# Public Libraries and Internet Access across the United States: A Comparison by State 2004–2006

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*Drawing upon findings from a national survey of U.S. public libraries, this paper examines trends in Internet and public computing access in public libraries across states from 2004 to 2006. Based on library-supplied information about levels and types of Internet and public computing access, the authors offer insights into the network-based content and services that public libraries provide. Examining data from 2004 to 2006 reveals trends and accomplishments in certain states and geographic regions. This paper details and discusses the data, identifies and analyzes issues related to Internet access, and suggests areas for future research.*

This article presents findings from the 2004 and 2006 *Public Libraries and the Internet* studies detailing the different levels of Internet access available in public libraries in different states.[1] At this point, 98.9 percent of public library branches are connected to the Internet and 98.4 percent of connected public library branches offer public Internet access.[2] However, the types of access and the quality of access available are not uniformly distributed among libraries or among the libraries in various states.

While the data at the national level paint a portrait of the Internet and public computing access provided by public libraries overall, studies of these differences among the states can help reveal successes and lessons that may help libraries in other states to increase their levels of access. The need to continue to increase the levels and quality of Internet and public computing access in public libraries is not an abstract problem. The services and content available on the Internet continue to require greater bandwidth and computing capacity, so public libraries must address ever-increasing technological demands on the Internet and computing access that they provide.[3]

Public libraries are also facing increased external pressure on their Internet and computing access. As patrons have come to rely on the availability of Internet and computing access in public libraries, so too have government agencies. Many federal, state, and local government agencies now rely on public libraries to facilitate citizens' access to e-government services, such as applying for the federal prescription drug plans, filing taxes, and many other interactions with the government.[4] Further, public libraries also face increased demands to supply public access computing in times of natural disasters, such as the major hurricanes of 2004 and 2005.[5] As a result, both patrons and government agencies depend on the Internet and computing access provided by public libraries, and each group has different, but interrelated, expectations of what kinds of access public libraries should provide. However, the data indicate that public libraries are at capacity in meeting some of these expectations, while some libraries lack the funding, technology-support capacity, space, and infrastructure (e.g., power, cabling) to reach the expectations of each respective group.

As public libraries (and the Internet and public computing access they provide) continue to fill more social roles and expectations, a range of new ideas and strategies can be considered by public libraries to identify successful methods for providing access that is high quality and sufficient to meet the needs of patrons and community. The goals of the *Public Libraries and the Internet* studies have been to help provide an understanding of the issues and needs of libraries associated with providing Internet-based services and resources.

The 2006 *Public Libraries and the Internet* study employed a Web-based survey approach to gather both quantitative and qualitative data from a sample of the 16,457 public library outlets in the United States.[6] A sample was drawn to accurately represent metropolitan status (roughly equating to their designation of urban, suburban, or rural libraries), poverty levels (as derived through census data), state libraries, and the national picture, producing a sample of 6,979 public library outlets.[7] The survey received a total of 4,818 responses for a response rate of 69 percent. The data in this article, unless otherwise noted, are drawn from the 2004 and 2006 *Public Libraries and the Internet* studies.[8]

While the survey received responses from libraries in all fifty states, there were not enough responses in all states from which to present state-level findings. The study was able to provide state-level analysis for thirty-five states (including Washington, D.C.) in 2004 and forty-four states at the outlet level (including Washington, D.C.) and forty-two states at the system level (including Washington, D.C.) in 2006. In addition, there was some variance in states with adequate responses between the 2004 and 2006 studies. A full listing of the states is available in the final reports of the 2004 and 2006 studies at http://www.ii.fsu.edu/plinternet_reports.cfm. Thus, the findings below reflect

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only those states for which both the 2004 and 2006 studies were able to provide analysis.

## Public libraries and the Internet across the states

### Overview of 2004 to 2006

As the *Public Library and the Internet* studies have been ongoing since 1994, the questions asked in the biennial studies have evolved along with the provision of Internet access in libraries. The questions have varied between surveys, but there have been consistent questions that allow for longitudinal analysis at the national level. The 2004 study introduced the analysis of the data at both the national and the state levels. With both the 2004 and 2006 studies providing data at the state level, some longitudinal analysis at the state level is now possible.

Overall, there were a number of areas of consistent data across the states from 2004 to 2006. Most states had fairly similar, if not identical, percentages of library outlets offering public Internet access between 2004 and 2006. For the most part, changes were increases in the percentage of library outlets offering patron access. Further, the average number of hours open per week in 2004 (44.5) and in 2006 (44.8) were very similar, as were the percentages of library outlets reporting increases in hours per week, decreases in hours per week, and no changes in hours per week. While these numbers are consistent, it is not known whether this average number of hours open, or the distribution of the hours open across the week, is sufficient to meet patron needs in most communities. Data across the states also indicated that physical space is the primary reason for the inability of libraries to add more workstations within the library building. There was also consistency in the findings related to upgrades and replacement schedules.

### Changes and continuities from 2004 to 2006

While the items noted above show some areas of stability in the Internet access provided by public libraries across the states, insights are possible in the areas of change for libraries overall or in the libraries that are leading in particular areas.

