involvement, with importance ratings ranging from 1.03 to 1.75 (1=very important, 5=very unimportant). Key factors affecting non-connected public library Internet involvement include telecommunications costs (1.03), followed by hardware/systems costs (1.0 8), the availability of state/federal money (1.16), and a tie between the availability of staff time to develop expertise on the Internet and Internet connection maintenance issues (1.9). In general, the data show that as public library population of legal service area decreases, the importance of the factors increases, particularly those factors related to Internet services costs. The data indicate that non-connected urban (CC) and rural (NO) libraries tend to consider the involvement factors more importantly than do non-connected suburban (NC) libraries.

Figure 6- Factors Affecting Library Internet Connectivity by Population and Urban/Rural Status for Connected Libraries

As Figure 6 demonstrates, connected public libraries also consider all factors associated with Internet service provision to be important, but somewhat less so that non-connected libraries with importance ratings ranging from 1.69 to 2.71 (1=very important, 5=very unimportant). Key factors affecting connected public library involvement with the Internet include telecommunications costs (1.69), followed

by the availability of staff time to develop expertise on the Internet (1.70), hardware/systems costs (1.80), the availability of in-house computer expertise (1.81), and the availability of state/federal money (1.85). The data show little difference in importance ratings between connected urban (CC), suburban (NC), and rural (NO) libraries. Of interest, however, is that rural libraries rate the telecommunications costs as being less important (1.77) than do urban and suburban libraries, with ratings of 1.59 and 1.77 respectively.

The Current State of Public Library Internet Connectivity

The following section details the current state of public library connectivity, including the percentage of public libraries connected to the Internet, the type(s) of Internet connection public libraries have, the future Internet connectivity plans non-Internet connected public libraries have, the type of network connection provider public libraries use, and the estimated cost of public library Internet services. Comparisons to the 1994 and 1996 *Public Library Internet* studies are made where possible.

Percentage of Public Libraries Connected to the Internet and Population Served

Figure 7. 1996-1997 Public Library Internet Connectivity and Average Months Connected by Population of Legal Service Area and Urban/Rural Status

At present, 72.3% of all public libraries have some type of Internet connection (see Figure 7). This is an increase of 27.7% from the 44.6% level of public library connectivity in 1996, and an increase of 49.8% from 1994. The data, however, show a clear pattern of connectivity by population of legal service area--library systems that serve populations of 25,000 and above enjoy a better than 90% connectivity rate (ranges from 92.5% for libraries with population of legal service areas of 25,000-99,999 and 100.0% for libraries with population of legal service areas of greater than one million). As Figure 7 indicates, the largest increases in public library Internet connectivity occurred in libraries with population of legal service areas between less than 5,000 and 99,999 (percentage increases ranging from 18.4% to 32.3%). It is worth noting, however, that libraries with population of legal service areas of greater than one million increased their Internet connectivity by 18.0% as well. On average, public libraries with larger population of legal service areas have had Internet connections the longest, with established connections ranging from 7.7 months for libraries with population of legal service areas of less than 5,000 up to 24.0 months for libraries with population of legal service areas of 500,000-999,999.

Public library Internet connectivity varies greatly by metropolitan status, with 86.9% of urban (CC) libraries connected to the Internet, followed by 83.5% of suburban (NC) libraries, and 66.0% of rural (NO) libraries (see Figure 7). Urban (CC) public libraries have been connected to the Internet for an average of 16.1 months, followed by suburban (NC) libraries with 14.3 months, and rural (NO) libraries with 8.4 months.

Figure 8. Public Libraries Planning to Connect to the Internet in the Next 12 Months by Population of Legal Service Area and Urban/Rural Status

When public libraries not currently connected to the Internet were asked to indicate future Internet connectivity plans, 48.6% stated that their libraries planned to have some type of Internet connection by May 1998 (see Figure 8). Of that 48.6%, 6.8% indicated that the library planned to have a library staff

only Internet connection, while 41.8% indicated that the library planned to have a library staff and public access Internet connection. As public library population of legal service area decreases, the percentage of public libraries indicating no Internet connection plans increases (percentages ranging from 0.0% for libraries serving populations of greater than 100,000 to 67.9% for libraries serving populations of less than 5,000). Public libraries that serve larger population of legal service areas, therefore, will continue to have greater percentages of public library Internet connections in general and public access-capable connections in particular. Indeed, nearly all public libraries that serve population of legal service areas of greater than 25,000 will have some type of Internet connection by May 1998.

As Figure 8 shows, future public library Internet connection plans vary dramatically by metropolitan status. A majority--59.2%--of public libraries in rural (NC) areas indicate that their libraries have no plans to connect to the Internet, whereas an overwhelming majority--100.0% for urban (CC) libraries and 75.9% for suburban (NC) libraries--will have some type of Internet connection by May 1998. More importantly, a majority of those connecting urban and suburban libraries will provide public access to the Internet, with 91.7% and 59.6% respectively. [Note: The survey collected connectivity data from library systems, not branches. For the 16.3% of systems with branches, the extent of branch level connectivity/planned connectivity is not known.

Figure 9. 1994-1997 Connectivity and Projected Public Library Internet Connectivity

Figure 9 provides a slightly different view of the past, current, and future state of public library Internet connectivity. Of the 20.9% of public libraries connected to the Internet in 1994, slightly more public libraries provided public access Internet services (12.7%) than Internet services for library staff only (8.2%). In 1996, the growth in public access Internet services increased to 27.8% with only 16.6% of public libraries having library staff only Internet connections. For 1997, 11.9% of public libraries have library staff only access to the Internet, while 60.4% provide some type of public access to the Internet. Should public libraries not currently connected to the Internet follow-through with their connection plans by May 1998, 85.8% of public libraries will have some type of Internet connection, of which 75.3% will provide public access Internet services and 10.5% will provide library staff only Internet services. More public libraries that are connecting to the Internet, therefore, are providing public access Internet services than library staff only Internet services. Indeed, the percentage of public libraries connecting to the Internet for only staff use is decreasing. The authors note that the estimated 1998 public access figures may be underestimated due to some public libraries that currently have library staff only connections offering public access Internet services in the future.

