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## Substance Use in Rural Central Appalachia: Current Status and Treatment Considerations

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### Abstract

The burden of substance use and especially the unmatched rates of overdoses in rural Central Appalachia highlight the need for innovative approaches to curb the initiation to drug misuse and to address current substance use disorders. Effective substance use interventions involve a thorough understanding of the region. In Central Appalachia, many of the barriers to treatment are shared with other rural and impoverished areas, including a lack of access to health care and lack of health care providers with specialized training. Parts of Appalachia also present their own considerations, including the challenges of fostering trust and encouraging treatment-seeking in communities with dense, long-term, place-based social and family networks. Current policies and interventions for substance use have been largely inadequate in the region, as evidenced by continued increases in substance use and substance-related deaths, especially related to nonmedical prescription drug use and increasing heroin use. The authors discuss ways in which rural life, poverty, identity, and values in Appalachia have influenced substance use and treatment and propose strategies and interventions to improve outcomes.

### Keywords

Addiction; opioid use; Appalachia; treatment; injection drug use; rural

### Substance Use in Rural Appalachia

Substance use has increased steadily in rural Appalachia over the past two decades (Centers for Disease Control and Prevention [CDC], 2011; Havens, Walker, & Leukefeld, 2007). Prescription medications, specifically opioids, are abused at rates exceeding national averages in rural Appalachia, resulting in a negative impact on the health of the overall population (CDC, 2011; Zhang et al., 2008). Nonmedical prescription drug use is of particular concern in rural Central Appalachia (see counties in West Virginia, Southwest Virginia, Eastern Kentucky, Southeast Ohio, East Tennessee, and Western North Carolina outlined in Figure 1), with among the highest rates of use and overdoses across the US

(CDC, 2011; Havens et al., 2013; Havens et al., 2007; Jonas, Young, Oser, Leukefeld, & Havens, 2012; Young & Havens, 2012). Currently, West Virginia has the highest rate of drug overdoses in the country, with an age adjusted rate of 35.5 overdoses per 100,000 inhabitants compared to a national average of 14.7 per 100,000 persons (CDC, 2015; Rudd, Aleshire, Zibbell, & Gladden, 2016). Despite high rates of opioid misuse throughout West Virginia and surrounding areas, drug use in coalmining regions of rural Central Appalachia (“the coalfields,” concentrated especially in Eastern Kentucky and Southern West Virginia, plus counties in Virginia, Tennessee, and Ohio) are over and above even those of rural non-coalmining Appalachia, indicating that people living in coalmining regions, specifically those with mountaintop coal removal, are at increased risk of developing substance use disorders (Steele, 2015; Zhang et al., 2008).

Patterns of drug use in Central Appalachia are distinctive to the region in that low education levels, high rates of unemployment, and high rates of job related injuries perpetuate risks for substance use (Coalition on Appalachian Substance Abuse Prevention [CASAP], 2016). In addition, a long history of anti-regulatory sentiments in the region may create resistance to legal efforts to curb substance sales and use (CASAP, 2016) and a paucity of training in substance use treatment for medical providers leaves many minimally equipped to address substance use disorders (CASAP, 2016). Importantly, Hansen and Resick (1990) described rural Appalachians as often living in a largely “self-contained culture” similar to other minority groups such as Native American and Amish communities. Such groups may resist Western medicine approaches. However, unlike the subcultures of Native American and Amish people, the distinct ways of life and belief systems of Appalachians are less readily acknowledged. Specifically, Appalachians appear consistent with normative middle class Americans in race, religion, ancestry, and language. Similarities between normative Americans and rural Appalachians may work against Appalachians in that less emphasis is placed on awareness and specialized training to facilitate understanding of local beliefs that could lead to better patient experiences and improved treatment outcomes (Hansen & Resick, 1990).

