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Community Readiness to Prevent Opioid Overdose

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Abstract

Effective community-based actions are urgently needed to combat the ongoing epidemic of opioid overdose. Community readiness (CR) has been linked to communities' support for collective action, which in turn has been associated with the success of community-wide prevention strategies and resulting behavior change. Our study, conducted in North Carolina, assessed the relationship between CR and two indices of opioid overdose. County-level data included a survey of health directors that assessed CR to address drug overdose prevention programs, surveillance measures of opioid overdose collected from death records and emergency departments, and two indicators of general health-related status. We found that counties' rates of CR were positively associated with their opioid-related mortality (but not morbidity) and that this relationship persisted when we controlled for health status. North Carolina counties with the highest opioid misuse problems appear to be the most prepared to respond to them.

Keywords

overdose; opioids; community readiness; prevention; health directors

INTRODUCTION

In the first 15 years of the 21st century in the United States, deaths from opioids comprising both prescription opioid pain relievers and heroin more than doubled, reaching 9.0 per 100,000 in 2014 (Rudd, Aleshire, Zibbell, & Gladden, 2016). In 2015, over 33,000 deaths were attributed to opioid overdoses; as opioid overdose rates show little sign of abating, the Centers for Disease Control and Prevention (CDC) has called for urgent and effective actions to combat this epidemic by means of a "multi-faceted and coordinated approach" (Rudd, Seth, David, & Scholl, 2016).

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The NC DETECT Data Oversight Committee does not take responsibility for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.

It is generally recognized that the communities affected by the epidemic play a role that is essential for meaningful and lasting change (Merzel & D'Afflitti, 2003). Strategies that communities may implement, often through the work of coalitions constituted for this purpose, include the reduction of stigma associated with the abuse of prescription pain medication and heroin; advocacy for change in physicians' and pharmacists' prescribing and dispensing policies; the organization of pill drop boxes and take-back days; the dissemination of the rescue medication naloxone, together with instruction about its appropriate administration to reverse opioid overdoses; and increases in local capacity for both inpatient and outpatient opioid addiction treatment services (Albert et al., 2011; Wheeler, Davidson, Jones, & Irwin, 2012). In North Carolina, our study's setting, these efforts are typically supported, and often led, by county-level health directors (Lancaster, McKee, & Mahan, 2013). However, one factor that may impede the successful implementation of these strategies is a community's potential lack of readiness to effect change. If that readiness is lacking in communities that have been greatly affected by the opioid overdose epidemic, the likelihood that they will come together to take effective action may be attenuated. However, the relationship between a community's readiness to address a given public health problem and the severity of the problem is presently unknown. The goal of our study was to increase our understanding of the extent to which communities with varying levels of opioid misuse and overdose are prepared to respond to the opioid epidemic

BACKGROUND

Community readiness (CR) may be defined as the various attributes of a community's context or ecology that constitute a prerequisite to the implementation of effective change, particularly the community's pertinent knowledge and attitudes and its capacity to implement change strategies (Beebe, Harrison, Sharma, & Hedger, 2001; Chilenski, Greenberg, & Feinberg, 2007). One model, developed by the Tri-Ethnic Center for Prevention Research at Colorado State University, suggests that CR proceeds through nine stages that are analogous to those experienced by individuals as they contemplate and then implement strategies related to health (Prochaska & Velicer, 1997). For a community, these strategies range from "no awareness" of the nature or extent of a problem at one extreme to a "high level of community ownership" of solutions to the problem at the other (Brackley et al., 2003; Edwards, Jumper-Thurman, Plested, Oetting, & Swanson, 2000). The CR model is based in part on the transtheoretical model of the stages of health behavior change (Prochaska & Velicer, 1997) and on diffusion of innovation theory (Rogers, 2010). CR assessments have been included in health promotion and prevention initiatives targeting a variety of health concerns, including obesity (Sliwa et al., 2011), substance abuse (Ogilvie et al., 2008), physical activity (Jones, Settipalli, Goodman, Hootman, & Goins, 2012), intimate partner violence (Brackley et al., 2003), breast health (Borrayo, 2007), and HIV prevention (Thurman, Vernon, & Plested, 2007).