Table 1 details the states with the highest average number of hours open per public library outlet in 2004 and 2006. Between 2004 and 2006, the national average for the number of hours open increased slightly from 44.5 hours per week to 44.8 hours per week. This increase is reflected in the numbers for the individual states in 2006, which are generally slightly higher than the numbers for the individual states in 2004. For example, the top state in 2006 averaged 55.7 hours per outlet each week, while the top state in 2004 averaged 54.8 hours.

The top four states—Ohio, New Jersey, Florida, and Virginia—were the same in both years, though with the top two switching positions. This demonstrates a continuing commitment in these four states by state and local government to ensure wide access to public libraries. These states are also ones with large populations and state budgets, presumably fueling the commitment and facilitating the ability to keep libraries open for many hours each week. While the needs of patrons in other states are no less significant, the data indicate that states with larger populations and higher budgets, not surprisingly, may be best positioned to provide the highest levels of access to public libraries for state residents.

The other six states in the 2006 top ten were not in the 2004 top ten. The primary reason for this is that the six states in 2006 increased their hours more than other states. Note that the fifth-ranked state in 2004, South Carolina, averaged 49 hours per outlet each week, which is less than the tenth-ranked state in 2006, Illinois, at 49.5 hours. Simply by maintaining the average number of hours open per outlet between 2004 and 2006, South Carolina fell from fifth to out of the top ten. These differences are reflected in the fact that there is nearly a ten-hour difference from first place to tenth place in 2004; yet only a six-hour discrepancy exists from first place to tenth in 2006. These numbers suggest that hours of operation may change frequently for many libraries, indicating the need for future evaluations of operational hours in relation to meeting patron demand.

Table 2 displays the states with the highest average number of public access workstations per public library in 2004 and 2006. The national averages between 2004 and 2006 also showed a slight increase from 10.4 workstations

**Table 1.** Highest average number of hours open in public library outlets by state in 2004 and 2006

| 2004 | | 2006 | |
|---|---|---|---|
| 1. New Jersey | 54.8 | 1. Ohio | 55.7 |
| 2. Ohio | 54.6 | 2. New Jersey | 55.6 |
| 3. Florida | 52.4 | 3. Florida | 52.3 |
| 4. Virginia | 51.3 | 4. Virginia | 52.3 |
| 5. South Carolina | 49.0 | 5. Indiana | 51.9 |
| 6. Utah | 48.0 | 6. Pennsylvania | 50.6 |
| 7. New Mexico | 47.4 | 7. Washington, D.C. | 50.6 |
| 8. Rhode Island | 47.3 | 8. Maryland | 50.0 |
| 9. Alabama | 46.9 | 9. Connecticut | 49.8 |
| 10. New York | 46.2 | 10. Illinois | 49.5 |
| National: | 44.5 | National: | 44.8 |

in 2004 to 10.7 workstations in 2006. A key reason for this slow growth in the number of workstations appears to have a great deal to do with limitations of physical space in libraries; in spite of increasing demands, space constraints often limit computer capacity.[9]

Unlike table 1, the comparisons between 2004 and 2006 in table 2 do not show across-the-board increases from 2004 to 2006. In fact, Florida had the highest average of workstations per library outlet in both 2004 and 2006, but the average number decreased from 22.6 in 2004 to 21.7 in 2006. It is interesting to note that Florida has a significantly higher number of workstations than the next highest state in both 2004 and 2006. In contrast, many of the states in the lower half of the top ten in 2004 had substantially lower average numbers of workstations in 2004 than in 2006. In 2004 there were an average of seven more computers in spot two than spot ten; in 2006, there were only an average of four more computers from spot two to ten. The large increases in the number of workstations in some states, like Nevada, Michigan, and Maryland, indicate sizeable changes in budget, numbers of outlets, and/or population size. Also of note is the significant drop of the average number of workstations in Kentucky, declining from 18.8 in 2004 to fewer than 13 in 2006. A possible explanation is that, since Kentucky libraries have been leaders in adopting wireless technologies (see table 3), the demand for workstations has decreased as libraries have added wireless access.

Five states appear in the top ten of both years—Florida, Indiana, Georgia, California, and New Jersey. The average number of workstations in Indiana, California, and Georgia increased from 2004 to 2006, while the average number of workstations in Florida and New Jersey decreased between 2004 and 2006. Some of the decreases in workstations can be accounted for by increases in the availability of wireless access in public libraries, as libraries with wireless access may feel less need to add more networked computers, relying on patrons to bring their own laptops. Such a strategy, of course, will not increase access for patrons who cannot afford laptops. Some libraries have sought to address this issue by having laptops available for loan within the library building.

The states listed in table 3 had the highest average levels of wireless connectivity in public library outlets in 2004 and 2006. The differences between the numbers in 2004 and 2006 reveal the dramatic increases in the availability of wireless Internet access in public libraries. The national average in 2004 was 17.9 percent, but in 2006, the national average had more than doubled to 37.4 percent of public libraries offering wireless Internet access. This sizeable increase is reflected in the changes in the states with the highest levels of wireless access.

