


Epidemiological Criminology: Drug Use Among African American Gang Members

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Abstract

Epidemiological methods and public health theories can be tied to theories of crime and delinquency and used to create evidence-based policy. Interdisciplinary theoretical approaches to existing, and emerging, public health and criminal justice problems hold great promise. Differential association theory postulates that close association with delinquent peers leads to an increase in deviant activities such as illicit drug use. Social cognitive theory postulates that health behavior change is driven by the interaction of (a) cognitive states that support a health outcome, (b) the social and contextual environment, (c) and individual action. Combined, these theories can be applied to drug eradication programs as well as other health and crime issues. Focus groups and interviews were performed to identify rates of illicit substance use among incarcerated African American adolescent male gang members and nongang members. The policy recommendations illustrate the convergence of criminological and epidemiological theory under the new paradigm of epidemiological criminology or "EpiCrim."

Keywords

epidemiological criminology, differential association, health belief model, drug abuse, gangs

During this time of increasing fiscal pressures, correctional administrators, staff, and policy makers will need to use new tools and strategies to help obtain grant funding, to develop and administer programs, and to justify practices. The purpose of this article is to present an emerging new field of study that has practical health care implications, and meets all the needs delineated above, called epidemiological criminology or "EpiCrim." Although academic in nature, the article nonetheless illustrates the importance of theory when developing policy and implementing health care programs. As such, it provides a new tool that can be used in grant writing, program development, and

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operational practices. Most contemporary efforts require an interdisciplinary focus. This article provides the rationale for such an approach.

We begin by defining the terms we frequently reference throughout the article. Epidemiology has traditionally served as the foundation for public health interventions (Coughlin, 1998; Grobbee, 2004; Krieger, Kass, & Steineck, 1993; Savitz, 1997). *Public health* is devoted to the prevention and eradication of diseases that may infect communities. Public health, as an academic discipline, has a rich repository of behavioral theories. Traditionally, *epidemiology* leads to, and examines, public health theory and policy. In comparison, *criminology* is devoted to theoretical explanations of deviant behaviors (crime) at the aggregate, community, and individual levels (Lanier & Henry, 2009). *Criminal justice* is concerned with the process of law enforcement, adjudication, and corrections. In this article, we advocate a greater merging of these seemingly disparate areas. We further argue that crime has become a "disease" in many communities and that analytical shortcoming occurs when theories are not necessarily integrated, as in the case of epidemiology and criminology (Akers & Lanier, 2009). Others have shared this conceptualization, though none have fully realized its potential. For example, when contemplating how AIDS/HIV has "reflected and intensified social inequalities," Skordis and Green found "this body of work has drawn on insights from sociology, epidemiology, policy, economics and has often been (of necessity) at the forefront of methodological development ..." (2006, p. 3).

Most destructive crime-related behaviors also have strong ties to mental and physical health problems. In fact, we argue that it is impossible to separate these links (Akers & Lanier, 2009). Consequently, the interdisciplinary nature of many projects should come as no revelation (Centers for Disease Control and Prevention, 2002; Osgood, 1998). There has long been an implicit overlap between epidemiology and criminology. For example, AIDS and HIV have been examined by interdisciplinary teams combining public health, medicine, and criminology for over 20 years (Akers & Hervey, 2003; DiClemente, Lanier, Horan, & Lodico, 1991; Lanier & McCarthy, 1989). A few texts have even made the connection. For example, *Prisons and AIDS* (Braithwaite, Hammett, & Mayberry, 1996) and *The Impact of HIV/AIDS on Criminology and Criminal Justice* (Lanier, 2006) have explicitly linked the two. However, most prior connections have dealt with specific problems (such as HIV/AIDS).

What is surprising is the current lack of direct integration between the two disciplines when it comes to theory development and program application (Timmermans & Gabe, 2002). Consequently, the primary purpose of this article is to integrate criminological theory with public health theory in an effort to develop more effective public policy that is more complementary and less confrontational (Akers & Lanier, 2009; Dixon & Maher, 2005). A secondary purpose is to show how public health policy may be more effective than the current criminal justice "war on drugs" as a means to combat drug abuse. The third objective of the current study was to identify differences in substance use among African American adolescents who were currently involved in a gang, formerly involved in a gang, or never involved in a gang. It was hypothesized that presently or formerly gang-involved adolescents would exhibit higher levels of all drug-using risk behaviors, and that different patterns of substance use would exist between presently, formerly, or never gang-involved youth. We conclude by demonstrating how linking public health theories to theories of crime causation are beneficial and provide sound policy, especially when contrasted with existing drug control policy.

