

TRENDS IN NON-MEDICAL PRESCRIPTION OPIOID USE AMONG URBAN AND RURAL AMERICAN INDIAN AND ALASKA NATIVE YOUTH RESIDING IN NEW MEXICO: 2013-2017

Katherine Hirschak, PhD, Solmaz Amiri, PhD, Judith Espinoza, MS, Jalene Herron, MS, Alexandra Hernandez-Vallant, MS, Violette Cloud, MS, JD, and Kamilla Venner, PhD

Abstract: Increasing rates of opioid-related deaths over the last twenty years have created a national public health crisis. However, minimal research investigates opioid use among American Indian and Alaska Native (AI/AN) youth. This study examined non-medical prescription opioid prevalence rates and resiliency of urban and rural AI/AN and non-AI/AN students. The sample included eighth, tenth, and twelfth grade students who participated in the New Mexico Youth Risk and Resilience Survey in 2013, 2015, and 2017 (n = 42,098). Logistic regression models showed no significant differences in non-medical prescription opioid use among rural and urban students in 2013, 2015, and 2017. No significant differences in use between AI/AN and non-AI/AN students occurred in 2013, 2015, or 2017. Family and community support were protective of misuse consistent across time points, and included caring adults, community involvement, and clear rules at school. These findings may help to inform the development of strengths-based prevention activities for AI/AN youth.

INTRODUCTION

The rate of opioid-related deaths has accelerated over the last twenty years, creating a major national public health crisis. Alarmingly, American Indian and Alaska Native (AI/AN) adults overdose at similar rates as non-Hispanic Whites, yet there are few studies examining both the epidemiological data on misuse as well as opioid-related treatment for AI/AN communities (Venner et al., 2018; Momper et al., 2013). Some research has demonstrated higher prevalence use rates of all substances among AI/AN youth, with an increase in lifetime use in higher grade levels. By twelfth grade, AI/AN youth were more likely to have used illicit drugs and opioids recreationally when compared with their non-AI/AN counterparts (9.1% vs. 5.0%; Stanley et al., 2014; Swaim & Stanely,

2018). In addition, AI/AN twelfth-grade students had 4.5 times the risk of lifetime heroin use compared with other students who were surveyed in the Monitoring the Future survey (Swaim & Stanley, 2018). This is concerning both in the potential increased risk related to overdose, but also when considering that in the general young adult population, younger initiation of illicit opioid use increases the likelihood of transitioning to heroin (Cerda et al., 2015). Research among a general household sample of adolescents revealed that the overall rate of current non-medical prescription opioid use was 7.0%, with 1.0% of youth meeting criteria for abuse or dependence (Wu et al., 2008).

There are distinct regional disparities in opioid-related overdose frequency among urban and rural AI/AN adults, with higher prevalence rates in the Midwest and the Pacific Northwest (Oluwoye et al., 2020) and much lower overdose rates in the rural Plains (Tipps et al., 2018). Similarly, non-medical prescription use of opioids appears to vary regionally for rural and urban AI/AN youth. AI/AN youth residing in the Great Lakes area, for example, reported a high rate of intentional misuse of opioids (31%; SAMHSA, 2016). For AI/AN adolescents residing in New Mexico, 14.3% reported having used non-medical prescription drugs to get high at least once in their lifetime (Healy et al., 2018). Greater health inequities caused by the misuse of substances among AI/AN people are related to many factors including colonization, historical trauma, and environmental contextual factors (Gone & Trimble, 2012; Duran, 2006; Duran & Duran, 1995). These complexities underscore the need for a multifaceted approach to address the opioid crisis in many tribal communities (Venner et al., 2018).

In the present study, we examined: a) lifetime non-medical prescription opioid use prevalence rates in 2013, 2015, and 2017 among urban and rural AI/AN and non-AI/AN middle and high school students (eighth, tenth, twelfth grade) residing in New Mexico, and b) urban-rural differences in patterns of non-medical prescription opioid use or in factors that may be protective. This study provides insight into potential differences between urban and rural AI/AN youth in opioid use and helps identify factors associated with resiliency that researchers and practitioners may consider when implementing developmentally and culturally appropriate opioid misuse prevention and intervention programs for AI/AN youth.

METHODS

Study Design

This is a secondary data analysis of the New Mexico Youth Risk and Resiliency Survey (NM-YRRS), a part of the Center for Disease Control and Prevention's Youth Risk and Behavior

Surveillance System. The survey is cross-sectional, conducted biennially, and assesses youth risk behaviors and resiliency for grades 6-12 (NM-YRRS-High School, 2017; NM-YRRS-Middle School, 2017). Youth included in the sample self-identified as AI/AN only or AI/AN in combination with another ethnicity. Non-AI/AN students were the combined total of all other races/ethnicities at the schools across years. AI/AN youth were oversampled, and schools were stratified by school district. Of the 42,098 participants over the five-year period, 7,307 (17.3%) self-identified as an AI/AN middle or high school student. The Southwest Tribal Institutional Review Board (IRB) approved the study.