Every position in the ratings in table 3 shows a dramatic jump from 2004 to 2006. The top position increased from 47 percent to 63.8 percent. The tenth position increased from 19.6 percent to 47.8 percent, an increase of nearly two-and-a-half times. These increases show how much more prominent wireless Internet access has become in the services that public libraries offer to their communities and to their patrons.

Four states appear on both the 2004 and 2006 lists—Virginia, Kentucky, Rhode Island, and New Jersey. These four states all showed increases, but the rises in some

**Table 2.** Highest average number of public access workstations in public library outlets by state in 2004 and 2006.

| 2004 | | 2006 | |
|---|---|---|---|
| 1. Florida | 22.6 | 1. Florida | 21.7 |
| 2. Kentucky | 18.8 | 2. Indiana | 17.5 |
| 3. New Jersey | 15.5 | 3. Nevada | 15.7 |
| 4. Georgia | 14.0 | 4. Michigan | 14.8 |
| 5. Utah | 13.0 | 5. Maryland | 14.6 |
| 6. Rhode Island | 12.6 | 6. Georgia | 14.4 |
| 7. Indiana | 12.3 | 7. Arizona | 14.1 |
| 8. Texas | 11.9 | 8. California | 14.0 |
| 9. California | 11.8 | 9. New Jersey | 13.8 |
| 10. South Carolina | 11.7 | 10. Virginia | 13.0 |
| New York | 11.7 | | |
| National: | 10.4 | National: | 10.7 |

**Table 3.** Highest levels of public access wireless Internet connectivity in public library outlets by state in 2004 and 2006

| 2004 | | 2006 | |
|---|---|---|---|
| 1. Kentucky | 47% | 1. Virginia | 63.8% |
| 2. New Mexico | 38.6% | 2. Connecticut | 56.6% |
| 3. New Hampshire | 31.6% | 3. Indiana | 56.6% |
| 4. Virginia | 30.8% | 4. Rhode Island | 53.9% |
| 5. Texas | 26.4% | 5. Kentucky | 52.0% |
| 6. Kansas | 25.8% | 6. New Jersey | 50.9% |
| 7. New Jersey | 22.8% | 7. Maryland | 49.8% |
| 8. Rhode Island | 22.5% | 8. Illinois | 48.3% |
| 9. Florida | 21.9% | 9. California | 47.8% |
| 10. New York | 19.6% | 10. Massachusetts | 47.8% |
| National: | 17.9% | National: | 37.4% |

other states were significant enough to reduce Kentucky from the top-ranked state in 2004 to the fifth ranked, in spite of the fact that the number of public libraries in Kentucky offering wireless access increased from 47 percent to 52 percent. In both years, a majority of the states in the top ten were located along the East Coast. Further, high levels of wireless access may be linked in some states to areas of high population density or the strong presence of technology-related sectors in the state, as in California and Virginia. Smaller states with areas of dense populations, such as Connecticut, Rhode Island, and Maryland, are also among the leaders in wireless access.

Tables 4 and 5 provide contrasting pictures regarding the number of public access Internet workstations in public libraries by state in 2004 and 2006. Table 4 shows the states with the highest percentages of libraries that consistently have fewer workstations that are needed by patrons, while table 5 shows the states with the highest percentages of libraries that consistently have sufficient workstations to meet patron needs. Of note is the fact that, unlike the preceding three tables, there appears to be no significant geographical clustering of states in tables 4 and 5.

Nationally, the percentage of libraries that consistently have insufficient workstations to meet patron needs declined from 15.7 percent in to 2004 to 13.7 percent in 2006, a change that is within the margin of error (+/- 3.4 percent) of the question on the 2006 survey. Due to the size of the change, it is not known if the national decline was a real improvement or simply a reflection of the margin of error. Washington, D.C., Oregon, New Mexico, Idaho, and California appear on the lists for both 2004 and 2006 in table 4. Washington, D.C. had the highest percentage of libraries reporting insufficient workstations in both years, though there was a significant decrease from 100 percent of libraries in 2004 to 69 percent of libraries in 2006. In this case, the significant drop represents major strides forward to providing sufficient access to patrons in Washington, D.C. Similarly, though California features on both lists, the percentages dropped from 44.9 percent in 2004 to 22.2 percent in 2006, a decline of more than half. States like these are obviously making efforts to address the need for increased workstations. Overall, eight out of ten positions in table 4 remained constant or saw a decline percentage in each position from 2004 to 2006, indicating a national decrease in libraries with insufficient workstations.

In sharp contrast, fewer than 20 percent of Nevada libraries in 2004 reported insufficient workstations, placing well out of the top ten. However, in 2006 Nevada ranked second, with 51.5 percent of public libraries reporting insufficient workstations to meet patron demand. With Nevada's rapidly growing population, it appears that the demand for Internet access in public libraries may not be keeping pace with the population growth.

