Rural Adolescent Substance Abuse: Prevention Implications from the Evidence

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Abstract

Purpose: To identify appropriate adolescent substance abuse prevention programming for rural populations through the application of three concepts: effectiveness (best clinical evidence), efficiency (benefit to rural populations), and equality (access).
Methods: A review of the literature guided by these concepts was conducted to identify criteria essential to the tailored development of rural adolescent substance abuse prevention programming. An advanced search of the Substance Abuse and Mental Health Services Administration's (SAMHSA) National Registry of Evidence-based Programs and Practices (NREPP) was then conducted using criteria tailored to rural populations.
Findings: Results from the literature search support the inclusion of two components directed at improving quality of outcomes through a customized approach to rural adolescent substance abuse prevention programming: inclusion of parents in prevention education efforts and use of the Internet as an appropriate method of program delivery. These components were satisfied by one program listed on SAMHSA's NREPP: *Parenting Wisely*.
Conclusions: While *Parenting Wisely* is an ideal program for rural adolescent substance abuse prevention strategy, it may not be suitable for all communities. Parallel to recommendations from the SAMHSA and Institute of Medicine, other evidence-based prevention programs need to be expanded to include a web-based delivery option. Strategies for moving forward would include the use of advanced-practice nurses at the forefront of discussion for rural professionals, researchers, educators, and policymakers.

***Keywords*:** Access to care, Technology, Substance abuse prevention, Rural

Rural Adolescent Substance Abuse: Prevention Implications from the Evidence

Adolescent substance abuse is a considerable problem in the United States. Although alcohol can best be described as an older problem with increasing incidence, illegal drug usage is a fairly new phenomenon in rural America (Schoeneberger, Leukefeld, Hiller, & Godlaski, 2006). With increased access to cell phones, Internet usage and migration of peoples to rural areas, what was formerly considered an urban issue is becoming an increasingly apparent problem in rural America (Dew, Elifson, & Dozier, 2007). Lambert, Gale, and Hartley (2008) note rural youth have a greater incidence of alcohol and methamphetamine usage when compared to urban youth. The authors also demonstrated a negative correlation between population and use of these substances in that alcohol and methamphetamine usage increases as population decreases.

The Substance Abuse and Mental Health Services Administration (SAMHSA) demonstrated these rural trends with its 2008 national survey results on drug use (SAMHSA,

2009). In 2008, alcohol binge drinking rate for young persons ages twelve to seventeen was greatest in nonmetropolitan areas at 9.8%. Small metropolitan areas had a rate of 9.0%, while large metropolitan areas had a rate of 8.4%. Illicit drug use in completely rural counties rose from 4.1% in 2007 to 6.1% in 2008. While it seems rural youth substance abuse rates now parallel their metropolitan counterparts, there still remains a disparity in resources available to combat the problem (Rural Assistance Center, 2010).

Regardless of geographical context, youth substance abuse results in the following problems: disrupted peer and family relationships (Collins, Johnson, & Becker, 2007), school problems such as misbehavior and academic failure (Henry, Smith, & Caldwell, 2006), and higher risk behavior (Lambert et al., 2008). Spending on substance abuse treatment is projected to increase to thirty-five billion dollars by 2014 (Levit, Kassed, Coffey, Mark, McKusick, King, Vandivort, Buck, Ryan, & Stranges, 2008). This spending increase coupled with the added social costs of overextended law enforcement, educational, and counseling-related services can deplete the already limited resources of a rural community. Therefore, it is imperative to identify effective strategies for youth substance abuse prevention and that those strategies be tailored specifically to the needs and abilities of rural communities. In order to reduce resource strains while maximizing the quality of outcomes, strategy development for the rural community can be guided by the vision of a pioneer in healthcare quality, Archibald "Archie" Cochrane.

Methods

A review of the literature guided by the concepts of *effectiveness (*best clinical evidence), *efficiency* (population benefit), and *equality* (access) as defined by Archie Cochrane (1972) was carried out in order to identify criteria essential to the development of rural adolescent substance abuse prevention programming. Methodology which incorporates the processes of a systematic review and meta-analysis affords clinicians the ability to summarize information from research literature in order to apply best evidence-based strategies to clinical practice (Haase, 2011). This review process incorporated a three-tiered approach. First, the CINAHL, Medline, PubMed, and Cochrane Library databases were utilized to conduct a text search of the research literature using several keywords: *rural*, *adolescent*, *substance abuse*, and *prevention*. Subsequently, search results were analyzed through the application of an A to D letter grade scale (Titler, 2002). Grade criteria are as follows: Grade A (evidence from well-designed meta-analysis or other systematic reviews); Grade B (evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action, intervention, or treatment); Grade C (evidence from observational studies or controlled trials with inconsistent results); and Grade D (evidence from expert opinion or multiple case reports). Based on the concepts of *effectiveness* and *efficiency* (Cochrane, 1972), articles were reduced to those graded as either A or B.