Measures

We assessed lifetime use of non-medical prescription opioids with one question: “Have you ever taken prescription pain medication without a doctor’s prescription or differently than how a doctor told you to use it? (Count drugs such as codeine, Vicodin, OxyContin, Hydrocodone, and Percocet)” (coded as 0/1). Questions vary between middle and high school; past 30-day non-medical opioid use was not assessed in middle school.

New Mexico is one of two states that continue to include items associated with resilience in their Youth Risk and Behavior Surveillance. Examples of items measuring resiliency include, “In my home, there is a parent or some other adult who believes that I will be a success”; “At my school, there is a teacher or some other adult who listens to me when I have something to say”; and “I have a friend about my own age who really cares about me”. For a complete list of the resilience questions, see New Mexico Youth Risk and Resilience Survey: <http://www.youthrisk.org/>. All questions are on a 4-point Likert scale (*not at all, a little true, pretty much true, very much true*) and were dichotomized based upon the bimodal distribution of higher and lower responses found in the data (coded as 0/1).

Data integrity is maintained in accordance with tribal communities in New Mexico. Therefore, the definition for rural and urban was modified by this partnership. Urban was defined as a city or town with a population greater than 50,000, school district designation, as well as proximity to a large metropolitan area (coded as 0/1).

Analytic Plan

A complex design was employed, and weights were applied to each student record to adjust for nonresponse and the distribution of students by grade, sex, and race/ethnicity as outlined by previous epidemiological research (e.g., CDC, 2013). We calculated the estimates of the prevalence of non-medical prescription opioid use for each year independently for the entire

sample. We also calculated estimates of the prevalence of non-medical prescription opioid use for urban and rural areas and for AI/AN versus non-AI/AN students for each year independently. We assessed the differences in non-medical prescription opioid use prevalence rates by grade. Missing data were low overall (< 4%); however, protective factor variables had a higher percentage of missing data (~9%). Further analysis indicated that data were not missing at random (MCAR; Roderick, 1988). Questions related to resilience are placed at the end of the survey, so it is possible that some students did not have time to complete their response, potentially explaining the pattern of missing data. Given the low rate of missingness overall, further statistical adjustments were not made (Bennett, 2001; Osborne, 2013).

Logistic regressions were conducted to examine non-medical prescription opioid use in 2013, 2015, and 2017. Non-medical prescription opioid use was regressed on all correlates and repeated for each period. We controlled for gender and grade, and additional covariates were included based upon the conceptual domains of social location, academics, and community and social resilience (Hawkins et al., 2004; Kim et al., 2015). Consistent with previous research, we assessed resiliency for each period staying consistent with our a priori domains, regardless of significance or the short time between each assessment period (Bush & Qeadan, 2019). In addition, there are almost twice as many resilience questions in the high school version of the survey compared to the middle school survey (15 questions versus 8). We therefore identified the questions that were asked across grades. These variables included: “I have a friend about my own age who really cares about me”; “In my home, there is a parent or some other adult who is interested in my schoolwork”; “In my school, there are clear rules about what students can and cannot do”; and “Outside of my home and school, I am a part of clubs, sports teams, church or temple, or other group activities.” We also conducted a Mantel-Haenszel Test to examine trends. Each year is modeled, and the odds ratios are pooled to assess whether they are equal across time points (Agresti & Franklin, 2013). Analyses were performed using Stata 14.2. The alpha threshold used to determine statistical significance was 0.05 (two-tailed).

RESULTS

Demographic information is shown in Table 1. There was an even proportion of female and male youth participation across time. Approximately three-fourths of survey participants were from urban areas. Lifetime non-medical prescription opioid use was higher in urban areas in 2013 and 2017 compared to rural areas. AI/AN students tend to have lower rates of non-medical

TRENDS IN OPIOID USE AMONG NATIVE YOUTH IN NEW MEXICO 5

prescription opioid use compared to non-AI/AN students across all years. Lifetime non-medical prescription opioid use increased with age across all grade levels, with twelfth-grade students reporting the highest percentage of non-medical prescription opioid use. Figures 1 and 2 describe lifetime non-medical prescription opioid use by location, grade, and ethnicity in 2013, 2015, and 2017.

Table 1
Demographic Characteristics of Students Participating in the New Mexico Youth Risk and Resiliency Survey, 2013, 2015, and 2017