Many factors have contributed to the rise in nonmedical prescription drug use. For example, historically, Central Appalachia has had a large number of physical laborers (e.g., coal miners and loggers), making the population prone to workplace injury and chronic pain. In the late twentieth century, new synthetic painkillers (the FDA approved prescription opiates Vicodin in 1984, OxyContin in 1995, and Percocet in 1999) provided such workers with relief (Kobak, 2012; Van Zee & Kobak, 2015). This concentration of need, in combination with inadequate federal and state regulation and pharmaceutical companies’ marketing of prescription pain medications to physicians in regions with high demand for pain treatment (“Drug firms,” 2016; Kobak, 2012), resulted in increased prescription drug availability (Bates, 2008; Kobak, 2014), with prescription rates of OxyContin five to six times higher than national averages in some counties (“Drug Firms,” 2016). In Central Appalachia, high rates of chronic pain, inadequate regulatory oversight, and targeted marketing by pharmaceutical companies led to prescription pain medications that were readily available (Zhang et al., 2008). In conjunction, too little public health education about the risks and abuse liability tied to prescription pain drugs resulted in individuals who were unaware of the consequences of initiating use (Zhang et al., 2008).

Throughout Central Appalachia, opioid and polysubstance misuse often translate into injection drug use and, in turn, high rates of blood-borne diseases such as Hepatitis C and HIV, which have increased the region's social and economic burdens. Until the 2010 release of a reformulated, controlled-release version, OxyContin was the primary pathway to injection drug use in Central Appalachia (Young & Havens, 2012). From 2006 to 2012, rates of Hepatitis C infection, the most common blood-borne infection in the United States, skyrocketed in Central Appalachia; most conspicuously, rates of Hepatitis C in people under 30 in Central Appalachian states increased 364% (Zibbell et al., 2015). The notable rise in Hepatitis C across the Central Appalachian region coincided with a 21.1% increase in treatment admissions for opioid dependence and a 12.6% increase in patients' reporting that injection was their primary route of drug administration (Zibbell et al., 2015). In other rural parts of the country, increases in Hepatitis C have preceded HIV outbreaks, raising concern over the potential for elevated rates of HIV in rural Appalachia (Havens et al., 2013; Indiana State Department of Health, 2015; Van Handel et al., 2016; Zibbell et al., 2015). In order to curb further spread of blood-borne viruses via injection drug use, a concerted focus in the region to educate, treat, and offer safer alternatives to residents is necessary.

## Considerations for Substance Use Treatment

Many characteristics of Appalachia make substance use treatment difficult and distinctive when compared to other impoverished areas (CASAP, 2016). Shortcomings in effective treatment of substance use problems in rural Appalachia include: (1) lack of access to health professionals because of cost and insufficient health insurance coverage; (2) lack of access to qualified health care providers as a result of travel distance, lack of training in evidence-based and evidence-supported treatments, and/or lack of trust in health professionals to provide effective treatment; and (3) lack of educational and economic opportunity contributing to systemic poverty, a key determinant of higher rates of substance abuse (CASAP, 2016). Each of these points is discussed in turn.

### Health Insurance Coverage

Rural residents have less access to health care broadly (Caldwell, Ford, Wallace, Wang, & Takahashi, 2016), and mental health care specifically (Reschovsky & Staiti, 2005), compared to urban residents; moreover, individuals suffering from substance use problems are less likely to be insured compared to their non-addicted counterparts (Hendryx, 2008). The Healthcare Costs, Coverage, and Access (HCCA) index, a composite score that weighs county-by-county access to health care, insurance coverage, and costs, reported that Central Appalachian counties that are not contiguous to metropolitan areas have disproportionately lower index scores (Lane et al., 2012). The low HCCA index scores in non-adjacent counties are, in part, driven by high rates of uninsured individuals, as shown in Figure 2. Although this report was conducted specifically on behalf of the Appalachian Regional Commission, it suggests that the other areas of the country with extremely low HCCA scores comparable to those in very rural Appalachia are broad areas of Texas, Louisiana, and Florida with high percentages of Latino immigration (Lane et al., 2012). The extent to which these health care access disparities will persist or be reduced in rural Appalachia may be contingent on the future of the Patient Protection and Affordable Care Act.

Between its passage in 2010 and 2016, the Affordable Care Act has increased coverage rates for people across America, and the subsequent expansion of the Medicaid program increased coverage for people in participating states (Courtemanche, Martin, Ukert, Yelowitz & Zapata, 2016). In 2015, the decrease in uninsured individuals in Central Appalachia was among the greatest in the nation (Witters, 2016), in part because Kentucky and West Virginia adopted both the Medicaid expansion and health care insurance exchange programs. In Kentucky, the rate of uninsured individuals went from 20.4% in 2013 to 7.5% in 2015 (Witters, 2016). Similarly, uninsured rates in West Virginia went from 17.6% in 2013 to 7.7% in 2015 (Witters, 2016). Other Central Appalachian states, including Tennessee and Virginia, have not adopted the Medicaid Expansion and as such have not seen these marked increases in health insurance coverage (Kaiser Family Foundation, 2016). Medicaid expansion, and specifically the coverage of otherwise uncompensated care costs, not only provides more access for individuals, but also disproportionately benefits rural health care providers by stabilizing funding sources (State Health Reform Assistance Network, 2016).

