

Broadband and Communities

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What is Broadband?

- ▶ Broadband is high-speed Internet
- ▶ As the Internet evolves, higher speeds are needed to take full advantage of the Internet and its potential
- ▶ May be fixed (wired) or wireless
- ▶ Higher speeds enable high resolution, video streaming, Internet of Things - how does this matter for communities?

Internet Use Matters for Innovation and the Economy

- ▶ Technology drives innovation, and it's not just about software development
- ▶ Technology **applications** (in various industries) will be the primary source of productivity growth in coming decades (Byrnjolfsson and Saunders 2010)
- ▶ Broadband **infrastructure** shows positive outcomes for employment, number of businesses, property values in communities (Gillett et al. 2006)
- ▶ For employment growth **across sectors** (health, manufacturing, finance, real estate, education, etc.) (Crandall, Lehr and Litan 2007)

Internet Use Matters for Economic Opportunity for Individuals

- ▶ Longitudinal data show Internet use at work and *at home* are both associated with higher wages (DiMaggio and Bonikowski 2008)
- ▶ Internet use at work accounted for about \$118/week more in wages in 2003, controlling for other influences (Mossberger, Tolbert and McNeal 2008)
- ▶ Even for workers with only a high school education or less, it resulted in \$111/week more (Mossberger, Tolbert and McNeal 2008)
- ▶ Connecting workers with better jobs for the level of education they have is one of the most effective economic development strategies (Bartik 2003)
- ▶ Nearly $\frac{3}{4}$ of job seekers use the Internet, which is often the only way to apply (American Library Assoc. 2010)

Benefits for Rural Communities

- ▶ Shrinking distances and decreasing isolation
 - ▶ E-Commerce – broader markets
 - ▶ Higher quality infrastructure can attract new businesses
 - ▶ Telecommuting/Teleworking
 - ▶ Telemedicine
 - ▶ Distance education, workforce development
 - ▶ Government services/civic engagement for dispersed populations
 - ▶ Emergency information – weather, severe weather, disaster and public safety information
- ▶ Aging in place – Access to health information, health care, in-home monitoring, shopping in communities with limited retail, government services, social networks and connections with distant neighbors, friends and family

Benefits for Urban/Metropolitan Communities

- ▶ Taking advantage of density and scale
 - ▶ Smart Cities solutions – smart grids for energy, water conservation, waste management, public safety, etc.
 - ▶ Big data – predictive analytics to understand trends in crime, city expenditures, etc. for better public management and policy
 - ▶ Real-time info for mass transit; for traffic management
 - ▶ Research needs and teleconferencing for universities, medical centers, museums
 - ▶ Telemedicine capacity for major research hospitals
 - ▶ National growth in productivity, wages, innovation through use of technology likely to occur in metros, with specialized labor markets

See Mossberger, Tolbert and Franko 2012 – *Digital Cities: The Internet and the Geography of Opportunity*, Oxford University Press

Why local governments are leaders in broadband

- ▶ Local governments are important actors in broadband policy
 - ▶ Need for tax revenues spurs them to encourage local economic development
 - ▶ Important services facilitated by broadband
 - ▶ responsibility for quality of life in communities (and that in turn is an important factor in growing, attracting, and retaining businesses)
- ▶ Government supports economic development through roads, and utilities like water and electricity
- ▶ Broadband as a 21st century infrastructure (FCC 2010)
- ▶ Broadband as a utility, as necessary as water (Lehr 2012)

Infrastructure Alone Not Enough – Broadband Use is the Key

Network Externalities – Value of broadband/wireless networks increase with number of users –

- ▶ For example, e-commerce is more important as more people use it
- ▶ Benefits depend on how organizations like schools, health care institutions, and businesses use broadband and innovate
- ▶ Large % of population offline limits benefits for communities, society

Who is online? US Data, CPS 2012

- ▶ 73% have broadband at home in the U.S.
- ▶ 63% of non-metropolitan households have broadband at home
- ▶ 2012 Current Population Survey (CPS) collected by the U.S. Census Bureau – questions about Internet use, barriers, activities online, forms of access, including mobile

What Matters for Differences in Internet use?

