

Review of Substance Use Disorder Treatment Research in Indian Country: Future Directions to Strive toward Health Equity

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Background: American Indians and Alaska Natives (AI/ANs) have disproportionately high rates of substance use disorders (SUDs). Effective treatment can help to reduce these disparities. **Objective:** To review and summarize the AI/AN SUD treatment research literature. **Methods:** The literature between 1965 and 2011 was reviewed to identify AI/AN SUD treatment articles. **Results:** Twenty-four unique studies were identified. Earlier treatment research focused on clinical ratings of improvement; later studies employed formal assessment measures. Poor outcomes were attributed to psychosocial factors. Where treatment outcomes appeared to be similar to comparison samples, interpretation was hampered by methodological concerns. **Conclusions:** The research has improved across the decades, as has the inclusion of cultural adaptations. Future research should examine factors that influence treatment effectiveness and improve retention to bolster confidence in findings. **Scientific Significance:** AI/ANs experience SUD-related health disparities. Understanding what factors contribute to positive treatment outcomes can help to address these disparities.

Keywords: American Indians, Alaska Natives, Native Americans, alcohol, drug, substance use disorder, treatment, culture

INTRODUCTION

Use of alcohol and other drugs varies considerably among American Indians and Alaska Natives (AI/ANs). While reports of abstinence are high, AI/ANs also have higher past-year and lifetime substance use disorder (SUD) rates than the general US population (1–5). Negative consequences from substance use are devastating for AI/ANs and include high rates of fetal alcohol spectrum disorder (FASD) (6), alcoholic cirrhosis deaths (7), and driving under the influence (8). AI/ANs are also at greater risk for alcohol-related violence (9), including motor vehicle deaths and suicides (10,11). AI/AN drug-related death

during the period 2002–2004 was 1.5 times higher than the US all-races rate and has increased 206% since 1979–1981 (7). These disparities compel one to consider how SUDs can be reduced; one way is to provide prompt and effective treatment services.

AI/ANs comprised 1.5% of the general US population but 2.3% of all SUD treatment admissions in 2007, and AI/ANs are more likely than other racial and ethnic groups to identify alcohol as their primary substance of abuse upon treatment admission (12). In a study of reservation-based AI/ANs, 38.9% of adults with past-year SUDs had sought help in the past year including traditional AI/AN healing (40%), 12-step programs (41%), and biomedical treatment (52%) (13). Those who sought traditional healing instead of biomedical help were more likely to endorse AI/AN spirituality and identify with AI/AN culture, whereas those who attended 12-step programs were more likely to identify with White culture. Given high rates of SUD and related consequences among AI/ANs, we must seek a better understanding of available treatments and their empirical support. The goals of this study were to critically review the literature on AI/AN alcohol and/or drug treatment, clarify historical trends in this research, provide a reference table, and suggest directions for future research.

METHOD

Search Strategy

A systematic review of the literature was conducted using PsychINFO and PubMed using all forms of the words alcohol- and drug-, treatment, American Indian, Alaska Native, and Native American as search terms. The search was limited to peer-reviewed articles published between 1965 and 2011; 154 unique articles were found. Additional articles were also found in the references of the initially located articles. To be included in the review, articles had to focus on interventions for AI/ANs with SUD and include outcomes. These criteria reduced the final number of reviewed articles to 24 unique studies published between 1968 and 2011. Table 1 provides an overview of

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TABLE 1. Treatment outcomes among AI/ANs.