Improvements in rates of health insurance coverage and in services covered by health insurance have offered some relief in Central Appalachia and rural areas in general, but the current political environment threatens recent gains. Additionally, greater and relatively easy access to substance use services are still needed (Watson, 2011) especially given that rural areas, as compared to urban centers, have fewer mental health providers per capita and lower availability of specialized providers such as addiction psychologists and psychiatrists (Hendryx, 2008).

## Providers

In Central Appalachia, as in other rural areas, health professionals qualified to provide efficacious treatment may be prohibitively far away. According to the Appalachian Regional Commission, approximately 55% of people living in Central Appalachia are in rural areas compared to 20% of the national population (Housing Assistance Council, 2010). The rurality of much of Central Appalachian may make access to health professionals disproportionately costly, especially for those who are uninsured. Moreover, rural health care providers nationally, including those tasked with treating substance use disorders, may not receive sufficient training in evidence-based treatments. Indeed, rural providers are less likely to use empirically-based interventions than those in urban areas (Dotson et al., 2014), further increasing barriers to treatment access. A lack of training availability can result in outdated treatment modalities that are minimally effective or even detrimental to recovery. Furthermore, training and implementation of evidence-based treatments (discussed in a section to follow) may better leverage strengths of Central Appalachian and other rural communities.

In addition to insufficient training of rural health care providers, Appalachian stereotypes such as fundamentalism, primitivism, isolationism, backwardness, and homogeneity (Billings, 2000; Scott, 2010) stand in the way of some health care providers' accurately understanding people living in this region (Coyne, Demian-Popescu, & Friend, 2006). Focus groups to identify beliefs of those living in Appalachia show promise as a way to unearth—rather than presume—pertinent values. In Central Appalachia, focus groups have identified

economic disparity, unemployment, and under-education as characteristics that may increase both substance use and treatment failure (Coyne et al., 2006). Characteristics such as strong faith in God, strong family ties, strong sense of pride, and valuing self-sufficiency, on the other hand, may act as preventative factors and help to bolster treatment effectiveness in the region (Coyne et al., 2006; Zhang et al., 2008).

Distrust or fear of stigma on the part of some Appalachian residents toward mental health professionals may present a challenge for substance use treatment in Central Appalachia (Zhang et al., 2008). Focus groups revealed a distrust of medical professionals for fear that they might prescribe drugs that will lead to addiction and concern that private family problems will become public (Coyne et al., 2006). Moreover, Appalachians in Southern West Virginia noted discomfort with medical professionals born outside the United States because of presumed cultural differences that resulted in poor relationships between the provider and patient (Coyne et al., 2006). The lack of trust in health care professionals hinders treatment seeking and treatment compliance in the region, underscoring the need for community-based initiatives to repair trust.

### **Social Determinants of Health**

Several social determinants of health, such as poverty and economic distress, are closely tied to other contributing factors for substance use, including lack of health care coverage and a lack of sufficiently trained and accessible health care providers. Nonetheless, these factors perpetuate the risk for substance use problems (Appalachian Regional Commission, 2013; CASAP, 2016; Leukefeld, Walker, Havens, Leedham, & Tolbert, 2007; Schoeneberger, Leukefeld, Hiller, & Godlaski, 2006). Central Appalachian counties are disproportionately impoverished even when compared to other areas in Appalachia (see Figure 3). In addition, Central Appalachian counties are occupationally distressed and these counties largely cluster around coalmining areas already at greater risk of prescription drug abuse (as discussed above). The combination of poverty, occupational distress, lack of health care coverage, and the shortage of qualified providers of substance use treatments underscore the growing need for multifaceted policies interventions in the region.