Income, education, race, ethnicity and urban/rural differences have remained statistically significant across the years

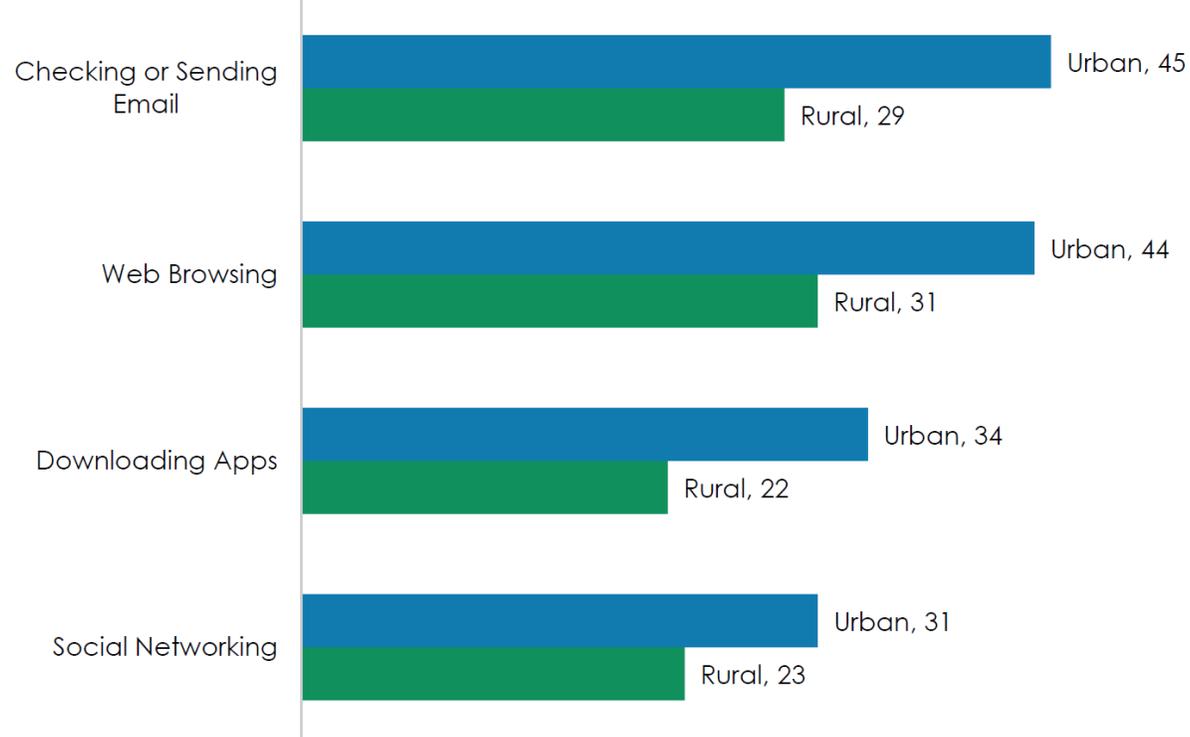
Age accounts for some of the largest disparities, but the age gap has narrowed somewhat over time

The challenge will be keeping people online as individuals accustomed to using the Internet age – adaptive technologies increasingly important

- ▶ “Mobile Transformation” – 88% of Americans over 25 have cell phones (CPS 2012)
- ▶ Urban and rural residents with cell phones nearly the same, but use differs

Internet Use on Cell Phones, Urban and Rural, 2012

Figure 7: Activities Americans Conduct on Mobile Phones by Population Density, Percent of Mobile Phone Users Age 25+, 2012



Mobile-only Users – A First Step?