Variables	2013				2015				2017			
	AI/AN		Non-AI/AN		AI/AN		Non-AI/AN		AI/AN		Non-AI/AN	
	Total <i>n</i>	%	Total <i>n</i>	%	Total <i>n</i>	%	Total <i>n</i>	%	Total <i>n</i>	%	Total <i>n</i>	%
Gender												
Female	1,222	49.9%	6,134	50.7%	990	50.3%	4,312	50.8%	1,393	48.3%	7,110	50.2%
Male	1,223	50.1%	5,954	49.3%	979	49.7%	4,168	49.2%	1,491	51.7%	7,063	49.8%
Grade												
8 th	917	37.5%	4,907	40.6%	703	35.7%	2,257	26.6%	1,413	48.9%	7,053	49.7%
10 th	891	36.4%	4,149	34.3%	756	38.4%	3,562	41.9%	828	28.6%	4,023	28.3%
12 th	637	26.1%	3,043	25.2%	512	26.0%	2,677	31.5%	650	22.5%	3,120	22.0%
Location												
Rural	1,906	78.0%	8,059	66.6%	1,460	74.1%	5,913	69.6%	2,179	75.4%	7,709	54.3%
Urban	539	22.0%	4,040	33.4%	511	25.9%	2,583	30.4%	712	24.6%	6,487	45.7%
Non-medical Prescription Use												
Used	357	14.8%	1,725	14.5%	242	12.4%	1,096	13.1%	345	12.1%	1,793	12.8%
Resiliency Items (Response: Pretty much/Very much true)												
Adult/ Community Cares	1,722	74.0%	9,102	78.6%	1,334	70.7	6,214	76.6%	1,513	70.3%	10,132	75.6%
Friend Cares	1,752	75.6%	9,247	80.0%	1,444	77.0%	6,728	83.3%	1,665	77.7%	10,975	82.3%
Clear Rules at School	1,905	82.3%	9,526	82.6%	1,573	83.9%	6,722	83.3%	1,730	80.8%	11,003	82.6%
Community Activities	1,134	49.0%	6,615	57.5%	899	48.0%	4,577	56.9%	1,165	54.3%	8,171	61.3%

Figure 1. Lifetime Non-Medical Prescription Opioid Use stratified by Urban and Rural Location and Grade

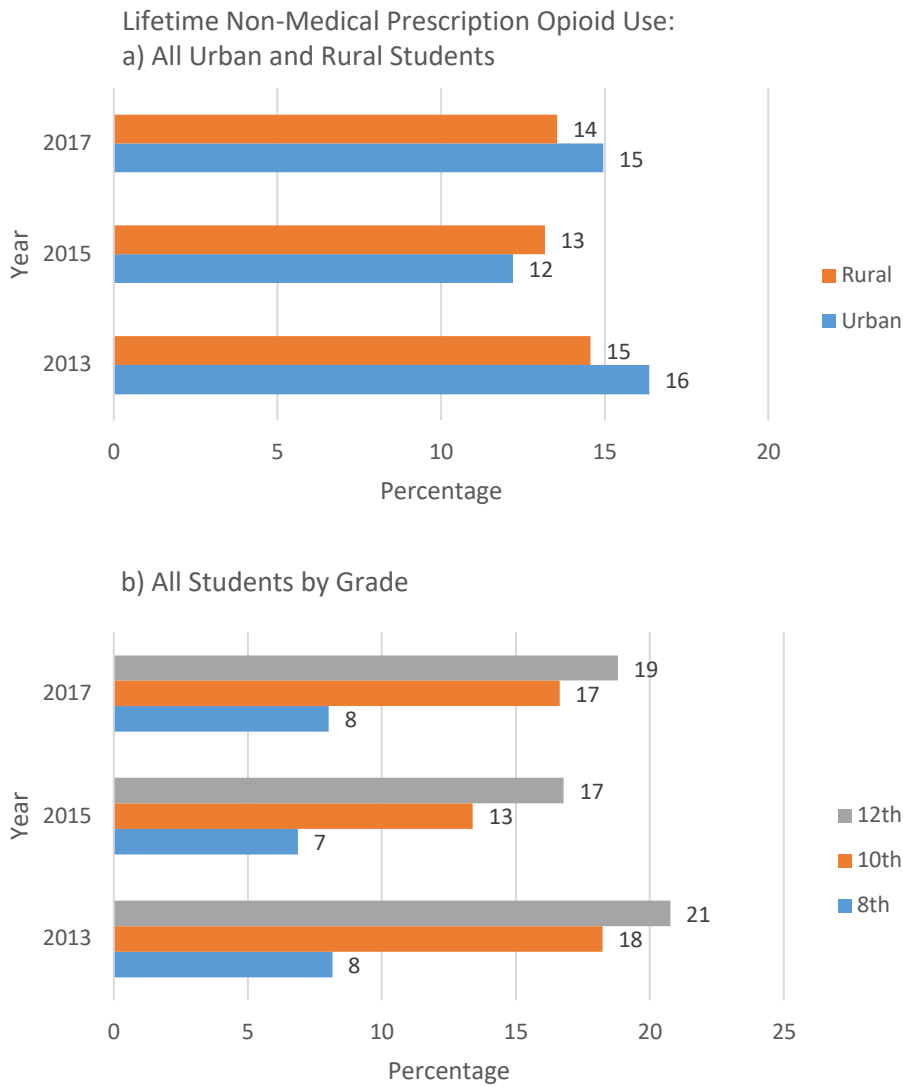
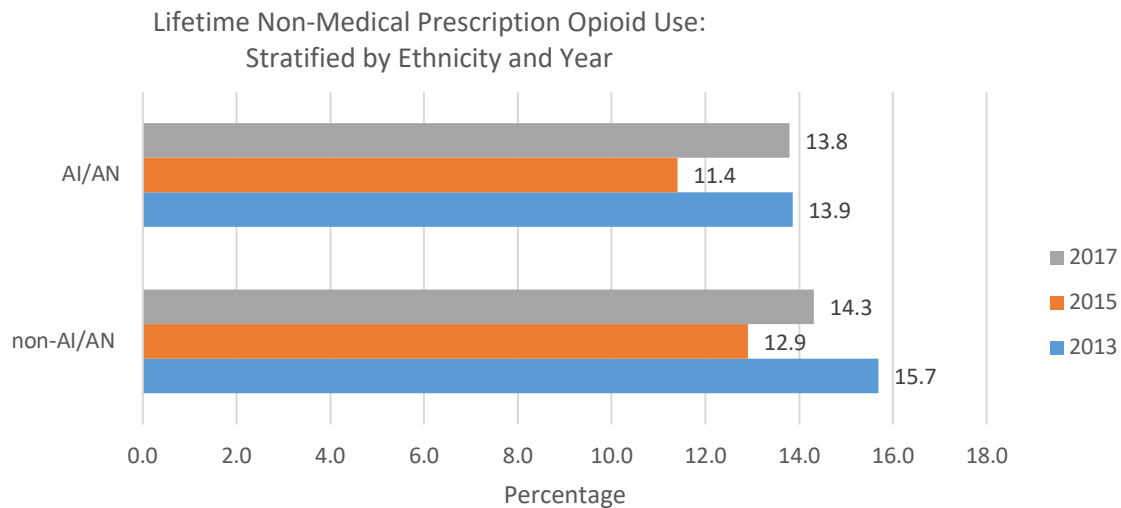