Figure 10. U.S. Population Served by Public Libraries Connected to the Internet

Public library connectivity and planned connectivity presents only part of the Internet connection picture. A compelling question to answer is "What is the estimated population served by connected public libraries?" By using population of legal service area data contained in the public library Universe File (NCES, 1997), an estimated 90.8% of the U.S. population is served by a connected public library (see Figure 10). Of that 90.8%, 78.2% of the U.S. population has access to a public library that provides public access Internet services, while 12.6% have access to libraries that have library staff-only access to the Internet. By combining planned Internet connectivity and population data, nearly the entire nation--97.1%--will have access to a connected public library (see Figure 10). More importantly, a vast majority of the U.S. population--91.3% will have access to a library with public access Internet services. [Note: Although only 16.3% of public library systems have branches, those that do repr esent significant

portions of the U.S. population. Indeed, over 75% of library systems with branches have population of legal service areas of greater than 25,000. Branch connectivity data is not available currently.]

Type of Internet Connection, Connection Costs, and Connection Ratings

Figure 11. Connected Public Libraries with Dial-Up, Leased-Line, and Both Dial-Up and Leased-Line Connections by Population of Legal Service Area and Urban/Rural Status

The following data details the type of Internet connection, bandwidth and speed of the connection, number of connection lines, and annual Internet connection costs. The percentages presented for this section will not total to 100.0%. The survey asked libraries to list all the types of connections and access speeds of their Internet connections and, as the data show, many libraries have multiple types of connections (see Figure 11).

As Figure 11 demonstrates, public libraries tend to have both dial-up and leased-line Internet connections. The data indicate, however, that larger library systems tend to have the greater percentage of both leased-line and dial-up connections, whereas smaller library systems tend to have dial-up connections. It is also worth noting that a clear majority (percentages ranging from 55.1% for libraries serving population of legal service areas of greater than 25,000 to 89.6% of libraries serving populations of legal service areas of greater than one million) have leased-line Internet connections. A majority of urban (CC) libraries have leased-lines with 64.1%, followed by suburban (NC) libraries with 47.0%, and rural (NO) libraries with 30.1%. Clearly, rural libraries rely on dial-up Internet connections (74.6%).

Figure 12. Libraries with No Dial-Up or Leased-Line Connections by Population of Legal Service Area and Urban/Rural Status

Figure 12 demonstrates further the pattern of dial-up versus leased-line connectivity, with smaller libraries (those serving populations of less than 99,999) tending not to have leased-lines (ranges from 26.4% to 31.2%). A similar pattern emerges with rural (NC) libraries, with 32.9% of rural libraries not having a leased-line connection.

Dial-Up and Leased-Line Connections

Figure 13. Public Library Type of Dial-Up Internet Connection by Population of Legal Service Area and Urban/Rural Status

As Figure 13 shows, the most common type of dial-up Internet connection is Internet gateway access (e.g., a commercial provider such as America On-Line) with 36.4%. This is followed by 33.4% of public libraries having a workstation Serial Line Internet Protocol (SLIP) or Point-to-Point (PPP) connection and 21.0% of public libraries having terminal/text-based access. Overall, therefore, a majority of libraries--69.8%--have some type of graphical dial-up Internet connection. It is interesting to note that text/terminal access to the Internet decreased by 25.2% since 1996. The use of text/terminal access has decreased more so in libraries that serve populations of under 25,000.

Of interest in terms of metropolitan area dial-up connectivity is that a greater percentage of rural (NO)

libraries have either an Internet gateway (41.7%) or SLIP/PPP (36.5%) connection than do urban (CC--32.1% and 29.0% respectively) and suburban (NC--29.1% and 29.5% respectively) libraries (see Figure 13). Based on the connectivity duration data presented in Figure 7, this stands to reason as rural libraries have only recently begun to connect to the Internet, thus enabling them to move directly into a graphical form of dial-up connectivity.

Figure 14. Maximum Speed of Public Library Dial-Up Connection by Population of Legal Service Area and Urban/Rural Status

As shown in Figure 14, most library dial-up connections operate at a rate of 28.8kbps with 49.2% of connected libraries (35.6% for all public libraries), followed by 18.6% operating at 14.4kbps (13.4% for all public libraries), 15.1% operating at 33.6kbps (10.9% for all public libraries), and 10.3% operating at 56kbps (7.4% for all public libraries). Perhaps due to the more recent connections of smaller public libraries (see Figure 7), libraries serving population of legal service areas of under 24,999 tend to have 28.8kbps or better dial-up connections. Very few public libraries use ISDN (64kbps or 128kbps) or cable dial-up connections. Those that do, however, serve populations of greater than 500,000.

As Figure 14 indicates, dial-up connection speed varies by metropolitan status, with rural (NO) libraries tending to have faster dial-up connection speeds as opposed to urban (CC) and suburban (NC) libraries. Nearly half of rural public libraries--46.4%--have a 28.8kbps connection, followed by a 33.6kbps connection with 17.9%, and a 56kbps connection with 12.2%. A majority of urban (51.6%) and suburban (53.6%) libraries, however, have a 28.8kbps con-nection, followed by 9.7% and 11.4% respectively with a 33.6kbps connection, and 7.6% and 7.6% respectively with a 56kbps connection. If at all, urban and suburban libraries make use of Integrated Services Digital Network (ISDN) and cable dial-up connections.

Figure 15. Average Number of Dial-Up Lines by Population of Legal Service Area and Urban/Rural Status

The average number of phone lines for the 14.4kbps-56kbps dial-up connections is 2.2, with the average number ranging from 1.2 for libraries with population of legal service areas of less than 5,000 to 27.6 for libraries with population of legal service areas of one million or greater (see Figure 15). Libraries serving population of legal service areas of greater than 500,000 have the greatest number of ISDN lines (64kbps and 128 kbps). In general, however, libraries that serve smaller populations do not use ISDN technologies for dial-up Internet connectivity. Figure 14 also indicates that urban (CC) library systems tend to have more dial-up lines than do suburban (NC) and rural (NO) libraries.

