March 2017

Evidence Roadmap:
Telehealth and Health Care Access for Rural Populations

AcademyHealth

AcademyHealth's Evidence Roadmap series presents selected, key research studies, systematic reviews, and other rigorous evidence to help policy analysts and others explore the current state of knowledge about a topic relevant to health policy or the delivery of health services.

This Evidence Roadmap catalogs recent evidence on the use of telehealth as a strategy to mitigate health care access issues in rural areas, including the establishment of telephone or video-based consultation and training for rural health care practitioners. In two of AcademyHealth's Listening Project reports, "Improving the Evidence Base for Medicaid Policymaking" and "Improving the Evidence Base for Safety Net Health Care Delivery," policymakers, health system leaders, and other experts identified this topic as needing additional attention from health services researchers.

While primarily focused on the past six years, this Roadmap includes older resources when they represent the most recent available evidence on a topic or a seminal contribution to the evidence base. This Roadmap does not address the strength or quality of the evidence on this topic.

Systematic Reviews

Leveraging the Affordable Care Act to Enroll Justice-Involved Populations in Medicaid: State and Local Efforts

Bandara SN, Huskamp HA, Reidel LE, McGinty EE, Webster D, Toone RE, Barry CL. Health Aff (Millwood). 2015 Dec; 34(12): 2044-2051.

This paper looked at four strategies to facilitate Medicaid enrollment and offered an overview of 64 different state, county, and federal programs that assisted individuals with Medicaid enrollment or coordination of health care services following release from incarceration.

Telehealth: Mapping the Evidence for Patient Outcomes from Systematic Reviews

Totten AM, Womack DM, Eden KB, McDonagh MS, Griffin JC, Grusing S, Hersh WR. Effective Health Care Program AHRQ. 2016 Jun; Publication No. 16-EHC034-EF.

This Congressionally-requested technical review provided an overview of the available telehealth evidence for use by policymakers and the research community. The paper also included an evidence map of published systematic reviews related to the impact of telehealth on clinical health outcomes.

Systematic Review of Telemedicine Applications in Emergency Rooms

Ward MM, Jaana M, Natafgi B. Int J Med Inform. 2015 Sep; 84(9): 601-616.

This systematic review evaluated publications related to telehealth emergency care. Its aim was to describe current hospital-based telemedicine applications for emergency care to inform future studies in this area.

Interactive Telemedicine: Effects on Professional Practice and Healthcare Outcomes

Flodgren G, Rachas A, Farmer AJ, Inzitari M, Shepperd S. Cochrane Effective Practice and Organization of Care Group. 2015 Sep.

This review evaluated the costs, effectiveness, and acceptability of telemedicine as an alternative to face-to-face care or telephone consultations.

The Effectiveness of Telemental Health: A 2013 Review

Hilty DM, Ferrer DC, Parish MB, Johnston B, Callahan EJ, Yellowlees PM. Telemed J E Health. 2013 May; 19(6): 444-454.

This review evaluated literature on telemental health and determined which methods were effective in enhancing mental health and in increasing access to care.

Videoconferencing Psychotherapy: A Systematic Review

Backhaus A, Agha Z, Maglione ML, Repp A, Ross B, Zuest D, Rice-Thorp NM, Lohr J, Thorp SR. Psychol Serv. 2012 May; 9(2): 111-131.

This systematic review examined the use of videoconferencing psychotherapy to evaluate whether or not it was a feasible form of therapy.

The Impact of eHealth on the Quality and Safety of Health Care: A Systematic Overview

Black AD, Car J, Pagliari C, Anandan C, Cresswell K, Bokun T, McKinstry B, Procter R, Majeed A, Sheikh A. PLoS Med. 2011 Jan; 8(2): 1-16.

This systematic review looked at the quality of eHealth interventions (i.e., digital health care solutions). The interventions were categorized into three areas: storing, managing, and transmitting of data; clinical decision support; and facilitating care from a distance.

Individual Studies

Telemedicine for Specialist Geriatric Care in Small Rural Hospitals: Preliminary Data

Gray LC, Fatehi F, Martin-Khan M, Peel NM, Smith AC. J Am Geriatr Society. 2016 Jun; 64(6): 1347-1351.

This paper reports findings from a prospective observational study examining the feasibility and sustainability of a telegeriatric service model for small rural hospitals. The model included videoconferencing, a geriatric assessment on a web-based clinical decision support system, multidisciplinary team support, and a trained nurse at the rural location.

