CONNECTING ANCHOR INSTITUTIONS: A VISION OF OUR FUTURE

by Christine Mullins

The SHLB Broadband Action Plan includes the following:

Connecting Anchor Institutions: A Vision of Our Future

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1   Broadband Needs Assessment and Planning for Community Anchor Institutions

2   Wi-Fi and Wireless Networking for Community Anchor Institutions

3   Partnerships, Sharing, and Community Anchor Institution Broadband

4   Promoting Competition for Community Anchor Institution Broadband Services

5   Broadband Infrastructure Policy and Community Anchor Institutions

6   Community Anchor Institutions Served by Government and Non-Profit Fiber Networks

7   Broadband Subsidies for Community Anchor Institutions

8   Government Funding for Broadband Network Providers Serving Community Anchor Institutions

9   Rural Broadband Programs and Community Anchor Institutions

10 Community Anchor Institutions and Residential Broadband Adoption

Introduction

The future belongs to those with access to high-speed broadband. Investing in broadband deployment to our nation's community anchor institutions ensures that the benefits of the Internet are widely available to everyone, promoting digital equity and opportunity for all.

In 2026, the United States will celebrate its 250th anniversary as a country and leader of modern democracy. As we look toward our future, preparing our nation for technological transformation is one of our most urgent national priorities.

The information and communications technologies (ICT) revolution is bringing enormous change to almost every facet of our education system, culture, society, and economy. To remain globally competitive, economically vibrant, educationally progressive, civically engaged, and culturally rich, the United States must ensure that all of our nation's community anchor institutions (CAIs) – schools, community colleges, libraries, healthcare providers, and other community and cultural institutions – are connected to high-capacity, high-quality broadband Internet networks.

Broadband connections will pave the way to technology breakthroughs and advancements, but we must first lay the infrastructure so everyone can benefit.

KLAUS SCHWAB,
Founder and Executive Chairman,
World Economic Forum

Why is ensuring high-capacity broadband for CAIs so vitally important? Our future could go in one of two directions: our society could be controlled by the digitally fortunate who have the technological know-how and high-capacity broadband access to master the information economy; or all Americans, enabled by high-capacity broadband access, could develop the Internet-based skills to launch their own businesses, conduct their own research, and follow their own path, competing, collaborating, and sharing information across all cultures and interest groups.

Anchor institutions are vitally important to ensuring that the Internet is available to everyone, and high-speed broadband connections are the key to making the Internet accessible to people of all ages, income levels, and demographic groups. For this reason, the National Broadband Plan called for anchor institutions to have at least one gigabit-per-second (Gbps) broadband connectivity by 2020.[1] While the U.S. has made progress toward that goal, achieving it will take more concerted work, as shown by the following:

- According to EducationSuperhighway, 23 percent of school districts and 41 percent of schools do not meet the minimum goals for Internet access, which leaves 21 million children without enough bandwidth for digital learning.[2]

- 42 percent of public libraries have a broadband connection slower than 10 Mbps.[3]

- Median subscribed download speed for rural libraries is one-fourth the speed of urban libraries.[4]

- Anchor institutions in rural and high-cost areas face extraordinary challenges in obtaining adequate broadband capacity. The costs of deploying fiber to schools in more rural regions of the US can be two to three times higher than the average cost of deploying fiber to schools in metro or suburban areas.[5]

- The gap between metro and non-metro health care facilities having at least a 50 Mbps connection grew by 34 points from 2010 to 2014. There is a similar gap in broadband connectivity for upload speeds, which affects transfer of Electronic Medical Records (EMR) and Health Information Exchanges (HIEs).[6]

In short, over the next few years, policymakers will need to decide whether to make the investments needed to ensure that anchor institutions have affordable, high-capacity broadband connections. And these decisions will determine whether the country will be divided between digital "haves" and "have-nots," or whether we capture the benefits of the Internet for all people.

CAIs can provide essential access and bridge this gap. CAIs can be the gateway to the digital community by offering equitable access to broadband-dependent services and teaching the skills needed to make best use of them. Deploying open, affordable, high-capacity broadband to CAIs in every community can expand educational opportunities, extend access to vital healthcare, keep people civically engaged and connected, and stimulate economic growth, while also promoting residential broadband adoption.

Schools, libraries, healthcare facilities, community centers, public media, and public service organizations can aggregate limited community resources over shared broadband networks and extend our digital lifeline—so even more end users can access the opportunities the Internet offers. Broadband connections will allow CAIs to expand on their public mission, scope and support—to do what they do best—so every student and citizen can reach their potential and be a full participant in our increasingly digital world. In a highly-connected environment, students and library patrons will be able to meet virtually with their teachers, professors, and outside experts online—to learn, explore and engage in research to address our most intractable problems. Medical specialists will be able to use high-resolution video to evaluate and monitor the health of patients who are physically located miles away, to ask questions, run diagnostic tests, and follow up on visual clues.

High-capacity broadband connects anchor institutions to their communities and to the world in the following ways:

- High-Capacity Broadband is the Foundation of 21st Century Learning and Education.

- High-Capacity Broadband Allows Libraries to Expand Community Connections and Services.