Figure 16. Average Cost of Dial-Up Lines by Population of Legal Service Area and Urban/Rural Status

Figure 16 shows the average annual costs for public library dial-up connections. On average, annual POTS (Plain Old Telephone Service) lines cost libraries $548.09, while annual 64kbps 1B+D ISDN service costs $1,076.87, 128kbps 2B+D ISDN service costs $5,021.38, and cable service costs $1,522.72. The data, however, show no clear average cost patterns between the population of legal service area categories. For costs by metropolitan status, however, a pattern does emerge. The data indicate that average POTS costs between urban (CC), suburban (NC), and rural (NO) libraries are relatively similar, with average urban costs of $684.78, average Suburban costs of $518.96, and average rural costs of $548.59. For 128kbps ISDN service, though, urban and suburban libraries pay substantially less

($2,449.23 and $1,269.86 respectively) than do rural libraries ($14,314.46).

While the cost data presented accurately reflect the responses provided by participating libraries, readers should note the difficulty libraries have in determining Internet-related costs. Appendix A discusses these difficulties in detail.

Figure 17. Public Library Type and Maximum Speed of Leased-Line Connection by Population of Legal Service Area and Urban/Rural Status

Public libraries that access the Internet through leased-line connections are equally likely to do so through an on-line public access catalog (OPAC) gateway and a local area network (LAN), with 35.7% and 34.9%, respectively (see Figure 17). A fair percentage of public libraries, 22.7%, also access the Internet through a wide area network (WAN). Although not depicted in Figure 16, the percentage of OPAC access decreased by 13.0% and LAN access decreased by 2.7% since 1996. It is interesting to note that the percentage of smaller public libraries using LAN technologies has increased since the 1996 study, particularly for public libraries serving population of legal service areas of under 25,000. Meanwhile, public libraries serving population of legal service areas of over 25,000 are increasingly using WAN connection technologies. Figure 17 also shows that public libraries in suburban (NC) areas make the most use of OPAC connectivity with 40.5%, whereas rural (NO) libraries make the most use of LAN connectivity with 42.2%.

Interestingly, the use of WAN connectivity is nearly even across urban (CC), suburban (NC), and rural (NO) libraries, with 28.7%, 22.4%, and 21.3% respectively.

Public libraries with leased-line Internet connections most commonly access the Internet through a 56kbps line (see Figure 17) with 56.1%, followed by a T1 line with 26.9%, and Other with 9.4% (e.g., ATM switched networks, wireless technologies). The data show that libraries make little use of ISDN connections (1.7% for 64kbps 1B+D service, and 5.8% for 128kbps 2B+D service). It is noteworthy that urban (CC) libraries make the most use of T1 connections with 38.7%, followed by suburban libraries with 27.0% and rural libraries with 22.9%.

Figure 18. Average Number of Leased-Lines by Population of Legal Service Area and Urban/Rural Status

On average, libraries have 2.1 56kbps lines and 1.8 T1 lines (see Figure 18). Although few libraries use ISDN connections, those that do have an average of 4.0 lines for 64kbps 1B+D service and 3.3 lines for 128kbps 2B+D service. As expected, the average number of 56kbps (range of 1.3 to 28.5), T1 (range of 1.0 to 9.7), and ISDN (range of 0.0 to 62.0) lines increases as does the population of legal service area. Urban (CC) libraries have the greatest average number of lines for 56kbps connectivity (28.5 lines), T1 connectivity (9.7 lines), 64kbps 1B+D connectivity (5.3 lines), and 128kbps 2B+D connectivity (7.1 lines).

Figure 19. Average Cost of Leased-Lines by Population of Legal Service Area and Urban/Rural Status

As Figure 19 shows, the average annual cost for a T1 line is $7,396.66, followed by $2,806.41 for a 128kbps 2B+D line, $2,693.70 for a 56kbps line, and $1,342.65 for a 64kbps 1B+D line. The cost data, however, show no clear patterns of cost for the lines by either population of legal service area or

metropolitan status. Indeed, annual average costs for a 56kbps line in Rural (NO) areas is less--$1,918.47--than in urban (CC) and suburban (NC) libraries, with $3,516.71 and $3,756.12 respectively. On the other hand, a T1 line is more costly for rural libraries ($8,003.54) than for urban ($7,267.98) and Suburban ($7,145.56) libraries.

Public Library Connection Ratings

Figure 20. Library Adequacy of Internet Connection by Population of Legal Service Area and Urban/Rural Status

Overall, libraries rate their Internet connections on the cusp between adequate and somewhat inadequate (See Figure 20). Libraries indicate little trouble with accessing a reliable Internet service provider (ISP) with a rating of 2.22 (1=Very Adequate, 5=Very In-adequate), followed by having sufficient bandwidth (e.g., speed of connection) with a rating of 2.80, LAN capabilities (e.g., speed, capacity) with a rating of 2.82, accessing multi-media information (e.g., full motion video, sound, images) with a rating of 3.20, and availability of public access Internet workstations with a rating of 3.26. The data further show that, generally, as library population of legal service increases, dissatisfaction with the library's Internet connection increases. The exception to this is the "accessing a reliable ISP" response, with larger library systems expressing greater satisfaction with their ability to access reliable ISPs. It is interesting to note that rural (NO) libraries tend to rate their library's Internet connection less favorably than do urban (CC) and suburban (NC) libraries for multi-media capabilities and public access workstations. Conversely, rural libraries rate their connections more highly than do suburban and rural libraries for bandwidth and LAN capabilities.

Internet Public Library Uses and Public Access Services

This section details the types and extent of public access Internet services that public libraries make available to patrons, and library ratings of library public access technologies.

