Measuring broadband availability is problematic, and no consumer price data are available nationwide. Geographically detailed broadband data with national coverage are available for U.S. ZIP Code areas from the Federal Communications Commission (FCC). FCC data report the number of companies providing broadband service in a ZIP Code area. These data overestimate broadband availability, however, because broadband “availability” requires that only one customer be located in that ZIP Code area. Results reported here should be interpreted with these limitations in mind.

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## Overall and in-home Internet use of any kind, 2007

<table>
<thead>
<tr>
<th>Region</th>
<th>Household income (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10,000 to 24,999</td>
</tr>
<tr>
<td></td>
<td>25,000 to 49,999</td>
</tr>
<tr>
<td></td>
<td>50,000 to 99,999</td>
</tr>
<tr>
<td></td>
<td>100,000 and over</td>
</tr>
<tr>
<td>Urban</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

#### Internet use, anywhere

- **Northeast**: 71.0, 69.5, 70.9, 64.1, 61.0, 63.7
- **Midwest**: 74.0, 65.7, 72.1, 63.1, 53.7, 60.9
- **South**: 70.7, 58.3, 88.3, 61.7, 46.4, 58.7
- **West**: 75.5, 68.6, 74.9, 67.0, 56.9, 66.1

#### Internet use, at home

- **Northeast**: 72.6, 63.3, 71.1, 63.7, 51.9, 61.8
- **Midwest**: 74.0, 65.7, 72.1, 63.1, 53.7, 60.9
- **South**: 70.7, 58.3, 88.3, 61.7, 46.4, 58.7
- **West**: 75.5, 68.6, 74.9, 67.0, 56.9, 66.1

*Percentage of households with at least one person going online at home or elsewhere.
*Percentage of households with at least one person going online at home.

Source: Economic Research Service calculations based on Census Bureau data.

### Broadband Availability

The growth in broadband availability since 2000 has been rapid. In 2000, land-based broadband service provision was clustered in highly urbanized areas with service available only in a limited number of rural areas. By 2006, broadband availability was far more common in rural areas. Throughout this decade, broadband access has increased, but is less likely to be found in rural areas. Today, clusters of lower service exist in sparsely populated areas, such as the Dakotas, eastern Montana, northern Minnesota, and eastern Oregon. Other low-service areas have an aging population and are experiencing persistent population loss (e.g., the Missouri-Iowa border and Appalachia).

Government policies that encourage deployment of broadband services increased availability and, in some cases, encouraged more competitive pricing. The Universal Service Program established by the Telecommunications Act of 1996 funded broadband Internet access for medical facilities and elementary and secondary schools. The 2008 Farm Bill (Food, Conservation, and Energy Act of 2008) reauthorized USDA’s telemedicine and distance learning and rural broadband access grant and loan programs. Government policies such as the American Recovery and Reinvestment Act of 2009 provided $2.5 billion to USDA for loans and grants to increase broadband provision in primarily rural areas.

**Source:** Economic Research Service calculations based on Federal Communications Commission data.

### Broadband’s Relationship With Rural Business

Broadband Internet enables businesses to increase efficiencies in existing commercial relationships, increase market presence by reducing the cost of reaching larger markets, and introduce new customers and markets. The cost savings and increased competition between businesses (e.g., local banks must compete with Internet-only banks) brought about by broadband adoption has been rapid. In 1997, 13 percent of farmers were using the Internet for farm business; 10 years later, use had increased to 55 percent. As Internet adoption increases, the need for high-speed Internet also rises as online purchasing and marketing become the norm. Rural businesses, however, use broadband less than urban businesses, perhaps due to higher prices for rural broadband service. Online business activity provides rural businesses with potential benefits due to the efficiencies found in high-speed Internet access:

- **Direct sales from manufacturer to consumer are available on a broader scale.** Value-added and niche agricultural products, horticulture, and other specialty products, for example, are often sold directly to consumers.
- **Business-to-business transactions over the Internet have increased substantially.** By 2005, online wholesale trade of farm products had already reached $3.7 billion or approximately 3 percent of all wholesale farm product sales, while all online wholesale trade had reached $386 billion or 13 percent of all wholesale trade.
- **Online retail sales have increased substantially.** Rural retail business Internet users found that broadband access allowed them to increase operational effectiveness and exploit market niches.

**Broadband’s Relationship With Rural People and Households**

Broadband Internet gives rural residents access to goods and services that may not otherwise be available locally or via dial-up Internet. Online purchases now replace the once common Sears and Roebuck catalog. Rural Internet access can also affect purchase decisions, however. Facilitating price discovery and consumer information gathering, real estate and automobile purchases are examples of markers that have been significantly impacted by Internet-based consumer price discovery activities. Rural Internet also facilitates greater contributions to community vitality through civic engagement and community participation.