Access and Quality of Care in Direct-to-Consumer Telemedicine

Uscher-Pines L, Mulcahy AW, Cowling D, Hunter G, Burns RM, Mehrotra A. Telemed J E Health. 2016 Apr; 22(4): 282-288.

This paper compared the care quality of Teladoc (a direct-to-consumer telemedicine company) with that of physician offices, and the quality of care of Teladoc users versus non-users.

Clinician Attitudes toward Adoption of Pediatric Emergency Telemedicine in Rural Hospitals

Ray KN, Felmet KA, Hamilton MF, Kuza CC, Saladino RA, Schultz BR, Watson RS, Kahn JM. Pediatr Emerg Care. 2016 Jan.

This study explored pediatric emergency telemedicine, including people's current attitudes towards it, barriers to its adoption in rural settings, and strategies to further its adoption and implementation by overcoming these barriers.

Optimizing Telehealth Strategies for Subspecialty Care: Recommendations from Rural Pediatricians

Ray KN, Demirci JR, Bogen DL, Mehrotra A, Miller E. Telemed J E Health. 2015 Aug; 21(8): 622-629.

In this study, rural pediatricians from 17 states were interviewed and asked about their experiences with telehealth services and their preferred telehealth strategies.

Telemedicine, Telehealth, and Mobile Health Applications that Work: Opportunities and Barriers

Weinstein RS, Lopez AM, Joseph BA, Erps KA, Holcomb M, Barker GP, Krupinski EA. Am J Med. 2014 Mar; 127(3): 183-187.

This paper explored recent advances in telehealth services as well as barriers to long-term success. It also discussed issues related to mobile health, the medical app industry, and the virtualization of health care.

Lessons from Tele-emergency: Improving Care Quality and Health Outcomes by Expanding Support for Rural Care Systems.

Mueller KJ, Potter AJ, Ward MM. Health Aff (Millwood). 2014 Feb; 33(2): 228-234.

This paper included a review of tele-emergency models in rural areas and a study of a large tele-emergency service in the Midwest. The study used a survey of hospitals, followed by telephone interviews and site visits with clinicians and administrators, to assess experiences with tele-emergency, including the impact on clinical quality, wait times, care coordination, patient-centered care, and resources.

Connected Health: A Review of Technologies and Strategies to Improve Patient Care with Telemedicine and Telehealth

Kvedar J, Coye MJ, Everett W. Health Aff (Millwood). 2014 Feb; 33(2): 194-199.

This paper examined promising strategies such as using telehealth for individuals with congestive heart failure, a home health program for veterans, the use of video conferencing, remote intensive care, eReferral, and electronic pill bottles, among others. The article also looked at the role of telehealth in expanding provider capacity.

Impact of Critical Care Telemedicine Consultations on Children in Rural Emergency Departments

Dharmar M, Romano PS, Kuppermann N, Nesbitt TS, Cole SL, Andrada ER, Vance C, Harvey DJ, Marcin JP. Crit Care Med. 2013 Oct; 41(10): 2388-2395.

This study assessed the quality of care provided to injured and critically ill children in rural emergency departments through telemedicine or telephone consultation services.

The Diffusion of Telehealth in Rural American Indian Communities: A Retrospective Survey of Key Stakeholders
Brooks E, Manson SM, Bair B, Dailey N, Shore JH. Telemed J E Health. 2012 Feb; 18(1): 60-66.

This study examined the factors impacting the spread of telehealth clinics providing mental health care to rural American Indian veterans.

Barriers to Telemedicine: Survey of Current Users in Acute Care Units
Rogrove HJ, McArthur D, Demaerschalk BM, Vespa PM. Telemed J E Health. 2012 Feb; 18(1): 48-53.

This study surveyed remote telemedicine users, specifically those using it for emergency and critical care, to understand the barriers and success factors influencing the acceptance and maintenance of a robotic telemedicine program.

Project ECHO: A Model for Complex, Chronic Care in the Pacific Northwest Region of the United States
Scott JD, Unruh KT, Catlin MC, Merrill JO, Tauben DJ, Rosenblatt R, Buchwald D, Doorenbos AZ, Towle C, Ramers CB, Spacha DH. J Telemed Telecare. 2012 Dec; 18(8): 481-484.