Figure 2. Lifetime Non-Medical Prescription Opioid Use by Ethnicity and Year



2013 Resilience and Lifetime Non-Medical Prescription Use

There were 2,445 AI/AN students and 12,099 non-AI/AN students in 2013. Logistic regression analysis was conducted to predict the relationship between non-medical prescription opioid use among rural and urban (OR = 0.86; 95% CI: [0.69, 1.07], $p = 0.19$) and AI/AN and non-AI/AN students (OR = 0.80; 95% CI: [0.55, 1.16], $p = 0.24$), controlling for grade (OR = 2.73; 95% CI: = 2.07, 3.59, $p < 0.001$), and sex (OR = 1.01; 95% CI: [0.85, 1.21], $p = 0.84$). Being in a higher grade increased the odds of non-medical prescription opioid use among students. Resilience related to a parent or some other adult who is interested in school work (OR = 0.54; 95% CI: [0.43, 0.67], $p < 0.001$), clear rules at school (OR = 0.57; 95% CI: [0.44, 0.73], $p < 0.001$), and engaging in clubs, sports teams, church or temple, or other group activity outside of home and school (OR = 0.55; 95% CI: [0.43, 0.69], $p < 0.001$) decreased odds of non-medical prescription opioid use. Having a friend that really cares was not significantly associated with non-medical prescription opioid use (OR = 0.97; 95% CI: [0.76, 1.22], $p = 0.81$). Table 2 summarizes the binary logistic regression models for each year.

2015 Resilience and Lifetime Non-Medical Prescription Use

There were 1,971 AI/AN students and 8,496 non-AI/AN students in 2015. Logistic regression analysis was conducted for 2015. Again, there was no relationship between non-medical prescription opioid use among rural and urban (OR = 0.98; 95% CI: [0.80, 1.22], $p = 0.91$) or among AI/AN and non-AI/AN students (OR = 0.88; 95% CI: [0.67, 1.15], $p = 0.36$), controlling for grade (OR = 2.59; 95% CI: [1.94, 3.46], $p < 0.001$), and sex (OR = 0.89; 95% CI: [0.76, 1.06], $p = 0.20$). As was the case in 2013, only a progression in grade increased the odds of lifetime non-medical prescription opioid use. Factors such as having a parent or some other adult who is interested in school work (OR = 0.67; 95% CI: [0.55, 0.82], $p < 0.001$), clear rules at school (OR = 0.61; 95% CI: [0.49, 0.78], $p < 0.001$), engaging in sports teams, church or temple, or other group activity outside of home and school (OR = 0.81; 95% CI: [0.67, 0.98], $p < 0.05$), and having a friend that really cares all significantly decreased the odds of non-medical prescription opioid use (OR = 0.69; 95% CI: [0.56, 0.84], $p < 0.001$).