Authors (year; reference)	N	Treatment	Cultural considerations	Follow-up rate	Outcomes and substance of interest
Savard (1968; 29)	30	6 days hospitalization prior to disulfiram	None	9 months (UNK)	75% had more sober periods and fewer drinking sprees 7% engaged in new enjoyable activities to replace alcohol A
Ferguson (1970; 26)	115 vs. 115 AI/ANs w/o tx	18 months probation w/minimum 12 months disulfiram	Navajo interpreter	End-tx (47% for psych battery), 6 months (UNK)	43% "long-term success" – no destructive drinking for 12+ months 78% decline in arrests during tx vs. 16% decline for control group A 28% "clear improvement" as rated by program staff
Shore and Von Fumetti (1972; 28)	642	Three tribally sponsored rehab programs	Evolved within communities	1–4 years (83%)	Women more likely to be in clearly improved category A
Wilson and Shore (1975; 21)	83	AI/AN residential	No required sharing of feelings in a group AI/AN counsellors Cont. care on home reservation	18 months (88%)	23 (32%) "clear improvement": abstinence or occasional drinking Rated by counselor and psychiatrist using collaterals A
Westermeyer and Neider (1984; 22); Westermeyer and Peake (1983; 23)	45	1–3 weeks inpatient hospitalization	Visiting AI counselor	10 years (93%)	More Indian cultural affiliation = better outcomes 23 (28%) clear improvement (good health, self-supporting, not using tx facilities) A, D
Kivlahan et al. (1985; 24)	50	2 day detoxification	None	2 years (76%)	74% had additional detoxification episodes
Query (1985; 27)	20 vs. 76 White youth in same program	Residential	None	6–7 months (60%-AI; 63%-CG)	None were improved A All AIs used alcohol post-tx vs. 27% of CG that did not use alcohol during f/u A, D
Kelley (1997; 25)	21	Neurofeedback added to AI/AN residential	Neurofeedback: Medicine man sanctioned protocol and purification, AI décor, gift exchange at f/u	3 years (62% + 29% collateral reports)	21% sustained full remission of alcohol dependence Decrease in BDI from pre-post neurofeedback training A

TABLE 1. (Continued).

Authors (year; reference)	N	Treatment	Cultural considerations	Follow-up rate	Outcomes and substance of interest
Coleman et al. (2001; 30)	78	AI/AN residential youth treatment	Family involvement, cultural healing, medicine wheel	2 years (60%)	Collateral report from staff in home community; 72% use inhalants and 50% use alcohol during f/u period A, D
Kunitz et al. (2002; 15)	2163 AI/AN (3069 all races) in-tx vs. 3502 all races arrested but tx not mandated	Residential treatment in bordertown for first time DWI offenders	Sweat lodge, talking circles	N/A – used public records	Probability of re-arrest greater in CG Analysis for tx group only: AI/ANs more likely to be re-arrested than Hispanics or Whites
Gossage et al. (2003; 31)	190	Weekly educational sessions + sweat lodge ceremonies (SLC) while incarcerated	SLC	Immediately after SLC (65%) 3 and 9 months (26%)	86% report peace of mind post-SLC Intake to f/u: non-sig. mean decrease of 1.5 drinks/occasion, relation to human/animal world improved A, D
Chong and Herman-Stahl (2003; 59)	30	Telephone “step-down” module post-AI/AN residential	Telephone module: added to address return to reservations, unknown if cultural adaptations	3 months (37%), 6 months (43%)	Intake to f/u: Significant reductions in past-month alcohol use, reductions in ASI alcohol-related symptoms, legal problems, family, psychiatric A, D
Boyd-Ball (2003; 35); Boyd-Ball et al. (2011; 33)	66	AI/AN family-enhanced 7-week residential treatment “Shadow Project”	Family-enhanced addition: Cultural adaptation of Family Check-Up; Welcome Home Ceremony; cultural pride/awareness; ceremonies while in tx	1 year (86%)	Monthly f/u re: days used alcohol or cannabis for 1 year 33% abstainers, 40% improved, 26% relapsers Relapsers reported less engagement with AI cultural practices A, D
Evans et al. (2006; 36)	368 vs. 368 matched non-AI controls	Outpatient, residential, and opiate replacement programs in CA	None	32% – in-tx services data; 9 months (AI/AN-18%; CG-30%)	AIs: fewer days in residential tx and fewer referrals for add'l care Improvements on ASI in all areas at 3 months except medical, no differences between groups A, D

TABLE 1. (Continued).