- High-Capacity Broadband Allows Patients to Benefit from Remote Healthcare.

- Deploying High-Capacity Broadband to Anchor Institutions Ignites Economic Development.

- Combining Anchor Institutions with Broadband Elevates Civic Engagement.

- Connected Community Anchors Promote Digital Equity.

High-Capacity Broadband is the Foundation of 21st Century Learning and Education

This is truly an exciting time for education in this country. The U.S. has an opportunity to transform its Industrial Age school systems to Information Age school systems that provide each student with individualized instruction, resources and support. Broadband services impact all levels of the educational process – classroom instruction, school administration, and homework. All schools, regardless of location, need access to high-capacity broadband in order to take maximum advantage of this technological revolution.

This digital transformation is well on its way. K-12 schools across the country are adopting 1:1 programs (providing a computing device to each student) and implementing "bring your own device" programs (utilizing the technology students already own). These programs enable more personalized, equitable, relevant, and cost-effective education for students.

One of the most recognized examples of this digital shift in education is in the Mooresville Graded School District (Mooresville), located north of Charlotte, North Carolina.[7] Mooresville has a comprehensive 1:1 program for its students in grades 4-12 and a robust broadband infrastructure to support it. The district has also worked to ensure equity by offering programs where every student, regardless of his/her ability to afford it, has broadband Internet access at home. As a result, Mooresville has shown positive gains in many benchmarks for educational improvement. These measurable outcomes include improved test scores in reading, math, and science; increased attendance and graduation rates; and lower spending to realize these gains compared to other North Carolina school districts. The district's graduation rate improved from 80 percent in 2008 to 91 percent in 2011.[8]

None of these educational gains would have been possible without having access to high-capacity broadband. The success of the Mooresville experience is having an impact across the country, as more and more school districts are replacing textbooks with digital devices. According to a 2014 survey sponsored by Amplify, nearly 71 percent of school district leaders said that a quarter or more of their schools have adopted mobile technology, up from 60 percent in 2013, and that 82 percent of school district leaders are highly interested in implementing 1:1 initiatives, if their budgets allow.[9]

Mobile Technology Moves to the Classroom

Research shows that mobile technology's substantial presence in schools is expanding and will only continue to grow in the next few years.

71% of districts surveyed in **2014** reported that at least a quarter of their schools have adopted mobile technology,

up from **60%** in **2013**.

67% of those with no mobile technology at present said they were very or somewhat likely to adopt it in the next **1-2 years.**

Amplify

Dr. Dallas Dance, superintendent of Baltimore County Public Schools, describes providing every student with access to broadband connections and new technologies as a moral imperative. Dr. Dance says, "In our future connected world, the new high-tech tools and pedagogies students in the wealthiest school districts enjoy must be available to every American, no matter where they are located. Students everywhere should be able to engage in the robust learning experiences that capitalize on the efficiencies of digital communications."

Four years ago, the State Educational Technology Directors Association (SETDA) issued a landmark white paper called "The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs."[10] This study recommended the following broadband standards for the future of K-12 education, which were adopted by the FCC two years later:

1. For the 2014-2015 school year, at least 100 Mbps per 1,000 students/staff for Internet access and at least 1 Gbps per 1000 students/staff for wide area network (WAN) connections; and

2. For the 2017-2018 school year, at least 1 Gbps per 1,000 students/staff for Internet access and at least 10 Gbps per 1,000 students/staff for WAN connections.

Network deficiencies exist in both the Internet access and District WAN connections

Percent of Schools
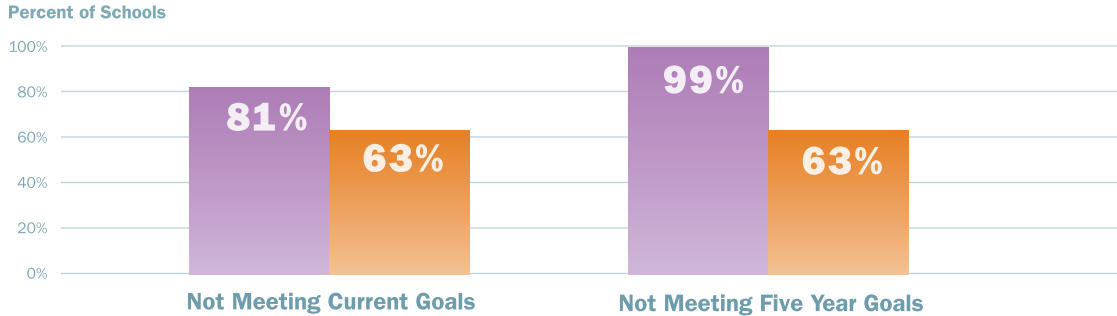
Education Superhighway

To ensure broadband access for students and educators, SETDA also recommended the federal government, states, and districts take responsibility for ensuring easy access to robust broadband connectivity outside of schools including, but not limited to, the home and such publicly-accessible institutions as libraries and community centers.

