



Program Evaluation of the Appalachian Regional Commission's Health Projects, 2004-2010

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Executive Summary

This report presents an evaluation of 202 health projects funded by the Appalachian Regional Commission (ARC) between Fiscal Year (FY) 2004 and FY 2010. Using the findings from an online survey administered to project personnel of past projects and additional in-depth case studies of 13 projects, this report provides recommendations for enhancing ARC's health programming.

An overview of health factors and outcomes in the ARC Region confirms that Appalachia is a place where additional funding in health improvement can be very beneficial. Relative to the rest of the United States and even non-Appalachian portions of Appalachian states, the Appalachian Region has a continued health disparity across overall functional health and many diseases like cancer and diabetes. These diseases, and the behaviors that lead to them, have significant economic costs that hinder growth, such as higher healthcare costs and lower workforce productivity.

To finance the 202 health projects, ARC invested about \$30.9 million in total—an average of about \$153,000 per project. Despite the diversity among the 202 health projects, they can be broken down into three primary project types: 90 are Healthcare Access projects, 45 are Clinical Services projects, and 67 are Health Promotion projects. ARC funding to the average Healthcare Access project and Clinical Service project were very similar at about \$177,000 and \$185,000, respectively, while ARC funds to the average Health Promotion project were substantially less at \$99,000. However, ARC's contribution to total expenditures for Health Promotion projects was the highest at 55.1 percent since Health Promotion projects were less expensive on average. In comparison, ARC's contribution to Healthcare Access and Clinical Service projects were 18.1 percent and 35.9 percent, respectively.

Quantitative Analysis

An analysis of data from ARC's monitoring database show that, on average, ARC health projects have made a great impact on participants and patients versus students and workers, and that equipment-based projects that improve healthcare access and clinical services contribute most to these categories. However, data inconsistencies prohibit its usefulness for monitoring ARC's health program over time; of the 174 close projects, only 68 percent have both proposed and actual recorded impacts. One reason for this is that ARC construction projects are usually administered through another federal agency and so actual outputs or outcomes are not

recorded in ARC's monitoring database. Potential solutions include clearly defining the difference between output and outcomes and following up with projects, particularly those involved in construction, to record actual outputs and outcomes.

Due to the limitations of the ARC.net database, an online questionnaire was necessary to gain more information on the output and outcomes of ARC health projects. For each original project, the questionnaire collected project information on outputs, outcomes, perceived overall impact, and operational details (e.g., funding, partnerships, etc.). After several attempts to encourage participation via reminder emails and phone calls, the online questionnaire's response rate was 50.3 percent and the completion rate was 40.7 percent. Responses were dispersed across project types with 37 Healthcare Access projects, 23 Clinical Service projects, and 24 Health Promotion projects responding to the questionnaire.

Analysis of the online questionnaire results revealed several interesting findings:

1. Of the 19 percent of projects that used ARC funding to construct or renovate a building, the average project added 1,540 square feet to new or existing facilities after excluding the construction of the College of Osteopathic Medicine at the University of Pikeville in Kentucky, which itself added 87,000 square feet.
2. Of the 48 percent of projects that used ARC funding to procure medical or other equipment, 66 specific equipment purchases were reported, 92 percent are still in good condition today.
3. The most selected outcome was increased provision of healthcare services, which was chosen by about half of Healthcare Access and Clinical Service projects. The second most selected outcome—promotion of public health—was selected by 64 percent of Health Promotion projects.
4. About 38 percent of projects created and/or retained jobs in the local economy, and employment of healthcare professionals in the grantee organizations today continues to be higher, on average, than before ARC funding.
5. Almost 50 percent of projects claimed that the ARC project funding helped to attract additional government or philanthropic funding.
6. Over 60 percent of respondents claimed that their project would not have been undertaken if not for ARC funding and over 95 percent of respondents claimed that, without ARC funding, the project would have been canceled, downsized, or delayed by more than a year.

Additionally, a regression analysis was used to tease out which characteristics of an ARC health project are linked to a higher impact. While the regression's results had low predictive power overall, the most significant finding is that projects with outcomes categorized as "Increased

provision of healthcare services / improvement of accessibility to healthcare” rated themselves as having a greater impact score in several categories. This finding suggests that ARC may want to consider limiting its health programming to projects which directly tackle this outcome, knowing that doing so not only makes an impact on health, but on the workforce and the economy as well.

Qualitative Analysis

Qualitative and observational data make valuable contributions to evaluations of any kind, and especially so for a group of projects as diverse as those in ARC’s Health programming. Therefore, the evaluation team also conducted 13 case studies of 16 projects that highlight some of the innovative solutions and difficult challenges to doing effective health work in the Appalachia Region. While each of the 13 case studies offers lessons of their own, we believe that they collectively offer four lessons that may be recommendations for future projects.

1. Relative to other grant-giving organizations, ARC is seen as a good partner that truly supports the Appalachian Region—an approach that is valued and should be maintained.
2. For small grantee organizations, evidence of community support—whether through fundraising or enlisting volunteers— was associated with increased community awareness and likelihood of success.
3. For large grantee organizations, involvement of institutional leadership in the planning and implementation of the project was associated with increased likelihood of success.
4. Sharing of best practices by successful project or technical expertise by ARC, particularly before making large medical purchases, may improve cost efficiency over time.

Overall Findings and Themes

Key Finding 1: While ARC invested larger award amounts in construction projects, most of those projects involved leveraging additional matching funds. Conversely, ARC awards smaller grant amounts for operations projects, but takes on greater risk by funding a larger percentage of the project. We think this allows more flexibility to support different types of projects and is a responsible method when investing in large-scale projects.

Key Finding 2: Analysis of the ARC monitoring database indicated that ARC health projects have the greatest impact on participants and patients with equipment-based projects, contributing the largest impact in terms of the quantity of person impacted.

Key Finding 3: ARC's health programming has diverse expected outcomes, including improvements to formal education, workforce training, healthcare provision, public health promotion, and public policy development. Of these, improved provision and accessibility to healthcare applies to most projects at 54 percent; however, in many cases, multiple outcomes apply to each project. This presents an evaluation challenge as each outcome requires another set of performance measures.

Key Finding 4: Among all the projects interviewed, the ARC was viewed as a helpful and flexible organization, especially relative to other federal grant-giving institutions. ARC's presence in the state was often cited as a key advantage to working with ARC. Additional collaboration between grantees and other organizations, especially public-private partnerships, increased the chances for success and helped projects raise additional funds.

Key Finding 5: Among the case studies, evidence of community support seemed to be a clear indicator of success, large impacts, and sustainability. This suggests that projects require community input (e.g., community coalition) during the planning process, and that projects benefit from having coordinators who already have connections in the community. ARC should look for evidence of broad-based community support before funding a project, such as private contributions from the community (vs. what the organization has fundraised with other grants or is paying for itself) or highly attended project outreach or planning events. Volunteers are also a good sign of community buy-in and also help with leveraging funding into a large impact.

Key Finding 6: Certain case studies showed how some small grants can lead to large impacts. While often ARC investments in small innovative projects are risky, they have the potential for significant long-term impacts. Given the high potential per dollar impact, the evaluation team believes that seed money from ARC should continue to be used for riskier and innovative projects and continue to provide support to these projects to ensure sustainability. It was also expressed by grantees with fewer resources that ARC could also support them with technical expertise, either by recommending certain technologies or connecting them with previous grantees who have worked on similar projects. Innovative projects might also benefit from small seed planning grants to build community support for the idea before implementation. Funding these small, innovative, and riskier projects was viewed as a comparative advantage of ARC's health programming.

Finally, throughout the evaluation, two overarching—and contradictory—themes emerged that may influence the discussion on the strategic direction of ARC’s health programming.

Theme 1: The first theme was that it is better to focus on large projects that created something new, because then it is easier to attribute future outputs with ARC support. So for example, if ARC helps start a new clinic, it is easy to associate and monitor the clinic’s jobs and treated patients with ARC’s original investment. Conversely, if an ARC investment helps improve communication capabilities in an existing health network, it can be challenging to quantify exactly how that improves community health though we know, a priori, that improved cost efficiency by the organization can lead to improved patient care. The theme here is to invest in large projects that create something new so that the desired outcomes can be easily tracked and attributed to ARC.

Theme 2: The second, admittedly contradictory, theme was that ARC should continue to take risks and provide the seed money for small and innovative projects. The grants that fell into this category expressed that ARC funding was essential, because no one else was willing to support their project until they had proven it was successful. If these projects are chosen carefully and are successful ideas led by capable managers, then the ARC investment can be leveraged into more funding opportunities and thus have a greater impact. However, investing in smaller riskier projects can be an administrative challenge, requiring ARC to develop expertise in a diversity of areas, monitor a diverse set of output and outcomes indicators, and offer greater flexibility and guidance. Sometimes, they might even not be successful—hence, why they are risky—and ARC has to accept that occasional outcome. While these challenges exist, these projects are essential if ARC believes that innovative solutions are needed to solve Appalachia’s health problems.

Both themes above suggest a strategic direction for ARC health projects that involves investing in something new—whether a large or small project—which simplifies output/outcome tracking as well as attribution to the original investment. The key difference between the two is the type of organizations with which ARC chooses to partner. Of course, ARC can (and does) work with both types, but doing so can be challenging given the diversity of the projects. There certainly are efficiencies to be gained by specializing in certain project or organization types. This is a crucial discussion for ARC’s health programming as it reflects on this evaluation and as it embarks upon framing its next strategic plan.

Recommendations for Future Evaluations

Specific steps for project evaluation that may be useful include:

1. An evaluation plan should be included in the grant application.

2. Along with expectations and goals of the project, short-, medium-, and long-term impacts should be specified in the application.
3. Performance measures (both process and short-term outcome) should be reported on a regular basis (semi-annually or annually). These measurements do not have to cover the entire range of impacts, but should represent indicators that can show progress and results of the project.
4. Baseline data or information that can show the starting point of the community or organizational situation should be collected at the beginning of the project.
5. For more detail about long-term impacts, perhaps small data collection grants could be awarded to grantees after the official project completion date so that data collection would continue. At the very least, ARC should express an expectation to grantees that they may be contacted in the next 10 years to check on the sustainability of the project or long-term impacts, and therefore, they should continue tracking these measures.
6. Have an evaluation team ready to work with grantees at the beginning or during the project to help both design the evaluation and collect information. If an evaluation team is contracted by ARC for a set of projects, having that team begin their work during the project period would allow them to offer assistance to the grantees.

Chapter 1: Introduction

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1.1 Study Background

There is an inextricable link between health status and economic performance. Indeed, research confirms what commonsense suggests—poor health outcomes have high economic costs. Multiple studies have shown that substance abuse,¹ obesity,² diabetes,³ smoking,⁴ and chronic disease⁵ exact a huge economic toll, which includes, but is not limited to, reduced worker productivity, higher absenteeism, and excessive criminal justice costs.

The health problems experienced by the residents of Appalachia are widespread, well known, and to a large extent preventable. According to the Centers for Disease Control and Prevention (CDC), more than 75 percent of health care costs are due to chronic conditions such as heart disease, cancer, stroke, diabetes, and arthritis.⁶ Many patients have multiple chronic conditions and their care costs up to seven times as much as those with one chronic condition.⁷ Much of the chronic disease is caused by four *preventable* health risk behaviors—lack of exercise, poor

¹ U.S. Department of Justice. National Drug Intelligence Center. 2011. *The Economic Impact of Illicit Drug Use on American Society*. <http://www.justice.gov/archive/ndic/pubs44/44731/44731p.pdf>.

² Hammond, Ross A, and Ruth Levine. 2010. "The economic impact of obesity in the United States." *Journal of Diabetes, Metabolic Syndrome, and Obesity* 3 (Aug 30), Published online Aug 30, 2010. doi: 10.2147/DMSOTT.S7384. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3047996>.

³ American Diabetes Association. 2013. Economic costs of diabetes in the U.S. in 2012. *Diabetes Care* 36. doi:10.2337/dc12-2625. <http://care.diabetesjournals.org/content/36/4/1033.full.pdf+html>.

⁴ U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Office on Smoking and Health. 2014. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. <http://www.surgeongeneral.gov/library/reports/50-years-of-progress/full-report.pdf>.

⁵ DeVol, Ross and Armen Bedroussian. Milken Institute. 2007. *An Unhealthy America: The Economic Burden of Chronic Disease Charting a New Course to Save Lives and Increase Productivity and Economic Growth*. http://assets1c.milkeninstitute.org/assets/Publication/ResearchReport/PDF/chronic_disease_report.pdf.

⁶ Centers for Disease Control and Prevention. 2013. *Rising Health Care Costs are Unsustainable*. <http://www.cdc.gov/chronicdisease/resources/publications/AAG/chronic.htm>.

⁷ Stanton, Mark W. 2006. "The High Concentration of U.S. Health Care Expenditures." *Agency for Healthcare Research and Quality (AHRQ)* Issue 19. <http://www.ahrq.gov/research/ria19/expendria.htm>.

nutrition, smoking, and heavy alcohol consumption.⁸ When compared to the U.S. overall, those living in the Appalachian Region are more likely to smoke, be obese, and not engage in regular physical activity.⁹

For these reasons, ARC has long considered the improved health of Appalachian residents a priority. From FY 2004 to FY 2010, ARC funded 202 health projects, providing over \$30 million to communities and providers across the thirteen Appalachian states. These projects contribute to goals that include:

- Improving healthcare access for underserved populations by creating an expanded pipeline of healthcare professionals through both infrastructure investments and workforce development programs;
- Increasing the availability of clinical services in underserved populations by providing infrastructure or start-up funds for primary care, dental care, mental health care, etc.; and
- Preventing disease and improving the healthy lifestyle of Appalachian residents.

As reflected by two health-related strategic objectives in *Moving Appalachia Forward: Appalachian Regional Commission Strategic Plan 2011–2016*,¹⁰ ARC clearly intends to continue focusing on improvements in the health status of people in Appalachia:

- Objective 2.5—Expand Community-Based Wellness and Disease-Prevention Efforts, and
- Objective 2.6—Increase the Availability of Affordable, High-Quality Health Care.

In 2012, ARC commissioned an evaluation of all health projects funded between 2004 and 2010. Given ARC's stated objectives, the purpose of this evaluation is to understand the many dimensions of prior ARC-funded health projects, identify the health and economic outcomes, describe the lessons learned, and offer recommendations for maximizing the impact of future investments as ARC works to advance its strategic plan for the region.

⁸ Centers for Disease Control and Prevention. 2011. *Four Specific Health Behaviors Contribute to a Longer Life*. <http://www.cdc.gov/Features/LiveLonger/?source=govdelivery>. Also see Ford, Earl S. et al. 2011. "Low-risk lifestyle behaviors and all-cause mortality: Findings from the National Health and Nutrition Examination Survey III Mortality Study." *American Journal of Public Health* (August 18), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3222361..>

⁹ Centers for Disease Control and Prevention (CDC). Various years. "Behavioral Risk Factor Surveillance System Survey Data." U.S. Department of Health and Human Services. <http://www.cdc.gov/brfss/>.

¹⁰ Appalachian Regional Commission. 2010. *Moving Appalachia Forward: Appalachian Regional Commission Strategic Plan 2011–2016*. <http://www.arc.gov/images/newsroom/publications/sp/ARCStrategicPlan2011-2016.pdf>.

Specifically, the objectives of this evaluation include:

1. Examine the status of general health in the Appalachian Region.
2. Assess the portfolio of health projects that were funded by ARC and analyze existing performance measures.
3. Administer an online survey to obtain updated project performance data for ARC health projects and summarize the descriptive results.
4. Analyze the online survey results using a regression model that creates a standardized methodology for measuring and comparing project impacts.
5. Conduct 13 case studies of ARC health projects to evaluate the effectiveness of individual projects and highlight qualitative impacts not captured in the online survey.
6. Identify recommendations that could strengthen the impact of ARC's investments in healthcare in the Appalachian Region.

Three entities at the University of Kentucky collaborated on this project: the Community and Economic Development Initiative of Kentucky (CEDIK), the College of Pharmacy, and the Center for Business and Economic Research (CBER). The research findings reflect insights garnered from two separate initiatives: a comprehensive survey sent to project personnel of over 200 health projects funded by ARC over the past decade and findings from 13 in-depth case studies conducted with project personnel. Most, but not all, of the case studies were conducted onsite, while some were completed via telephone. The program outcomes and lessons learned—as well as recommendations—are presented below and will inform future ARC healthcare funding priorities and decisions.

1.2 Structure of the Report

The structure of this report closely aligns with its objectives. Chapter Two gives an overview of health in the Appalachian Region, providing a look at health outcomes by ARC counties in several categories. Chapter Three describes the characteristics and outcomes of ARC health projects, starting with available data from ARC.net as well as examining results from an online survey administered for this evaluation. Then, a regression analysis seeks to determine which project characteristics are most closely correlated with its impact. Chapter Four presents 13 case studies that were selected to reflect the diversity of projects within the portfolio of ARC health programming. Chapter Five provides recommendations for enhancing ARC health programming and monitoring for future projects.

Chapter 2: Overview of Health in the Appalachian Region

Appalachia is a diverse region made up of 420 counties and nine independent cities. The goal of ARC's health projects is to improve health status throughout the region while providing extra support to particular areas of need. In this chapter, we provide an overview of health in the Appalachian Region, consider health outcomes at the county level and discuss the impact of health on economic growth.

2.1 Overview of the Region

There is an extensive literature on the health of the Appalachian Region, with a primary focus on the disparities between Appalachian and non-Appalachian Regions. The ARC has catalogued an impressive collection of research assessing the health status of the Appalachian Region. Overall, socioeconomic measures and health outcomes for the region are well below those of the United States and even the non-Appalachian portions of Appalachian states.

A baseline health status report for the Appalachian Region was commissioned by the Appalachian Regional Commission in 2004.¹¹ The study compared mortality, morbidity, and risk of residents of the entire Appalachian Region compared to the rest of the non-Appalachian United States. Using data from 1997, the findings of this report indicate that:

“the Appalachian Region as a whole suffers considerable excess in mortality from leading causes of death when compared to the non-Appalachian U.S. Among the causes of death examined in this study, Appalachian populations suffer the most significant excesses in heart disease mortality, the leading cause of death in the U.S. In addition, the Appalachian Region suffers an excess in premature deaths (among persons ages 35 to 64) from heart disease, all cancers combined, lung cancer, colorectal cancer, chronic obstructive pulmonary disease, diabetes, and motor vehicle accidents, relative to comparable non-Appalachian U.S. populations.”¹²

¹¹ Halverson, Joel A., Lian Ma, and E. James Harner. 2004. *An Analysis of Disparities in Health Status and Access to Health Care in the Appalachian Region*. Washington, D.C.: Appalachian Regional Commission; Morgantown, WV: Office of Social Environment and Health Research, West Virginia University. <http://purl.access.gpo.gov/GPO/LPS100136>.

¹² Ibid., xxi.

The 2004 report also examined death rates within Appalachia by race and gender categories. For most diseases within these categories, the death rates are higher for those within the Appalachian Region than for the rest of the United States. Heart disease and all cancers are the leading causes of death within Appalachia and the United States, yet Appalachia had higher death rates than the rest of the United States. There are some differences by race and gender categories, but again, overall rates reveal that Appalachia experiences higher death rates and more premature deaths than the rest of the United States.

These data are useful to establish benchmarks for health and disease statistics that have been collected since 1997. Other ARC-commissioned reports in 2008 and in 2012 also provide comprehensive assessments of the health and socioeconomic characteristics of the region.^{13,14} Comparisons with more recent data illustrate what progress has been made in addressing the particular health needs of the Appalachian Region.

Recent findings from peer-reviewed journals also document that the Appalachian Region has continued socioeconomic and health disparities across every measurable category, including socioeconomic measures (e.g., education, income, unemployment), overall functional health, and detailed disease specific health measures such as cancer, diabetes, obesity, mental health and substance abuse, and cardiovascular health. Cancer, in particular, is a leading cause of death in Appalachia. A comparison of cancer mortality rates between the Appalachian Region and the rest of the United States found that lung cancer has significantly higher mortality rates in Appalachia.¹⁵ Likewise, stroke mortality within Appalachia was about 20.5 percent higher than outside Appalachia.¹⁶

Mental health conditions also show considerable disparities in the Appalachian Region, with depression and substance abuse particular problems for rural areas.^{17,18} Lack of access to

¹³ Halverson, Joel and Greg Bischak. Appalachian Regional Commission. 2008. *Underlying Socioeconomic Factors Influencing Health Disparities in the Appalachian Region*.
http://www.arc.gov/assets/research_reports/SocioeconomicFactorsInfluencingHealthDisparitiesinAppalachianRegion5.pdf.

¹⁴ Lane, Nancy, Andrew Lutz, and Kimberly Baker. Appalachian Regional Commission. 2012. *Health Costs and Access Disparities in Appalachia*.
http://www.arc.gov/assets/research_reports/HealthCareCostsandAccessDisparitiesinAppalachia.pdf.

¹⁵ Blackley, D., B.Behringer and S. Zheng. 2012. "Cancer mortality rates in Appalachia: descriptive epidemiology and an approach to explaining differences in outcomes." *Journal of Community Health* 37(4): 804-13.

¹⁶ Sergeev, AV. 2013. "Stroke mortality disparities in the population of the Appalachian Mountain region." *Ethnicity & Disease* 23(3): 286-91.

¹⁷ Hendryx, M., T. Borders, and T. Johnson. 1995. "The Distribution of Mental Health Providers in a Rural State." *Administration and Policy in Mental Health* 23(2):153-155.

¹⁸ Simmons, L et al. 2008. "Depression and Poverty Among Rural Women: a Relationship of Social Causation or

specialty mental health providers appears to be part of the barrier, but additional work exploring the supply of mental health professionals in urban and rural Appalachian areas reveals that while rural areas do have lower access to mental health professionals, the results may be driven by socioeconomic conditions.¹⁹

The disparities persist with other measures of health, including access to medical care and the overall quality of medical care. A 2012 ARC-commissioned study finds that Appalachian counties have more healthcare cost, coverage, and access disparities than the United States or even the non-Appalachian portions of their respective states. The report also presents extensive analysis on mortality disparities, finding that years of potential life lost from preventable causes for people younger than 75 was about 19 percent higher in the Appalachian Region relative the entire United States.²⁰ Finally, a recent study reported significant health disparities between Appalachian and non-Appalachian counties, but also that health insurance does not appear to mitigate the disparities. They argue that the health disparities are so woven into the social and cultural fabric of the Appalachian Region that insurance alone is not sufficient to improve the outcomes.²¹

2.2 Impact of Health on Economic Growth

The health status of an individual as well as the wider community can have important and significant economic consequences. That is, the effect of health is manifested at both the micro (individual) and macro (national) levels.²² Better health enables workers to be more productive—both mentally and physically. There are also a number of indirect channels through which higher levels of health facilitate, for example, more education and schooling, which is directly linked to better economic outcomes.²³ Finally, better health, more economic productivity, and higher education levels result in lower government assistance levels—yet another positive outcome.

Social Selection?” *Journal of Rural Health* 24(3): 292-8.

¹⁹ Hendryx, M. 2008. “Mental Health Professional Shortage Areas in Rural Appalachia.” *Journal of Rural Health* 24(2): 179-82.

²⁰ Lane, Nancy, Andrew Lutz, and Kimberly Baker. Appalachian Regional Commission. 2012. *Health Costs and Access Disparities in Appalachia*.

http://www.arc.gov/assets/research_reports/HealthCareCostsandAccessDisparitiesinAppalachia.pdf.

²¹ McGarvey et al. 2011. “Health Disparities Between Appalachian and Non-Appalachian Counties in Virginia USA.” *Journal of Community Health* 36: 348–356.

²² Bloom, David E. and David Canning. 2005. *Health and Economic Growth: Reconciling the Micro and Macro Evidence*. http://cddrl.stanford.edu/publications/health_and_economic_growth_reconciling_the_micro_and_macro_evidence.

²³ Weil, David N. 2005. “Accounting for the Effect of Health on Economic Growth.” http://iis-db.stanford.edu/pubs/24301/2005-07_paperweil.pdf.

The long-term impact of individual health on the economy is perhaps most evident when considering the health status of children. The Centers for Disease Control and Prevention (CDC), Division of Adolescent and School Health (DASH), focuses on student health because, as the research shows, it impacts academic achievement.²⁴ Some research findings indicate that lower academic achievement can result if a child is significantly overweight or obese.²⁵ The reasons are numerous; overweight or obese students, it is argued, are more likely to suffer from adverse health consequences, such as asthma, type 2 diabetes, depression, and sleep apnea, which can then lead to higher absenteeism and negatively affect their academic performance. According to a 2007 study, obesity is a stronger predictor of school absenteeism than race, socioeconomic status, age or gender; the research found that underweight students missed, on average, about 7.5 days of school per year, normal-weight students missed 10.1 days, overweight students missed 10.9 days, and obese students missed 12.2 days.²⁶ Moreover, less-advantaged children are more likely to have serious health problems compared to more-advantaged children, with some research showing that childhood health problems can prevent poor children from achieving economic success as adults.²⁷

While many of the effects are felt in the long-term, others are immediate and direct. For example, oral health—for both children and adults—can have clear and tangible economic effects. First, missing and decayed teeth or diseased gums can make it difficult to find employment and perform well on the job, adversely affecting the pocketbooks of individuals and families as well as a state's capacity to realize economic development and increase prosperity. Second, and perhaps most important, missing teeth, inflamed gums, and cavities often make it difficult to eat a balanced diet, and increasingly research links poor oral health to illness, chronic disease, and even early mortality.

The ill-effects of poor health outcomes, which include premature death, lower workforce participation rates, higher public assistance costs, and less-than-optimal worker productivity, can directly affect economic outcomes such as employment and earnings. A 2005 study found, for instance, that labor time lost due to health reasons totaled \$260 billion per year in lost economic

²⁴ Centers for Disease Control and Prevention. Adolescent and School Health. 2014. *Health and Academics*. http://www.cdc.gov/HealthyYouth/health_and_academics/index.htm.

²⁵ See, for instance, Taras, Howard and William Potts-Datema. 2005. "Obesity and Student Performance at School." *Journal of School Health* 75(8): 291–295.

²⁶ Andrew Geier, et al. 2007. "The Relationship Between Relative Weight and School Attendance Among Elementary Schoolchildren." *Obesity* 15(8): 2157-2161. <http://www.obesityresearch.org/cgi/reprint/15/8/2157>.

²⁷ Case, Anne and Christina Paxson. 2006. "Children's Health and Social Mobility." *The Future of Children*. http://futureofchildren.org/futureofchildren/publications/docs/16_02_FullJournal.pdf.

output.²⁸ Moreover, given the importance of workforce quality on firm location decisions, holding all else equal, communities with high disability rates and poor health status are at a competitive disadvantage to other communities, with respect to industrial recruitment and business retention. For these reasons, investments in improving the health outcomes of individuals and communities can and do have vital and long-lasting economic benefits.

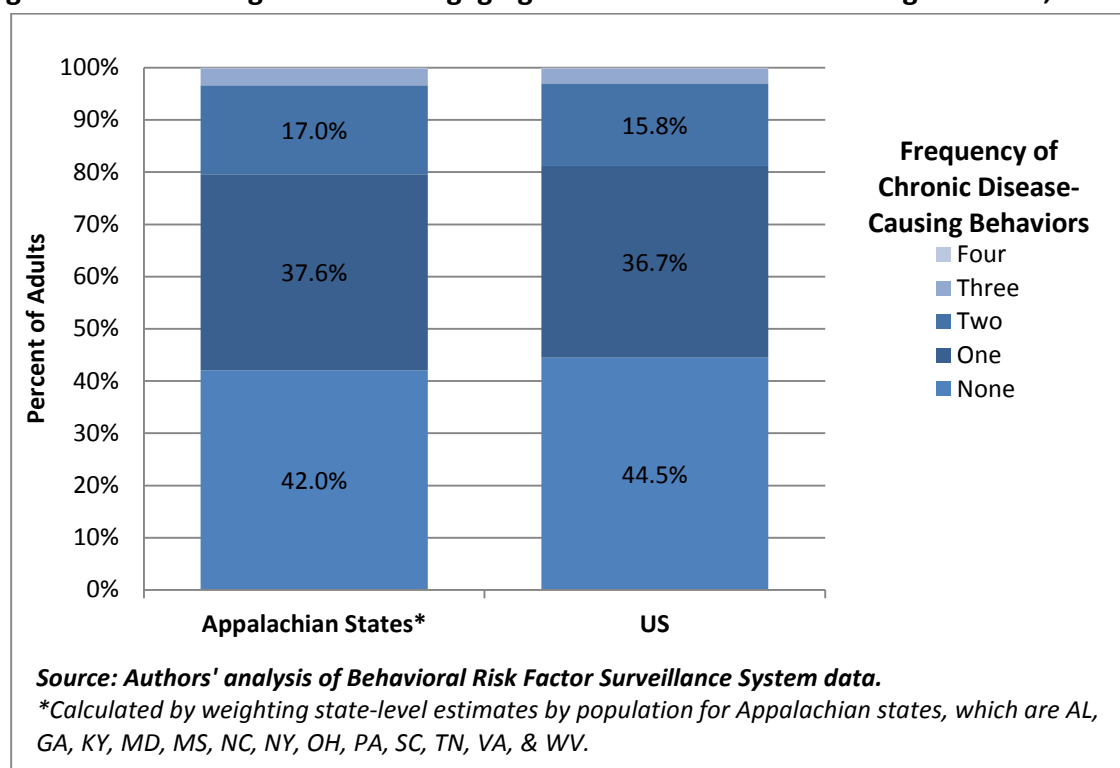
Table 2.1: Four Risk Behaviors Contributing to Chronic Disease, 2011-2012

Adults, 18 and Older	US (%)	Appalachian states (%)*
Current Smoker	19.5%	21.5%
Obese	27.6%	28.7%
Lack of Physical Activity	24.3%	26.4%
Heavy Alcohol Consumption	6.2%	5.6%

Source: Authors' analysis of data from Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System Survey Data, Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2011-2012

**Calculated by weighting state-level estimates by population for Appalachian states, which are AL, GA, KY, MD, MS, NC, NY, OH, PA, SC, TN, VA, & WV. Each estimate is statistically different from the US percentages (alpha=.05).*

Figure 2.1: Percentage of Adults Engaging in a Chronic Disease-Causing Behavior, 2011-12



²⁸ Davis, Karen et al. The Commonwealth Fund. 2005. *Health and Productivity among U.S. Workers*. http://www.commonwealthfund.org/~media/files/publications/issue-brief/2005/aug/health-and-productivity-among-u-s--workers/856_davis_hlt_productivity_usworkers-pdf.

According to the Centers for Disease Control and Prevention (CDC), more than 75 percent of health care costs are due to chronic conditions such as heart disease, cancer, stroke, diabetes, and arthritis.²⁹ Many patients have multiple chronic conditions and their care costs up to seven times as much as those with one chronic condition.³⁰ Much of the chronic disease is caused by four *preventable* health risk behaviors—lack of exercise, poor nutrition, smoking, and heavy alcohol consumption.³¹ When compared to the U.S. overall, the Appalachian states (i.e., AL, GA, KY, MD, MS, NC, NY, OH, PA, SC, TN, VA, & WV) are more likely to smoke, be obese, and not engage in regular physical activity—but are slightly less likely to be heavy drinkers (see Table 2.1). Over 58 percent of individuals living in an Appalachian state demonstrate at least one of these four behaviors that put them at risk of developing a chronic disease, compared to 56 percent for the United States (see Figure 2.1).¹¹

The economic costs associated with high levels of chronic disease are enormous. The Milken Institute estimated in 2007 that the most common chronic diseases were costing the U.S. economy \$1 trillion annually.³² This estimate reflects the cost of treating avoidable medical expenses as well as the resulting lower labor force productivity and subsequent lower economic growth rates. Unfortunately, a majority of the 13 Appalachian states are listed near the bottom of the Milken Institute’s State Chronic Disease Index³³—six states are in the bottom quartile (i.e., AL, KY, MS, PA, TN, & WV) and five states are in the third quartile (i.e., GA, MD, NC, OH, & SC). Only the states of New York and Virginia rank above the national average.

A vast body of literature draws connections to health status and economic outcomes; some of these outcomes are short-term and direct, while others are long-term and indirect. The consequences of poor health are apparent for children and adults, advantaged and

²⁹ Centers for Disease Control and Prevention. 2013. *Rising Health Care Costs are Unsustainable*. <http://www.cdc.gov/chronicdisease/resources/publications/AAG/chronic.htm>.

³⁰ Stanton, Mark W. 2006. “The High Concentration of U.S. Health Care Expenditures.” *Agency for Healthcare Research and Quality* Issue 19. <http://www.ahrq.gov/research/ria19/expendria.htm>.

³¹ Center for Disease Control and Prevention. 2011. *Four Specific Health Behaviors Contribute to a Longer Life*. <http://www.cdc.gov/Features/LiveLonger/?source=govdelivery>. Also see Ford, Earl S. et al. 2011. “Low-risk lifestyle behaviors and all-cause mortality: Findings from the National Health and Nutrition Examination Survey III Mortality Study.” *American Journal of Public Health* Ford, Earl S. et al. “Low-Risk Lifestyle Behaviors and All-Cause Mortality: Findings From the National Health and Nutrition Examination Survey III Mortality Study.” *American Journal of Public Health* 101.10 (2011): 1922–1929. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3222361>.

³² DeVol, Ross and Armen Bedroussian. Milken Institute. 2007. *An Unhealthy America: The Economic Burden of Chronic Disease Charting a New Course to Save Lives and Increase Productivity and Economic Growth*. http://assets1c.milkeninstitute.org/assets/Publication/ResearchReport/PDF/chronic_disease_report.

³³ The Milken Institute State Chronic Disease Index ranks all 50 states by the concentration of chronic disease – or the reported cases per capita for each state. Differences in lifestyle (smoking, alcohol abuse, diet, exercise), along with demographics (age distribution, ethnicity) and urbanization partly explain differences in disease rates among the states (<http://www.chronicdiseaseimpact.org/ebcd.taf?cat=index>).

disadvantaged, and for the individual as well as the wider society. The findings are clear—poor health can have deleterious economic effects while good health can improve earnings, employment, and one’s quality of life.

2.3 Health Outcomes by County

While the Appalachian Region as a whole suffers from health disparities relative to the rest of the United States, there are significant health disparities within the region related to different risk behaviors and health outcomes. While ARC has a mandate to serve the entire region, it is important to align programming with particular areas within the Appalachian Region in order to provide support where it is needed most.

This section is divided into 12 maps of the Appalachian Region, each of which depicts a different measure. Each map includes a brief description and interpretation. The order of the maps is outlined below:

Population Overview:

Figure 2.2: Total Population by County

Figure 2.3: Percent of the Population in Rural Areas by County

Figure 2.4: Percent of Population Over 65 Years of Age by County

Risk Behaviors Contributing to Chronic Disease:

Figure 2.5: Percent of Adults Who Smoke Regularly by County

Figure 2.6: Percent of Obese Adults (BMI greater than or equal to 30) by County

Figure 2.7: Percent of Adults Who are Physically Inactive by County

Figure 2.8: Percent of Adults Who Drink Excessively (Heavy or Binge) by County

Health Outcomes:

Figure 2.9: Average Poor Mental Health Days in Past 30 Days by County

Figure 2.10: Percent Born with Low Birth Weight (less than 2500 grams) by County

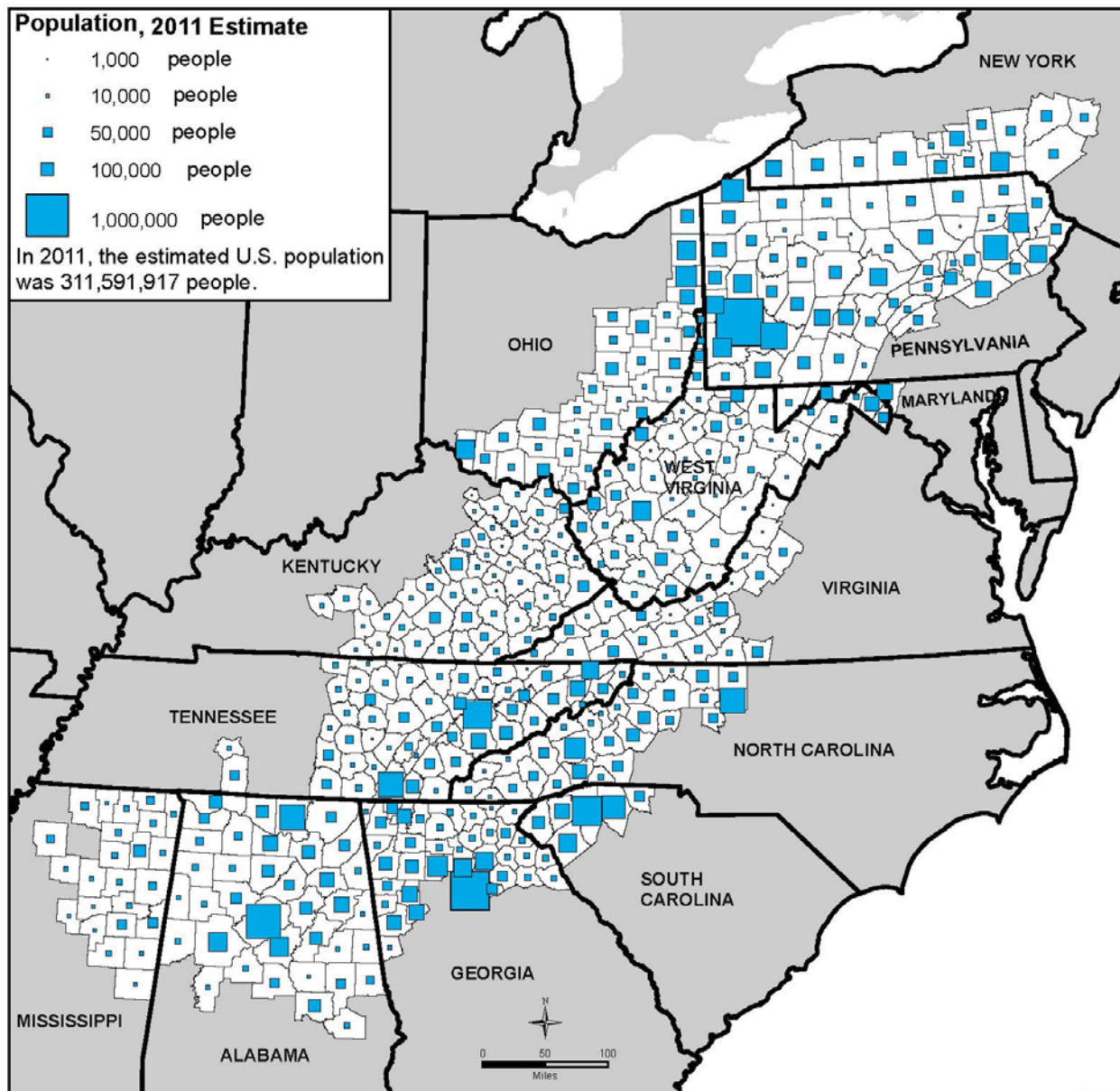
Figure 2.11: Percent of Adults with Diabetes by County

Health Insurance:

Figure 2.12: Percent of Uninsured Adults by County

Figure 2.13: Percent of Uninsured Children by County

Figure 2.2: Total Population by County

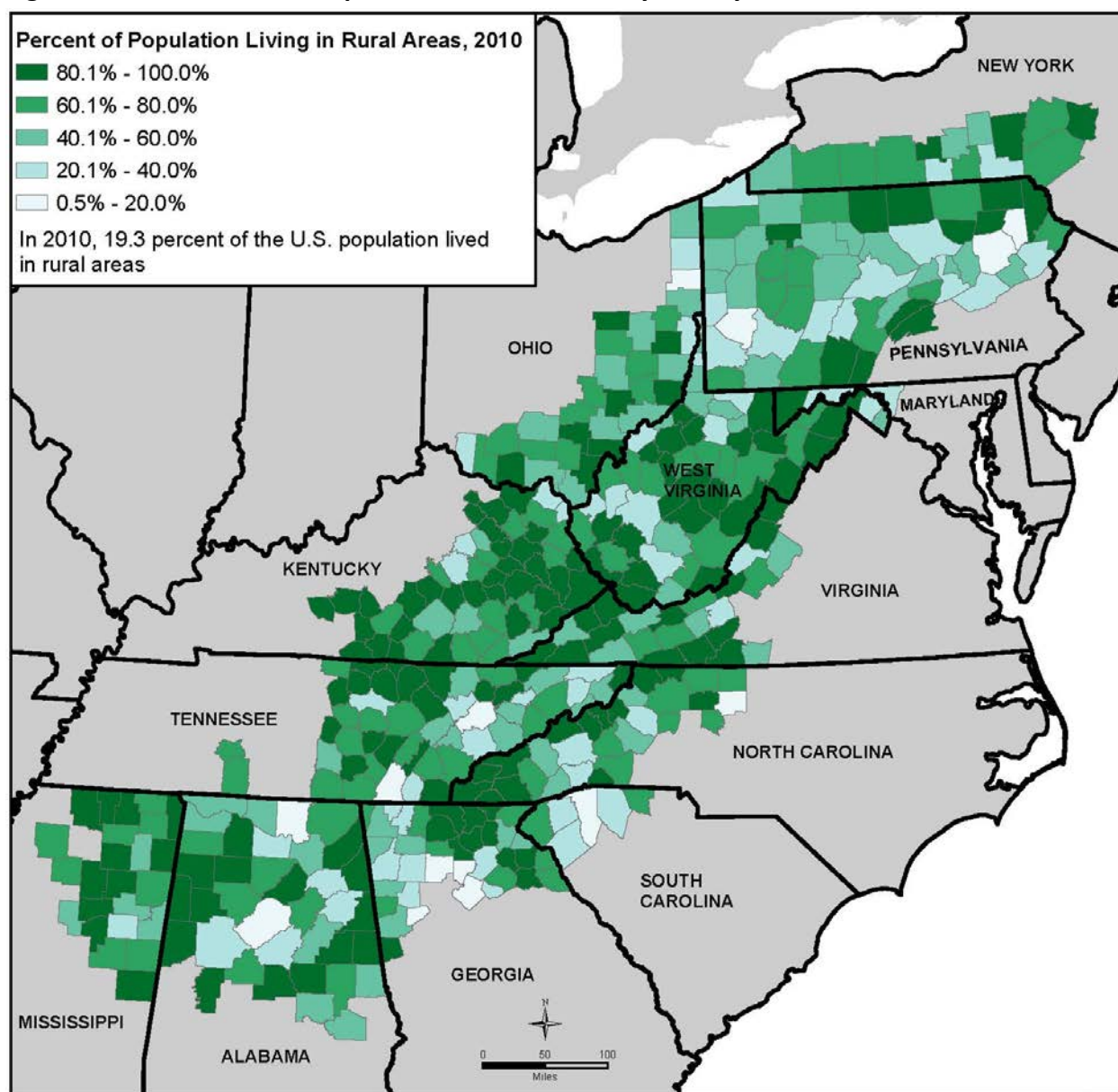


Data Source: County Health Rankings, 2014 & The U.S. Census Bureau



Figure 2.2 shows total estimated population in 2011 for all counties within the Appalachian Region. Overall, the Appalachian Region is home to over 25 million people. The map shows higher populations in South Carolina, northern Alabama and on the border of Ohio and Pennsylvania, though it is worth mentioning that the population is likely associated with county size, which are larger in South Carolina, Alabama and Pennsylvania. There is also higher population around city centers like Charleston, West Virginia and Atlanta, Georgia. Population is most sparse in the rural counties of Kentucky, West Virginia and Mississippi, where county size tends to be smaller.

