

Laws Prohibiting Over-the-Counter Syringe Sales to Injection Drug Users: Relations to Population Density, HIV Prevalence, and HIV Incidence

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ABSTRACT

Objectives. This study sought to assess relations of laws prohibiting over-the-counter syringe sales (anti-OTC laws) to population prevalence of injection drug users and HIV prevalence or incidence among 96 US metropolitan areas.

Methods. A cross-sectional analysis was used.

Results. Metropolitan areas with anti-OTC laws had a higher mean HIV prevalence (13.8% vs 6.7%) than other metropolitan areas (pseudo- $P < .001$). In 83 metropolitan areas with HIV prevalence of less than 20%, anti-OTC laws were associated with HIV incidence rates of 1% or greater (pseudo- $P < .001$). Population proportions of injection drug users did not vary by presence of anti-OTC laws.

Conclusions. Anti-OTC laws are not associated with lower population proportions of injection drug users. Laws restricting syringe access are associated with HIV transmission and should be repealed. (*Am J Public Health.* 2001;91:791–793)

HIV prevalence and incidence rates among injection drug users (IDUs) vary greatly across localities in the United States.^{1,2} This variability is the result of multiple factors, including how long HIV has been present in the local population, whether IDUs heard about HIV before it entered the population, the underlying frequencies of risk behaviors and “mixing patterns” among IDUs, public health responses, and the extent to which antidrug public policies may encourage high-risk mixing patterns and behaviors. Understanding this variability requires analyses at the level of geographic areas.

One antidrug policy that has been widely implemented in the United States is laws against over-the-counter sale or purchase of syringes without prescriptions (abbreviated hereafter as anti-OTC laws). During the early years of the HIV epidemic, the District of Columbia and 11 states (California, Connecticut, Delaware, Illinois, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, and Rhode Island) had anti-OTC laws. Most of these laws date back to the 1950s (in some states, the range of these laws was broadened after the 1979 federal Model Drug Paraphernalia Act).³ Thus, anti-OTC laws generally antedate HIV infections among IDUs, which did not appear until approximately 1975, even in New York.⁴ In most of these jurisdictions, selling syringes without prescriptions remains illegal (although the laws have been repealed or relaxed in Connecticut, Maine, and New York). It has been argued that anti-OTC laws increase the extent to which IDUs share syringes and perhaps other paraphernalia^{5–9} and thus increase HIV transmission. AIDS rates among IDUs have been shown to be higher in states with anti-OTC laws.¹⁰

These differences allowed us to determine whether anti-OTC laws are associated with re-

duced rates of drug use and with higher rates of HIV prevalence or transmission in metropolitan areas.

Methods

This report is a secondary ecologic analysis of data presented by Holmberg.² We begin by briefly discussing his data.

Data

Holmberg estimated the population sizes and HIV prevalence and incidence rates of metropolitan subpopulations at particular risk for HIV, including IDUs and men who have sex with men (MSM), within each of the 96 largest metropolitan areas in the United States circa 1992. (HIV prevalence estimates for both IDUs and MSM included only those infected individuals who had survived to be counted—a proportion of the ever infected that is likely to vary across metropolitan areas.) Holmberg's data sources included the census, Centers for Disease Control and Prevention, drug treatment centers, HIV counseling and testing sites, sexually transmitted disease clinics, local and state health departments, Ryan White programs, the National Serosurveillance database, and local studies.

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Measurement error is a concern for Holmberg's estimates, particularly his incidence estimates, which depend strongly on estimated prevalence and mortality rates. Holmberg also found it difficult to differentiate incidence rates that were lower than 1% per person-years at risk.

Thirty-six of the metropolitan areas in this database required prescriptions to buy syringes before 1985.³

Statistical Analysis

Because the unit of analysis in this study was the metropolitan area, dependent variables were rates for a given metropolitan area, and statistical analyses used *t* tests to compare means and linear regression to estimate associations among variables. Differences in medians were examined when distributions were skewed. Difficulties estimating incidence rates lower than 1% per person-years at risk led us to treat this variable as a dichotomy ($\geq 1\%$ vs $< 1\%$); analyses thus used cross-tabulation and logistic regression. HIV incidence was modeled for only the 83 metropolitan areas with HIV prevalence rates lower than 20%.

Control variables included the following:

- *Distance from New York City.* Because New York City has been the epicenter for the HIV/intravenous drug use epidemic in the United States,¹¹⁻¹⁴ distance from New York City was controlled in multivariate analyses of HIV prevalence and incidence.

- *HIV prevalence among MSM.* The US HIV/AIDS epidemic has been concentrated among IDUs and MSM. Considerable HIV transmission from MSM to IDUs may have occurred through either high-risk injection or sexual transmission in some cities.^{15,16} We used Holmberg's estimates for HIV prevalence among MSM as a control variable in modeling HIV prevalence and incidence among IDUs.

- *Sample and its implications for statistical analyses.* This study focused on the 96 largest metropolitan areas in the United States. Thus, it was a study of a population rather than of a sample. This means that there was no sampling error (although there was measurement error). The applicability of statistical inference is debatable. Some researchers conducting studies with similar populations use *P* values as a heuristic device to avoid overinterpreting model parameters.¹⁷⁻²² (We refer to these as *pseudo-P*'s.) Other analysts would consider the population to be a random sample of "possible universes"; under this interpretation, *pseudo-P*'s have a probabilistic interpretation.