In addition to the assessment tool, the Tri-Ethnic model provides suggestions for activities to increase CR levels based on the community's specific stage. Knowing a community's stage of readiness relative to each dimension, as well as its overall CR, can be helpful in prioritizing which activities are most appropriate at different points of time in the change process and in leveraging available resources to facilitate change. As such, the CR model is

designed to be used as both a practice and a research tool (Donnermeyer, Plested, Edwards, Oetting, & Littlethunder, 1997; Edwards et al., 2000).

CR has been linked to communities' resistance to or support for change and has been associated with the success of communitywide prevention strategies and resulting systems and behavior change (Chilenski et al., 2007; Feinberg, Greenberg, & Osgood, 2004). We sought to contribute to the limited research concerning a community's readiness to respond to a given health problem by assessing the relationship between CR and two indices of a community's epidemic of prescription drug overdose: mortality and morbidity. We reasoned that communities experiencing high levels of this epidemic, which affects broad segments of the population (Bohnert et al., 2011), would be the most aware of its nature, extent, and effects. We thus hypothesized that these communities would demonstrate the greatest readiness to combat it by implementing prescription drug overdose prevention strategies. We reasoned further that CR in this regard would be sufficiently robust that it would be unaffected by other local health-related conditions that might independently affect the community's readiness to engage in collective action. We thus also hypothesized that the relationship between CR and measures of the opioid epidemic would persist even when we controlled for county-level contextual measures of health and quality of life.

METHOD

Setting

North Carolina is a predominantly rural state with a population of 9.7 million residents as of 2012. The overall annual state mortality rate for unintentional/undetermined intent prescription and opioid-related overdoses was 8.30 deaths per 100,000 population (North Carolina Department of Health and Human Services, Division of Public Health, Chronic Disease and Injury Section, 2016). Corresponding county-level overdose mortality rates ranged from none to 28.4. The suspicion that North Carolina was entering the now well-established epidemic of drug overdoses began as early as 2002 (Sanford, 2004). By 2007, county public health departments had begun identifying the prevention of drug overdose as a primary public health concern and the state legislature had passed legislation to develop a statewide prescription drug monitoring program.

For this study, we superimposed four North Carolina county-level data sets: (1) a survey of county health directors assessing CR to address drug overdose prevention programs in North Carolina, surveillance measures of opioid overdose collected from (2) death records and (3) emergency departments (EDs), and (4) two indicators of general health-related factors from public use data sets described below. All data sets pertained to the State's counties as of 2012, prior to the initiation by Community Care of North Carolina of the Chronic Pain Initiative (Project Lazarus; https://www.communi-tycarenc.org/population-management/chronic-pain-project/). This initiative comprises a set of strategies, based on the Project Lazarus model of opioid overdose prevention (Albert et al., 2011), that includes the development and support of community coalitions as a means to advocate for, implement, and sustain a reduction in overdoses from opioid pain medications and heroin. The primary data collection presented below was conducted as baseline data for an ongoing evaluation of

the statewide rollout of a set of both community- and provider-based overdose prevention strategies.

Measures

To assess counties' CR for prescription drug abuse prevention, we adapted an instrument originally developed by the Tri-Ethnic Center for Prevention Research (Plested, Edwards, & Jumper-Thurman, 2006), which was designed to be applied to a variety of content areas. The original instrument comprised generic semistructured questions that the Center intended to be administered to multiple key informants in each community, the results of which were then aggregated to determine the level of readiness of each community to engage in a given prevention strategy. As conceptualized by the developers, CR comprises six dimensions, each of which is measured by means of a hierarchical 9-point ordinal scale that includes response options that are tailored to that dimension. The overall CR score constitutes an average of the individual scores for each dimension.