Figure 2.3: Percent of the Population in Rural Areas by County



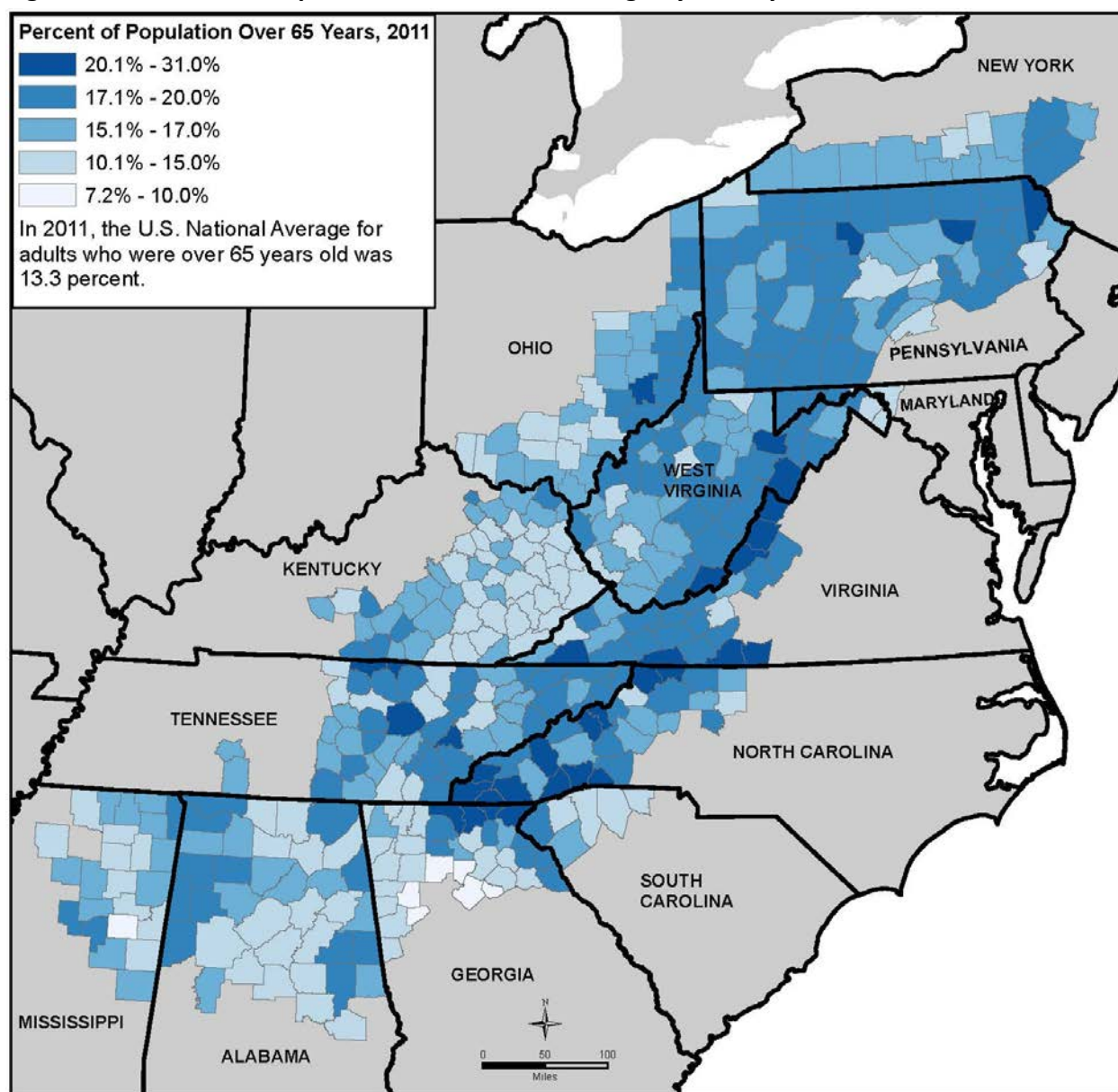
Data Source: County Health Rankings, 2014 & U.S. Census Bureau



Figure 2.3 shows the percent of the population that lives in a rural area. According to the US Census, which is where these data derive, “rural” is defined as all population not included within an urban area that meets a minimum population density requirement and has at least 2,500 people.³⁴ Thus, the darkest shade represents counties where 80 to 100 percent of the population resides in a rural area. Clusters of rural populations are clearly visible in Kentucky, West Virginia, Virginia, Tennessee, and along the border of North Carolina and Georgia.

³⁴ United States Census Bureau. 2011. *2010 Census Urban and Rural Classification and Urban Area Criteria*. <http://www.census.gov/geo/reference/ua/urban-rural-2010.html>.

Figure 2.4: Percent of Population Over 65 Years of Age by County

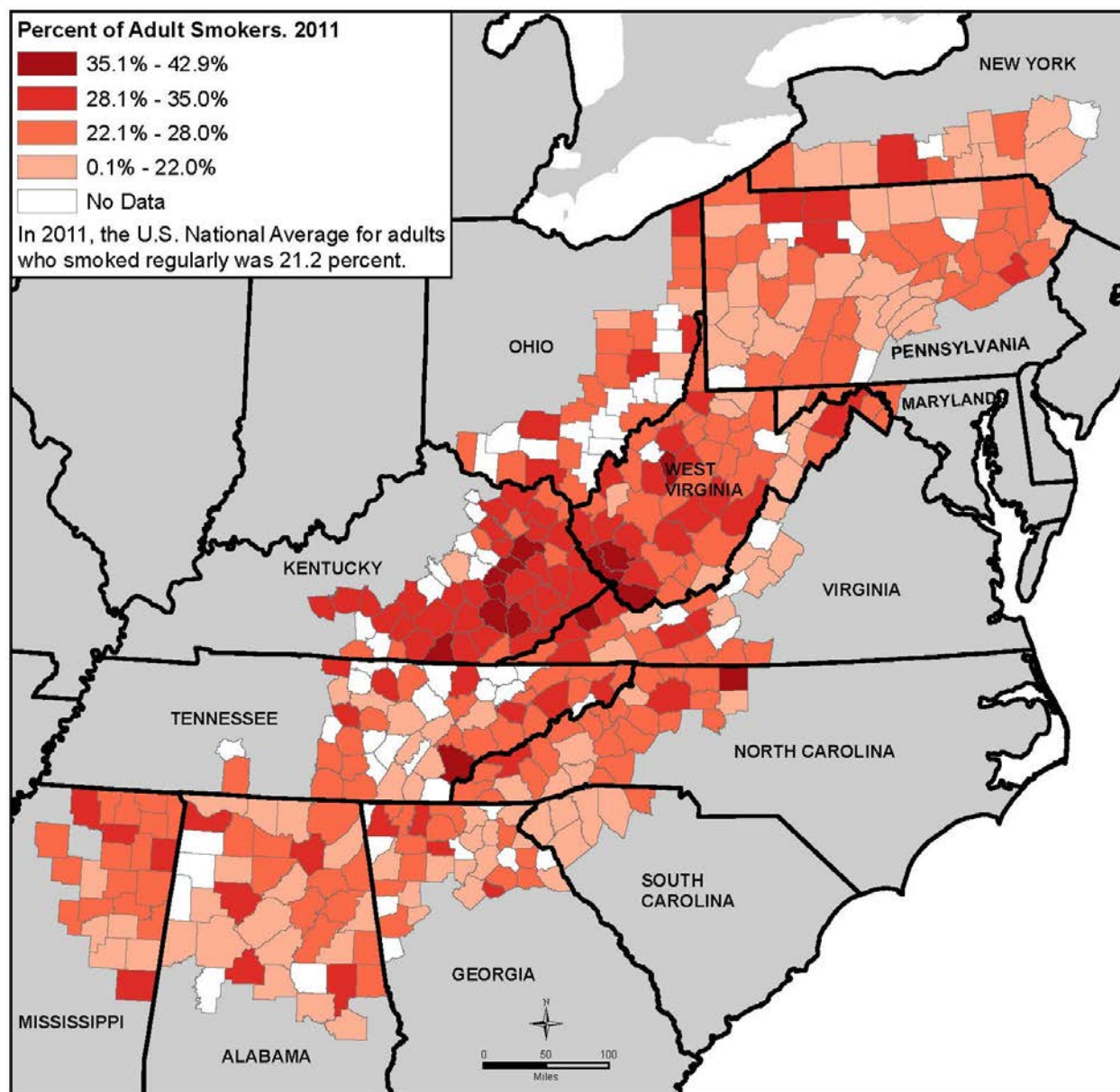


Data Source: County Health Rankings, 2014 & The U.S. Census Bureau



Figure 2.4 shows the percent of the Appalachian population over 65 years of age. This is an important predictor of health status and economic growth as an aging population often leads to a shrinking workforce and increased need for healthcare services. The two lightest shades represent where those over 65 years of age comprise less than 15 percent of the population, which can be seen around Atlanta, Georgia, as well as in eastern Kentucky and southern Alabama. Conversely, the darkest shade represents where those over 65 years of age comprise over 20 percent of the population, such as on the border of Georgia and North Carolina, the border of North Carolina and Virginia, and the border of Virginia and West Virginia.

Figure 2.5: Percent of Adults Who Smoke Regularly by County

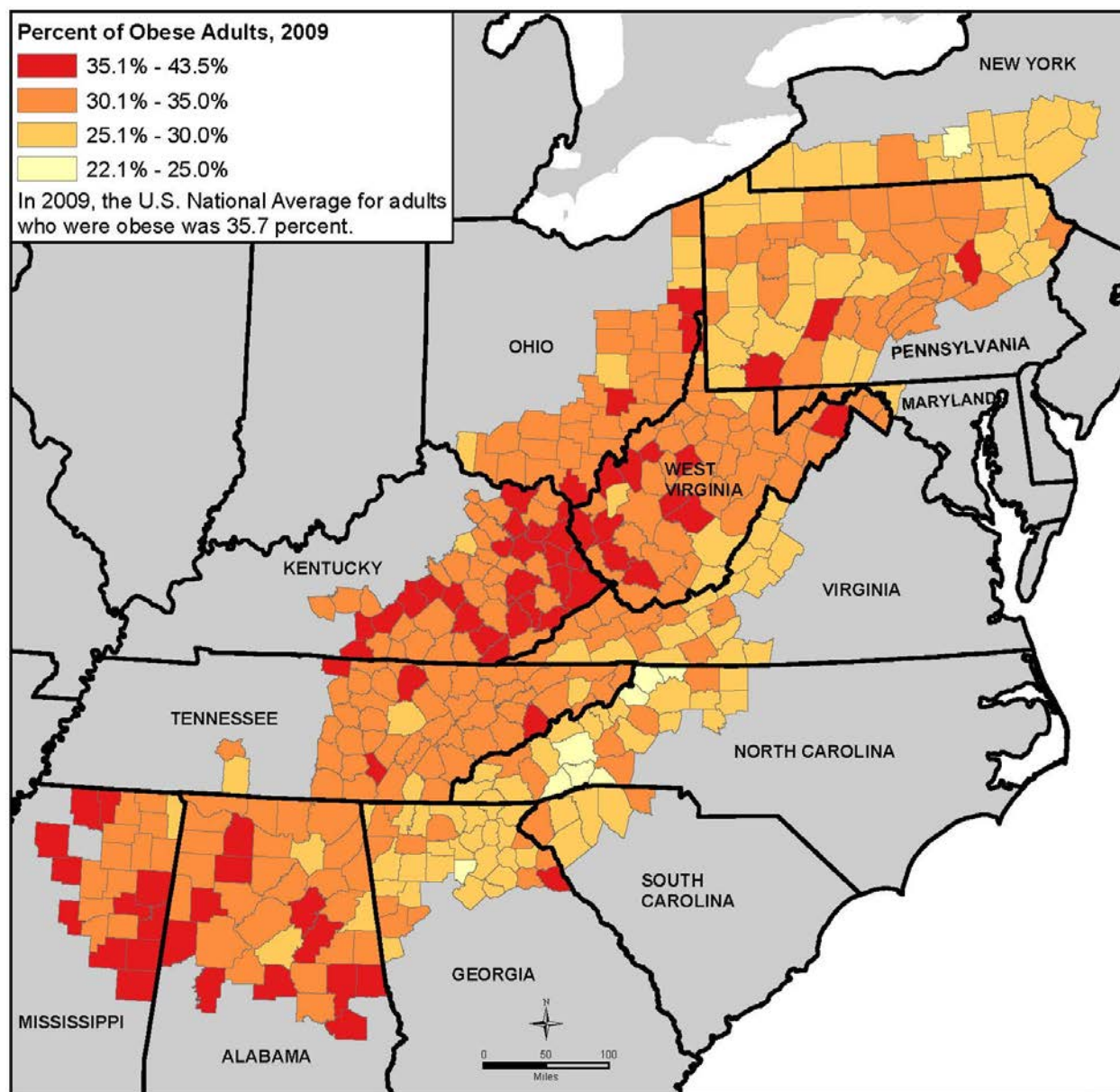


Data Source: County Health Rankings, 2014



Figure 2.5 shows the percent of adults who smoke regularly by county within the Appalachian Region, which is one of four risk behaviors discussed in the previous section that contribute to chronic disease, and by extension, higher healthcare costs. While data are not available for several counties in Tennessee and Ohio, several clusters of high percentages of adult smokers stand out. In particular, most of Kentucky and western West Virginia contain several counties where over one-third of the adult population smokes. Conversely, Georgia, Alabama, and Pennsylvania have several counties where there are a low percentage of adult smokers.

Figure 2.6: Percent of Obese Adults (BMI greater than or equal to 30) by County

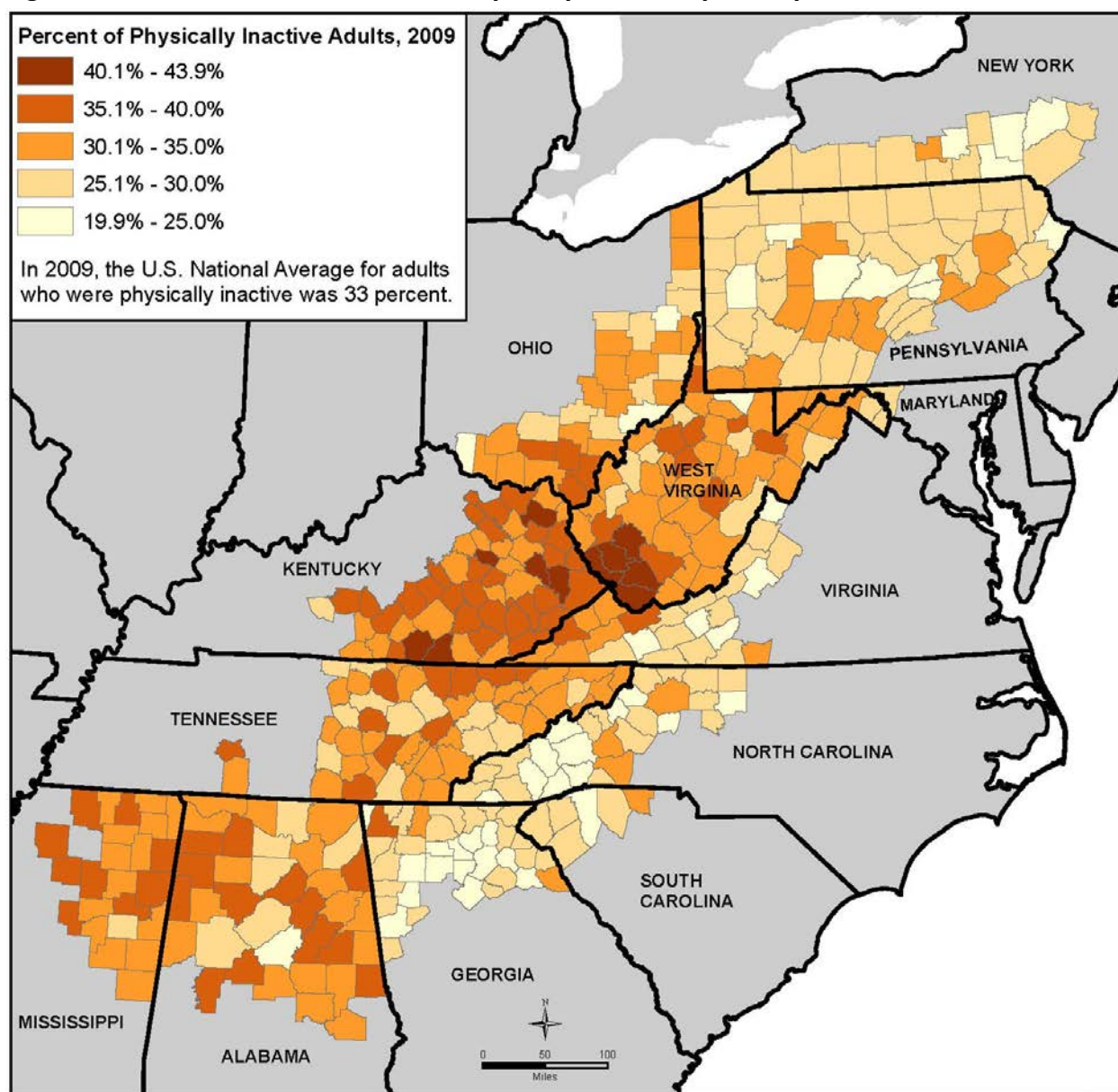


Data Source: County Health Rankings, 2014



Figure 2.6 shows the percent of the adult population who are obese in the Appalachian Region, meaning that their body mass index (BMI) is greater than or equal to 30. Obesity is the second of four risk behaviors discussed in the previous section that contributes to chronic disease. Most of the counties south of Pennsylvania have adult obesity prevalence greater than 30 percent. Specifically, the map shows that 35 percent to 44 percent of adults are obese in eastern and southern Kentucky, western and central West Virginia, and parts of Mississippi and Alabama. On the other hand, two small clusters in North Carolina have adult obesity rates of less than 25 percent.

Figure 2.7: Percent of Adults Who are Physically Inactive by County

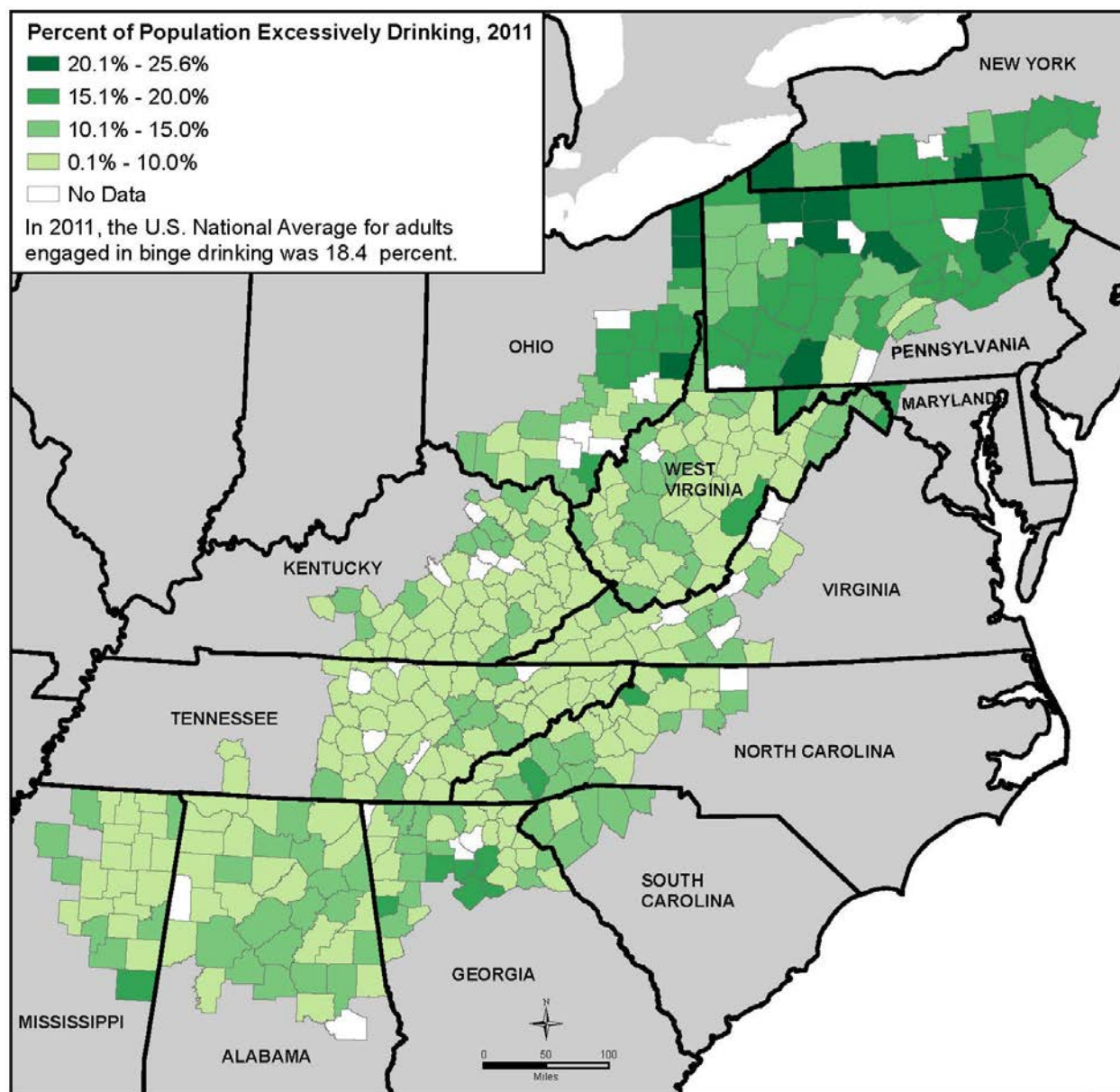


Data Source: County Health Rankings, 2014



Figure 2.7 shows the percent of the adult population who are physically inactive in the Appalachian Region, meaning that they report no leisure time physical activity. These data represent the third of four risk behaviors discussed in the previous section. As one might expect there is a correlation between counties with obese adults and those with physically inactive adults. Counties with physically inactive adults are clustered in southwest West Virginia and Kentucky, with other concentrations of physically inactive populations residing in Mississippi, Alabama, and Tennessee counties. Appalachian counties with the most physically active adults are found in parts of North Carolina, Georgia, Pennsylvania and New York.

Figure 2.8: Percent of Adults Who Drink Excessively (Heavy or Binge) by County

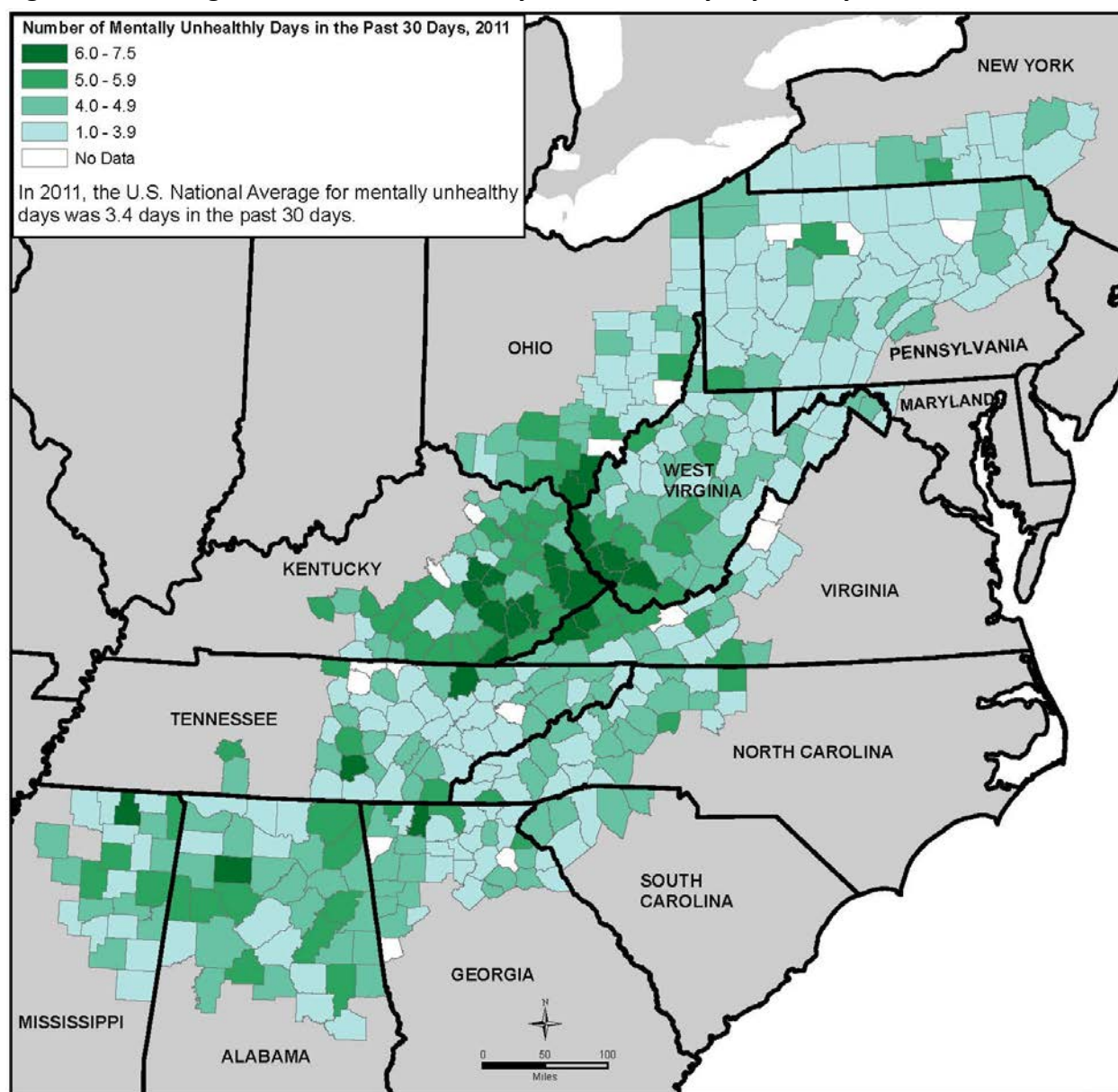


Data Source: County Health Rankings, 2014



Figure 2.8 shows the percent of the adult population who are binge drinkers (consuming more than four (women) or five (men) alcoholic beverages on one occasion in the past 30 days) or heavy drinkers (drinking more than one (women) or two (men) drinks per day on average). The darkest shade on the map above represents counties where over 20 percent of adults who binge drink or drink excessively, which is highly clustered in the northern Appalachian counties of New York, Pennsylvania and Ohio. Conversely, Kentucky and Tennessee seem to have the smallest populations of adult binge and excessive drinkers.

Figure 2.9: Average Poor Mental Health Days in Past 30 Days by County

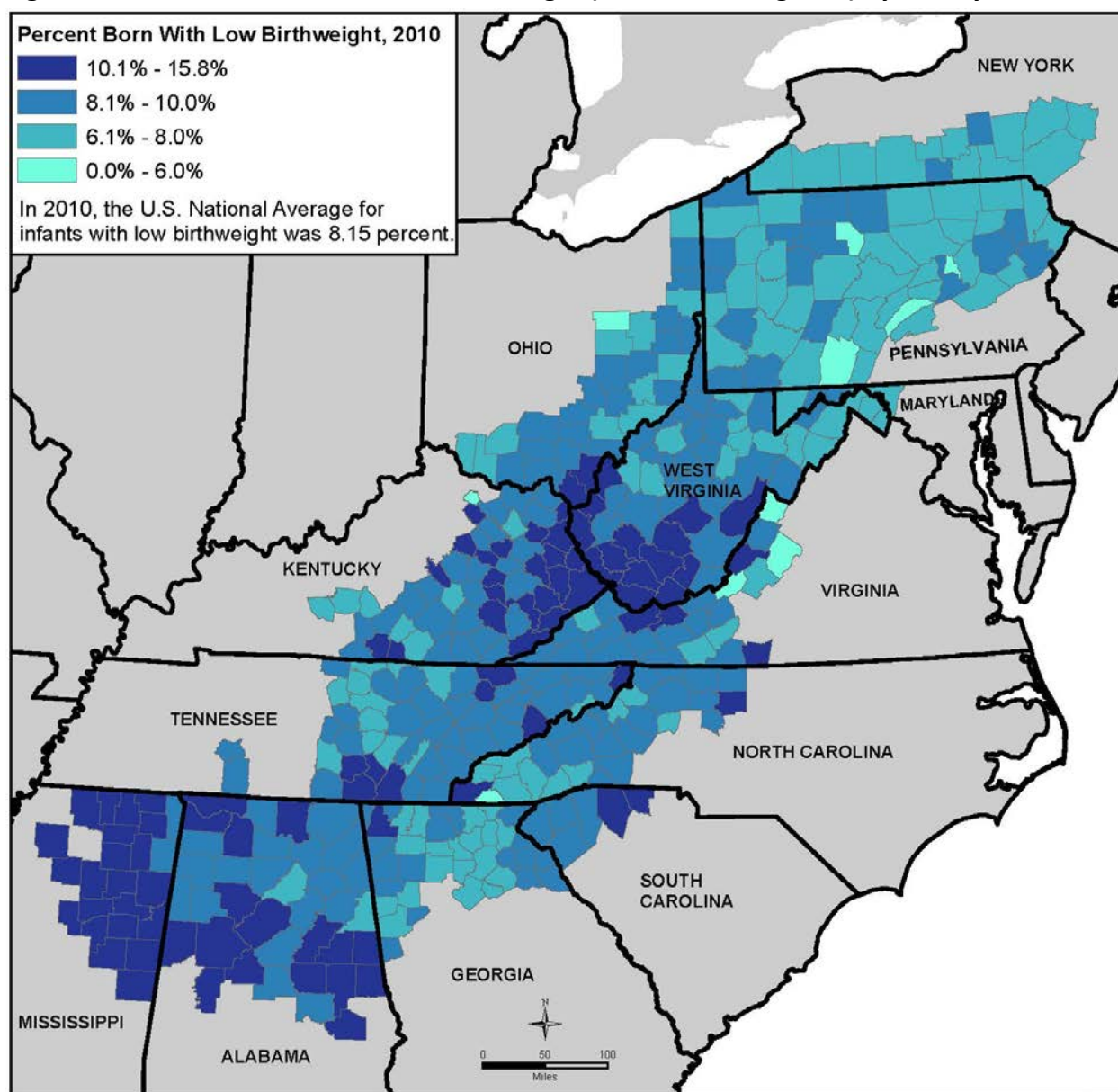


Data Source: County Health Rankings, 2014



Figure 2.9 shows the average number of poor mental health days for an adult in the past 30 days in the Appalachian Region. Poor mental health is defined as days when an adult's mental health was upset by stress, depression, or other emotional problems. It is an important measure of mental well-being, which is part of one's overall health. Areas with the highest percentage of adults reporting poor mental health days are clustered in eastern Kentucky and southwest West Virginia. Areas with the lowest percentage are central Tennessee, Pennsylvania and New York.

Figure 2.10: Percent Born with Low Birth Weight (less than 2500 grams) by County

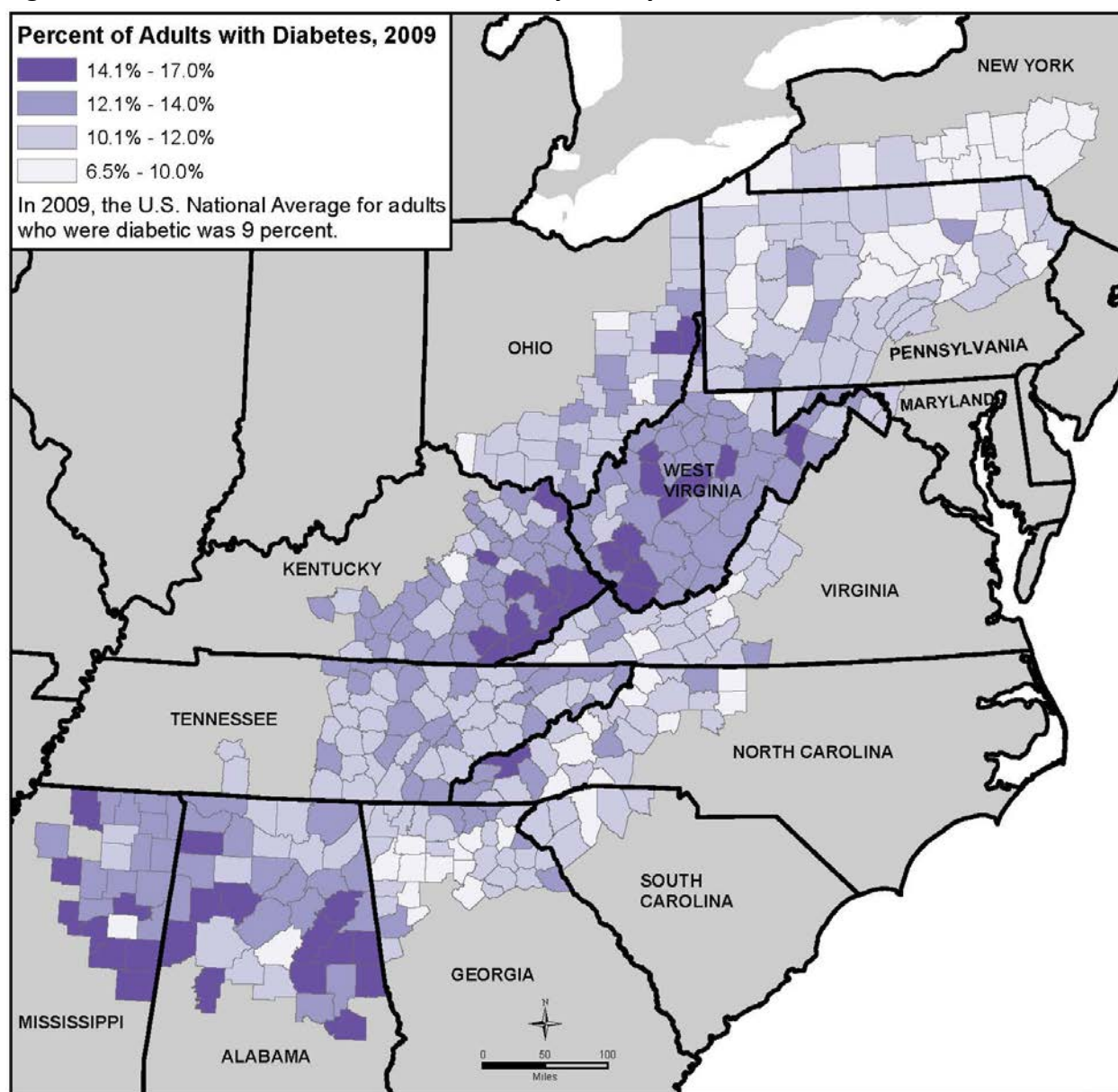


Data Source: County Health Rankings, 2014



Figure 2.10 shows the percent of live births where the infant weight less than 2,500 grams, which is approximately 5 pounds, 8 ounces. Low birth weight represents maternal exposure to health risks and is a predictor of the infant's premature mortality and potential for cognitive development problems. There are clusters where low birth weight is seen in over 10 percent of live births, which is represented by the map's darkest shade. These clusters include, within the Appalachian Region, nearly all of Mississippi, southern Alabama, eastern Kentucky and southwest West Virginia. Conversely, a relatively low percent of infants are born with low birth weight in Pennsylvania, New York and Georgia.

Figure 2.11: Percent of Adults with Diabetes by County

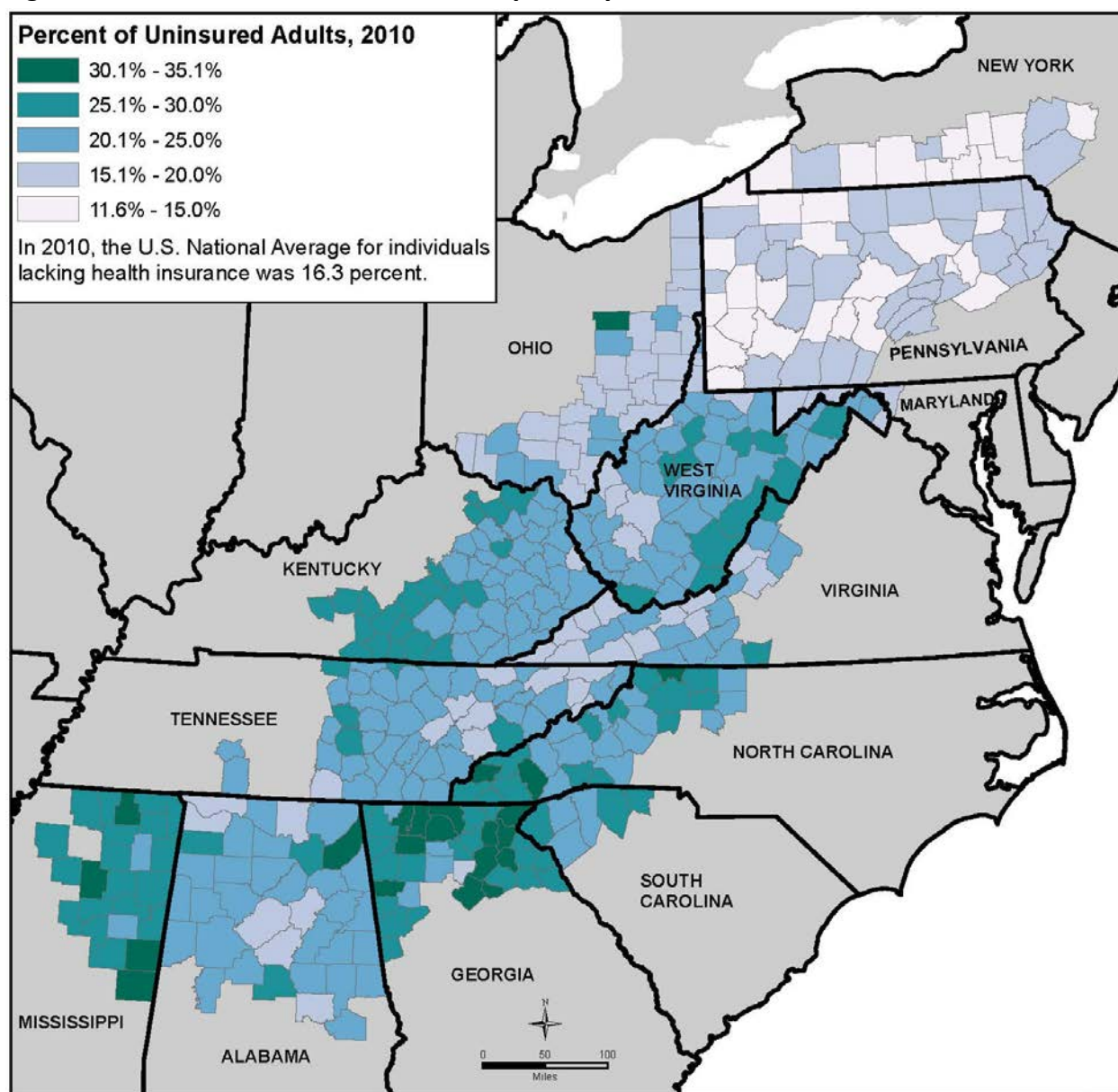


Data Source: County Health Rankings, 2014



Figure 2.11 shows the percent of adults in the Appalachian Region who have ever been told by a doctor that they had diabetes (excluding pregnant women). Unlike the health risk factors already discussed, diabetes represents one of the chronic diseases that can develop as a result of those risk factors. Rates of adult diabetes are particularly high in West Virginia and parts of Eastern Kentucky, Mississippi and Alabama. Rates of adult diabetes are the lowest (under 10 percent) in New York, around Atlanta, Georgia, and in parts of Pennsylvania and North Carolina.

Figure 2.12: Percent of Uninsured Adults by County

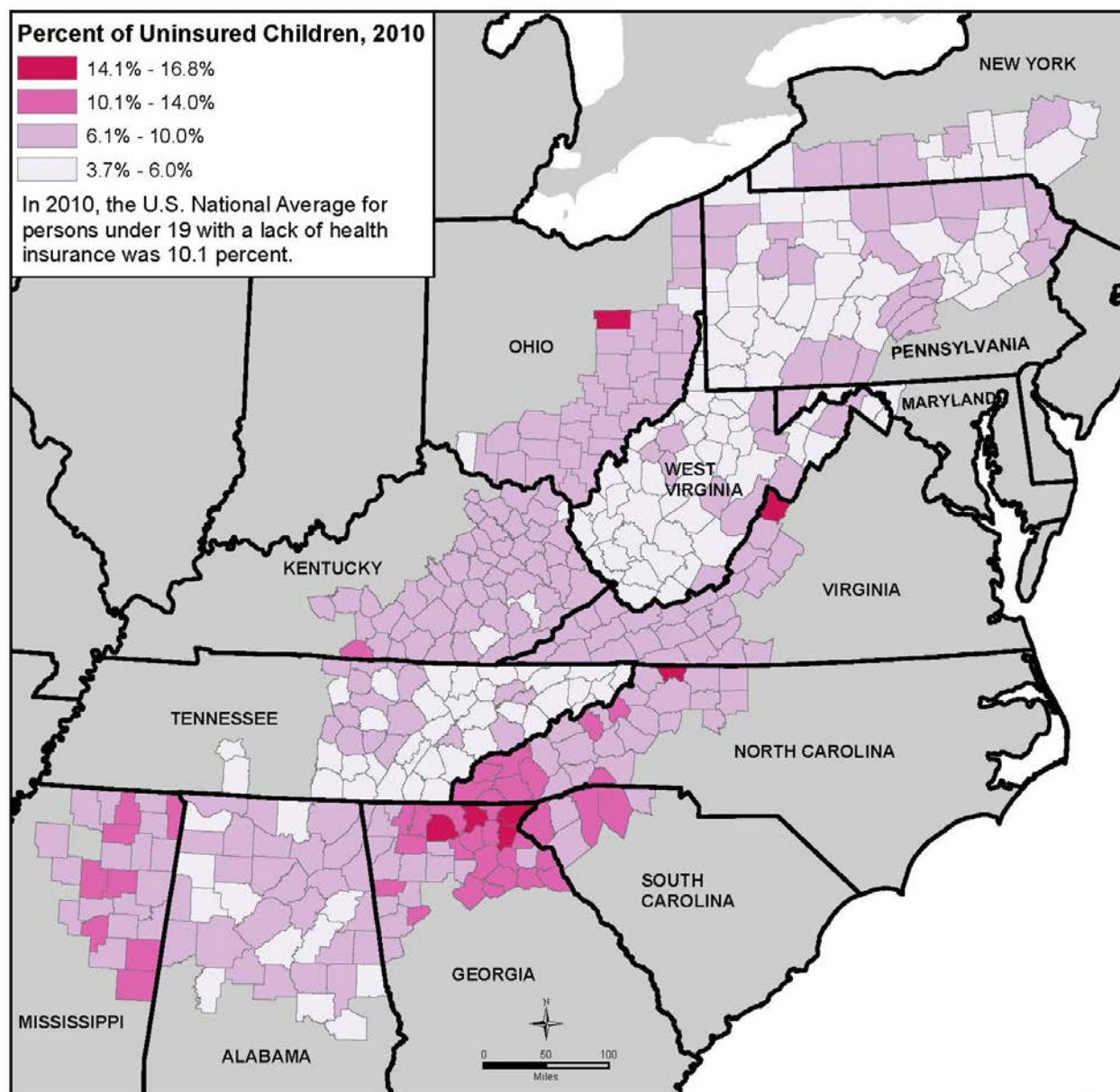


Data Source: County Health Rankings, 2014 & Small Area Health Insurance Estimates



Figure 2.12 shows the percent of uninsured adults aged 18 to 65 by county for the Appalachian Region as of 2010. Within the Appalachian Region, in 2010, over 25 percent of adults were uninsured in most of Georgia, Mississippi and central Kentucky. On the other hand, lower rates of uninsured adults are more common in New York and Pennsylvania. The remaining states fall somewhere in between in terms of the adults who are uninsured. However, it is worth noting that these figures may have changed significantly as a result of the Patient Protection and Affordable Care Act.

Figure 2.13: Percent of Uninsured Children by County



Data Source: County Health Rankings, 2014 & Small Area Health Insurance Estimates



Figure 2.13 shows the percent of uninsured children under 18 by county as of 2010. It is worth noting that these figures may decrease significantly as a result of the Patient Protection and Affordable Care Act. Due to government programs like Medicaid and the Children's Health Insurance Program (CHIP), the rates of uninsured children are lower than uninsured adults. In particular, most of West Virginia, Pennsylvania and eastern Tennessee have counties where less than six percent of children are uninsured. Conversely, higher rates of uninsured children are more common in Georgia and parts of Mississippi and North Carolina. The remaining states fall somewhere in between in terms of the percent of children who are uninsured.

2.4 Conclusion

An overview of health factors and outcomes in the ARC Region confirms that Appalachia is a place where additional funding in health improvement can be very beneficial. Relative to the rest of the United States and even non-Appalachian portions of Appalachian states, the Appalachian Region has a continued health disparity across overall functional health and many diseases like cancer and diabetes. These diseases, and the behaviors that lead to them, have significant economic costs that hinder growth, such as higher healthcare costs and lower workforce productivity.

While the Appalachian Region as a whole suffers from health disparities, a look at health behaviors and indicators by counties reveals that some areas are affected more than others. Eastern Kentucky and southwest West Virginia report alarming measures in several categories, including smoking, obesity, physical inactivity, poor mental health, low birth weight, and diabetes. For most of these same measures, Mississippi and Alabama were not far behind and in some cases worse. Conversely, the New York, Pennsylvania, and the Atlanta, Georgia area have relatively better health status, with the exception of binge and excessive drinking, which was noticeably worse in these three areas. Parts of Appalachian Tennessee, Virginia, North Carolina, and South Carolina fell somewhere in between for most of the health measures depicted.

In the next chapter, we review and analyze health projects financed by ARC between FY 2004 and FY 2010. One thing that we will look for is whether projects are targeted to improve the health factors and outcomes that will likely lead to economic growth. We will examine whether ARC is able to prioritize projects in the most at-risk areas, where health disparities exist relative to the rest of the region.

Chapter 3: Analysis of the ARC's Health Projects

Between FY 2004 and FY 2010, the ARC invested over \$30 million into 202 health projects. In an effort to obtain additional information about the impacts of these health projects, we designed and implemented an online survey that asked for information about the associated outputs and outcomes of each project. In the end, the online survey achieved a 40 percent completion rate. The survey data coupled with data collected by project administration and stored on ARC.net served as the basis for our quantitative evaluation of these projects. This chapter begins by characterizing the types of health projects funded by ARC, and describing the projects' impacts using data stored on ARC.net. Next, we explain the survey design and methodology, including how it was administered. The final sections provide a descriptive and econometric analysis, respectively, of the data collected by the online survey. These analyses lead to recommendations about which types of health projects were most effective or impactful.

3.1 Characteristics of ARC Health Projects

Before describing the impacts of ARC projects, this section provides a brief overview to showcase the diversity of ARC health projects. We categorize the projects by type and function, summarize funding sources across projects, and describe their geographic distribution.