2017 Resilience and Lifetime Non-Medical Prescription Use

There were 2,891 AI/AN students and 14,196 non-AI/AN students in 2017. In 2017, the pattern remained the same with no difference between non-medical prescription opioid use among

rural and urban (OR = 0.90; 95% CI: [0.77, 1.06], $p = 0.23$) or AI/AN and non-AI/AN students (OR = 0.97; 95% CI: [0.77, 1.21], $p = 0.79$), controlling for grade (OR = 2.54; 95% CI: [2.07, 3.13], $p < 0.001$), and sex (OR = 1.04; 95% CI: [0.89, 1.20], $p = 0.59$). Grade remained the only significant predictor for increased lifetime use across the three time points. Resilience related to parent or some other adult who is interested in schoolwork (OR = 0.62; 95% CI: [0.53, 0.73], $p < 0.001$), clear rules at school (OR = 0.58; 95% CI: [0.48, 0.70], $p < 0.001$), and having a friend that really cares decreased the odds of non-medical prescription opioid use among youth (OR = 0.73; 95% CI: [0.62, 0.85], $p < 0.001$). Engaging in clubs, sports teams, church or temple, or other group activity outside of home and school was not significantly associated with non-medical prescription opioid use in 2017 (OR = 0.87; 95% CI: [0.76, 1.01], $p = 0.07$).

Table 2
Logistic Regression Models for Non-Medical Prescription Opioid Use 2013, 2015 and 2017

Covariates	2013		2015		2017	
	Odds Ratio	(95% CI)	Odds Ratio	(95% CI)	Odds Ratio	(95% CI)
Gender (Female) →	1.01	0.85-1.21	0.89	0.76-1.06	1.04	0.89-1.02
Ethnicity (AI/AN Youth) →	0.80	0.55-1.16	0.88	0.67-1.15	0.97	0.77-1.21
Grade (10th) →	2.21	1.71-2.85***	2.01	1.49-3.46***	2.13	1.74-2.61***
Grade (12th) →	2.73	2.07-3.59***	2.59	1.94-3.46***	2.54	2.07-3.13***
Location (Rural) →	0.86	0.69-1.07	0.98	0.80-1.22	0.90	0.77-1.06
Adult/Community Cares about Schoolwork →	0.54	0.43-0.67***	0.67	0.55-0.82***	0.62	0.53-0.73***
Friend Cares →	0.97	0.76-1.22	0.69	0.56-0.84***	0.73	0.62-0.85***
Clear Rules at School →	0.57	0.44-0.73***	0.61	0.49-0.78***	0.58	0.48-0.70***
Community Activities →	0.55	0.43-0.69***	0.81	0.67-98*	0.87	0.76-1.01

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Patterns Across the Three Time Points

Controlling for year, the log of the pooled odds ratios between ethnicity and non-medical prescription opioid use was not significant, indicating no difference between AI/AN and non-

AI/AN students across years ($\chi^2_{MH} = 1.22$, $\alpha^{MH} = 0.97$, 95% CI: [0.90, 1.04], $p = 0.44$). There is evidence that the association of rurality and non-medical prescription opioid is different, depending on year ($\chi^2_{MH} = 9.03$, $\alpha^{MH} = 1.08$, 95% CI: [1.02, 1.15], $p < 0.05$). There were also significant differences between years for grade, stratified by year, with highest use in 2013 ($\chi^2_{MH} = 3.68$, $\alpha^{MH} = 2.42$, 95% CI: [2.26, 2.58], $p < 0.05$).

DISCUSSION

This study contributes to the literature on the trends in prevalence of non-medical prescription opioid use among rural and urban AI/AN and non-AI/AN youth in eighth, tenth, and twelfth grade. We did not observe a significant difference in the prevalence among AI/AN youth residing in rural and urban locations nor between AI/AN students compared with their non-AI/AN counterparts. As is commonly found, the likelihood of non-medical prescription opioid use increased as students progressed in school (National Institute on Drug Abuse, 2018). The importance of resilience was highlighted by the fact that the more social and community support youths have, the greater the protective effect in not using non-medical prescription opioids. These findings may offer preparatory evidence for clinicians and prevention scientists in determining ideal times for intervention and how resiliency may buffer the initiation or progression of non-medical prescription opioid use for all youth. This information may also offer evidence for considering the conception and implementation of developmentally appropriate interventions.

Counter to our findings, previous research has indicated that the risk of any illicit drug use among AI/AN youth residing on or near reservations is higher compared with their non-AI/AN counterparts (Swaim & Stanely, 2018; Whitesell et al., 2012). Frequency of substance use in the Southwest has shown to be lower among AI/AN adults compared to AI/AN adults in the Northern Plains and in the general U.S. population (Beals et al., 2003), pointing to potential regional differences in buffering effects of misuse among youth as well. In alignment with previous research, our findings indicated that with non-medical prescription opioid use, there was increasing risk as youth aged, with highest lifetime use at twelfth grade (Johnston et al., 2018; Swaim & Stanely, 2018). Our preliminary findings also support the trend that non-medical prescription opioid use has been diminishing overtime, with evidence suggesting that it may be due in part to the decrease in youth perception of opioid availability since 2010 (from 54.2% to 32.5%; National Institute on Drug Abuse, 2018).