Authors (year; reference)	N	Treatment	Cultural considerations	Follow-up rate	Outcomes and substance of interest
Villanueva et al. (2007; 18)	25	Project MATCH RCT of Motivational Interviewing (MI; <i>n</i> = 8), CBT (<i>n</i> = 9), and 12-step Facilitation (<i>n</i> = 8)	None	12 months post-intake (92%)	Fewer drinks per drinking day in MI group at 12 months No group differences in percent days abstinent from alcohol No differences in amount of therapy attended or reported satisfaction with treatment A
Chong and Lopez (2008; 41)	346	45-day residential	AI values of family, community, spirituality incorporated. Sweat lodge ceremonies, drumming, traditional healing available	6 months (54%); 12 months (48%)	Predictors of past-month substance use at <i>t</i> /u: craving, being around others who are using, low self-efficacy, conflicts with others, more prior treatment, more years using substances A, D
May et al. (2008; 16)	131	Case management (CM) for pregnant women	None	6 months (UNK/30%), 12 months (UNK/28%)	31% enter tx during CM 38% abstinent at 6 months 76% normal deliveries 38% do not complete CM A Trend of better outcomes with medications vs. placebo A
O'Malley et al. (2008; 17)	68	16 weeks of placebo (<i>n</i> = 22), naltrexone (<i>n</i> = 24), or naltrexone + sertraline (<i>n</i> = 22)	Adapted to rural communities – meds provided by paraprofessionals	64–71% during tx	
Madras et al. (2009; 20)	645	Screening, brief intervention, and referral to tx in primary care and ED RCT of Job Seeker's Workshop (<i>n</i> = 53) vs. Job Interview Videos (<i>n</i> = 49), add-on to 60-day AI/AN residential tx	None	6 months (UNK/72–82%)	Significant reductions in substance use A, D
Foley et al. (2010; 19)	102		Sessions in Navajo	UNK	Improvements in employment and reduced substance use at 3 and 6 months – no significant differences by group A, D

TABLE 1. (Continued).

Authors (year; reference)	N	Treatment	Cultural considerations	Follow-up rate	Outcomes and substance of interest
D'Silva et al. (2011; 14)	303	Four session individual counseling plus nicotine replacement therapy	Add Ojibwe stories and teachings on sacred use of tobacco Fewer sessions Individual format	End-tx (70%) and 90 days (47%)	Reduction in daily # of cigarettes 1/3 abstinent for 7 days at end-tx Average of 2 quit attempts during and after program T
Dickerson et al. (2011; 37)	279 vs. 279 non-AI/ANs	Treatment Impact System Project (TSI; n = 245) & Meth Tx Project (MTP; n = 34)	None	12 months (TSI – 18%; MTP – 88%)	AI/ANs received more tx services AI/ANs improved in all areas at 12 months (ASI, legal involvement, substance use); no differences btw AI/ANs and CG at 12 months A, D
Kidney et al. (2011; 38)	17 vs. 860 non-AI/ANs	Oxford House residents	None	4 months (88%)	No differences at 4 months in days sober from drug or alcohol use At baseline, AIs rated house as having more disharmony A, D
Wright (2011; 32)	613 (87% AI/AN)	AI/AN outpatient and residential	Native healers and ceremonies (e.g., talking circles, prayer, and drumming), Gathering of Native Americans (GONA), Positive Indian Parenting interventions	6 months (80%)	Significant decreases in past-month alcohol and drug use, stress from substance use Increases in employment, educational enrollment, and psychiatric functioning A, D

Note: AI/AN = American Indian/Alaska Native, CG = comparison group, f/u = follow-up, UNK = unknown, unclear, or not provided, A = Alcohol, D = Drugs, T = Tobacco, tx = treatment, ASI = Addiction Severity Index, BDI = Beck Depression Inventory, ED = Emergency Department.

the sample, type of treatment, cultural considerations, follow-up rates, and outcomes.

RESULTS

Types of Studies

Studies focused primarily on residential (50%) and outpatient treatment (21%). Less common were medication trials (17%), hospital-based inpatient (8%), and detoxification programs (4%). One-third (33%) incorporated traditional healing and/or ceremonies. Only 3 (13%) centered on youth. Because some studies included multiple types of treatment, these percentages are not mutually exclusive.

Over half of the studies (54%) included both alcohol and drug use as outcome variables, one focused exclusively on tobacco use (14), another focused on driving while intoxicated rearrest rates but not substance use outcomes (15), and 38% focused solely on post-treatment alcohol use. None examined only drug use outcomes. Most earlier studies that examined alcohol use did not include a justification for this focus, whereas more recent studies did so for a particular reason [e.g., FASD prevention (16), medication trial (17), and Project MATCH (18)]. Table 1 specifies which substances were examined in which studies. A quarter focused on programs that extended beyond conventional treatment modalities, such as screening, brief intervention, and referral to treatment (SBIRT), case management for pregnant women abusing substances, and a program to enhance employment among individuals with SUD (16,19,20).