3.1.1 Types of Services Provided by ARC Health Projects

While ARC grants are administered at the federal level, projects are selected through a decentralized process that gives specific states latitude in dispersing their allotted ARC funding. According to ARC Project Guidelines, applications for ARC assistance are first submitted at the state level. Applicants are told that their project must contribute to their state's Development Plan and be part of the state's annual Strategy Statement, meaning that the state may limit funding to certain projects that are not in line with their own ARC funding priorities. Then, if certified by the state member of the Commission (i.e., the state's governor), then projects are vetted at the federal level to ensure that the project is viable and within the scope of ARC's federal strategic plan.³⁵ ARC's federal program managers rarely reject projects but more often coordinate with state offices to improve or modify project applications as needed. This decentralized approach, which emphasizes state-level priorities, explains differences in health programming between ARC states; for example, why West Virginia has no health projects other

³⁵Appalachian Regional Commission. 2011. "ARC Project Guidelines".
<http://www.arc.gov/publications/ARCProjectGuidelines.asp#act>.

than special Commission-controlled grants, and why Ohio has a high proportion of equipment-based health projects (see Figure 3.4 below).

Mostly through this administrative process, the ARC funded a total of 202 health projects between FY 2004 and FY 2010, and the projects came in many shapes and sizes. For example, one project was a planning grant for creating community recreational trails, while another project equipped a health network with video-conferencing equipment to improve logistical efficiency between 10 health centers. Other projects required construction or renovation, and yet other projects supported public health programming. In fact, the original ARC.net database identified 18 different project types.

Despite the variety of projects, Table 3.1 categorizes the health projects into three primary project types: Healthcare Access, Clinical Services, and Health Promotion. The 90 Healthcare Access projects focused on expanding accessibility to healthcare providers by supporting the training of healthcare professionals or by directly increasing access to healthcare providers via telehealth or a new facility. The 45 Clinical Services projects sought to improve the quality of healthcare by improving or adding to the services that a healthcare facility offered. Finally, the 67 Health Promotion projects attempted to educate the public about healthy behaviors and encourage their participation. While we chose to categorize all of the projects, note that 28 projects were continuations or renewals of past projects that we did not feel significantly change the scope or objectives of the original project.

Table 3.1: ARC Health Projects by Project Type

Project Type	Number of Projects	Percent of Total Projects
<i>Healthcare Access</i>	90	44.6%
<i>Clinical Services</i>	45	22.3%
<i>Health Promotion</i>	67	33.2%
Total	202	100.0%

3.1.2 Primary Function of ARC Health Projects

We broke down the health projects into three primary functions: Construction/Renovation, Equipment, and Operations. The 25 Construction/Renovation projects used most of the funding to support the construction or renovation of a facility with the aim of improving local health outcomes. Similarly, the 71 Equipment projects used funding to procure large pieces of equipment (often medical). Finally, 106 projects with an Operations function primarily used funding to support programming and pay salaries or any other expenses not directly related to

construction, renovation, or equipment procurement. Again, while we chose to categorize all of the projects, note that 28 projects were continuations or renewals of past projects that we did not feel significantly changed the scope or objectives of the original project.

Table 3.2: Distribution of ARC Health Projects between Project Type and Project Function

Project Type	Project Function			Row Total
	<i>Construction/Renovation</i>	<i>Equipment</i>	<i>Operations</i>	
<i>Healthcare Access</i>	18	41	31	90
<i>Clinical Services</i>	7	28	10	45
<i>Health Promotion</i>	0	2	65	67
Column Total	25	71	106	202

Table 3.2 shows the project distribution across the different categories of Project Type and Project Function. Of the Construction/Renovation projects, most were associated with increasing healthcare access—largely due to changes made at healthcare facilities—and none were classified as a Health Promotion project. Similarly, Equipment projects were mostly categorized as Healthcare Access (e.g., a telehealth project expanded healthcare access through purchase of equipment), though they also made up the majority of projects aimed at improving clinical services, as often new equipment was required in order to offer a new clinic service. Next, Operations-based projects were most categorized as Health Promotion, which was expected given that projects aimed at improving public health often require funding for programming and not as much on construction or equipment.

3.1.3 Funding of ARC Health Projects

The total, average, and median funding expenditures across all 202 projects are shown in Table 3.3. In total, ARC invested about \$30.9 million, the states invested about \$13.7 million, and the projects themselves raised matching funds equal to \$78.3 million. On average, each project acquired \$152,819 from ARC and \$67,814 from the state, though it should be noted that only 21 percent of projects received state funding. On average, each project acquired matching funding equal to \$387,699, meaning that, in total, each project acquired an average of \$608,332. However, after removing an outlier construction project for Pikeville College School of Osteopathic Medicine—which required \$29 million in matched funds—average community funds decreased to \$245,349 and average total funds decreased to \$464,592. In contrast, the median investment was \$100,000 from the ARC, \$0 from the state, and only \$72,750 from matching funds.

Table 3.3: Funding across All ARC Health Projects between FY 2004 and FY 2010

Measure	Total Funds	ARC Funds	State Funds	Community Funds
Sum	\$122,883,067	\$30,869,380	\$13,698,487	\$78,315,200
Average	\$608,332	\$152,819	\$67,814	\$387,699
Median	\$225,000	\$100,000	\$0	\$72,750

When all fund sources are combined, about \$122.9 million was spent on ARC health projects for an average of \$608,332 per project during the timeframe between FY 2004 and FY 2010; however, this figure is heavily skewed by a few large infrastructure projects. In contrast, the median total expenditure across all projects was only \$225,000. In other words, half of the projects spent less than \$225,000 overall, and half spent more.

Table 3.4 shows the average funding for ARC health projects by project type, as defined above. On average, Healthcare Access projects required the most total funding at \$974,856 followed by Clinical Service projects at \$514,180. It appears that differences in total funds for the average project can best be explained by differences in matching funds for the average project of each type. On average, Healthcare Access projects had the highest matching funds at \$710,099, Clinical Service projects had \$212,714 of matching funds, while Health Promotion projects only had \$72,152. State funds also played a role, and interestingly, we see that Clinical Service projects, relative to Health Promotion projects, often acquired almost an additional \$108,000 for the state. This may be because some state funding is often available to support rural health care facilities to purchase medical equipment, which is generally straightforward than operational expenditures for a health promotion project.

Table 3.4 also shows that ARC funding to the average Healthcare Access project and Clinical Service project were very similar at \$176,544 and \$184,822, respectively, while ARC funds to the average Health Promotion project were substantially less at \$99,455. However, ARC's contribution to Health Promotion projects was the highest at 55.1 percent since Health Promotion projects were, on average, less expensive than Healthcare Access and Clinical Service projects. In comparison, ARC's contribution to Healthcare Access and Clinical Service projects were 18.1 percent and 35.9 percent, respectively.

Table 3.4: Average Funding of ARC Health Projects by Project Type

Project Type	Total Funds	ARC Funds	State Funds	Matching Funds	ARC Contribution
<i>Healthcare Access</i>	\$973,856	\$176,544	\$87,214	\$710,099	18.1%
<i>Clinical Service</i>	\$514,180	\$184,822	\$116,645	\$212,714	35.9%
<i>Health Promotion</i>	\$180,566	\$99,455	\$8,959	\$72,152	55.1%
OVERALL	\$608,332	\$152,819	\$67,814	\$387,699	25.1%

The challenge in interpreting Table 3.4 is understanding why there are such differences in funding across project types. It is important to recall the distribution of projects among the different project types and functions that were shown in Table 3.2. Additionally, Table 3.5 shows the average funding for ARC health projects by project function, as defined above. On average, Construction projects—most of which are Healthcare Access projects—had the most total funds at nearly \$2.7 million, which is more than \$2.0 million greater than the average Equipment project. Equipment projects—of which most are also Healthcare Access projects and many are Clinical Service projects—averaged \$482,619, which is more than double the amount attributed to the average Operations projects, most of which are Health Promotion projects. Funding given from ARC, the state, and matching funds follow a similar pattern, as construction is often the most expensive, followed by purchase of large equipment (often medical), with operations budgets often being the least expensive.

However, Table 3.5 also shows that ARC’s contribution to total funds changes drastically between the project functions. On average, ARC contributes almost half (48.9 percent) to Operations projects, over a third (37.3 percent) to Equipment projects, and 11.3 percent to Construction projects. Although ARC contributes more money to Construction projects, state and matching funds still cover a larger percentage of the total project funding. Conversely, ARC gives less, on average, to Operations projects, and is also willing to take on more risk when doing so by funding a larger percentage of the project. Managing risk by investing this way is a responsible method of distributing funding across the different project types and functions.

Table 3.5: Average Funding of ARC Health Project by Project Function

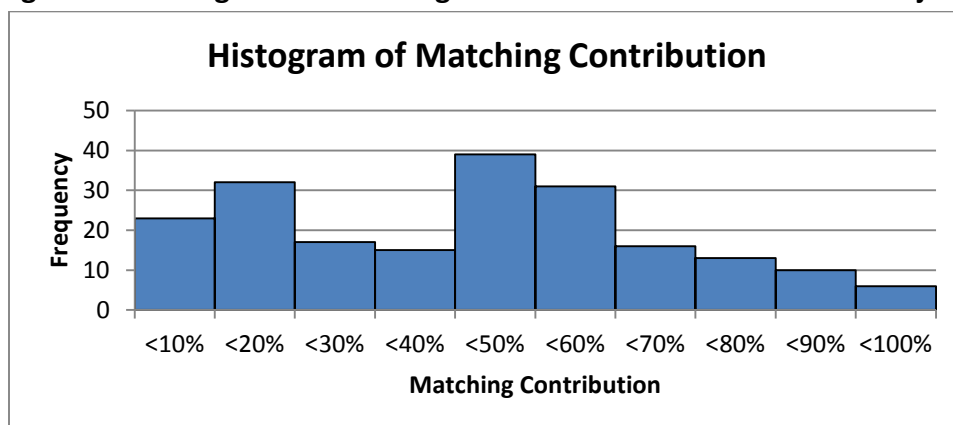
Project Function	Total Funds	ARC Funds	State Funds	Matching Funds	ARC Contribution
<i>Construction</i>	\$2,683,911	\$302,209	\$325,022	\$2,056,680	11.3%
<i>Equipment</i>	\$482,619	\$180,064	\$60,550	\$242,005	37.3%
<i>Operations</i>	\$203,013	\$99,336	\$12,018	\$91,659	48.9%
OVERALL	\$608,332	\$152,819	\$67,814	\$387,699	25.1%

Additionally, projects varied significantly in terms of the matching contribution, that is, how much of the total cost was paid for by matching funds raised by the grantee organization. The average matching contribution was 42 percent across all projects. The maximum matching contribution belonged to the construction project for Pikeville College School of Osteopathic Medicine, of which 98 percent of its \$29.5 million budget was paid for in matched funds.³⁶ There were a total

³⁶ Two projects appeared to have matching funds that represented 100 percent of total project expenditures, but in fact these were funded through an interagency agreement between ARC and the Centers for Disease Control.

of 20 projects where there was no minimum matching contribution—about half of which were ARC-supported academic research—these projects were not required to raise any matching funds. The most common matching contribution was exactly 50 percent, which was the case for 29 individual projects. Figure 3.1 is a histogram of matching contribution, where each bar represents the frequency of projects that had a matching contribution less than or equal to the horizontal axis label, but greater than the category behind it.

Figure 3.1: Histogram of Matching Contribution across the Health Projects



It is important to discuss the overall investments made in the ARC health projects before discussing the impacts of the projects, as the tradeoffs for the health impacts are alternative uses of the funding both from the perspective of the ARC and the grantee organizations. The next two subsections describe funding by project type as well as project function.

3.1.3 Geographic Distribution of ARC Health Projects

Funding for ARC Health Projects were awarded in every state in the ARC. Table 3.6 shows the distribution of projects by state. With only three projects, Maryland had the fewest projects, and, with 50 projects, Kentucky had the most projects. West Virginia—the only state entirely included in the ARC—had 11 projects, six of which funded the Appalachian Diabetes Control & Translation Project out of Marshall University. West Virginia is the only state between 2004 and 2010 that did not use state ARC funds for health-related projects; all West Virginia projects were special projects funded through the Commission at the federal level.

Note that a project’s geographic location was determined by the mailing address of grantee and does not necessarily represent where the project was implemented. For example, the aforementioned Appalachian Diabetes Control & Translation Project out of Marshall University has worked in ten Appalachian states.

Table 3.6: ARC Health Projects by State

State	Number of Projects	Percent of Total Projects
<i>Alabama</i>	18	8.9%
<i>Georgia</i>	5	2.5%
<i>Kentucky</i>	50	24.8%
<i>Maryland</i>	3	1.5%
<i>Mississippi</i>	15	7.4%
<i>North Carolina</i>	9	4.5%
<i>New York</i>	10	5.0%
<i>Ohio</i>	32	15.8%
<i>Pennsylvania</i>	8	4.0%
<i>South Carolina</i>	2	1.0%
<i>Tennessee</i>	29	14.4%
<i>Virginia</i>	10	5.0%
<i>West Virginia</i>	11	5.4%
<i>Total</i>	202	100.0%

Below, Figures 3.2 through 3.5 shows the geographic distribution of ARC health projects represented on a map of the Appalachian Region. Recall that the number, type, and function of health projects may vary between states depending on the health programming funding priorities for each state ARC office. The order of the maps is outlined below:

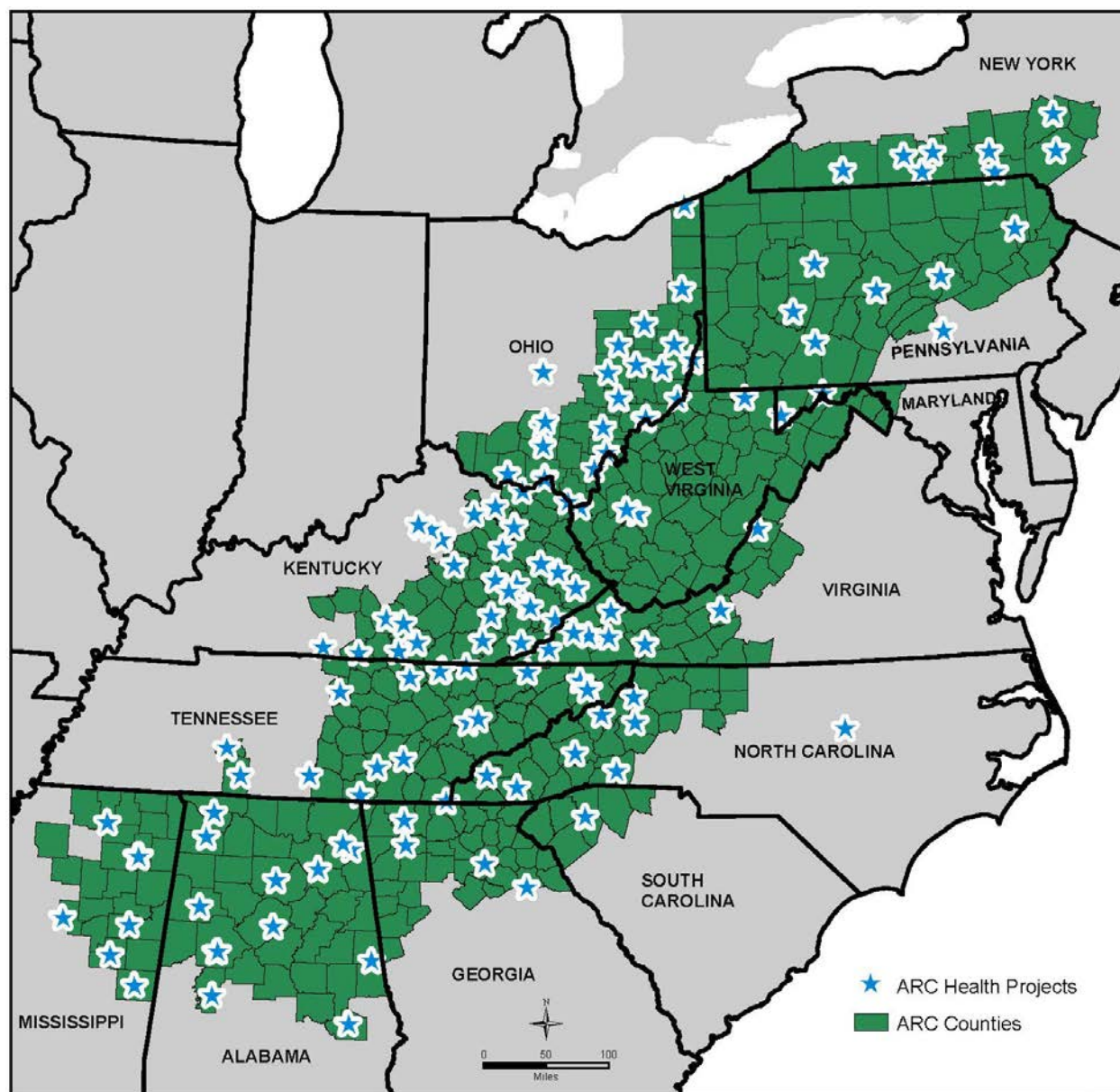
Figure 3.2: Geographic Distribution of ARC Health Projects

Figure 3.3: Geographic Distribution of ARC Health Projects by Project Type

Figure 3.4: Geographic Distribution of ARC Health Projects by Project Function

Figure 3.5: Geographic Distribution of ARC Funds Invested into ARC Health Projects

Figure 3.2: Geographic Distribution of ARC Health Projects

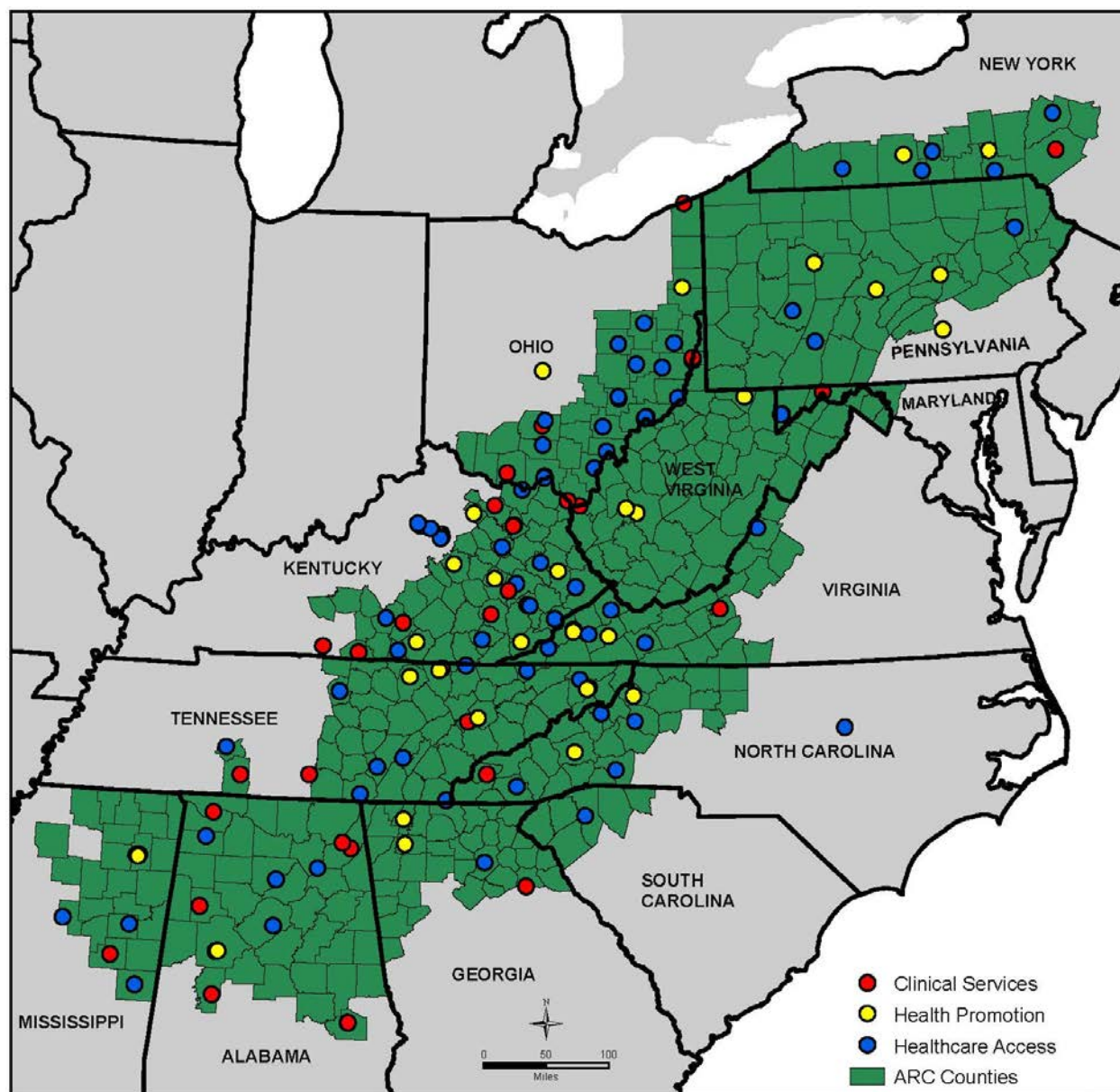


Data Source: Appalachian Regional Commission, 2013



Figure 3.2 shows the geographic distribution of ARC Health Projects. The location of each project was determined by the mailing address of grantee and does not necessarily represent where the project was implemented. For example, many projects were located at the University of Kentucky in Fayette County, Kentucky (which is outside of the ARC) though these projects were implemented in Eastern Kentucky in ARC counties. While stars may overlap if multiple projects were initiated from the same address, the map roughly illustrates the geographic distribution of projects and draws attention to the difference in the number of health projects between Kentucky and West Virginia.

Figure 3.3: Geographic Distribution of ARC Health Projects by Project Type

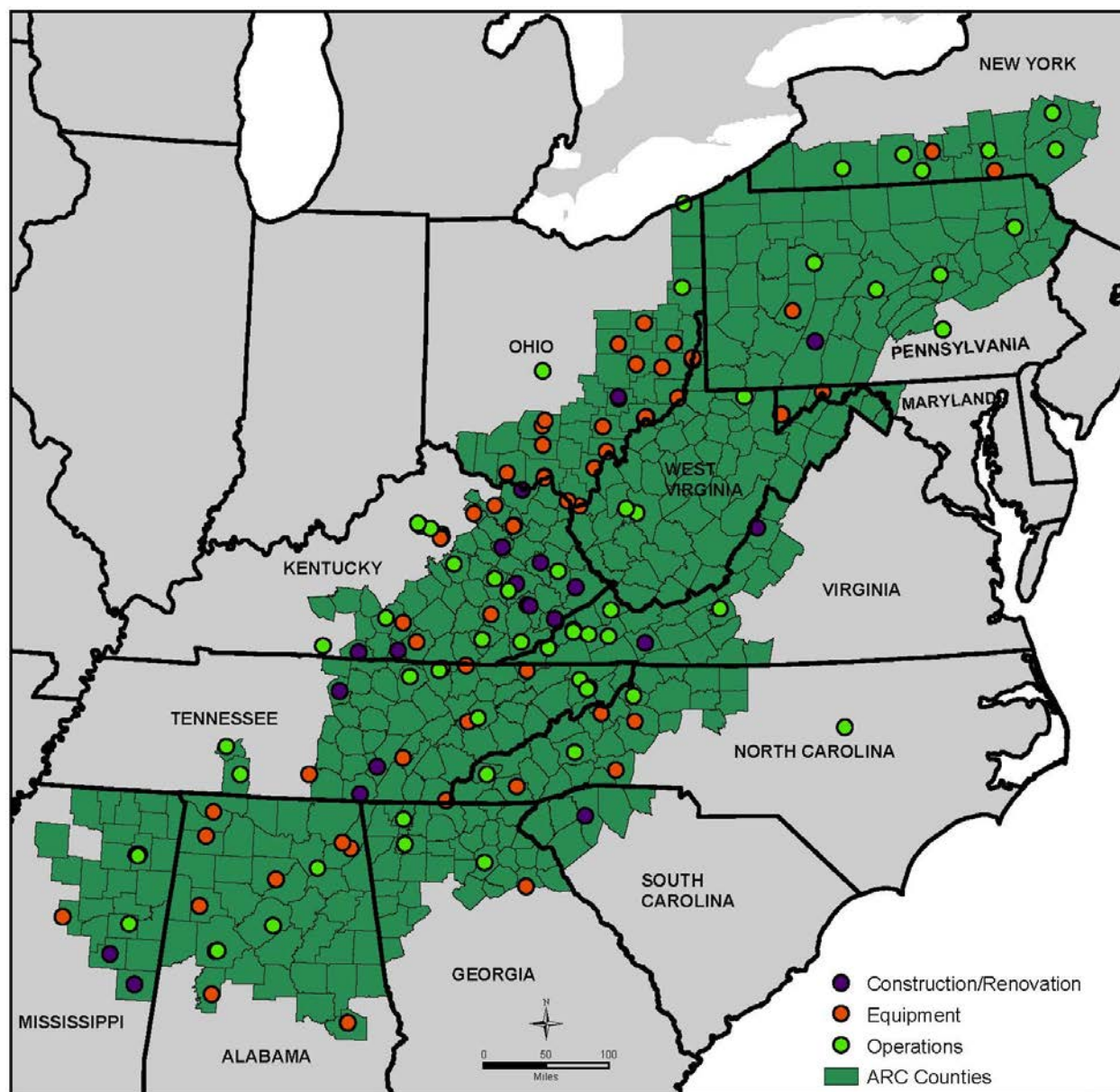


Data Source: Appalachian Regional Commission, 2013



Figure 3.3 shows the geographic distribution of ARC Health Projects by Project Type, which includes Clinical Services, Health Promotion, and Healthcare Access. Overall, this map highlights the diversity of project types across different states, though there seems to be a higher concentration of Healthcare Access projects in Ohio.

Figure 3.4: Geographic Distribution of ARC Health Projects by Project Function

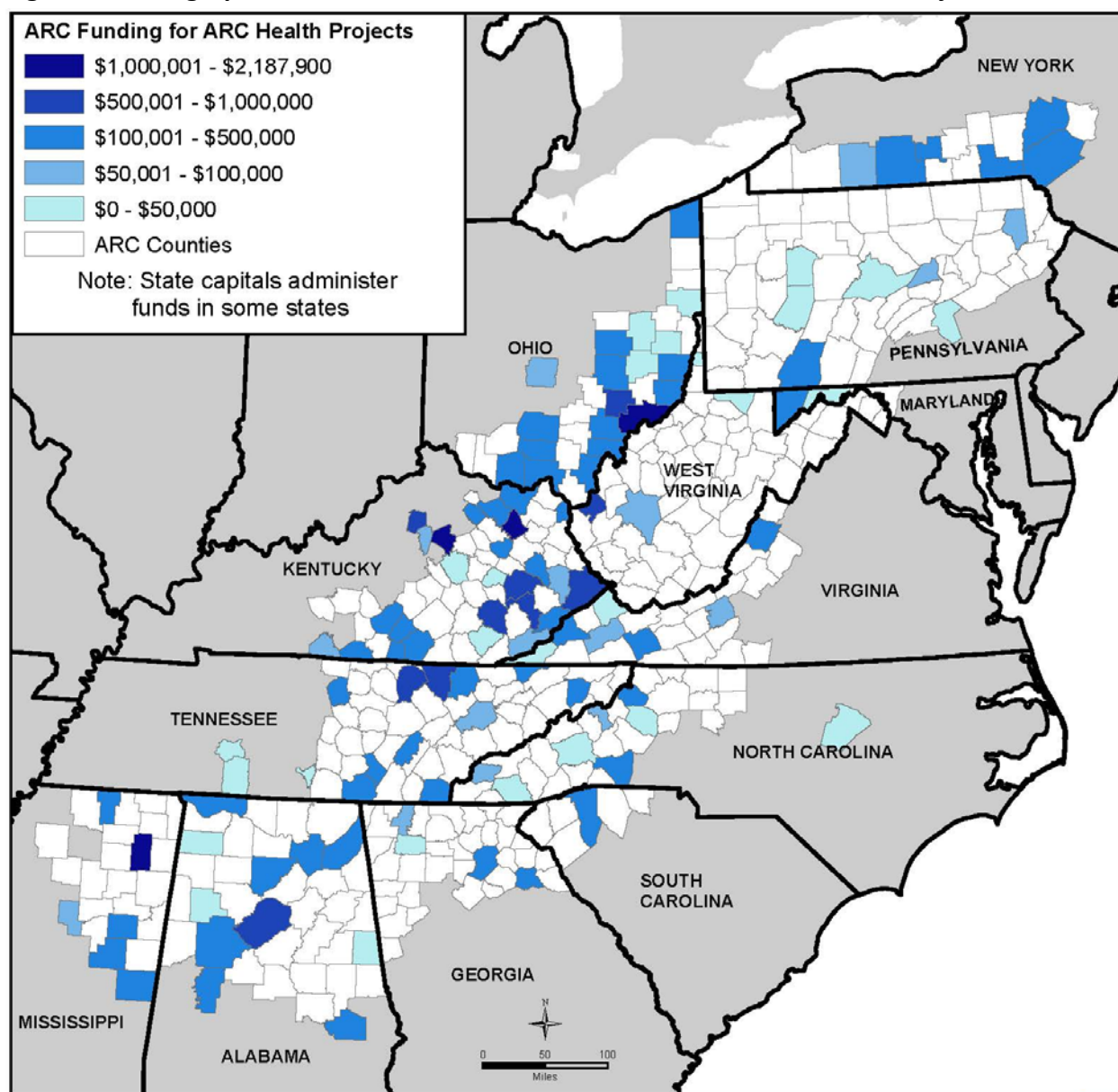


Data Source: Appalachian Regional Commission, 2013



Figure 3.4 shows the geographic distribution of ARC Health Projects by Project Function, which includes Construction/Renovation, Equipment, and Operations. The map also highlights the diversity of project functions across different states, though there seems to be a higher concentration of Equipment projects in Ohio, which corresponds well with Ohio's concentration of Healthcare Access projects, shown in Figure 3.3, given that most Healthcare Access projects were also Equipment projects (see Table 3.2). Conversely, there are no Equipment projects in Virginia or West Virginia. Additionally, there are no Construction/Renovation projects in Alabama, Georgia, New York, North Carolina, or West Virginia.

Figure 3.5: Geographic Distribution of ARC Funds Invested into ARC Health Projects



Data Source: Appalachian Regional Commission, 2013

Figure 3.5 shows the geographic distribution of ARC Funds Invested into ARC Health Projects. To create this map, funds across multiple projects were aggregated within the county containing the grantee's mailing address; thus, this map does not necessarily represent where ARC funds were spent. Darker shades and more categorized counties in Kentucky and Ohio suggest that much of ARC's funding for health projects went to these states, while there is relatively fewer funds used for health projects in Pennsylvania and West Virginia.

3.2 Description of Data from ARC.net

To start the evaluation, we examined project-level data from ARC.net, which serves as ARC's grant management system for recording and monitoring progress on ARC-funded projects. The ARC.net data includes basic descriptive information about the project (e.g., FY, funding, dates of approval and closure) as well as recorded outputs and outcomes for each project.

There are several categories of outputs and outcomes, though not all were applicable to health projects. For example, zero health projects recorded any "Communities Served" and only two projects recorded any "Businesses Served", though these outputs are applicable to other types of ARC projects (e.g., infrastructure projects). For health projects, the four most common categories of outputs and outcomes were Participants, Patients, Students Served, and Workers/Trainees, which recorded the number in each category that were impacted by the project. Note that the Patients category was not used at all until 2007, after which there is a dramatic decrease in the use of the Participants category, suggesting that patients may have been categorized as participants prior to 2007. Jobs Created, Jobs Retained, and New Telecom Sites were three other categories of outcomes, though these were used much less frequently by the health projects. For each category of outputs and outcomes, ARC recorded those outputs and outcomes that were proposed by the project before implementation as well as the outputs and outcomes at the close of the project. For select projects, ARC staff conducted a validation visit to verify closeout results including outputs and outcomes.

Another limitation to the ARC.net data is that output and outcomes are not recorded for all projects; of the 202 health projects, only 159 (78.7 percent) of the projects have any proposed impacts recorded and 125 (61.9 percent) have any actual outputs or outcomes recorded. One explanation is that, of the 202 health projects in the database, 24 projects have the status "open" and four projects were "cancelled", and neither category reports actual outputs or outcomes. Therefore, in examining and comparing proposed and actual impacts, the remainder of this section will only consider those projects that are closed. Still, of the 174 closed projects, 142 (81.6 percent) of the projects have any proposed impacts, 125 (71.8 percent) have any actual outputs or outcomes recorded, and only 119 (68.3 percent) have both proposed *and* actual recorded impacts. Other reasons for missing output and outcomes include use of other output/outcome measures that were not easily categorized in the ARC.net database and that 15 projects classified as renewals or continuations did not require additional proposed impacts.

Using the sample of 119 projects that have both proposed and actual recorded impacts in at least one category, it is useful to compare data within the ARC.net system. Table 3.6 compares, across these 119 projects, proposed outputs and outcomes reported before the project and actual

outputs and outcomes reported after project implementation for the four most common categories in the ARC.net database: Participants, Patients, Students Served, and Workers/Trainees. Table 3.6 shows that for participants, actual output was higher than proposed though actual outcome was lower than proposed. For both patients and students, actual impacts were lower than proposed impacts for both outputs and outcomes. Conversely, the actual outputs and outcomes in the Workers/Trainees category were higher than those proposed.

Table 3.6: Total Outputs and Outcomes for Sample (n=119)

Categories	Total Outputs		Total Outcomes	
	Proposed	Actual	Proposed	Actual
Participants	123,527	131,464	73,197	64,895
Patients	415,815	359,860	428,174	371,017
Students	9,261	7,118	8,775	6,539
Workers/Trainees	4,562	5,056	4,473	4,906

Next, Table 3.7 shows the total actual output and outcomes by project type across the sample of 119 projects that have both proposed and actual recorded impacts in at least one category. First, the table shows that the average Healthcare Access project had a much larger impact on participants than other project types. Second, Clinical Service projects had the greatest impact on patients; an expected finding given the nature of most Clinical Service projects. Finally, though Health Promotion projects, on average, do not affect many patients, they have the highest actual impact on students. While the impact numbers for students and workers seem very low compared to those for participants and patients, it should be noted that projects affecting healthcare students and workers directly will have a positive effect on many participants and patients in the future.

Table 3.7: Actual Outputs and Outcomes by Project Type across Sample (n=119)

Categories	Actual Outputs			Actual Outcomes		
	Healthcare Access	Clinical Services	Health Promotion	Healthcare Access	Clinical Services	Health Promotion
Participants	93,671	8,511	15,537	53,598	2,864	3,494
Patients	46,663	301,585	3,536	50,798	304,002	8,325
Students	2,725	634	3,759	2,633	179	3,727
Workers/Trainees	1,487	40	1,529	1,578	40	1,288

Similar to Table 3.7, Table 3.8 looks at how total actual output and outcomes varied by project function across all projects. What stands out first is that the total impact of construction-based projects in all categories was zero. This is because ARC construction projects are usually

administered through another federal agency and so actual outputs or outcomes are not recorded, though a few had proposed outcomes and others had figures in other categories such as jobs retained. For the purposes of evaluation, ARC might want to consider recording these projects' impacts or requesting impact measures from the administering agencies.

Also in Table 3.8, it appears that Equipment projects had the highest impact in affecting participants (many of whom may have been patients prior to 2007), patients, and students. Finally, Operations projects had a very significant impact on participants and the highest impact on workers, likely because Operations projects often retain or hire workers. Again, while the numbers are highest for Equipment projects, one patient is not comparable to one worker, as a worker will likely have an impact on numerous patients.

Table 3.8: Actual Outputs and Outcomes by Project Function across Sample (n=119)

Categories	Actual Outputs			Actual Outcomes		
	Operations	Construction	Equipment	Operations	Construction	Equipment
Participants	58,650	0	59,069	19,896	0	40,697
Patients	3,754	0	348,030	4,616	0	358,509
Students	2,675	0	4,443	2,597	0	3,942
Workers/Trainees	2,021	0	1,035	1,871	0	1,035

Still using the sample of 119 projects that have both proposed and actual recorded impacts in at least one category, Tables 3.9 and 3.10 summarize the proposed and actual outputs and outcomes, respectively, for those projects that recorded a greater-than-zero impact within a category. In other words, the averages and medians reported in Tables 3.9 and 3.10 are not skewed by projects that recorded a zero impact within the category.

Looking first at Table 3.9, we see that the Participants category was the most common with 46 projects recording both proposed and actual outputs. The average actual outputs were greater than the average proposed outputs in the Participants and Workers/Trainees categories, but not by much. Conversely, average actual output was lesser than the average proposed outputs for the Patients and Students category. These trends are also accurate in comparing average and median outcomes in Table 3.10. However, significantly fewer projects recorded outcomes in the Participants category and, in fact, the Patients category was most common. Most significantly across Tables 3.9 and 3.10, the average number of patients greatly decreases between proposed and actual impacts. Also, only the workers category exhibits an increase in both the average and median impact.

Table 3.9: Descriptive Summary of Outputs where Positive across Sample (n=119)

Categories	Proposed Outputs			Actual Outputs	
	Number	Average	Median	Average	Median
Participants	46	2,538	675	2,858	645
Patients	34	12,229	1,740	10,478	1,382
Students	16	576	233	445	245
Workers	14	308	58	361	160

Table 3.10: Descriptive Summary of Outcomes where Positive across Sample (n=119)

Categories	Proposed Outcomes			Actual Outcomes	
	Number	Average	Median	Average	Median
Participants	27	2,201	650	2,403	580
Patients	39	10,978	1,500	9,453	1,378
Students	13	634	172	503	255
Workers	14	320	75	350	106

Despite limitations, the data from the ARC.net database are informative. These data show that, on average, ARC health projects have made a great impact on participants and patients versus students and workers, and that equipment-based projects that improve healthcare access and clinical services contribute most to these categories. However, this section also shows how addressing preventable inconsistencies in reporting and recording data can greatly improve the quality and usefulness of the data for ARC's purposes. Potential solutions include clearly defining the difference between output and outcomes and following up with projects, particularly those involved in construction, to record actual outputs and outcomes. Due to the limitations of the ARC.net database, an online questionnaire was necessary to gain more information on the output and outcomes of ARC health projects, though the ARC.net data will continue to serve as a point of reference for measuring project impact in these categories.

3.3 Survey Design and Methodology

In order to supplement the ARC.net database with more detailed information on the impact of ARC health projects, a survey was designed and distributed to project personnel for this study. The questionnaire itself was designed with input from the evaluation team as well as representatives of ARC and was administered via Qualtrics online survey software. After reviewing the 202 health projects, it was determined that we would request survey responses from only 174 projects because several projects were revisions or continuations of projects that were already being surveyed and, moreover, did not have significantly different objectives than their original projects.

First, the survey collected updated contact information and clarifying data on the geographic scope of the project. Second, the survey inquired about project outputs, including construction or renovation of a building and procurement of equipment, and for each selected output, follow-up questions were posed to understand more about that output. For example, if respondents indicated that the project involved the construction of a building, they were then asked about the changes in square footage as a result of the project. Third, the survey asked about project outcomes, including improvement of educational programs, workforce trainings, healthcare provision, and public health. Each outcome question, if selected, was followed-up with additional questions. For example, if the respondent indicated that the project led to an improvement of a formal education program, then they were asked to list new or improved program and courses and the number of students involved (see Q3.2 and Q3.3 in the survey, located in the Appendix). Additionally, the outcome section inquired about the effect of the project on employment. The survey also asked respondents to assess the project's impact on 18 categories of long-term, health, workforce, and economic outcomes. Finally, the survey asked miscellaneous questions about additional funding, partnerships, organizations, and self-evaluations that may have arose as a result of the project. In all sections, the survey used a mix of multiple choice and text entry questions types in an attempt to collect comparable data from each project while still keeping it flexible enough so that questions applied to all projects.

Potential survey respondents were made aware of the online survey via email, the first of which was sent out from the evaluation team on July 1st, 2013. Contact information for the projects was provided by ARC. The body of the email contained a cover letter that provided a link to the Qualtrics survey, explained its purpose, and provided basic information about the ARC project (e.g., the project's title, description, and FY). Of the 174 emails sent out, 56 emails (32 percent) failed to deliver due to erroneous email addresses. A few emails simply contained a typo, but the vast majority had to be updated because either the grantee organization had changed the format of their email addresses or the project contact had moved to a new position. We found replacement emails—either to the project contact or someone in a similar position currently at the grantee organization—for 48 projects, and five projects were contacted via phone and informed of the online survey. In the end, seven projects could not be reached and informed about the online survey, at least three of which because the grantee organization no longer operates. Failure to reach these seven projects after multiple attempts reduced our potential sample to 167 projects.

Other efforts were taken to ensure a higher response rate. About two weeks after the original email, a reminder email was sent on July 15th, 2013 from the evaluation team to all who had yet to complete the online questionnaire. As before, the email included identifiable information

about the project and a link to the online survey. A similar email was also sent out from ARC on September 24th, 2013. Additionally in September, we noted that there were about 20 respondents who had started the online survey but had not completed it; therefore, we called these respondents and encouraged them to complete the survey, and sent a follow-up email afterwards with another link to the online survey.

In the end, 84 projects responded to the online survey, and 68 projects completed it. Consequently, the online survey's response rate was 50.3 percent and the completion rate was 40.7 percent. Table 3.11 shows the response and completion rates by project type. The difference between the completion rate and response rate is greatest for Clinical Service projects and least for Health Promotion projects. Meanwhile, the lowest response and completion rates refer to Healthcare Access projects. However, none of the completion rates go below 33 percent, which would have signaled a strong respondent bias based on project type.

Table 3.11: Response and Completion Rates by Project Type

Project Type	Responded to Survey	Response Rate	Completed Survey	Completion Rate
<i>Healthcare Access</i>	37	46.3%	29	36.3%
<i>Clinical Service</i>	23	56.1%	17	41.5%
<i>Health Promotion</i>	24	52.2%	22	47.8%
OVERALL	84	50.3%	68	40.7%

For another look at the distribution of the evaluation's response rates, Table 3.12 displays the response and completion rates by project function. Here we observe a dramatic difference between the rates for both Construction and Equipment projects, both of which end up with a below average completion rate. Again, while rates differ by project functions, none of the completion rates go below 33 percent and they are not different by more than 10 percent, which would have signaled a strong respondent bias based on project function.

Table 3.12: Response and Completion Rates by Project Function

Project Function	Responded to Survey	Response Rate	Completed Survey	Completion Rate
<i>Construction</i>	11	47.8%	8	34.8%
<i>Equipment</i>	32	48.5%	24	36.4%
<i>Operations</i>	41	52.6%	36	46.2%
OVERALL	84	50.3%	68	40.7%

We also hypothesized that we might see respondent bias on the basis of FY, as projects completed several years ago would be less likely to retain project records as well as continue to

have the same project personnel. To examine this, Table 3.13 looks at response and completion rates by FY. While Table 3.13 does indeed show different completion rates by FY, it does not seem to follow the expected pattern. Completion rates are lowest at 11.8 percent in 2004 (as expected), but then jump up to the second highest completion rate at 42.9 percent in 2005. However, the fact that there were more health projects in 2010 and particularly 2009 than in years prior means that 47 percent of the completed surveys come from FY 2002 to 2008 and the remaining 53 percent come from FY 2009 and 2010.

Table 3.13: Response and Completion Rate by FY

FY of Project Approval	Did Not Respond	Responded to Survey	Response Rate	Completed Survey	Completion Rate
2004	14	3	17.6%	2	11.8%
2005	10	11	52.4%	9	42.9%
2006	9	9	50.0%	7	38.9%
2007	11	8	42.1%	5	26.3%
2008	11	12	52.2%	9	39.1%
2009	15	28	65.1%	26	60.5%
2010	13	13	50.0%	10	38.5%
OVERALL	83	84	50.3%	68	40.7%

Analysis of the survey response and completion rates reveals that the sample is representative of the population. Every category of project type and project function has a response rate that is at least over 33 percent. It is slightly, but not largely, biased toward Operations-based projects with aims of improving clinical service and health promotion. Also, while the completions rates vary year to year, it does not do so in a way that vastly oversamples recent projects versus older projects. Finally, the data include enough observations to allow for a meaningful regression analysis, which is conducted below.

3.4 Descriptive Analysis of Data

Table 3.14 shows the distribution of projects by organization type. This table begins to reflect the diversity of projects that comprise ARC health projects. The most prevalent classification is county- or local-level organizations, at about 31 percent, though many projects are hospitals or regional projects. Additionally, a significant number of projects classified themselves as Other, which included medical clinics, economic development organizations, and medical colleges that did not quite see themselves as a university.

Table 3.14: ARC projects by Organization Type

Organization Type	Frequency	Percentage
<i>State or Multistate</i>	5	6.1%
<i>Regional or Multicounty</i>	13	15.9%
<i>County or Local</i>	25	30.5%
<i>Hospital</i>	17	20.7%
<i>University</i>	9	11.0%
<i>Other</i>	12	14.6%
<i>No response</i>	3	1.2%
OVERALL	84	100%

The next three subsections describe the results of the survey, focusing first on project outputs, followed by project outcomes, and ending with questions about project sustainability.