Public Library Provision of Public Access Internet Services

For this section, the survey asked public libraries to indicate the Internet-based services to which they provided public access. Responding libraries could answer in the following ways: "No", "At Main/Central Library Only", "At Main/Central Library and All Branches", and "At Main/Central Library and Some Branches". Readers should note the following:

•Not all public library systems have a central or main library. Those that do not were asked to answer the questions as though they did; and

Figure 21. Public Library System Branches by Population of Legal Service Area

•A vast majority of public library systems do not have branches, particularly library systems that serve populations of legal service areas of under 25,000 (see Figure 21). Those that do not would therefore

answer the public access services questions with the "At Main/Central Library Only" choice. As such, those libraries will show a defficiency of public access services to the "At Main/Central Library and All Branches" and "At Main/Central Library and Some Branches" options.

Readers should keep these two factors in mind as they read the following section on types of public library Internet services.

Also, Figures 22-33 provide both connected and total public library data. For presentation purposes, this section only discusses the connected library data.

Figure 22. Public Libraries Providing Public Access by Population of Legal Service Area and Urban/Rural Status

Overall, a majority of public libraries provide some type of public access Internet services (see Figure 22). However, libraries do not provide public access equally to all services.

Figure 23. Public Libraries Providing Public Access E-mail Internet Services by Population of Legal Service Area and Urban/Rural Status

Of connected libraries, 82.0% do not provide public access to e-mail services, while 12.8% provide public access to e-mail services at the Main/Central Library, 3.9% at the Main/Central Library and All Branches, and 1.2% at the Main and Central Library and Some Branches (see Figure 23). The data indicate that libraries that serve population of legal service areas of 5,000-24,999 and less than 5,000 provide the highest percentage of public access e-mail services in the Main/Central Library with 11.3% and 19.9% respectively. Figure 23 also shows that libraries that serve population of legal service areas of 500,000-999,999 and over one million provide the highest percentage of e-mail services in the Main/Central Library and All Branches, with 15.4% and 16.0% respectively. Of further interest is that rural (NO) libraries provide the highest percentage of public access e-mail services in the Main/Central Library with 16.5% (see Figure 23).

Figure 24. Public Libraries Providing Public Access Newsgroup Internet Services by Population of Legal Service Area and Urban/Rural Status

As Figure 24 demonstrates, 71.9% of connected libraries do not provide public access newsgroup services, followed by 20.5% that provide public access to newsgroup services at the Main/Central Library, 5.7% at the Main/Central Library and All Branches, and 1.9% at the Main and Central Library and Some Branches. Libraries that serve population of legal service areas of under 99,999 provide the highest percentage of public access newsgroup services at the Main/Central Library (range of 16.4% to 23.8%), while libraries that serve population of legal service areas of over 500,000 provide the highest percentage of public access newsgroup services at the Main/Central Library and All Branches (range of 10.4% to 20.0%). Suburban (NC) and rural (NO) libraries provide the highest percentage of newsgroup services at the Main/Central Library, with 21.0% and 20.7% respectively. Urban libraries (CC) provide the highest percentage--10.9%--of public access newsgroup services at Main/Central Libraries and All Branches.

Figure 25. Public Libraries Providing Public Access FTP Internet Services by Population of Legal Service Area and Urban/Rural Status

Overall, 59.4% of connected public libraries do not provide public access to FTP (File Transfer Protocol) services, followed by 29.2% that provide public access to FTP services at the Main/Central Library, 9.2% at the Main/Central Library and All Branches, and 2.3% at the Main and Central Library and Some Branches (see Figure 25). Libraries that serve populations of under 100,000 provide the greatest public access to FTP services in Main/Central Libraries (range of 33.0% to 52.9%), while libraries that serve population of legal service areas of over one million and 500,000-999,999 provide the highest percentage of public access FTP services in Main/Central Libraries and All Branches with 31.5% and 41.1% respectively. Of interest is that nearly the same amount of urban (CC), suburban (NC), and rural (NO) libraries provide FTP services in Main/Central Libraries, with 26.1%, 27.2%, and 30.8% respectively.

Figure 26. Public Libraries Providing Public Access Text-based World-Wide Web Internet Services by Population of Legal Service Area and Urban/Rural Status

Of the public libraries that provide text-based public access Web services, 28.7% provide such services at the Main/Central Library, followed by 9.5% that provide text-based Web services at the Main/ Central Library and All Branches, and 2.6% that provide text-based Web services at the Main/Central Library and Some Branches (see Figure 26). Overall, public libraries that serve population of legal service areas of under 100,000 provide the greatest public access to text-based Web services in Main/Central Libraries (range of 22.5%-38.8%), while libraries that serve population of legal service areas of over 100,000 provide the highest percentage of public access text-based Web services in Main/Central Libraries and All Branches (range of 30.2% to 54.4%). It is interesting to note that Rural (NO) libraries provide the highest percentage--30.8%--of access to text-based Web services in Main/Central Libraries, whereas urban (CC) libraries provide the highest percentage--25.1%--of text-based access in Main/Central Libraries and All Branches.

Figure 27. Public Libraries Providing Public Access Graphical World-Wide Web Internet Services by Population of Legal Service Area and Urban/Rural Status

As Figure 27 indicates, only 27.9% of connected public libraries do not provide public access to graphical Web services. This is followed by 54.4% of public libraries that provide public access to graphical Web services at the Main/Central Library, 12.7% at the Main/Central Library and All Branches, and 5.0% at the Main and Central Library and Some Branches. Libraries that serve populations of under 100,000 provide the greatest public access to graphical Web services in Main/Central Libraries (range of 44.6% to 61.6%), while libraries that serve population of legal service areas of over 100,000 provide the highest percentage of public access graphical Web services in Main/Central Libraries and All Branches (range of 32.1% to 45.6%). Rural (NO) libraries provide the greatest public access to graphical Web services in Main/Central Libraries with 61.1%, followed by 46.8% of suburban (NC) libraries and 35.3% of urban (CC) libraries. Urban (CC) libraries provide the highest percentage--26.4%--of graphical access in Main/ Central Libraries and All Branches.