In our study, we defined "community" as a county-level health jurisdiction. We used only one key informant per county, its health director. We asked respondents to specify their county's level of readiness to prevent prescription drug abuse relative to each of the six dimensions of the CR model, instructing them to "please choose the statement that most accurately captures the current state of your jurisdiction." Table 1 displays the six dimensions of the CR model, as well as the response options that served as anchors for the lowest (1) and highest (9) of the nine levels constituting each dimension (Jumper-Thurman, Plested, Edwards, Helm, & Oetting, 2001).

As specified by the developers of the CR model, key informants need only to be knowledgeable concerning the status of their community with regard to a particular problem of interest; they do not need to play a leadership or decision-making role in the community (Edwards et al., 2000). While the scale was originally developed as an interview-based instrument, we converted it to a Web-based survey for ease and accuracy of administration. We then e-mailed links to the survey to all 87 of the directors in 2012, of whom 69 (79%) returned completed surveys. Note that because the catchment areas of five of the responding health departments comprise a combined total of 14 counties, these 69 jurisdictions represent 78 of the State's 100 counties. Our adapted instrument is available on request from the first author.

To measure rates of ED visits attributable to opioid misuse, we used data from the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT; http://www.ncdetect.org/), which includes data on admissions to all 24/7, acute care, and civilian hospital–affiliated EDs in North Carolina. NC DETECT, which is supported by the North Carolina's Division of Public Health, comprises a statewide syndromic surveillance system, of which the ED visit data are one component. It is designed to detect salient medical events in a timely fashion that can be used for tracking and other epidemiological purposes. We identified ED data pertaining to county-level opioid overdose-related visits by the following ICD-9-CM (*International Classification of Diseases, 9th revision, Clinical Modification*; CDC, 2016a) diagnostic and external cause of injury codes: 965.0 (.00–.09), E850.0-E850.2,

and E935.0. Note that these data pertained to the patient's county of residence at the time of the visit.

We secured mortality data concerning North Carolina residents whose deaths occurred in 2012 and were attributable to medications and opioids from the State's vital statistics (CDC, 2016b). Considered as cases were those residents whose underlying cause of death was an unintentional or undetermined drug overdose (i.e., ICD-10 [*ICD, 10th revision, Clinical Modification*]; CDC, 2016b] codes X40–X44, and Y10–Y14). Deaths specifically due to opioids were identified by T-codes.

To control for contextual health-related variables, we used aggregated scores related to two key constructs from the 2012 Robert Wood Johnson Foundation (RWJF) County Health Rankings (RWJF & University of Wisconsin Population Health Institute, 2015) for North Carolina. The first, *health outcomes*, assessed the *present* level of the overall health of county residents. This measure comprised length and quality of life, which included indicators of physical and mental health and low birth weight. The second, *health factors*, assessed the likely *future* health of county residents. Health factors comprised health behaviors, which included tobacco use, diet and exercise, alcohol and drug use, and sexual activity; clinical care, including access to and quality of care; social and economic factors, including education, employment, income, family and social support, and community safety; and physical environment, including air and water quality, housing, and transit. Scores for each county-level indicator were drawn from a variety of national data sources; further information about the scores representing each indicator and the methods by which they were aggregated may be found at www.countyhealthrankings.org.

Analysis

We began by aggregating data from all four county-level data sets into a single database, including the health director survey, mortality and ED visit data relating to opioid overdose, and the RWJF file related to health indicators. Note that in the case of the five health directors who were responsible for a total of 14 counties (i.e., four departments each represented three counties, and one department represented two), we duplicated their CR scores across the counties within their jurisdictions. We converted all mortality and ED visit data to rates based on total county population as of 2012, as assessed by U.S. Census data (CDC & National Center for Health Statistics, 2016).

We next developed a Pearson product–moment correlation matrix of all study variables. As did Paltzer, Black, and Moberg (2013), we treated CR as a continuous variable to allow the mean of all six CR components to be compared across counties. We assessed statistical significance by means of correlation coefficients.

We then used an ordinary least squares regression to create and assess two discrete models that regressed ED visit rates and mortality on mean CR scores. Because of the high level of collinearity of the two health indicator variables, as reported in the next section, we only used a single RWJF county health ranking measure to adjust for the overall differences between counties' health statuses. We assessed model fit using the R^2 statistic and both

Akaike information criterion and Bayesian information criterion. We performed all analyses using Stata/IC 13.1 (StataCorp, 2013).