Unfortunately, not all schools have been able to meet these standards. Twenty-three percent of school systems indicated to the Consortium for School Networking (CoSN) that none of the schools in their system can meet the 2014-15 school year SETDA broadband connectivity goal of at least 100 Mbps per 1,000 students/staff.[11]

Thanks to the Federal Communication Commission's (FCC) decision in 2014 to increase funding for the E-rate program, many schools are now upgrading their broadband infrastructure and capacity to meet greater demand. While the FCC's decision is extremely important, funding is just one component of the comprehensive, holistic approach that is needed. Ensuring that these technologies deliver an improved educational experience requires leadership, teamwork, and a strategy for success.

At its best, technology allows us to extend our human presence so students can interact with, and begin to understand and empathize with, others who are located across the community, the country and around the world, as they encounter new viewpoints and perspectives. Susan Crawford, Professor at Harvard and former official in the Obama Administration, believes the killer app for broadband will be "human interaction." In an ideal educational environment, high-capacity Internet connections allow students not just to go on virtual field trips and record their scientific findings, but allow them to record interviews with scientists, offer personal commentary, and facilitate new types of video presentations to stream to their teachers and fellow students in other states and countries.

New Education Paradigms Need High-Capacity Broadband

High-capacity broadband infrastructure will allow schools to incorporate new or enhanced learning opportunities and technological applications—such as open educational resources, distance learning, and flipped learning.

● Open Education Resources (OER): State governments, school districts, and college students spend millions of dollars annually to purchase printed textbooks that are often out-of-date as soon as they come off the press. Educators have discovered that—by leveraging the prevalence of smartphones, mobile devices, and laptops—they can help their communities and students take advantage of free and low-cost eTextbooks, and other OERs. Some materials are already freely available and many have a Creative Commons copyright license that allows educators to use and adapt the learning materials

Broadband provides students and families with more information and more options. Simply put, access to robust broadband is foundational to student success.

DOUGLAS LEVIN
Founder and president of EdTech Strategies, LLC

as they wish. Most recently, the use of OER for K-12 use has been adopted by 14 states across the country with others expected to join the shift from print to digital education resources.[12]

- Distance and Online Learning: Distance and online learning is increasingly popular. Many students would not be able to pursue their educational goals otherwise. Distance education transcends physical constraints, allowing access to courses from high-caliber teachers, curriculum, and institutions that are not locally available.[13]

- Flipped Learning or Flipped Classroom: The flipped classroom is a relatively new teaching approach where lecture and homework are reversed. In a flipped classroom model, students view lectures online at home and classroom time is reserved for activities, tutorials, or discussions to enhance and ensure subject mastery.

These are just a few of the new learning paradigms enabled by high-capacity broadband. Emerging technology-based learning opportunities—such as educational games, simulations, and virtual and augmented reality—are being developed to engage students' imaginations and tap their creativity. These new learning approaches not only promote self-discovery; they also allow students to interact in fun, unexpected, and meaningful ways with their teachers, professors, other students, and with the subject matter itself.

Connected Schools Create a Modern Workforce

The most critical component of the nation's economy is skilled human capital, and demand for highly-skilled workers appears to exceed supply.[14] Increasingly, schools need to develop a sophisticated, flexible and highly-educated workforce with the knowledge and 21st century technological skills needed to lead the information economy. Workers also need continual job and professional development training to enhance their competencies, update their professional licenses, and learn additional skills to pursue new or advanced career opportunities. Businesses require digitally-skilled and knowledgeable employees, who have the ability to think on their feet, communicate, collaborate, and quickly take advantage of evolving customer demands, technologies, and opportunities. With the growth of cloud-based workforce training courses and the emergence of online entrepreneurs, ready access to high-speed Internet connections is a must.

America's future competitiveness depends, in part, on our students' abilities to master science, technology, engineering and math (STEM) skills. According to the STEM Education Coalition, 60 percent of employers are having trouble finding qualified workers to fill vacancies at their companies, even though STEM workers earn 11 percent higher wages compared with their same-degree counterparts in other jobs. Today, only 45 percent of high school graduates are ready for college work in mathematics, and only 30 percent are ready for college work in science.[15]

As far back as 2000, the Congressionally-mandated 21st Century Workforce Commission identified universal broadband access as a key to the success of workforce development – and identified anchor institutions as critical partners to provide technology access to underserved individuals and families.[16]

Schools and community colleges need access to fast broadband connections so these workforce-enabling community anchor institutions can address the shortfalls in 21st century STEM education and digital literacy. Creating "Information Age" environments in our schools and community colleges will require the highest levels of technological sophistication, and their success depends on the availability of affordable, high-capacity broadband networks.

High-Capacity Broadband Allows Libraries to Expand Community Connections and Services

Libraries Create Digital Creative Commons and Makerspaces

Stop by your local public library today and you will find a range of digital services and tools unimaginable even a decade ago. From videoconferencing capabilities to digital media labs to 3D printers, libraries enable people to create, collaborate and learn new digital skills. People also visit their local library to access vital lifeline services—to search online job openings, do schoolwork, file their taxes remotely, access online government services, conduct legal research, and explore our world. Many of these services or information sources are no longer offered in a print format. For all these reasons, library computer desktops are often full, laptops and tablets are checked out, and library Wi-Fi is intensively used—sometimes even after the physical library has closed.