Figure 28. Public Libraries Providing Public Access Online Database Services by Population of Legal Service Area and Urban/Rural Status

Overall, 73.7% of public libraries do not provide public access to online database services, followed by 17.9% that do provide public access to online database services at the Main/Central Library, 6.9% at the Main/Central Library and All Branches, and 1.4% at the Main and Central Library and Some Branches (see Figure 28). Libraries that serve population of legal service areas of 25,000-99,999 and 5,000-24,999

provide the greatest percentage of public access to online database services at the Main/Central Library with 20.3% and 20.8% respectively. Libraries that serve population of legal service areas of over one million and 500,000-999,999 provide the largest percentage of public access to online database services at the Main/Central Library and All Branches with 41.9% and 47.8% respectively. Suburban (NC) libraries provide the highest percentage--24.2%--of public access to online databases at the Main/Central Library, whereas urban (CC) libraries provide the highest percentage--22.7%--of public access to online databases at the Main/Central Library and All Branches.

Figure 29. Public Libraries Providing Public Access Online CD Services by Population of Legal Service Area and Urban/Rural Status

Of the connected libraries that provide online access to CD services, 22.8% do so at the at the Main/ Central Library, 5.6% at the Main/Central Library and All Branches, and 2.3% at the Main and Central Library and Some Branches (see Figure 29). It is interesting to note that nearly the same percentage, with the exception of libraries that serve population of legal service areas of 500,000-999,999 (4.5%) and 100,000-499,999 (10.5%), provide similar access to online CD services (range of 21.2% to 24.7%). Libraries that serve population of legal service areas of greater than 100,000 provide the highest percentage of public access to online CD services at the Main/Central Library and All Branches (range of 17.7% to 21.2%). Urban (CC), suburban (NC), and rural (NO) libraries provide similar access to online CD services at the Main/Central Library, with access ranging from 19.1% to 24.8%. Urban libraries, however, provide the greatest percentage of access to online CD services at the Main/Central Library and All Branches with 17.2%.

Figure 30. Public Libraries Providing Public Access Online Reference Services by Population of Legal Service Area and Urban/Rural Status

A majority of public libraries--70.3%--do not provide public access online reference services, followed by 24.9% that do provide access to such services at the at the Main/Central Library, 3.5% at the Main/Central Library and All Branches, and 1.3% at the Main and Central Library and Some Branches (see Figure 30). In general, as library population of legal service decreases, the provision of online reference services increases at the Main/Central Library. Conversely, as population of legal service area increases, so too does the provision of online reference services at the Main/Central Library and All Branches. Rural (NO) libraries provide the greatest percentage (27.4%) of public access online reference services at the Main/Central Library, whereas urban (CC) libraries provide the greatest percentage (9.5%) of public access online reference services at the Main/Central Library and All Branches.

Figure 31. Public Libraries Providing Public Access to Special Software/Hardware for Individuals with Disabilities by Population of Legal Service Area and Urban/Rural Status

Few public libraries provide special software/ hardware for individuals with disabilities (see Figure 31). Indeed, only 5.9% provide such services at the Main/Central Library, 3.3% at the Main/Central Library and All Branches, and 1.3% at Main/Central Library and All Branches. As the population of legal service area increases, so too does the provision special software/hardware for individuals with disabilities at the Main/Central Library and the Main/Central Library and All Branches. Urban libraries (CC) provide the greatest access to special software/hardware for individuals with disabilities at the Main/Central Library with 15.4%.

Remote/Dial-In Public Access Services

Figure 32. Remote/Dial-In Public Access Services by Population of Legal Service Area and Urban/Rural Status

Overall, 18.5% of connected libraries (13.4% of all public libraries) provide some type of public access remote/dial-in services (see Figure 32). Although readers might assume that urban and/or libraries that server larger population of legal service areas would be more likely to provide such dial-in services as opposed to rural and/or libraries that serve small population of legal service areas, this is not the case. Libraries that server population of legal service areas of more than one million provide the highest percentage of dial-in services with 26.1%; this is followed by libraries that serve population of legal service areas of 5,000-24,999 with 20.3%, libraries that serve population of legal service areas of less than 5,000 with 17.9%, and libraries that serve population of legal service areas of 25,000-99,999 with 17.6%. Of notable interest is that rural (NO) libraries provide the highest percentage of dial-in access with 21.1%, followed by urban (CC) libraries with 16.3%, and suburban (NC) libraries with 14.6%.

Public Access and Staff Workstations/Terminals

Figure 33. Type of Public Access and Librarian Terminals by Population of Legal Service Area and Urban/Rural Status

Public libraries provide substantially more graphical workstations than text-based terminals for public Internet access services with 72.9% and 38.2%, respectively (see Figure 33). As indicated, this is an increase of 45.2% for public access graphical workstations, and an increase of 3.7% for public access text-based terminals since 1996. In general, as the population of legal service area increases, so too does the percentage of graphical workstations (range of 69.7% to 88.8%) and text-based terminals (range of 26.0% to 79.4%). Libraries that serve population of legal service areas of greater than one million have the greatest percentage--94.6%--of library staff only workstations/terminals, whereas libraries that serve population of legal service areas of less than 5,000 have the lowest percentage--48.1%--of library staff only workstations/terminals. It is interesting to note that urban (CC), suburban (NC), and rural (NO) libraries have nearly the same percentage of public access graphical workstations (range of 70.4% to 79.1%). There is a marked difference, however, between urban, suburban, and rural library percentages of public access text-based terminals, with 59.4%, 46.9%, and 30.7% respectively. Urban libraries are substantially more likely to provide library staff only workstations/terminals than are rural libraries, with 94.3% and 59.6% respectively.

Figure 34. Number of Library System Public Access and Librarian Terminals by Population of Legal Service Area and Urban/Rural Status

In terms of average public access terminal or workstation numbers, however, libraries that serve population of legal service areas of greater than 100,000 have considerably more available public access text-based terminals (average number ranging from 42.6 to 218.0) and graphical workstations (average number ranging from 21.7 to 178.0) than do libraries that serve population of legal service areas of less than 100,000 (average number of text-based terminals ranging from 1.0 to 9.9, and average number of graphical workstations ranging from 1.8 to 6.5) (see Figure 34). Also, as public library population of legal service area increases, so too does the average number of library staff only workstations/terminals (range of 2.5 to 135.6). As Figure 34 shows, urban(CC) libraries have the largest average number of

workstations and terminals (38.0 terminals and 24.7 workstations), followed by suburban (NC) libraries (12.8 terminals and 5.8 workstations), and rural (NO) libraries (4.1 terminals and 3.0 workstations). Similarly, urban libraries have the most library staff only workstations/ terminals with 31.1, followed by suburban libraries with 10.2, and rural libraries with 4.2.