All study procedures were approved by the institutional review board of the University of North Carolina.

RESULTS

Table 2 displays tests of the strength of the bivariate associations of all study variables. We found a small and nonsignificant association between health directors' mean total CR scores and their counties' overdose mortality rates ($r = .16$, $p = .17$, degrees of freedom = 78). We also found significant positive relationships between health directors' mean CR scores and both RWJF's outcome- and factor-related health indicators. That is, counties with a high length and quality of life, and positive indicators of physical and mental health, were more likely to score high on total community readiness for change.

We concluded our analyses with two linear regression models, the results of which are displayed in Table 3. These models assessed the association between health directors' mean CR scores and their counties' (1) mortality rates and (2) ED visit rates, controlling for RWJF's county health outcomes ranking. The bivariate association between health directors' mean CR scores and opioid overdose mortality rates persisted ($\beta = 1.21$, $p = .046$) in this multivariate context, and the relationship between mean CR score and ED visit rate continued to be nonsignificant ($\beta = 1.55$, $p = .423$). These models further supported, and indeed strengthened, the initial association we found between mean CR score and opioid overdose mortality, and no association between the CR score and ED visits for overdose. Note that when we substituted RWJF's outcome with factor scores in our regressions the results of the models did not change.

DISCUSSION

Our study results only partially validated our hypothesis; counties' rates of CR were positively associated with their opioid-related mortality (but not morbidity). Counties with high rates of opioid-related mortality were also more likely to score high on their health directors' ratings of their residents' knowledge of their counties' opioid overdose problems. These findings are encouraging, insofar as they suggest that the communities in high-risk counties seem prepared to select and implement prevention strategies such as those promoted by Project Lazarus (Albert et al., 2011), which is designed to build capacity and infrastructure and to raise awareness. We should note, however, that the evidence supporting our first hypothesis was mixed, in that we did not find an analogous relationship between CR and opioid-related ED visits. This finding led us to speculate why their relationship was all but nonexistent.

While statistically significant, the association between our two measures of county-level opioid overdose rates, mortality and ED visits, was quite low; the shared variance for their correlation was less than 10% ($r = .29$, $r^2 = .08$). This finding suggests that the ratio of opioid overdoses resulting in ED visits relative to mortality is likely to vary considerably by county. This variation may be attributed, at least in part, to the availability and accessibility

of EDs and to the willingness of any bystanders who witness the overdose either to call 911 or to transport the overdosing individual to an ED. Take-home naloxone distribution was not widespread in North Carolina in 2012, eliminating the likelihood that this could explain the discrepancy. In that regard, North Carolina's Good Samaritan Law (SB20/S.L.2013-23), enacted in 2013, should be particularly helpful, as it removed the threat of criminal liability from individuals who report an opioid overdose. A particularly low ratio of county-level ED visits to mortality related to overdoses may indicate the need to increase access to emergency services, increase awareness of these services if they are indeed available, or publicize the provisions of the Good Samaritan law to encourage prompt reporting.

It is also possible that the types of poisonings that result in ED visits rather than in death differ, to the extent that young children and women are more likely than adult males to visit EDs following an overdose. Furthermore, like incidents of drowning or suffocation, opioid overdose events may result in a death or, if they are successfully treated in the community, people who overdose may refuse further medical assistance. Their risk of mortality from a subsequent overdose may then increase. Finally, it is entirely possible that overdoses resulting in deaths receive much more publicity—and thus public attention—than those that result in ED visits. If so, relative to morbidity, mortality would be more likely to raise community awareness and stimulate action. These various explanations are at best tentative and are thus deserving of empirical investigation.