The percentage of public libraries reporting sufficient workstations to consistently meet patron demands increased slightly at the national level from 14.1 percent in 2004 to 14.6 percent in 2006, again well within the margin of error (+/- 3.5 percent) of the 2006 question. However, in table 5, the top ten positions in 2006 all feature lower percentages than the same positions in 2004. In 2004 the top-ranked state had 53.2 percent of libraries able to consistently meet patron needs for Internet access, but the top-ranked state in 2006 had only 31 percent of libraries able to consistently meet patron access needs.

**Table 4.** Public library outlet public access workstation availability by state in 2004 and 2006–consistently have fewer workstations than are needed

| 2004 | | 2006 | |
|---|---|---|---|
| 1. Washington, D.C. | 100% | 1. Washington, D.C. | 69.9% |
| 2. California | 44.9% | 2. Nevada | 51.5% |
| 3. Florida | 36% | 3. Oregon | 34.8% |
| 4. New Mexico | 30.7% | 4. New Mexico | 31.9% |
| 5. Oregon | 30.4% | 5. Tennessee | 30.4% |
| 6. Utah | 29.2% | 6. Alaska | 27.8% |
| 7. South Carolina | 28.4% | 7. Idaho | 26% |
| 8. Kentucky | 24.1% | 8. California | 22.2% |
| 9. Alabama | 21.5% | 9. New York | 21.4% |
| 10. Idaho | 21.1% | 10. Rhode Island | 19% |
| National: | 15.7% | National: | 13.7% |

**Table 5.** Public library outlet public access workstation availability by state in 2004 and 2006—always have a sufficient number of workstations to meet demand.

| 2004 | | 2006 | |
|---|---|---|---|
| 1. Wyoming | 53.2% | 1. Louisiana | 31% |
| 2. Alaska | 34.9% | 2. New Hampshire | 30.4% |
| 3. Kansas | 32.2% | 3. North Carolina | 28.4% |
| 4. Rhode Island | 31.4% | 4. Arkansas | 26.2% |
| 5. New Hampshire | 29.7% | 5. Wyoming | 25.2% |
| 6. South Dakota | 25.2% | 6. Mississippi | 24.4% |
| 7. Georgia | 25% | 7. Missouri | 23.6% |
| 8. Arkansas | 24.8% | 8. Vermont | 22.2% |
| 9. Vermont | 32.7% | 9. Nevada | 20.9% |
| 10. Virginia | 22.4% | 10. Pennsylvania | 17.9% |
| | | West Virginia | 17.9% |
| National: | 14.1% | National: | 14.6% |

Four states—New Hampshire, Arkansas, Wyoming, and Vermont—appear on both the 2004 and 2006 lists.

The national increase in the sufficiency of the number of workstations to meet patron access needs and decreases in all of the top-ranked states between 2004 and 2006 seems incongruous. This situation results, however, from a decrease in range of differences among the states from 2004 to 2006, so that the range is compressed and the percentages are more similar among the states. Further, in some states, the addition of wireless access may have served to increase the overall sufficiency of the access in libraries, possibly leveling the differences among states. Nevertheless, the national average of only 14.6 percent of public libraries consistently having sufficient numbers of workstations to meet patron access needs is clearly a major problem that public libraries must work to address. Comparing the 2006 data of tables 4 and 5 demonstrates that patron demands for Internet access are being met neither evenly nor consistently across the states.

Nationally, the percentage of public library systems with increases in the information technology budgets from the previous year dropped dramatically from 36.1 percent in 2004 to 18.6 percent in 2006. As can be seen in table 6, various national, state, and local budget crunches have significantly reduced the percentages of public library systems with increases in information technology budgets. When inflation is taken into account, a stationary information technology budget represents a net decrease in funds available in real dollar terms, so the only public libraries that are not actually having reductions in their information technology budgets are those with increases in such budgets. Since Internet access and the accompanying hardware necessary to provide it are clearly a key aspect of information technology budgets, decreases in these budgets will have tangible impacts on the ability of public libraries to provide sufficient Internet access.

Virtually every position on table 6 has a decrease of 20 percent to 30 percent from 2004 to 2006, with the largest decrease being from 84.2 percent in 2004 to 48.3 percent in 2006 in the second position. Five states—Delaware, Kentucky, Florida, Rhode Island, and South Carolina—are listed for both 2004 and 2006, though every one of these states registered a decrease from 2004 to 2006. No drop was more dramatic than South Carolina's from 84.2 percent in 2004 to 31 percent in 2006. Overall, though, the declining information technology budgets and continuing increases in demands for information technology access among patrons creates a very difficult situation for libraries.

### Public libraries and the Internet in 2006

Along with questions that were asked on both the 2004 and 2006 *Public Libraries and the Internet* studies, the survey included new questions on the 2006 study to account for social changes, alterations of the policy environment, and the maturation of Internet access in public libraries. Several findings from the new questions on the 2006 study were noteworthy among the state data.