Literature Review

Although a substantial literature has clearly established a positive relationship between gang involvement, violence, and delinquency (Bjerregaard & Lizotte, 1995; Esbensen, Huizinga, & Weiher, 1993; Lahey, Gordon, Loeber, Stouthamer-Loeber, & Farrington, 1999; Thornberry, 1998), the association of gang involvement with alcohol and other drug use is less understood. Studies have found more drug use and drug trafficking among gang members compared to nongang members

(Esbensen & Huizinga, 1993). However, prior research has not provided comparisons between individual drugs and current gang involvement status (i.e., presently or formerly in a gang). It is reasonable to speculate that if gang affiliation is associated with increased substance use, then current use would be higher among *current* gang members but may not be higher among *former* gang members. By contrast, the prevalence of ever having used alcohol and other drugs should be elevated among both current and former members compared to youth who were never involved in a gang. This hypothesis is consistent with the finding that gang membership is often transitory (Thornberry, Krohn, Lizotte, & Chard-Weirschem, 1993).

From a public health framework, drug use and gang involvement can also be considered from a theoretical perspective that takes into account migratory patterns of gangs and their risk behavior. One study has shown that injection drug users experience a postmigration adjustment period, when they move from one location to another, thereby leading them to become six times more likely to share their drug injection "works" as compared to drug users who are not experiencing a postmigration period (Paschane & Fisher, 2000). In the context of criminal justice and public health policy, others have held that displacing and dispersing activities through various forms of (community) policing are associated with risk of infectious diseases, such as hepatitis C (HCV) and HIV, which can be transmitted through the sharing of works, that run counter to basic principles and priorities of public health (Dixon & Maher, 2005).

Similar relationships have been examined between the social control of criminal justice and health systems where both disciplines have operated in isolation of one another while drawing from similar theoretical issues (Klein, Miller, Noble, & Speigman, 2004; Liska, Markowitz, Whaley, & Bellair, 1999). And, when examined over time, other studies have shown that the risk in violent crime, such as during the early 1990s, may have been attributable to specific social factors (e.g., drug dealing or gang membership) that grew as individuals became older during this time period but did not explain differences in cohort (Fabio et al., 2006).

The need for considering epidemiological and public health theory and theoretical models will help reveal the levels of gang involvement and types of substance abuse. Epidemiology as a method and public health as a strategy for behavioral and environmental change must first and foremost be distinguished. Epidemiology is the study of health in populations that takes into account group level of analysis (Last, 2001). An essential characteristic of epidemiology as a science is its focus on measuring disease outcomes with respect to populations at risk and their characteristics. The theoretical underpinning of epidemiology focuses on the interconnecting of ideas and their interrelationship and interdependence across social parameters and disease outcomes (Krieger & Zierler, 1996). However, public health provides the science and practices used to protect and improve the health of communities through employing various theories of behavioral and community change, as in the case of the health belief model (Becker, 1974) or social cognitive theory (SCT; for more specific applications, see the AIDS Risk Reduction Model, Lanier & Gates, 1996).

SCT was first presented as a means to explain the dynamic interaction between a person's cognition, or reaction to their social environment, and their subsequent alteration of behavior based on their perceptions related to preventive or risk behaviors (Bandura, 1986). Like other value-expectancy theories, SCT was first presented as a means to explain behaviors related to illness prevention (Rosenstock, 1974). SCT is thus concerned with the triadic reciprocity between these three components: the cognition, the social environment, and the action. Observational learning is key in the SCT framework and classic behavioral constructs such as rewards and punishment are also important. Like other value-expectancy theories, the underlying assumption is "that individuals make decisions regarding their health following a rationally conducted cost/benefit analysis" (Lanier & Gates, 1996, p. 538). Unfortunately, as Lanier and Gates (1996) found, not all individuals at risk for things such as HIV behave in rational ways. In criminology, this would be considered a rational choice theory (Lanier & Henry, 2009).