Our study's second hypothesis was also partially confirmed. That is, we found a positive relationship between health directors' total CR scores and RWJF's indicator of their county's overall health outcomes and health factors. As might be expected, healthy communities seem generally prepared to take action to promote their health. On the other hand, our finding suggests the need to pay particular attention to building readiness to change in communities that rank low on health indicators, if efforts to plan and implement opioid overdose prevention strategies are to be successful. Understanding how ready a community is to address a particular issue is important for anyone concerned with health and community development. A community cannot be expected to address a public health–related problem until it recognizes the gravity of the problem. Tools such as the Tri-Ethnic Center's CR model provide suggestions about activities that will increase the readiness of a community for each stage. Paired with Project Lazarus and other related substance abuse prevention capacity-building models, these tools can guide community members and leaders to develop stage-appropriate strategies and leverage available resources.

Because we were concerned that the strength of the associations we found might be an artifact of the number of duplicated CR scores (9 of the78 counties represented in the data set), we conducted an ex post facto analysis to reexamine the strength and range of these associations, by pooling county populations and outcome counts. As expected, we found that the magnitude of the associations tested changed minimally, demonstrating a slight increase in the magnitude of our key association of interest, between mean CR scores and overdose ED visit rates (.12 vs. the original .09, with no change in significance).

We note two other implications of our study's findings. They provide modest initial support for our adaptation of the Tri-Ethnic Center scale for research use, in which we limited the

number of informants to one per county (its health director) and administered the instrument by means of a hierarchical list of response options. However, our adaptation of the scale should be subjected to further study and validation before it is considered for widespread use. We should also note the very high association between the pair of measures we used to assess RWJF's county-level health indicators (outcomes and factors), which yielded a coefficient of .87. These findings suggest that for our purposes we could have selected one of this pair almost arbitrarily and achieved the same results.

In addition, our findings have implications for other research on community-based health promotion efforts. Community-randomized trials of community-based interventions in drug abuse rely on baseline characteristics of a community to compare intervention and control settings (Shapiro et al., 2013; Shapiro, Oesterle, & Hawkins, 2015). The CR tool adapted for our study could serve as a useful adjunct to others trying to understand the differences between communities with and without successfully implemented interventions.

LIMITATIONS

We acknowledge several limitations to this study. First, we employed only one reporter per county (i.e., its health director), while the Tri-Ethnic Center suggest the need for multiple reporters for each CR assessment. However, that was impractical for a study as large as ours. We believe that if we were limited to one, the health director would be the reporter of choice as the individual best qualified to understand the context of the community under her or his jurisdiction with regard to readiness to implement opioid overdose prevention strategies. Second, and as mentioned in the Measures section, we modified the data collection methods specified by the Tri-Ethnic Center so that we could measure the CR scale in a survey format, using one informant per county, as opposed to administering open-ended questions to multiple informants in each by means of interviews. While we believe that our adaptation was appropriate for this relatively large scale study, our findings may well have been different had we used the methods suggested by the Center. Third, we did not secure responses from all the health directors surveyed, so that our findings should not be considered as fully representative of the entire state of North Carolina. Fourth, as previously discussed, the jurisdictions of five of the health directors encompassed multiple (either two or three) contiguous counties, and we duplicated their CR scores across all the counties in their jurisdiction. It is thus entirely possible that CR scores would have varied across the counties within each jurisdiction had our respondents rated each of them individually. However, these jurisdictions tended to encompass rural counties with low populations; they averaged a population of 29,778 (SD = 19,067), which may be compared to the state's average county-level population of 103,094 (SD = 161,665). Thus, the CR scores of the individual counties within each multicounty jurisdiction may have been unlikely to vary substantially, even if they had been individually rated. We also note that in operationalizing communities as specific counties we were unable to control for the fact that the State's larger counties comprised multiple communities of greatly varying sizes. However, we believe that the likely social and cultural heterogeneity of the larger counties would have been more likely to generate a Type II than a Type 1 error, mitigating against finding the effects reported.

Finally, the regression models made an assumption that neighboring communities' scores and overdose rates would not have a direct influence on any given county. Testing this assumption is beyond the scope of this article, but it represents an area for further research. Finally, we recognize that the overall relationship we reported between CR and opioid overdose mortality, while significant, was modest. That may be a function of our CR questions, which related directly to prescription drug abuse, while our mortality data encompassed overdoses attributable to both prescription drugs and Schedule 1 (i.e., illegal) opioids.