TABLE 1—Characteristics of US Metropolitan Areas With Laws Against Over-the-Counter Sale or Purchase of Syringes Without Prescriptions (Anti-OTC Laws) Compared With Metropolitan Areas That Lack Such Laws

	Anti-OTC Metropolitan Areas (n=36)	Other Metropolitan Areas (n=60)	Pseudo- <i>P</i>
Population density of IDUs, %			
Mean	0.94	0.82	.188 ^a
SD	0.43	0.43	
Median	0.89	0.71	.094 ^b
HIV prevalence among IDUs			
Mean	13.83	6.71	.001 ^a
SD	10.84	6.51	
Median	12.25	4.75	.001 ^b
HIV incidence among IDUs ^c	61%	17%	.001 ^d
HIV prevalence among MSM			
Mean	14.64	13.96	.652 ^a
SD	8.09	6.56	
Median	14.05	12.15	.739 ^b
Distance from New York City, miles			
Mean	928	1120	.373 ^a
SD	1129	780	
Median	195	979	.009 ^b

Note. IDU = injection drug user; MSM = men who have sex with men.

^aPseudo-*P* by *t* test.

^bPseudo-*P* by Mann-Whitney test.

^cPseudo-*P* by χ^2 .

TABLE 2—HIV Prevalence Among Injection Drug Users in 96 Large Metropolitan Areas, as a Linear Function of Presence of Laws Against Over-the-Counter Sales of Syringes (Anti-OTC Laws), Distance From New York City, and HIV Prevalence Among Men Who Have Sex With Men (MSM)

	Regression coefficient	<i>t</i>	Pseudo- <i>P</i> of <i>t</i>
Intercept	5.49	3.21	.002
Metropolitan area subject to anti-OTC law	5.83	4.02	.001
Distance from New York City	-.005	-6.27	.001
HIV prevalence among MSM	0.49	4.76	.001

Note. $R^2 = 0.446$; adjusted $R^2 = 0.428$.

Results

Table 1 compares metropolitan areas with and without anti-OTC laws in terms of their population densities of IDUs, HIV prevalence and incidence rates among IDUs, HIV prevalence among MSM, and distance from New York City. IDUs accounted for more (0.94%) of the population in the 36 metropolitan areas in states with anti-OTC laws than in the 60 metropolitan areas without anti-OTC laws (0.82%; pseudo-*P* = .188).

Mean HIV prevalence was 13.8% in metropolitan areas with anti-OTC laws and 6.7% in other metropolitan areas (pseudo-*P* < .001). Median HIV prevalence was also greater in cities with anti-OTC laws than in cities without them. In linear regression controlling for distance from New York City and HIV prevalence among MSM (see Table 2), seroprevalence among IDUs was greater by

5.8% in metropolitan areas with anti-OTC laws (pseudo-*P* < .001).

In the 83 metropolitan areas with low HIV prevalence, incidence rates were more likely to be 1% or greater in metropolitan areas with anti-OTC laws (50% vs 12%; odds ratio = 7.14; pseudo-*P* < .001). Although analyses that used logistic regression to control for distance from New York City and HIV prevalence among MSM were complicated by small numbers of cases in some cells, the size of the odds ratio was increased, if anything, by these controls (and the lower bound of its pseudo-confidence interval remained above 1, and its pseudo-*P* remained less than .01).

Discussion

Because the metropolitan areas in this study were not randomly assigned to legal or

illegal OTC sales status, other causes for the results of this study (such as possible geographic confounding of network patterns, shooting gallery use, or cohort effects in a time-dependent epidemic with OTC laws) cannot be excluded. Furthermore, conditions other than anti-OTC laws might reduce the use of sterile syringes in localities that permit syringe sales without prescriptions, including pharmacists who refuse to sell syringes to persons who they think may be drug injectors,^{23,24} laws that ban possession of syringes for the purpose of injecting drugs,^{8,9,25,26} and lack of knowledge about HIV/AIDS among IDUs (which may help explain why HIV spread widely in Spain and Italy early in the epidemic). Similarly, in some jurisdictions with anti-OTC laws, drug injectors report having purchased syringes in stores or pharmacies. (This was true for 9% of the IDUs in New York in 1990—before nearby Connecticut changed its law; data available from senior author). Thus, dichotomizing localities by whether OTC sales are legal may underestimate the extent to which restrictions on the availability of sterile syringes may have contributed to the spread of HIV.

Conclusions

The data in this report offer no support for the idea that anti-OTC laws prevent illicit drug injection. However, the data do show associations between anti-OTC laws and HIV prevalence and incidence. In an ongoing epidemic of a fatal infectious disease, prudent public health policy suggests removing prescription requirements rather than awaiting definitive proof of causation. Such action has been taken by Connecticut, by Maine, and, recently, by New York. After Connecticut legalized OTC sales of syringes and the personal possession of syringes, syringe sharing by drug injectors decreased.⁶ Moreover, no evidence showed increases in drug use, drug-related arrests, or needlestick injuries to police officers.

Furthermore, it seems reasonable to suspect that laws restricting the possession of syringes (with or without drug residues in them) also may increase syringe sharing.^{26,27}

Anti-OTC laws are not associated with lower population proportions of IDUs. Laws restricting syringe access are statistically associated with HIV transmission and should be repealed. □

Contributors

S.R. Friedman planned the study, oversaw the analyses, and took the primary role in writing the paper. T. Perlis conducted the analyses and assisted with plan-

ning the project and writing the paper. D.C. Des Jarlais assisted with planning the project and writing the paper.

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