Libraries are transforming into community hubs for digital content creation and collaboration. Having a high-speed and resilient Internet connection at each and every library is essential to ensuring a full range of services related to education, employment, entrepreneurship, empowerment and community engagement for all.

SARI FELDMAN
President, American Library Association

Cuyahoga County Public Library (CCPL) in Ohio provides an exciting example of what a high-capacity integrated network can offer a community. Nearly all of its 27 library locations have a robust, one-gigabit, broadband connection.[17] This connectivity allows the library system to become a "creative commons"—a reliable, trusted environment where patrons can learn workplace skills, take GED and college prep courses, and obtain digital literacy skills, so they can navigate the new digital environment. Recently, during the open enrollment season for health insurance, the library became a place where many came to learn about their healthcare options and enroll online in insurance programs available through the Affordable Care Act.

According to CCPL Executive Director and American Library Association President Sari Feldman, "The mission of the Cuyahoga County Public Library is to be at the center of community life by providing an environment where reading, life-long learning and civic engagement thrive. That environment has to include high-speed broadband and skilled staff."[18]

Feldman further states that broadband technologies enhance the library's ability to provide a safe, face-to-face, and online meeting environment where patrons can meet new friends and colleagues to discuss and share ideas. For example, the CCPL writing center offers a creative space to meet other aspiring writers, take face-to-face and online courses, and even upload one's newly-created eBook to a digital platform to share via the Web. Feldman notes that "this trend toward collaborative learning will only continue to grow" in a more digitally-connected world, and libraries will play an integral role. Libraries are quickly broadening their impact in their community by serving as digital hubs for broadband access, digital services, and related training.

There are many examples of libraries incorporating technologies for young people into their programming. The Brooklyn Public Library (BPL) created a technology-centered program specifically designed for teens who can learn, for instance, how to create their own iMovies using a "green screen." According to Lisa Goldstein, the head of the Youth Wing at BPL's Central Library, "Teens are some of our most enthusiastic and adventurous users of technology, and tech programs for teens are essential. They not only train teens in the technologies that may be required for future educational and job opportunities, they educate librarians about what tech trends will endure, and which may not."[19] The Carnegie Library of Pittsburgh created a
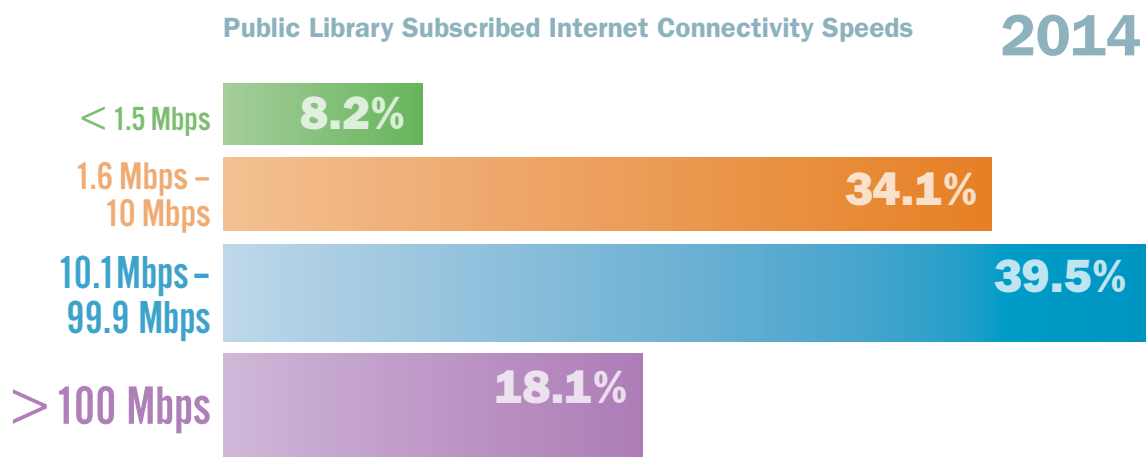
technology-based early learning and elementary outreach program, called BLAST (Bringing Libraries and Schools Together) to integrate a wide variety of technologies that support literacy and learning.[20]

John Palfrey, head of school at Phillips Academy, Andover, and founding president of the board of directors of the Digital Public Library of America (DPLA), believes that digital technologies can be designed to preserve the joys of serendipity libraries offer—such as when a patron or reader discovers a book they had not anticipated or expected to find on a nearby shelf, or sees a news article of interest on an adjoining page. DPLA brings together, and freely provides, materials and resources from libraries, archives and museums in an online format. DPLA and similar online repositories use technology to create inviting, dynamic "virtual shelves" of information for their users no matter where they are located.[21] It takes significant bandwidth to upload and share large digital collections, particularly photos, audio and video. These materials support access to rich cultural, historical and primary source material, including for educational purposes. In addition to providing this information to the general public, DPLA has programs to bring content to the K-12 and higher education communities.

Libraries are transforming themselves into hybrid spaces—where patrons can access analog and digital materials. Libraries will increasingly serve as content aggregators and point us to everything that is being digitized across the country—so the public can easily find information and knowledge. The DPLA and other emerging institutions like it allow users to tap into the innovation that is happening across the country.