Although preliminary, the most crucial areas of resilience in our study in reducing likelihood of non-medical prescription opioid use were social connection and school environment. School-related factors have been found to contribute to opioid use for AI/AN adolescents in other studies as well. Among AI/AN youth across 11 states, performance in school was associated with lifetime opioid misuse (OR=.90, 95% CI: [0.82, 0.98] $p < 0.01$; Nalven et al., 2020). Our findings also support the factors associated with resiliency identified across ethnicity found to protect against substance use among youth (Catalano et al., 2012; Hawkins et al., 1992; Viner et al., 2012). Furthermore, the differences in resiliency between the grades within certain protective domains may indicate the developmental role of resiliency, with one study indicating that the strength of protective effects diminishes in middle school and begins to increase again in high school, supporting the need for early and consistent initiatives to enhance community and social support for youth through high school (Kim et al., 2015).

In addition, AI/AN young adults in the Southwest have been shown to have lower rates of tobacco and alcohol use compared to the general population, with cultural ties a potential contributor. More than half the sample in one study indicated they spoke their Native language and participated in their traditional ceremonies (Greenfield et al., 2018). Another recent descriptive study showed similar substance use prevalence rates among urban AI/AN youth compared with non-AI/AN students, with up to 85% of AI/AN students participating in cultural activities. These results point to the possible protective effect of cultural engagement for youth (D'Amico et al., 2019). Our findings also add to the previous literature that noted school attachment and bonding as decreasing risk of substance use among AI/AN youth (Dickens, et al., 2012; HeavyRunner-Rioux & Hollist, 2010). Future research should continue to investigate the intervening, moderating, and mediating effects of resilience among urban and rural AI/AN youth and how this contributes to reduced substance use (Greenfield et al., 2018; Manson, 2018; Whitesell et al., 2012).

There are limitations of this study that may be important to consider when interpreting the findings. The results of this study may not generalize to youth residing in other states, especially since AI/AN communities in the Southwest have historically had lower prevalence rates of substance use (Beals et al., 2003). In addition, this study was limited in terms of questions asked about non-medical prescription opioid use and resilience. For example, in eighth grade, non-medical prescription opioid use in the last 30-days was not assessed. Further, we were unable to account for school dropout rates so the full extent of non-medical prescription opioid use may be

higher than reported here. Due to a basic violation of the assumption of independence of observation required in regression analysis, a more nuanced examination of trends is not possible in this sample using advanced statistical analyses. Future research should also address patterns of other substance use that may be associated with non-medical prescription opioid use among AI/AN youth. Lastly, the study was cross sectional, and the findings are therefore preliminary in nature.

Strengths of this research include the large sample of AI/AN students across three time points and the ability to assess non-medical prescription opioid use among rural and urban youth. Including resiliency in an epidemiological study is also beneficial. Reporting resiliency may be important in reducing stigma within AI/AN communities by identifying strengths that may be important to reinforce. Finally, findings may be used to assist in the development of prevention activities for AI/AN and non-AI/AN youth to thwart or delay the initiation of non-medical prescription opioid use.

REFERENCES

- Agresti, A., & Franklin, C. 2013. *Statistics: Pearson New International Edition: The art and science of learning from data*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Beals, J., Spicer, P., Mitchell, C. M., Novins, D. K., Manson, S. M., Big Crow, C. K., Buchwald, D., Chambers, B., Christensen, M. L., Dillard, D. A., DuBray, K., Espinoza, P. A., Fleming, C. M., Frederick, A. W., Gurley, D., Jervis, L. L., Jim, S. M., Kaufman, C. E., Keane, E. M., Klein, S. A., ... AI-SUPERPPF Team. (2003). Racial disparities in alcohol use: comparison of 2 American Indian reservation populations with national data. *American Journal of Public Health, 93*(10), 1683–1685. <https://doi.org/10.2105/ajph.93.10.1683>
- Bennett, D. A. (2001). How can I deal with missing data in my study? *Australian and New Zealand Journal of Public Health, 25*(5), 464–469. <https://doi.org/10.1111/j.1467-842X.2001.tb00294.x>
- Bush, A., & Qaedan, F. (2019). Social support and its effects on attempted suicide among American Indian/Alaska Native youth in New Mexico. *Archives of Suicide Research, 24*(Suppl 1), 337-359. <https://doi.org/10.1080/13811118.2019.1577779>
- Catalano, R. F., Fagan, A. A., Gavin, L. E., Greenberg, M. T., Irwin, C. E., Jr, Ross, D. A., & Shek, D. T. (2012). Worldwide application of prevention science in adolescent health. *Lancet, 379*(9826), 1653–1664. [https://doi.org/10.1016/S0140-6736\(12\)60238-4](https://doi.org/10.1016/S0140-6736(12)60238-4)