### **Strategies for Substance Abuse Programs and Treatments**

Central Appalachia needs improved substance use interventions because of the high rates of use and to the unparalleled economic and social burden that substance use causes for the people living in this area (Leukefeld et al., 2007; Schoeneberger et al., 2006). Successful interventions in rural Central Appalachia will require (1) public health dissemination strategies adapted to the region, (2) greater reliance on evidenced-based treatment strategies, and (3) the expansion of telehealth in the absence of a more equitable distribution of health providers.

### **Public Health Initiatives**

Well-crafted public health interventions can facilitate better dissemination and acceptability of substance use treatment. Effective outreach followed by treatment implementation strategies sensitive to regional characteristics, such as skepticism of influence from

unfamiliar sources and strength of familial and social networks, may increase treatment acceptability and outcomes. Additionally, culturally appropriate public health strategies that foster trust and community involvement may lower the threshold for treatment seeking and provide a reduction in public health burden for those not yet ready to stop substance use.

Lay health providers, or local residents who receive frontline training and offer initial treatment, may serve as a bridge between community members and specialized health care providers by offering referrals from a trusted source to more specialized providers (Eng & Young, 1992; Wewers et al., 2016; Zuvekas, Nolan, Tumaylle, & Griffin, 1999). Given that some individuals in Appalachia report a distrust of health care professionals (Coyne et al., 2006), the use of long-time community members to provide the first line of care may be especially important for this region. Moreover, the training provided to lay health providers may help to raise awareness of relatively high levels of disparity and unmet need compared to national health standards (Halverson, Friedell, Cantrell, & Behringer, 2012).

Another public health strategy, participatory development, includes community members in planning and decision-making to build ties and trust between outside agencies and locals (Keefe, 2009). Participatory development values local cultures, community organizations, collaboration between mental health professionals and community members, and empowerment of local individuals (Prokopy & Castelloe, 1999). These models facilitate people-focused plans that foster local leadership, such as that provided by lay health advisors, and increase participation by at-risk members of the population. The success of a participatory development program is measured by its sustainability without, or with minimal, outside help. Given the reports from focus groups in the region (Coyne et al., 2006), inclusion of local religious leaders in program development and triage care may aid in acceptability of implementation and dissemination strategies.

In addition to public health models that increase community involvement and acceptability, integrated health care models facilitate the housing of medical and mental health facilities together. By providing joint accommodations for both services, patients receive multiple benefits, including increased convenience and decreased stigma related to mental health treatment (Franko, 2014). Moreover, for individuals suffering from multiple health problems or chronic diseases, integrated care models have a positive economic impact for the patient (Desmedt et al., 2016). Continued movement toward these models may provide increased access, reduced stigma, and reduced economic burden for individuals living the rural Central Appalachia.

Finally, syringe exchange programs, or the provision of free access to clean syringes and disposal of used syringes, are needed in Central Appalachia. Given that use of nonprescription opioids is a major risk factor for progressing into injection drug use (Havens et al., 2007; Leukefeld et al., 2005; Young & Havens, 2012), and that injection drug use is associated with increased risk for infectious diseases such as Hepatitis C and HIV (Havens et al., 2013), syringe exchange programs provide a harm reduction technique to reduce the spread of infectious disease. Syringe exchange programs prevent the spread of infectious disease by providing a front-line alternative for injection drug users (Hyshka, Strathdee, Wood, & Kerr, 2012). Importantly, these programs have been successful in other rural areas

(Strathdee & Beyrer, 2015). In one study of Appalachian Kentucky injection drug users, fewer than 4% reported regularly purchasing clean syringes from pharmacies (Havens et al., 2013), highlighting the low rates of access or use of clean needles. An ongoing challenge for syringe exchange programs is the discrepancy between empirical evidence showing that increased access to clean needles decreases spread of disease (Gibson, Flynn, & Perales, 2001; Lurie et al., 1993; Watters, Estilo, Clark, & Lorvick, 1994), and decisions by sociopolitical policy makers, who make claims about community detriment without research-backing (Allen, Ruiz, & O'Rourke, 2015). Perhaps the buy-in of local opinion leaders may increase the likelihood of success for syringe exchange programs and aid in their implementation in rural Appalachia (Vestal, 2016).

The opportunities for meaningful public health initiatives in Central Appalachia are vast. Areas for public health interventions include the adoption of public health models, such as lay health providers and participatory development, to promote community engagement and sustainability for substance use treatment. Continued movement toward integrated health care models that reduce stigma, cost, and barriers to access will reduce the burden for patients to receive specialized substance use treatment. Finally, implementation of syringe exchange programs throughout the region will help to reduce the spread of infectious diseases.