As broadband connections proliferate, more libraries will be able to offer another type of makerspace—business incubators, where community members can use free office space, computers, 3-D or specialized printers, and other office equipment to get their new business started. Arizona State University (ASU), for instance, has rolled out a network of co-working business incubators inside public libraries, calling it the "Alexandria Network."[22] The initiative is led by ASU's Entrepreneurship and Innovation Group and is designed to create a statewide network of places for people to connect, collaborate and find valuable resources. Similarly, the John F. Germany Public Library in Tampa, Florida, offers "The Hive," a public community innovation center that offers kits for fabricating electrical and mechanical items, an A/V recording studio, and an arts center.[23]

Unfortunately, the lack of broadband connectivity at many libraries constrains their ability to innovate. Only about 58% of all libraries reported download speeds greater than 10 Mbps, with city libraries generally skewing on the higher end (about 36% with subscribed speeds of 100 Mbps or higher) and rural libraries generally skewing on the lower end (about 4% with speeds of 100 Mbps or higher). Nearly one-third of public libraries report that Internet speeds rarely or sometimes meet patron demand.[24]

Public Library Subscribed Internet Connectivity Speeds   **2014**

< 1.5 Mbps	8.2%
1.6 Mbps – 10 Mbps	34.1%
10.1 Mbps – 99.9 Mbps	39.5%
> 100 Mbps	18.1%

ALA/iPAC

High-capacity broadband connections allow libraries to experiment with offering new ideas and services to help their communities thrive. With high-capacity broadband at all public libraries, all community members will have access to such innovations.

Broadband Enables Libraries to Offer Virtual Field Trips and Promote Artistic Expression

As videoconferencing and telepresence systems improve capabilities and lower costs, more libraries are leveraging high-capacity broadband to increase experiential learning opportunities that are particularly valuable for young people who might be unable to travel. High-capacity broadband also allows libraries to partner with schools and museums to provide virtual field trips so students can explore the world of science and nature.

Kentucky's Jessamine County Public Library, for example, partnered with one of its local elementary schools to offer a virtual field trip for students and their families to the Texas State Aquarium located in Corpus Christi. The Texas State Aquarium has video cameras located around its facilities so the audience can see its exhibits live—and learn from an extremely knowledgeable docent. Most of these children will never have the opportunity to travel to Corpus Christi to see this exhibit in person. But, because of the power of high-capacity broadband, all of them were able to see and appreciate the wonders of undersea life.

The Cherryfield (Maine) Public Library, which serves a population of about 1,200, used its broadband network to allow 28 elementary students to view an exhibit at the Smithsonian in real time. Co-Director Cara Sawyer reports: "We were proud to be the first library in our area to partner with the Smithsonian Museums for interactive video conference programs. Without our high-speed Internet, there is no way we would even have a Tandberg Video Conferencing Device, never mind use it for such fabulous programming. The connection has also allowed us to use our Tandberg to connect with other library programs throughout the state."[25]

Today, most, if not all, major museums—from New York's Metropolitan Museum of Art to the Smithsonian's Air and Space Museum—offer a treasure trove of digital, interactive resources on their websites to online visitors and those who physically visit their exhibits. High-speed Internet connections also allow Americans from across the country to access unique video archive collections, such as the Shoah Foundation Institute for Visual History and Education, an online portal that hosts 53,000 video-based testimonies of survivors and witnesses of the Holocaust and other genocides. Universal access to these amazing digital resources enables our Nation's treasures, found across the country, to be shared virtually with young and old audiences alike, enhancing formal and informal education.

Broadband also enhances opportunities for artistic expression. As artists incorporate new digital technologies and creative media into their artwork, high-capacity broadband connections will become increasingly integral for showcasing ingenuity and imagination. Examples include collaborative musical and theatrical performances; master classes to students across the globe; and virtual auditions, rehearsals, and performances. Libraries also are using digital platforms to improve discovery and build audiences for emerging and/or local artists.[26] The Madison Public Library established the Yahara Music Library with Murfie Music, Inc., to share local music and support local musicians. The online collection includes music, artist and album pages featuring reviews, biographies, and information about upcoming shows, links to the musicians' websites, social media, and online stores.

High-Capacity Broadband Allows Patients to Benefit from Remote Healthcare

Technology is revolutionizing how physicians, specialists, and other healthcare professionals communicate with, and treat, their patients. Telemedicine offers a special lifeline to patients who reside in rural areas and cannot travel to and from the closest urban center where healthcare specialists tend to be located. Jonathan Bush, the co-Founder and CEO of athenahealth, shares, "What I think of as the real health care reform will be the virtualizing of health care. [A] radiologist can sit in front of a flat screen and crank out so much more work, so much better. Let's say a primary care guy says, 'You need to see a cardiologist, hold on a second' – beep! – 'Here's one!' The cardiologists will like it more because they'll make more money. The patients will like it more because they'll spend less money."[27]

Reliable, high-capacity broadband connections allow rural consumers to benefit from remote patient monitoring, exchange of electronic medical records, access to specialists in urban markets, all of which save money and improve healthcare quality for both patients and providers.