The states listed in table 7 had the highest percentage of public library systems with increases in total operating budget over the previous year in 2006. Nationally, 45.1 percent of public library systems had some increase in their overall budget, which includes funding for staff, physical structures, collection development, and many other costs, along with technology. At the state level, three Northeastern states clearly led the way, with more than 75 percent of library systems in Maryland, Delaware, and Rhode Island benefiting from an increase in the overall operating budget. Also of note is the fact that two fairly

Table 6. Highest levels of public library system overall Internet information technology budget increases by state in 2004 and 2006

| 2004 | | 2006 | |
|---|---|---|---|
| 1. Florida | 87.5% | 1. Delaware | 60% |
| 2. South Carolina | 84.2% | 2. Kentucky | 48.3% |
| 3. Rhode Island | 67.5% | 3. Maryland | 47.6% |
| 4. Delaware | 64.9% | 4. Wyoming | 45.7% |
| 5. New Jersey | 61.5% | 5. Louisiana | 40% |
| 6. North Carolina | 55.5% | 6. Florida | 38% |
| 7. Virginia | 53.6% | 7. Rhode Island | 33.3% |
| 8. Kentucky | 53.2% | 8. South Carolina | 31% |
| 9. New Mexico | 49.3% | 9. Arkansas | 27.5% |
| 10. Kansas | 49% | 10. California | 27.3% |
| National: | 36.1% | National: | 18.6% |

Table 7. Highest levels of public library system total operating budget increases by state in 2006

| | |
|---|---|
| 1. Maryland | 85.7% |
| 2. Delaware | 80% |
| 3. Rhode Island | 76.4% |
| 4. Idaho | 74.5% |
| 5. Kentucky | 73.6% |
| 6. Connecticut | 68.6% |
| 7. Virginia | 62.8% |
| 8. New Hampshire | 62.5% |
| 9. North Carolina | 61.6% |
| 10. Wyoming | 60.9% |
| National: | 45.1% |

rural and sparsely populated Western states—Idaho and Wyoming—were among the top ten.

Five of the states in the top ten in highest percentages of increases in operating budget in 2006 were also among the top ten in highest percentages of increases in information technology budgets in 2006. Comparing table 7 with table 6 reveals that Delaware, Kentucky, Maryland, Rhode Island, and Wyoming are on both lists. In these states, increases in information technology budgets seem to have accompanied larger increases in the overall 2006 budget.

An interesting point to ponder in comparing table 6 with table 7 is the large discrepancy between average increases in information technology budgets (18.6 percent) with overall budgets (45.1 percent) at the national level. As Internet access is becoming more vital to public libraries in the content and services they provide to patrons, it seems surprising that such a smaller portion of library systems would receive an increase in information technology budgets than in overall budgets.

One growing issue with the provision of Internet access in public libraries is the provision of access at sufficient connection speeds. More and more Internet content and services are complex and require large amounts of bandwidth, particularly content involving audio and video components. Fortunately, as demonstrated in table 8, 53.5 percent of libraries nationally indicate that their connection speed is sufficient at all times to meet patron needs. In contrast, only 16.1 percent of public libraries nationally indicate that their connection speed is insufficient to meet patron needs at all times.

**Table 8.** Highest percentages of public library outlets where public access Internet service connection speed is sufficient at all times or insufficient by state in 2006

| Sufficient to meet patrons needs at all times | | Insufficient to meet patron needs | |
|---|---|---|---|
| 1. Georgia | 80.5% | 1. Virginia | 35% |
| 2. New Hampshire | 70.6% | 2. North Carolina | 28.1% |
| 3. Iowa | 64.2% | 3. Alaska | 27.3% |
| 4. Illinois | 64% | 4. Delaware | 26.9% |
| 5. Ohio | 63.9% | 5. Mississippi | 26.6% |
| 6. Indiana | 63.6% | 6. Missouri | 24.3% |
| 7. Vermont | 63.5% | 7. Rhode Island | 23.1% |
| 8. Oklahoma | 62.8% | 8. Oregon | 22.4% |
| 9. Louisiana | 61.7% | 9. Connecticut | 21.5% |
| 10. Wisconsin | 61.5% | 10. Arkansas | 21.2% |
| National: | 53.5% | National: | 16.1% |

Georgia has the highest percentage of libraries that always have sufficient connection speed at 80.5 percent. In the case of Georgia, the statewide library network is most likely a key part of ensuring the majority of libraries have sufficient access speed. Many of the other states that have the highest percentages of public libraries with sufficient connection speeds are located in the middle part of the country. The state with the highest percentage of libraries with insufficient connection speed to meet patron demands is Virginia, with 35 percent of libraries. Curiously, Virginia consistently ranks in the top ten of tables 1–3. Though Virginia libraries have some of the longest hours open, some of the highest numbers of workstations, and some of the highest levels of wireless access, they still have the highest percentage of libraries with insufficient connection speed. Only five states had more than 25 percent of libraries with connection speeds insufficient to meet the needs of patrons at all times. This issue is significant now in these states, as these libraries lack the necessary connection speeds. However, it will continue to escalate as an issue as content and services on the Internet continue to evolve and become more complex, thus requiring greater connection speeds.

Comparing table 8 with table 4 (consistently have fewer workstations than are needed) and table 5 (always have a sufficient number of workstations to meet demand) reveals some parallels. Alabama and Rhode Island are among the top ten states both for connection speed being consistently insufficient to meet patron needs (table 8) and consistently have fewer workstations than are needed (table 4). Conversely, Vermont and Louisiana are among the top ten states both for connection speed being sufficient to meet patron needs at all times (table 8) and always have a sufficient number of workstations to meet demand (table 5).