3.4.1 Survey Results of Project Outputs

Outputs are the direct result of the project; examples include the number of patients served by a new piece of equipment, or the square footage of renovated space. In this view, respondents were asked if their ARC-funded project involved construction or renovation of a building, purchase of equipment (medical or otherwise), and/or purchase of other large materials (e.g., furniture). Table 3.15 shows the number of projects, by project type, that selected each output option. Keep in mind that respondents were able to select multiple outputs, and many projects selected more than one. While there are projects in each category, equipment purchasing was the most common choice. As expected, there are strong correlations between respondents who indicated construction or equipment as a project output and those projects whose designated type was associated with construction or equipment, respectively.

Table 3.15: Survey Results of Project Outputs by Project Type

Project Type	Construction or Renovation	Equipment	Other Large Purchases	None
<i>Healthcare Access</i>	9	21	4	9
<i>Clinical Service</i>	4	13	3	5
<i>Health Promotion</i>	2	4	1	18
OVERALL	15	38	8	32

Of the 84 respondents who started the survey, 79 completed the section of survey concerning project outputs. Of these 79 survey observations, 15 projects (19 percent) indicated that they used ARC funding for the construction or renovation of a building; of these, six were primarily

construction and nine were primarily renovation. On average, these projects added about 8,300 square feet to new or existing facilities. However, this number is skewed by the construction of the College of Osteopathic Medicine at the University of Pikeville in Kentucky, which added 87,000 square feet. Without this project, the average project added 1,540 square feet to new or existing facilities, though seven of the projects did not add any square footage to their facility. Additionally, for the six projects with facilities that contained classrooms, the construction/renovation added an average of 2 classrooms to each facility.

Of these 79 survey observations, 38 projects (48 percent) indicated that they used ARC funding to procure equipment, medical or otherwise. Between the 38 projects, at least 66 large pieces of equipment were purchased. Of the 66 entries of equipment purchases, 56 percent procured medical equipment, which included digital imaging, electrocardiographs, digital mammography, thermometers and stethoscopes. The remaining 44 percent of purchases were for non-medical equipment, which was mainly spent on computers, simulation tools, therapy chairs, and hospital beds. A few projects also purchased kitchen equipment, such as a refrigerator, and one project purchased a minivan to provide transportation for the patients treated at their facility.

In addition, of the 66 equipment purchases, 61 pieces (92 percent) are still in good condition today. Otherwise, one set of remote telehealth monitoring equipment from 2006 is in fair condition, a training mannequin and digital radiography (both from 2005) are in poor condition, and one picture archiving communication system from 2005 is broken or no longer used. Given that these four pieces of equipment are all high-use items that were purchased at least eight years ago, these few instances are not surprising. Overall, equipment purchased as part of ARC health projects has been well used and maintained. Furthermore, 13 projects indicated that they had served additional patients as a result of their new equipment, which averaged about 1,550 additional patients per project.

Of these 79 observations, eight projects (10 percent) indicated that they used ARC funding to make other large purchases. A few projects purchased computers, such as laptops and iPads, that the respondent did not feel qualified as equipment. A couple other projects purchased furniture and appliances for clinics (dental and drug rehab). A college purchased medical library books and additional medical supplies.

3.4.2 Survey Results of Project Outcomes

Outcomes describe the impact that is made as a result of the project, such as the number of patients improved or the number of jobs created. To better measure project outcomes, the survey asked if the project directly or indirectly resulted in the following outcomes:

Outcome 1 (Education): *Improvement of a formal education program*

Outcome 2 (Workforce): *Training of a new or existing workforce for a health-related field*

Outcome 3 (Healthcare Services): *Increase provision of healthcare services / improvement of accessibility to healthcare*

Outcome 4 (Public Health): *Promotion of public health through community service or program*

Outcome 5 (Public Policy): *Development of public policy on a health-related issue*

Outcome 6 (Jobs): *Creation or retention of Jobs in the Short- or Long-term*

Before results for each outcome are discussed in detail, Table 3.16 displays the number of projects that selected each outcome by project type. Keep in mind that respondents were able to select multiple outcomes and many projects selected more than one. By far, the most often selected outcome was increased provision of healthcare services, which was chosen by about half of Healthcare Access and Clinical Service projects. Table 3.16 also shows a strong link between Health Promotion projects and those with an outcome of improving public health.

Table 3.16: Survey Results of Project Outcomes by Project Type

Project Type	Education	Workforce	Healthcare Services	Public Health	Public Policy	Jobs
<i>Healthcare Access</i>	9	9	22	6	4	13
<i>Clinical Service</i>	4	5	10	5	1	10
<i>Health Promotion</i>	4	3	8	14	5	5
OVERALL	17	17	40	25	10	28

After selecting a given outcome, respondents were asked several follow-up questions about their achievement of a given outcome. Among other things, respondents indicated the number of people who were impacted by the project within the project timeframe. While not identical, follow-up questions for Public Health, Healthcare Services, Education, and Workforce outcomes are similar to outcomes collected by the ARC.net database for the number of participants, patients, students, and workers, respectively. Table 3.17 presents a comparison of these outcome measures between the survey and the ARC.net database. In Table 3.17, the evaluation survey's measure of participants comes from the reported number of people affected by improvements in public health, patients are those impacted by increased healthcare services, students are those impacted by improvements to formal education programs, and workers are those impacted by increased workforce trainings.

Table 3.17: Comparison of Outcome Measures from Survey and ARC.net Data

Categories	Online Survey Outcomes	ARC.net Actual Outcomes (n=119)
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	Number	Average	Median	Number	Average	Median
Participants	25	2,282	327	27	2,403	580
Patients	40	1,761	865	39	9,453	1,378
Students	17	92	62	13	503	255
Workers	17	128	68	14	350	106

For all output and outcome categories, Table 3.17 reveals that the average and median impacts reported by the projects for the online survey are significantly less than those reported to ARC.net at the close of the project. There are a few possible explanations for this. First is that, the wording of the online survey elicited lower figures because of how questions were phrased, though efforts were taken best capture comparable measures. Second, a drop in average and median impact could be explained if big impact projects were less likely to complete the survey since it might be harder to collect these figures; however, while the numbers used from the online survey only come from a small sample of projects, the data show little correlation between funding amount and likelihood of survey completion. Third, human error resulting from forgetfulness, job turnover, or loss of the project's final report to ARC could have caused unintentional mistakes. All of these are possible explanations for the decrease in impacts between the two evaluation mechanisms.

A problem with both sets of project impacts, though it is controlled a bit better in the online survey, is that these figures measure quantity and not quality. For example, an electronic medical record project reported to ARC.net that their project affected over 15,000 patients yields a different quality of impact than the impact of new digital imaging software that affected less than 1,000 dental patients. We attempted to account for quality in the online survey by asking some open-ended questions, but the long-term solution for ARC monitoring and evaluation is either an improved standard for measuring project impact or standardization of the projects themselves so that their impacts can be more easily compared. An improved standard may include a greater variety of outputs/outcomes measured by ARC or a requirement of baseline assessments for each project. Standardizing the projects themselves would reduce the diversity of impact of quality; for example, if ARC only funded medical equipment projects, then the quality of impact could be more easily assessed by the number of patients served and the function of the equipment. However, both of these recommendations put at risk ARC's ability to support a diversity of programming and innovative projects, which are two of the key strengths of ARC's health project funding. The diversity of ARC's health projects will perhaps be best represented in the remainder of this section, which discusses some statistics about each outcome in more detail.

Outcome 1: Improvement of a formal education program

Of the 74 survey observations, 17 projects (23 percent) indicated that their project resulted in the improvement of a formal educational program (affiliated with a formal learning institution). Between the 17 projects, at least 21 educational programs were affected, most of which were professional degrees at the associate's or bachelor's level. Six of the 22 programs were new as a result of the project, and the remaining 15 were improved by it in some way. To date, all of these programs are still offered. Additionally, of those that measured enrollment, an average of 92 students has completed and an average of 57 students are currently enrolled in each new and improved program.

Outcome 2: Training of a new or existing workforce for a health-related field

Of the 74 observations, 17 projects (23 percent) indicated that their project resulted in the training of a new or existing workforce for a health-related field. Not surprisingly, 10 of the 17 projects also identified themselves with the previous outcome of having improved a formal education program. Between the 17 projects, at least 20 different trainings were affected by ARC funding. Five of the 20 programs (25 percent) were improved by the project, and the remaining 15 (75 percent) were new as a result of the project. Additionally, half of the trainings met in-person two or more times throughout the course of the training, another 40 percent of trainings met in-person one time, and 10 percent of trainings were done as a computer module. Of the 20 trainings most are still being offered, though 40 percent of trainings are no longer offered as they were only relevant during the project timeframe. Furthermore, the survey did not collect the purpose of most trainings, but we know that 35 percent of trainings were to retrain an existing workforce, 20 percent of the trainings were to earn professional certifications, and zero percent were for required continuing education credits. This latter category may represent an opportunity for ARC programming in this area; while it is important to encourage education and certification to create a strong healthcare workforce, it is also critical to ensure that the existing workforce is well trained and does not have to travel out of the region to receive continuing education. While it varied greatly by project, an average of 128 trainees completed one or more trainings per project. Additionally, another 98 trainees were enrolled in trainings at the time of the survey.

Outcome 3: Increase provision of healthcare services / improvement of accessibility to healthcare

Of the 74 survey observations, 40 projects (54 percent) indicated that their project led to increased provision of healthcare services or an improvement of accessibility to healthcare. This was the most commonly selected outcome, and projects included improvements to health clinics, hospitals, dental clinics, and more. Many facilities saw an increase in patients or were able to

start accepting patients as a result of the project. On average, facilities were able to serve an additional 263 patients during the project relative to before the project.

Additionally, facilities have increased the number of served patients since the project started by an average of 189 patients per project, which is evidence that these facilities have continued to grow and that the ARC investment has been sustained over time. However, only 10 projects (12 percent of the sample) improved provision of healthcare services using a telehealth site or a mobile clinic, which is a focus of ARC funding as of late. In the sample, four projects (five percent) added an average of three telehealth sites as a result of ARC funding, and today a few more grantees are involved in telehealth who were not during the project. Moreover, for two projects (two percent) involved in mobile clinics, ARC funding increased mobile clinics by an average of four and a half clinics per project, and these essentially operate twice as many mobile clinics today.

Outcome 4: Promotion of public health through community service or program

Of the 74 survey observations, 25 projects (34 percent) indicated that their project promoted the public health through community service or an education program (e.g., non-formal adult education class on healthy cooking). The average project had about 2,280 participants per year involved in their public health programming during the project timeframe, and this increased slightly to 2,386 participants per year currently. However, it should be noted that some projects only had participants during the project timeframe but not now, while others did not have participants during the project, but are now involved in public health programming. Of all the projects, the HealthWorks! project in Northern Mississippi has the most participants by far with an estimated 21,474 per year (see Chapter 4 to read their case study), and this likely skews the project averages.

Additionally, 11 projects gave information about the 18 specific public health programs or services that they collectively offer. Half of these programs were trainings that required two or more sessions for participants, and a few were one session trainings or organized events. Topics included exercise and nutrition classes, chronic disease management courses, and anti-drug programs for youth. Of these 18 public health programs, 72 percent were new and the remaining 28 percent were improved as a result of ARC funding. Also, of the 18 public health programs, 88 percent continued to be offered since the close of the grant, which is a positive sign of sustainability.

Outcome 5: Development of public policy on a health-related issue

Of the 74 survey observations, 10 projects (14 percent) indicated that their projects were involved in the development of public policy on a health-related issue (e.g., healthcare, public health, etc.). Five projects shared specific information on one public policy issue that they have worked to address, and one organization—East Tennessee State University—indicated three different public policies that they have affected through their ARC project. Of the eight public policies affected by these ARC projects, half benefited because the grantee organization was part of the discussion and partially implemented the policy, though other projects introduced new ideas to policymakers or fully implemented the policy proposal. Additionally, these policy changes were mainly at the state or county level. However, there has not been enough time since the completion of these projects to determine the long-term impacts of these policy changes and local health outcomes.

Outcome 6: Creation or retention of Jobs in the Short- or Long-term

Table 3.18 highlights the average employment for those projects that created or retained jobs. Of the 74 survey observations, 28 projects (38 percent) indicated that their project created and/or retained jobs in the local economy. Of the projects that created jobs, 82 percent indicated that the projects had created new jobs and 82 percent also signified that they had retained jobs. While it is interesting to observe the average number of jobs created and retained during the project, the more significant indicator from an evaluation standpoint is the difference between employment today and employment before the project (i.e., pre-project). In all categories except Construction, today's employment levels are higher than before the project. This suggests that at least some, if not all, of the jobs created or retained during the project have been sustained and possibly added to since.

Table 3.18: Average Jobs by Projects that Created or Retained Jobs

	Healthcare Professionals			Non-Healthcare Professionals		
	Physicians	Non-Physicians	Admin and Staff	Educators	Construction	Other
# Employed Pre-Project	0.33	12.46	6.48	0.09	0.34	0.05

# Jobs Created During Project	0.65	1.08	1.16	1.41	0.57	0.14
# Jobs Retained During Project	0.18	12.98	6.50	0.68	0.45	0.14
# Employed Today	1.06	14.67	7.89	1.27	0.00	0.14

3.4.3 Survey Results for Additional Measures of Project Impact

The final section of the survey asked about additional measures of project impact in terms of innovation, reliance on ARC funding, and what organization or partnerships were created as a result of the project. Table 3.19 summarizes the responses to most of the questions asked by reporting the number of projects that answered “yes” and “no”, and the percentage of total projects that answered affirmatively. To start, the data show that 16 percent of projects formed another organization or group and that 29 percent formed partnerships or networks, both of which are useful to ensure sustainability of the project and generate long-term impacts. Additionally, a third of the projects indicated that their project’s concept and implementation was new and innovative. We believe that this is a respectable percentage that highlights one of ARC’s strengths of taking risks with innovative health projects.

Table 3.19: Responses to Additional Questions about Project Impact

Question Asked	Freq. "Yes"	Freq. "No"	Percent "Yes"
Did organizations or groups form because of the project?	11	56	16.4%
Did partnerships or networks form because of the project?	19	46	29.2%
Was the concept of the project new and innovative?	20	40	33.3%
Did the ARC project attract additional gov’t or non-profit funding?	31	32	49.2%
Did the ARC project bring about any private investment?	8	54	12.9%
Did your organization conduct its own evaluation of the project?	26	35	42.6%

As for additional funding, Table 3.19 reveals that almost half of the projects surveyed claimed that the ARC project funding helped to attract additional government or philanthropic funding and 13 percent claimed it brought private investment too. These are encouraging numbers that show that about half of ARC’s projects are able to leverage their grant into additional funding from elsewhere. Finally, according to the survey, 43 percent of the organizations conducted their own evaluation of the project, though a closer look informs that some organizations confuse monitoring and evaluation. This figure shows that ARC projects may benefit from undertaking

better monitoring and evaluations of the projects over time, which may in turn help ARC evaluate its own projects in the future.

The last question of the survey asked about the importance of ARC funding to project implementation, asking how the project would have been affected if ARC funding were not available. Table 3.20 exhibits the options that were available, the frequency of projects that selected each, and their percent of the total. According to these results, over 60 percent of respondents claimed that the project would not have been undertaken if not for ARC funding and over 95 percent of respondents claimed that, without ARC funding, the project would have been canceled, downsized, or severely delayed. That over 95 percent of respondents felt that ARC funding had a major impact on timely project completion suggests that ARC is highly valued in the region for funding projects that few or no others will.

Table 3.20: Responses to Importance of ARC Funding to Project Implementation

What would have happened without ARC funding:	Freq.	Percent
Completed with other funds in same time period	1	1.5%
Delayed for up to a year	2	3.0%
Delayed for a year or more	9	13.9%
Completed on a smaller scale	13	20.0%
Not have been undertaken	40	61.5%

This section showcases the outputs and outcomes of ARC health projects as measured by the online survey using descriptive statistics and analysis. However, given the diversity of projects, it is difficult to determine from these tables which projects have the greatest impact. Therefore, to better assess which characteristics define an impactful project, the next section discusses a multivariate regression analysis that was used to analyze the data from the online survey.

3.5 Regression Analysis of Data

A common tool used in the social sciences for quantitative analysis is multiple regression analysis, which attempts to isolate the effect of various factors on a single variable-of-interest. A general multiple linear regression model can be written as:

$$(1) \quad y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + u,$$

where y is the dependent variable (i.e., the variable-of-interest), x are the independent variables, β represent coefficients that explain how y changes with respect to changes in x (except for β_0 which is the y -intercept), and u is a generic error term.³⁷

The advantage of a multiple regression over comparative statistics is that a regression can isolate the correlation between the dependent variable and each independent variable. It does this because it holds constant all other independent variables present in the model when estimating the coefficient for each independent variable. In other words, β_1 measures the change in y with respect to x_1 holding other factors fixed. Assuming that the model contains all possible determinants of the dependent variable, the regression's estimates can reveal which independent x -variables best explain change in the dependent y -variable. So, to best answer the question "what makes an ARC health project have the highest impact?", data from the online survey were fitted to an ordinary least squares regression model.

3.5.1 Dependent Variable: Impact Index

For the dependent variable, we started by looking at the four survey questions regarding general project impact. The first question—Question 4.1—asked about project impact on three different categories of long-term outcomes. For example, the first category under long-term outcomes asked if the project did "Reduce cost of healthcare by improving efficiency or productivity". Question 4.4 asked about project impact on five categories of workforce outcomes. Question 4.6 asked about project impact on five categories of health outcomes. Finally, Question 4.8 asked about project impact on five categories of economic outcomes. A full copy of the online survey is located in the Appendix.

For each category, respondents could indicate that their project had "None", "Little", "Some", or "Strong"/"A Lot" impact, or indicate that they did not know. Using these responses, we calculated an index for each outcome type that would give each project a score between 0 and 100 based on their self-assessed impact. To do this, responses of "None" impact were given a value of 0, "Little" given a value of 1, "Some" given a value of 2, and "Strong"/"A Lot" given a value of 3. If a respondent selected "Do Not Know", meaning that they did not know the impact, this was recorded as a missing value. These values were then summed for each outcome, divided by the maximum possible score, and multiplied by 100. Therefore, a score of 0 means that a respondent indicated that the project had no impact on a particular outcome (or that project personnel did

³⁷ Wooldridge, Jeffrey M. 2006. *Introductory Econometrics: A Modern Approach* (3rd ed.). Mason, OH: Thomson Higher Education.

not know), and a score of 100 means that a respondent indicated that the project had a strong impact for every category within an outcome.

Since the four questions asked about long-term, workforce, health, and economic outcomes, we created a Long-term Index, a Workforce Index, a Health Index, and an Economic Index. Additionally, we combined the values for all of the categories to create an index of overall impact. In the Overall Index, the values from Question 4.1 (long-term outcomes) were doubled in order to compensate for the fact that there were fewer categories in this question and to give more weight to these responses. Like the other four indices, the Overall Index ranges from 0, meaning no impact in any outcome, to 100, meaning strong impact in all outcomes.

Table 3.21: Summary Statistics for Dependent Variables

Dependent Variable	Number	Mean	Standard Deviation	Minimum	Maximum
Overall Index	29	42.31	19.27	7.94	77.78
Long-term Index	47	64.07	26.23	0.00	100.00
Workforce Index	41	35.93	25.47	0.00	86.67
Health Index	41	48.45	24.99	0.00	93.33
Economic Index	41	28.13	25.23	0.00	80.00

Table 3.21 shows summary statistics on the five Impact Indices for the observations included in the multiple regression analysis. Number indicates the quantity of observations available for each regression. Note an additional two observations were excluded as they were considered outliers in terms of total funding. All but the Overall Index have a minimum a zero, meaning that while some projects claimed no impact for certain outcomes, all projects included in the sample indicated some level of impact among the four outcomes. Only the Long-term Index has a maximum of 100, a score given to three projects that all indicated having a strong impact on the three categories representing long-term outcomes. In general, the summary statistics show a fair distribution across all of the indices. There is not a huge aggregation of scores at 100, which could indicate respondent bias, and while each category has some projects with a 0 score, we know that these scores are intentional and not the result of an incomplete survey. The index with the lowest average score was the one looking at impacts in the general economy, which makes sense since many of these projects were strictly focused on health; it is also possible that the respondent may not know about larger, more general impacts.

3.5.2 Independent Variables

The independent variables represent those factors we hypothesize may have an effect on the dependent variable. Additionally, if we leave out important independent variables then we risk skewing the estimates, but if we include too many independent variables then we risk generating estimates that have no statistical significance. In designing this model, attention was given to theorizing and testing potential independent variables to ensure that the regression results would be accurate, informative and straightforward.

We selected four categories of independent variables: Total Funds, Project Outputs, Project Functions, and Other Factors. The first category, Total Funds is a continuous variable of total project funding in millions of US dollars. We hypothesize that the greater the total cost of the project, the greater impact, on average.

Other than Total Funds, all other variables are dummy variables (a.k.a., binary variables) that are given a value of 1 if it applied to the project and 0 if it did not apply to the project. Project Outputs referred to whether the grant was used to fund construction or renovation, purchase equipment, or make other large purchases. Projects were not limited to only choosing one of these categories, and some projects chose none having spent all funding on operations. Next, Project Functions refer to whether the project’s main function brought about improvements to a formal education program, workforce training program, provision of healthcare services, public health promotion, public policy development, or other improvements. One variable also indicates if the project created or retained any number of jobs. As with the previous category, projects were not limited to only selecting one of these categories. Finally, the Other Factors category contains two additional indicators that describe an effective project: whether or not the project created a new group or created a new partnership. Projects were not limited to selecting only one nor required to choose any.

Table 3.22 shows summary statistics for the independent variables for the observations included in the multiple regression analysis on the Overall Index, which has 29 observations that are included in every regression. For the dummy variables (all variables except Total Funds), note that the mean represents the percentage of total respondents who fall into that category. For example, a mean of 0.10 under Construction/Renovation indicates that 10 percent of the sample’s respondent used project funding for some sort of construction or renovation project.

Table 3.22: Summary Statistics for Independent Variables in Regression on Overall Index

Independent Variables	Mean	Standard Deviation	Minimum	Maximum
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TOTAL FUNDS: (in millions)	0.35	0.44	0.03	1.85
PROJECT OUTPUTS:				
Construction/Renovation	0.10	0.31	0	1
Equipment	0.48	0.51	0	1
PROJECT FUNCTIONS:				
Formal Education Program	0.14	0.35	0	1
Training of Workforce	0.14	0.35	0	1
Provision of Health Services	0.55	0.51	0	1
Promotion of Public Health	0.28	0.45	0	1
Public Policy Development	0.10	0.31	0	1
Create or Retain Jobs	0.34	0.48	0	1
OTHER FACTORS:				
Did Groups Form	0.14	0.35	0	1
Did Partnerships Form	0.24	0.44	0	1

Together, we believe that this set of independent variables determines a project's impact: how much funding it expends, the major project outputs, the project's primary functions, and a few other factors. Understanding how these factors are related to a project impact, as measured by the Impact Indices, will help us determine which types of ARC health projects have the biggest impact and the most effective use of ARC resources.

3.5.3 Results

We ran an OLS regression of the independent variables on each of the five Impact Indices, generating five sets of estimated coefficients, all of which are displayed in Table 3.23. For the independent variables, the top bolded number is the estimated coefficient and the standard errors are below them in parentheses. Asterisks are given alongside coefficients to indicate statistical significance: * represents that $p < 0.10$, ** represents that $p < 0.05$, *** represents that $p < 0.01$. Thus, coefficients without asterisks should be interpreted with extreme caution as we are not confident in these cases that the true correlation between the dependent and independent variable is any greater than zero. However, despite that we are only regressing a sample of all ARC health projects, we are more confident interpreting those coefficients with asterisks as it is more likely that the predicted relationship between the independent and dependent variable are different from zero (either positive or negative).

Table 3.23: Results from Regressions on the Five Impact Indices

	INDEX (scale 0 to 100)				
	Overall	Long-term	Workforce	Health	Economic
TOTAL FUNDS: (in millions)	14.40	-12.59	21.29	-8.04	0.98
	(10.09)	(10.84)	(13.06)	(11.26)	(9.75)
PROJECT OUTPUTS:					
Construction/Renovation	-9.85	18.65	-26.18*	-11.44	-13.90
	(11.02)	(13.47)	(15.27)	(11.80)	(13.18)
Equipment	1.38	14.29	0.23	-10.62	-0.20
	(8.73)	(8.98)	(9.01)	(8.75)	(8.66)
PROJECT IMPACTS:					
Formal Education Program	-5.14	-2.33	26.24*	-2.93	12.30
	(10.14)	(11.42)	(14.73)	(12.52)	(12.41)
Training of Workforce	14.10	14.59	4.51	10.72	-16.32
	(10.51)	(9.53)	(12.74)	(11.70)	(13.47)
Provision of Health Services	16.63**	17.79*	17.54*	15.62*	23.91***
	(7.22)	(8.83)	(9.17)	(9.07)	(8.63)
Promotion of Public Health	20.94**	16.42*	1.14	23.61**	-5.47
	(7.40)	(8.72)	(8.83)	(8.69)	(7.98)
Public Policy Development	6.45	4.99	-0.19	6.97	-5.47
	(9.88)	(11.16)	(11.85)	(11.87)	(12.03)
Create or Retain Jobs	-2.35	-4.29	3.20	5.43	17.86**
	(6.49)	(7.89)	(8.32)	(7.90)	(7.98)
OTHER FACTORS:					
Did Groups Form	8.84	17.10*	3.86	2.24	24.88**
	(10.59)	(10.10)	(10.03)	(9.41)	(9.18)
Did Partnerships Form	0.07	-12.74	-7.71	5.74	-3.91
	(7.87)	(9.21)	(8.84)	(8.52)	(8.61)
Constant	20.31***	45.28***	18.89**	35.71***	9.37
	(6.64)	(6.96)	(7.64)	(6.40)	(7.55)
N:	29	47	41	41	41
Adjusted R-squared:	0.43	0.26	0.23	0.31	0.30
F-statistic:	2.94	2.46	2.09	2.62	2.54
Standard errors are below their coefficients in parentheses			* p<0.10, ** p<0.05, *** p<0.01		

The sample for the 5 regressions varies between 29 and 47 observations. This is less than the 84 projects that responded to the online survey as several projects started but did not complete the survey, failed to answer some questions, or responded with a “Do Not Know” regarding project impact. Additionally, two observations were excluded as outliers for having total funds over \$2 million. The nature of the regression analysis is such that it requires that there are no missing data for any of the variables used in the model. Likely because of the small sample, all sets of results have an adjusted R-squared measure below 0.50 and an F-statistic less than 3.00, which suggest that the model does not have much explanatory power.

There are relatively few results that are statistically significant. Under the Project Impacts category, we observe that projects that improved a formal educational program were positively correlated with the Workforce Index, projects that promoted public health were positively correlated with the Overall, Long-term, and Health Index, and projects that created/retained jobs were positively correlated with the Economic Index. Additionally, projects that were involved in the provision of health services stand out as they are statistically significantly associated with a higher score in all five Impact Indices. Finally, the model estimated that projects that formed groups had a significant positive correlation with the Economic Index. In the next section, we explain and discuss the implications of these results.

3.5.4 Discussion of Results

The purpose of the regression analysis was to tease out which characteristics of an ARC health project are linked to a higher impact. While there are some statistically significant results, the generally low F-statistic and adjusted R-squared for each regression indicate that the model has low predictive power overall. For instance, R-squared measures the percent of variation in the dependent variable that is explained by variation in the independent variables once the model is fit, meaning that independent variables in the best fit model—the Overall Index—still explain less than half of the variation. These suggest that there are other unexplained and unmeasured factors affecting the Impact Indices that are not accounted for in the regressions. Because the Impact Indices were created using categorical and self-reported impact measures, it is possible that respondent biases—including the “halo effect”, in which respondents unintentionally select favorable responses—skewed the results, making the model less reliable.

Given these limitations, perhaps the most important finding is that for those projects where outcomes were categorized as “Increased provision of healthcare services / improvement of accessibility to healthcare,” respondents gave themselves a significantly greater impact score across all of the Impact Indices. Of the 29 survey observations used in the regression on the

Overall Index, 16 respondents (55 percent) selected this outcome, which tells us that the model's estimates are not caused by a small minority of project respondents that gave their projects much higher impact scores. These 16 projects were diverse and comprised a mix of construction and equipment projects.

This finding suggests that ARC may want to consider limiting its health programming to projects which directly tackle this outcome, knowing that doing so not only makes an impact on health, but on the workforce and the economy as well. Another benefit of limiting ARC health programming to those projects that can address this outcome is that it allows for the standardization of monitoring tools. If all projects improve accessibility or services, then all should be able to measure gains in patients served as a result of the project. It also seems reasonable to expect that all ARC health projects consider provision of healthcare services to be an outcome of their project.

Of course, there are other types of projects that do not quite fit that description, and these are also seen in the model. For example, Table 3.23 shows that promotion of public health come close with significantly positive correlation on the Overall, Long-term, and Health Indices. Additionally, Table 3.23 shows that improvement of formal education impacts the workforce, creation and retention of jobs impacts the economy, but none of these have the same overarching impact as health provision projects. Based on these findings, it may be effective to support health projects with these objectives if ARC's desired impact relates to improvement of the workforce or the economy, respectively. The results also suggest that projects with expected outcomes in workforce training did not have impacts that were statistically significant. However, impacts made from workforce training are also very difficult to measure, especially in terms of direct health impacts, and thus may not have been captured in the analytical model.

Overall, other characteristics present in the model do not seem to be as informative (though it was important that they were controlled for). For example, coefficients on construction or equipment procurement were mostly not correlated to any index, other than an odd negative correlation between construction and impact on the workforce. Additionally, whether or not a project formed partnerships did not make any statistical difference, though projects that formed groups had a higher impact score on the Long-term and Economic Indices suggesting that group formation by ARC health projects may help improve project impact.

However, not all data are quantitative and can be analyzed using a regression analysis. The next chapter summarizes the results of 13 case studies of ARC health projects that will discuss some of themes and lessons that emerge from this analysis as well as others not found in the data.

Chapter 4: Case Studies for ARC's Health Projects

Qualitative and observational data make valuable contributions to evaluations of any kind, and especially so for a group of projects as diverse as those in ARC's Health programming. Therefore, the evaluation team conducted 13 case studies of 16 projects that highlight some of the innovative solutions and difficult challenges to doing effective health work in the Appalachia Region.

4.1 Methodology

The 13 case studies used for this study were carefully chosen by the evaluation team. Several criteria were considered in selecting the case studies, including:

1. **Completion of the Online Survey** – 11 of the 13 case studies had completed the online survey, which gave us more information to draw on for the analysis. Additionally, data from the completed surveys was utilized to ensure a diversity of outputs, outcomes, and other factors between the projects. For example, a survey question about innovation allowed for a representative sample of projects that saw themselves as innovative.
2. **Geographic Distribution** – The original intent was to select one project from every state, but the concentration of health projects across the Appalachian Region is uneven. In the final assembly, all states are represented except for New York, South Carolina, and Tennessee, and consequently, Kentucky, Pennsylvania, and West Virginia are represented twice.
3. **Diversity of Funding** – Among the case studies, the smallest grant was \$24,723, and the largest grant was \$750,000. The \$750,000 grant was also the largest grant given to any health project between FY 2004 and FY 2010. Among the case studies, average ARC funding was \$155,243, which is close to the average ARC contribution across all projects of \$153,000. Additionally, the case studies' average total cost was \$695,072, compared to an average total cost of \$608,000 across all projects. Finally, ARC's share of total funding among the case studies varies from 7 percent to 80 percent, with an average of 39 percent.
4. **Project Type** - Project types also vary, though are skewed toward health education and telemedicine, since ARC has shown an interest in these types of projects. Case studies for these types of projects are particularly useful, due to the difficulty that arises in measuring

the variety of outputs and outcomes. Other case study project types include dental care, health manpower, health planning, mental health/rehab and primary care.

5. **FYs** – The FYs when projects began were considered, but are skewed to more recent projects; 56 percent of the case study projects come from FY 2009 or 2010. However, this figure is reflective of the fact that 53 percent of survey respondents came from FY 2009 and 2010.
6. **ARC Review** – Before projects were contacted, a list of potential case studies was reviewed by ARC in order to get feedback on whether or not they were interested in a particular project type or a specific project. The list also contained justifications for why each project was selected. Ultimately, only one project was replaced at their recommendation. Once the list of case studies was finalized, ARC notified the state program managers that case studies were being conducted so projects could verify the legitimacy of the evaluation with their state office.

Once the 13 case study candidates were selected, all were contacted and asked if they were willing to participate. Of the original 13, 11 agreed to participate, one declined, and one was unable to be reached. Thus, two suitable substitutes were found that exhibited similar characteristics, and the figures above reflect the inclusion of these two studies.

After agreeing to participate, a date and time were negotiated when the project contact and a member of the evaluation team were available for an interview. Each interview lasted between one hour and fifteen minutes and two and a half hours and built upon a list of standard case study interview questions that were developed by the evaluation team (see Appendix 5). After each interview, follow-up emails were sent out to gain additional information, when necessary. Of the 13 scheduled case study interviews, seven were conducted over the phone and six were conducted in-person and involved a visit to project facility. Reasons for an in-person visit included wanting to observe the output of an ARC investment or discuss a complex and/or innovative project with multiple project stakeholders.

There are three data sources that are used for each case study. First, the interviews and other personal correspondence with the project contact and other personnel were the primary source of data in the case study write-ups below, including many of the past and current estimates of project outputs, outcomes and impacts. Second, the ARC Approval Memos for each project were used to describe the expected impacts. Third, the data that describe the health outcomes in the

Community Profile section mostly come from County Health Rankings.³⁸ These sourcing assumptions will significantly reduce the number of citations throughout the chapter. Therefore, all information is assumed to have originated from these three sources, where appropriate, unless otherwise cited.

The rest of the chapter is organized as follows. Table 4.1 summarizes key characteristics of the 13 case studies, which includes 16 different projects. Write-ups for the individual case studies follow Table 4.1, and each case study is broken up into five parts. First, a brief introduction explains the expected outcome of the project. Second, a Community Profile describes the project's service area. Third, a short Project Description summarizes the ARC project. Fourth, a section on Project Planning and Implementation describes the project's development process. Fifth, a section on Economic and Community Impacts summarizes outputs and outcomes and discuss the economic and health impacts of the project. Sixth, a section of Lessons Learned highlights a few takeaways from the project as interpreted by the evaluation team. Finally, each case study has a short Conclusion that states whether the project met, exceeded or failed to meet expectations. The chapter ends with collective examination of the 13 case studies with Common Lessons and Common Themes.

³⁸ Robert Wood Johnson Foundation. University of Wisconsin Population Health Institute. 2014. *County Health Rankings and Roadmaps. Data Sources and Measures*. <http://www.countyhealthrankings.org/ranking-methods/data-sources-and-measures>.

Table 4.1: Summary of 13 Case Studies

Grantee	Title	Description	Project Type	ARC Funding	Total Cost	Outcomes
Wallace State Community College, Alabama	Wallace State Health Tech: Preparing the Healthcare Workforce of the Future	Equipping 10 health programs at Wallace State Community College with medical equipment for training students.	Health Man-power	\$200,000	\$603,275	314 students trained; 91% of graduates employed in ARC Region
Marshall University Research Corporation, West Virginia	The Appalachian Diabetes Control & Translation	Designed to support, train, and sustain county-level diabetes coalitions throughout the Appalachian Region.	Health Education	\$75,000	\$225,000	24,000 participants in physical activity; 217 local leaders trained
The WALs Foundation, West Virginia	WALS Foundation Mock Trial Program	Expanded a mock trial program to eight counties in West Virginia to teach students about prescription drug abuse.	Health Education	\$24,723	\$33,573	1,600 5 th grade participants; 96.8% student satisfaction; part of K-12 curriculum
MedLink Georgia Georgia, Inc., Georgia	MedLink Georgia Rural Telemedicine	Purchased and installed video-conferencing equipment for 10 health centers to improve logistical efficiency.	Tele-medicine	\$134,251	\$268,502	Video equipment in 10 CHCs; communication efficiency; preparation for EMRs
Hope in the Mountains, Inc., Kentucky	Hope in the Mountains Residential Substance Abuse Services for Women	Developed a residential substance abuse treatment program for women that included job-skills training.	Mental Health/ Rehab	\$74,616	\$288,022	252 patients since 2008; raised \$21 for every \$1 of ARC funding
Morehead State University, Kentucky	Health Sciences Equipment and Furnishings	Equipped the new Center for Health, Education and Research (CHER) building for training students.	Health Man-power	\$750,000	\$3,550,000	352 students have passed certification or licensing; 50% work in ARC Region

Grantee	Title	Description	Project Type	ARC Funding	Total Costs	Outcomes
Western Maryland Health System Corp., Maryland	WMHS Integrated Electronic Medical Records System	Created a Health Information Exchange that interfaces between the Western Maryland Medical Center and local providers.	Health Planning	\$45,000	\$611,725	To date, expanded to 70 local health providers in EMR network; over 150,000 patients in EMR system
Health Care Foundation of North Mississippi, Mississippi	Health Care Foundation of North MS HealthWorks	Constructed and supported programming at HealthWorks!, a 15,000 square foot interactive health education center. In addition to hands-on exhibits, HealthWorks! received other ARC grants to support substance abuse programming and to provide health education services in 12 distressed counties in Mississippi.	Health Education	\$300,000	\$1,200,000	Renovated 15,000 ft ² grocery store into health education center; over 60,000 visits in first year; 8,000 students visited HealthWorks! Since 2007 and their curriculum is in schools; 83% students had improved post-test score
	Specialized Substance Abuse Programming for Adolescent Girls at Healthworks		Health Education	\$65,638	\$131,276	
	Foundation for a Fit Future: Igniting, Engaging & Empowering the Region		Health Education	\$151,968	\$189,960	
Center for Rural Health Innovation, North Carolina	Yancey/Mitchell School-Based Telehealth Network	Equipping three schools with high-definition video-conferencing equipment to fund a pilot program for a school-based telehealth network.	Tele-medicine	\$89,459	\$127,798	To date, expanded to 14 schools; 2,000 students enrolled in program
Meigs County Commissioners, Ohio	Meigs County Community Clinic	Supports a coalition that works to transform a closed hospital into a functioning local health clinic.	Primary Care	\$180,725	\$1,510,259	Serves 20,000 patients per year; will employ over 50 after summer 2014 with new ER facility

Grantee	Title	Description	Project Type	ARC Funding	Total Costs	Outcomes
Lackawanna College, Pennsylvania	Lackawanna College Physical Therapist Assistant Certification	Started and got accreditation for a physical therapy assistant program	Health Education	\$100,000	\$345,908	To date, 49 students entered; of 10 who are licensed, all work in PA
SEDA Council of Governments, Pennsylvania	Creating Safe, Walkable & Healthy Communities	Planning grant that facilitated community forums to discuss how to create healthier walkable communities by creating walking and biking trails.	Health Planning	\$37,500	\$75,000	Regional forum with 50 residents; action plans for 7 counties; developed 3 walking/bike plans in area
	Creating Safe, Walkable & Healthy Communities, Phase II		Health Planning	\$55,000	\$110,000	
Town of Saltville, Virginia	Southwest Virginia Regional Dental Center	Renovated an old hospital facility to be a dental center that also serves as a teaching facility.	Dental Care	\$200,000	\$1,850,857	To date, treated 3,395 patients; trains 172 dental students yearly

4.2 Individual Case Studies

4.2.1 Wallace State Community College, Alabama – Health Tech: Preparing the Healthcare Workforce of the Future

Wallace State Community College is one of the largest colleges in the Alabama Community College System and serves more than 7,000 students per semester. Wallace State Community College has 22 health programs, which is the largest offering of health programs in Alabama. This project enabled Wallace State Community College to purchase several expensive pieces of medical training equipment, which were expected to improve several health professional training programs, including its nursing and dental programs. Specifically, Wallace State Community College was expected to train 250 students with the new equipment across 10 different health programs. Evidence that the new equipment led to better training was to be measured by a Student Satisfaction Survey where 90 percent of students indicated satisfaction, and additionally, 90 percent of these students obtained employment upon graduation. The ARC provided \$200,000 in project funding, approximately a third of the project's total costs. The project was approved in 2008 and closed in 2010.

Community Profile:

Wallace State Community College is located in the city of Hanceville, in Cullman County, in the north central portion of Alabama. The total county population is 80,536 residents, 73 percent of whom live in rural areas, which is higher than the ARC average of 42 percent. The county unemployment rate is around eight percent compared to the state unemployment rate of nine percent and an unemployment rate in the Appalachian Region of nine percent. The county's median household income of \$39,395 is below both Alabama's and the Appalachian Region's median household incomes of \$41,427 and \$42,915, respectively.

Within Cullman County, a few health indicators stand out. Twenty-two percent of adults within Cullman County reported being in fair or poor health and 13 percent of county residents are living with diabetes. By comparison, 20 percent of adults in Alabama and 16 percent of adults in the United States reported being in fair or poor health, and 13 percent of adults in Alabama and 9 percent of adults in the United States live with diabetes. Additionally, 32 percent of adults within Cullman County are considered obese while 33 percent of adults are considered obese across Alabama and 31 percent of adults are considered obese in the Appalachian Region. Access to care is another important health indicator; 24 percent of adults and seven percent of children in Cullman County are uninsured. This number is higher than the state of Alabama data, which reports that only 21 percent of adults are uninsured and six percent of children are uninsured. However, measures of uninsured may change soon as a result of the Affordable Care Act. Finally, 15 percent of adults living in Cullman County reported not being able to see a doctor because of costs, compared with 14 percent of adults across the Appalachian Region reported not being able to see a doctor because of costs.

Wallace State Community College's extends well beyond Cullman County, to all of northern Alabama—the Appalachian portion of Alabama. The Appalachian portion of Alabama has a total population of about 3.1 million residents, 42 percent of whom live in rural areas. Nineteen percent of adults in the Appalachian portion of Alabama report poor or fair health and 12 percent are living with diabetes. Similarly, across the entire Appalachian Region, 18 percent of adults reported being in poor or fair health and 11 percent of adults are living with diabetes.

The Appalachian Region of Alabama has very few healthcare providers, and the extra equipment and training is expected to increase the number of healthcare providers. By increasing the number of healthcare providers, more people will have access to care and will travel less time to get the care they need. Within Cullman County, there were fewer than 10 general physicians and

fewer than 10 dentists. By 2023, Cullman County is projected to have at least 15 general physicians and 14 dentists.³⁹

Project Description

The project involved providing 10 health programs at Wallace State Community College with state-of-the-art medical equipment for training and educating students, not treating patients. Project funding from ARC amounted to \$200,000 of the \$603,275 total, with the remaining funds provided by Wallace State with some help from the Carl D. Perkins Career and Technical Education Act of 2006, which paid for equipment in different health programs as well as project administrative costs. The project was approved on February 4, 2008 and was closed on April 8, 2010.

Project Planning and Implementation

In 2003, Wallace State Community College obtained new presidential leadership after the previous president had served for 32 years. Among other things, the new president made technology one of the priorities of her administration, stating in Wallace State Community College's 2006 Annual Report that "the college will provide cutting-edge technology using common platforms that transform the learning environment."⁴⁰ According to Wallace State Community College's Director of Development, a technology upgrade was needed mostly in the medical program. The technology was not current, the training equipment did not match what employers were using, and feedback suggested that graduates were not well prepared for the workforce. One of the college's advisory boards—made up of independent local employers of Wallace State Community College's medical-field graduates—was direct in saying that the medical training equipment had to be updated.

Thus, Wallace State Community College sought out a grant through ARC to help update their medical training equipment. The ARC was their first attempt for this grant as they had worked with ARC in the past and have a good relationship with the previous and current state director. Once funding was secured through the Development Office, funds were then distributed to the departments and faculty of the 10 health programs to purchase the medical training equipment needed. For all large purchases over \$15,000 (exceptions for joint purchases), departments were required by Wallace State Community College to go through a bidding process before purchasing

³⁹ Economic Model Specialists, Inc. 2013. "Cullman County." Accessed from EMSI, 2013.

⁴⁰ Wallace State Community College. 2006. "Wallace State Hanceville - 2006 Annual Report." http://www.wallacestate.edu/fileadmin/user_upload/WallaceState/documents/general/annual_report_web.pdf.

in order to get the lowest price. Additionally, all purchases required the review and approval of the dean, the administration, and the Development Office.

An intensive budget hearing process provides a system of checks and balances that helps to ensure the cost efficiency of the project. Furthermore, none of the ARC funding was used to support project administrative costs (these were part of the matching funds); all of it went toward purchasing equipment and supplies. Throughout the project, the Development Office reported to the Wallace State Community College Executive Cabinet (which includes the deans and president) at least once a month and periodically with their health advisory board.

Economic and Community Impacts

Today, all of the training equipment is still operational and in use, and none of it has required major repairs. Medical training equipment purchased included a radiology diagnostic machine, nursing simulators, a SimMan simulation mannequin, a birthing simulator, radiology software, microscopes, dental sensors, a dental digital x-ray machine, and classroom technology. These directly supported seven health programs, including dental hygiene, dental assisting, registered nursing, licensed practical nursing, respiratory therapy, and diagnostic imaging, and also were used by laboratory technicians. Matching funds supported equipment for three other health programs, including sleep technology, physical therapy, and pharmacy technician. Since faculty within the health programs selected the training equipment, it has all been utilized very strategically within their program curriculum.