	Criminology	Public Health
Theory	Differential association	Health belief model
Theorist	Sutherland and Cressey (1966)	Becker (1974)
Human nature	Social blanks, learn behaviors	Free will, cost/benefit, self-serving, goal directed
Explanatory variables	Poverty, minority status, gender neutral	Poverty, minority status, gender neutral
Evaluation	Survey research: correlation, regression, ANOVA	Survey research: power, LISREL, path analysis network
Level of analysis	Macro	Macro
Practice	Restitution, rehabilitation	Empowerment
Policy	Reeducation, isolate bad influences, promote law	Education, promote healthy practices
First responder	Police	Health department, EMT, ER
Funding	National Institute of Justice, Department of Justice	National Institutes of Health, American Public Health Association

Figure 1. Epidemiological criminology: Areas of convergence

From the criminal justice side, various theories have been postulated to link with deviant behavior. For example, binge drinking has been found to be associated with low levels of self-control (Gibson, Schreck, & Miller, 2004). Labeling theory argues that the process of being labeled delinquent leads to further delinquency (Lanier & Henry, 2009). However, the criminological theory most likely to predict illegal drug use is perhaps Edwin Sutherland's differential association theory (Sutherland, 1936). Sutherland's social learning theory essentially argued that criminal behavior is learned and that the "content" of what is learned is important. The "process" of learning occurs with "the intimate informal groups and the collective and situational context" such as is provided by gang membership (Lanier & Henry, 2004, p. 162). In short, gangs provide the ideal milieu for learning and practicing illicit drug use. The priority, frequency, intensity, and duration of exposure to the "teaching" group are also important in how behaviors will be manifested. Thus, the more gang exposure one has, the more likely one is to engage in illegal activities such as drug use.

When drug abuse is examined in the context of the SCT, it is postulated that a person will take the appropriate preventive action if that person perceives risk or consequence resulting from a behavior (as in the case of drug overdose or acquiring HIV/AIDS through the sharing of contaminated needles). The perception of threat or reward resulting from seeing others engage in the activity (as in the case of drug overdose or benefit from engaging in gang activity) can further serve to become either a perceived barrier or benefit that confronts the individual. Through this experience, the individual weighs the benefit of preventive action or perceived barriers to the action. That is, as long as the individual (or gang in this instance) perceives that they are not susceptible to external problems (e.g., arrest, imprisonment, overdose, collateral infection, as in the case of HIV/AIDS), there will exist limited perceived severity as to their consequences; thus, gang activity and group "teaching" and drug abuse will spread like an epidemic.

Figure 1 outlines the relationships between public health and criminological theory that are relevant for this discussion.

Methods

Between May 1997 and January 1998, each African American adolescent male entering a youth detention center (YDC) in a large southeastern city was asked to complete a risk behavior interview. Only minority males were examined since the funding agency was specifically targeting this

population. (This research was supported by the National Institutes of Mental Health Office on AIDS.) See Lo (2004) for a description of gender differences of jail inmates' illicit drug use. All subjects were detained in anticipation of their court appearance and thus were not convicted of a crime at the time of data collection. However, most had also been previously arrested.

Approximately 75 small groups of two to six individuals were recruited, informed about the nature of the study, and interviewed in a classroom setting. Interviewers explained that responses would be kept confidential and would be used only for research purposes. To minimize potential social desirability and literacy effects, the survey instrument was read aloud to the group with each individual respondent completing his own form. All respondents completed informed consent approved by both the institutional review board of the University of Alabama at Birmingham (UAB) and the YDC.

Each participant was asked if he currently belonged to a gang, and, if so, for how many months he had been a gang member. Those denying current gang membership were asked if they had previously belonged to a gang, and, if so, how many months they had been a member.

For alcohol, tobacco, marijuana, crack cocaine, powder cocaine, heroin, speed, LSD, and inhalants, the following questions were asked of each respondent:

- I. Have you ever used this drug in your life? (If so:)
 - A. Have you used this drug in the past year? (If so:)
 - a. Did you use this drug in the 3 days before you were brought to YDC?
 - B. Have you ever tried to stop using this drug, but found that you could not?
 - C. How old were you when you first used this drug?

Each question had a response option of "yes" or "no," or in the case of the last question a blank space to write the age at which they first used the drug.

The group differences in demographic characteristics and drug use were examined using chi-square (for categorical responses) and one-way ANOVA (for continuous responses). Alpha was set at $p < .05$. The Bonferroni adjustment technique (alpha/number of statistical tests performed) was used to control for type I error due to alpha inflation. This was done for each individual question. Hence, the adjusted level of significance is $.05/5 = .01$.