The cost savings of telemedicine will be significant for the government, which is footing a large part of our medical bills. A 2011 Center for Disease Control study showed that 80 percent of adults discharged from the emergency room (ER) said they sought ER care because they could not access a primary care provider. The report further identifies that almost 52 percent of adults outside a metropolitan statistical area utilized an emergency room because they had no other place to go.[28] The average cost of a visit to the emergency room costs $2,168, or 40 percent more than the average American pays in monthly rent.[29] In contrast, the average estimated cost of a telehealth visit is $40 to $50 per visit compared to the average estimated cost of $136 to $176 for in-person acute care.[30]

Johns Hopkins University has reported receiving a 19 percent savings from its "Hospital at Home" model, which it uses to remotely treat Medicaid and Medicare Advantage patients, as compared to costs to treat similar patients using traditional in-patient services. Hopkins attributed these cost-savings to shorter hospital stays, fewer labs and diagnostics, and earlier identification of acute issues.[31]

Telemedicine or virtualized communications require the best high-capacity, reliable broadband connections with high-resolution and often specialized audio and video equipment, so doctors can properly view their patients, access medical records and charts, use remote diagnostic equipment to make accurate prognostications, follow up with patients after medical procedures, and make other healthcare recommendations.

Electronic Medical Records Save Lives and Reduce Inefficiencies

Ready access to electronic medical records (EMR) is another benefit broadband technologies will bring to a connected society. An easily-accessible EMR system will make it easier for patients to work together with their healthcare providers to detect deviations, redundancies and on-going problems, collaborate with specialists on treatment options, track disease progression, ask pertinent questions, report adverse drug reactions, set up appointments, request refills and referrals, and report problems. Patients and their healthcare providers will be able to communicate more freely, and their relationship will transition from a series of episodic encounters to an on-going connection.[32]

In addition to providing easy computer access, efficiencies, and cost-savings, new technologies enabled by high-capacity broadband, can also enhance patient files with high-resolution images, audio, and video

materials. Patients usually visit multiple doctors, specialists, and other healthcare providers during a course of treatment as they address various ailments. Having complete access to all of their patients' records will help multiple providers reduce or prevent unnecessary or duplicative procedures, flag human or computer errors and discrepancies, and catch conflicting prescriptions that could have serious, negative side effects, potentially saving lives and reducing costly errors and inefficiencies. Imagine how much more effective paramedics could be when responding to a 911 call, if they could instantly access an accident victim's medical records, their health history, list of allergies, and a database that describes the latest, most-effective emergency treatment procedures.

## Broadband Connects Rural Schools to Telemedicine

Monroe County Schools (MCS) is a small, rural school district nestled in the foothills of the Cherokee National Forest and the Smoky Mountains in East Tennessee. MCS is fortunate to have gigabit-speed connectivity at every location. Sonia Hardin, MCS' supervisor of health services, oversees a school-based health clinic at each school, where schools are located more than 50 miles apart. Hardin explains:

> With mobile videoconferencing, we now have our students sit in front of a computer and communicate via videoconferencing with our remote nurse practitioners. We have equipment we can hook up to the computer so that the nurse practitioner can visualize the inside of a student's ear or throat. The nurse practitioner is able to diagnose illnesses and prescribe treatments on the spot, just as if he or she were physically present. The video solution is hosted on a secure website, so we feel comfortable using it, and it's saving our nurse practitioners a lot of driving time.

Hardin has also discovered that the technology has created more of a team environment for her nurses. "Being in a rural county, our nurses sometimes feel like they are out there all alone," shares Hardin. "This technology makes them feel connected to each other. They know if they have a question or if there's a medical emergency, they can contact a nurse practitioner using videoconferencing."[33]

But Monroe is an exception. As depicted in the chart at right, the National Broadband Map shows a significant difference between metro and non-metro areas in the speeds at which health care facilities connect. High-speed connections (> 50 megabits per second) for health care facilities increased dramatically in metropolitan areas between 2010 and 2014, but only slightly in non-metropolitan areas. From 2010 to 2014, the gap between metro and non-metro health care facilities at that connection speed grew by 34 points.

Connection Speed Gap Between Metro and Non-Metro Health Care Facilities
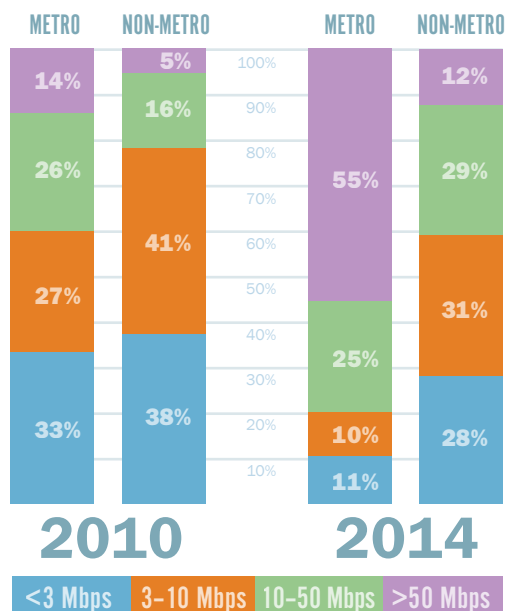
The Journal of Rural Health

High-Speed Broadband in Community Anchor Institutions Offers a Wide Range of Community Benefits

In addition to the specific benefits for education, information access, and health, CAI broadband can generate a wide variety of additional community benefits. Massachusetts Institute of Technology researcher William Lehr studies the economics and regulatory policies surrounding Internet infrastructure with a focus on mapping the communications value chain. He states,[34]

> Anchor institutions – our schools, libraries, hospitals, and cultural institutions – play a special role in maintaining the healthy fabric of society and our communities. Consequently, ensuring access to broadband by anchor institutions is critically important for enabling anchor institutions to achieve their mission goals and will help realize the benefits of broadband for our economy and society and for meeting the public obligation to provide universal access to broadband.