- Centers for Disease Control and Prevention. (2013). Methodology of the Youth Risk Behavior Surveillance System-2013. *MMWR*, 62(No. RR-#1), 11-13. <https://www.cdc.gov/mmwr/pdf/rr/rr6201.pdf>
- Cerda, M., Santaella, J., Marshall, B.D.L., Kim, J.H., & Martins, S.S. (2015). Nonmedical prescription opioid use in childhood and early adolescence predicts transitions to heroin use in young adulthood: A national study. *The Journal of Pediatrics*, 167(3), 605-612.e2. <https://doi.org/10.1016/j.jpeds.2015.04.071>
- D'Amico, E. J., Dickerson, D. L., Brown, R. A., Klein, D. J., Agniel, D., & Johnson, C. (2019). Unveiling an 'invisible population': Health, substance use, sexual behavior, culture, and discrimination among urban American Indian/ Alaska Native adolescents in California. *Ethnicity & Health*, 1–18. <https://doi.org/10.1080/13557858.2018.1562054>
- Dickens, D. D., Dieterich, S. E., Henry, K. L., & Beauvais, F. (2012). School bonding as a moderator of the effect of peer influences on alcohol use among American Indian adolescents. *Journal of Studies on Alcohol and Drugs*, 73(4), 597–603. <https://doi.org/10.15288/jsad.2012.73.597>
- Duran, E. (2006). *Healing the Soul Wound: Counseling with American Indian and other Native Peoples* (pp. 13-20; 60-64). Teachers College Press.
- Duran, E., & Duran, B. 1995. *Native American Postcolonial Psychology*. State University of New York Press.
- Gone, J., & Trimble, J. (2012). American Indian and Alaska Native mental health: diverse perspectives on enduring disparities. *Annual Review of Clinical Psychology*, 8, 131-160. <https://doi.org/10.1146/annurev-clinpsy-032511-143127>
- Greenfield, B. L., Venner, K. L., Tonigan, J. S., Honeystewa, M., Hubbell, H., & Bluehorse, D. (2018). Low rates of alcohol and tobacco use, strong cultural ties for Native American college students in the Southwest. *Addictive Behaviors*, 82, 122–128. <https://doi.org/10.1016/j.addbeh.2018.02.032>
- Hawkins, J., Catalano, R., & Miller, J. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112(1), 64-105. <https://doi.org/10.1037/0033-2909.112.1.64>

- Hawkins, E. H., Cummins, L. H., & Marlatt, G. (2004). Preventing substance abuse in American Indian and Alaska Native youth: Promising strategies for healthier communities. *Psychological Bulletin*, 130(2), 304–323. <https://doi.org/10.1037/0033-2909.130.2.304>
- Healy, R., FitzGerald, C., Green, D., & Penaloza, L. (2018). New Mexico Youth Risk & Resiliency 2015 Survey Results Report: Drug use and related behaviors. <https://digitalrepository.unm.edu/prc-reports-documents/4>
- HeavyRunner-Rioux, A. R., & Hollist, D. R. (2010). Community, family, and peer influences on alcohol, marijuana, and illicit drug use among a sample of Native American youth: An analysis of predictive factors. *Journal of Ethnicity in Substance Abuse*, 9(4), 260-283. <https://doi.org/10.1080/15332640.2010.522893>
- Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2018). Demographic subgroup trends among adolescents in the use of various licit and illicit drugs, 1975–2017. (Monitoring the Future Occasional Paper No. 90). Institute for Social Research, The University of Michigan.
- Kim, B. K. E., Oesterle, S., Catalano, R. F., & Hawkins, D. (2015). Change in protective factors across adolescent development. *Journal of Applied Developmental Psychology*, 40, 26-37. <https://doi.org/10.1016/j.appdev.2015.04.006>
- Manson, S. (2018). Substance use among American Indian youths today: A threat to our future. *JAMA Network Open*, 1(1), e180381. <https://doi.org/10.1001/jamanetworkopen.2018.0381>
- Momper, S. L., Delva, J., Tauiliili, D., Mueller-Williams, A. C., & Goral, P. (2013). OxyContin use on a rural Midwest American Indian reservation: Demographic correlates and reasons for using. *American Journal of Public Health*, 103(11), 1997–1999. <https://doi.org/10.2105/AJPH.2013.301372>
- Nalven, T., Spillane, NS., & Schick, MR. (2020). Risk and protective factors for opioid misuse in American Indian adolescents. *Drug and Alcohol Dependence*, 206(107736), 1-6. <https://doi.org/10.1016/j.drugalcdep.2019.107736>
- National Institute on Drug Abuse. (2018). Monitoring the Future Survey: High School and Youth Trends, Drug Facts. National Institutes of Health; U.S. Department of Health and Human Services.
- New Mexico Youth Risk and Resilience Survey (NM-YRRS)-High School. (2017). 2017 High School Questionnaire. <http://youthrisk.org/pdf/surveybooklets/YRRS-2017-survey-booklet-HS-E-Std.pdf>