Early Studies (1968–1997)

Many of these studies (e.g., 21–26) focused on loosely defined outcomes such as ratings made by treatment staff or community members about participant functioning in various life domains (e.g., legal system utilization) and of post-treatment substance use. Participants generally were not asked directly about outcomes. Outcomes included 0–16% “improved” in detoxification programs (22,24), continued post-treatment alcohol use among all AI/AN youth in a residential program (27), and “clear improvement” reported by staff at an AI/AN-specific residential program (28). In one study, 75% of participants reported more sober periods and less binge drinking following hospital-based detoxification with disulfiram, but only 7% identified new non-alcohol-related positive reinforcers (29). Early studies had variable follow-up rates [e.g., above 85% (22) to below 50% (26)] and often lacked comparison groups; it is difficult to attribute improvement to the treatment itself.

Modest outcomes were attributed in part to the type of treatment and social factors. Kivlahan and colleagues wrote that a “brief interruption of a chronic pattern of abusive drinking is unlikely to have an enduring impact” (p. 1470; 24), and called for culturally appropriate treatments that considered employment and social relationships. Elsewhere unemployment and lack of social support (23) and disulfiram treatment alone (29) were

implicated in poor outcomes. Others concluded that “to overlook the special cultural and associated identity needs of Indian or other minorities is to court failure” (p. 500; 27); better outcomes 10 years post-inpatient hospitalization were found for AI individuals who reported greater affiliation with their culture (22).

Efforts to incorporate cultural elements into treatment included AI/AN counselors and language interpreters. Ferguson (26) attributed positive drinking outcomes with disulfiram in part to interpreters, many of whom were recovered AI/AN drinkers. In 1997, the first culturally adapted treatment, which brought a medicine man into neurofeedback sessions, was reported (25). Unfortunately, specification of cultural adaptations in these studies was lacking and much needed, especially to guide non-AI/AN providers and researchers.

The Twenty-First Century (2000–2011)

Adding Culture to Treatment

The new century brought an increase in treatment studies that included traditional healing components and AI/AN researchers as authors. Nine studies focused on treatment programs that were partially or fully based on what AI/AN community members and treatment staff saw as essential for healing and cultural restoration, representing a paradigm shift from earlier research.

Culturally adapted treatment included talking circles, family involvement, healing historical trauma, sweat lodge ceremonies, cultural restoration, and drumming (e.g., 30–32). These studies generally reported reductions in substance use following treatment. Boyd-Ball and colleagues (33) culturally adapted an evidence-based family treatment (34) and found that youth with higher engagement in AI/AN cultural practices had better 1-year outcomes. Even though descriptions of adaptations have been provided, attempts to incorporate AI/AN cultural traditions and worldviews into currently available treatment are difficult and still in their infancy (32). Follow-up rates have remained variable and mostly low, and it is unclear if adding cultural components has improved outcomes.

Randomized Controlled Trials

Two randomized controlled trials (RCTs) have been reported (17,19). Naltrexone provided better drinking outcomes than placebo alone in a small sample of AI/ANs (17). Unfortunately, only 34% of the intended sample size was recruited, which was attributed to slower than expected recruitment and other delays. Foley and colleagues (19) found decreased substance use and improved employment outcomes across two interventions (3-session job seekers workshop vs. 40-minute video on interviewing for a job).

Expanding Outcomes

Researchers began to expand treatment outcomes beyond substance use to areas such as prevention of FASD (16) and harmony and connection with the human, animal, plant, and mineral world (31). This noteworthy shift brought treatment outcomes closer to an AI/AN worldview

that considers substance use as being out of balance or disconnected from cultural traditions. Some researchers recommended that treatment should not only focus on reducing substance use, but also instigate change in these other variables. For example, Boyd-Ball (35) found that study participants endorsed high levels of familial support. The next step would be to examine social support as a mechanism of change in treatment. However, despite making strides in incorporating cultural healing and culturally focused outcomes, the field continues to depend almost exclusively on mainstream assessments (e.g., self-efficacy; the Addiction Severity Index), while the validity of these instruments for AI/ANs remains largely unknown and psychometric studies are needed.