CAI Broadband is Essential for Economic Development

Deploying high-capacity broadband to anchor institutions not only expedites access for the entire community but also ignites economic development.

Anchor institutions can be part of a "success-based" build strategy in which fiber is deployed first to the anchor institutions, which serve as the "anchor tenants" of the network extending fiber to the rest of the community. The nDanville Fiber Network in Danville, Virginia, was the first municipally-owned, open-access, open-services network in the United States. Facing economic pressures from the decline of the tobacco industry, the fiber project was initiated in 2004 to provide the City of Danville, as well as three surrounding counties, with powerful, high-capacity broadband services. The first phase of the project connected all the schools, and the second phase connected the area businesses. The nDanville project has attracted Cray Supercomputers, which require very high-capacity broadband, and companies from Sweden, Germany, India and China.[35] Now in its third phase, the open-access nDanville network is facilitating the build-out of fiber-to-the-home by third-party fiber companies.[36]

Deploying high-capacity broadband to community anchor institutions will ensure the United States improves its broadband ecosystem and remains globally competitive and economically vibrant.

In Maryland, the Allegany County Board of Education drove the deployment of high-speed broadband to downtown Cumberland. The school district wanted to provide high-capacity broadband to its maintenance facility located in the downtown area, but the service was unavailable and costly to install. The district and city partnered and received grant funding from the Appalachian Regional Commission (ARC), which helps communities become more economically successful. ARC will pay 50 percent of the broadband network cost with the district and city splitting the balance. Nil Grove, the chief technology officer said, "Providing additional options for high-speed Internet service in Allegany County can only be a positive move for economic development and growth. The downtown area specifically will benefit from competitive pricing available to private entities with reliable and redundant high-speed service." Shawn Hershberger, the economic development coordinator for the city, adds, "It helps us toward the jobs we are trying to compete for and helps us keep the jobs we have here now." [37]

Several highly-recognized research reports show a positive correlation between broadband, anchor institutions, and economic development.

One 2011 study found that doubling broadband speeds for an economy can add 0.3 percent to GDP growth.[38] The study further concluded that the benefits of faster broadband include:

● Economic effects which include job creation, increased innovation, and productivity in business;

● Social effects which include better access to services, improved education opportunities via e-learning, and improved healthcare via e-health services; and

● Environmental effects which include dematerialization such as telecommuting or video conferencing, and more efficient energy consumption such as smart grids or smart homes.

The White House Council of Economic Advisers (CEA)[39] recently found that:

● Broadband Internet is associated with higher employment rates, especially in rural communities;

● Online job searches decrease the duration of unemployment spells; and

● People who searched for jobs online were re-employed 25 percent faster.

CEA also noted the importance of public libraries in providing the access needed for people to conduct online job searches. The report estimated that 30 million Americans used library Internet access to conduct job searches, submit online job applications, and receive job-related training in 2009.

Focusing on providing high-capacity broadband to CAIs will help ensure the United States improves its broadband ecosystem and remains globally competitive and economically vibrant.

Broadband Elevates Civic Engagement

Anchor institution broadband can also help to address the disturbing trend in political participation by America's youth. An April 2012 report[40] highlighted the dismal state of civics knowledge and engagement among youth directly related to income and education. According to another study, voter turn-out in the 2012 Presidential election among 18-29 year olds was only 45 percent, compared to 66 percent for voters age 30 and above.[41]

Internet access can have a direct effect on political participation. A study conducted in 2003 found that Internet access may enhance voter information about candidates and elections, and stimulate increased participation. The research suggested that Internet access and online election news significantly increased the probability of voting by an average of 12 percent and 7.5 percent respectively.[42]

The National Broadband Plan suggests that access to high-capacity broadband can inform communities and increase civic engagement by:

● Leveraging broadband-based technologies to modernize the delivery of government services and enhance democratic processes and ensure that they are accessible to all Americans;

● Increasing opportunities for citizens to participate in the civic life of their local communities and to engage their government through social media and broadband-enabled tools;

● Expanding opportunities to weave citizen-based innovation and collaboration into our government; and

● Create an open and transparent government.

Robust broadband networks can also generate new, innovative ways cities can converse with constituents—to offer a new mesh of interactive civic "touch points" for those who were previously excluded, says Harvard Law School Professor Susan Crawford. Imagine if cities could obtain ongoing feedback from the general population, not just once every two years. Such interaction could lead to a government that is more responsive to community needs and a more engaged, civic-minded citizenry.