Results

The study sample comprised 283 African American male youth (mean age 16 years) detained for at least 1 day in a YDC in a large southeastern city. The refusal rate was 2.5%, yielding a response rate of 97.5%. The study population had been arrested a median of three times and admitted to a detention center a median of two times. At the time of this study, 90% of the respondents had been in detention for less than 5 days.

Ninety-five (33.6%) of the respondents reported currently belonging to a gang, 30 (10.6%) said they had formerly been in a gang, and 158 (55.8%) said they had never been gang-involved. Mean length of gang membership was 41 months for present members and 46 months for former members ($p = n.s.$). There were three or fewer respondents who indicated that they had used heroin, speed, LSD, or inhalants. Consequently, due to the low number of cases, these data will not be presented.

One-way ANOVA was used to detect differences in mean values of each level of the demographic variables ($\alpha = .05$). No statistically significant differences were found for age, mother's or father's educational level, number of males or females living in the youth's home, number of times arrested, or number of times admitted to a detention center.

For each substance, use tended to be higher among gang members, whether former or current (Table 1). Gang members were more likely to have used alcohol and cocaine in their lives; used

Table 1. Affirmative Response to Ever Having Engaged in the Behavior in Question for Presently, Formerly, or Never Gang-Involved Youth

Gang involvement	Presently		Formerly		Never		χ^2	p
	N	% ^a	n	% ^a	n	% ^a		
Ever done it? (Yes)								
Alcohol	91	95.8	28	93.3	128	83.1	10.1	.007
Tobacco	82	87.2	26	86.7	118	78.1	3.7	.155
Marijuana	91	95.8	27	90.0	128	84.2	7.9	.019
Crack	3	3.2	1	3.3	1	0.6	—	^b
Powder cocaine	18	18.9	8	26.7	13	8.2	10.4	.005
Did you use this drug in the past year? (Yes)								
Alcohol	84	88.4	26	86.7	103	66.9	17.1	.000
Tobacco	77	83.7	26	86.7	105	71.4	6.5	.038
Marijuana	85	89.5	22	75.9	104	69.8	12.8	.002
Crack	3	3.2	0	0.0	1	0.6	—	^b
Powder cocaine	9	9.5	8	26.7	9	5.7	13.3	.001
Did you use this drug in the three days before being admitted to the YDC? (Yes)								
Alcohol	55	57.9	16	53.3	53	34.4	14.2	.001
Tobacco	68	75.6	19	65.5	90	61.2	5.2	.076
Marijuana	64	68.8	12	40.0	69	46.0	14.3	.001
Crack	2	2.1	0	0.0	1	0.6	—	^b
Powder cocaine	5	5.3	2	6.7	4	2.5	1.9	.391
Have you ever tried to stop using this drug but found that you could not? (Yes)								
Alcohol	21	22.1	6	20.0	25	16.2	1.4	.502
Tobacco	37	42.5	11	37.9	46	31.7	2.8	.246
Marijuana	31	33.3	6	20.7	39	26.0	2.4	.304
Crack	1	1.1	1	3.3	0	0.0	—	^b
Powder cocaine	4	4.2	1	3.3	1	0.6	—	^b
At what age did you first try this drug? (Mean age)						F	p	
Alcohol	89	12.1	28	13.0	128	12.5	1.3	.279
Tobacco	80	12.1	25	13.2	118	13.0	3.3	.039
Marijuana	89	12.4	26	13.6	127	13.3	6.2	.002
Crack	3	13.3	0	—	1	17.0	—	^b
Powder cocaine	18	15.2	7	15.9	12	15.5	1.1	.348

^a Percentage of respondents answering yes within each category of the variable "gang involvement."

^b Unreliable estimate of alpha due to small number of subjects in each cell.

alcohol, marijuana, and cocaine in the past year; and used alcohol and marijuana in the 3 days before detention. In general, substance use did not differ significantly on the basis of "former" versus "ever" gang membership, with the exception of marijuana use in the past 3 days—which was higher among current rather than former gang members—and cocaine use, which was generally higher among former gang members. Rates of youth who reported ever having attempted to stop use of a substance varied on the basis of substance, but did not vary as a result of gang membership status. The only substance for which there was a significant difference in the age of initiation of use was marijuana, with present gang-involved youth being significantly younger at first use than both former and never gang-involved youth. Crack use was generally very low across all groups.