Table 9 displays the two leading types of Internet connection providers for public libraries and the states with the highest percentages of libraries using each. Nationally, 46.4 percent of public libraries rely on an Internet Service Provider (ISP) for Internet access. In the states listed in table 9, three-quarters or more of libraries use an ISP, with more than 90 percent of libraries in Kentucky and Iowa using an ISP. The next most common means of connection for public libraries is through a library cooperative or library network, with 26.2 percent of libraries nationally using these means. In such cases, member libraries rely on their established network to serve as the connector to the Internet. The library network approach seems to be most effective in geographically small states. The top three on the list being three of the smallest of the states—Rhode Island, Delaware, and West Virginia—with more than 75 percent of libraries in each of these states connecting through a network. Nationally, the remaining approximately 25 percent of

libraries connect through a network managed by a nonlibrary entity or by other means.

The highest percentages of public library systems receiving each kind of E-rate discount are presented in table 10. E-rate discounts are an important source of technology funding for many public libraries across the country, with more than $250,000,000 in E-rate discounts distributed to libraries between 2000 and 2003.[10] Nationally in 2006, 22.4 percent of public library systems received discounts for Internet connectivity, 39.6 percent for telecommunications services, and 4.4 percent for internal connection costs. Mississippi and Louisiana appear in the top five for each of the three types of discounts. Minnesota and West Virginia are each in the top five for two of the three lists. Many of the states benefiting the most from E-rate funding in 2006 have large rural populations spread out over a geographically dispersed area, indicating the continuing importance of E-rate discounts in bringing Internet connections to rural public libraries.

Maryland and West Virginia are both included in the Telecommunications Service column of table 10 due to proportionally large areas of these smaller states that are rural. The importance of the telecommunications discounts in certain states is obviated by the fact that more than 75 percent of public library systems in all five states listed received such discounts. In comparison, only one state has more than 75 percent of library systems receiving discounts for Internet connectivity, while no state has 30 percent of library systems receiving discounts for internal connection costs, with the latter reflecting the manner in which E-rate funding is calculated.

In spite of the penetration of the Internet into virtually every public library in the United States and the general expectations that Internet access will be publicly available in every library, not all public libraries offer information technology training for patrons. Nationally, 21.4 percent of public library outlets do not offer technology training. Table 10 lists the states with the highest percentages of public library outlets not offering information technology training. Six of the ten states listed are located in the Southeastern part of the country. The lack of resources or adequate number of staff to provide training is a leading concern in these states.

Not offering patron training may be strongly linked to lacking economic resources to do so. For example, the two states with the highest percentage of public libraries not offering patron training—Mississippi and Louisiana—are also the two states in the top five recipients of each kind of E-rate funding listed in table 10. If the libraries in states like these are economically struggling just to provide Internet access, it seems likely that providing accompanying training might be difficult as well. A further difficulty is that there is little public or private funding available specifically for training.

Table 9. Highest levels of types of Internet connection provider for public library outlets by state in 2006

| Internet service provider | | Library cooperative or network | |
|---|---|---|---|
| 1. Kentucky | 93.5% | 1. Rhode Island | 84.7% |
| 2. Iowa | 90.9% | 2. Delaware | 79.5% |
| 3. New Hampshire | 83.8% | 3. West Virginia | 77.9% |
| 4. Vermont | 81.1% | 4. Wisconsin | 71.2% |
| 5. Oklahoma | 80.6% | 5. Massachusetts | 54.7% |
| Wyoming | 80.6% | 6. Minnesota | 52.5% |
| 7. Idaho | 80.2% | 7. Ohio | 48.9% |
| 8. Montana | 78.9% | 8. Georgia | 45.1% |
| 9. Tennessee | 78.4% | 9. Mississippi | 41.2% |
| 10. Alabama | 74.6% | 10. Connecticut | 38.5% |
| National: | 46.4% | National: | 26.2% |

## Discussion of issues

The similarities and differences among the states indicate that the evolution of public access to the Internet in public libraries is not necessarily an evenly distributed phenomenon, as some states appear to be consistent leaders in some areas and other states appear to consistently trail in others. While the national picture is one primarily of continued progress in the availability and quality of Internet access available to library patrons, the progress is not evenly distributed among the states.[11]

Libraries in different states struggle with or benefit from different issues. Some public libraries are limited by state and local budgetary limitations, while other libraries are seeking alternate funding sources through grant writing and building partnerships with the corporate world. Some face barriers to providing access due to their geographical location or small service population. It may also be the case that the libraries in some states do not perceive that patrons desire increased access. Other public libraries are able to provide high-end access as a result of having strong local leadership, sufficient state and local funding, well-developed networks and cooperatives, and a proactive state library.