CONCLUSIONS

CR is generally considered a prerequisite to the effective adoption and implementation of community-based strategies designed to address local public health problems. In this study we applied the concept of CR to the community-based implementation of drug overdose prevention programs in North Carolina as of 2012 and found that it was positively associated with opioid overdose–related mortality. Thus, all other things being equal, the counties with the greatest opioid misuse problems appear to be the most prepared to respond to them.

This finding suggests that community-based practitioners who seek to support and promote the effective adoption and implementation of local opioid overdose prevention strategies should consider mechanisms to increase CR. As specified by Goodman, Wandersman, Chinman, Imm, and Morrissey (1996), the first stage of CR entails the mobilization of community members and organizations. We suggest that this mobilization can best be effected by means of a campaign to raise public awareness of the extent of opioid misuse within the community, by sharing information concerning local statistics concerning overdose-related morbidity and mortality through social media and at community meetings. As increasing attention is paid to the importance of reducing stigma that remains attached to opioid use disorders (Olsen & Sharfstein, 2014), more families may be willing to disclose secrets that were once taboo—for example, by means of obituaries—concerning family members who have succumbed to opioid addiction. In so doing, a once hidden problem is likely to generate public action.

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References

Albert S, Brason FW II, Sanford CK, Dasgupta N, Graham J, Lovette B. Project Lazarus: Community-based overdose prevention in rural North Carolina. Pain Medicine. 2011; 12(Suppl 2):S77–S85. DOI: 10.1111/j.1526-4637.2011.01128.x [PubMed: 21668761]

Beebe TJ, Harrison PA, Sharma A, Hedger S. The community readiness survey development and initial validation. Evaluation Review. 2001; 25(1):55–71. [PubMed: 11205524]

Bohnert AS, Valenstein M, Bair MJ, Ganoczy D, McCarthy JF, Ilgen MA, Blow FC. Association between opioid prescribing patterns and opioid overdose-related deaths. Journal of the American Medical Association. 2011; 305:1315–1321. [PubMed: 21467284]

Borrayo EA. Using a community readiness model to help overcome breast health disparities among US Latinas. Substance Use & Misuse. 2007; 42:603–619. [PubMed: 17558953]

Brackley M, Davila Y, Thornton J, Leal C, Mudd G, Shafer J, Spears W. Community readiness to prevent intimate partner violence in Bexar County, Texas. Journal of Transcultural Nursing. 2003; 14:227–236. [PubMed: 12861925]

Centers for Disease Control and Prevention. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). 2016a. Retrieved from http://www.cdc.gov/nchs/icd/icd9cm.htm

Centers for Disease Control and Prevention. International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). 2016b. Retrieved from http://www.cdc.gov/nchs/icd/icd10cm.htm

Centers for Disease Control and Prevention & National Center for Health Statistics. Bridged-race population estimates, United States July 1st resident population by state, county, age, sex, bridged-race, and Hispanic origin. 2016. Retrieved from http://wonder.cdc.gov/bridged-race-v2014.html

Chilenski SM, Greenberg MT, Feinberg ME. Community readiness as a multidimensional construct. Journal of Community Psychology. 2007; 35:347–365. [PubMed: 18714368]

Donnermeyer JF, Plested BA, Edwards RW, Oetting G, Littlethunder L. Community readiness and prevention programs. Community Development. 1997; 28(1):65–83.

Edwards RW, Jumper-Thurman P, Plested BA, Oetting ER, Swanson L. Community readiness: Research to practice. Journal of Community Psychology. 2000; 28:291–307.