Between 2008 and 2010, 314 students and 23 faculty members received training on the new equipment. This exceeded the expectation of training 250 students. One expected outcome was that Wallace State Community College graduates would be better prepared for the healthcare workforce. To measure the achievement of this outcome, Wallace State Community College administered a Student Satisfaction Survey in the Spring of 2007 and 2009, before and after students trained on the updated equipment had entered the workforce.⁴¹ The results found that 93 percent of students in 2009 agreed that “use of the instructional technology supports my learning” and 90 percent of students agreed that “the equipment in classrooms, shops, and labs is adequate to meet my training needs.” This is evidence of achievement of the second outcome, which was satisfaction by at least 90 percent of students. However, these results do not represent a significant change from 2007, when 88 percent of students agreed that “use of instructional technology supports my learning” and 96 percent of students agreed that “the equipment in classrooms, shops, and labs is adequate to meet my training needs.”

⁴¹ Harbin, Suzanne. 2009. “Health-Tech: Preparing the Healthcare Workforce of the Future.” Wallace State Community College, Hanceville, Alabama.

Other performance measures were also used by Wallace State Community College to measure that graduates were better prepared for the healthcare workforce. Between 2007 and 2009 in the same Student Satisfaction Survey, students indicating “strongly agree” for the statement “use of instructional technology support my learning” increased from 41 percent to 50 percent. Another performance measure used was local employer satisfaction, which was compared using an Employer Satisfaction Survey administered in the Spring of 2007 and 2009. Over this time period, employer satisfaction rates increased slightly from 94.5 percent to 97.25 percent between 2007 and 2008. Particularly, the diagnostic imaging program saw a 10 percentage point increase between 2007 and 2008, from 90 percent to 100 percent.⁴² However, while both performance measures show improvements, the question remains as to whether these increases were significant enough to attribute Wallace State Community College’s success to the purchase of the state-of-the-art training equipment.

In terms of economic impacts, the support of local healthcare providers as a result of the project has helped generate new partnerships, clinical sites, and clinical instructors for the academic programs at Wallace State Community College. With expanding enrollment, many health programs have had to expand to new sites, but it has been easier because the faculty is already trained on up-to-date technology. Furthermore, Wallace State Community College has partnered with South Alabama University to offer physical therapy training and has provided technical assistance to Faulkner State University on the appropriate use of the training equipment. Use of the SimMan and birthing simulators represent unique training tools that were new to the area and add economic value.

In 2008, 91 percent of all graduates from Wallace State Community College’s 10 health programs were employed in the ARC Region. In terms of health impacts, the literature suggests that medical training on simulators improves health education. A literature review of simulation-based training found that simulation has been shown to lead to improvements in medical knowledge, comfort in procedures, improvements in testing, teamwork, and communication.⁴³ For example, one study compared test scores of fourth-year medical students who were randomly taught acute care assessment and management skills either using interactive problem-based learning or full-scale simulation, finding that simulation-based learning was significantly superior for acquisition of critical assessment and management skills.⁴⁴ While few studies have actually linked

⁴² Ibid.

⁴³ Okuda, Yasuharu et al. 2009. “The Utility of Simulation in Medical Education: What is the Evidence?” *Mount Sinai Journal of Medicine* 76:330-343.

⁴⁴ Steadman, Randolph H. et al. 2006. “Simulation-based training is superior to problem-based learning for the acquisition of critical assessment and management skills.” *Critical Care Medicine* 34(1).

simulation-based training to direct improvements in clinical outcomes, the underlying assumption is that better education on healthcare knowledge and procedures should result in improved clinical outcomes. If this is true, then this project will bring about improved health outcomes to the Appalachian Region over time.

The ARC project was described as “the catalyst for ramping up the technology across the healthcare and technology program.” Funding provided by ARC initiated the technology upgrade, and Wallace State Community College used that momentum to continue to upgrade its technology using Perkins funds and grants from the Department of Labor. Since the project ended, they have purchased a Medi-Man, digital x-ray machine, and a NOELLE maternal and neonatal birthing simulator, among other things. If previous equipment purchases brought about increased student and employee satisfaction rates, then we may expect that these additional purchases will continue to improve the college’s medical training as well.

Lessons Learned

Wallace State Community College used ARC funds to purchase medical training equipment, which contributed to improved workforce training and expected improvement in local health outcomes. There are a few lessons learned from this case study:

- ***ARC’s helpfulness and accessibility should be maintained*** – The federal and state ARC offices are seen as going the extra mile when it comes to their grants. The Director of Development for Wallace State Community College has worked with many grant programs and said “that ARC is unbelievably helpful” and that “they want to help”—qualities that are sometimes not associated with federal grants. Both offices were easy to contact whenever questions arose, and this accessibility improved project implementation and reporting.
- ***With grants to large institutions, buy-in and participation from institutional leadership leads to a smoother project*** – Red tape on federal grants are often assumed to come from the federal agencies themselves, but can also come from the grantee organization. When working with universities, hospitals, or healthcare networks, ARC can improve the chance of a timely and successful project by ensuring that the institutional leadership is involved in the project. Wallace State Community College’s Executive Cabinet, which includes the deans and president, approved the project and were updated on the status of the project at least once a month. Because it was a priority for institutional leadership, there were relatively few unexpected obstacles originating from within Wallace State itself.

- ***Bidding on large purchases (e.g., medical equipment) can improve cost efficiency*** – Wallace State Community College requires a bidding process for all large purchases over \$15,000. Ultimately, this meant that Wallace State Community College was able to purchase more with ARC funding because the bidding process ensured that the project received a competitive price on the equipment. Conversely, other projects expressed that they could have received better prices had they better understood the market. Requiring a bidding process for all large purchases (and providing some support to do so) may help ARC maximize the impact of its funding.

Conclusion

Wallace State Community College received \$200,000 of ARC funds to purchase medical training equipment ranging from a SimMan nursing simulator to a dental digital x-ray machine. Combined with funding from other sources, the project strengthened 10 of 22 health programs, resulting in higher student and employer satisfaction rates from years prior and improving the healthcare workforce in Alabama and elsewhere. As a result, the project met its expectations, though in hindsight, the proposed outcomes of the project were not much different than what Wallace State Community College was already achieving before the project. In other words, while the desired outcomes were achieved, there was still not much improvement in student and employee satisfaction rates relative to the baseline scenario. However, the medical literature suggests that improved healthcare workforce skills are often a result of simulation-based training, which was made possible by this grant. Despite the recipient being a large institution, the grant was executed smoothly thanks to support from institutional leadership and an established process for the purchase of medical equipment. ARC funding enabled Wallace State to establish a mechanism for updating their medical technology, which will serve future students as Wallace State continues to adapt to changes in the medical field.

4.2.2 Marshall University Research Corporation, West Virginia –

The Appalachian Diabetes Control & Translation Project

A recent study by the American Diabetes Association estimated the cost of diagnosed diabetes in the United States at \$245 billion (\$176 billion in direct medical costs and \$69 billion in reduced worker productivity).⁴⁵ With generally higher prevalence rates, diabetes extracts a steep

⁴⁵ American Diabetes Association. 2013. Economic costs of diabetes in the U.S. in 2012. *Diabetes Care* 36. doi:10.2337/dc12-2625. <http://care.diabetesjournals.org/content/36/4/1033.full.pdf+html>.

economic cost on communities throughout Appalachia. To reduce the prevalence of diabetes and its attendant economic consequences, the Appalachian Diabetes Control and Translation Project, which is administered through Marshall University in Huntington, West Virginia, is designed to support, train, and sustain county-level diabetes coalitions throughout the Appalachian Region. These community coalitions engage in various activities to minimize chronic disease, ranging from the sponsorship of “Walk with Ease” programs (i.e., community based programs that teach people how to safely make physical activity part of their everyday life) to “Shopping Matters” tours (i.e., guided grocery store tours to encourage healthy food choices), many of which are evidenced-based programs recognized by the Centers for Disease Control (CDC) as efficacious in combating diabetes and other chronic diseases. The expectations for this project were that community-based coalitions would successfully engage community members, which would facilitate healthier behavior and better health outcomes.

Community Profile

While this project is administered through Marshall University, it operates throughout the entire Appalachian Region. To date, it has funded projects in 75 ARC-designated distressed counties in 10 different states.⁴⁶ The total Appalachian Region has an estimated population of over 25 million, about 42 percent of whom live in rural areas. The Region’s unemployment rate is around nine percent and has a median household income of \$42,915. In comparison, West Virginia—the state where the project is located—has about eight percent unemployment and a median household income of \$38,587.

Within the Appalachian Region, a few health indicators stand out: 18 percent of adults reported being in fair or poor health and 31 percent of adults are considered obese. In contrast, 22 percent of adults reported poor or fair health and 33 percent of adults are considered obese in West Virginia. In terms of access to care, 20 percent of adults and seven percent of children are uninsured in the Appalachian Region, which is on par with West Virginia, where 22 percent of adults are uninsured and five percent of children are uninsured. However, these measures may change soon as a result of the Affordable Care Act.

However, as the goal of this project is to address diabetes throughout Appalachia, statistics on diabetes are particularly relevant. An estimated 11 percent and 13 percent of adults have diabetes in the Appalachian Region and the state of West Virginia, respectively, compared to the US average of 9 percent. Statistics for percentage of adults with diabetes for each state in the

⁴⁶ Refer to the ARC Web site for information on County Economic Status and Distressed Areas in Appalachia at http://www.arc.gov/appalachian_region/CountyEconomicStatusandDistressedAreasinAppalachia.asp.

Appalachian Region is summarized in Table 4.3. Additionally, of those who are diabetic, about 84 percent and 83 percent of adults in the Appalachian Region and the state of West Virginia, respectively, have received an HbA1c screening that measures average blood sugar levels over a three-month period.

Table 4.3: Percentage of Adults with Diabetes by State in the Appalachian Region

State	Appalachian Portion of State	Entire State
Alabama	12.4%	12.7%
Georgia	9.6%	10.2%
Kentucky	13.1%	11.6%
Maryland	11.7%	9.5%
Mississippi	13.1%	12.7%
New York	9.3%	8.9%
North Carolina	10.3%	10.0%
Ohio	11.2%	10.7%
Pennsylvania	10.3%	10.0%
South Carolina	10.6%	11.3%
Tennessee	11.5%	11.2%
Virginia	10.6%	9.6%
West Virginia	12.7%	12.7%

Project Description

The Appalachian Diabetes Control and Translation Project, administered through Marshall University, is designed to support, train, and sustain county-level diabetes coalitions throughout the Appalachian Region. Since the project's launch in 2000, this initiative has funded community-based coalitions in 75 ARC-designated distressed counties across 10 states with competitively awarded grants of \$10,000 each. These community coalitions engage in various activities to minimize chronic disease, ranging from sponsorship of "Walk with Ease" to "Shopping Matters" programs. Many of the community-based activities are evidenced-based programs recognized by the CDC as efficacious in combating diabetes and other chronic diseases. According to the project director, many of these coalitions continue for several years after the grants were awarded, with 77 percent still reporting results to public health researchers at Marshall University.

Project Planning & Implementation

This initiative has been financially sustained since 2000 mainly with annual funding awards from the ARC and the CDC. According to the project director, ARC funds have generally ranged from

\$75,000 to \$100,000 each year with CDC providing \$150,000 each year—amounting to approximately \$225,000 in funding each year (2000 to 2013) from these two sources. These funds are augmented with other grants and in-kind contributions. For example, the project received a five-year \$2.6 million grant from Bristol-Myers Squibb in 2011, and it regularly reports grants and in-kind contributions from the coalition volunteers, their local governments, and selected foundations. Through the first three quarters of 2013 (January 1, 2013 to September 30, 2013), the project administrators report that an estimated \$210,000 has been derived in cash and in-kind contributions from the reporting coalitions. This includes the estimated value of the coalition leaders' time, which is valued at \$12 per hour.

The funding the project has received from ARC and CDC mainly goes for technical assistance, which entails helping the local diabetes coalitions implement their community-inspired projects. They train local volunteer leaders, educate them about evidence-based programs, and communicate information that is relevant for reducing chronic disease and diabetes prevention. The technical assistance by personnel from Marshall University is performed by two full-time staff as well as the project director, who is part-time on the project.

It is important to keep in mind that the local diabetes coalitions are typically volunteers who are not public health professionals. These are individuals living in a community—representing schools, businesses, nonprofits, as well as health care providers—who see a need to reduce chronic disease in their communities. Local diabetes coalitions often pursue a wide range of programs, projects, and initiatives. Their activities include smoking cessation programs, tours of grocery stores to identify the locations of healthy foods (e.g., Shopping Matters tours), organized physical activities like walks (e.g., Walk with Ease), and a variety of health education activities.

Economic and Community Impacts

The expectations for this project were that coalitions would successfully engage community members and that this engagement will facilitate healthier behavior and better health outcomes.

These coalitions have encouraged thousands of individuals to become more physically active and more knowledgeable about healthy nutrition—thereby meeting the expectations regarding engagement. In the first three quarters of 2013, 217 local leaders were trained in various evidenced-based activities or best practices programs, such as *Walk with Ease* or *Shopping Matters*. During this same time period, the coalitions reported that nearly 24,000 individuals participated in physical activity programs—about one-quarter of which are considered best-practices programs that adhere to the CDC's recommended 150 minutes of planned physical activity in a week. There were over 4,300 individuals who participated in healthy eating programs,

with around 14 percent of them participating in evidenced-based programs. Additionally, there were nearly 44,000 individuals who participated in health education programs, like glucose, cholesterol, blood pressure, or eye screenings.

The expectations on health outcomes are not as clear and definitive, but we can assume that some of the participants' health outcomes have improved. While from a clinical perspective it is not possible to determine if the individual participants are healthier as a result of these initiatives, public health outcome data are collected and there is ample research on evidenced-based programs to suggest these efforts make a difference. According to the CDC, more than 75 percent of health care costs are due to chronic conditions such as heart disease, cancer, stroke, diabetes, and arthritis. Many patients have multiple chronic conditions and their care costs up to seven times as much as those with one chronic condition. Much of the chronic disease is caused by four *preventable* health risk behaviors—lack of exercise, poor nutrition, smoking, and heavy alcohol consumption. Most of these diabetes coalitions focus their efforts on increasing exercise, improving nutrition, and stopping smoking.

The initiative was formally evaluated in 2011 by the Prevention Research Center, George Warren Brown School of Social Work, Washington University in St. Louis. As is evident in the report's executive summary (see below), the external evaluators were generally positive about the Appalachian Diabetes Control and Translation Project while still offering suggestions on ways to improve community outcomes:

The overall goal of this evaluation project was to determine the effectiveness of the coalitions in facilitating healthy behavioral and environmental changes and social organizational structures that support diabetes prevention and control in Appalachian counties. This multi-method evaluation included quantitative assessment of coalition membership, activities, and perceptions of successful outcomes, an analysis of patterns and commonalities among the coalitions and in depth case studies of five coalitions. Overall results from the evaluation conclude that the coalitions provide a valued service in resource-poor areas. These groups, while varied in structure and membership, promote activities that help manage and prevent diabetes, but also promote behaviors that improve overall health and wellbeing.⁴⁷

⁴⁷ For summary of the evaluation, see Thompson-Reid P. et al. 2012. "Evaluation of an Initiative to Develop Community-based Capacity in Appalachia for Implementing Evidenced-based Practice for Diabetes Prevention and Control." Poster at the 2012 APHA Conference. <https://livewell.marshall.edu/DMC/news/thomas-reid>.

To the extent that the diabetes rate has been reduced as a result of these community-based programs, there is assuredly an economic benefit derived from the expected improvement in worker productivity due to better health.

Lessons Learned

This program has sustained itself for a number of years—since 2000—suggesting that their approach is sound. It has also attracted funding from multiple sources and enjoyed tremendous volunteer support from the community. There are three main lessons learned from this case study:

- ***Multiple small grants can leverage huge impacts through volunteers.*** The grants for the community-based organizations are for \$10,000, which is not a lot of funding. However, because these initiatives rely heavily on volunteer participation they can translate into huge impacts.
- ***Social media is an important communication tool.*** These projects rely heavily on various social media platforms to publicize events and disseminate information. When compared to traditional media platforms, social media is clearly a highly cost-effective tool.
- ***Broad-based community support is vital for sustainability.*** By definition, these projects spring from the communities themselves—not from some distance location. This community support has proven vital for its success—evidenced by 77 percent of the coalitions that are reporting activity to Marshall University—including several that received their grant several years ago.

Conclusion

There are many positive attributes to the Appalachian Diabetes Control and Translation Project. Thousands of community leaders have been trained, tens of thousands of individuals have participated in the various projects, and hundreds of thousands have been reached through traditional and social media. They estimate, for example, that in the first three quarters of 2013 nearly 750,000 individuals have been reached through social media channels. The ARC funds have been leveraged along with CDC funds as well as resources from the coalitions' communities to help grow local leaders. Since it relies on local leaders from communities, it is helping to strengthen community capacity, and while it is not possible to document with clinical data—common sense would suggest that these efforts are helping to increase health literacy and

reduce chronic disease. Therefore, in the evaluator's opinion, the project has met expectations over the course of the project.

4.2.3 The WALs Foundation, West Virginia - WALS Foundation Mock Trial Program

The Wheeling Academy of Law and Science (WALS) Foundation is a 501(c)(3) non-profit corporation founded in 2004 to provide educational outreach to the state of West Virginia. In 2009, the WALs Foundation was recommended for funding through the ARC's Substance Abuse Grants Competition due to its innovative mock-trial program that educates students about the dangers of prescription drug abuse. The WALs Foundation was expected to use the ARC grant to expand its program to eight impoverished and typically underserved West Virginia counties, reaching an additional 975 students in 39 classes. The ARC provided \$24,723 in project funding, representing 74 percent of the project's total costs. It was approved in 2009 and closed in 2011.

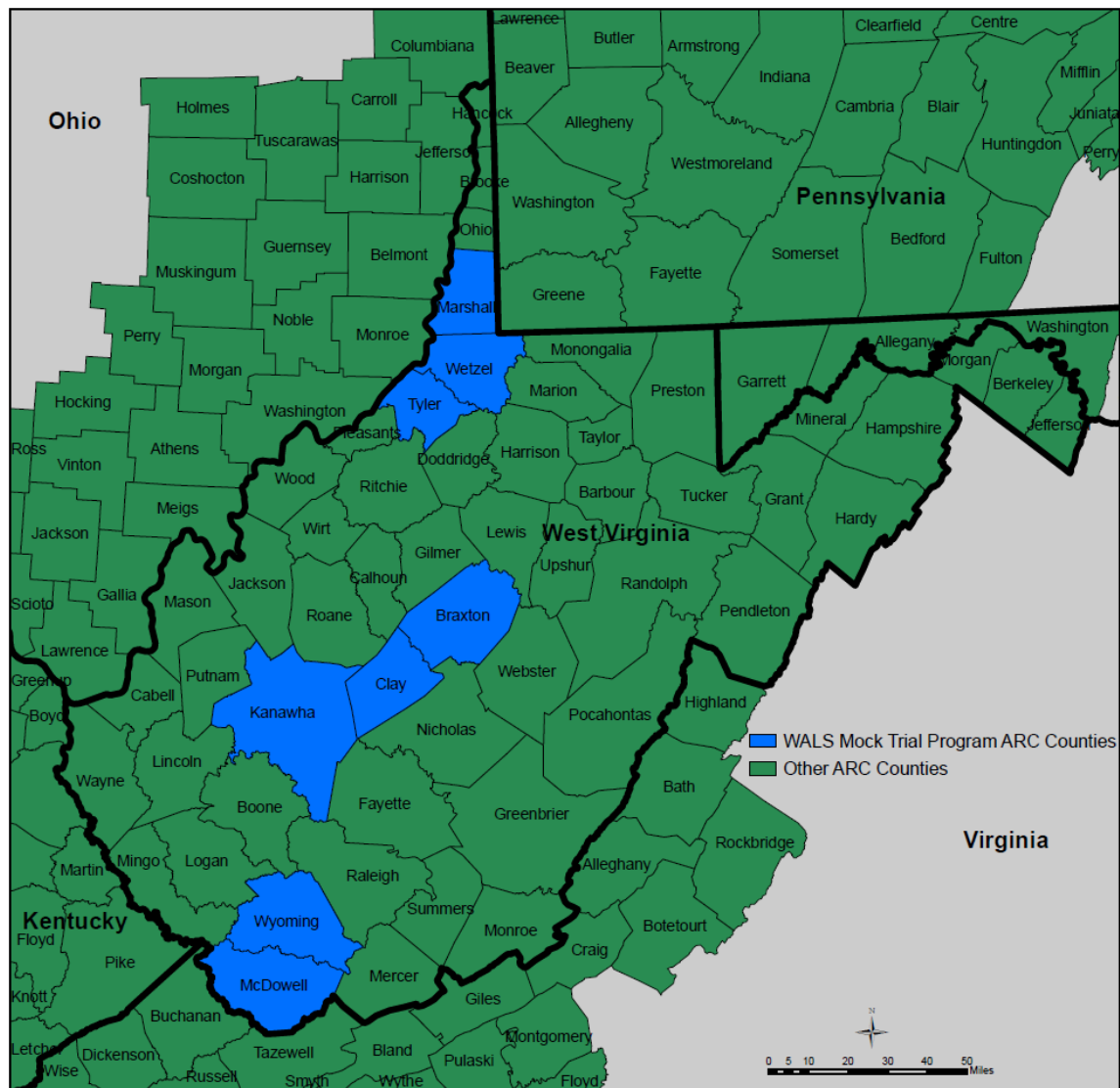
Community Profile

This project took place in eight counties in rural West Virginia: Braxton, Clay, Kanawha, McDowell, Marshall, Tyler, Wetzel, and Wyoming counties (see Figure 4.1). However, the scope of the project today extends throughout the entire state. In West Virginia, prescription drug abuse is a huge problem; according to the CDC, West Virginia had the highest rate of drug overdose fatalities—28.9 people per 100,000 population—a figure that has grown more than six times since 1999.⁴⁸

The eight county service areas for this particular project (shown in Figure 4.1) has a total population of 319,577, which is about 17 percent of West Virginia's estimated population of 1.9 million. It is notable that 60 percent of this area's population resides in Kanawha County, which contains the city of Charleston, West Virginia's largest city and state capital. Excluding Kanawha County, about 76 percent of the seven county area's population lives in rural areas compared to the state average of 51 percent. Continuing to exclude Kanawha County, the median household income is \$34,384, and 26 percent of adults reported poor or fair health. In comparison, the state's median household income of \$38,587 and 22 percent of adults reported poor or fair health.

⁴⁸ Trust for America's Health. 2013. *West Virginia has the highest Drug Overdose Mortality Rate in the United States*. <http://healthyamericans.org/reports/drugabuse2013/release.php?stateid=WV>.

Figure 4.1: Map of Counties for WALS Mock Trial Program



Data Source: Appalachian Regional Commission



Project Description

The project involved expanding a mock-trial program to eight counties in West Virginia, which supported an additional 1,600 students. As participants in the mock-trial program, students role-play as attorneys and witnesses with revised scripts from real prescription drug abuse trials. Thus, the program teaches students about the judicial system while also teaching them the health and legal dangers of prescription drug abuse. Of the project's total costs of \$33,573, funding from ARC amounted \$24,723. Of the remaining \$8,850, \$1,500 came from state funds and \$7,350 came from annual fund drives as well as in-kind contribution from lawyers participating in the program. The project was approved on September 30, 2009 and was closed on February 9, 2011.

Project Planning and Implementation

In 2004, an attorney in Wheeling, West Virginia and his wife founded the WALs Foundation to offer educational programming on issues of public concern that remained under-addressed in the school system. In its first year, the foundation began a mock trial program in Ohio County, West Virginia to educate 4th and 8th grade students about the civil and criminal trial system, as well as the dangers of substance abuse. The project originally included around 975 students in 39 classes. Program coordinators had drafted scripts from real substance abuse trials, adapting the material for 4th and 8th grade audiences, while students were encouraged to role play as attorneys and witnesses. Members of the local legal community volunteered their time to act as judges presiding over the hypothetical cases. The students in Ohio County very much enjoyed the role playing aspect of the mock trial program, and were excited to be able to take an active role in the process.

Initially, the scripts focused on crystal meth cases, eventually moving towards the issue of prescription drug abuse. West Virginia currently leads the country in prescription drug abuse, with much of it concentrated in economically distressed counties. Judges participating in the mock trial program report that 64 percent of users get their drugs from friends or family. Executive Director of the WALs Foundation mentions that many of the program's participants were not even aware that it was illegal to take a family member's drugs. The recent deaths of celebrities such as Heath Ledger and Michael Jackson also helped to impress upon the students the prevalence and dangers of prescription drug abuse.

The mock trial program has typically operated on a small budget. The program is funded through a grant from the West Virginia Department of Health and Human Resources, about \$34,000 in total. Most of this goes to the Executive Director's salary and travel expenses. The WALs Foundation also collects from community-wide fundraisers. The founder of the WALs Foundation reports that he occasionally uses his own money to purchase supplies for the program, such as props for the trials. The program also utilizes in-kind donations from local lawyers and judges who volunteer their time and travel to participate in the mock trials as well as support from local donors.

The WALs Foundation always had the goal of expanding throughout the state, particularly to underserved counties where prescription drug abuse is especially severe. When the Executive Director learned about the ARC grant opportunity through an email from the Drug Abuse Prevention Network, the program had involved around 6,000 students. The ARC grant helped the Executive Director develop programs for Braxton, Clay, Kanawha, McDowell, Marshall, Tyler,

Wetzel, and Wyoming counties. Funding from the ARC grant went directly to fund the participation of 1,600 students.

Economic and Community Impacts

The WALs Foundation used grant funding from the ARC to expand the program to 1,600 students in eight underserved West Virginia counties. The Executive Director says she would rate the success of the project “as high as you could rate it” and that students, teachers, and administrators are “most satisfied” with the project. She reports that students who had previously participated in the program are still talking about how much they enjoyed it.

The program has a direct impact on mock trial participants. Since 2004, the program has grown to involve 11,500 students from 12 counties across West Virginia. In the 2012/2013 school year, all 5th grade students in the Brooke, Hancock, Ohio, Marshall and Wetzel counties participated in their school’s manifestation of the program. In 2013 alone, the program worked with about 600 fifth graders. Through use of pre- and post-surveys, they observed an increase in student awareness regarding prescription medication (see Table 4.4).⁴⁹ Additionally, questions asked only in the post-trial survey show that participants were overwhelmingly satisfied with the mock trial and felt they learned about the dangers of prescription drugs.

Literature on the effectiveness of substance abuse education is varied. A meta-analysis of 33 evaluations of school-based alcohol and drug education program found that these programs have the most positive effect on knowledge and attitudes, but were often unsuccessful in changing drug-using behaviors.⁵⁰ In another study, a meta-analysis of eight evaluations of Project DARE (Drug Abuse Resistance Education) found that the presence of interactivity with students was more effective for developing drug-specific social skills.⁵¹ The WALs Foundation program is unique in that, unlike most school-based drug education programs, it educates students about prescription drugs and the judicial system. As a result, it is difficult to apply conclusions from the literature to this case study, though Table 4.4 suggests that the student’s involvement in the mock trials improves knowledge, and hopefully, future drug-using behaviors.

⁴⁹ Table constructed by author using WALs Foundation, “Pre-Test and Post-Test Survey Results,” 2013.

⁵⁰ Bangert-Drowns, Robert L. 1988. “The Effects of School-Based Substance Abuse Education – a Meta-Analysis.” *Journal of Drug Education* 18(3):243-264.

⁵¹ S T Ennett, N S Tobler, C L Ringwalt, and R L Flewelling. 1994. “How effective is drug abuse resistance education? A meta-analysis of Project DARE outcome evaluations.” *American Journal of Public Health* 84(9): 1394-1401.

Table 4.4: Survey Results for WALs Foundation Mock-Trial Program

Statements	Pre-Trial: percent responding true	Post-Trial: percent responding “true”	Percentage Point Change
Prescription drugs or medicines are ALWAYS safe because doctors give them to us	22.1%	11.9%	-10.1
If you have a prescription drug that is not yours, you could be arrested for illegal possession of drugs	91.6%	98.2%	6.7
It is against the law to give your prescription medicines to a friend	86.7%	97.5%	10.8
Prescription drugs should be locked up in the home	71.4%	87.9%	16.5
Do you think there are risks if you take someone else's prescription medicine?	96.5%	97.9%	1.4
It's okay to use someone else's prescription medicine as long as you know what it is for.	11.6%	5.1%	-6.5
Questions in post-trial survey only		% responding yes	
Did you enjoy the mock trial?	--	96.8%	
Did you learned about the dangers of prescription drugs?	--	99.3%	
Do you understand better the legal consequences of making a bad choice about drugs from the mock trial?	--	99.1%	

Due to its success, the mock-trial program has recently been adopted in the West Virginia 5th grade state curriculum, meaning that teachers can use the mock trial program to fulfill the 5th grade Next Generation Social Studies Content Standard and Objective requirement from the West Virginia Department of Education. As a result, over 20,000 West Virginia 5th grade students were invited to enjoy the mock-trial program in the 2013/2014 school year to complete their Next Generation Standard and Objective.

Since the program's adoption as West Virginia state curriculum, the WALs Foundation has essentially turned the project over to the state. They do not anticipate receiving grant money from the Department of Health and Human Resources next year, and hope the state will embrace

the program. The Executive Director will serve as a consultant for the program, rather than helping to directly implement it in schools. The WALs Foundation has provided the state with 10 scripts used over the project's duration, and plans to publish them online for teacher use. Though the WALs Foundation will no longer be involved in the "nuts and bolts" of the mock trial program, they will move in other educational directions, including creating the Ruther-Wheeling library to facilitate research on issues of economic inequality.

The founder of the WALs Foundation credits the ARC grant with lending statewide credibility to the program, calling it the "tipping point" for making the program part of West Virginia's state curriculum. The Executive Director also describes the grant as the catalyst for bringing the program to economically distressed counties in rural West Virginia, though the program stopped operating in these eight counties following the grant's closure. Overall, the project was described as an overwhelming success, and those interviewed stated that they have received numerous letters and phone calls from student participants, teachers, and faculty members who have raved about the effectiveness of the program.

Lessons Learned

This project had a different scope than many of the projects in that it had a relatively small budget and also taught children about the judicial system as well as the dangers of prescription drug abuse. Despite this, this case study has some valuable lessons to takeaway:

- ***Projects to tackle substance abuse can be different than other health projects*** – This project is relatively unique in an already diverse group of health projects. This is because in tackling substance abuse, there are many possible approaches. If ARC wishes to focus more on the issue of substance abuse in Appalachia, this may require its own expertise and possibly a subprogram as the issues facing substance abuse are complex and numerous.
- ***ARC investments in innovative projects can have significant long-term impacts*** – When ARC made the relatively small investment at the WALs Foundation to expand into eight additional counties, it was not known that this innovative idea would become part of the West Virginia state curriculum for 5th graders, where it can potentially have a much larger impact. Yet, the project managers stated that ARC's investment was a catalyst toward this outcome and gave credence to the idea. While not all good ideas will succeed this quickly, ARC should recognize the importance of its backing and support innovative programs throughout Appalachia.

Conclusion

Overall, this project stands out because ARC saw an opportunity to expand a successful drug prevention education program to underserved counties struggling with issues of substance abuse. The fact that the cases are centered on the topic of prescription drug abuse makes them even more relevant to distressed counties. Students were able to learn not only about how the civil and criminal justice system operates, but also about the real-world ramifications of illegal drug abuse. The ARC funding from this grant went directly to implementing this program in eight impoverished counties, impacting 1,600 West Virginia 5th graders. According to WALIS Foundation administrators, this investment was the catalyst for inserting the mock-trial program into the West Virginia statewide curriculum. As a result of the project's role in shaping West Virginia public policy, this project exceeded expectations even if we are unable to measure how the mock-trial program affected participant drug-using behavior.

4.2.4 MedLink Georgia, Inc., Georgia –

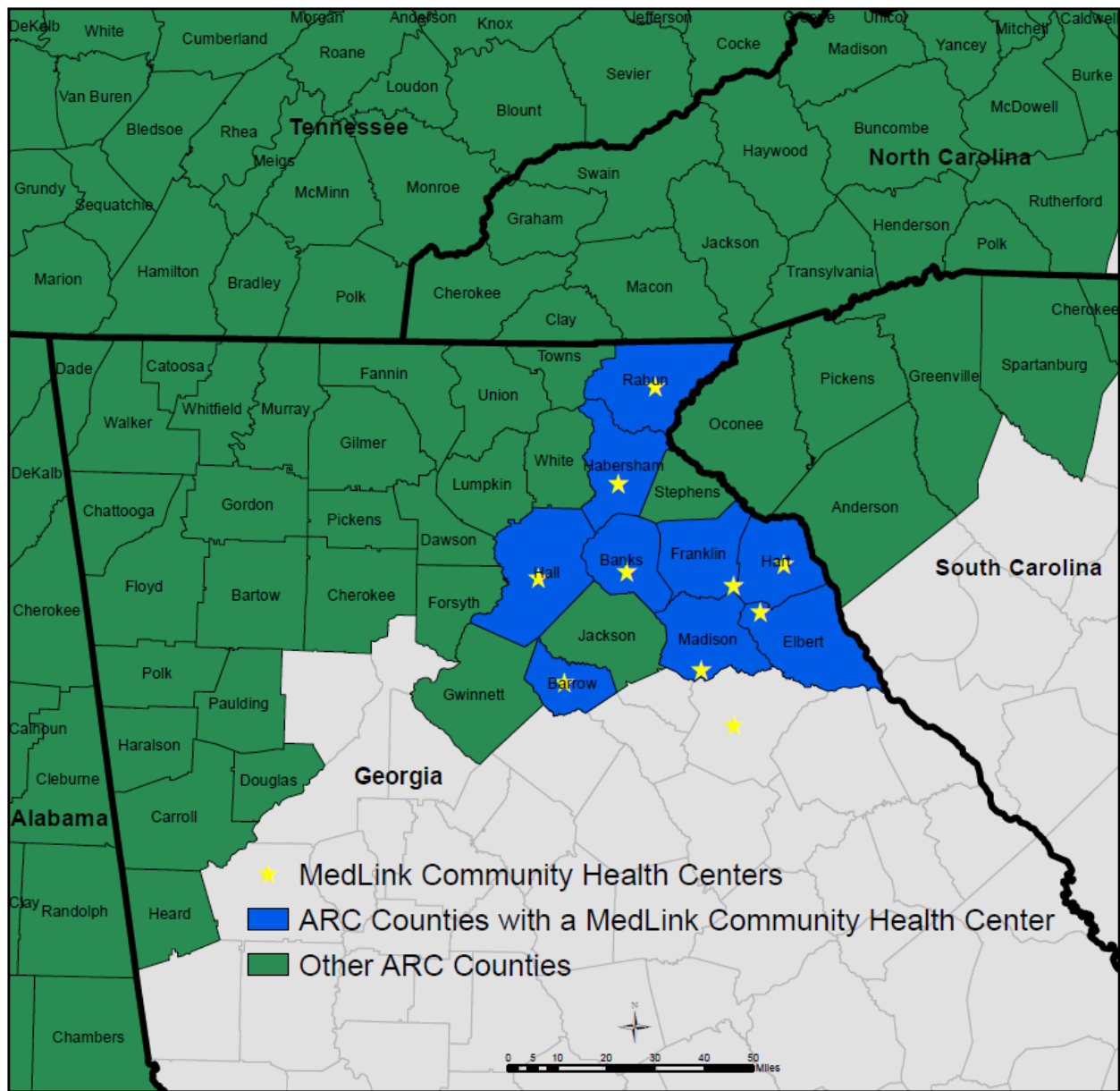
MedLink Rural Telemedicine

MedLink Georgia, Inc., is incorporated as a tax-exempt nonprofit organization under Internal Revenue Code 501 (c)(3) that operates one Community Health Center (CHC) in each of 10 different counties in Northeast Georgia, all but one of which are in the Appalachian Region. In total, they serve patients from 26 counties in Georgia as well as both North and South Carolina, covering an area of about 6,000 square miles. Through the project, MedLink Georgia was equipped with videoconferencing technology that was expected to establish a telemedicine network and Electronic Medical Records (EMR) system that would ultimately benefit about 22,000 patients. The ARC provided \$134,251 in project funding, representing 50 percent of the project's total costs. It was approved in 2005 and closed in 2008.

Community Profile

MedLink Georgia's 10 different CHCs are located in 10 different counties: Banks, Elbert, Madison, Hall, Habersham, Hart, Oglethorpe, Rabun, Franklin, and Barrow counties. All but Oglethorpe County fall into the Appalachian Region and are clustered together in the northeast part of the state (see Figure 4.4 below). MedLink Georgia's headquarters are in Gainesville, Georgia, which is in Hall County. As the map shows in Figure 4.4 shows, the service area for MedLink Georgia extends well beyond Hall County and includes most of the Appalachian portion of Georgia and South Carolina.

Figure 4.4: Counties with a MedLink Community Health Center



Data Source: Appalachian Regional Commission



Georgia ARC counties have a median wage of \$51,954 with an unemployment rate of nine percent while the Appalachian Region has a median wage of \$42,915 with an unemployment rate of nine percent. Only 16 percent of the adults in Georgia ARC counties report poor or fair health and 28 percent of adults are obese. In Georgia ARC counties, 28 percent of adults are uninsured, 11 percent of children are uninsured, and 5 percent of adults reported not seeing a doctor due to costs.

Furthermore, 16 percent of adults within Georgia's ARC counties reported being in fair or poor health and 10 percent of adults are living with diabetes. Similarly, the state of Georgia reported having 16 percent of the adults in poor or fair health and 10 percent of adults within the state are living with diabetes. Across the entire Appalachian Region, 18 percent of adults reported being in poor or fair health and 11 percent of adults are living with diabetes. Additionally within Georgia's ARC counties, 28 percent of adults are considered obese while 31 percent of adults are considered obese in the Appalachian Region.

South Carolina ARC counties have a median wage of \$43,611 with an unemployment rate of nine percent while the Appalachian Region has a median wage of \$42,915 with an unemployment rate of nine percent. Only 16 percent of the adults in South Carolina ARC counties report poor or fair health and 29 percent of adults are obese. In South Carolina ARC counties, 25 percent of adults are uninsured, 11 percent of children are uninsured, and 16 percent of adults reported not seeing a doctor due to costs.

Since the project covers over 6,000 square miles, being able to communicate electronically is vital. By increasing the efficiency of the CHCs located in northeastern Georgia and western North Carolina, the quality and accessibility to healthcare will improve.

Project Description

The project involved purchasing and installing videoconferencing equipment for MedLink Georgia's 10 CHCs so that one could have a real time conversation with anyone in the MedLink Georgia network. The technology has been used for Board of Directors' meetings, staff meetings, staff trainings, and translation services. The videoconferencing technology has increased efficiency by reducing transportation and phone costs and time spent traveling to and from headquarters for MedLink Georgia business. Moreover, the digital infrastructure set up by the ARC grant laid the foundation for further work, such as acquisition and use of electronic medical records. Of the project's total costs of \$268,502, funding from ARC amounted to \$134,251 and most went toward purchasing videoconferencing equipment and paying the salary of a contractor. The remaining \$134,251 came from MedLink Georgia itself. The project was approved on September 12, 2005 and was closed on May 29, 2008.

The videoconferencing technology is equipped with a webcam so that anyone in the CHCs network can communicate in real time. However, the equipment does not include telehealth equipment, such as an exam camera, telephonic stethoscope, or digital otoscopes. Currently, the videoconferencing equipment is not used with telehealth because it remains difficult to connect the patient and physician and then to handle the billing as only the offsite physician can be charged in the telehealth consultation. It was decided that the telecommunication equipment alone was more useful for connecting their staff and Board members over the 6,000 square mile

area where they serve, which makes it possible to communicate efficiently without having to drive four hours to meet in person. However, the digital infrastructure established for the project (e.g., servers and T1 fiber optic lines) are still used today and support MedLink's EMR system.

Project Planning and Implementation

MedLink Georgia, Inc., is one of the oldest Community Health Centers (CHCs) in Georgia. According to the Director of Public Policy and Community Development at MedLink Georgia, Inc., the organization was started in 1976 with two CHC centers. Back then, there was less demand; each center could close at 2pm to allow for an afternoon staff or Board meeting once every six weeks.

However, after developing a strategic plan in 1994, the organization grew rapidly adding seven sites by 2001. As the organization has expanded, patient demand has increased and the distance between facilities proved to be a logistical challenge. MedLink Georgia's Board of Directors has at least one member from each of the 10 counties in their network, and thus has struggled to meet every six weeks since some counties are over two hours from their headquarters. As a result, improving communication and logistical coordination through use of videoconferencing technology between the CHCs and with headquarters quickly became a priority. The idea for the project had strong support from the Chief Executive Officer (CEO) and the Board. So, MedLink Georgia staff began planning by travelling with the University of Georgia's College of Health Promotion and Behavior (now College of Public Health) and the Cooperative Extension Service, as both were involved in utilizing similar videoconferencing equipment across the state.

MedLink Georgia's Director of Public Policy and Community Development and CEO have long been familiar with ARC, having previously worked in organizations that required ARC funding. They originally pursued ARC funding for a brick-and-mortar expansion of one of their CHCs, but learned it had been taken from the Georgia Governor's ARC state plan. Then they decided to invest in a communication system to manage their growth. Before receiving the ARC grant, MedLink Georgia had saved funds for 18 months in order to improve their communication system. However, it was a high initial investment cost and MedLink Georgia could not afford for it to come entirely out of their budget. ARC agreed to match their funding and split the costs of the project fifty-fifty. According to the Director of Public Policy and Community Development, it was a pleasure to work with Mr. Thompson at the state ARC office in Atlanta, who had experience with county governments adopting a similar communication system. He was willing to pick up the phone, give leads and advice, and help MedLink Georgia get changes approved as the project progressed.

After receiving the funding, MedLink Georgia decided to buy from the vendor Tandberg, especially because their partners at the University of Georgia were familiar with their equipment

already. The project costs included videoconferencing equipment for each CHC, which varied depending on the needs of the facility. For example, some of smaller CHCs received a 22-inch monitor on a rolling cart while the Board room at MedLink Georgia headquarters received a 48-inch screen capable of splitting four ways to facilitate a meeting. It was important to MedLink Georgia that the system was portable as they anticipate future growth and expansion.

In line with their strategic plan, the videoconferencing equipment was first installed in their headquarters, then the furthest CHCs, followed by those remaining in the middle. Funds also went toward setting up the digital infrastructure of servers and fiber optics to support the videoconferencing connectivity. Additionally, funds were given to an Information Technology contractor whose job was to set up and maintain the technical equipment. Since setting up the digital infrastructure took longer than expected, the project required an extension; MedLink Georgia appreciated ARC's flexibility as it was worth the wait to do the job well. Finally, \$2000 of ARC funding was classified as administrative, though this was contracted out and did not pay into the salaries of the primary project administrators. While MedLink Georgia did not conduct a formal evaluation of the project, they did offer a monthly review and report to the Board, who checked on its progress and implementation.

Economic and Community Impacts

Overall, the videoconferencing equipment has had a significant economic impact on MedLink Georgia, even though the impacts were different than anticipated. Originally, MedLink's physicians had advised that they could use the videoconferencing equipment to support telemedicine consultations two or three times a week. In their final report to ARC, MedLink recorded eight psychiatric evaluations, seven diabetic education sessions, and six dermatology consultations—serving 42 patients—that were used in place of a referral when patients were unwilling or unable to travel to a larger medical facility. While more telemedicine consultations were intended, MedLink found that third-party payers would only reimburse the consulting specialist and not MedLink's primary physician. Therefore, MedLink began to utilize the videoconferencing equipment in other ways.

Today, the primary use of the equipment is for Board meetings, which has made their organization more efficient, especially in reducing travelling costs. In their final report to ARC, MedLink reported that their Board meeting had 100 percent quorums with the new equipment. Since then, they have met about 30 times (with about 10 members per meeting). If four board members save four hours of driving time for each meeting, then the project has saved about 480 hours of driving time and perhaps 120 tanks of gas for these board members, many of whom are community leaders.

Additionally, the equipment has also been used for MedLink employees completing Open Enrollment, Flexible Spending Account, and Occupation Safety and Health Administration annual trainings, which has saved on driving time and mileage reimbursement. In their final report to ARC, MedLink reported having used the videoconferencing equipment for 71 different sessions, totaling 284 hours and involving 658 individuals. In addition to Board Meetings and aforementioned trainings, these sessions included physician and mid-level trainings, office manager trainings for Electronic Health Records (EHR), medical secretary training for EHR, evaluation of EHRs, and Reference Lab implementation discussions. Many of these sessions directly trained MedLink's existing workforce, improving their staff's capacity.

Perhaps most importantly, the improved digital infrastructure has brought additional economic benefits. MedLink Georgia was able to use hardware purchased from the ARC project (e.g., servers) to support another grant through USDA to establish and integrate EMRs in their network. By fall of 2006, MedLink started using a Practice Management software in their front offices that necessarily prefaced EHRs by giving every patient a digital identity within MedLink's administration. They were then able to launch EHR software in the Spring of 2008, which allowed patients' medical histories and doctors' notes to be digitally saved and connected to the patients' account. MedLink has since updated their EHR software in 2009 and 2010 and plan to switch to an Athena-based EHR system in January of 2015. Despite these changes in software, the system still relies on the servers and fiber optic cables put into place with the ARC grant. Additionally, the ARC project served as MedLink's introduction to digitizing their system and, consequently, taught them many lessons that enabled them to make wiser decisions regarding procurement of EMR technologies. Finally, by placing their servers in a CHC that was eligible for a rural communications discount, MedLink Georgia was able to drop its phone bill each month by \$10,000 for the past six years.