- ▶ Most smartphone users also have home broadband (Horrigan 2010)
- ▶ Around 10% are mobile-only users (Mossberger, Tolbert and Anderson 2014)
- ▶ Mobile-only Internet users are more likely to be young, low-income, less-educated, Black, Hispanic, and American Indian/Alaskan Natives (ACS 2013 Summary; Mossberger, Tolbert and Anderson 2014; Tahy, Deschine, Morris and Mossberger 2015)
- ▶ “Digital Citizenship” is the ability to participate in society online – mobile-only users engage in fewer economic and civic activities online than home broadband users (Mossberger, Tolbert and Franko 2012)
- ▶ Fully-connected have home broadband, mobile, public access

Infrastructure is Not Enough: Barriers to Adoption

- ▶ Variation within metros: Poverty of place matters within urban areas, as well as individual characteristics
- ▶ Even for nonmetropolitan residents, factors like income, education, race and ethnicity are the factors that account for most of the rural disparities in broadband adoptions
- ▶ Cost most likely to be cited as a barrier by low-income residents, especially minorities
- ▶ Lack of interest – most likely older, white; American Indians and Alaskan Natives least likely to cite lack of interest
- ▶ Lack of confidence/skill – older, less-educated
- ▶ Lack of availability as a barrier – rural residents with higher incomes, white, and younger

(Mossberger, Tolbert and Franko 2012)

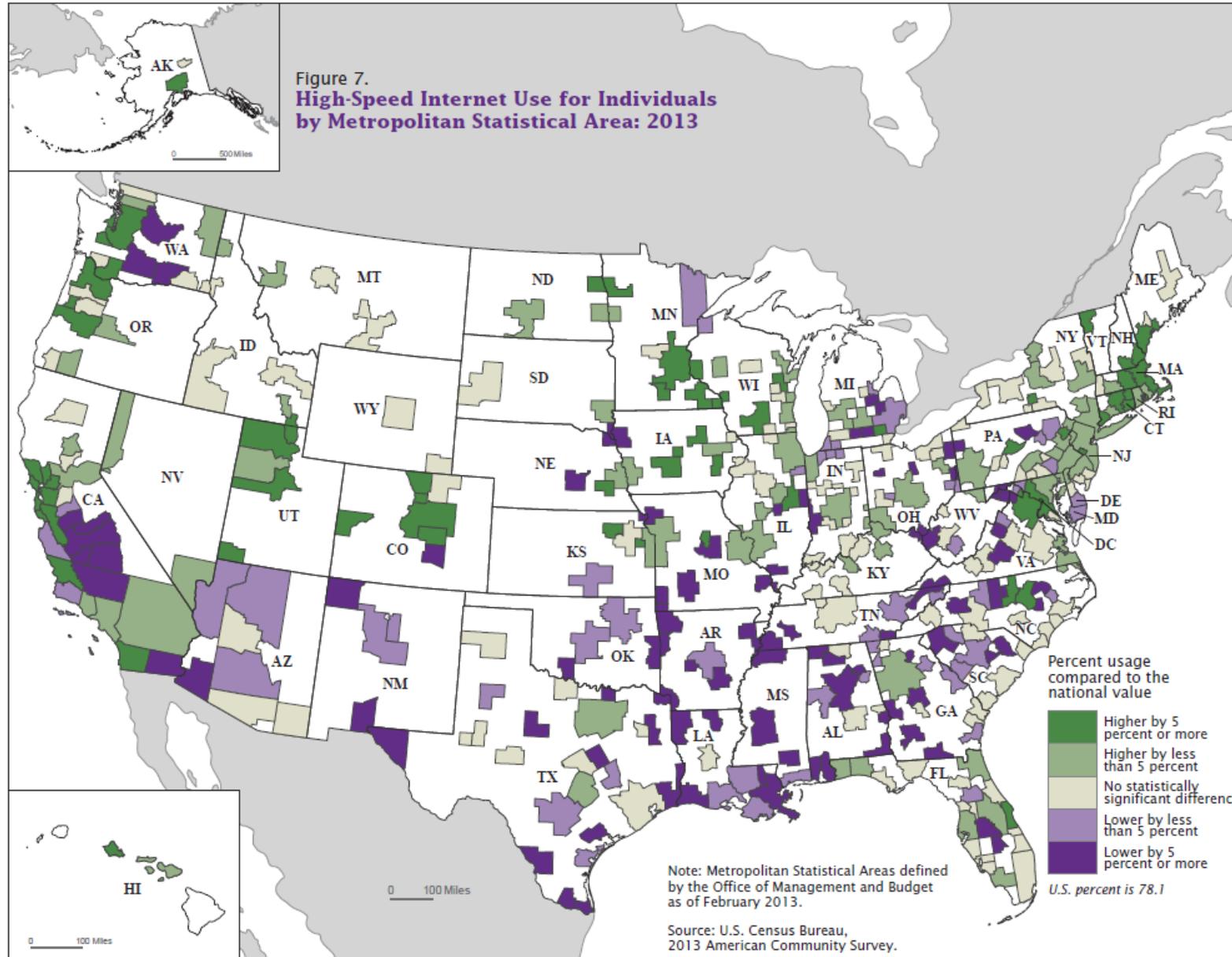
What is Internet use in my community?