Feinberg ME, Greenberg MT, Osgood DW. Readiness, functioning, and perceived effectiveness in community prevention coalitions: A study of communities that care. American Journal of Community Psychology. 2004; 33:163–176. [PubMed: 15212176]

Goodman RM, Wandersman A, Chinman M, Imm P, Morrissey E. An ecological assessment of community-based interventions for prevention and health promotion: Approaches to measuring community coalitions. American Journal of Community Psychology. 1996; 24:33–61. DOI: 10.1007/BF02511882 [PubMed: 8712187]

Jones DL, Settipalli S, Goodman JM, Hootman JM, Goins RT. Community readiness for adopting a physical activity program for people with arthritis in West Virginia. Preventing Chronic Disease. 2012; 9:E70. [PubMed: 22420313]

Jumper-Thurman P, Plested BA, Edwards RW, Helm HM, Oetting ER. Using the community readiness model in native communities (Cultural Competence Series Monograph 9). Rockville, MD: National Institute on Drug Abuse; 2001.

Lancaster M, McKee J, Mahan A. The chronic pain initiative and community care of North Carolina. North Carolina Medical Journal. 2013; 74:237–241. [PubMed: 23940897]

Merzel C, D'Afflitti J. Reconsidering community-based health promotion: Promise, performance, and potential. American Journal of Public Health. 2003; 93:557–574. [PubMed: 12660197]

North Carolina Department of Health and Human Services, Division of Public Health, Chronic Disease and Injury Section. Injury and violence prevention branch: Data poisoning. Tables. 2016. Retrieved from http://www.injuryfreenc.ncdhhs.gov/DataSurveillance/Poisoning.htm

Olsen Y, Sharfstein JM. Confronting the stigma of opioid use disorder and its treatment. Journal of the American Medical Association. 2014; 311:1393–1394. DOI: 10.1001/jama.2014.2147 [PubMed: 24577059]

Ogilvie KA, Moore RS, Ogilvie DC, Johnson KW, Collins DA, Shamblen SR. Changing community readiness to prevent the abuse of inhalants and other harmful legal products in Alaska. Journal of Community Health. 2008; 33:248–258. [PubMed: 18392927]

Paltzer J, Black P, Moberg D. Evaluating community readiness to implement environmental and policy-based alcohol abuse prevention strategies in Wisconsin. Journal of Alcohol and Drug Education. 2013; 57(3):27–50. [PubMed: 25346555]

Plested BA, Edwards RW, Jumper-Thurman P. Community readiness: A handbook for successful change. Fort Collins, CO: Tri-Ethnic Center for Prevention Research; 2006.

Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. American Journal of Health Promotion. 1997; 12(1):38–48. [PubMed: 10170434]

Robert Wood Johnson Foundation & University of Wisconsin Population Health Institute. 2015 County health rankings: North Carolina. 2015. Retrieved from http://www.countyhealthrankings.org/sites/default/files/state/downloads/CHR2015_NC_0.pdf

Rogers EM. Diffusion of innovations. New York, NY: Simon & Schuster; 2010.

Rudd RA, Aleshire N, Zibbell JE, Gladden RM. Increases in Drug and opioid overdose deaths: United States, 2000–2014. MMWR: Morbidity and Mortality Weekly Review. 2016; 64:1378–1382.

Rudd RA, Seth P, David F, Scholl L. Increases in drug and opioid-involved overdose deaths: United States, 2010–2015. Morbidity and Mortality Weekly. 2016; 65:1445–1452. DOI: 10.15585/mmwr.mm655051e1

Sanford CP, editorTask force to prevent deaths from unintentional drug overdoses. findings and recommendations of the task force to prevent deaths from unintentional drug overdoses in North Carolina, 2003. Raleigh: North Carolina Department of Health and Human Services; 2004.

Shapiro VB, Hawkins JD, Oesterle S, Monahan KC, Brown EC, Arthur MW. Variation in the effect of Communities That Care on community adoption of a scientific approach to prevention. Journal of the Society for Social Work and Research. 2013; 4:154–164.

Shapiro VB, Oesterle S, Hawkins JD. Relating coalition capacity to the adoption of science-based prevention in communities: evidence from a randomized trial of Communities That Care. American Journal of Community Psychology. 2015; 55(1–2):1–12. [PubMed: 25323784]

Sliwa S, Goldberg JP, Clark V, Junot B, Nahar E, Nelson ME, Hyatt RR. Peer reviewed: Using the community readiness model to select communities for a community-wide obesity prevention intervention. Preventing Chronic Disease. 2011; 8(6):A150. [PubMed: 22005643]

StataCorp. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP; 2013.