Today, the videoconferencing equipment is in good condition and is still utilized. However, MedLink's Director of Public Policy and Community Development expressed that with technology changing so rapidly, the ability to upgrade computers and laptops makes the need for portable monitors in each CHC "not as great now as it was five years ago." Thankfully, MedLink Georgia has been able to use their digital infrastructure to justify getting new or upgraded equipment using a Health and Human Services grant since the project.

Lessons Learned

MedLink Georgia, Inc. used ARC funds to support the installation of videoconferencing equipment in network of 10 CHCs. While the project was unable to use the videoconferencing technology for telemedicine purposes, the project improved cost efficiency, particularly in reducing travel costs for annual trainings and monthly Board meetings. The project also laid the

groundwork for future adoption of EMR, though the project does not seem to use the videoconferencing technology for telemedicine purposes. There are a few lessons to be learned from this case study:

- ***Some projects lack technical expertise when it comes to large purchases*** – MedLink’s Director of Public Policy and Community Development explained that it was difficult to write the proposal without knowing who the vendor would be. Having access to some technical expertise when writing the grant and creating the work plan would have made the workflow much easier later. For example, it was easier for MedLink to write the USDA grant after they understood the Tandberg equipment. Many other lessons learned from the project may have taught beforehand if MedLink had been offered access to a telemedicine expert or consultant.
- ***Technology is a continuously needed but short-lived investment*** - High-tech equipment is changing and up-dating continuously. The videoconferencing equipment purchased for this project is now nearly eight years old, and newer technology telehealth is becoming available (e.g., smartphone applications). Seeking equipment funds for new technology is an on-going process. However, ARC can have a greater long-term impact when the investments are in basic hardware that provide a digital infrastructure for new equipment and software. For example, while MedLink is now about to launch its fourth version of EHR software, the servers established by the ARC project are still being used to support MedLink’s EMR system, providing higher quality care to patients and improving workplace efficiency.

Conclusion

The project enabled MedLink Georgia to purchase servers and videoconferencing equipment that allowed for virtual face-to-face conversations between people in the MedLink Georgia’s network of 10 CHCs, which were used for telemedicine events, increasing efficiency of workforce trainings, and improving attendance at MedLink Board meetings. Additionally, the project provided the resources for MedLink to establish a digital infrastructure used to support MedLink’s first EMR system in 2008 and will be used to support MedLink’s new EHR system in January of 2015. MedLink also learned many valuable lessons about incorporating technology in their healthcare system over the course of the project and appreciated ARC’s patience and flexibility when the project encountered technical difficulties. According to MedLink’s Director of Public Policy and Community Development, “I’m not sure that [the project] would have happened at all” without the ARC funding.

4.2.5 Hope in the Mountains, Inc., Kentucky –

Residential Substance Abuse Services for Women

Hope in the Mountains, located in Prestonsburg, Kentucky, is an in-patient (residential) substance abuse treatment center for women. In addition to counseling for substance abuse, the women receive job-training and life-skills education. The expectations for this project are that the individuals will remain drug-free and become more productive members of society once they complete the program. A total of 252 patients have gone through this program since the initial patients arrived in March 2008. The initial seed money provided by ARC in 2007 for this project, \$74,616, has been leveraged since then with \$1,575,806 in funds from other sources (e.g., fees, grants, and donations)—a \$21 return for every \$1 in ARC funding.

Community Profile

Prestonsburg, Kentucky, is the county seat of Floyd County—currently designated as a distressed county by ARC. The population of Prestonsburg is around 3,300 and the total county population is 39,450 (2010 Census). Nestled among the Eastern Kentucky coal counties, this region has been experiencing substantial economic uncertainty as coal mining jobs are eliminated. According to the Kentucky Office for Employment and Training, the total civilian labor force for Floyd County in December, 2013 was 14,804, of which 13,183 were employed and 1,621 were unemployed. The unemployment rate was 10.9 percent. By comparison, Kentucky’s statewide unemployment rate was 7.4 percent in December 2013 while the U.S. unemployment rate was 6.5 percent. The level of economic distress is further demonstrated by a poverty rate (33 percent) that is significantly higher than either the state (19.3 percent) or national averages (15.9 percent). Similarly, a higher percentage of those in Floyd County do not have health insurance (17.9 percent) than individuals statewide (16.9 percent).

The economic distress in this county is captured by one single number—40 percent. Government transfer payments—things like retirement and disability insurance benefits from Social Security, medical benefits such as those provided through Medicaid and Medicare, income maintenance benefits like TANF and SNAP, unemployment insurance compensation, and veterans’ benefits—as a percentage of total personal income in Floyd County were 40 percent in 2011 compared to 18 percent nationally. The high level of reliance on government transfer payments for total personal income is indicative of a lack of economic opportunity.

While this treatment facility is located in Floyd County, most of the clients come from three nearby counties—Perry, Knox, and Laurel—which have similar socioeconomic and community profiles.

Project Description

Hope in the Mountains is an in-patient (residential) substance abuse treatment center for women. Most of the patients are seeking treatment for abusing prescription of pain medication, but increasingly heroin is becoming the drug of choice. In November 2013, there were 15 patients—most of whom will undergo 90 days of treatment though some will remain for up to six months. The initial seed money provided by ARC in 2007 for this project, \$74,616, has been leveraged since then with \$1,575,806 in funds from other sources (e.g., fees, grants, and donations)—a \$21 return for every \$1 in ARC funding.

Currently employing nine individuals, Hope in the Mountains is incorporated as a tax-exempt nonprofit organization under Internal Revenue Code 501 (c)(3). It was initially incorporated in August 2004 with three directors, and expanded to a seven-member board by 2008 when the initial group of nine patients entered treatment. According to the organization's 2011 IRS Form 990, there are eight members on the Board. These individuals—all from the local community—include a business owner, a licensed clinical social worker, and a physician. The current Chairman of the Board is a business owner in the oil and gas industry. Hope in the Mountains' end-of-year assets in 2011 totaled \$437,506.

Project Planning & Implementation

Hope in the Mountains began with an initial group of nine patients in March 2008. It sprung from a conversation between two local residents about the substance abuse in both Kentucky and Appalachia, and the dearth of treatment centers in the region that were specifically tailored to the needs of women. Working as a nurse at a nearby community mental health facility, the founder and now director of Hope in the Mountains could see firsthand the steady stream of patients seeking treatment for substance abuse and the complex causes of their drug usage. While they will accept patients from any location in the United States, most of their clients come from nearby Perry, Knox, and Laurel Counties.

Once the organization was officially incorporated in the fall of 2004, three-and-a-half years passed before the first patients were admitted in the spring of 2008. During the interim period the Board would meet regularly while the staff refined the business plan and searched for funding. With help from a professional grant writer based in Lexington, Hope in the Mountains successfully applied for and received a \$74,616 grant from the Appalachian Regional Commission in September 2007. By March 2008, the first patients entered treatment.

According to the director, were it not for the infusion of ARC funding, Hope in the Mountains would have never gotten off the ground. She indicated in our interview how grateful she was that ARC took a chance on her, the board, and the idea to create a substance abuse treatment center

in Prestonsburg that is uniquely tailored to the needs of women. The director indicated that when the ARC funding was received, it would have been easy to view their nascent group as a risky investment with a meager track record.

The ARC funding provided them with the necessary funds to begin treating patients as well as a financial foundation upon which they could build. While the ARC grant was sufficient for three months of funding to begin the program, they had to secure additional funding to keep Hope in the Mountains operating into the future. Soon after opening, they used the new-found legitimacy lent by the ARC grant to persuade a local television station to host a 4-hour telethon on their behalf. Engaging the local community in this fund-raising effort, they raised \$48,000 in the telethon—a majority of which came from small donations. Since the initial telethon they have done two others—collecting approximately \$14,000 in one and \$36,000 in another.

The staff and board at Hope in the Mountains have been successful in engaging the local community to provide both financial and in-kind support. The total value of gifts, grants, contributions, and fees received from 2007 to 2011 has increased from \$93,242 to \$583,104. This funding has come from a variety of sources, including, but not limited to the United Way, Operation Unite, local businesses, and the Perry County Drug Court. For example, Operation Unite pays the \$6,000 all-inclusive treatment fee to Hope in the Mountains for certain patients who meet the Operation Unite criteria for treatment. The Perry County Drug Court secured a grant to send individuals through treatment at Hope in the Mountains. And, a local businessman donated a building used as housing for the patients along with several acres of land.

In addition, Hope in the Mountains has received an incredible amount of in-kind donations from local individuals, businesses, churches, and charitable organizations. These in-kind donations include winter coats, personal care items, and consumables like food and cleaning supplies.

Other sources of funding include the patients themselves. In addition to the \$6,000 fee for going through the program, which lasts from three to six months, some patients who remain beyond 90 days will pay a portion of their income toward housing costs if they are working and have earned income. Using guidelines promulgated by HUD, these clients will pay 30 percent of their earnings toward the cost of housing at the Hope in the Mountains residential facility.

Melding professional and peer counseling along with self-help opportunities, these patients receive, on average, about seven hours of counseling each day, Monday through Friday; they clean and housekeep on Saturday and have Sunday free. The 252 women who have gone through this program since 2008 have ranged in age from 18 to 62. There is group counseling, individual counseling, and self-help from both Alcoholics Anonymous (AA) as well as Narcotics Anonymous (NA). In addition to on-site GED classes which has enabled many women to obtain a GED, an instructor from the local community college teaches the patients about nutrition, a nun teaches

sewing skills, a social worker counsels about domestic violence, a local dentist provides free dental care, and peer mentoring is available about life skills and job opportunities—all provided onsite at the Hope in the Mountains.

A relatively new initiative at Hope in the Mountains, the Inspire Program, was made possible by a \$30,000 grant from the Steele-Reece Foundation. This funding enables them to provide drug screenings for potential employers, parenting classes, job counseling, and housing information for both current and former clients. The women are provided a place to meet and talk in a non-judgmental peer-led context as they transition from the residential program back into society. The goal is to provide information and support that will increase their chances for self-sufficiency once they leave the program. Along these lines, Hope in the Mountains works with the East Kentucky Concentrated Employment Program to improve the job skills and employability of their clients.

Economic and Community Impacts

One expectation for this project is that the individuals will remain drug-free once they complete the program. A total of 252 patients have gone through this program since its inception, and according to the director, “this would have never happened without the initial grant money from ARC.” Moreover, according to the director, the program’s one-year success rate—whether a patient is still drug-free one year after completing the program—is 41 percent, which is markedly higher than the national average of 27 percent.

Another expectation is that these women will become more productive members of society. Hope in the Mountains’ multitude of programs and initiatives have facilitated many successful transitions from residential treatment to becoming a successful member of society who are educated, employed, and drug free. Hope in the Mountains contacts their former patients once they leave the program after eight weeks, three months, six months, and one year. They do not systematically collect data on former clients, but anecdotally they know that many have completed a GED, some have gone to college, and many are working. Moreover, while they have never conducted a formal or systematic self-evaluation, they have had their organization successfully audited, according to the director, demonstrating to potential grantors that the organization has good business practices.

According to a 2011 U.S. Department of Justice study, the economic impact of illicit drug use on American society is \$193 billion annually due to the high cost of crime, healthcare, and lost productivity.⁵² The individuals who have successfully completed this program and have remained

⁵² U.S. Department of Justice. National Drug Intelligence Center. 2011. *The Economic Impact of Illicit Drug Use on American Society*. <http://www.justice.gov/archive/ndic/pubs44/44731/44731p.pdf>.

drug-free have the potential to become productive workers, dependable family members, and valuable community participants. Conversely, this also means they are equally likely to not be part of the criminal justice system or heavily dependent on government assistance programs. Consequently, one can infer that there is a broad economic benefit associated with individuals completing this program.

Lessons Learned

This program has sustained itself for a number of years—incorporating in 2004 and accepting patients in 2008—which indicates it is providing a needed service in the region. It has also attracted funding from multiple sources and enjoyed tremendous in-kind support from the community. There are two main lessons learned from this case study:

- ***Seed money from ARC can germinate into a sustained program.*** Seed money is important. The initial seed money provided by ARC in 2007 for this project, \$74,616, has been leveraged since then with \$1,575,806 in funds from other sources (e.g., fees, grants, and donations)—a \$21 return for every \$1 in ARC funding. Evidenced by its continued existence since the 2007 ARC grant, it is clearly on a path toward long-term sustainability.
- ***Broad-based community support is vital for sustainability.*** A significant amount of these funds come directly from community citizens, businesses, churches, and other nonprofit organizations. Hope in the Mountains has also enjoyed considerable in-kind support from the community. The director and the board have worked diligently to forge strong ties to the community. This community support has proven vital for its success.

Conclusion

Hope in the Mountains has leveraged the initial ARC grant of \$74,616 into nearly \$1.6 million in funds which fuels a multidimensional program addressing many of the needs of their clients. They have engaged the local community as board members, workers, donators, and contributors to the needs of participants. Of the 252 women who completed the program, over 100 were drug free after one year and many are contributing members of their communities, reliable workers, and dependable parents. According to the program's director, this is because of the initial momentum created by the ARC grant in 2007.

4.2.6 Morehead State University, Kentucky –

Health Sciences Equipment and Furnishings

Morehead State University received state funding for a new building on campus to house the health science programs of nursing and imaging sciences. Funding was obtained from ARC to purchase up-to-date equipment for use in the new facility for these two programs. The expectation was that the project would lead to improved instructional quality for health science programs for at least 450 graduates over three years. The ARC provided \$750,000 in project funding (the largest for any health project), representing 21 percent of the project's total costs. It was approved in 2010 and closed in 2011.

Community Profile

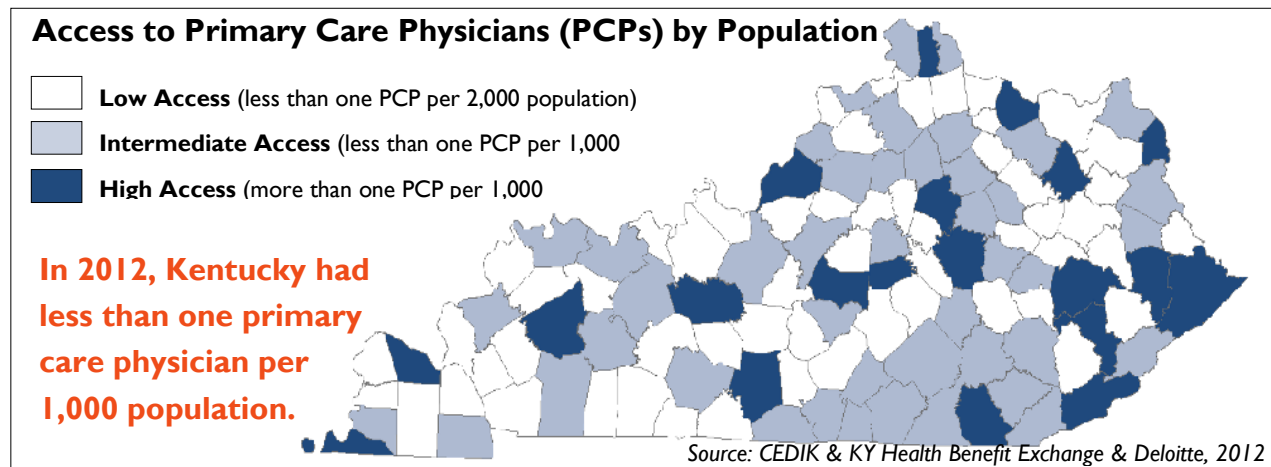
Morehead State University is located in the city of Morehead, in Rowan County, Kentucky. Rowan County is located in the eastern portion of the state. The total county population is 23,582 residents, 69 percent of whom live in rural areas, which is higher than the ARC average of 42 percent. The county unemployment rate is around eight percent compared to the state unemployment rate of 10 percent and unemployment rate of nine percent in the Appalachian Region. The county has a median household income of \$34,920, which is below the state median household income of \$41,141 and close to the median household income is \$42,915 across the entire Appalachian Region.

Given that the project aims to train a stronger healthcare workforce, access to care is another important health indicator. Twenty five percent of adults and eight percent of children in Rowan County are uninsured, which is higher than the state of Kentucky where 22 percent of adults are uninsured and seven percent of children are uninsured. However, these measures may change soon as a result of the Affordable Care Act and Kynect health insurance exchange. Finally, 20 percent of adults living in Rowan County reported not being able to see a doctor because of costs, compared with 14 percent of adults across the Appalachian Region in the same situation. Within Rowan County, 24 percent of adults reported being in fair or poor health condition and 10 percent of county residents are living with diabetes. Additionally, 35 percent of adults are considered obese in Rowan County compared with 33 percent of adults in Kentucky and 31 percent of adults in the Appalachian Region.

Of course, Morehead State's reach goes beyond Rowan County and at the very least to all of eastern Kentucky—this is the section of Kentucky that comprises the ARC. The Appalachian Region in Kentucky has a total population of about 1.2 million residents, 71 percent of whom live in rural areas. The region's unemployment rate is around 11 percent and the median household

income is \$32,791. The Appalachian Region in Kentucky has 28 percent of adults reporting poor or fair health and 13 percent living with diabetes. The region as a whole has more dismal numbers than Kentucky in general and Rowan County in particular.

Figure 4.5: Kentucky Map of Access to Primary Care Physicians by Population



Additionally, the Kentucky counties included in the Appalachian Region have very few healthcare providers. Figure 4.5 shows access to primary care physicians (PCP) throughout the state. Those counties that are shaded white have very poor access to PCPs and those that are dark are primarily due to hospitals and medical training facilities like the one at Morehead State. The extra equipment and training is predicted to increase the number of healthcare providers for the Kentucky counties within the ARC. By increasing the number of healthcare providers, more people will have access to care and will travel less time to get the care they need. Within Rowan County itself, there were an estimated 10 general physicians and less than 10 dentists. This situation looks similar in other eastern Kentucky ARC counties, suggesting the need for more healthcare professionals.

Project Description

The Morehead State University project was implemented to update and upgrade the health sciences programs of nursing and imaging sciences. State government funding was obtained to build a new building, the Center for Health, Education, and Research (CHER) to house these two programs at a cost of \$2.8 million. Equipment and furnishings were not included in the funding for the building. ARC funding was obtained to purchase the equipment needed for the programs so that the facility was operational when construction was completed. The purchased equipment included state-of-the-art simulators, diagnostic equipment, and associated furnishings to improve the level of training for students in the programs. ARC funding for equipment was \$750,000 out of \$3,550,000 in total costs. The facility opened in 2010.

Project Planning and Implementation

Morehead State University had plans to upgrade the available instructional technology and facility for the health science programs of nursing and imaging sciences for several years. Funding for construction requests were submitted to the state legislature for inclusion in the Morehead State University's budget for several years as well, until funding for the CHER building was included in the budget in 2008.

In addition to Morehead State University and the academic programs of Nursing and Imaging Sciences, partners in planning, instruction, and implementation of these programs included St. Clair Hospital in Morehead and the University of Kentucky's Medical Center. The plan among these partners was to develop the programs with access to state-of-the-art technology. Led by the Provost's office, Morehead State University worked with ARC to fund the equipment and other technology needed for the updated programs. Equipment included in the CHER funded by ARC includes simulation mannequins, radiography machines, and other training and diagnostic systems and software.

Consistent with the mission of Morehead State University to serve its portion of the Appalachian Region in Kentucky, the goals of these programs include providing highly trained health care professionals for the region. With the high-tech instruction from the CHER, and Research, and the practical experience provided by the partners of St. Clair Hospital and the University of Kentucky, graduates of the program are well prepared to enter the health professions.

Economic and Community Impacts

Because the two health science programs at Morehead State University reached full enrollment capacity, community impacts include more potential health professionals to provide health services in the region who were also trained there. The CHER building has continued to make the programs desirable for students interested in the health professions. Local health service programs have been assisted by student trainees in local clinic operations, coordinated both by St. Clair Hospital and the University of Kentucky. Health care professionals in Nursing and Imaging Science programs have also contributed to the health care work force in the region. Since the opening of the CHER building, 367 students have taken an exam for professional certification or licensing, and 352 of these students have passed the exam.

Alumni follow-up has determined that approximately 50 percent of the program graduates obtain professional employment in the Appalachian Region. Of those employed outside the region, many work in Lexington or Northern Kentucky, locations where many residents of Appalachian Kentucky travel for medical care as well. This represents an economic impact for employed graduates and the community to where they relocate. While few studies have actually

linked updated laboratory equipment to direct improvements in clinical outcomes, the underlying assumption is that better education of healthcare knowledge and procedures should also result in improved clinical outcomes. Thus, it is likely that the project also had a positive health impact as greater availability of well-trained medical graduates should improve healthcare accessibility and quality of care.

Lessons Learned

- ***ARC funds go farther when they fill needs that state funds do not*** - Funds from state government budgets often cover only building construction costs, so equipment and other technology must be funded from other sources. In this project, ARC was an invaluable partner for Morehead State so that the new Center for Health, Education, and Research was fully operational for academic programs.
- ***Partnerships between grantees and other organizations increase chances for success*** - The partnership of Morehead State, St. Clair Hospital, and the University of Kentucky resulted in a comprehensive plan for instructional capabilities as well as practical experience for the students. This partnership resulted in an outstanding program for the preparation of health care professionals for the region.
- ***Technology is a continuously needed but short-lived investment*** - High-tech equipment is changing and up-dating continuously. The equipment included from this project is now nearly four years old, and newer technology is becoming available. Seeking equipment funds for technology dependent programs is an on-going process, and Morehead State is already in the planning stages to replace the equipment and other technology.

Conclusion

The Morehead State University project was successful in providing state-of-the-art academic programs in nursing and imaging sciences. Graduates of the program have been successful in obtaining positions in health professions throughout the Appalachian Region. The ARC funding of this project was for a very specific purpose, to purchase the equipment and technology needed for the new facility. Direct results of economic and community health impacts are difficult to determine, but there is some evidence that graduates of the program are serving in health care professions in the Appalachian Region.

4.2.7 Western Maryland Health System – Regionally Integrated Electronic Medical Records System

The Western Maryland Health System (WMHS) and its Western Maryland Regional Medical Center (WMRMC), which opened in 2009, is located in northwestern Maryland where it serves as the primary comprehensive medical facility and hospital for residents of Maryland, Pennsylvania, and West Virginia. With ARC funding, WMRMC was able to purchase equipment that supports electronic medical records (EMRs) between the Medical Center and local health providers. As a result, it was expected that within one year of operation, 50 local physicians would be utilizing EMRs, serving about 250,000 patient visits. The ARC provided \$45,000 in project funding, representing seven percent of the project's total costs. It was approved in 2010 and closed in 2012.

Community Profile

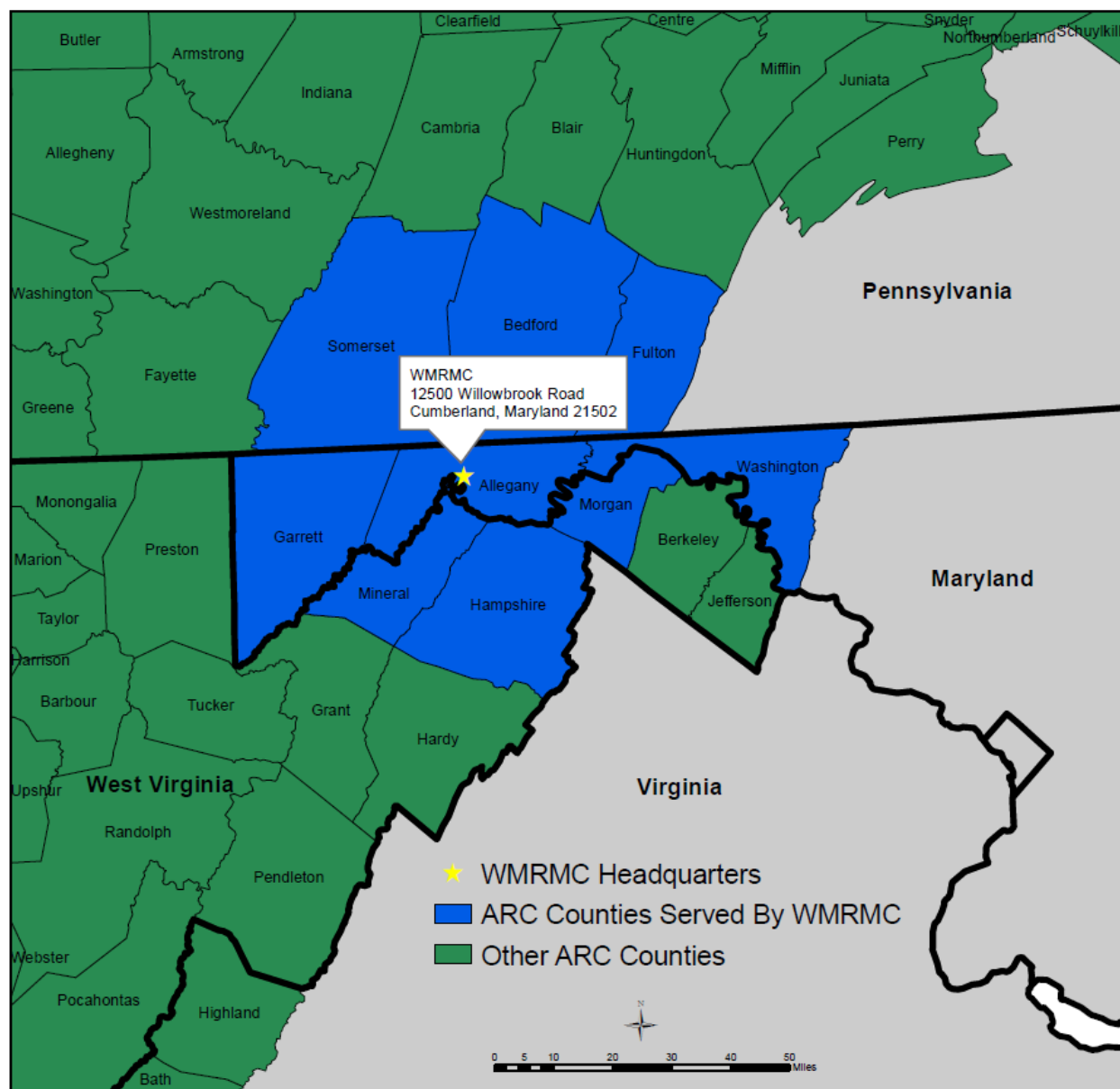
The WMHS is headquartered in Cumberland, Maryland, which is located in Allegany County. The Medical Center there also primarily serves the residents of Garrett and Washington counties in Maryland; Bedford, Somerset, and Fulton counties in Pennsylvania; and Mineral, Hampshire, and Morgan counties in West Virginia, all of which fall into the Appalachian Region (see Figure 4.6).

Allegany County, Maryland is located in the far western portion of the state. The total county population is 74,692 residents, 27 percent of whom live in rural areas, which is lower than the ARC average of 42 percent. County unemployment rate is around nine percent, compared to the state unemployment rate of seven percent and unemployment rate of nine percent in the Appalachian Region. The county has a median household income of \$38,504 which is well below the state median household income of \$70,075 but close to the median household income of \$42,915 across the entire Appalachian Region.

Within Allegany County, a few health indicators stand out. Eighteen percent of adults within Allegany County reported being in fair or poor health and 14 percent of county residents are living with diabetes. In contrast, the state of Maryland reported 13 percent of adults in poor or fair health and nine percent of adults within the state living with diabetes. Across the entire Appalachian Region, 18 percent of adults reported being in poor or fair health and 11 percent of adults are living with diabetes. Within Allegany County, 31 percent of adults are considered obese while 28 percent of adults are considered obese across the state of Maryland and 31 percent of adults are considered obese in the Appalachian Region.

Access to care is another important health indicator. Fifteen percent of adults and five percent of children in Allegany County are uninsured. This number is comparable to the state of Maryland data which reports that only 16 percent of adults are uninsured and five percent of children are uninsured. However, these measures may change soon as a result of the Affordable Care Act. Finally, 12 percent of adults living in Allegany County reported not being able to see a doctor because of costs, compared with the 14 percent of adults across the Appalachian Region reported in the same situation.

Figure 4.6 Service Area for Western Maryland Medical Center in Allegany County, Maryland



Data Source: Appalachian Regional Commission



In the nine county service area for WMHS (shown in Figure 4.6), the total population is 464,430, 56 percent of whom live in rural areas. Moreover, the median household income is \$43,455 and the unemployment rate is almost nine percent, which is just about even with the averages for the Appalachian Region. Also, 17 percent of adults reported poor or fair health and 12 percent of adults are diabetic. Most of the counties have fewer than 10 family or general practitioners in their county with the exception of Washington County, Maryland, which has 70 providers, and Somerset County, Pennsylvania, which has 22 providers. Connecting the providers in this area, given that most are few and far between, is a challenge and a priority for the WMHS.

Project Description

In order to improve coordination between its primary Medical Center and other local health providers, the WMHS used grant funding from ARC in order to create a Health Information Exchange. Thus, the project involved purchasing software and equipment for local health providers that interface between Electronic Medical Records (EMRs) at the Medical Center and other EMR systems in the community. Funding from the original ARC grant allowed WMHS to connect with 53 local health providers, though it has expanded since then. Of the project's total costs of \$611,725, project funding from ARC amounted to \$45,000, all of which went to the purchase of EMR equipment for local providers. The remaining \$550,000 came from WMHS to setup EMR hardware and software in the Medical Center and its employed providers. The project was approved on July 30, 2010 and closed in 2012.

Project Planning and Implementation

In early 2009, the Vice President and Chief Information Officer at WMHS, presented a 5-year strategic plan for the use of information technology in the WMHS in which he put together a roadmap for establishing EMR capabilities for the Medical Center of their employed local providers. The plan was quickly approved, but financing was tied up in the new Medical Center, which was completed in 2009. Therefore, the ARC grant seemed like an ideal way to help increase adoption of EMR technology in the community. While the plan probably would have been adopted regardless, the ARC funding accelerated the project by at least a few years.

For the ARC project, WMHS set up a Physician Advisory Committee that meets three to four times annually and rotates its membership. While the committee primarily consulted on the EMR Integration project, they have also advised on other EMR-related advances, such as a new computerized provider order entry system. To prepare for the project, WMHS talked with the Physician Advisory Committee who agreed that the EMR plan was valuable, especially for having quick access to test results that their patients received at the Medical Center. Soon, they set up an EMR vendor fair for local healthcare providers to learn about the different EMR systems.

Providers then gave feedback and thoughts on the EMR companies, and fortunately, most agreed that eClinicalWorks had the best content for a reasonable price.

The start-up costs for the project were undertaken by WMHS and included getting an EMR system for the Medical Center and setting up the server hardware that served as point-to-multipoint interface (a.k.a., “the hub” for outside EMR systems). Next, WMHS negotiated with the EMR provider to reduce the cost from \$7,500 to \$2,500. They then purchased the \$2,500 system for 53 local healthcare providers and the ARC project reimbursed them for this expense. Thus, the ARC funds were used to purchase EMR systems for 53 local healthcare providers, all of which were able to interface to the hub at the Medical Center. eClinicalWorks then conducted multiple fairs in the area in order to train all physicians on their EMR systems.

When the goal of reaching 50 local providers was set in the ARC proposal, this objective had seemed optimistic at the time, even though about half of these providers were owned by WMHS. Adoption seemed slow and did not happen until late in the project, and WMHS was grateful that ARC was understanding of the extended timeframe. However, once the process began, local physicians were quickly recruited for the program throughout the Cumberland tri-state area at a rate that was, according to the Vice President of WMHS, “quicker than I thought we ever could.”

Economic and Community Impacts

During the course of the project, 53 local health providers joined the Health Information Exchange (HIE), meeting the project’s initial goal. Since the project, even more local providers have joined the HIE established at the WMHS’s Medical Center. To date, over 70 health providers have joined the network and WMHS has paid the \$2500 for each new EMR system not covered by the ARC grant. While it is difficult to estimate, the Vice President of WMHS expects that there are at least 150,000 patients in the system, especially considering that they are the only hospital and emergency department within a catchment area of 250,000 and have about a 75 percent market share for urgent care and the majority share of blood lab work. Given that the original goal was to serve 250,000 patient visits (not individual patients), it is very likely that they have met and surpassed that goal as well. According to WMHS’s Vice President and Chief Information Officer, the project was “very successful” and because of ARC funds, they were “able to achieve all the goals and accelerate the achievement of those goals.”

The newly established HIE has numerous health and economic impacts. Primarily, it allows for urgent care and lab results to be quickly sent electronically to the patient’s primary care provider and highlight patient lab tests if they are abnormal, improving the quality of care and cost efficiency. This aligns with a review of recent literature on the impact of health information technology, which found that 92 percent of recent articles have reached positive conclusions and have associated EMRs with greater efficiency and effectiveness of care, and improved patient

safety and satisfaction.⁵³ Additionally, the system receives heavy use, and as a result, mailings to local health providers have decreased significantly lowering administrative costs.

Looking forward, WMHS would like to see an expansion in the quantity and quality of data that can be shared with providers. The WMHS Medical Center would like the ability to receive information from local providers if, for example, one of their patients were in the emergency room. While “the hub” has the capability to receive, the trouble is coming up with the standard for how to interface between the systems, though they hope to accomplish this soon. They also would like to conduct a survey of the local providers to evaluate the existing EMR services provided by the Medical Center. Still, the Vice President of WMHS is happy with the success of the project and is comfortable saying that local health providers “see the value in this and in doing more.” He expressed that this was one of the most rewarding projects in his 25-year professional career.

Some challenges that WMHS continue to face deal with local providers’ satisfaction with the EMR systems. On one hand, local providers claim that EMRs reduce efficiency because doctors are no longer able to scribble their results. Yet, primary care providers do appreciate when information is easily accessible; the ability to send and receive paperwork electronically (e.g., e-prescriptions) makes the process more efficient. While a couple providers did refuse to buy an EMR system for their practice, no one who has adopted the system has dropped it. In fact, all providers must pay a few hundred dollars a year to eClinicalWorks to maintain use of the service, and every local provider has done so thus far. This can be seen as evidence that local providers see the economic benefit of ARC’s initial investment and ensures the sustainability of the HIE moving forward.

Lessons Learned

The project used ARC funding to help local providers purchase EMR equipment so that they could interface with a Health Information Exchange being set up by a regional medical center. There are some lessons that emerge from an examination of this project.

- ***Project planning ensured community support*** – Before purchasing any EMR equipment, WMHS set up a Physician Advisory Committee and invited local healthcare providers to an EMR vendor fair to give feedback on their preferred systems. These steps helped the community accept use of the EMR system once a certain threshold of local health providers adopted the system.

⁵³ Buntin, MB. et al. 2011. “The benefits of health information technology: a review of the recent literature shows predominantly positive results.” *Health Aff (Millwood)* 30: 464–71.

- ***A highly motivated and organized grantee makes for successful project implementation –***
While the ARC contribution to the project was relatively small, its success was almost ensured by the motivation and resources of the WMHS. In fact, WMHS was willing to purchase the EMR system for 53 health providers and then get reimbursed by ARC, which was a logistical challenge for WMHS but highly effective for ARC funding. By using ARC funding to encourage adoption of a worthwhile investment to small practices, the project helped build momentum for the regional Medical Center. In turn, the Medical Center will ensure the sustainability of the project.

Conclusion

This project was successful because ARC saw an opportunity in a regional hospital to be the primary driver of EMR adoption by primary care providers in the area. Although the ARC investment was relatively modest at \$45,000—which represented only seven percent of the project and likely less given the addition of other local providers—it gave the WMHS the financial motivation needed to overcome the start-up costs of establishing an advanced health information network in their region. Moreover, the investment seems sustainable as WMHS continues to work with local physicians to improve the EMR integration in ways that fosters efficiency gains for everyone, even after achieving their original goals. Given the demonstrated economic benefits, expected health benefits, and the relatively low investment required from ARC, this project exceeded expectations and was a successful investment for the area.

4.2.8 Health Care Foundation of North Mississippi, Mississippi –

HealthWorks! and related projects

The Health Care Foundation of North Mississippi is the fundraiser for the North Mississippi Medical Center System; the Foundation has been in existence since 1980. The Foundation took ownership over healthcare projects that were outside the purview of the daily activities of the hospital whose mission is to provide excellent patient-centered care. Health education and outreach activities for the most part are organized and implemented by the Foundation. HealthWorks! North Mississippi was one notable project that the Foundation launched through funding provided by the ARC. HealthWorks! is an interactive children's health education center whose mission is to improve health knowledge and outcomes among children in Mississippi. A series of three ARC grants have helped to create the center and support innovative programming with students. The ARC provided \$517,606 over the three grants evaluated, representing 34 percent of total costs. The projects were implemented in 2007, 2009, and 2010. The original expectations for this project included building a 15,000 square foot interactive education health

center, recording at least 40,000 admissions to HealthWorks! annually and providing transportation to 5,000 students. In addition, of the students surveyed, at least 60 percent of them will demonstrate gains in health knowledge.

Community Profile

The HealthWorks! interactive children's health education center is located in the city of Tupelo, in Lee County, Mississippi, which is located in the northeastern portion of the state. The total county population is 84,156 residents, 45 percent of whom live in rural areas, which is slightly higher than the ARC average of 42 percent. The county unemployment rate is around 11 percent and is identical to the state unemployment rate of 11 percent and higher than the ARC unemployment rate of nine percent. The county has a median household income of \$40,983, which is above the state median household income of \$36,963 but lower than the median household income of \$42,915 across the entire Appalachian Region. Twenty percent of adults living in Lee County reported not being able to see a doctor because of costs.

The overall goal of the program is to improve physical activity, particularly in the area's youth. Looking at the adult population, 18 percent of adults reported being in fair or poor health and 13 percent of county residents are living with diabetes. Thirty-four percent of adults are considered obese in Lee County, compared with 36 percent in Mississippi and 31 percent in the Appalachian Region. Additionally, 31 percent of adults in Lee County are physically inactive compared with 33 percent across the state.

Of course, the reach of HealthWorks! goes beyond Lee County to at least the 19 northern counties of Mississippi that are part of the Appalachian Region. The Appalachian Region in Mississippi has an estimated total population of over 628,000 residents, 68 percent of whom live in rural areas. The region's unemployment rate is around 12 percent and the median household income is \$34,519. The Appalachian Region in Mississippi has 22 percent of adults reporting poor or fair health, 13 percent of adults are living with diabetes, 35 percent of adults are obese, and 34 percent of adults are physically inactive. Although Lee County and the city of Tupelo are similar on many health indicators, the Appalachian Region of Mississippi as a whole has more dismal numbers than Lee County in particular.

Project Description

In order to improve the health of the youth in Mississippi, HealthWorks! used funding from ARC for several unique but related projects. The first of these was to build a 15,000 square foot interactive children's health education center that features hand-on exhibits and state-of-the-art displays. The project was implemented in 2007 and \$300,000 of the project's total costs of \$1.2 million came from ARC. In 2009, a second project supported substance abuse programming for

adolescent girls and ARC provided a 50 percent match, paying \$65,638 of the total cost of \$131,276. Finally in 2010, the third project extended programming to nearly 5,000 third- to fifth-graders from 12 distressed counties by supporting transportation to the HealthWorks! center and follow-up outreach to the schools.

Project Planning and Implementation

The Board of the Health Care Foundation of North Mississippi recognized that health education was lacking within the school system. The initial response was to allocate resources to support health nurses and educators within the schools. However, the Board still felt that while this was an important resource to have, a different catalyst was needed that would change the health behavior of children, something more proactive and preventive. The Board heard of a children's health museum, HealthWorks!, out of South Bend, Indiana that was designed to be an interactive and fun educational experience for children in elementary and middle schools. The Board visited HealthWorks! and decided it was a model that might work in Tupelo.

Next, the Board applied for funding to ARC for the renovation of the building that would eventually house HealthWorks!. The building used to be a medium-sized grocery store. After the renovation was complete, it became clear that many of the schools in the more distressed Appalachian counties of Mississippi could not afford to bus students to the facility. The Board then applied for and received funding to reimburse schools' transportation costs associated with transporting a total of 3,000 students enrolled in the 3rd through 5th grades. To date, there has been roughly \$6.7 million invested in the HealthWorks! Program; \$4.7 million has been generated through two capital campaigns and the remaining \$2 million was donated by two local physicians and other members of the medical community.

The HealthWorks! model includes numerous programs: BodyWorks, Lighten Up: Running is Fun, Together, We Can!, Boy and Girl Scout Programs, and Be a Food Groupie. In addition there were small targeted classes for boosting self-esteem and preventing substance use and abuse. A lot of the programs are provided on-site but the staff will also take their programs on the road and travel to the schools, and recently have started working with the home-schooled population. In addition, HealthWorks! maintains regular exhibits around healthy eating and physical activity.

The HealthWorks! program that attracted the largest number of participants was Be a Food Groupie which was a Mississippi Board of Education sanctioned interactive curriculum designed to improve student health knowledge. Students were bussed in from their respective schools and spent a day at HealthWorks! with a portion of their day in a formal classroom setting and the rest of their day engaging in physical activities and exploring the exhibits. Teachers utilized Be a Food Groupie in the classroom and then six months later the students returned to HealthWorks! to complete the final components of the program.

Economic and Community Impacts

Approximately 8,000 students from surrounding counties have visited HealthWorks! and the curriculum has been introduced in their schools. An external evaluator was hired to measure the success of the Be a Food Groupie program. The results suggested that attending HealthWorks! specifically to participate in the Be a Food Groupie program has a significant positive effect on student understanding and retention of valuable health information, including how to correctly interpret food labels, the importance of eating a variety of healthy foods, and a better ability to manage portion sizes. The evaluation suggests that 83 percent of students (N=1,000) demonstrated an improved post-test score compared to the same pre-test they took prior to participating in the Be a Food Groupie program. ARC set a benchmark success rate of 60 percent, thus the results far exceeded expectations. Students specifically mentioned that they learned something new both about food labels and USDA's MyPlate program.

A formal evaluation also measured teacher satisfaction with the Be a Food Groupie program. The success of this program hinges on teachers incorporating the curriculum into their classrooms in between student visits to HealthWorks! Survey data from 221 teachers who used the Be a Food Groupie curriculum found that 99 percent of teachers agreed that Be a Food Groupie enriched or reinforced student health knowledge. In addition, nine out of 10 teachers reported that they had actually learned something new.

The long-term anticipated outcomes associated with the HealthWorks! program is to prevent obesity in children which is a risk factor for diabetes and heart disease. In addition, the programming could also be used to address those at-risk youth who started off overweight or obese. While the program was designed to be implemented in a group setting, there were opportunities for individual students with current poor health conditions to work towards improving their health outcomes. For example, there was one student who started the program weighing 300 pounds. She received both group and individualized education and was granted access to the community health center next door and worked to lose weight by swimming. If the HealthWorks! program had not existed it is likely that this child would not have changed her behavior.

One study explored the factors that were likely to give rise to obesity. Their findings suggested that the following had a significant effect on obesity in the majority of the studies reviewed: intake of fruits and vegetables (negative relationship), sugar sweetened beverages (positive relationship), breakfast skipping (positive relationship), eating out (positive relationship), portion sizes (positive relationship), family meals together (negative relationship), physical activity

(negative relationship), and sedentary behavior (positive relationship).⁵⁴ To the extent that the Healthworks! Program is able to significantly change these food and physical activity behaviors then the program will likely be successful in reducing overweight and obesity in children.

There has been scattered evidence about the effectiveness of school-based interventions on the improvement in health behaviors and outcomes. In general, the findings suggest that roughly 33 to 45 percent of diet, physical activity and combined (physical activity and diet) school-based interventions have resulted in significant and positive outcomes. These interventions tend to be a minimum of 12 weeks in duration.⁵⁵ It is not likely that the HealthWorks! program itself will result in a significant change in health outcomes in the short-term because it serves more as of an introductory intervention; however, it could serve as the catalyst for longer-term comprehensive health promotion programs within in the school system. A Comprehensive School Health Program (CSHP) would entail “1) planned, sequential health education across the whole curriculum, 2) school-based health services, 3) the school environment, 4) physical education at school, 5) food services, 6) counseling services, 7) health promotion among school staff, and 8) school/community integration of health promotion efforts.”⁵⁶

The economic consequences of childhood obesity are typically categorized as either direct or indirect costs. Direct costs include medical costs associated with treating obesity and the complications associated with obesity. The direct costs of childhood obesity include annual prescription drug, emergency room, and outpatient costs of \$14.1 billion, plus inpatient costs of \$237.6 million.⁵⁷ An even larger cost is incurred when obese children become obese adults. About one-third of obese preschool children, and about half of obese school-age children become obese adults. Indirect costs include job absenteeism, lower productivity, disability premiums, transportation costs, and human capital accumulation.

Another study estimates the likely future economic burden that will result from current high rates of overweight in US adolescents. They simulate the costs of excess obesity (and associated diseases) among US adults aged 35 to 64 years from 2020 to 2050. Results suggest that currently existing levels of overweight adolescents will result in close to \$45 billion in direct medical costs

⁵⁴ Davis, et al. . 2007. “Recommendations for Prevention of Childhood Obesity.” *Pediatrics* 120(4): 229-253.