- ▶ Traditionally, only national and state-level data has been available
- ▶ The American Community Survey has begun to collect data on a few questions, beginning with 2013
- ▶ Only metro data in ACS so far; tribes and communities will be listed in the future

NATIONAL SCIENCE FOUNDATION PROJECT

- ▶ Data repository at ASU – will have 50 largest cities in the US and county-level data 1997-2012, comparisons with ACS
- ▶ Includes an index of activities online by county level from 2012 CPS data (job search, use at work, health, education)

Figure 7.
**High-Speed Internet Use for Individuals
 by Metropolitan Statistical Area: 2013**



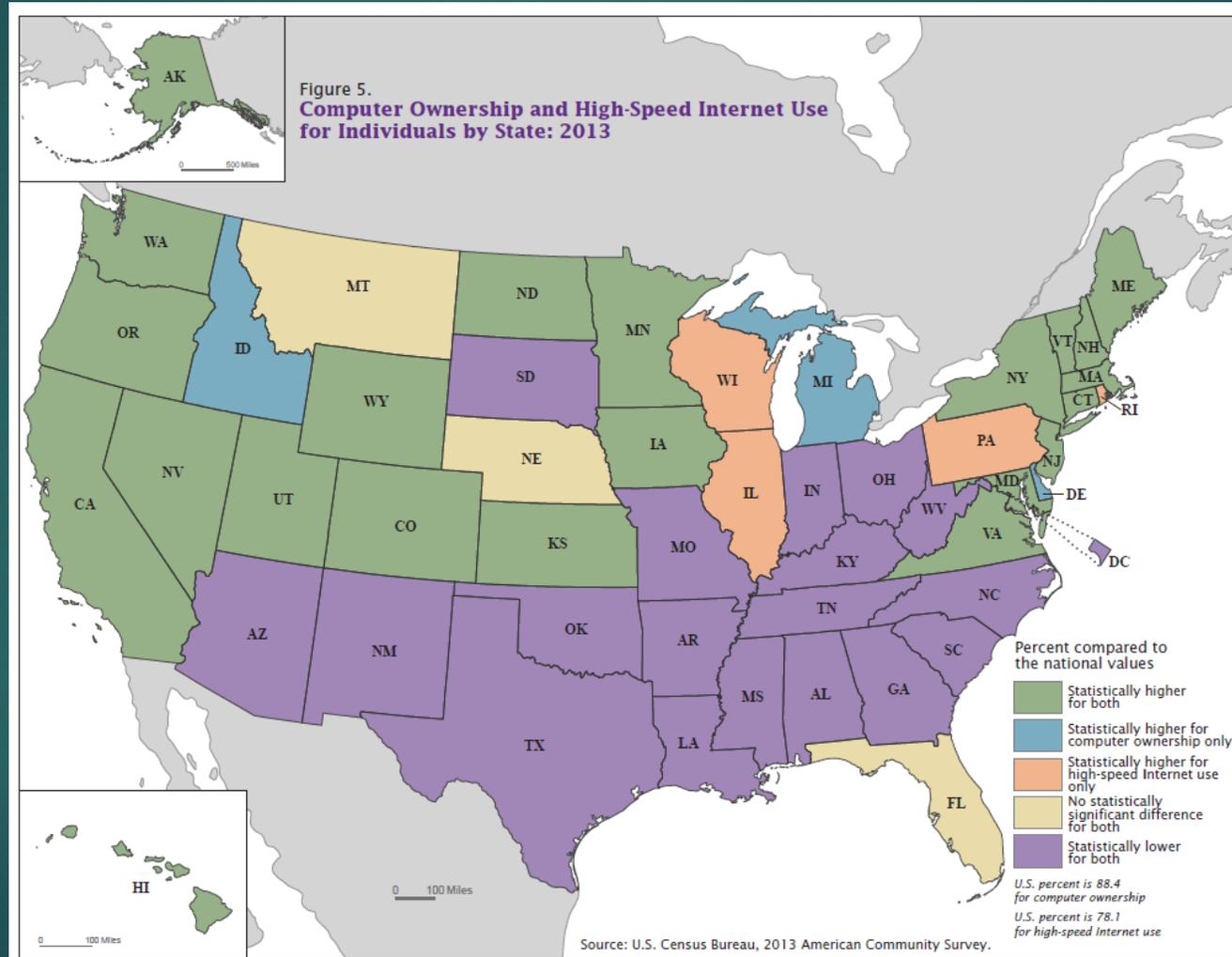
ACS 2013 – SELECTED RESULTS FOR METROS

- ▶ Lowest broadband at home – Laredo, TX - 52%
 - ▶ Small metros in South and Texas are lowest
- ▶ Highest broadband at home – Corvallis, OR – 89%
 - ▶ Other high metros include the clusters for San Jose, San Francisco, Seattle, Boston, Washington, D.C., Boulder, Anchorage, Colorado Springs, and Lawrence, KS

AZ BROADBAND

- ▶ Yuma 68%
- ▶ Flagstaff 74%
- ▶ Lake Havasu/Kingman 74%
- ▶ Phoenix/Mesa/Scottsdale 77%
- ▶ Prescott 78%
- ▶ Tucson 78%

ACS 2013



Policy Needs

- ▶ Infrastructure and availability are important
- ▶ But, without addressing affordability and skills, many rural and urban residents who are low-income, older, and minorities will still be left behind
- ▶ Broadband infrastructure, affordable access, and training and support are needed so that communities can promote economic development, workforce development, health, education, and government services

APPENDIX – for reference only



Indiantown, FL

- ▶ \$8.1 million RUS loan for fiber network, replacing aging network
- ▶ Declining population and depressed economy