The gang involvement variable was collapsed into three dichotomous variables to calculate odds ratios for each cross-tabulation with each dichotomous substance use variable. The first variable reflected "present" and "former" gang involvement (combined) or "never" gang affiliated. The

Table 2. Odds Ratios (OR) and 95% Confidence Intervals (CI) for Gang Involvement by Drug Use

Gang involvement	Presently or formerly vs. never (reference)		Presently vs. formerly and never (reference)		Presently vs. formerly (reference)	
	OR	95% CI	OR	95% CI	OR	95% CI
Ever done it? (Yes)						
Alcohol	2.6	1.2-5.4	2.9	1.2-7.5	-	-
Tobacco	-	-	-	-	-	-
Marijuana	2.1	1.1-4.1	2.9	1.1-7.3	-	-
Crack	1.8	1.2-2.9	-	-	-	-
Powder cocaine	1.6	1.3-2.2	-	-	-	-
Did you use this drug in the past year? (Yes)						
Alcohol	2.3	1.4-3.6	2.4	1.4-4.2	-	-
Tobacco	1.6	1.1-2.4	-	-	-	-
Marijuana	1.9	1.2-2.8	2.5	1.4-4.5	-	-
Crack	-	-	2.3	1.3-4.1	1.3	1.2-1.5
Powder cocaine	1.6	1.1-2.1	-	-	.28	0.1-0.8
Did you use this drug in the three days before being admitted to the YDC? (Yes)						
Alcohol	1.6	1.3-2.1	1.7	1.2-2.4	-	-
Tobacco	1.4	1.0-1.9	1.6	1.0-2.4	-	-
Marijuana	1.4	1.1-1.9	1.9	1.4-2.8	3.3	1.4-7.8
Crack	-	-	-	-	1.3	1.1-1.4
Powder cocaine	-	-	-	-	-	-
Have you ever tried to stop using this drug but found that you could not? (Yes)						
Alcohol	-	-	-	-	-	-
Tobacco	-	-	-	-	-	-
Marijuana	-	-	-	-	-	-
Crack	-	-	-	-	-	-
Powder cocaine	1.9	1.3-2.8	2.0	1.1-3.7	-	-

NOTE: YDC, youth detention center; -, n.s.

second variable reflected "current" gang involvement compared to "never" and "former" gang membership categories combined. The third variable reflected "current" versus "never" belonging to a gang. The results of this analysis are presented in Table 2.

In general, both present and former gang members were significantly more likely to self-report virtually all substance use compared to nongang members. Present gang members generally reported the highest levels of use. Among gang members, former gang members reported more past-year cocaine use, but current gang members reported significantly more current marijuana use.

Discussion

Substance use, both current and lifetime, is higher among gang members than among nongang members in this study. This finding also holds true for lifetime, past year, and recent alcohol and tobacco use. For marijuana, the pattern is slightly different, with former gang members reporting a level of use similar to youth who were never gang-involved. Interestingly, the pattern is exactly opposite for cocaine use, with former gang members reporting the highest levels. Crack cocaine was not examined but others have provided insightful analysis into its effect (Johnson, Golub, & Fagan, 1995). Temporal changes in drug availability (i.e., cocaine being more accessible and hence more prevalent in the era when the formerly gang-involved youth were active in the gang) may explain this phenomenon.

Given the high-risk nature of youth in detention, our findings indicate that gang involvement may be associated with a particular predilection for substance use. The high rate of all youth reporting unsuccessful attempts to discontinue substance use is especially alarming and is consistent with reports of low success rates among adolescents with tobacco cessation (Moolchan, Me, & Henningfield, 2000) and reports of high rates of relapse with regard to drug use (Brown, Tapert, Tate, & Abrantes, 2000; Morehouse & Tobler, 2000; Terry, Vanderwaal, McBride, & VanBuren, 2000). From a criminological perspective, this finding can be explained by differential association theory (originally designed to explain gang type behaviors) since gang involvement, like incarceration, exposes drug abusers to temptation, opportunity, and companionship with other drug abusers.