According to Cochrane (1972), *equality* can only be met by satisfying the concepts of *effectiveness* and *efficiency*. As a result of this preliminary literature search, a secondary examination of the literature was conducted via methods similar to the initial search but using the following keywords: *parents*, *prevention*, and *technology*. Based on the concept of *equality* (Cochrane, 1972), results were reduced to information relevant to the prevention of mental health issues including parenting skills education utilizing methods designed to increase access with hard to engage groups such as those in rural populations.

In the third tier of this review process, an advanced search of the SAMHSA National Registry of Evidence-based Programs and Practices (NREPP) was conducted (SAMHSA, 2010) using the following search criteria: areas of interest (substance abuse prevention); geographical

location (rural and/or frontier); ages (6-12 [childhood], 13-17 [adolescent]); and setting (home, workplace, other community settings). This search method was designed to identify substance abuse prevention programs which would satisfy the concepts of *effectiveness* and *efficiency* (Cochrane, 1972). Program results were then tailored to rural populations by narrowing interventions to those that included delivery methods suggested by the secondary literature review which would satisfy the concept *equality* (Cochrane, 1972) by increasing access.

Results

In the first tier of the literature review process, search terms yielded over two hundred articles. Through application of Titler's (2002) letter grade criteria, search results were reduced to less than a dozen research articles. None of these A or B Grade articles addressed the use of technology-based methods for substance abuse prevention program delivery. However, the secondary literature review did produce some evidence through data supporting use of the Internet as a delivery method for prevention programming in mental health including education designed to improve parenting skills. In a Grade B randomized study, Calam, Sanders, Miller, Sadhnani, and Carmont (2008) demonstrated improvement in parenting skills and child behavior. In addition, Internet-based training methods demonstrated principles inherent to the concept of *equality* (Cochrane, 1972): provide mental health services access to families who might not otherwise receive them (Feil, Baggett, Davis, Sheeber, Landry, Carta, & Buzhardt, 2008), meet cultural demands today for Internet-based delivery methods (Feil et al., 2008), and improve cost-effectiveness by permitting parents access convenience of services whenever needed (Calam et al., 2008). An advanced search of the SAMHSA NREPP (SAMHSA, 2010) yielded one program that encompassed the concepts of *effectiveness*, *efficiency*, and *equality* resulting in a prevention approach tailored to the needs of a rural community. In order to put the results into full perspective, it is important to address specific findings individually through each of the three concepts and tailored approach results.

Effectiveness

Cochrane describes *effectiveness* as the best clinical evidence (Cochrane, 1972). In other words, clinical applications of evidence should be derived from high quality research designs such as randomized controlled trials, systematic reviews, and/or meta-analyses. Most of the substance abuse prevention programming interventions in the research literature for both rural and urban populations are targeted towards one of three key aspects: parenting skills, peer socialization skills, or school-based interventions. A systematic review demonstrated significant findings for these same populations: positive outcomes were most evident in the areas of parenting skills and peer socialization skills; programs directed at parenting skills and improving family processes demonstrated great success in substance abuse reduction outcomes; and the most beneficial approaches were those that focused on parental involvement (Petrie, Bunn, & Byrne, 2007).

The Cochrane Library, named after Archie Cochrane (Cochrane, 1972), currently has two systematic reviews in its database of Cochrane Reviews demonstrating similar results with parental findings. The first systematic review examined school-based programming focused on illicit drug use prevention in both rural and urban settings (Faggiano, Vigna-Taglianti, Versino, Zambon, Borraccino, & Lemma, 2005). Findings indicated social skills programs were most popular and effective in reducing substance use. The second systematic review examined non school-based programs designed to prevent drug use in young people (Gates, McCambridge, Smith, & Foxcraft, 2006). This review examined the prevention programming types of

motivational interviewing or brief intervention, education or skills training, family interventions, and multi-component community interventions. Findings were mostly inconclusive due to lack of homogeneity in research designs, but the authors did conclude there was enough evidence to suggest that family-based interventions including contact with parents to be beneficial in preventing substance use.