Secondary Analyses of Large Data Sets

A final trend involved analyzing outcomes for AI/ANs from larger treatment outcome studies that included individuals from multiple racial and ethnic backgrounds (18,20,36–38). The treatment provided in these studies ranged from residential treatment (36) to the Oxford House (38) to SBIRT (20). None explicitly included cultural adaptations.

Two studies (36,37) concluded that AI/ANs have equivalent treatment outcomes to those of the matched controls. Yet, several considerations must temper the “equivalent outcomes and benefit” conclusion. One concern is the possibility of sampling bias, such that AI/ANs who enter non-adapted treatment programs may comprise a specific subset of AI/ANs. Evans and colleagues reported an overall 70% follow-up rate, but the follow-up for AI/ANs appeared to be only 18%. Also of concern is dosage of treatment received: AI/ANs spent fewer days in residential treatment and received fewer additional treatment referrals than the matched controls despite similar substance use severity (36). Given these methodological concerns, it is unclear for whom the outcomes are equivalent and whether the dosage of treatment was a significant influence.

Madras and colleagues (20) reported significant reductions in substance use for AI/ANs following SBIRT, but did not contrast these outcomes with those of other racial/ethnic groups or a non-SBIRT comparison group. Villanueva and colleagues (18) conducted a secondary analysis of Project MATCH data and found that AI/ANs had equivalent percent days abstinent across Motivational Interviewing (MI), Cognitive Behavioral Therapy, and Twelve-Step Facilitation (TSF). One matching result occurred such that AI/ANs receiving MI reported fewer drinks per drinking day at 9 months post-treatment than those receiving TSF. But similar to Kidney and colleagues (38), the AI/AN sample size was very small ($n = 17$ and 25 , respectively).

Dickerson and colleagues (37) combined data from two studies and reported varying follow-up rates for each study (18% and 88%), but did not indicate if follow-up rates differed by ethnicity. Considering the difficulty other researchers report achieving high follow-up rates with AI/AN samples (31), it is possible that the follow-up rate

for AI/ANs was lower than the overall sample follow-up rates, which would call into question the conclusion that treatment outcomes were similar across groups.

Scientific Caveats

High follow-up rates are critical to the interpretation of outcome research. Rates at or below 70% can bias findings in unexpected ways, even after performing attrition analyses (39). Table 1 includes studies that have follow-up rates of 70% or above ($n = 7$; 29%) and the more stringent 90% or above ($n = 3$; 12.5%) (39). The remaining studies have follow-up rates below 70% ($n = 11$; 46%) or unreported or unclear follow-up rates ($n = 3$; 12.5%).

DISCUSSION

In light of the high prevalence of SUDs and associated problems among AI/ANs, there have been a surprisingly small number of peer-reviewed treatment studies focusing on these populations. The field of AI/AN SUD treatment research, with origins in the ground-breaking but mostly non-controlled work of the 1970s and 1980s, has shown considerable recent improvement. This century has marked a growing interest in assessing treatment efficacy and incorporating AI/AN values, practices, and beliefs into treatment. Recent studies report positive treatment outcomes for AI/ANs, but it is unclear to what extent these findings are generalizable to all AI/ANs due to low follow-up rates and possible selection biases (as detailed in 40). Finally, outcomes have become more diverse including FASD prevention (16) and employment (19).

Early researchers attended to certain aspects of culture by employing AI counselors (21–23) or interpreters (26). Later researchers included assessment of cultural identity (22,23) and cultural components like the medicine wheel (30) and traditional healers and healing ceremonies (14,15,31–33,41). There appears to be a trend for adapting evidence-based treatments (EBTs) to include elements of AI/AN healing practices and ways of life such as cultural identity, spirituality and religiosity, discrimination, collectivism (33,42,43), and historical trauma (44). Researchers maintain that these inclusions increase the appeal and efficacy of treatment, contribute to better outcomes and engagement among a wider range of AI/ANs (e.g., varying levels of acculturation) and may thereby help to reduce substance-related health disparities (42–46).

Only recently two RCTs have been completed among AI/ANs. One, conducted in a detox and residential treatment facility, yielded good substance use outcomes but not increased employment in a small community with few job prospects (19). The other found positive substance use outcomes for a pharmacological trial of naltrexone but only recruited 34% of the proposed AI/AN sample (17). Retention of ethnic minority participants is difficult for medication trials, and recruitment is difficult in part due to strict eligibility criteria. Future studies should consider protocol adaptations to facilitate participant engagement and retention, including community outreach and

involvement, respondent-driven sampling, and enhanced participant incentives (45).