This premise is strengthened by the findings that the differing pattern of recent cocaine and marijuana use among former versus current gang members may mean that within the gang culture, adolescents may not be able, or allowed, to quit—even if quitting was desirable to them. This explanation is particularly likely if the gang is in the business of marketing drugs and has drugs readily available for sale and use. It is also possible that the prevailing norm is to use drugs openly and socially. If, as some research suggests (Greydanus, Farrell, Sladkin, & Rympe, 1990; Ruble & Turner, 2000), the gang culture is structured and hierarchical, with members' behavior being directed by older, more tenured leaders in the gang, this supposition is especially troubling. Further validation of differential association theory is provided by this finding. The longer, more intensely, and deeply involved one is with gang life, the more likely one is to abuse illicit substances, just as Sutherland (1936) would have predicted. However, the methodology employed does not permit more definitive confirmation of this theory.

Policy implications thus appear clear. If drug use is associated with gang membership and if the duration of gang membership is predictive of increased drug use, then early identification of gang members and potential gang members is necessary. Once involved in gang activity, means of disassociating with the gang must be provided. Current criminal justice law, practice, and policy does the opposite, suggesting a need for public health policy in the criminal justice arena (Burriss et al., 2004; Klein et al., 2004). Current drug laws concentrate drug abusers in close proximity with one another (prisons and jails) and consequently have the opposite of the desired effect (unless of course punishment and deterrence are the desired outcome). Some politicians have recognized this policy issue and passed legislation to address the problem. Most significantly, the authors of California's proposition 36 and California voters supported a dramatic shift in priorities from punishment to treatment (Klein et al., 2004). Proposition 36 mandated that adults convicted of drug possession be offered treatment instead of incarceration. This public health policy was a dramatic shift away from criminal justice law and practice toward a more integrated public health intervention. The intent was described by Klein et al. (2004):

Its passage has been variously described as signaling the end of the decades-old dominance of law enforcement in policy toward drug users, that is, the "war on drugs" (Waters, 2000); as proof that voters want to slow or reverse the steep climb of recent years in government expenditures on imprisonment (Butterfield, 2001; Davenport, 2001); as evidence of the public acceptance of addiction as an illness and support for treatment (Lichtblau, 2001); and as an expression of public willingness to consider as a goal a move toward harm reduction or even the partial legalization of drugs (Wallace, 2000). (p.724)

Further affirmation of a shift toward public health policies for addressing crime and justice issues was provided by Burriss et al. (2004), who convincingly argue that current law and law enforcement strategies magnify rather than reduce drug abuse in America. Current laws regarding sentences for crack cocaine compared to powder cocaine especially harm African American drug users. The movement toward epidemiological criminology is further proof that many criminals may derive *more* benefit from *less* criminal justice intervention.

Conclusion

Our findings indicate a strong predilection for drug-using behavior among African American male gang members and those formerly gang-involved compared with African American males who did not report being gang-involved. Current gang-involved juveniles reported the highest levels of substance use. Leaving a gang seemed to be protective for marijuana use, but not cocaine use. Once again, it should be stressed that policy interventions for primary preventive efforts for very high-risk adolescents may benefit from a focus on getting youth to disassociate with gangs. One successful strategy could be the use of "therapeutic communities" (TC) where "the TC provides holistic treatment that is guided by an emphasis on drug use disorder, the person, recovery, and right living" (Smiley-McDonald & Leukefeld, 2005, p. 574). These TCs are congruent with the precepts of differential association and SCT since primary interactions will be with treatment providers, peers, and staff as opposed to gang members. This strategy premised on the data shown here clearly illustrates the need and desirability of explicit linkages between public health and criminal justice behavioral change processes and strategies to their theoretical and methodological counterparts, as in the case of epidemiological criminology. Thus, the evolution of an epidemiological criminology framework sets the stage for greater theoretical modeling and policy developments into the aberrant phenomenon of substance abuse and gang membership. We further hope that others will begin to explore EpiCrim's application with risk assessment tools, drug treatment programs, and health care interventions. Hopefully, we have provided a conceptual and theoretical basis for such policy and program development.