Though the discussion of the "digital divide" has become much less frequent, the state data seem to indicate that there are gaps in levels of access among libraries in different states. While every state has very successful individual libraries in terms of providing quality Internet

**Table 10.** Highest percentages of public library systems receiving E-rate discounts by category and state in 2006

| Internet connectivity | | Telecommunications services | | Internal connection costs | |
|---|---|---|---|---|---|
| 1. Louisiana | 89.2% | 1. Mississippi | 92.6% | 1. Mississippi | 29.6% |
| 2. Indiana | 70.8% | 2. South Carolina | 89.4% | 2. Minnesota | 22.6% |
| 3. Mississippi | 63% | 3. Louisiana | 79.5% | 3. Arizona | 19.3% |
| 4. Minnesota | 50.5% | 4. West Virginia | 79.1% | 4. West Virginia | 14.2% |
| 5. Tennessee | 44.7% | 5. Maryland | 76.2% | 5. Louisiana | 12.3% |
| National: | 22.4% | National: | 39.6% | National: | 4.4% |

access and individual libraries that could be doing a better job, the state data indicate that library patrons in different parts of the country have variations in the levels and quality of access available to them. Uniformity across all states clearly will never be feasible, though, as different states and their patrons have different needs.

For example, tables 1, 2, and 3 all display features that indicate high-level Internet access in public libraries—high numbers of hours open, high numbers of public access workstations, and high levels of wireless Internet access. Three states—Maryland, New Jersey, and Virginia—appear in the top ten in these three lists for 2006. Further, Connecticut, Florida, Illinois, and Indiana each appear in the top ten of two of these three lists. These states clearly are making successful efforts at the state and local levels to guarantee widespread access to public libraries and the Internet access they provide.

Gaps in access are also evident among different regions of the country. The highest percentages of library systems with increases in total operating budgets were concentrated in states along the East Coast, with seven of the states listed in table 7 being Mid-Atlantic or Northeastern states. In contrast, the highest percentages of library systems relying on E-rate funding in table 10 were concentrated in the Midwest and the Southeast. Further, the numbers in tables 6 and 7 showed far greater increases in the total operating budgets than in the information technology budgets in all regions of the country. As a result, public libraries in all parts of the United States may need to seek alternate sources of funding specifically for information technology costs.

As can be seen in table 3, the leading states in adoption of wireless technology are concentrated in the Northeast and Mid-Atlantic. In table 11, Southern states, particularly Louisiana and Mississippi, had many of the highest percentages of libraries not offering any Internet training to patrons. It is important to note with data from the GulfStates, however, that the effects of Hurricane Katrina may have had a large impact on the results reported.

One key difference in a number of states seems to be the presence of a state library actively working to coordinate access issues. This particular study was not able to address such issues, but evidence indicates that the state library can play a significant role in ensuring sufficiency of Internet access in public libraries in a state. Maine, West Virginia, and Wisconsin all have state libraries that apply and distribute funds at the statewide level to ensure all public libraries, regardless of size or geography, have high-end connections to the Internet. The state library of West Virginia, for example, applied for E-rate funding for telecommunications costs on a statewide basis and received 79.1 percent funding in 2006, using such funding to cover not only connection costs for public libraries, but also to provide IT and network support to libraries.

**Table 11.** Highest levels of public library systems not offering patron information technology training services by state in 2006

| | |
|---|---|
| 1. Louisiana | 48.7% |
| 2. Mississippi | 40.7% |
| 3. Arkansas | 39.6% |
| 4. Alaska | 36% |
| 5. Arizona | 34.8% |
| 6. Georgia | 34.5% |
| 7. New Hampshire | 32.8% |
| 8. South Carolina | 31.1% |
| 9. Tennessee | 30% |
| 10. Idaho | 29% |
| National: | 21.4% |

Another example of a successful statewide effort to provide sufficient Internet access can be found in Maryland. In the early 1990s, Maryland public library administrators agreed to let the state library use Library Services and Technology Act (LSTA) funds to build the Sailor network, connecting all public libraries in the state.[12] This network predates the E-rate program by a number of years, but having an established statewide network has helped the state library to coordinate

applications, funding, and services among the libraries of the state. The state budget in Maryland also provides other types of funding to support the state library, the library systems, and the library outlets in providing Internet access. In states such as Georgia, Maryland, Maine, West Virginia, and Wisconsin, the provision of Internet access in public libraries is shaped not only by library outlets and library systems, but by the state libraries as well. In these and other states, the efforts of the state library appear to be reflected in the data from this study.

A final area for discussion is the degree to which librarians understand how much bandwidth is required to meet the needs of library users, how to measure actual bandwidth that is available in the library, and how to determine the degree to which that bandwidth is sufficient. Indeed, many providers advertise that their connection speeds are "up to" a certain speed when in fact they deliver considerably less.[13] The authors have offered an analysis of determining the quality and sufficiency of bandwidth elsewhere.[14] Suffice to say that there is considerable confusion as to "how good is good enough" bandwidth connection quality. These types of issues frame understandings of how connected libraries in different states are and whether those connections are sufficient to meet the needs of patrons.