The aforementioned research findings supporting benefit with parental inclusion in prevention efforts parallel adolescent reports in SAMHSA's *2008 National Survey on Drug Use and Health* (SAMHSA, 2009). A majority of adolescents ages twelve to seventeen reported a belief that their parents would strongly disapprove of substance usage: 90.8% in regard to marijuana or hashish; 89.7% in regard to alcohol usage; and 92.4% in regard to cigarette usage. Adolescents who believed their parents would strongly disapprove of substance usage were less likely to use substances than those who sensed a lesser degree of parental disapproval (SAMHSA, 2009). Research has demonstrated that changing parental opinions is necessary in altering adolescent beliefs (Abbey, Pilgrim, Hendrickson, & Buresh, 2000). Adolescents view parents as believable in terms of drug knowledge, and substance abuse prevalence decreases as perceived family penalties for such usage increases (Kelly, Comello, & Hunn, 2002).

Survey results also demonstrated level of parental involvement including support, oversight, and control of adolescent activities affected substance usage. Use of substances including illicit drugs, alcohol, and cigarettes was less for adolescents ages 12-17 who reported regular parental monitoring of behaviors than those whose behaviors were rarely monitored by parents (SAMHSA, 2009). As depicted in Table 1, substance usage rates for adolescents whose parents seldom or never monitored behaviors were approximately twice that of adolescents whose parents were always or sometimes involved (SAMHSA, 2009).

Table 1

Adolescent Usage Rates Based Upon Level of Parental Behavior Monitoring (SAMHSA, 2009)

Substance	Rate of Use for Adolescents Whose Parents Seldom or Never Monitored Behavior	Rate of Use for Adolescents Whose Parents Always or Sometimes Monitored Behavior
Illicit Drugs	15.6%	7.7%
Alcohol	15.9%	7.3%
Cigarettes	15.3%	7.7%

Efficiency

Cochrane describes *efficiency* as involving benefit to a predefined population (Cochrane, 1972). In other words, interventions found to be effective through research should provide a benefit to the community. Substance abuse prevention programming that includes parental involvement has demonstrated benefits other than just youth substance abuse prevention. A systematic review found such interventions improved both parenting skills and family processes resulting in greater family cohesiveness and less family fighting (Petrie et al., 2007). Other benefits include saved dollars from reduced usage of resources provided by both society and the government (SAMHSA, 2007).

An example of a family-based program demonstrating an increase in cost benefit is the *Strengthening Families Program*. This prevention program for parents and youth ages ten to fourteen cost $851 per child participant to implement but yielded an estimated $9656 social cost benefit (Aos, Lieg, Mayfield, Miller, & Pennucci, 2004). While this program demonstrated a

benefit greater than eleven times the investment, not all programs provide similar results; however, even the smallest measure of mental and behavior problem prevention will result in significant cost-benefit and savings for rural communities (SAMHSA, 2007). A key to improving rural community benefit is by focusing on *equality*, specifically access to the prevention intervention.

Equality

According to Cochrane, *equality* can be met by satisfying the preliminary steps of *effectiveness* and *efficiency*. He hoped this third concept would provide a humanitarian bridge in the gap of care between the rich and poor (Cochrane, 1989). In order to bridge this gap, access to substance abuse efforts need to be increased in rural populations. Failure to provide access to evidence-based substance abuse prevention programming in rural populations will result in continued financial strains with agencies at the local, state, and national levels (SAMHSA, 2007).

Geographical disparities often provide an obstacle to substance abuse prevention efforts with rural populations. In comparison to their metropolitan counterparts, rural areas typically lack assets needed to implement evidence-based substance abuse prevention programming: adequate funding, trained professionals to implement the programs, sufficient infrastructure, and appropriate facilities for instruction provision. In addition, population numbers in rural areas are less and more widely dispersed in comparison to their urban counterparts. These disparities often reduce cost effectiveness due to lessened access (SAMHSA, 2007). As a result, the uniqueness of rural populations facilitates the need for tailored implementation strategies designed to increase access.

Basic principles to increasing family involvement are dependent upon making programs more accessible and acceptable (SAMHSA, 2007). Program effectiveness and population acceptance can be increased when programs are tailored to cultural and community norms of rural populations. Program tailoring would include strategies designed to integrate the intervention into the normal daily schedule of participants, utilizing community assets, and adaptation to financial limitations (SAMHSA, 2007). In order to successfully tailor substance abuse prevention efforts in rural communities, one solution method for program implementation would be a nontraditional, web-based programming approach.

Interestingly, the same technology that has increased rural access to substances of abuse can be used to target parents with prevention efforts. The significant increases in Internet usage and demand has led to alternative delivery method considerations for mental health services (Calam et al., 2008). Parallel with traditional direct-contact approaches, nontraditional web-based prevention methods have demonstrated ability to improve both child behavior and parenting skills (Feil et al., 2008). In addition, these web-based programs also have the ability to increase cost-effectiveness by allowing parents access to needed services at the time and location most convenient to them (Feil et al., 2008).