- New Mexico Youth Risk and Resilience Survey (NM-YRRS)-Middle School. (2017). 2017 Middle School Questionnaire. <http://youthrisk.org/pdf/surveybooklets/YRRS-2017-survey-booklet-MS-E-Std.pdf>
- Oluwoye, O., Kriegel, L. S., Alcover, K. C., Hirchak, K., & Amiri, S. (2020). Racial and ethnic differences in alcohol-, opioid-, and co-use-related deaths in Washington State from 2011 to 2017. *Addictive Behaviors Reports*, *12*, 100316. <https://doi.org/10.1016/j.abrep.2020.100316>
- Osborne, W. J. (2013). Dealing with missing or incomplete data: Debunking the myth of emptiness. In *Best Practices in Data Cleaning: A Complete Guide to Everything You Need to Do Before and After Collecting Your Data*. Sage Research Methods.
- Roderick, R. J. L. (1988). A test of missing completely at random for multi variety data with missing values. *Journal of the American Statistical Association*, *83*(404), 1198–1202. <https://doi.org/10.1080/01621459.1988.10478722>
- Stanley, L. R., Harness, S. D., Swaim, R. C., & Beauvais, F. (2014). Rates of substance use of American Indian students in 8th, 10th, and 12th grades living on or near reservations: Update, 2009-2012. *Public Health Reports*, *129*(2), 156–163. <https://doi.org/10.1177/003335491412900209>
- Substance Abuse and Mental Health Services (SAMHSA). (2016). *The National Tribal Behavioral Health Agenda*. Rockville, MD: U.S. Department of Health and Human Services. <https://store.samhsa.gov/product/The-National-Tribal-Behavioral-Health-Agenda/PEP16-NTBH-AGENDA>
- Swaim, R. C., & Stanley, L. R. (2018). Substance use among American Indian youths on reservations compared with a national sample of US adolescents. *JAMA Network Open*, *1*(1), e180382. <https://doi.org/10.1001/jamanetworkopen.2018.0382>
- Tipps, R. T., Buzzard, G. T., & McDougall, J. A. (2018). The opioid epidemic in Indian Country. *Journal of Law, Medicine & Ethics*, *46*(2), 422-436. <https://doi.org/10.1177/1073110518782950>
- Venner, K. L., Donovan, D. M., Campbell, A., Wendt, D. C., Rieckmann, T., Radin, S. M., Momper, S. L., & Rosa, C. L. (2018). Future directions for medication assisted treatment for opioid use disorder with American Indian/Alaska Natives. *Addictive Behaviors*, *86*, 111–117. <https://doi.org/10.1016/j.addbeh.2018.05.017>

- Viner, R. M., Ozer, E. M., Denny, S., Marmot, M., Resnick, M., Fatusi, A., & Currie, C. (2012). Adolescence and the social determinants of health. *Lancet*, 379(9826), 1641-1652. [https://doi.org/10.1016/S0140-6736\(12\)60149-4](https://doi.org/10.1016/S0140-6736(12)60149-4)
- Whitesell, N. R., Beals, J., Crow, C. B., Mitchell, C. M., & Novins, D. K. (2012). Epidemiology and etiology of substance use among American Indians and Alaska Natives: Risk, protection, and implications for prevention. *The American Journal of Drug and Alcohol Abuse*, 38(5), 376–382. <https://doi.org/10.3109/00952990.2012.694527>
- Wu, L. T., Ringwalt, C. L., Mannelli, P., & Patkar, A. A. (2008). Prescription pain reliever abuse and dependence among adolescents: A nationally representative study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47(9), 1020–1029. <https://doi.org/10.1097/CHI.0b013e31817eed4d>

ACKNOWLEDGEMENTS

We would like to thank the Albuquerque Area Southwest Tribal Epidemiology Center and the Albuquerque Area Health Board, Inc. for all their assistance during this project.

FUNDING INFORMATION

Funding was provided by grants from the National Institute on Alcohol Abuse and Alcoholism (T32 AA018108, PI: McCrady; K01 AA028831-01, PI: Hirchak).

AUTHOR INFORMATION

Dr. Katherine Hirchak is an assistant research professor at the Elson S. Floyd College of Medicine at Washington State University in Spokane, WA. Dr. Solmaz Amiri is an assistant research professor at the Elson S. Floyd College of Medicine at Washington State University in Spokane, WA. Ms. Judith Espinoza is an epidemiologist at the Albuquerque Area Southwest Tribal Epidemiology Center in Albuquerque, NM. Ms. Jalene Herron is a doctoral student in the Department of Psychology and a Fellow at the Center on Alcohol, Substance use And Addictions at the University of New Mexico in Albuquerque, NM. Ms. Alexandra Hernandez-Vallant is a doctoral student in the Department of Psychology and a Fellow at the Center on Alcohol, Substance use And Addictions at the University of New Mexico in Albuquerque, NM. Ms. Violette Cloud is a doctoral student in the Department of Psychology at the University of New Mexico in Albuquerque, NM. Dr. Kamilla

Venner is an assistant professor in the Department of Psychology and the Center on Alcohol, Substance use And Addictions at the University of New Mexico in Albuquerque, NM.

CONFLICT OF INTEREST DISCLOSURE

Dr. Kamilla Venner has a conflict of management plan at the University of New Mexico due to providing consultation and training of evidence-based treatments such as CRAFT for remuneration. All authors have no other conflicts to declare.