Public Library World-Wide Web Servers

Figure 35. Percentage of Libraries that have Web Pages by Population of Legal Service Area and Urban/Rural Status

As Figure 35 indicates, 14.4% of connected public libraries have Web servers, up from 2.8% in 1996. The data clearly show, however, that larger public libraries--those serving population of legal service areas of greater than 100,000--are more likely to have a Web server (range of 44.3% to 67.9%) than are libraries that serve population of legal service areas of under 100,000 (range of 6.5% to 23.8%). Rural (NO) libraries (8.8%) are substantially less likely than Urban (CC) and suburban (NC) libraries (39.8% and 19.0% respectively) to have a Web server. The percentage of libraries maintaining Web servers is up by 10.6% from 1996.

Public Library Ratings of Public Access and Staff Workstations

Figure 36. Public Library Ratings of Public Access Technology by Population of Legal Service Area and Urban/Rural Status

Public libraries generally disagree that their public access workstations are enough or sufficiently equipped for today's multi-media applications (see Figure 36). Indeed, libraries rate the adequacy of the number of public access workstations with a 3.33 (1=Strongly Agree, 5=Strongly Disagree) and the multi-media capabilities with a 3.40 (1=Strongly Agree, 5=Strongly Disagree). Libraries, however, indicate that the access that library staff have to workstations is adequate (rating of 2.30, with 1=Strongly Agree, 5=Strongly Disagree). The data show that as the population of legal service area decreases, dissatisfaction with the number of publicly available workstations increases (range of 2.65 to 3.56). In general, the same trend holds true for the sufficiency rating of library technology multimedia capabilities (range of 3.01 to 3.63). Staff access ratings vary, with the data showing no clear trend by population of legal service area.
Figure 36 also indicates that rural (NO) libraries are more likely to be dissatisfied with the number of public access workstations (rating of 3.40) than are urban (CC) and suburban (NC) libraries, with ratings of 3.17 and 3.26 respectively. It is interesting to note, however, that rural libraries rate their public access workstations more highly for multimedia capabilities (rating of 3.19) than do urban (rating of 3.46) and suburban libraries (rating of 3.39). This is perhaps the case due to rural libraries connecting to the Internet more recently than urban and suburban libraries, thus rural libraries would tend to have newer computing equipment.

Public Library Information Technology Costs, Internet Service Costs, and Future Library Connection Resource Allocation

This section presents annual public library IT and Internet cost expenditure data for the last completed fiscal year prior to the mail survey. The data reflect accurate estimates of library-provided IT and Internet expenditures, however, readers should note the following:

•Internet services are often provided via existing library technologies (e.g., OPACS, workstations, and terminals) and libraries cannot therefore attribute all of the OPAC costs to Internet service provision. It is difficult, at best, to separate and/o r estimate Internet service provision costs from such installed technologies;

•Not all library-based Internet services are paid for by the libraries. Rather, many libraries receive grants from a variety of sources such as the state library, private corporations, and philanthropic groups. It should also be noted that these grants take a variety of forms, such as equipment, telecommunications services, and software licenses. As such, libraries cannot fully estimate the costs of those services and/or in-kind contributions;

•Related to the above, many libraries benefit from and participate in a wide array of local, regional, or statewide network consortia that generally provide telecommunications and software licensing services. Further complicating this issue is that these consortia often receive financial and other support themselves, and member libraries receive services in a multitude of differing ways. For example, one participating library will receive more telecommunications lines than another, thus making it difficult to determine the average library's real consortia costs.

•Library budget reporting structures and mechanisms do not break out Internet costs. Thus, many respondents contacted the survey team indicating their inability (and, in some cases, unwillingness) to report Internet-specific costs.

These issues prompted the study team to select a small subset of regional and statewide library networks to further explore library Internet cost issues, models, and worksheets. The findings from this effort are presented in Appendix A.

Public Library IT and Internet Costs

Figure 37. Total Average IT Expenditures and Internet Expenditures for the Last Completed Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Public libraries spent an average of $69,041.91 on all library IT for the last completed fiscal year prior to the survey (see Figure 37). Not surprisingly, the average library IT expenditure increases as the library population of legal service area does (range of $12,491.88 for libraries that serve populations of less than 5,000 to $2,471,624.63 for libraries that serve populations of more than one million). Urban (CC) libraries, however, substantially outspend suburban (NC) and rural (NO) libraries, with average IT expenditures of $350,629.13, $78,214.35, and $26,094.96 respectively (see Figure 37).

Overall, libraries spent an average of 46.5% of their total IT budgets on Internet-related items (see Figure 37). In general, as the library population of legal service area increases, so too does the percentage of IT budget spent on the Internet (range of 42.0% to 55.9%). These percentages translate into an average library Internet expenditure of $32,104.00, with a range of $5,247.00 to $1,307,489.00. It is interesting to note that the percentage of library Internet expenditure as a percentage of library IT expenditures is relatively constant across urban (CC), suburban (NC), and rural (NO) libraries, with 49.8%, 49.2%, and 44.6% respectively (see Figure 37). In terms of average dollar amounts, however, urban libraries

substantially outspend suburban and rural libraries, with average expenditures of $174,613.00, $38,481.00, and $11,638.00 respectively.

Figure 38. Internet Cost Data by Category as a Percentage of Overall IT Expenditures by Population of Legal Service Area and Urban/Rural Status

The five most costly items for the provision of Internet-related services are system/server hardware with 24.7%, followed by staffing costs with 15.9%, telecommunications fees with 17.8%, communications hardware with 11.1%, and software costs with 10.6% (see Figure 38). Of particular interest is that rural (NO) libraries spend proportionately more on system/server hardware (37.4%) and telecommunications fees (20.7%) than do urban (23.4% for system/server hardware and 10.7% for telecommunications fees) and suburban (30.5% for system/server hardware and 14.3% for telecommunications fees) libraries.