⁵⁵ Brown, T., and C. Summerbell. 2009. “Systematic Review of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity; an update to the obesity guidance produced by the National Institute for Health and Clinical Excellence.” *Obesity Reviews* 10: 110-141.

⁵⁶ Deschesnses, Marthe, C. Martin, and A. Hill. 2003. “Comprehensive Approaches to School Health Promotion: How to Achieve Broader Implementation.” *Health Promotion International* 18: 4, 387- 396.

⁵⁷ Cawley, John. 2010. “The Economics of Childhood Obesity.” *Health Affairs* 29(3): 364-371.

over this period, affecting young as well as middle-aged adults.⁵⁸ An intervention designed to reduce or combat childhood obesity could have significant impacts on health care costs as well as the long run indirect costs associated with loss in worker productivity.

Lessons Learned

There are several key takeaways from the three projects in this case study:

- ***Volunteers can be the key to a successful project*** - The Lee County Medical Alliance played an important role in the ability to implement health education programs at HealthWorks! Volunteers acted as mentors for individual kids as they tried to lose weight. Like most nonprofits, the Foundation is always struggling to maintain a sustainable group of volunteers.
- ***Projects can have greater impact when incorporated with policy and educational curriculum*** - The constraints on adding new curriculum to the classroom are nearly insurmountable given how much material teachers are required to cover within a given academic year. Because the HealthWorks! Curriculum was sanctioned by the Board of Education, incorporating this into the classroom was a relatively easy process. In addition, the relationship between the school principals and teachers was essential. School officials recognized the importance of interactive learning and encouraged participation.
- ***Private contributions are a good sign of community support*** - HealthWorks! was very fortunate to receive the majority of the needed funding through capital campaigns and contributions by local physicians. Over \$6 million was contributed which was used to fund exhibits, renovations, and personnel. Physicians and medical providers viewed this as a good investment because it was interactive and educational. The pre- and post-tests revealed that students were learning and adapting their behavior based on the HealthWorks! program.
- ***Projects should have an interest in evaluating themselves*** - ARC funded the Be a Food Groupie program evaluation. This evaluation provides evidence of the success of HealthWorks! largest program, in terms of overall number of students participating. These results are what drive future contributions to HealthWorks! In addition, the self-evaluation provides suggestions for improvement so that the program can continue to address the health needs of the youth in the Appalachian Region.

⁵⁸ Lightwood, James, K. et al. 2009. "Forecasting the future economic burden of current adolescent overweight: an estimate of the coronary heart disease policy model." *American Journal of Public Health*. 99(12): 2230–2237.

Conclusion

The original expectations for this project included building a 15,000 square foot interactive education health center, to record at least 40,000 admissions to HealthWorks! annually and to provide transportation to 5,000 students. In addition, of the students surveyed, at least 60 percent of the students will demonstrate gains in health knowledge. After the first year, more than 60,000 visits had taken place, which was significantly more than anticipated. Standards-based nutrition and physical activity programming was disseminated to close to 3,000 third-through fifth-graders in Mississippi counties designated as distressed. Ninety-nine percent of teachers agreed that the program connected with students, 97 percent agreed that equipment was in good working order, and 92 percent believed that students would retain knowledge of healthy behaviors. Eighty-three percent of sampled students who completed pre-tests demonstrated gains in health knowledge as measured by the results of post-tests. In conclusion, in the evaluator's opinion the project has exceeded the initial expectations.

4.2.9 Center for Rural Health Innovation, North Carolina –

MY Health-e-Schools

The Center for Rural Health Innovation (CRHI) in Bakersville, North Carolina, was founded in 2010 after a grant from ARC kick-started its primary program: MY Health-e-Schools. Through the project, CRHI purchased telehealth technology for three schools allowing CRHI's nurse practitioner or physician to conduct scheduled medical appointments with students from the school nurse's office. The telehealth technology was expected to give 480 students access to the telehealth facilities about 1,570 times each school year and increase efficiencies for students, parents, and healthcare providers. The ARC provided \$89,459 in project funding, representing 70 percent of the project's total costs. The project was approved in 2010 and closed in 2011.

Community Profile

The CRHI is located in the city of Bakersville, which is in Mitchell County, North Carolina. The project is also active in Yancey County, North Carolina; both counties are located in the far western portion of the state. The estimated total population is 15,445 residents for Mitchell County and 17,701 for Yancey County. In Mitchell County, 83 percent of residents live in rural areas, (which is double the Appalachian Region average of 42 percent), the unemployment rate is around 12 percent, and median household income is \$35,322. In neighboring Yancey County, 100 percent of residents live in rural areas, the unemployment rate is also around 12 percent,

and median household income is \$36,440. In comparison, the median household income is \$44,028 for North Carolina and \$42,915 across the Appalachian Region.

Within Mitchell County, 20 percent of adults reported being in fair or poor health and 11 percent of county residents are living with diabetes. Within Yancey County, 19 percent of adults reported being in fair or poor health and 10 percent of county residents are living with diabetes, which is comparable with the percentages for the state of North Carolina and the entire Appalachian Region.

Given that the project aims to improve access to healthcare professionals, access to care is another important health indicator. Both Mitchell and Yancey counties contain fewer than 10 family and general practitioners and fewer than 10 pediatricians; however, there are 33 nurse practitioners in Mitchell County and 19 in Yancey County. Sixteen percent of adults living in Mitchell County and 14 percent of adults in Yancey County reported not being able to see a doctor because of costs.

Additionally, in Mitchell County, 23 percent of adults and eight percent of children are uninsured, while 28 percent of adults and 12 percent of children are uninsured in Yancey County. By comparison, 24 percent of adults and eight percent of children are uninsured across North Carolina. However, these figures may change as a result of the Affordable Care Act.

Project Description

The project involved equipping three elementary schools with telehealth carts and high-definition videoconferencing equipment, which included a webcam, an exam camera, a telephonic stethoscope, and a digital otoscope. Project funding from ARC amounted to \$89,459 of the project's total costs of \$127,798 and all went toward the purchase of the telehealth equipment. The remaining \$38,339 came from the Samuel L. Phillips Family Foundation, a local foundation primarily active in Mitchell County, North Carolina. The project was approved in July 2010 and was closed in September 2011.

The premise for MY Health-e-Schools is once a child has received parental consent, a school nurse can schedule an appointment to connect with the CRHI's nurse practitioner. The parent is notified of this and invited to virtually attend the appointment as well. Using the telehealth equipment, the nurse practitioner is able to observe, diagnose, counsel, and prescribe medications to the child patient. Examples of common illnesses that can be addressed by a nurse practitioner include influenza, an earache, or a skin infection like a rash.⁵⁹ Finally, MY Health-e-Schools services are

⁵⁹ For information on the MY Health-e-Schools model can be found on their website <<http://www.crhi.org/MY-Health-e-Schools/>> or on Youtube <<http://youtu.be/qRBKa2SAobA>>. Accessed on April 30, 2014.

free for children with no insurance, and they also accept Medicaid and private insurance. Their ability to bill Medicare and private insurance companies has brought in income for the program.

It is important to CRHI that the community understand that the program is not intended to replace the school nurse or the child's regular doctor. School nurses are encouraged to utilize this program as another tool for promoting child health. Overall, the school nurses have been receptive and willing to be trained on the telehealth equipment and enthusiasm was also expressed when MY Health-e-Schools was presented at a state school nursing conference. To keep a child's local doctor involved, MY Health-e-Schools faxes clinical notes to primary care physicians to make them aware of the visit. Reception by local physicians has been mixed. While MY Health-e-Schools is still trying to negotiate a relationship with some local primary care physicians, others have been very supportive citing that the program reduces a bottleneck of appointments in the late afternoon for minor ailments. Additionally, while the program is housed in the schools, it does not require any funding from the school systems or the county governments. In addition to the ARC funding, a large amount of community support is responsible for the success of the project. They have a local physician on their board and have close relationships with the local health department, the school system, several social services providers, and the local hospital.

Project Planning and Implementation

CRHI's Founder and President had several experiences that led him toward developing the MY Health-e-Schools program. He spent two years participating in Teach for America, in eastern North Carolina, where he first learned about school-based healthcare at schools large enough to justify sharing a nurse practitioner one day a week. While earning his Master's in Public Health, at the University of Rochester, the hospital was involved in a school-based telemedicine program as a way to reach out to rural communities. Unlike the larger schools in eastern North Carolina, some rural schools have less than 60 children, which does not justify the hiring of a nurse practitioner or similar medical professional. However, he realized that telehealth technology could allow for these smaller schools to gain access to nurse practitioners as well, so he brought this idea western North Carolina.

The President of CRHI spent about a year planning for CRHI and MY Health-e-Schools without any grant funding. He organized a needs assessment in the local community that included a survey of local parents (30 percent response rate), teachers, and students, as well as focus groups with community stakeholders to identify if there was a need and demand for this type of service. This time was also spent marketing the idea to community leaders, including the school system and local health department and planning the logistics of the project.

Prior to this project, the President of CRHI was not familiar with ARC. Following a conversation with an ARC staff member, he successfully applied for ARC funding. At this initial phase, 70 percent of the project's funding came from ARC—the second-highest percentage of all the case studies—and the remaining 30 percent came from a local foundation. All of the ARC'S funding went to the purchase of the three telehealth carts. The initial investment made MY Health-e-Schools accessible to about 480 children and started the CRHI, which is incorporated as a tax-exempt nonprofit organization under Internal Revenue Code 501 (c)(3).

Today, 90 percent of the CRHI is currently devoted to operating, promoting and improving the MY Health-e-Schools program. They are working toward a partnership with the local hospital to offer tele-psychiatry along with pediatric cardiology and nutrition counseling. Additionally, they are hoping to soon develop a way for parents to join in the appointments virtually as well to join in the child's consultation while at home or work. Furthermore, they are currently working on another project called "Homegrown Health," where they are trying to build a new facility attached to the high school to serve as a student clinic, life science classrooms, and a public health education space to showcase new technologies.

Current challenges to the program include the \$130,000 in recurrent funds for operational costs. While they are currently able to bill Medicaid and private insurance, this only covers about \$20,000. Thus, MY Health-e-Schools still requires grant funding while they attempt to increase utilization of the program in the area. However, CRHI has found the rate at which the program was adopted by individual users was slower than expected. According to the director, the community needs to be convinced of two different ideas: 1) that the school can serve as a place to receive healthcare; and 2) that the telehealth system, in which the provider is only virtually present, is effective. They are simultaneously promoting both a new access point for health and a new delivery system. While the infrastructure for the program is now in place, encouraging people to support and utilize it continues to be a challenge. He hopes that utilization will increase now that they are at operating in every school (as of the Fall of 2013).

Economic and Community Impacts

ARC funding purchased telehealth equipment for three schools, which increased healthcare access to approximately 480 students. Since then, MY Health-e-Schools has grown significantly, matching the \$120,000 from the original project with a USDA Rural Utilities grant to get \$390,000 for seven more sites. CRHI has also received grants from the Health Resources and Services Administration (HRSA) with two partner organizations to get another round of four carts.

Now three years into the project, they have equipment and operate in 14 schools in Mitchell and Yancey counties. This allows them to reach up to 4,000 children, though currently only 2,000 students are enrolled in the program. In other words, the health impact of the project (measured

by the number of enrolled patients) has more than quadrupled in the two and a half years since the project was closed. Furthermore, CRHI has observed a 10 percent decrease in ER utilization for kids aged 5-18 for non-urgent issues in the last school year. This is evidence that MY Health-e-School is having an especially positive health and economic impact on children without health insurance, who are able to enroll and setup an appointment free of charge.

In terms of economic impacts, the expansion of CRHI has also led to new jobs as a result of MY Health-e-Schools. CRHI has been able to hire a full-time Executive Director, a full-time Nurse Practitioner (who came from the local health department), a full-time Program Coordinator, and a half-time staff for publicity and billing. Additionally, the program supports a fraction of the salary for CRHI's President and Medical Director; both positions are filled by the same individual. Additionally, surveys administered by CRHI to the parents of enrolled students reveal that "parents [are] saying that it's a huge benefit for them" as they no longer have to miss work to tend to a sick child. A study of another rural school-based telehealth program found that 71 percent of their patient's parents would have missed an average of 3.0 hours of work, resulting in an average of \$43 in lost wages (and economic productivity) per appointment.⁶⁰ If a similar estimate can be applied to this case study, this saves the local economy an additional \$100,000 for every 2,325 appointments through MY Health-e-Schools. Furthermore, because MY Health-e-Schools aims to work, and not compete, with local healthcare providers, it is strengthening the local healthcare industry.

Since CRHI's President attributes the existence of CRHI to the start of MY Health-e-Schools through the project, all of CRHI's current programming (described above) can be partially attributed to ARC. Most exciting is the possibility of MY Health-e-Schools as an innovative model for improving healthcare access in rural areas—already, CRHI has received federal contracts that earn \$10,000 to \$15,000 to help set up similar school-based healthcare programs. MY Health-e-Schools is innovative in several ways. First, according to CRHI's President, "MY Health-e-Schools is one of the few programs in that nation that is not associated with a hospital or university." In other words, it is a method of increasing healthcare access that comes from a non-profit organization. Furthermore, while telehealth is becoming more common, CRHI's President claims that the program is "one of the purely telehealth program in the nation," meaning that other programs may have their Nurse Practitioner travel to different sites everyday whereas their Nurse Practitioner stays in one place—"98 percent of our services is done via telehealth."

⁶⁰ Young, Thomas L., C. Ireson. 2003. "Effectiveness of school-based telehealth care in urban and rural elementary schools." *Pediatrics* 112: 1088-1094.

Lessons Learned

MY Health-e-Schools and the CRHI is an innovative program that is using telehealth technology to expand healthcare access to youth in schools. The project has positive health and economic impacts as a result. However, now in their fourth year, the program must now increase utilization in order to make the project sustainable. There are a few lessons learned from this case study:

- ***Seed money from ARC should continue to be used for riskier and innovative projects*** – Before ARC, CRHI could not get funding for MY Health-e-Schools because funders had never seen the program before. However, recognizing that innovative solutions are needed for tackling Appalachia’s health problems, ARC provided the seed money. Once the program was in place in three schools, its value was quickly noted, allowing for expansion. According to CRHI’s President, “without this [ARC] project, our organization wouldn’t exist. CRHI exists because my Health-E-schools program.” Much of CRHI’s current and future work is possible because of the financial support received from ARC.
- ***ARC can improve projects efficacy with provision of technical expertise*** - When asked, CRHI’s President suggested that technical expertise in telemedicine could have helped him develop the project more efficiently. Specifically, the project was challenged by choosing between so many different vendors for telehealth equipment and setting up an efficient workflow for a telehealth visit. These challenges were instructional but not necessarily cost efficient. For example, when starting the project, carts were originally \$30,000 but the most recent bunch were purchased for \$18,000—much of is due to cheaper technologies but also because their understanding of the market improved over time. To help, ARC may want to consider gaining market expertise in a few priority areas or referring projects to experts from past projects who can share lessons learned.

Conclusion

By providing medical care to students in their schools, MY Health-e-Schools is able to make healthcare more accessible to youth, which hopefully improves the child’s health and school attendance as well as the parents’ performance in the workplace. According to CRHI’s President, if it “hadn’t been for ARC funding our program would have been delayed or never occurred.” He expressed that other funders did not seem interested until he had a concrete plan that had proven successful, but it was ARC and the local foundation that gave him a chance to put his plan into action. The initial investment into three carts to reach 400 students has multiplied; MY Health-e-Schools now reaches 14 schools and 4,000 children. As a result, the project has exceeded expectations and has potential for continued growth. The next step for MY Health-e-Schools is to increase participation among eligible students from about half to nearly 90 percent

as well as find ways to make the system sustainable. If they can accomplish this and deliver results showing how the program is effective at improving child health and reduce absenteeism (both in school and for parents at work), then MY Health-e-Schools could well serve as a model for a grassroots solution to improving healthcare access in rural areas.

4.2.10 Meigs County Commissioners, Ohio –

Meigs County Community Clinic

Meigs County, Ohio, conducted this project in reaction to closure of the local Veterans Memorial Hospital in 2000. ARC funding was used as seed money to begin a community-wide effort to provide primary health care to the area. Specifically, ARC funds were utilized to procure medical equipment and supplies to start a clinic in a previously vacant medical building. Expectations were that the equipment would make the clinic operational, establish a medical and dental program, and create 12 new jobs. The project anticipated that the new facility would serve 9,145 medical encounters annually, and 85 percent of the patients would be residents of Meigs County, including unemployed, working poor, and uninsured individuals. The ARC provided \$180,725 in project funding, which was 12 percent of the project's total costs. It was approved in 2008 and closed in 2009.

Community Profile

Meigs County is located in the Appalachian Region of southeastern Ohio. It is historically a coal mining community, with some transportation industry because of its location along the Ohio River. As in many Appalachian communities, the population has been declining for many years. In 2000, Meigs Mines, the largest employer in the county, closed its operations. Shortly after the mining closure, the local hospital closed due to the reduced employment and population in the county. Statistics showed Meigs County had some of the highest levels of deaths due to heart disease, cancer, stroke, and diabetes in the state.

The estimated total county population for Meigs County is 23,680 residents, 81 percent of whom live in rural areas, which is nearly double the Appalachian Region average of 42 percent. The county unemployment rate is around 14 percent, which is higher than the 9 percent unemployment rate of both the state of Ohio and the Appalachian Region. The county has a median household income of \$33,520, which is well below the state median household income of \$45,803 and the median household income is \$42,915 across the entire Appalachian Region. Meigs County is worse off economically compared with the Appalachian Region of Ohio, which has an unemployment rate of 10 percent and median household income of \$41,081.

Within Meigs County, 24 percent of adults are reported being in fair or poor health. In contrast, only 15 percent of adults in Ohio and 18 percent of adults in the Appalachian Region of Ohio share those conditions. However, the percentage of adults with diabetes and obesity are comparable to the Appalachian Region and state averages. Within Meigs County, 32 percent of adults are obese and 11 percent are diabetic, compared with Ohio, where 30 percent of adults are obese and 11 percent are diabetic.

Because the purpose of the project is to establish a health clinic, access to care is another important health indicator. In Meigs County, there are no medical facilities outside of private practices and outpatient care centers. There are an estimated 39 nurse practitioners, 34 registered nurses, and less than 10 family and general practitioners, pediatricians, physician's assistants, or dentists. Certainly, a new clinic will help to provide better healthcare access to the area.

Project Description

The Meigs County health project has been in the planning and implementation stages since 2001. A community coalition coordinated by the Meigs County Economic Development office led the effort to assess, plan, and implement appropriate health services in the county after the local hospital closed in 2000. Funds received from ARC were used for equipment in the clinic, especially dental equipment and for the emergency facility, and to help purchase the land for the location of the health care facilities. As a result of the ARC grant, this public and private coalition has resulted in the opening of a local health clinic that provides primary health care, mental health care, and dental care. Additionally, an emergency medical services facility is currently under construction with an expected opening date of summer of 2014.

Project Planning and Implementation

The Meigs County health project began in 2001 as a community coalition effort to assess county health care needs and options after the local Veterans Memorial Hospital closed. A steering committee initiated the project. The steering committee and coalition formation and operations were coordinated and supported by Meigs County Economic Development office. The project was overseen by an economic developer from that office, and the steering committee also worked with programs from both Ohio University and Ohio State University to determine the health situation in the county and to get local input about preferences for needed health care. A survey of local residents was also conducted to get input about most pressing health concerns and needs. Analysis of the local hospital situation also determined that conversion of the hospital to a Critical Access Hospital was not feasible in this case.

The coalition continued to meet for several years to try and find a way to provide health care to the community. The steering committee concluded that the most needed health services were emergency room services, primary care, and dental care. During this time, the community applied for Federally Qualified Health Center status four times. The third application was approved but not funded. The designation was officially received by Holzer Hospitals and Holzer Clinic. Other private partners became involved with the local effort, including Hopewell Health Centers, which operates several primary care clinics in other counties of the region.

During this coalition planning process, most county organizations, public and private, were involved at some level. Open meetings for the general public were conducted periodically as well for general information and input. County and city government and the county health department were critical partners throughout the planning and funding process.

Results of these efforts by the coalition and steering committee are being realized within the last couple of years. Land was obtained by the coalition for facilities just outside of Pomeroy on the main highway. Hopewell Clinics built and opened a clinic at this location with assistance from a HRSA grant. Primary care, dental care, and mental health care are available for patients at the clinic, and accommodations are made for patients without health insurance or who are underinsured. Currently an emergency care facility is under construction at the same site, across the street from the clinic. The emergency facility, operated by Holzer, is expected to open during the summer of 2014. The new emergency medical services facility will employ an additional 30 to 35 people and cost a total of \$8.8 million.

Economic and Community Impacts

The ARC grant was critical for the success of the project. The commitment of these funds allowed some tangible outcomes for the coalition effort that had been ongoing for years. As a result of the ARC commitment, other funding from both private and public sources was obtained for the clinic and the emergency facility. The additional funds totaled \$8.8 million, which is almost 49 times greater than the original investment from ARC. If even half of the additional funding can be directly attributed to leverage gained from ARC funds, this represents a huge economic impact for Meigs County.

Furthermore, the project has brought much needed jobs into a county that experienced a hospital closure. A study of hospital closures in rural counties between 1990 and 2000 found that the average hospital closure reduced per capita income by 4 percent and increased the unemployment rate by 1.6 percentage points.⁶¹ As a result of the project, the Hopewell Clinic

⁶¹ Holmes, George M., et al. 2006. "The effect of rural hospital closures on community economic health." *Health Services Research* 41(2): 467-485.

currently has 21 employees. These include primary care physicians and a dentist, health care support professionals, and office staff. The emergency care facility, scheduled to open in the summer of 2014, will have between 30 and 35 employees. In a county with an above average unemployment rate relative to both the state of Ohio and the Appalachian Region, these additional jobs—most of which qualify as skilled labor—represent a significant economic impact of the project.

In addition to the approximately 60 new jobs created by the new facilities, the economic and health impact of the services provided is a great benefit to the county. Overall, the Hopewell Clinic serves 20,000 visits per year at its Pomeroy location, which is more than double what was expected for the grant. As anticipated, many of these visits are from patients without health insurance or who are underinsured. Once completed, the emergency care facility is projected to serve a similar number of patients as well.

Lessons Learned

A few lessons emerged from this project:

- ***Community coalitions help lead to a successful project*** - The community coalition approach to assessment, planning, and fundraising was critical to the operation and success of the project. Community input and support was widespread among public, private, and governmental sectors of the county.
- ***Some projects take a long time*** - It was over ten years from the closing of the hospital and the beginning of the coalition efforts until the commitment to secure land and build the clinic and emergency facility was obtained. The role of the Meigs County Economic Development office and its director was essential to this entire project. Having the long term commitment and support of a sponsor was essential to maintaining the project over this long time period.
- ***Public-private partnerships can help communities raise additional funds*** - Private company involvement was a key to securing additional funding and to completion of the project facilities. The project showed that a public-private partnership can lead to a strategy of funding that includes government grants and private investment.
- ***Seed money from ARC can have a large per dollar impact*** - While the ARC grant was relatively small compared to the total funds raised for the project, it played an essential role to realizing the project results. ARC funds provided the seed money to secure equipment and land. This, in turn, provided a tangible base that attracted other funds from both public and private sources.

Conclusion

The Meigs County health project has been extremely successful and exceeded its expectations. This was a result of a long process that included a dedicated project sponsor, a community coalition, outside partners, public and private involvement, and many different funding sources. The Meigs County project used a \$180,725 ARC grant to leverage total project funds of \$8.8 million. The health care clinic is open and serving a large and previously underserved population with primary health care, dental care, and mental health care. The emergency medical facility will open later in 2014, and will provide the remaining service that was identified as most needed during the community process. Economic benefits include new jobs and health care spending remaining in the county. Community health care benefits are the number of patients and patient visits served, which includes uninsured and underinsured people who otherwise would not have access to health care services.

4.2.11 Lackawanna College, Pennsylvania –

Physical Therapist Assistant Certification

Lackawanna College is a private, accredited, two-year institution located in Scranton, Pennsylvania that had an enrollment of 1,522 students in its 2012-2013 year, about 80 percent of whom were from the local region. With ARC funding, Lackawanna College was able to start an accredited physical therapy assistant program, which began in the Fall of 2011. As a result, they were expected to train 15 students in the first class, 20-25 students in subsequent classes, and attain a 100 percent job placement rate within six months of graduation. The ARC provided \$100,000 in project funding, representing 29 percent of the project's total costs. The project was approved in 2008 and closed in 2012.

Community Profile

Lackawanna College's Physical Therapist Assistant Certification program is housed in the college's Lake Region Center, in the city of Hawley, located in Wayne County, Pennsylvania, which is in the far northeastern portion of the state. The total county population is 53,004 residents, 88 percent of whom live in rural areas, which is more than double Appalachian Region average of 42 percent. The county unemployment rate is around eight percent and is comparable to both the state unemployment rate of eight percent and Appalachian Region rate of nine percent. The county has a median household income of \$47,824, which is below the state median household income of \$50,221, but above the median household income of \$42,915 across the entire Appalachian Region.

Within Wayne County, a few health indicators stand out. Fourteen percent of adults within Wayne County reported being in fair or poor health, and 11 percent of county residents are living with diabetes, which is comparable with the percentages for the state of Pennsylvania and the entire Appalachian Region. Within Wayne County, 28 percent of adults are considered obese while 29 percent of adults are considered obese across the state of Pennsylvania and 31 percent of adults are considered obese in the Appalachian Region.

Access to care is another important health indicator. Eighteen percent of adults and seven percent of children in Wayne County are uninsured. This number is higher than the state of Pennsylvania, which reports that 15 percent of adults are uninsured and five percent of children are uninsured. However, these measures may change soon as a result of the Affordable Care Act. Finally, 14 percent of adults living in Wayne County reported not being able to see a doctor because of costs, identical to the 14 percent of adults across the Appalachian Region who were unable to see a doctor due to costs.

Of course, the reach of the Lackawanna College Physical Therapist Assistant Certification program goes beyond Wayne County and impacts, at the very least, to the Pennsylvania counties that are included in the Appalachian Region, which has an estimated population of over 5,793,000 people. In this area, there are an estimated 4,508 physical therapists, though data for many counties are not available. However, the number of therapists is expected to grow more than 23 percent in the next 10 years to reach a projected 5,562 physical therapists in the area by 2023. Certainly, this kind of increase will bring about an increased demand for physical therapy assistants. This program will help increase the total number of physical therapy assistants as well as decrease the number of miles people will have to drive to receive care.

Project Description

The project involved starting a physical therapy assistant program at Lackawanna College, requiring an exhaustive three-year evaluation for accreditation from the American Physical Therapy Association (APTA), which was received in May 2013. Funding from ARC paid for the \$12,000 accreditation fee (required by the APTA to start the evaluation process) as well as the salaries and travel expenses of personnel working directly with the project, including consultants hired by the college to help formulate the curriculum for the program, and the salary of the Program Director. Project funding from ARC amounted to \$100,000 of the project's total costs of \$345,908; the remaining \$245,908 came from Lackawanna College. The project was approved on July 18, 2008 and was closed on January 27, 2012.

Project Planning and Implementation

In 2007, Lackawanna College recognized a lack of accredited physical therapy assistant programs in the Scranton, Pennsylvania region and wanted to fill that educational void. College administrators formed an advisory board comprised of professionals in the field of physical therapy including healthcare professionals, physical therapists, school administrators, and core faculty to help create curriculum and hire administrators. Finding adequate funding was a primary concern given that Lackawanna College prides itself on its low tuition rates. An ARC grant was pursued because the creation of a workforce training program was in line with ARC's strategic goal of increasing educational opportunities and healthcare professionals working in the Appalachian Region.

In 2007, the Director of Grant Support applied for the ARC grant and was notified of the project's acceptance in 2008. Although the college anticipated launching the program in 2009, extensive requirements for certification by the APTA and difficulty in finding a qualified program director resulted in the program being delayed a year. Today's Director of Grant Support at Lackawanna College reports that the ARC was understanding about the delay and granted necessary extensions without penalties.

Soon after, the College Board hired a Program Director and an Academic Coordinator of Clinical Education. Both also serve as classroom instructors. While the program was being put together, the Program Director began the process of applying for board certification. Certification by the APTA is a three-year process that involves a litany of paperwork and a thorough audit of planned coursework and clinic partnerships in the region. Funds from the ARC grant were directly used to pay the \$12,000 application fee to the APTA, fund the salaries of the Program Director and an Academic Coordinator of Clinical Education, and help defer the costs of hiring curriculum consultants and recruiting local physical therapy clinics for practicums. Some training equipment was donated and the college took on other startup costs, including the renovation required at the school's Hawley Campus, which is located in an old silk mill. After a site visit and the proper documentation, the APTA granted the Lackawanna College Physical Therapist Assistant Program candidacy. Full accreditation was dependent on the performance of the first graduating class. The program received a five-year accreditation in May of 2013.

Today, the two-year program is located at the college's Hawley campus—45 minutes from Scranton, Pennsylvania—and involves three semesters of in-class academic instruction and an additional semester working as a student assistant in a local physical therapist's office. Lackawanna College continues to consult with the advisory board on the Physical Therapy Assistant program. The group meets twice yearly to discuss curriculum and other matters

pertaining to the program. Additionally, all program costs are covered completely by the college's general funds.

Economic and Community Impacts

In the fall of 2011, the program admitted its first class of 18 students, 16 of whom began the program. The students attended classes five days a week for three semesters before completing a semester in a clinical setting, working around 30 hours per week. Of the initial class, 14 students graduated from the program. All 14 students took the Physical Therapist Assistant licensing exam; 10 passed on their first try, resulting in a 71 percent pass rate. Within six months, all 10 of the newly licensed students were employed. While the project saw fewer students pass the Physical Therapist Assistant licensing exam than anticipated, it did succeed in attaining a 100 percent job placement rate for those who did pass. Dr. Augustine reports that none of the students have left the state for employment, and that the majority work in the Scranton, Pennsylvania area.

That all 10 of the newly licensed students were employed within six months supports the grantee's claim that there was a local demand for physical therapist assistants. As the Baby Boomer generation reaches retirement and demand increases for physical therapy services, a community suffering from a shortage of physical therapist assistants could lead to reduced access to quality healthcare. Therefore, we can expect that the training of these students and their placement in the Appalachian Region leads to positive health outcomes, especially for the aging population.

In terms of economic impacts, graduates of the program are gaining employment in the region, helping to strengthen the healthcare workforce. Many students are older individuals who have recently been laid off from declining industries like manufacturing. The program provides an opportunity to gain a marketable and highly employable skill with a two-year degree costing only about \$24,000, a low tuition rate for comparable programs. According to the Bureau of Labor Statistics, the 2012 median salary for a physical therapist assistant was \$39,430 per year, which is money that it is then spent in the local economy.⁶²

Both the Program Director and the Director of Grant Support at Lackawanna College report that the physical therapy assistant program has become a flagship program for the college in the last three years. In the fall of 2012, 18 students were again admitted and 15 began the program. In the fall of 2013, 18 students were admitted and all 18 began the program. The program has no plans to admit more than 18 students in the near future, as that would require additional licensing by the APTA. Additionally, the Program Director believes the students benefit from the

⁶² Bureau of Labor Statistics. 2014. *Physical Therapist Assistants and Aides*. <http://www.bls.gov/ooh/healthcare/physical-therapist-assistants-and-aides.htm>.

small class sizes and personalized instruction they receive from small cohorts. The program has not faced challenges thus far in recruiting potential students. Students have been pleased with the instruction they have received and clinical supervisors have been impressed with their preparedness.

The only potential challenge to sustainability the program may encounter is losing clinical partnerships. First, the program is required to maintain 25 percent more clinical placements than the number of students in each class (i.e., if 16 students need to complete a clinical practicum semester, the program needs to have 20 available placements), which means that clinics are not guaranteed a student. Secondly, physical therapy clinics do not receive compensation for allowing students to train in their facilities, which can be cumbersome. However, the program does not anticipate losing these contracts. The participating organizations have been happy with the students' work, and there is an understanding of the need to train the next generation in the physical therapy community.

As a result of the success of the program, the college is considering starting an occupational therapy program modeled after it. One of the issues the physical therapy assistant program faced was that the college originally tried to formulate the program itself, using only the help of the advisory board. They soon learned that consultants were necessary to create curriculum for the program, particularly because of the accreditation board's stringent requirements. Academic administrators at the college will take this as a lesson when drafting future projects.

Lessons Learned

The development of a physical therapy assistant program at Lackawanna College is a good example of a workforce development program funded by ARC. The program is now in its third year and should be sustainable as one of Lackawanna College's Allied Health programs. When comparing this project to other education-based projects, there is one key lesson to consider:

- ***Educational program creation vs. program support*** – Unlike similar education-based projects that help procure up-to-date medical training equipment, this project started a new program. This required more time and funding directed toward administrative costs instead of new equipment, but is also easier to measure the project's long-term outputs as all graduating students can be attributed to the original ARC funding. Given these tradeoffs, program creation may be a more attractive option for ARC investment, especially if ARC can provide some technical expertise for those starting their own program (which was the primary difficulty here).

Conclusion

The ARC funding helped Lackawanna College cover startup costs to provide students with an opportunity to gain a lucrative skill as a physical therapy assistant. Since receiving funding in 2008, the program has had 49 students enter the program and 14 program graduates (out of 16 possible in the first class). According to the Program Director for the Physical Therapist Assistant Certification program, it might not have become a reality for Lackawanna College without ARC funding. Educational assistance is a smart investment, as these institutions are generally familiar with the grant process and have the benefit of familiarity with instituting educational programs. Moreover, the program is sustainable through student tuition and no longer requires grants to continue to provide the educational and healthcare benefits to the region. As a result, this project met and exceeded expectations and provides an example of an education-based project that delivers a larger impact relative to the initial investment.

4.2.12 SEDA Council of Governments, Pennsylvania –

Creating Safe, Walkable & Healthy Communities, Phase one & 2

The SEDA-Council of Governments (SEDA-COG) is a regional multi-county development agency that provides leadership and services to communities under guidance of a public policy board. In order to encourage physical activity in their community, SEDA-COG used ARC funding to develop a walkable community plan focused on four Susquehanna River Towns: Northumberland, Sunbury, Williamsport, and Berwick. The planning team consisted of individuals representing SEDA-COG, transportation officials, health care providers, and the Susquehanna Greenway Team. SEDA-COG was able to organize and facilitate interaction among residents, leaders, planners, agencies, public health officials, and health care providers with the unified vision of creating safer, vibrant, and healthy communities. In total, there were approximately 80 task force members that provided insight into the plan. Through two grants, the ARC provided \$92,500 in project funding, representing 50 percent of the project's total costs. The project was implemented between 2009 and 2010.

Community Profile

This project was planned and implemented along the Susquehanna River in the city of Williamsport, in Lycoming County, Pennsylvania located in the central northern part of the state. The total county population is 116,747 residents, 36 percent of whom live in rural areas, which is lower than the ARC average of 42 percent. County unemployment rate is around eight percent, compared to the state unemployment rate of eight percent and ARC unemployment rate was

nine percent. The county has a median household income of \$41,163, which is well below the state median household income of \$50,221 and close to the median household income of \$42,915 across the entire Appalachian Region.

Within Lycoming County, 14 percent of adults reported being in fair or poor health and 10 percent of county residents are living with diabetes, which are almost identical to same measures across the state of Pennsylvania. Also within Lycoming County, 31 percent of adults are considered obese and 29 percent are physically inactive, while in Pennsylvania, 29 percent of adults are obese and 26 percent are physically inactive.

As this project concerns the development of outdoor facilities, indicators of the county's physical environment are relevant here. In Lycoming County, there are an estimated seven recreational facilities per 100,000 population, which is less than the state average of 11 recreational facilities per 100,000 population. Additionally, an estimated 18 percent of the county population lives within a half mile of a park. In comparison, 25 percent and 35 percent of the population lives within a half mile of park within Pennsylvania's Appalachian Region and across the entire state of Pennsylvania, respectively. However, while proximity to a park is low in Lycoming county relative to other locations across the state, the measure is still higher than the Appalachian Region's average, which estimates that 15 percent of the ARC population lives within a half mile of park.

Project Description

With the first grant, SEDA-COG developed one community plan. In order to improve the physical environment in their communities, the project involved developing a plan for safe and walkable communities in the Middle Susquehanna Region. As a result of the planning process a minimum of 30 stakeholders convened and organized in the Northumberland/Sunbury, Williamsport, and Berwick communities to implement community-based planning and programming. In addition, the committee performed two walkability/bikeability community audits, developed two pedestrian and bicycle master plans and additional ideas for projects, programs, and new policies within the region. Phase I was implemented in 2009 and ARC funded \$37,500 of the project's total costs of \$75,000.

The second grant implemented a priority project identified in Phase I (Berwick-Briar Creek community) and completed planning studies for two additional communities. The project would convene community stakeholders and facilitate forum discussions to raise awareness about the environment-infrastructure-community health connection; disseminate research facts about public health and the community environment, complete regional community environment assessments and develop a pedestrian-bicycle master plan for two multi-municipalities; create a

forum for regional active living, health programming and health research where community leaders and planners can develop new partnerships; design and manage construction of a 1-mile Berwick Riverfront Trail; and organize a dedication event for this newly active-community walking trail and program. Phase II of the project was implemented in 2010 and of the total project's costs of \$110,000, ARC again funded half, which was \$55,000.

Project Planning and Implementation

Rural Pennsylvania lags far behind in many national trends for improved pedestrian and bicycle safety. At the same time the region suffers from a high rate of obesity and all of its related negative health impacts. Based on these trends in the region and recognizing that the built environment can play an important role in promoting physical activity, SEDA-COG and several partnering agencies decided to pursue funding that would engage a large number of stakeholders in a planning process designed to address these needs. The region wanted to be different than the typical suburban sprawl, homogenized city and pursued a plan that would connect schools, business, and residential areas with each other and with the river by promoting bikeable/walkable communities.

Planning for the Susquehanna Greenway occurred in several stages after its inception in 2001. In 2007, the Susquehanna Greenway Partnership, a new nonprofit was formed. The process included visioning, concept design and strategic planning. The essence of this plan was the design of a 500-mile network of interconnected communities, trails and natural areas. Nearly a decade later, the "Building Safe, Walkable and Healthy Communities" project was funded by ARC with the purpose of beginning a long-term initiative around the idea of safe, vibrant, energy efficient, and sustainable communities. The process was to be driven by strong community participation and input. Equally important was the development of meaningful partnerships between agencies and organizations within the region.

During the first phase, 33 study committee members in the Muncy-Hughesville Area and 26 study committee members in the Berwick Area participated in the planning process. Together, they established the Walkable/Bikeable Community principles "(to) maintain the core, create people places, access for all, connected neighborhoods, connect with nature, promote alternative transportation, use the carrot, use the stick, and do whatever it takes," which were reported to all print and broadcast media in 11 counties.⁶³ Additionally, bikeability and walkability community audits were completed in seven municipalities, and two multi-municipal regional

⁶³ SEDA-Council of Governments. 2011. *Building Safe, Walkable and Healthy Communities in the Middle Susquehanna Region*.

<http://www.susquehannagreenway.org/sites/default/files/Safe%20Walkable%20Berwick%20Williamsport%20Nort%20humberland%20Sunbury%20SEDA%20COG%202011.pdf>.

plans to guide development were completed. Action strategies prepared for seven counties highlighted bike and pedestrian infrastructure and public safety improvement projects. A sample of generated ideas for these projects, programs and policies are provided in the Table 4.13 below.

Table 4.13: Program, Projects, and Policies Identified for SEDA-COG Planning Grant

Programs	Proposed Projects	Policies
Walkable-Bikeable Communities- Active Living in Williamsport, 10/2011 (75 participants)	Northumberland (sample)	Enforcement activities designed to create and maintain safe walking and biking environments
Sunbury Community Hospital: new and existing health and active-living outreach and education programming	<ul style="list-style-type: none"> • Intersection enhancements • Riverfront park development 	
1) Challenge four health – Weight Loss Challenge (>100 people)	<ul style="list-style-type: none"> • Streetscape corridor enhancement 	Sidewalk ordinances
2) Senior Circle – Seniors encouraged to advocate for the implementation of favorite Walkable-Bikeable Communities projects	<ul style="list-style-type: none"> • Canal trail 	

During Phase II, Pedestrian and Bicycle master plans were developed for the Williamsport and Northumberland/Sunbury area and integrated into the municipal plans. Additionally, two plans that emerged as priorities from Phase I were scheduled to be implemented. In the Northumberland/Sunbury area, the first plan involved a land survey and preliminary engineering design for an improved trail connection to Shikellamy State Park. The second plan involved the Berwick Riverfront Trail at Test Track Park for which funding was recently secured. Overall, Phase II of this project involved three events and activities with the Sunbury Community Hospital and a Walkable-Bikable Community event in Williamsport. These four outreach activities reached over 200 residents.

A diverse group of residents, municipal officials, business and school officials were guided through an interactive process of self-evaluation, in essence performing an audit to determine the barriers to walking and biking in the community. Stakeholders were asked to identify important destinations within the community including schools, parks, popular businesses, and major employers and build consensus for possible responses or design ideas based on walkable and bike-friendly principles to ease impediments.

Economic and Community Impacts

There were several substantial outputs and outcomes as a result of the planning process. The final plan “Building Safe, Walkable and Health Communities in the Middle Susquehanna Region” was published in November 2011. The report identifies priority areas for new projects and programs and provides designs to improve the built environment.

The following are actual outputs outlined in the report and verified upon visit with the SEDA-COG in December 2013.

- a) Create a regional forum to raise awareness of the link between the built environment and human health, reaching 50 residents in two communities;
- b) Perform two audits for the walkability/bikeability in Williamsport and Northumberland/Sunbury;
- c) Created two pedestrian and bicycle master plans for the City of Williamsport and Northumberland/Sunbury;
- d) Develop the Berwick’s Riverfront Trail plan including all details and provide supervision of trail construction.

As a result of these outputs there were several short-term outcomes that are important to note. Specifically, the Pedestrian and Bicycle master plans were integrated in the municipal plans and policies with two enhancement projects scheduled to be implemented within the near future. In addition, a land survey and design was completed to facilitate an improved trail connection to Shikellamy State Park. As a result, pedestrians can now avoid crossing a busy state highway. Finally, a notable outcome is the planned construction of the Susquehanna Greenway Riverfront Trail at Berwick’s Test Track Park that was facilitated by this project. Normally the design-build process takes several years but the construction of this project has been expedited due to the planning process. The long-term outcomes from this process are very clear. Improved access and utilization of the built environment can improve the health of the residents living in the community. SEDA-COG with its partnering agencies were very intentional about not just getting input from the communities but also providing education about the link between the built environment and improved health.

It is not possible at this time to measure the long-term impacts of this project because it is only in the planning and design stages; however, there is evidence that careful planning for improved walkability and bikability can improve both health and economic outcomes. Frank et al (2006) discussed the three ways the built environment can negatively affect health: 1) If the built environment reduces opportunity for active transportation, this reduces total physical activity and potentially increases the risk for chronic disease. 2) If the built environment results in an increased time spent in vehicles, it reduces physical activity and this might contribute to obesity

and the risk for chronic disease and 3) if the built environment results in an increased use of vehicles this will lead to increased exposure to pollutants and risk of respiratory and cardiovascular disease.⁶⁴

There is empirical evidence to support that people who live in neighborhoods with walkable designs are more likely to report exercising more than 30 minutes per day compared to those who live in neighborhoods with less walkable, more suburban designs.⁶⁵ If the built environment affects physical activity, it is reasonable to expect it to affect weight as well. A study in Atlanta found that for each additional hour spent in a car per day, there was a 6 percent increase in the odds of becoming obese while each kilometer of walking per day decreased the odds of becoming obese by 4.8 percent.⁶⁶

Given the direct link between increased physical activity and obesity, the economic impacts realized with a project like this one would be revealed through reduced medical spending associated with obesity. Obesity is linked with higher risk for several serious health conditions, such as hypertension, type 2 diabetes, hypercholesterolemia, coronary heart disease (CHD), stroke, asthma, and arthritis. Direct medical spending on diagnosis and treatment of these conditions, therefore, is likely to increase with rising obesity levels. Several studies offer retrospective or prospective estimates of the degree of disease incidence that can be linked to obesity, and of the magnitude of associated direct medical costs.

For example in one study, the economic costs of obesity were estimated using a retrospective study conducted at Kaiser Permanente in Oregon, with 1,286 subjects who responded to a 1990 random sample survey. The obese group, with a BMI ≥ 30 had 36 percent higher average annual health care costs than the healthy-weight group, including 105 percent higher prescription costs and 39 percent higher primary-care costs. The overweight group, with a BMI between 25–29 had 37 percent higher prescription costs and 13 percent higher primary-care costs than the healthy-weight group over a nine-year period.⁶⁷

⁶⁴ Frank, Lawrence D. et al. 2006. "Many Pathways from Land Use to Health." *Journal of the American Planning Association* 72(1): 75-87.

⁶⁵ Frank, Lawrence D. et al. 2005. "Linking objectively measured physical activity with objectively measured urban form: findings from SMARTAQ." *American Journal of Preventive Medicine* 28 (Suppl 2): 117-125.

⁶⁶ Frank, Lawrence D., Martin A. Andresen, and Thomas L. Schmid. 2004. "Obesity relationships with community design, physical activity, and time spent in cars." *American Journal of Preventive Medicine* 27(2): 87-96.