### **Evidence Based Treatments**

In addition to public health initiatives in rural Central Appalachia, training and adoption of evidence-based treatments may provide the tools necessary to successfully treat individuals with substance use disorders. These treatments broadly fit into two, often overlapping, domains: medical and psychological. Opioid substitution therapies (OSTs) provide medicinal alternatives to opioid misuse. Methadone and buprenorphine (including Suboxone and Subutex) maintenance treatments provide safer alternatives than illicit opioids because of the much lower abuse potential (Ball & Ross, 2012; Marsch, 1998; West, O'Neal, & Graham, 2001). OSTs, sometimes in conjunction with psychological treatment, support reduced opioid use and help individuals remain abstinent from, and in treatment for, illicit opioid use (Mattick, Breen, Kimber, & Davoli, 2014). Providing access to OSTs, especially through integrated health care offices, may provide cost-effective options for more widespread treatment, especially if increased coverage through the Affordable Care Act and the Mental Health Parity and Addiction Equity Act persist (Volkow, Frieden, Hyde, & Cha, 2014).

Psychological interventions, either on their own or in combination with medicinal treatments, provide skills to promote and maintain abstinence. Innovative treatments that are appropriate for rural Central Appalachia include system-based interventions such as the Community Reinforcement Approach (CRA), a psychotherapeutic intervention that uses social, recreational, familial, and vocational reinforcers to assist clients toward recovery. CRA includes motivational enhancement, monitoring of pharmacotherapy such as OSTs, functional analysis of substance use patterns, skills training (including drug refusal, communication skills, problem solving skills, and relapse prevention), help with employment, relationship counseling, and social recreational counseling (Smith & Meyers,

1995). CRA has been used successfully to treat cocaine, opioid, and cannabis dependence (Abbott, 2009; Abbott, Moore, Weller, & Delaney, 1998; Bickel, Amass, Higgins, Badger, & Esch, 1997; Budney & Higgins, 1994; McGarvey et al., 2014; Roozen, Kerkhof, & Van den Brink, 2003; Schottenfeld, Pantalon, Chawarski, & Pakes, 2000; Smith, Meyers, & Miller, 2001) and, in combination with OSTs, it is associated with a reduction in opioid use, reduction in other drug use, improvements in legal status, improvement in employment status, and improvement in social functioning (Abbott, 2009; Abbott et al., 1998; Roozen et al., 2003).

Importantly, CRA leverages strengths of the rural Appalachian identity, such as a deep-seated connection to extended family, by including family members in the treatment process to help facilitate exposure to prosocial reinforcers. It is especially well-suited for the rural Appalachian environment, as many components of the treatment are adaptable to be administered through telehealth technologies and by lay health providers, increasing treatment feasibility in the region and reducing costs over time. An important note is that implementation of psychological treatments is often expensive, even with expanding health care coverage, and may require substantial initial investment from government agencies, such as through dissemination and implementation initiatives through National Institutes for Health, grant funding mechanisms through the Substance Abuse and Mental Health Services Administration (SAMHSA), as well as other grant funding mechanisms.

### Telehealth Interventions

In combination with the implementation of medical (e.g., OSTs) and psychological (e.g., CRA) services, telehealth interventions provide the opportunity to reduce cost while still expanding the provision of evidence-based medical and psychological treatments (Backhaus et al., 2012; Graham, 1996; Perle & Nierenberg, 2013). In randomized clinical trials, telehealth interventions are as effective as face-to-face interventions and can be combined with empirically supported substance use treatments (Gros et al., 2013; King, Brooner, Peirce, Kolodner, & Kidorf, 2014; Richardson, Frueh, Grubaugh, Egede, & Elhai, 2009). Importantly, telehealth strategies are increasingly feasible where legislation for equitable reimbursement of telehealth services is available, such as in Virginia and Kentucky (West Virginia Center on Budget & Policy, 2013). Additionally, the reach of technology has grown and the spread of computer and cellular access makes the use of telehealth interventions increasingly feasible, though portions of Central Appalachia have disparate access compared to national averages and compared to other regions of Appalachia (Lawrence, Oliver, Hogan, & VanLear, 2015). Despite access challenges, a local leader in telehealth services in Appalachia, Cherokee Health Services, has successfully implemented telehealth systems in collaboration with school systems to reach rural adolescents in need of physical and mental health screening (Franko, 2014).