- ▶ Telecommuting – new businesses run from homes
- ▶ Virtual call center, hiring unemployed residents to work from home, with free Internet service first month, before paycheck
- ▶ County collaborated to build own fiber network and saved \$2 million
- ▶ Chambers and County, rebranding as iTown (biofuels interest)
- ▶ Tier 3 level data center
- ▶ Hurricanes and emergency management network
- ▶ New service accompanied by Internet education
 - ▶ Change from 20% to 75% home broadband adoption in some areas
 - ▶ One retirement community increased broadband adoption by nearly 50%
 - ▶ Immediate 25% growth in home broadband throughout service area

Case studies, best practices

United States Department of Agriculture

Success stories

<http://www.rurdev.usda.gov/>

National Telecommunications and Information Administration, U.S.
Department of Commerce

Best practices manual

Case studies

<http://www.ntia.doc.gov/broadband>

Figure 10: Home Computer, Internet, and Broadband Use by Demographics and Population Density, Percent of Households, 2012

	Computer Use	Internet Use	Broadband Use**
All Households	79	75	73
Family Income			
Less Than \$25,000	57	49	48
\$25,000-49,999	77	72	70
\$50,000-74,999	90	88	86
\$75,000-99,999	95	93	92
\$100,000 or More	97	96	95
Education*			
No Diploma	49	40	39
High School Diploma	69	65	63
Some College	84	80	79
College Degree	94	92	91
Race and Ethnicity*			
White	82	79	77
African American	67	62	61
Hispanic	69	64	63
Asian American	87	85	84
American Indian or Alaska Native	68	58	56
Population Density			
Urban	80	76	75
Rural	72	66	63

* These are attributes of the householder.

** For the purpose of this analysis, households are considered to use broadband if they report home Internet use and list any type of connection other than dial-up, including “some other service.”