John Palfrey, Head of School at Phillips Academy Andover, says libraries continue to be "essential to a functioning democracy" whether they are a large physical building in the middle of a city or an open, dynamic, online portal. Palfrey loves the bold letters carved above the entrance to the Boston Public Library, which simply state, "Free to All." In the heart of this vast civic space, the city's grand library is devoted to ensuring every Bostonian—regardless of education or ability to pay—can equitably access the information they need to be informed, engaged citizens in their community. Libraries and other anchor institutions are carrying this same philosophy online, and, by doing so, they foster an informed electorate that is a critical element to a functioning, thriving democracy.[43]

Community Anchors Promote Digital Equity

Community anchor institutions offer an important means for low-income families to access the Internet. According to a White House Fact Sheet,

> While nearly two-thirds of households in the lowest-income quintile own a computer, less than half have a home Internet subscription. While many middle-class U.S. students go home to Internet access, allowing them to do research, write papers, and communicate digitally with their teachers and other students, too many lower-income children go unplugged every afternoon when school ends. This 'homework gap' runs the risk of widening the achievement gap, denying hardworking students the benefit of a technology-enriched education.[44]

Community anchor institutions offer an important means for low-income and rural families to access the Internet.

The 'homework gap' affects low-income and rural schools the most. A recent report by CoSN noted that, "only three percent of teachers in high-poverty schools said that their students had the digital tools necessary to complete homework assignments while at home, compared to 52 percent of teachers in more affluent schools." While some families have no access, many have service that is too slow to utilize today's resources and tools. Whether un- or under-connected, CoSN suggests that "…the entire community shares an interest in advancing digital equity for all."[45] Similarly, a recent report by the Education Commission of the States notes that "Of individuals who live in rural areas of the U.S., more than half (53 percent) lack access to industry standards for broadband service speeds; by contrast, only 8 percent of urban residents confront similar limitations on broadband access."[46] Community anchor institutions offer an important means for low-income and rural families to access the Internet.

Tony Marx, the president and CEO of the New York Public Library, describes visiting a library in the South Bronx and finding a young boy sitting outside on the library steps, after hours, doing homework on his laptop because it was the only place where he could get free Internet access. Marx noted that close to three million New Yorkers cannot afford Internet service.[47]

Children in rural farming communities live in areas that Adrianne Furniss, the executive director of the Benton Foundation, calls "digital deserts" because they lack broadband services.[48] Megan Smith, Chief Technology Officer of the United States, said there is a lot of work to be done in rural areas: census data shows that there are still five million households with school-aged children who are not effectively connected to the Internet.[49]

Darryl Adams is superintendent of the Coachella Valley Unified School in California, where many of his students live in trailer parks and remote communities. He convinced the school district to outfit 100 school buses with Wi-Fi routers and solar panels, so students who commute 45 minutes to and from school can complete their online school assignments to bridge the homework gap. The district also parks its buses overnight in the most underserved communities because, "we wanted to ensure that students had 24/7 access to the Internet. Because learning does not stop at the end of the school day," Adams said.

Similarly, administrators of the Cuyahoga County Public Library system have installed repeaters on the sides of its library buildings so local residents can use CCPL's publicly-funded Wi-Fi hot spots. Executive Director Sari Feldman hopes to extend the reach of its broadband network to the residents of a nearby housing project. Baltimore County Public Schools has created opportunities for its students, parents and other community residents by creating a digital classroom in a neighboring community center for after-hours Internet access, GED and English language classes.

In addition to the examples noted above, Project Tomorrow's 2015 Speak Up National Data Findings reported that 35 percent of students go to school early or stay late to use their schools' Internet connections and 24 percent of students use their public library Internet connections.[50] As demonstrated by these examples and research findings, CAIs increasingly serve as community hubs that allow millions of Americans to gain access to the Internet. CAIs can promote digital equity by providing essential access to high-capacity broadband serving a diverse group of unserved and underserved community members.

Conclusion

Broadband is more than just a platform, it is a "meta-infrastructure" that makes all other infrastructures (such as education and healthcare) serve the public more effectively. While progress has been made, the U.S. still has a long way to go to meet the goal, articulated in the National Broadband Plan, that every American community have anchor institutions that enjoy affordable access to at least one gigabit-per-second (Gbps) broadband service by the year 2020.

Ensuring access to high-capacity broadband for anchor institutions should be a primary goal of broadband policies. Our federal, state, and local governments must adopt sound programs for public investment in broadband, including funding and adequate investment to bring robust broadband to anchor institutions.

The time has come to ensure all community anchor institutions have access to high-capacity broadband so that the benefits of the Internet reach everyone, keeping America globally competitive, economically vibrant, educationally progressive, civically engaged, and culturally rich.

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The **Schools, Health & Libraries Broadband (SHLB) Coalition** is a 501(c)(3) advocacy organization that supports research and public policies that promote open, affordable, high-capacity broadband connectivity for anchor institutions and their communities. Founded in 2009 in Washington, DC, the SHLB Coalition receives financial support from its non-profit and corporate members and from the Bill & Melinda Gates Foundation. For more information, visit www.shlb.org/.

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