According to the United States Department of Agriculture (USDA) Economic Research Service (2009), current estimates describe the rate of Internet use for individuals in rural areas to be 71%. In 2007, 63.3% of rural residents accessed the Internet at home or elsewhere, whereas 51.9% maintained home Internet service. Broadband, considered the gold standard in Internet connection and speed, has seen rapid growth in rural areas since 2000. Due to this rapid growth, rural broadband service access has been considered much more common in recent years (USDA Economic Research Service, 2009).

Not only does web-based access to substance abuse prevention programming increase the ability to reach larger numbers in rural populations, it also provides the ability to tailor efforts to the cultural and community norms. Individuals would be able to fit the intervention into their routine schedule whenever and wherever they have Internet access (i.e., home, work). This method would utilize preexisting assets within the community, specifically computer and Internet access. In addition, costs are reduced by: web-based programming that is not labor intensive in comparison to traditional face-to-face classroom approaches; participant need for transportation and lost work time would be decreased; and a less number of highly skilled professionals would be needed to implement the programs.

It is not uncommon to see rural communities provide some degree of evidence-based substance abuse prevention programming targeting youth within the school system. However, these same communities often lack the funding to incorporate parents and/or guardians into the prevention education efforts. Programs focused on improving parenting skills and family processes have demonstrated great success in substance abuse reduction outcomes, and the approaches that include parental involvement seem to be the most beneficial (Petrie et al., 2007). With this in mind, the focus in rural communities should be directed at technology-based prevention programs involving parents to complement the programs already being provided to their children within the school system.

Tailored Approach

An advanced search of the SAMHSA's NREPP initially yielded fourteen evidence-based substance abuse prevention programs meeting basic appropriateness for rural communities (SAMHSA, 2010). Of these fourteen interventions, Table 2 demonstrates eight prevention programs that include parental involvement through either family-based approaches or a sole parent focus; however, only one of these programs offers a web-based program delivery option: *Parenting Wisely* (Family Works, 2010).

Table 2

Advanced Search Results of The SAMHSA NREPP Tailored to Rural Communities (SAMHSA, 2010)

Evidence-based Program	Included Parents in Prevention Education	Provided an Internet Delivery Method
Al's Pals: Kids Making Healthy Choices	No	No
CASASTART	No	No
Community Trials Intervention To Reduce High-Risk Drinking	No	No
Creating Lasting Family Connections (CLFC)/Creating Lasting Connections (CLC)	Yes	No
Early Risers "Skills for Success"	Yes	No
Families and Schools Together (FAST)	Yes	No
Family Matters	Yes	No
Keep A Clear Mind	Yes	No
Nurse-Family Partnership	Yes	No
Parenting Wisely	**Yes**	**Yes**
Project SUCCESS	No	No
Reward & Reminder	No	No
SPORT	No	No
Strengthening Families Program	Yes	No

Parenting Wisely offers an online program for parents of children ages 9-18 years. This program is designed to improve communication and disciplinary skills of parents resulting in reduced substance abuse and behavior problems with their children. For each of eleven modules, parents watch recorded video(s) of family situations. Throughout these scenarios, parents are provided with interactive questions and answers along with rationales for both appropriate and inappropriate responses to these situations. At the conclusion of each module, parents answer a brief quiz of approximately five questions to demonstrate knowledge retained. Through payment of a subscription fee, parents can access the *Parenting Wisely* program for as little as $16.50 per participant. Parents can complete the program in approximately 3 hours (Family Works, 2010). With this in mind, *Parenting Wisely* is an ideal intervention for rural populations due to aspects inherent to the program: evidence-based, accessibility, convenience, and relative low cost for implementation.

Discussion

The Institute of Medicine (IOM) identified six core needs for quality healthcare interventions: safe, effective, patient-centered, timely, efficient, and equitable (IOM, 2001). As demonstrated through the theoretical application process, *Parenting Wisely* has the potential to be effective, efficient, and equitable. Since this substance abuse prevention program offers an Internet-based delivery method, *Parenting Wisely* directly satisfies the remaining three core concepts (IOM, 2001): safety (avoiding injury), patient-centered (care individualized to patient preferences, needs, and values), and timely (reducing waits and delays). While this program does satisfy the IOM core concepts of quality healthcare interventions, issues related to barriers need to be addressed.