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References

- Akers, T., & Hervey, W. (2003). Why classification for HIV/AIDS prevention interventions? *Journal of the Association of Nurses in AIDS Care, 14*, 17-20.
- Akers, T., & Lanier, M. (2009). Epidemiological criminology: Coming full circle. *American Journal of Public Health, 99*, 397-402.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Becker, M. (1974). The Health Belief Model and personal behavior. *Health Education Monographs, 2*, 220-243.
- Bjerregaard, B., & Lizotte, A. (1995). Gun ownership and gang membership. *Journal of Criminal Law and Criminology, 86*, 37-58.
- Braithwaite, R. L., Hammett, T., & Mayberry, R. M. (1996). *Prisons and AIDS: A public health challenge*. San Francisco: Jossey-Bass.
- Brown, S., Tapert, S., Tate, S., & Abrantes, A. (2000). The role of alcohol in adolescent relapse and outcome. *Journal of Psychoactive Drugs, 32*, 107-115.

- Burris, S., Blankenship, K., Donoghoe, M., Sherman, S., Vernick, J. S., Case, P., et al. (2004). Addressing the "risk environment" for injection drug users: The mysterious case of the missing cop. *The Milbank Quarterly*, 82, 125-156.
- Butterfield, F. (2001, September 29). New drug-offender program draws unexpected clients. *New York Times*, p. A6.
- Centers for Disease Control and Prevention. (2002). *The development of a national HIV/AIDS prevention intervention taxonomy for program evaluation*, 1-576. Retrieved January 21, 2009, from <http://aspe.hhs.gov/pic/pdf/7707.pdf>
- Coughlin, S. S. (1998). Scientific paradigms in epidemiology and professional values. *Epidemiology*, 9, 578-580.
- Davenport, P. (2001, November 28). Study finds Arizona drug law avoids millions in prison costs. *Associated Press*. Online, accessed January 21, 2009.
- DiClemente, R. J., Lanier, L. M., Horan, P. F., & Lodico, M. (1991). Comparison of AIDS knowledge, attitudes, and behaviors among incarcerated adolescents and a public school sample in San Francisco. *American Journal of Public Health*, 81, 628-630.
- Dixon, D., & Maher, L. (2005). Policing, crime and public health: Lessons for Australia from the "New York miracle." *Journal of Criminology and Criminal Justice*, 5, 115-143.
- Esbensen, F., & Huizinga, D. (1993). Gangs, drugs, and delinquency in a survey of urban youth. *Criminology*, 31, 565-587.
- Esbensen, F., Huizinga, D., & Weiher, A. (1993). Gang and non-gang youth: Differences in explanatory variables. *Journal of Contemporary Criminal Justice*, 9, 94-116.
- Fabio, A., Loeber, R., Balasubramani, G. K., Roth, J., Fu, W., & Farrington, D. P. (2006). Why some generations are more violent than others: Assessment of age, period, and cohort effects. *American Journal of Epidemiology*, 164, 151-160.
- Gibson, C., Schreck, C., & Miller, J. M. (2004). Binge drinking and negative alcohol-related behaviors: A test of self-control theory. *Journal of Criminal Justice*, 32, 411-420.
- Greydanus, D., Farrell, E., Sladkin, K., & Rympa, C. (1990). The gang phenomenon and the American teenager. *Adolescent Medicine: State of the Art Reviews*, 1, 55-70.
- Grobbee, D. E. (2004). Epidemiology in the right direction: The importance of descriptive research. *European Journal of Epidemiology*, 19, 741-744.
- Johnson, B., Golub, A., & Fagan, J. (1995). Careers in crack, drug use, drug distribution, and nondrug criminality. *Crime and Delinquency*, 41, 275-295.
- Klein, D., Miller, R., Noble, A., & Speigman, R. (2004). Incorporating a public health approach in drug law: Lessons from local expansion of treatment capacity and access under California's Proposition 36. *The Milbank Quarterly*, 82, 723-757.
- Krieger, N., Kass, P. H., & Steineck, G. (1993). Epidemiologic theory and societal patterns of disease. *Epidemiology*, 4, 276-278.
- Krieger, N., & Zierler, S. (1996). What explains the public's health? A call for epidemiologic theory. *Epidemiology*, 7, 107-109.
- Lahey, B., Gordon, R., Loeber, R., Stouthamer-Loeber, M., & Farrington, D. (1999). Boys who join gangs: A prospective study of predictors of first gang entry. *Journal of Abnormal Child Psychology*, 27, 261-276.
- Lanier, M. M. (Ed.). (2006). *The impact of HIV/AIDS on criminology and criminal justice*. Burlington, VT: Ashgate.
- Lanier, M. M., & Gates, S. (1996). An empirical assessment of the AIDS Risk Reduction Model (ARRM) employing ordered probit analyses. *Journal of Criminal Justice*, 24, 537-547.
- Lanier, M. M., & Henry, S. (2004). *Essential criminology* (2nd ed.). Boulder, CO: Westview.
- Lanier, M. M., & Henry, S. (2009). *Essential criminology* (3rd ed.). Boulder, CO: Westview.
- Lanier, M. M., & McCarthy, B. (1989). AIDS awareness and the impact of AIDS education in juvenile corrections. *Criminal Justice and Behavior*, 16, 395-411.