⁶⁷ Thompson, David et al. 2001. Body mass index and future healthcare costs: a retrospective cohort study. *Obesity Research* 9(3): 210–218.

Relative medical spending for the obese may be as much as 100 percent higher than for healthy weight adults, and nationwide “excess” medical spending may amount to as much as \$147 billion annually for adults and \$14.3 billion annually for children (Hammond R and R Levine, 2010).⁶⁸

Lessons Learned

The success of this project hinged on two very important lessons:

- ***The value of strong interagency coordination and collaboration is a key to success*** - SEDACOG had an excellent working relationship with the planning and transportation departments associated with all of the involved counties and cities. In addition, the strong partnership with the hospital in Williamsport was key to moving several projects forward.
- ***A sustainable project requires community input during the planning process*** - Stakeholders identified the key obstacles to a healthy community and provided input into how to address these barriers. At the same time, they were the recipients of why improving the built environment is as essential component of a vibrant, healthy community. This inclusive process will improve the likelihood that the communities will utilize and thus maximize the benefits from an investment in the built environment.

Conclusion

This project is unique in that ARC funding went toward planning a project that has yet to be carried out to completion. Therefore, it is difficult to measure the direct outputs or outcomes of the project. The long-term goal of the "Walkable Communities" project was to have changes in the built environment increase walking and biking activity in people of all ages and to have numerous pedestrian and bicycle enhancement projects identified and prioritized for design and implementation. Given the high level of community and interagency coordination, this appears to be a community-led grassroots project that will be successful because of its careful planning. Therefore, in the evaluators' opinion, the project has met expectations over the course of the project. While the health and economic impacts have not yet been realized, if the projects are completed according to planning then it is expected that there will be significant positive health and economic outcomes. The project shows that careful planning can significantly contribute to success, especially when the project involves so many community stakeholders.

⁶⁸ Hammond, Ross and Ruth Levine. 2010. "The Economic impact of obesity in the United States." *Diabetes Metabolic Syndrome and Obesity: Targets and Therapy* 3: 285-295.

4.2.13 Town of Saltville, Virginia –

Southwest Virginia Regional Dental Center

The Southwest Virginia Community Health Systems (SVCHS) and their Southwest Virginia Regional Dental Center (SVRDC), which opened in 2009, is located in Saltville, Virginia and serves as a dental clinic for underinsured residents of Virginia, West Virginia, and Kentucky as well as a training facility for dental professionals. The SVCHS used ARC grant money to buy dental equipment necessary for the startup of the facility, which now simultaneously treats dental patients and trains dental students. It was expected that the clinic would create at least six new jobs, accept 3,295 patient visits, and provide workforce training for 150 dental students each year. The ARC provided \$200,000 in project funding, representing 11 percent of the project's total costs. It was approved in 2009 and closed in 2011.

Community Profile

SVRDC is located in the city of Saltville, which is in north Washington County, Virginia. As the name of the dental center implies, Washington County is located in the far southwestern portion of the state. The total county population is 54,827, 72 percent of whom live in rural areas, which is higher than the Appalachian Region average of 42 percent. The county unemployment rate is around eight percent, compared to the state unemployment rate of six percent and Appalachian Region unemployment rate of nine percent. The county has a median household income of \$40,513, which is well below the state median household income of \$61,877, but close to the median household income of \$42,915 across the entire Appalachian Region.

Today in Washington County, there are 134 jobs associated with dentists' offices, but less than 10 dentists in the county. This indicates that the two dentists employed by the project definitely help to make up for the low supply of dentists in the area.⁶⁹ Also, within Washington County, 22 percent of adults reported being in fair or poor health, which is greater than the state average of 14 percent. Additionally, 27 percent of adults are considered obese in Washington County, which is less than the 28 percent of obese adults in Virginia and 31 percent of obese adults in the Appalachian Region. Smoking is higher than average in Washington County; 25 percent of adults smoke regularly compared to the state average of 18 percent and ARC average of 22 percent.

Of course, while the clinic is in Washington County, Virginia, its service area is greater. While clients come to the clinic from West Virginia and Kentucky, Figure 4.7 shows the eight county

⁶⁹ Economic Model Specialists, Inc. 2013. "Washington County." Accessed from EMSI, 2013

Figure 4.7: Service Area for Southwest Virginia Regional Dental Center

★ Southwest Virginia Regional Dental Center

ARC Counties Served by SVRDC

Other ARC Counties

SVRDC
319 5th Ave.
Saltville, VA 24370

Map labels include: Logan, Mingo, Wyoming, Raleigh, Summers, Mercer, McDowell, Bland, Wythe, Grayson, Alleghany, Wilkes, Watauga, Johnson, Ashe, North Carolina, Tennessee, Washington, Carter, Unicoi, Greene, Hamblen, Hancock, Sullivan, Hawkins, Lee, Harlan, Letcher, Perry, Knott, Pike, Buchanan, Dickenson, Russell, Scott, Washington (+ Bristol city), Smyth, Tazewell, Wise (+ Norton city), Kentucky, West Virginia, Virginia.

Scale: 0 2.5 5 10 15 20 25 Miles

The project involved renovating a former hospital facility and setting it up to be a dental center that improves local access to dental care and also serves as a teaching facility. Project funding from ARC amounted \$200,000 of the project's total costs of \$1,850,857. All ARC funds went

toward the purchase of the dental equipment, including dental chairs, two dental x-ray systems, medical cabinetry, special lighting, and sterilization equipment. The remaining \$1,650,857, which purchased additional equipment and construction, came from several federal sources as well as community-based donations. The project was approved on August 31, 2009 and was closed on May 25, 2011.

In 2006, the Mount Rogers Planning District (encompassing Smyth County, in which Saltville is located) partnered with the SVCHS to create a dental facility to serve those individuals in the community who were uninsured but whose income was too high to qualify for government assistance. To date, 3,295 patients have been treated at the SVRDC. The clinic has become an important community asset for the working poor, providing dental services at a sliding scale cost and even helping to arrange patient transportation.

Project Planning and Implementation

Smyth and Washington counties, which make up the Mount Rogers Planning District (MRPD), have seen a sharp decline in the number of well-paying jobs in the area. A regional planner for MRPD, who grew up in Saltville, Virginia, observed that one of the consequences of this economic distress has been a decline in oral health of members of the community. He mentioned that while there were a sufficient number of dentists and clinics in the area, there were few resources for the working poor, who did not receive insurance benefits from their employer but made too much money to qualify for federally subsidized healthcare.

In 2006, the MRPD approached the major healthcare provider in the area, Southwest Virginia Community Health Systems (SVCHS), with a plan to open a dental clinic that would operate on a sliding pay scale, fulfilling the dual purpose of serving the low-income population in the community as well as training local dental students. The organizations decided to construct their facility in McKee Hospital in Saltville, a facility built in the 1940s and used until the 1970s. The first and third floors were already used for administrative purposes by the SVCHS while the second floor would serve as the proposed dental clinic.

The MRPD pursued ARC funding having long worked with ARC to complete community development projects, including a recent project in Glade Spring (sister town to Saltville) to renovate its historic downtown into an artisan center using a \$200,000 ARC grant. A regional planner at MRPD described the application process with the ARC as less difficult than other grant applications. It was, however, challenging to bring together necessary community actors such as the mayor, educational institutions, and program administrators at the SVCHS. One of the factors that helped make this partnership (and the project as a whole) successful were the MRPD Regional Planner's connections with the community as a member of the Mount Vernon Planning

Commission, allowing him to bring together a number of relevant stakeholders to make the program possible.

While the planning took place in 2006, the project did not achieve full funding until 2008 because funding for the dental center came from several sources: The \$200,000 from ARC along with \$255,000 from the Virginia Tobacco Commission helped the organization obtain a \$700,000 Community Development Block Grant from the Department of Housing and Urban Development. The project also received a loan/grant combination from the United States Department of Agriculture for \$519,000. Finally, \$176,000 came from the community. To raise this amount, SVCHS undertook a donor drive and about half of the money came from there, and SVCHS paid for half from their reserves. The MRPD Regional Planner describes obtaining the last \$176,000 to complete the project as a “very grassroots effort” that called upon individuals who had grown up in the community and since moved away, but were sympathetic to the region’s economic plight.

Renovation of the hospital for use as a dental clinic was financed by the Tobacco Commission funding, the HUD funding, some of the USDA funding, and some of the community-based funding. The MRPD reports that the project faced no significant construction roadblocks and was in fact completed thirty days ahead of schedule. Next, the ARC funding, along with portions of both the USDA funding community-based funding went to the purchase of dental equipment. Specifically, the ARC funding purchased dental chairs, two dental x-ray systems, medical cabinetry, special lighting, and sterilization equipment. According to the MRPD Regional Planner, the project might not have been completed or would have been significantly delayed without ARC funding.

Economic and Community Impacts

The health impacts resulting from this project are clear. Since the clinic opened in 2009, it has treated over 3,295 patients, many of whom have lower incomes and have not received regular dental treatment. As a result, the facility also assists patients in finding affordable transportation to the center; they have partnered with a low-cost transportation system that provides buses to the facility for \$1. Now SVRDC routinely treats patients from Virginia, West Virginia, and Kentucky, casting its positive health impacts over a wide portion of the Appalachian Region.

In terms of economic impacts, the dental clinic has created two jobs for experienced dentists and four other staff who supervise 12 dental students at a time. The facility continues its partnership with Virginia Commonwealth University and Virginia Medical College and provided six-week rotations to help train 72 dentists and 100 dental hygienists per year in 2009 and 2010. Providing clinical training to 172 dentistry and dental hygiene students annually exceeds the original goal and provides economic benefits to the students, who get training toward their degree, and to the community that benefits from a steady inflow of students every six weeks or so. Today,

SWCHS pays the dentists' salaries and overhead costs of the clinic with payments made going into the system. The MRPD Regional Planner says the center is as sustainable as the other eight clinics in the SWCHS.

Lessons Learned

The project used an ARC grant in conjunction with other funding in order to startup a dental clinic that serves the lower-income population while providing training to dental students. The ARC can take several lessons from the success of this project.

- ***ARC's presence in the state makes the grant process easier*** – The MRPD Regional Planner mentioned that having the funds administered through the State of Virginia facilitated communication and made coordination easier and more efficient than working with the federal government. Other grantees have expressed this sentiment, but MRPD worked with many of those federal sources on this same project giving the statement additional weight.
- ***Project coordinators benefit significantly from having connections in the community*** - Though a regional planner may seem far removed from dentistry, the MRPD Regional Planner's intimate knowledge of the community and local healthcare providers facilitated gathering relevant stakeholders and raising community funds for the clinic. Projects of this magnitude hinge on selecting coordinators with strong community ties, and in some cases, this quality may be more important than technical expertise. Conversely, we have seen other projects struggle when they are less integrated into the local community.
- ***Large projects benefit from community support*** – This project was able to raise around \$88,000 from community donations, demonstrating that the community supports the efforts of constructing a dental clinic. While this takes longer, projects that fundraise locally often benefit later from the additional planning and marketing that is required to get local donations.

Conclusion

The ARC grant purchased equipment for a startup dental clinic that directly addresses the needs of the working poor in Virginia. Improved dental health helps individuals and the community by reducing sick days, improving quality of life, and improving employment opportunities. The clinic now supports two dentists and has trained about 172 dental students annually. The MRPD Regional Planner says he would rate the success of the project as a "10 out of 10", and says it helps fulfill the strategic planning goal of the Town of Saltville and Smyth County of improving access to medical care. While the project does not currently employ as many dental professionals

as originally expected, this is a well-rounded project that exceeds the project's initial expectations in other ways.

4.3 Lessons Learned

While each of the 13 case studies featured in this chapter offers lessons of their own, we believe that they collectively offer recommendations and topics for discussion. The following is a list of four “meta-lessons” that appear in several case studies and may be considered recommendations for future projects.

- ***The ARC is seen as a helpful and flexible grant-giving organization*** - When asked about how projects came across ARC funding, every case study complimented the people who make up the ARC in some way. One grantee was inspired to apply for a grant after an encouraging conversation with someone from the Washington, D.C. ARC office, whom they met at a regional conference. Others were already familiar with their ARC state program manager. Additionally, project contacts often admired ARC's approachability and flexibility. One contact discussed how she felt free to pick up the phone and call the state office whenever she had a problem with the grant. Others were grateful for ARC's understanding of unforeseen obstacles that caused their projects to be delayed. Relative to other grant-giving organizations, ARC was seen as a good partner that was truly supportive of the Appalachian Region. Of course, the lesson here is that this approach is valued and should be maintained.
- ***Evidence of community support increases likelihood of success*** – While all projects are expected to match ARC funds, projects are not required to raise that money directly from community members. However, in the cases where grantees did reach out to the community for additional financial support, this often improved the project because it gained community buy-in or developed a public-private partnership. Additionally, the community and other partners serve as project reviewers; that is, the grantee had to convince the community of the need and feasibility of the project, resulting in more successful projects. While raising money directly from the community was always challenging for the grantee, it is associated with a project that has strong community support. This is especially true for smaller projects that may be anxious to get started without anticipating the community's reaction. Showing evidence of community support—whether through fundraising or enlisting volunteers—forces smaller projects to introduce their idea to the community and plan for how to increase community adoption later on.

- ***Involvement of institutional leadership increases likelihood of success*** – Especially for larger projects where the grantee has a bureaucracy of its own (e.g., a university or hospital), involvement of institutional leadership in the planning and implementation of the project is critical. Large organizations often have several priorities and projects going on at once, and while leadership is always likely to be supportive of an incoming grant, ARC does not want this leadership to cause snags if a bigger priority gets in the way. Sometimes progress on a grant can get held up due to institutional red tape. However, if the institutional leadership is actively involved (i.e., receiving monthly updates, reviewing and approving budgets, and talking with ARC), then the project is more likely to go smoothly.
- ***Projects may be able to improve cost efficiency for large purchases*** – While no projects seemed to take their funding for granted, best practices exhibited by some case studies may be extended to improve cost efficiency in others. For example, one university requires a bidding process for all large purchases over \$15,000. If ARC had a similar requirement, even for its smaller projects, it could potentially lower project costs. Similarly, some projects claimed that their first purchases were overpriced because they did not understand the market. When asked, they expressed that they could have benefited from technical expertise before making the purchase. Whether ARC can provide that expertise or refer projects to those who can (possibly past projects), this may bring down costs over time. This could be especially effective if ARC decided to focus on a particular category of large medical equipment, such as digital infrastructure for electronic medical records.

Chapter 5: Conclusion

While each chapter has offered lessons of its own, this final chapter summarizes key findings and provides some general conclusions and recommendations from the entire evaluation.

5.1 Report Summary

Between FY 2004 and FY 2010, ARC invested over \$30.9 million into 202 health projects. This report presents an evaluation of these projects largely drawing from results of an online survey administered to past projects and 13 case studies. Our analysis of the impact of the ARC projects is based on quantitative analysis (Chapter 3) and qualitative case studies (Chapter 4).

The quantitative analysis uses both the ARC.net data and new survey data generated for this report. For the quantitative analysis, we grouped projects into three primary project types: Healthcare Access, Clinical Services, and Health Promotion. We also grouped the projects by three primary functions: Construction, Equipment, and Operations. We then used these categories to compare funding and impacts across different types of projects.

However, three characteristics of ARC's health projects made them difficult to evaluate: the diversity of projects, the deficiency of baseline data, and the relatively short time since implementation. First, while all projects were directly or indirectly tied to improving health outcomes in the Appalachian Region, they varied greatly in type, function, impact, total funding, and funding received from ARC, which made their expected outcomes difficult to compare. Second, an absence of baseline data for most projects makes it challenging, if not impossible, to measure improvement in health outcomes over time, though it can sometimes be inferred. Baseline data can include demographic variables, county-level statistics on access to care or health outcomes, or can be collected by a project prior to implementation. Third, some projects have not been implemented long enough for there to be measurable long-term impact on health.

As a result of these challenges, an online survey was designed and administered for this study to collect detailed information from project contacts. The online survey had a 50.3 percent response rate and 40.7 percent completion rate. The survey collected updated contact information, additional data about project outputs, and clarifying information about project specific outputs. The survey also collected data on each project's impact on long-term health, workforce, and economic outcomes.

Additionally, survey data was analyzed using a multiple regression analysis to determine the project characteristics correlated with the greatest project impact. Project characteristics included in the analysis were total funding, organization type, project outputs, project functions, and other factors (e.g., innovation), most of which came from the online survey. Project impact was measured based on the responses to 18 different questions in the online survey and calculated into an index to create an Overall Impact Score. The regression analysis enabled us to see which project characteristics were most closely correlated with a higher self-assessed Overall Impact Score.

Finally, the qualitative analysis was based on case reviews and analysis of a sample of projects. In total, the evaluation team conducted 13 case studies of 16 projects. In addition to data from ARC.net and the online survey, the case studies relied on interviews and personal correspondences with project contact and personnel to determine if the expected impact of the project was met, exceed, or not met. Additionally, the case studies explored unique aspects of particular programs and explored some reoccurring issues pertaining to ARC's health programming.

5.2 Key Findings

Emerging from the quantitative and qualitative analysis described above come several Key Findings about ARC's health projects between 2004 and 2010. Many of these Key Findings are accompanied with general recommendations for how ARC can enhance its health programming.

Key Finding 1: While ARC invested larger award amounts in construction projects, most of those projects involved leveraging additional matching funds. Conversely, ARC awards smaller grant amounts for operations projects, but takes on greater risk by funding a larger percentage of the project. We think this allows more flexibility to support different types of projects and is a responsible method when investing in large-scale projects.

Key Finding 2: Analysis of the ARC.net data indicated that ARC health projects have the greatest impact on participants and patients with equipment-based projects, contributing the largest impact in terms of the quantity of person impacted.

Key Finding 3: ARC's health programming has diverse expected outcomes, including improvements to formal education, workforce training, healthcare provision, public health promotion, and public policy development. Of these, improved provision and accessibility to healthcare applies to most projects at 54 percent; however, in many cases, multiple outcomes

apply to each project. This presents an evaluation challenge as each outcome requires another set of performance measures.

Key Finding 4: Among all the projects interviewed, the ARC was viewed as a helpful and flexible organization, especially relative to other federal grant-giving institutions. ARC's presence in the state was often cited as a key advantage to working with ARC. Additional collaboration between grantees and other organizations, especially public-private partnerships, increased the chances for success and helped projects raise additional funds.

Key Finding 5: Among the case studies, evidence of community support seemed to be a clear indicator of success, large impacts, and sustainability. This suggests that projects require community input (e.g., community coalition) during the planning process, and that projects benefit from having coordinators who already have connections in the community. ARC should look for evidence of broad-based community support before funding a project, such as private contributions from the community (vs. what the organization has fundraised with other grants or is paying for itself) or highly attended project outreach or planning events. Volunteers are also a good sign of community buy-in and also help with leveraging funding into a large impact.

Key Finding 6: Certain case studies showed how some small grants can lead to large impacts. While often ARC investments in small innovative projects are risky, they have the potential for significant long-term impacts. Given the high potential per dollar impact, the evaluation team believes that seed money from ARC should continue to be used for riskier and innovative projects and continue to provide support to these projects to ensure sustainability. It was also expressed by grantees with fewer resources that ARC could also support them with technical expertise, either by recommending certain technologies or connecting them with previous grantees who have worked on similar projects. Innovative projects might also benefit from small seed planning grants to build community support for the idea before implementation. Funding these small, innovative, and riskier projects was viewed as a comparative advantage of ARC's health programming.

5.3 Recommendations for Future Evaluations

One limitation of this report is the deficiency of baseline data, which made it difficult to measure improvements in health outcomes resulting from a particular project. The evaluation team believes that changes can be made to ARC's monitoring procedures and, in particular, Arc.net that could improve internal evaluation and review of programming moving forward.

In order to evaluate projects in the future, some specific evaluation and data collection plans must be in place at the beginning of the projects. Baseline data can provide both a starting point for measuring project impacts and a guide for the type of data or information to collect during and after the project. An example of a federal agency that collects baseline data well is the Health Resources Services Administration (HRSA), which administers many community or network-based health grants. Grantees are required to identify evaluation measures prior to the start of the project.⁷⁰ HRSA offers a list of approximately 30 common indicators (Performance Improvement Measurement System (PIMS)) that the grantee can select, or the grantee is encouraged to identify additional measures that they can measure and report on semi-annually. The measures that grantees select vary depending on the type of project. Thus the common indicators would need to be flexible and broad enough that each project would be able to report on at least four to five measures. For example, for planning grants, all grantees might report on the number of partners, the number of meetings, the number of activities implemented from a strategic plan; however, some measures for education grants might include the number of minority participants (or other demographic variables), the number of individuals reporting a change in knowledge or behavior, and the number of individuals who seek care for the targeted health issue. Collecting both process and outcome measures would also allow for those organizations and communities that receive funding to provide the impacts to measure that are most appropriate for the goals and expectations of the project. While a full-scale logic model may not be necessary, outlining short-term, medium-term, and long-term impacts would provide meaningful levels of impacts to measure based on the status of the project at the time of the evaluation.

Specific steps for project evaluation that may be useful include:

7. An evaluation plan should be included in the grant application.
8. Along with expectations and goals of the project, short-, medium-, and long-term impacts should be specified in the application.
9. Performance measures (both process and short-term outcome) should be reported on a regular basis (semi-annually or annually). These measurements do not have to cover the entire range of impacts, but should represent indicators that can show progress and results of the project.

⁷⁰ U.S. Department of Health and Human Services. Health Resources and Services Administration. *Performance Management and Measurement*.
<http://www.hrsa.gov/quality/toolbox/methodology/performancemanagement/index.html>.

10. Baseline data or information that can show the starting point of the community or organizational situation should be collected at the beginning of the project. Similar data or information can be collected and compared at the time of the project evaluation. These data can include demographic variables, access to care (uninsured rates, ER or Clinic utilization/capacity rates), or health outcome data including cancer rates or obesity measures (although these would only be appropriate for longer projects).
11. For more detail about long-term impacts, perhaps small data collection grants could be awarded to grantees after the official project completion date so that data collection would continue. At the very least, ARC should express an expectation to grantees that they may be contacted in the next 10 years to check on the sustainability of the project or long-term impacts, and therefore, they should continue tracking these measures.
12. Have an evaluation team ready to work with grantees at the beginning or during the project to help both design the evaluation and collect information. If an evaluation team is contracted by ARC for a set of projects, having that team begin their work during the project period would allow them to offer assistance to the grantees.

Adopting all or a few of these recommendations would help ARC more effectively monitor its programming across all sectors. However, given the diversity of the health projects, these procedures are especially important. Which procedures ARC decides to prioritize may be dependent on the strategic direction of ARC's health programming. Using a system similar to HRSA's allows for a more comprehensive examination of the impacts of these projects and can also assist in helping to address those projects that are not performing as anticipated.

5.4 Discussion on Strategic Direction of ARC's Health Programming

During the evaluation team's analysis of the online survey and case studies, two overarching themes emerged on how to enhance ARC's health programming. Despite the seeming contradiction of these two themes, it was determined that they represent two distinct strategic directions for ARC's health programming in the future. These two themes are presented below, but it is for ARC leadership to decide if one or both are applicable given the desired strategic direction for ARC health programming.

The first theme was that it is better to focus on large projects that created something new, because then it is easier to attribute future outputs with ARC support. So for example, if ARC aids in implementing a health-related professional degree program, then it is easy to attribute the

graduates to ARC's original investment. Similarly, if ARC helps start a new clinic (medical or dental), then it is relatively straightforward to associate the clinic's jobs and treated patients with ARC's original investment. In terms of tracking and recording outputs and outcomes, these examples are preferred relative to those projects that only help move along something that already existed. For example, when ARC investments help to improve communication capabilities in an existing health network, it can be challenging to quantify exactly how that improves community health. Theoretically, we know that improved cost efficiency by the organization can directly and indirectly lead to improved patient care; however, it is harder to attribute these outputs to the original ARC investment. Therefore, the lesson here was to invest in large projects that create something new so that the desired outcomes can be easily tracked and attributed to ARC.

However, the second theme was that ARC should continue to take risks and provide the seed money for small and innovative projects. The grants that fell into this category expressed that ARC funding was essential, because no other funder was willing to support their project until they had proven it was successful. Of course, the Catch-22 was that these projects could not prove their success without initial seed money. If these projects are chosen carefully and are, in fact, successful ideas led by capable managers, then the ARC investment has a large impact because the initial grant is leveraged into more funding opportunities. Many expressed that the ARC grant provided their project with a level of credibility, in addition to the funding, that made it easier for them to continue to receive funding after the ARC grant. Therefore, investments in these projects can be very rewarding and are essential if ARC believes that innovative solutions are needed to solve Appalachia's health problems.

However, investing in these smaller riskier projects can be a challenge. First, they require ARC to carefully choose its projects and develop expertise in a diversity of areas. Also, because these projects do not often fit a mold, their outputs and outcomes rarely match those of the larger projects, making their impacts difficult to track and compare. Finally, risky projects require greater flexibility and guidance. The staff for a small organization may lack the expertise to expertly purchase large medical equipment at a fair market price. Because many of the projects have never been done before, unforeseen obstacles can arise, requiring additional time and resources. Sometimes, they might even not be successful—hence, why they are risky—and ARC has to accept that occasional outcome. While these challenges exist, it seems like the most impactful projects and case studies fall into this category.

In both of the above themes, ARC should invest in something new—whether a large or small project—which simplifies output/outcome tracking as well as attribution to the original investment. The difference between the two is the type of organizations that ARC chooses to

partner with. Of course, this is a false dichotomy in that ARC can (and does) work in both arenas, but doing so can be challenging given the diversity of the projects. There certainly are efficiencies to be gained by specializing in certain project or organization types. Deciding how best to balance between these two themes is a vital discussion for ARC to have as it embarks upon framing its next strategic plan.

Appendix: Copy of the Online Survey

Q1.1 In order to enable us to follow-up with you, please provide your organization's contact information. Your contact information, along with all answers given, will be kept strictly confidential.

Name of person completing this questionnaire

Organization

Address

City

State

Zip Code

Phone Number

Email

Website

Q1.2 Where was the project primarily implemented? Please complete all that apply.

City or County

State

LDD (Local Development District)

Congressional District(s)

If project covered multiple jurisdictions, list them here:

Q1.3 Which of the following best describes the organization that implemented the ARC-funded health project?

- ☐ State- or Multistate-level organization
- ☐ Regional- or multicounty-level organization
- ☐ County- or Local-level organization
- ☐ Hospital
- ☐ University
- ☐ Other

Q2.1 Many ARC-funded health projects were used to make large purchases, such as building construction, renovation, or medical equipment.

OUTPUTS: Did your project result in any of the following large purchases? CHECK ALL THAT APPLY

- ☐ Construction or renovation of a building(s)
- ☐ Procurement of equipment, medical or otherwise
- ☐ Other large purchases of physical materials (e.g., furnishings)
- ☐ None of the Above

Answer If Q2.1 = Construction or renovation of a building(s) Is Selected

Q2.2 YOU SELECTED: "Construction or renovation of a building(s)" CONSTRUCTION/RENOVATION: For all buildings newly constructed or renovated using ARC funding, please answer the following. If the listed measures are not relevant, consider the last option listed below or the

“Other large purchases” option on a previous page. If a certain output measure is Not Relevant to your project, please enter “NR”. If a certain measure was Not Measured, or the data are no longer available, enter “NM”.

	Click to write Column 1	# of Square Feet in Building(s)		# of Beds in Building(s)		# of Classrooms in Building(s)		Was the work done on the building(s) primarily...	
		Pre-Project	Post-Project	Pre-Project	Post-Project	Pre-Project	Post-Project	Construction	Renovation
Building #1	Description of New Building(s)							<input type="radio"/>	<input type="radio"/>
Building #2								<input type="radio"/>	<input type="radio"/>
Building #4								<input type="radio"/>	<input type="radio"/>
Building #3								<input type="radio"/>	<input type="radio"/>

Answer If Q2.1 = Construction or renovation of a building(s) Is Selected

Q2.3 QUALITY OR OTHER: If construction or renovation of a building was not properly described above, or if the construction or renovation improved quality of care, please share more below. Please be as specific as possible.

Answer If Q2.1 = Procurement of equipment, medical or otherwise Is Selected

Q2.4 YOU SELECTED: “Procurement of equipment, medical or otherwise” EQUIPMENT: For every major piece of equipment that ARC helped you procure, please fill out the following table. If the listed measures are not relevant, consider the last option listed below or the “Other large purchases” option on a previous page. If a certain measure was Not Measured, or the data are no longer available, enter “NM”.

	Please describe the function of the equipment:		Condition of Equipment Today				IF YES, list the # of additional patients...		Was it medical equipment?	
	Description Equipment	New Services Offered	Good	Fair	Poor	Broken or no longer in use	served using the equipment	referred from elsewhere due to equipment	Yes	No
Equipment 1			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>
Equipment 2			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>
Equipment 3			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>
Equipment 4			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>

Answer If Q2.1 = Procurement of equipment, medical or otherwise Is Selected

Q2.5 QUALITY OR OTHER: If equipment function was not properly described above, or if equipment improved quality (and not quantity) of care, please share more below. Please be as specific as possible.

Answer If Q2.1 = Other large purchases of physical materials Is Selected

Q2.6 YOU SELECTED: "Other large purchases of physical materials" OTHER: If your ARC project helped you to make a large purchase, please describe the purchase, its function, and improvement from pre-project functionality. Please quantify as much as possible.

Q3.1 Different ARC-funded health projects impacted their community in different ways, including improvements to a formal education programs, workforce training programs, provision of healthcare services, and public health promotion. OUTCOMES: Did your project result in any of the following outcomes, either directly or indirectly? CHECK ALL THAT APPLY

- ☐ Improvement of a formal educational program (affiliated with a formal learning institution)
- ☐ Training of a new or existing workforce for a health-related field
- ☐ Increased provision of healthcare services / improvement of accessibility to healthcare
- ☐ Promotion of public health through creation or expansion of a community service or program (e.g., non-formal adult education class on healthy cooking)
- ☐ Other Outcome
- ☐ None of the Above
- ☐ Development of public policy on a health-related issue (e.g., healthcare, public health, etc.)

Answer If Q3.1 = Improvement of a formal educational program (affiliated with a formal learning institution) Is Selected

Q3.2 YOU SELECTED: "Improvement of a formal education program" FORMAL EDUCATIONAL PROGRAMS: Did the project bring about new programs or improvements to existing programs? For each affected program, please provide the following information. If a measure was Not Measured, or the data are no longer available, enter "NM".

	Descriptive Title of Program	New or Improved?		For Degree or Certification?		Length of program (years or months)			Still being offered?		Students (Write "0" if none)		
		New	Improved	Degree	Certification	Years	Months	Year first offered	Yes	No	# entered since inception	# fully completed	# currently enrolled
Program 1	Please write out below:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>			
Program 2		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>			
Program 3		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>			
Program 4		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>			

Answer If Q3.1 = Improvement of a formal educational program (affiliated with a formal learning institution) Is Selected

Q3.3 COURSES: Did any new or improved programs benefit from new or improved courses? For each affect course, please provide the following information. If a measure was Not Measured, or the data are no longer available, enter "NM".

	Descriptive Title of Course	New or Improved?		For Degree or Certification?		Still being offered?		Students (Write "0" if none)			# of Courses Offered since ARC Project
		New	Improved	Degree	Certification	Yes	No	# entered since inception	# fully completed	# currently enrolled	Please write below:
Course 1	Please write out below:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Course 2		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Course 3		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Course 4		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Course 5		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Course 6		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				

Answer If Q3.1 = Improvement of a formal educational program (affiliated with a formal learning institution) Is Selected

Q3.4 CERTIFICATION/LICENSE: If there is a certification/license attached to the completion of a new or improved program, please provide the following information. ANSWER ONLY for those years during and after the program was affected by ARC funding.

How many students have taken an exam for certification/license?

How many students have passed the certification/license exam?

Please name and describe the certification/license offered:

Answer If Q3.1 = Improvement of a formal educational program (affiliated with a formal learning institution) Is Selected

Q3.5 FORMAL EDUCATION OTHER: If funding was used to create or improve any formal educational programs not captured by these measures, please explain how ARC funding was used. Please quantify as much as possible.

Answer If Q3.1 = Training of existing workforce Is Selected

Q3.6 YOU SELECTED: “Training of a new or existing workforce for a health-related field” WORKFORCE TRAINING PROGRAMS: Did the project bring about new trainings/programs or improvements to existing trainings/programs that were designed to develop workforce skills either among the unemployed or currently employed? For each affected program, please provide the following information. If a measure was Not Measured, or the data are no longer available, enter “NM”.

	Descriptive Title of Training	New or Improved?		For Licensure or Certification?		Type of Training			Still being offered?		Trainings since Inception		Purpose of Training			
	What was the trainings about?	New	Improved	Yes	No	Computer module	In-person (1 class)	In-person (2+ classes)	Yes	No	# of trainings	Year first offered	Retraining workforce	Professional Certification	Required cont. education	Other
Training 1		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training 2		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training 3		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training 4		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Answer If Q3.1 = Training of existing workforce Is Selected

Q3.7 TRAINEES: How many were you able to train as a result of the project? To answer, please fill in the spaces below as best as possible. Write "0" if none. If a certain output measure is Not Relevant to your project, please enter "NR". However, if a measure is relevant but was Not Measured, or the data are no longer available, enter "NM".

	Number of people involved in a new or upgraded/enhance workforce trainings			Of those who were involved in a new or enhanced/upgraded workforce training, (since inception), how many...			
	# since inception	# fully completed	# currently enrolled	were already employed in a health-related field?	received promotions or raises as a result of training?	were unemployed in a health-related field?	received a job as a result of trainings?
For all trainings:							

Answer If Q3.1 = Training of existing workforce Is Selected

Q3.8 CERTIFICATION/LICENSE: If there is a certification/license attached to the completion of a new or improved training program, please provide the following information. ANSWER ONLY for those years during and after the program was affected by ARC funding.

How many trainees have taken an exam for certification/license?

How many trainees have passed the certification/license exam?

Please name and describe the certification/license offered:

Answer If Q3.1 = Training of existing workforce Is Selected

Q3.9 REFERRALS: Have employers or organizations in the area sent people to you for your trainings and programs? IF YES, please complete the following:

of employers who have sent people to be trained:

of organizations (non-profit or public) who have sent people:

of people sent from other employers/organizations since inception:

Answer If Q3.1 = Training of a new or existing workforce for a health-related field Is Selected

Q3.10 WORKFORCE TRAINING OTHER: If funding was used to create or improve a workforce training program not captured by these measures, please explain how ARC funding was used. Please quantify as much as possible.

Answer If Q3.1 = Provision of healthcare services Is Selected

Q3.11 YOU SELECTED: "Increase provision of healthcare services / improvement of accessibility to healthcare" HEALTHCARE SERVICES: Improvement of provision or accessibility to healthcare services is a broad category. Please indicate below if your project expanded provision or accessibility to healthcare services in the following ways: If a certain output measure is Not Relevant to your project, please enter "NR". However, if a measure is relevant but was Not Measured, or the data are no longer available, enter "NM".

of Telehealth or Telemedicine Sites Before Project

of Telehealth or Telemedicine Sites During Project

of Telehealth or Telemedicine Sites Today

of Mobile Clinics Before Project

of Mobile Clinics During Project

of Mobile Clinics Today

If Project improved quality (not quantity), describe how:

Answer If Q3.1 = Increased provision of healthcare services / improvement of accessibility to healthcare Is Selected

Q3.12 HEALTHCARE SERVICES OTHER: If funding was used to improve provision or accessibility to healthcare services not by increasing telehealth sites or mobile clinics, please explain how ARC funding has achieved this outcome. Please quantify as much as possible.

Answer If Q3.1 = Provision of healthcare services Is Selected

Q3.13 Because improvement of provision or accessibility to healthcare services is a broad category, one of the best ways to measure it is by the change in the number of patients served pre-project, during the project, and today. Be sure to specify the timeframe used for your measurements. Write "0" if none. If a certain output measure is Not Relevant to your project, please enter "NR". However, if a measure is relevant but was Not Measured, or the data are no longer available, enter "NM".

Choose timeframe for patient #s (e.g., per day, per month, per year):

of Patients Pre-Project

of Patients During Project

of Patients Now

Location of change in patient care (e.g., clinic or hospital department)

Answer If Q3.1 = Promotion of public health through creation or expansion of a community service or program (e.g., non-formal adult education class on healthy cooking) Is Selected

Q3.14 YOU SELECTED: "Promotion of public health through creation or expansion of a community service or program" PUBLIC HEALTH: Many organizations promote public health by offering courses, trainings, or events (called "Program" here) to the general public as a form of non-

formal adult education. If your project utilized ARC funding in this way, please fill out the following table to best of your ability. Write “0” if none and “NM” if data were Not Measured or is no longer available.

	Click to write Column 1	New or Improved?		Type of Program					Still being offered ?		Programs since inception		Program participants	
	Description of Class/Service Offered	New	Improved	Online	1 session	2+ sessions	Organized events	Other	Yes	No	# of classes	Year first offered	# enrolled since inception	# fully completed
Public Health Program 1		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Public Health Program 2		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Public Health Program 3		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
Public Health Program 4		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				

Answer If Q3.1 = Promotion of public health through creation or expansion of a community service or program (e.g., non-formal adult education class on healthy cooking) Is Selected

Q3.15 PUBLIC HEALTH OTHER: If the table above was insufficient for describing the impact of your project, please describe how your project had an impact on public health below: Please provide some measure of participation and quantify as much as possible.

Answer If Q3.1 = Promotion of public health through creation or expansion of a community service or program (e.g., non-formal adult education class on healthy cooking) Is Selected

Q3.16 Because improvement of public health is a broad category, one of the best ways to measure it is by the change in the number of participants served pre-project, during the project, and today. Be sure to specify the timeframe used for your measurements. Write "0" if none. If a certain output measure is Not Relevant to your project, please enter "NR". However, if a measure is relevant but was Not Measured, or the data are no longer available, enter "NM".

Choose timeframe for participants #s (e.g., per day, per year):

of Participants Pre-Project

of Participants During Project

of Participants Now

What qualifies someone as a participant in your program?

Answer If Q3.1 = Development of public policy on a health-related issue (e.g., healthcare, public health, etc.) Is Selected

Q3.17 YOU SELECTED: "Development of public policy on a health-related issue" PUBLIC POLICY: It is challenging to measure the impact of affecting public policy at the state, regional, or local level. Please answer the following for each specific policy or political discussion that your project has engaged in as a result of ARC funding.

	Please describe each of the following:		Which of the following best describes your impact on public policy?				Which of the following best describes the level of government where your impact on policy had effect?			
	General public policy issue	Proposed policy change (e.g., regulation, legislation, or other?)	Introduced to policymakers	Part of the discussion but not implemented	Part of the discussion and partially implemented	Fully implemented	Community	County or multi-county	State or multi-state	National
Policy #1			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Policy #2			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Policy #3			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Policy #4			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Answer If Q3.1 = Development of public policy on a health-related issue (e.g., healthcare, public health, etc.) Is Selected

Q3.18 PUBLIC POLICY: Has there been any research or reports to see whether any changes made to public policy as a result of ARC funding has made an impact on health outcomes? If so, describe the impact on health outcomes below, and please be as specific as possible. Also, please let us know where we might find this research or report.

Answer If Q3.1 = Other Is Selected

Q3.19 YOU SELECTED: "Other Outcome" OTHER: Different ARC-funded health projects impacted their community in different ways, including improvements to a formal education programs, workforce training programs, provision of healthcare services, and public health promotion. If

your project had an impact not listed here, please share here: What specific outputs were actually achieved by the project? Please quantify as much as possible.

Q3.20 Regardless of their goals, several (but not all) projects affected local employment by creating or retaining jobs. EMPLOYMENT: Including healthcare professionals and others, did your project directly create or retain any jobs in the short- or long-term?

- ☐ Yes
- ☐ No

Q3.21 IF YES, please fill in the following concerning employment before, during, and after the project as it relates to healthcare professionals (physicians or non-physicians) and non-healthcare professionals (those working as staff or in administration, educators, construction, or other). Created refers to new positions opened up specifically because of the project, while Retained refers to positions that were set to expire but

continued due to ARC funding, directly or indirectly. We do not expect every project to have hired every type of job. Write “0” if none. If a measure was Not Measured, or the data are no longer available, enter “NM”.

	Healthcare Professionals		Non-Healthcare Professionals			
	Physicians	Non-Physicians	Administration/Staff	Educators	Construction	Other
# Employed Pre-Project						
# Jobs Created During Project						
# Jobs Retained During Project						
# Employed Today						

Q4.1 The following questions ask about the project's long-term outcomes on healthcare. When looking at the project's impact today, how well did the project work to do the following:

	No Impact	Little Impact	Some Impact	Strong Impact	Do Not Know
Reduce cost of healthcare by improving efficiency or productivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve the quality of healthcare by creating access to new or better services, equipment, or professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve the overall health of the population by addressing a community health need	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.2 If applicable to your project, please describe your reasoning to your answers above. Particularly if the project had a "Strong Impact," how did it do so? And how is this impact still seen today? Please quantify as much as possible.

Q4.3 Were you surprised by any of the project's impacts on improving healthcare? Were the impacts much more or much less than originally expected? If so, please explain.

Q4.4 The following questions ask about the project's effect on certain WORKFORCE measures. What impact did the project have on:

	None	Little	Some	A Lot	Do Not Know
Attracting new healthcare professionals (e.g., physicians, nurses, etc.) to the area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building or expanding the pipeline of healthcare professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving the skill level of the existing healthcare workforce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving the skill level of students soon entering the healthcare workforce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving the quality of care for the average patient visit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.5 If you indicate "A Lot" for one or more responses, please describe how and quantify as much as possible:

Q4.6 The following questions ask about the project's effect on certain HEALTH BEHAVIOR measures. What impact did the project have on:

	None	Little	Some	A Lot	Do Not Know
Improving the overall health of patients or program participants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Especially improving the overall health for low-income, underserved population	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing substance abuse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving public awareness of health issues (e.g., diabetes, healthy eating, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encouraging patients or participants to make lifestyle changes that improve their health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.7 If you indicate "A Lot" for one or more responses, please describe how and quantify as much as possible:

Q4.8 The following questions ask about the project's effect on certain ECONOMIC measures. What impact did the project have on:

	None	Little	Some	A Lot	Do Not Know
Improving the stability and sustainability of local economy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attracting new jobs or increasing employment at existing businesses, hospitals, or organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Retaining jobs that would have otherwise been lost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improving the efficiency and/or productivity of a healthcare facility or public service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing the cost of medical or administrative services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.9 If you indicate "A Lot" for one or more responses, please describe how and quantify as much as possible:

Q4.10 Were you surprised by any of the project's impacts on WORKFORCE, HEALTH BEHAVIOR, or ECONOMIC measures? Were the impacts much more or much less than originally expected? If so, please explain.

Q5.1 Did any organizations or groups form because of the project (e.g., focus group that becomes a task force)?

- ☐ Yes
- ☐ No

Q5.2 IF YES, please describe the organization or group. What was the most number of people who were involved in the group? What is the status of the group today? If this question is Not Relevant to your project, please enter "NR".

Q5.3 Did any partnerships or networks form because of the project (e.g., public-private partnerships)?

- ☐ Yes
- ☐ No

Q5.4 IF YES, please describe the partnership or network. What was the most number of people who were involved in the group? What is the status of the group today? If this certain question is Not Relevant to your project, please enter "NR".

Q5.5 Was the project an attempt to try something new, or was it based on another project/idea that had been successful elsewhere?

- ☐ Project concept and implementation have been done elsewhere
- ☐ Project concept was from elsewhere, but it was the first implemented
- ☐ Project concept and implementation were both new

Q5.6 No matter what you selected above, please describe below how you feel your project was innovative. Was the innovation successful? If this certain question is Not Relevant to your project, please enter "NR".

Q5.7 Did the project help attract any additional government or philanthropic funding? If so, please describe and quantify as much as possible.

- ☐ Yes
- ☐ No

Q5.8 If yes, please describe and quantify as much as possible.

Q5.9 Did the project bring about any private investment not directly related to the project?

- ☐ Yes
- ☐ No

Q5.10 If yes, please describe and quantify (amount and impact of private investment) as much as possible.

Q5.11 To what extent was the attraction of additional funding (public or private) attributable to the ARC intervention and funding?

- ☐ Entirely
- ☐ Mostly
- ☐ Somewhat
- ☐ Slightly
- ☐ Too difficult to determine

Q6.1 While implementing the project, did your organization conduct its own evaluation?

- ☐ Yes
- ☐ Started, but did not finish
- ☐ No

Q6.2 IF YES, what was the nature and outcome of your own evaluation? Would you be willing to send it us?

Q6.3 Did the project have any unexpected outcomes that you would like to share? If so, please share below.

Q6.4 Were there any other positive or negative economic impacts on the state, region, or community not yet indicated above?

- ☐ Yes
- ☐ No

Q6.5 IF YES, please explain and quantify as much as possible.

Q6.6 What do you think would have happened to the project if ARC funding had not been available?

- ☐ Completed with other funds in approximately the same time period
- ☐ Delayed for up to a year
- ☐ Delayed for a year or more
- ☐ Completed on a smaller scale
- ☐ Not have been undertaken

Q6.7 Please provide any additional comments on the project in terms of accomplishments, challenges, or other relevant information to help with the ARC health program evaluation.