In addition to established evidence-based treatments and telehealth strategies, promising interventions are being developed to increase treatment availability in rural areas. One example is computerized treatments for opioid dependence, such as the Therapeutic Education System, which provide module- and skills-based cognitive-behavioral treatment anywhere with computer access (Bickel, Marsch, Buchhalter, & Badger, 2008). In



combination with OSTs, the Therapeutic Education System is an empirically-supported treatment for opioid use disorder (Campbell et al., 2014) that can provide services to areas where a specialized treatment provider may be unavailable. Similarly, remotely delivered contingency management, or incentive-based treatment to promote abstinence, is currently an area of development with potential to provide efficacious and cost effective treatment regardless of proximity to a health care provider. Contingency management, when delivered remotely, allows individuals to submit biological samples, such as breath alcohol levels, from home. Although not yet studied in opioid using populations, remote contingency management treatment is effective for smoking cessation (Dallery & Raiff, 2011) and is currently under evaluation for alcohol use disorder (Koffarnus, Kablinger, Swallow, & Bickel, 2015).

## Conclusions

Nonmedical prescription drug use has increased over the past two decades in Central Appalachia (CDC, 2011; Havens et al., 2007) and prescription opioid abuse has come to the forefront as a public health concern. The burden of nonmedical opioid abuse in rural Appalachia extends beyond the individual drug users as it tears away at traditionally close-knit families, reduces the viable workforce, increases crime, overloads the justice system, and spreads disease through the region (CDC, 2011; Leukefeld et al., 2005). A call to action by state and federal leaders in Central Appalachia, taking the form of political endorsements of taxes on opioids (Merica, 2016) and local leaders stating the need for more funding and resources (Vilsack & McAuliffe, 2016) has brought the opioid problem to the public's attention.

Successful large-scale interventions in Central Appalachia, like those in other rural areas, require capitalizing on local values to increase treatment seeking, acceptability, and fidelity. Participatory development models to implement lay health providers as a first line of care coupled with widespread use of telehealth to provide access to rural regions and to increase availability of highly trained professionals will improve substance use treatment. Empirically-based medical and psychological interventions such as OSTs, the Community Reinforcement Approach, the Therapeutic Education System, and remote contingency management offer candidate treatments that are well suited for the region. Furthermore, harm reduction techniques such as syringe exchange programs are necessary to curb pending epidemics of blood-borne diseases. Together, treatment efforts, with the support of funding initiatives in Central Appalachia, may pave the way for similar models in other rural areas struggling with comparable mental health and substance use problems.