This study evaluated the Project Extension for Community Health Outcomes (Project ECHO). This program used a set of videoconferences to arrange for a panel of experts at an academic medical center to provide case management advice to rural clinicians. The paper looked at the impact of the program on access to health care, specifically specialist care in rural areas.

Differences in Readiness between Rural Hospitals and Primary Care Providers for Telemedicine Adoption and Implementation: Findings from a Statewide Telemedicine Survey
Martin AB, Probst JC, Shah K, Chen Z, Garr D. J Rural Health. 2012 Jan; 28(1): 8-15.

This study explored the differences between rural hospitals and primary care providers in telemedicine adoption or readiness, telemedicine training needs, use of technology for patient care, and environmental concerns in facilities for telemedicine.

Role of Telehealth/Videoconferencing in Managing Cancer Pain in Rural American Indian Communities
Haozous E, Doorenbos AZ, Demiris G, Eaton LH, Towle C, Kundu A, Buchwald D. Psychooncology. 2012 Feb; 21(2): 219-223.

This study evaluated the feasibility and usefulness of videoconferencing in delivering education on cancer-related pain management and case consultation to health care providers in rural American Indian and American Native communities.

Reaching Rural Caregivers with a Multicomponent Telehealth Intervention: The Telehelp Line for Caregivers
Clancy Dollinger S, Chwalisz K. Prof Psychol Res Pr. 2011 Dec; 42(6): 528-534.

This study discussed the challenges for caregivers and professional service providers in offering psychological services in rural areas and evaluated the Telehelp Line for Caregivers, a clinical telehealth intervention aimed at improving physical and mental functioning of caregivers in rural areas.

Using Telehealth to Provide Diabetes Care to Patients in Rural Montana: Findings from the Promoting Realistic Individual Self-management Program
Ciemins E, Coon P, Peck R, Holloway B, Min SJ. Telemed J E Health. 2011 Oct; 17(8): 596-602.

This study analyzed the feasibility of using telehealth technology to provide a team-based approach to caring for rural patients with diabetes. It also compared the effect this technology on patient outcomes relative to inpatient visits.

Pediatric Obesity Management in Rural Clinics in California and the Role of Telehealth in Distance Education
Shaikh U, Nettiksimmons MA, Romano P. J Rural Health. 2011 Summer; 27(3): 263-269.

This study evaluated a pediatric obesity management program in rural California and explored strategies to improve care through telehealth.

Enhancing Access to Cancer Education for Rural Healthcare Providers via Telehealth
Doorenbos AZ, Kundu A, Eaton LH, Demiris G, Haozous EA, Towle C, Buchwald D. J Canc Educ. 2011 Dec; 26(4): 682-686.

This paper evaluated the Native People for Cancer Control Telehealth Network's telehealth cancer education series. This series provided telehealth technology to deliver the series to Washingtonian and Alaskan rural health care providers who treated American Indians and Alaskan Native people.

Using Telemedicine to Provide Pediatric Subspecialty Care to Children with Special Health Care Needs in an Underserved Rural Community

Marcin JP, Ellis J, Mawis R, Nagrampa E, Nesbitt TS, Dimand RJ. Pediatrics. 2004 Jan; 113(1 Pt. 1): 1-6.

This study evaluated a telemedicine program for children with special health care needs, assessing parent and guardian's perceptions of the consultations, and local provider satisfaction.

Grey Literature

Telehealth in Rural America

Health Resources and Services Administration: National Advisory Committee on Rural Health and Human Services; March 2015.

This report explained telehealth formats, telehealth reimbursement, and pros and cons of telehealth in practice. It also provided recommendations to the Centers for Medicare and Medicaid Services regarding distant site provider status and nursing facility visits.

How Mobile Devices are Transforming Healthcare

Brookings Institution; May 2012.

This article described the rise of mHealth (mobile health) initiatives, the management of chronic disease through remote monitoring, the use of telehealth for vulnerable populations such as the elderly and expectant mothers, telehealth's use in rural areas, policy controversies, and the economic impact of mHealth.

Ongoing Research

Improving Access and Outcomes for Rural Veterans with HIV (CDA 11-211)

Ohl M (Iowa City VA Health Care System, Center for Comprehensive Access and Delivery Research and Evaluation, Iowa City, IA). Department of Veterans Affairs.

This research project aims to develop, implement, and evaluate a delivery model to improve accessibility, quality, and outcomes for rural veterans with HIV.