Challenges of AI/AN Treatment Research

There are long held and justifiable concerns about SUD research that has either stigmatized or not benefited AI/ANs (e.g., Barrow Study) (47). Many AI/AN communities are reluctant or refuse to employ EBTs and report experiencing “significant pressure to utilize evidence-based practices that are untested for AI/AN populations. . . while their priorities lie in delivering service to people who are facing great daily struggles” (p. 1427; 32). They have voiced concerns about aspects of RCT design including randomization, withholding effective interventions in placebo-controlled designs, and concerns about cultural fit, as currently available treatment may disregard or undermine cultural preservation and revitalization (48,49). There can be a clash between Native people and scientists about ways of knowing what works for AI/ANs resulting in skepticism on both sides. Recommendations for facilitating more successful and sustainable treatment studies with AI/ANs include tribal participation in research, considering community level risks and benefits, and indigenizing (incorporating AI worldview and values) the research process (50,51).

It is important to remember that alcohol use is not the norm for AI/ANs who, contrary to stereotypes, nationally are more likely than all other racial/ethnic groups *not* to consume alcohol in the past month (1) and evidence high rates of lifetime alcohol abstinence in reservation-based epidemiological studies (2). AI/AN people have survived years of injustice; innovative SUD treatments for AI/AN people should consider how strengths such as high rates of abstinence and community resilience can be mobilized to improve treatments.

Next Steps for Treatment Research

Future AI/AN treatment outcome research should include partnerships with tribal communities and governments and include culturally relevant research questions, assessments, and variables (e.g., cultural identity, harmony, spirituality, and discrimination). Treatments need to be described in greater detail so that mediators or mechanisms of change may be examined and dose of intervention may be ascertained. Enhanced recruitment and retention would increase confidence in the findings, but needs to be done in culturally acceptable ways. Examples include partnering with tribes and AI/AN organizations to conduct research that is relevant to and driven by the community, employing research staff from the community, consultation with community members regarding the appropriateness of follow-up strategies, and communicating the principles of respect and autonomy to participants (45).

Finally, cultural adaptations to treatment may address sample biases by attracting less acculturated participants and increasing the range of AI/ANs who seek and benefit from treatment. Examining aspects of AI/AN diversity (e.g., acculturation, tribal, and regional origin) may inform

which AI/ANs would benefit from which SUD treatment. We may find EBTs are adequate for highly acculturated AI/ANs, adapted EBTs for bicultural or traditional AI/ANs, culturally supported healing interventions already in place for thousands of years for those who are traditional or bicultural, or new treatments for identified subgroups (46,52). There are supporters and detractors for each of these solutions, with some concern that simply applying an unadapted EBT may involve inadvertent pressures to assimilate (48,53). Given AI/AN heterogeneity, each of these treatment/healing approaches is likely appropriate for a corresponding segment of AI/AN people. Guidelines for adapting and testing EBTs are provided in the literature (54,55). Much empirical work remains to further the science of adapting EBTs while maintaining fidelity to the underlying mechanisms of change to decrease health disparities among AI/AN and other groups evidencing tremendous burden from SUD.

Addressing Health Disparities

Improving treatment studies is only the first step in addressing substance-related health inequities among AI/AN people. Researchers must broaden their scope to consider how their findings can be sustained. Community-based participatory research (56) offers a research approach that focuses on sustainability through a bi-directional exchange of knowledge and capacity building to train the next generation of AI/AN researchers. While treatments are being developed and studied, treatment availability should be expanded. Indian Health Service is underfunded compared with other federally supported health care systems (57); efficacious treatment is useless without avenues for implementation and barriers to treatment (both cultural and pragmatic) must be addressed. Finally, a multitude of factors contribute to health inequities; treatment is only one of many ways to intervene to reduce health inequities. Poverty and racism, among other social determinants of health, must be addressed if we expect change (58). This review of the AI/AN treatment research reveals a trajectory of growth in methods and cultural adaptations and a continued striving for health equity for AI/ANs in this new millennium.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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