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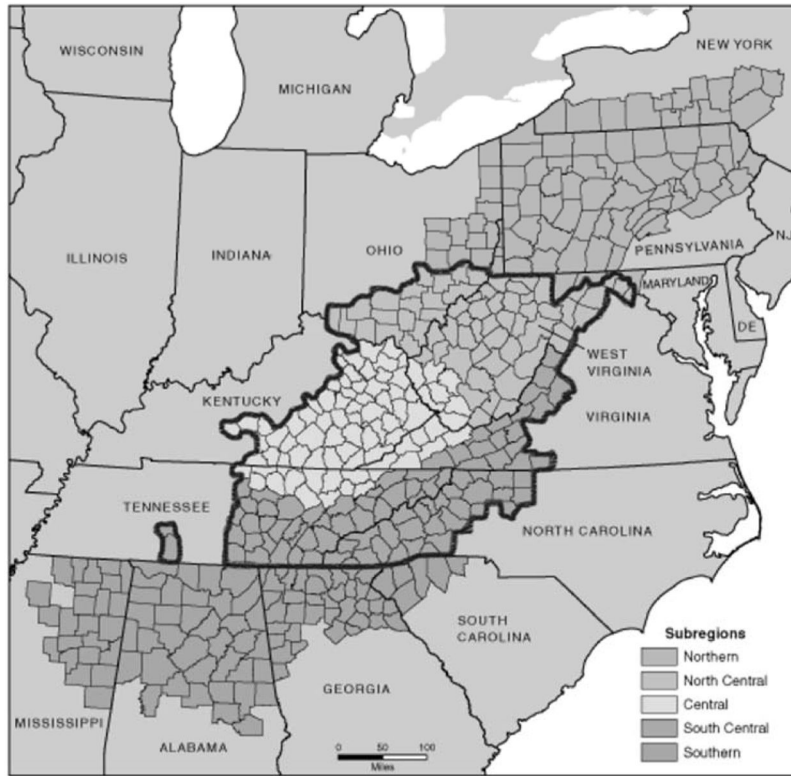
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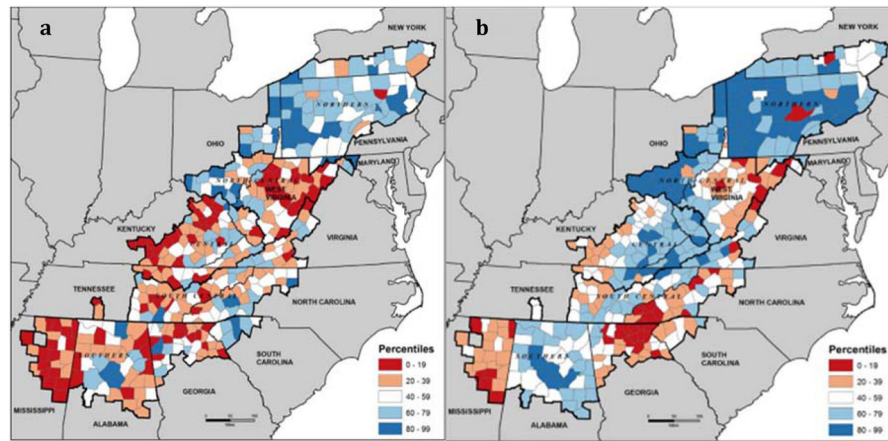
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Map by: Appalachian Regional Commission, November 2009.

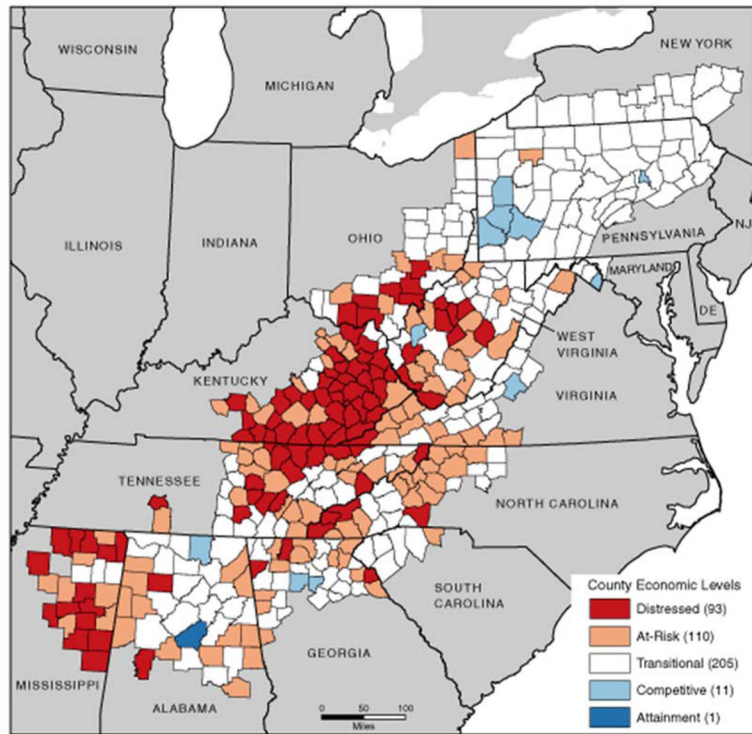
**Figure 1.**  
The outlined regions depicts counties in Central Appalachia.



**Figure 2.**

County healthcare cost, coverage, and access index scores across Appalachia (from Lane et al., 2012, *Health Care Costs and Access Disparities in Appalachia*, Appalachian Regional Commission). Blue represents good access, coverage, and payment compared to the national average. White indicates the County's index score is close to the national average. Red indicates the index score is well below the national average. Panel a shows the combined index scores for cost, coverage, and access. Panel b shows the percentiles for healthcare insurance coverage only.





**Figure 3.** Appalachian Regional Commission county-by-county map of economic disparity.