Anticipated Public Library Internet Costs

Figure 39. Anticipated Internet Expenditures for Hardware Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 40. Anticipated Internet Expenditures for Software Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 41. Anticipated Internet Expenditures for Communications Hardware Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 42. Anticipated Internet Expenditures for Telecommunications Fees for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 43. Anticipated Internet Expenditures for Facilities Upgrade Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 44. Anticipated Internet Expenditures for Training and Education Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 45. Anticipated Internet Expenditures for Content and Resource Development Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 46. Anticipated Internet Expenditures for Program Planning and Management Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 47. Anticipated Internet Expenditures for Staffing Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figure 48. Anticipated Internet Expenditures for Maintenance Costs for the Next Fiscal Year by Population of Legal Service Area and Urban/Rural Status

Figures 39-48 present library estimates for anticipated Internet expenditures for the fiscal year following the survey. Libraries indicated their anticipated Internet expenditures with the following: Decline, Remain the Same, Increase 1-5%, or Increase More than 5%. By totaling the Increase 1-5% and Increase More than 5% categories, it is clear that libraries expect increases in nearly all cost categories. Libraries

expect their maintenance costs to increase the most with 64.0% indicating an increase (see Figure 48), followed by 56.9% for staffing costs (see Figure 47), 55.9% for training and education costs (see Figure 44), 53.7% for content and resource development (see Figure 45), 53.3% for telecommunications fees (see Figure 42), 49.9% for software costs (see Figure 40), 48.9% for hardware costs (see Figure 39), 45.5% for facilities upgrade costs (see Figure 43), 40.6% for program planning and management costs (see Figure 46), and 25.5% for communications hardware costs (see Figure 41).

As these figures indicate, public libraries of all population of legal service area and Urban/Rural categories will continue to invest in Internet-related technologies to enable electronic networked services.

Internet Costs Not Paid by Libraries

Figure 49. Percentage of Internet Costs Not Paid by Libraries by Population of Legal Service Area and Urban/Rural Status

The survey pre-tests and research conducted by the authors indicated that not all public libraries pay for some and/or all of their library's Internet services. As such, the survey asked libraries to indicate Internet costs for which they incurred no costs and to estimate the market value of those donated items and/or services. Readers should note that these contributions can take multiple forms such as donated equipment (e.g., workstations, routers), telecommunications services (e.g., telecommunications lines, Internet accounts), statewide licensing agreements (e.g., Dialog, Carl Uncover), and grants (e.g., monies for equipment, special content development projects). Moreover, libraries do not necessarily receive funding for all of a particular cost category. More often than not, libraries receive some type of matched-funding for a variety of cost categories, thus the percentages presented in Figure 49 likely represent portions of Internet costs not paid for by libraries, rather than absolute costs not paid for by libraries.

As Figure 49 indicates, the five most frequent costs not paid by libraries are system/server hardware with 29.5%, followed by software costs with 26.4%, communications hardware costs with 25.9%, training and education costs with 14.0%, and program planning and management costs with 12.0%. The data indicate a clear trend with a higher percentage of libraries that serve population of legal service areas of under 100,000 not paying for Internet-related cost items as opposed to libraries that serve population of legal service areas of over 100,000.

For libraries that serve population of legal service areas of under 100,000, the costs not paid for by libraries for system/server hardware ranges from 22.2% to 42.0%, as opposed to libraries that serve population of legal service areas of over 100,000 with a range of 0.0% to 14.8%; for libraries that serve population of legal service areas of under 100,000, the costs not paid for by libraries for software ranges from 21.2% to 30.0% as opposed to libraries that serve population of legal service areas of over with a range of 0.0% to 10.3%; for libraries that serve population of legal service areas of under 100,000, the costs not paid for by libraries for communications hardware costs ranges from 24.5% to 28.4% as opposed to libraries that serve population of legal service areas of over 100,000 with a range of 0.0% to 14.7%; for libraries that serve population of legal service areas of under 100,000, the costs not paid for by libraries for training and education costs ranges from 11.8% to 16.0% as opposed to libraries that serve population of legal service areas of over 100,000 with a range of 0.0% to 5.2%; and for libraries that serve population of legal service areas of under 100,000, the costs not paid for by libraries for program planning and management costs ranges from 10.8% to 14.1% as opposed to libraries that serve population of legal service areas of over 100,000 with a range of 0.0% to 5.2% (see Figure 49).

Also of particular interest is that rural (NO) libraries receive substantially more assistance for their Internet services than do urban (CC) and suburban (NC) libraries (see Figure 49). Rural libraries do not pay for 37.4% of their system/server hardware costs, 33.3% of software costs, 30.3% of communications hardware costs, 16.8% of training and education costs, and 14.5% of program and planning management costs. Clearly, rural libraries receive substantial assistance with Internet connection hardware and software--assistance targeted to provide rural libraries with basic Internet capabilities.

Figure 50. Average Internet Costs Not Paid by Libraries by Population of Legal Service Area and Urban/Rural Status

As Figure 50 indicates, the average library Internet cost not paid for by libraries is $9,877.69. As the population of legal service area increases so too does the average estimated dollar amount of costs not paid by libraries. Furthermore, urban (CC) libraries receive an average of $22,166.52 in Internet support, followed by $12,501.57 for suburban (NC) libraries, and $7,562.99 for rural (NO) libraries.

SUMMARY

The 1997 study of public library Internet use, involvement, and cost shows that libraries are connecting rapidly to the Internet, are providing public access to the Internet, and are increasingly offering electronic network services to patrons.