Under the guide of Archie Cochrane's vision, the greatest barrier to *effectiveness* and *efficiency* is with research itself. While some higher quality research including randomized controlled trials (Newton, Andrews, Teesson, & Vogl, 2009), systematic reviews (Petrie et al., 2007; Faggiano et al., 2005; Gates et al., 2006), and meta-analyses (Collins et al., 2007) have been conducted in recent years, gaps in the research literature remain, including studies with a rural population focus, technology-based interventions, and the cost-effectiveness of prevention programs. A systematic review found that study designs were limited in both number and similarity thus lessening the ability for comparative evaluations (Gates et al., 2006).

The largest gap in the research literature is related to cost evaluations of substance abuse prevention programming efforts. A systematic review of interventions for prevention of youth substance abuse delivered in non-school settings found cost-effectiveness was not addressed in any of the seventeen randomized controlled trials reviewed (Gates et al., 2006). SAMHSA acknowledges a large gap in the number of thorough cost-related evaluations in research literature (SAMHSA, 2007). When adding cost as an outcomes identifier to the advanced search criteria as described in the prior section, the number of programs on SAMHSA's NREPP decreased from fourteen to zero (SAMHSA, 2010).

A barrier to *equality* in substance abuse prevention programming efforts in rural populations is related to technology. Although Internet access, including Broadband services, has increased in geographically rural areas in recent years, there is still a disparity with urban counterparts. In 2007, the disparity of Internet access was at minimum ten percent. Current estimates demonstrate the disparity has slightly decreased with 71% of rural residents having Internet access in comparison to 77% of urban persons. In addition, there is a positive correlation

between income levels and at home Internet service for rural households with less income resulting in reduced access (USDA Economic Research Service, 2009). As a result, intervention access may be further decreased for rural persons with lower incomes, a known risk factor for substance abuse.

The IOM acknowledges that in order to overcome these barriers, changes in the healthcare environment are needed in specific areas: applying evidence to healthcare delivery, using information technology, and preparing the workforce (IOM, 2001). Use of *Parenting Wisely* as a model program for rural adolescent substance abuse prevention incorporates the applications of evidence and information technology to healthcare interventions; however, preparing the workforce is well-suited for a focus on empowering stakeholders in leadership positions throughout the rural community.

In regard to the IOM recommendations, a team-based approach is essential in meeting the changing and challenging aspects of our current health care system. This method helps reduce waste while improving outcomes through a combined effort of various disciplines: education (teachers, school nurses, and school administration); legal (police and court officials); social services (counselors and other service providers); local government (elected officials); and medical (doctors, nurses, and non-physician providers such as nurse practitioners and physician's assistants). Advanced practice nurses, specifically nurse practitioners, are particularly suited as an important adjunct to the rural health care system where there is a worsening shortage of primary care physicians. Their inclusion in community-based group efforts, as well as their critical coordination of care skills, provides a viable solution to help improve evidence-based practice, clinical outcomes, and access points for prevention (Montoya & Kimball, 2007). Research demonstrates it is beneficial to incorporate parents into prevention education efforts by providing these services through settings and methods easily accessible to these caregivers (SAMHSA, 2007). Technology, specifically web-based programming, provides a method that can achieve this task. In addition, involving the aforementioned leaders further increases access to prevention education.

Conclusions

Parenting Wisely provides a logical solution in rural substance abuse prevention programming through its ability to promote the concepts of *effectiveness, efficiency,* and *equality* along with the other IOM concepts of safety, patient-centered, and timely. However, one program will not satisfy the prevention needs of all communities. SAMHSA recommends professionals expand current programs by incorporating new knowledge and resources (SAMHSA, 2007). This includes updating other known evidence-based substance abuse prevention programs to nontraditional approaches. In addition, this includes advocating the expansion of rural Internet and Broadband Services at the local, state, and national levels (USDA Economic Research Service, 2009).

While increasing environmental access to rural substance abuse prevention programming is critical to efforts, those labors are futile unless acceptance of both prevention programming and method of delivery is created. It is important to advertise the financial and social benefits resulting from investment in prevention programming (SAMHSA, 2007). Rural communities must view substance abuse prevention programming as an investment that reaps profitable rewards to the community by reducing costs related to substance abuse. Such a view is dependent upon expanded research with a focus including rural acceptance of programs along with reductions in both substance usage and costs. Results of this research will demonstrate to rural populations the return on investment. Even minimal gains in reducing the incidence of

mental health and behavior problems will produce significant cost savings and quality improvement in the lives of all stakeholders in the rural community. On the other hand, failure to improve access points for evidence-based prevention programming will result in less than optimal outcomes resulting from a depletion of community resources (SAMHSA, 2007). With the disparities in community assets well-documented in rural areas, this population cannot afford to delay a concerted effort in adolescent substance abuse prevention. Education methods involving parents should be included as a focus in substance abuse prevention programming efforts.

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