- Last, J. M. (Ed.). (2001). *A dictionary of epidemiology* (4th ed.). New York: Oxford University Press.
- Lichtblau, E. (2001, August 21). DEA chief looks at California policy as blueprint for US. *Los Angeles Times*.
- Liska, A. E., Markowitz, F. E., Whaley, R. B., & Bellair, P. (1999). Modeling the relationship between the criminal justice and mental health systems. *American Journal of Sociology, 104*, 1744-1775.
- Lo, C. (2004). Sociodemographic factors, drug abuse and other crimes: How they vary among male and female arrestees. *Journal of Criminal Justice, 32*, 399-409.
- Moolchan, E., Me, M., & Henningfield, J. (2000). A review of tobacco smoking in adolescents: Treatment implications. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 682-93.
- Morehouse, E., & Tobler, N. (2000). Preventing and reducing substance use among institutionalized adolescents. *Adolescence, 35*, 1-28.
- Osgood, D. W. (1998). Interdisciplinary integration: Building criminology by stealing from our friends. *The Criminologist, 23*, 1.
- Paschane, D. M., & Fisher, D. G. (2000). Etiology of limited transmission diseases among drug users: Does recent migration magnify the risk of sharing injection equipment? *Social Science & Medicine, 50*, 1091-1097.
- Rosenstock, I. (1974). The Health Belief Model and preventive health behavior. *Health Education Monographs, 2*, 355-386.
- Ruble, N., & Turner, W. (2000). A systemic analysis of the dynamics and organization of urban street gangs. *American Journal of Family Therapy, 28*, 117-132.
- Savitz, D. A. (1997). The alternative to epidemiologic theory: Whatever works. *Epidemiology, 8*, 210-212.
- Skordis, J., & Green, J. (2006). Virtual issue on HIV/AIDS. *Critical Public Health*, pp. 1-5. Retrieved January 21, 2009, from http://www.criticalpublichealth.net/pdf/CPH_virtual_issue_on_sexual_health.pdf.
- Smiley-McDonald, H. M., & Leukefeld, C. G. (2005). Incarcerated clients' perceptions of therapeutic change in substance abuse treatment: A 4-year case study. *International Journal of Offender Therapy and Comparative Criminology, 49*, 574-589.
- Sutherland, E. (1936). *Criminology* (3rd ed.). Philadelphia: J. B. Lippincott.
- Sutherland, E. H., & Cressey, D. R. (1966). *Principles of criminology*. Philadelphia: J. B. Lippincott.
- Terry, Y., Vanderwaal, C., McBride, D., & VanBuren, H. (2000). Provision of drug treatment services in the juvenile justice system. *Journal of Behavioral Health Services Research, 27*, 194-214.
- Thornberry, T. (1998). Membership in youth gangs and involvement in serious and violent juvenile offending. In R. Loeber & D. Farrington (Eds.), *Serious and violent juvenile offenders: Risk factors and successful interventions* (pp. 147-166). Thousand Oaks, CA: Sage.
- Thornberry, T., Krohn, M., Lizotte, A., & Chard-Weirschem, D. (1993). The role of juvenile gangs in facilitating delinquent behavior. *Journal of Research on Crime and Delinquency, 30*, 55-87.
- Timmermans, S., & Gabe, J. (2002). Introduction: Connecting criminology and sociology of health and illness. *Sociology of Health and Illness, 24*, 501-516.
- Wallace, B. (2000, November 9). Election results show U.S. tiring of war on drugs: Laws against punitive approach win voter approval in five states. *San Francisco Chronicle*, p. A17.
- Waters, M. (2000, August 15). Remarks by Rep. Maxine Waters (D-Calif) to the 2000 Shadow Convention, August 15, Los Angeles. Reprinted in *The Drug Policy Letter* 48, September-October 2000, 14-15. New York: Lindesmith Center/Drug Policy Foundation.