## Future research

While the experience of individual patrons in particular libraries will vary widely in terms of whether the access available is sufficient to meet their information needs, the fact that the state data indicate variations in the levels and quality of access among some states and regions of the country is worthy of note. An important area of subsequent research will be to investigate these differences, determine the reasons for them, and develop strategies to alleviate these apparent gaps in access.

Investigating these differences requires consideration of local and situational factors that may affect access in one library but perhaps not in another. For example, one public library may have access to an Internet provider that offers higher speed connectivity that is not available in another location. The range of the possible local and situational factors affecting access and services is extensive. A preliminary list of the factors that contribute to being a successfully networked public library is described in greater detail in the 2006 study.[15] However, additional investigation into the degree to which these factors affect access, quality of service, and user satisfaction needs to be continued.

The personal experience of the authors in working with various state library agencies suggests the need for additional research that explores relationships among those states ranked highest in areas such as connectivity and workstations with programs and services offered by the state library agencies. One state library, for example, has a specific program that works directly with individual public libraries to assist them in completing the various E-rate forms. Is there a link between that state library providing such assistance and the state's public libraries receiving more E-rate discounts per capita than other states? This is but one example where investigating the role of the state library and comparing those roles and services to the rankings may be useful. Perhaps a number of "best practices" could be identified that would assist the libraries in other states in improving access and services.

In terms of research methods, future research on the topics identified in this article may need to draw upon strategies other than a national survey and on-site focus groups/interviews. The 2006 study, for the first time, included site visits and interviews and produced a wealth of data that supplemented the national survey data.[16] On-site analysis of actual connection speeds in a sample of public libraries is but one example. The degree to which survey respondents know the connection speeds at specific workstations is unclear. Simply because a T-1 line comes in the front door, it is not necessarily the speed available at a particular workstation. Other methods such as log file analysis or user-based surveys of networked services (as opposed to surveys completed by librarians) may offer insights that could augment the national survey data.

Other approaches such as policy analysis may also prove useful in better understanding access, connectivity, and services on a state-by-state basis. There has been no systematic description and analysis of state-based laws and regulations that affect public library Internet access, connectivity, and services. The authors are aware of some states that ensure a minimum bandwidth will be provided to each public library in the state and pay for such connectivity. Such is not true in other states. Thus, a better understanding of how state-based policies and regulations affect access, connectivity, and services may identify strategies and policies that could be used in other states to increase or improve access, connectivity, and services.

The data discussed in this article also point to many other important needs in future research. Libraries in certain states that seem to be frequently ranking high in the tables indicate that certain states are better able to sustain their libraries in terms of finances and usage. However, additional factors may also be key in the differences among the states. Future research needs to consider the Internet access in public libraries in different states in relation to other services offered by libraries and to uses of the Internet connectivity in libraries, including types of online content and services available, types of training

available, community outreach, other collection issues, staffing in relation to technology, and other factors.

## Conclusion

Internet and public computing access is almost universally available in public libraries in the United States, but there are differences in the amounts of access, the kinds of access, and sufficiency of the access available to meet patron demands. Now that virtually every public library has an Internet connection, provides Internet access to patrons, and offers a range of public computing access, the attention of public libraries must refocus on ensuring that every library can provide sufficient Internet and computing access to meet patron needs. The issues to address include being open to the public a sufficient number of hours, having enough Internet access workstations, having adequate wireless access, and having sufficient speed and quality of connectivity to meet the needs of patrons. If a library is not able to provide sufficient access now, the situation will only continue to grow more difficult as the content and services on the Internet continue to be more demanding of technical and bandwidth capacity.

Public libraries must also focus on increasing provision of Internet access in light of federal, state, and local governments recently adding yet another significant level of services to public libraries by "requesting" that they provide access to and training in using numerous e-government services. Such e-government services include social services, prescription drug plans, health care, disaster support, tax filing, resource management, and many other activities.[17]

The maintenance of traditional services, the addition and expansion of public access computing and networked services, and now the addition of a range of e-government services tacitly required by federal, state, and local governments, in combination, risk stretching public library resources beyond their ability to keep up. To avoid such a situation, public libraries, library systems, and state governments must learn from the library outlets, systems, and states that are more successfully providing sufficient Internet access to their patrons and their communities. Among these leaders, there are likely models for success that can be identified for the benefit of other outlets, systems, and states. Beyond the lessons that can be learned from the most connected, however, there are also practical and logistical issues that remain beyond the control of an individual library and sometimes the entire state, such as geographical and economic factors.

Ultimately, the analysis of state data offered here suggests that much can be learned from one state that might assist another state in terms of improving connectivity, access, and services. While the data suggest a number of significant discrepancies among the various states, it may be that a range of best practices can be identified from those more highly ranked states that could be employed in other states to improve access, connectivity, and services. Staff at the various state library agencies may wish to discuss these findings and develop strategies that can then improve access nationwide.

Providing access to the Internet is now as established a role for public libraries as providing access to books. Patrons and communities, and now government organizations, rely on the fact that Internet access will be available to everyone who needs it. While there are other points of access to the Internet in some communities, such as school media centers and community technology centers, the public library is often the only public access point available in many communities.[18] Public libraries across the states must continually work to make sure the access they provide meets all of these needs.

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