The study also shows, however, that the distribution of Internet connectivity, costs, and service provision is not equal across library population of legal service areas or urban/rural status. Indeed, libraries that serve population of legal service areas of more than 5,000, and are in urban (CC) and suburban (NC) areas, are much more likely to be connected to the Internet than are libraries that serve population of legal service areas of under 5,000 and are in rural (NO) areas (see Figure 7). Thus, individuals that live in a rural area and are served by a small library (about 44.3% of all public library systems, according to NCES (1997) data), are not likely to have access to a public library that provides Internet-based services.

It is important to note that public libraries will continue to connect to the Internet and increasingly provide public access Internet services. Indeed, by May 1998, approximately 86% of public libraries will have an Internet connection (see Figure 9). Moreover, those libraries will serve approximately 97% of the U.S. population (see Figure 10). Thus, the libraries that do not plan to connect, which are most likely to be rural, small (see Figure 8), and serve a small portion of the U.S. population.

On the surface the connectivity statistics are impressive. Readers, however, should note that libraries generally disagree, across all population of legal service areas and Urban/Rural categories, that their public access Internet services are adequate (see Figure 36). In particular, libraries indicate that patrons do not have adequate access to public access workstations and that those workstations are not sufficiently equipped for today's multimedia requirements.

While the public library Internet connectivity percentages are impressive, libraries that do have Internet connections use predominantly dial-up technology to connect to the Internet (see Figure 11). Although a majority of public libraries do provide graphical access to the Internet (see Figures 13 and 33), most do so

over a single dedicated phone line at rates of 33.6kbps or less (a majority-- 49%--at 28.8kbps) (see Figure 14). For libraries that do have leased-lines, a majority--56%--still use 56 kbps lines (see Figure 17). While 27% of public libraries do have T1 lines, discussions with survey respondents and author experience in other studies, indicate that most of the T1 lines are fractional, with 56kbps lines connecting library system branches to the main library's services. Thus, readers should not be surprised when responding libraries rate their Internet connections as somewhat inadequate (see Figure 20).

Costs for library Internet services range from 5% to 25% of public library IT expenditures (see Figure 38). This translates into approximately $5,247 to $1,307,489 per year in Internet-related costs, with an average annual expenditure of $32,104 (s ee Figure 37). Overall, libraries anticipate that their Internet-related expenditures will increase over the next year (see Figures 39-48). It is important to note, however, that libraries that serve population of legal service areas of under 100,000 and are in rural (NO) areas do not pay for a significant portion of their Internet-related system hardware, communications hardware, and software costs (see Figures 49-50). These libraries, therefore, report little to no Internet costs. But, clearly, someone is paying for such services either in part or in total. Appendix A further discusses the complexity related to identifying library Internet-related costs.

Given the current policy environment of universal service and LSTA, these findings raise difficult questions that policy makers, library professionals, and researchers need to consider for public library Internet service provision:

•What is Universal Service in the networked environment? Is it:

Connectivity?

Not just connectivity, but a certain level of connectivity?

Services provision over the network?

A combination of a certain level of connectivity and a level of services provision?

•Given the percentage/anticipated percentage of library Internet connectivity, has universal service been achieved for public libraries?

•What measures are necessary to assess, evaluate, and improve public library electronic networked services?

Answers to such questions are not easy to derive. Careful consideration of these, and other, questions is necessary to inform policymakers and library professionals as to the best means possible to facilitate the on-going transition of public libraries into the electronic networked environment.

FUTURE DATA NEEDS

This report provides policy makers, library professionals, and researchers with previously unavail-able and longitudinal data concerning public library involvement with and use of the Internet. These data serve a variety of purposes, including providing base-line library connectivity, connection and cost data, as well as information on connectivity and connection progress.

The study, however, has its limitations. It is necessary to expand both the types of data collected and the entities from which the data are collected. For example, the study collected Internet-related data from public library *systems*, not branches. While only approximately 16.3% of public library systems have branches (NCES, 1997), those systems that do have branches represent significant demographic characteristics and population sizes that need further study. Such libraries--Los Angeles Public Library, New York Public Library, Chicago Public Library, to name a few--serve large U.S. population segments of varied socio-economic backgrounds. While the study indicates that these library *systems* have some type of Internet connection, the study does not provide data concerning the percentage of system *branches* that have Internet connections or the type of Internet connection(s) within those branches. Moreover, no data are available that correlate various population demographics (e.g., poverty) to branch connectivity.

NCLIS, ALA, the Gates Library Foundation, and other groups indicate an interest in such additional data collection. These data are critical to assisting policy makers, library professionals, and funding agencies to:

•Determine the critical needs areas for electronic network funding;

•Measure the impact of various networking funding efforts (e.g., USF, Gates Library Foundation grants); and

•Inform the policy debate for future networking funding initiatives.

A collaborative data collection effort among federal and state library agencies (e.g., IMLS, NCLIS, and state libraries), library professional organizations (e.g., ALA), and other funding organizations (e.g., Gates Library Foundation <http://www.glf.org>) is necessary to pool limited resources and begin laying the foundation for ongoing and additional public library electronic network-related studies.

NOTES

1. For a detailed discussion of Universal Service definitions and concepts, see: Bertot, J.C. and McClure, C.R. (1996). The Clinton Administration and the National Information Infrastructure. In P. Hernon, C.R. McClure, & H. Relyea (Eds.), *Federal information policies in the 1990s: Issues and conflicts.* Norwood, N.J.: Ablex Publishing Corporation, pp. 19-44. Also review related documents at the FCC website: http://www.fcc.gov

2. Note: This study surveyed library systems. The extent and nature of branch connectivity is unknown.

3. An example, Concord Free Public Library Massachussetts, based on the FSCS Population of Legal Service Area (5,000-24,999) and Urban/Rural categories (Suburban, NC), has been assigned a weighting factor of 6.37 by NCES. In producing national public library estimates for public libraries in the same Population and Urban/Rural categories, each Concord Free Public Library variable response is multiplied by its assigned weight. Based on Concord's indication of an Internet connection, it is estimated that 6.37 other public libraries in the same strata have some type of an Internet connection. Totals for the strata are achieved through summing all the weights in the appropriate categories. Analysis for each public library and survey question must follow the above procedure to produce accurate national estimates.

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