Thurman PJ, Vernon IS, Plested B. Advancing HIV/AIDS prevention among American Indians through capacity building and the community readiness model. Journal of Public Health Management & Practice. 2007; 13(Suppl):S49–S54.

Wheeler E, Davidson PJ, Jones TS, Irwin KS. Community-based opioid overdose prevention programs providing Naloxone: United States, 2010. Morbidity and Mortality Weekly Report. 2012; 61:101–105. [PubMed: 22337174]

TABLE 1

Dimensions of the Community Readiness for Prescription Drug Abuse Prevention Scale

Dimension	Question	Response Options (1–9)
Community climate	What is the community climate around prescription drug abuse?	**1** The community does not see prescription drug abuse as a problem. It is an accepted part of community life. "It's just the way things are." **9** All major segments of the community are highly supportive, and community members are actively involved in evaluating and improving efforts and demand accountability.
Knowledge about the issue	What is your community's knowledge level about the problem of prescription drug abuse?	**1** It is not viewed as a problem. **9** Specific information about the problem is being used to target high-risk groups and plan the types of prevention programs needed. Information about the effectiveness of local programs is available.
Leadership	What level of involvement do local leaders (health, political, religious, tribal, etc.) have in prevention programming for prescription drug abuse?	**1** Leadership is resistant to prevention efforts. **9** Authorities support multiple efforts, staff are highly trained, community leaders and volunteers are involved, and an independent evaluation team is functioning.
Existing efforts	What is the current state of prescription drug abuse prevention programming in your community?	**1** Prevention is not important. **9** Evaluations plans are routinely used to test effectiveness of many different efforts, and the results are being used to make changes and improvements.
Community knowledge of efforts	What is your community's level of knowledge of prescription drug abuse prevention efforts?	**1** Community has no knowledge of the need for efforts addressing the issue. **9** Community has accurate knowledge based on thorough evaluation data about how well the different local efforts are working, their benefits and limitations.
Resources	What is your community's attitude about supporting prescription drug overdose prevention efforts with resources: people, money, time, or space?	**1** There is no need for resources to deal with this problem. **9** There is continuous and secure support for basic programs and activities, evaluation is routinely expected and completed, and there are substantial resources for trying new efforts.

SOURCE: Plested, Edwards, and Jumper-Thurman (2006).

TABLE 2

Correlation Matrix of Study Variables (N = 78 of North Carolina's 100 Counties)

		Opioid Overdose Rates		Health Indicators	
	Community Readiness	**Mortality**	**ED Visits**	**Outcomes**	**Factors**
Community readiness	1.00				
Opioid overdose rates					
Mortality	.16	1.00			
ED visits	.09	.27*	1.00		
RWJF health indicators					
Outcomes	.30**	.01	−.26*	1.00	
Factors	.23*	−.02	−.25*	.87***	1.00

NOTE: ED = emergency department; RWJF = Robert Wood Johnson Foundation.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

TABLE 3

Multiple Linear Regression of CR Scale Score and Health Outcomes on Overdose Events

Model	Exposure Variables	*β*	*SE* (*β*)	*t*	*p*
Mortality rate (deaths per 100,000 person-years): $F(2, 75) = 2.05$, $p = .1354$; adjusted $R^2 = .0266$	Mean CR scale score	1.21	0.60	2.03	.046
	RWJF health outcomes	−0.65	1.03	−0.63	.531
	Constant	4.43	3.14	1.41	.162
ED visit rate (visits per 100,000 person-years): $F(2, 75) = 1.98$, $p = .1459$; adjusted $R^2 = .0247$	Mean CR scale score	1.55	1.92	0.81	.423
	RWJF health outcomes	−6.49	3.29	−1.97	.052
	Constant	30.50	10.07	3.03	.003

NOTE: CR = community readiness; RWJF = Robert Wood Johnson Foundation; ED = emergency department.