Improving Specialty Care Delivery in Chronic Skin Diseases

Armstrong A (University of Colorado, Denver, CO). Patient-Centered Outcomes Research Institute.

This trial compares the impact of an online specialty care model versus an in-person treatment model. It samples individuals from Colorado and California with chronic skin conditions and specifically focuses on rural patients.

Integrated versus Referral Care for Complex Psychiatric Disorders in Rural Federally Qualified Health Centers (FQHCs)

Fortney JC (University of Washington, Seattle, WA). Patient-Centered Outcomes Research Institute.

This study evaluates whether off-site mental health specialists should support primary care providers' treatments of bipolar and post-traumatic stress disorder in rural areas through an integrated model or the use of telemedicine technology.

Sanford Community Cancer Program of the North Central Plains

Steen PD (Sanford Research, Sioux Falls, SD). National Institutes of Health—National Cancer Institute.

This study aims to transform cancer treatment and clinical trials for those living in the rural west by using the Sanford Community Cancer Program network community. The program strives to maintain and enhance robust accrual to NCI Division of Cancer Prevention-supported trials, address the disparities in clinical trial accrual in underserved and underrepresented populations, cultivate innovative access points to address barriers to clinical trial accrual through outreach and telemedicine, and develop a cancer care delivery infrastructure.

Operation Reentry North Carolina: Veteran Resiliency and Reintegration through Technology (ORNC: R&R)

Toriello PJ (East Carolina University, Greenville, NC). Substance Abuse and Mental Health Services Administration.

This project aims to provide support to individuals who are homeless or have a substance abuse issue or co-occurring mental health disorder in rural North Carolina. This support is provided through the use of technology such as mobile outreach, telehealth and web-based services, and community-based treatment.

Palliative Care Symptom Management in Rural Communities

Doorenbos AZ (University of Washington, Seattle, WA). National Institutes of Health—National Institute of Nursing Research.

This study evaluates the effects of a telehealth-enhanced palliative care symptom-management program for cancer patients and providers in rural health care settings.

Search Strategy:

Staff used key words to search various databases and journals for relevant articles and examined the bibliographies of those articles to identify additional studies. Staff identified grey literature by searching Google with the key words identified below and by reviewing the websites of health care, health policy, trade group, government, and academic organizations mentioned in the individual studies listed in this Roadmap or those known to produce analysis and publications related to rural populations' access to healthcare. Because the Roadmap seeks to inform current policy, we focused the search on the period 2011 through 2016. AcademyHealth revised an initial draft to incorporate suggestions and comments from three external reviewers with relevant expertise.

Databases Searched: PubMed/MEDLINE; JSTOR; Wiley Online Library; Web of Science; SAGE Publications—Medical Care Research and Review; EBSCO HOST—Academic Search Complete, Academic Search Alumni Edition, MEDLINE, E-Journals, Business Source Complete, Abstracts in Social Gerontology; Google Scholar; Health Services Research Projects in Progress (HSRProj); McMaster Health Forum—Health Systems Evidence; Cochrane Library.

Key words: The list below outlines all of the key word combinations included in the search strategy:

(telehealth **OR** telemedicine) **AND** (rural **OR** "rural access" **OR** access **OR** "access to healthcare")
(telemedicine **OR** telehealth) **AND** "rural access" **AND** "United States"
(telemedicine **OR** telehealth) **AND** rural **AND** access **AND** "United States"
(telemedicine **OR** telehealth) **AND** access **AND** (care **OR** rural)
(telemedicine **OR** telehealth) **AND** "access to care" **AND** rural

Inclusion criteria: Research studies and other resources related to programs focusing on rural populations' access to health care through telehealth/telemedicine.

Key to Cited Resources

- **Systematic reviews** synthesize findings from a body of research literature.
- **Individual studies** provide findings from key pieces of research published in the peer-reviewed literature.
- **Grey literature** provides relevant evidence that may or may not be peer reviewed and is published by organizations whose primary activity is not publishing.
- **Ongoing research** includes studies currently underway that address the topic area.

Endnotes

1. In informal conversation, telehealth and telemedicine are used interchangeably. However, the Health Resources and Services Administration makes the distinction and defines telehealth as "the use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health-related education, and public health and health administration." Telemedicine is more narrow in scope and specifically refers to remote clinical services. Retrieved from: **Health IT.gov**
2. The Listening Project interviews policymakers, delivery system leaders, and other users of health services and policy research to identify the most pressing health services research needs looking three to five years into the future.