### Measuring Broadband Availability

Measuring broadband availability is problematic, and no consumer price data are available nationwide. Geographically detailed broadband data with national coverage are available for U.S. ZIP Code areas from the Federal Communications Commission (FCC). FCC data report the number of companies providing broadband service in a ZIP Code area. These data overestimate broadband availability, however, because broadband “availability” requires that only one customer be located in that ZIP Code area. Results reported here should be interpreted with these limitations in mind.

**Source:** Economic Research Service calculations based on Census Bureau data.
The Value of Broadband: Telemedicine

Rural residents often face challenges accessing a full range of health care services. Today, due to the availability of broadband Internet, rural health care providers can more easily link with urban providers through the use of health information technology. There is a national push to create electronic health records for all Americans so that patient information can follow individuals from one health care provider to the next. The ability to meet that goal is dependent on all health care providers’ having the kind of rich connectivity available only through broadband Internet services. Rural health care providers and their patients also benefit from the use of telemedicine technology, where specialty services can be offered real-time to clinics and hospitals that may not have full-time specialists. Patients no longer have to travel long distances or wait to consult with specialists, and emergency cases may not always have to be evacuated to a larger hospital. Telemedicine is helping address an array of problems in the United States, where vast distances and low population densities have led to doctor shortages for many rural communities. Other benefits of telemedicine include the following:

Medical benefits
- Improving the perception of locally provided health care quality
- Offering a larger menu of locally provided medical services
- Treating emergencies more efficiently
- Telephone monitoring can help providers better manage elderly rural residents with chronic conditions; thereby reducing hospitalizations and avoiding early placement in nursing homes or assisted-living care facilities

Economic benefits
- Reducing time off work due to decreased travel time to access specialist care
- Lowering the cost of travel to receive care
- Increasing revenue from pharmacy and lab work that can be conducted locally
- Reducing costs to health facilities by outsourcing specialized medical procedures

In summary, rural communities have not been left out of the ever-changing information economy, although issues of equal access exist. Evidence suggests that the difference in access may lie in the higher cost or limited availability of broadband Internet in rural areas. Data on broadband use in households and businesses and its cost are needed to better address this issue.

Rural Broadband At a Glance

The Federal Communications Commission has historically defined broadband Internet service as providing a minimum of 200 kilobits per second (kbs). This speed is much faster than dial-up, which has a maximum speed of 56 kbs and can be as slow as 14 kbs in rural areas. Unfortunately, the definition, although recently updated to a tiered definition, includes a wide array of technologies with varying reliability and quality, making economic impact analysis and discussion of broadband Internet service challenging.

Data Resources

This report draws on the research of ERS’s Resource and Rural Economics Division. Data in this analysis are drawn from the Federal Communication Commission’s (FCC) Form 477 survey and the U.S. Census Bureau’s Current Population Survey (CPS).

FCC Form 477 survey data provide a biannual account of broadband Internet service providers in each ZIP Code area. The number of providers in areas with one, two, or three providers, however, is not disclosed to protect firm confidentiality. Form 477 represents the only nationwide data on the number of broadband providers serving rural communities. The CPS surveys a nationally representative sample of households in both rural and urban areas and included a supplement on “Internet and Computer Use” in its August 2000, September 2001, October 2003, and October 2007 surveys.

Additional data resources include surveys and the Local Exchange Routing Guide data on the number of local exchange carriers and switches. USDA’s June Agricultural Survey (since 1997), Agricultural Resource Management Survey (since 2005), and Census of Agriculture (2007) provided information on Internet and broadband adoption by rural households. The Pew Internet & American Life Project has also conducted multiple, publicly available, nationwide surveys of household use of the Internet. In addition, some states (e.g., North Carolina and Kentucky) collect data on broadband availability within their borders, affording more geographic detail than that provided in the FCC data.

Background and Contacts . . .

Findings in Rural Broadband at a Glance are drawn from a larger body of research currently underway. ERS is conducting a multi-disciplinary nationwide study of the economic issues surrounding broadband access and use in rural America. Ongoing research focuses on broadband use, broadband availability, and the effects of broadband Internet service on health, wealth, and prosperity; the provision of community public services, access to healthcare, and rural well-being.

For additional information on this topic, please contact Peter Stenberg at stenberg@ers.usda.gov or Sarah Low at slow@ers.usda.gov.