Trends in Crime and the Introduction of a Needle Exchange Program

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Objective. This study sought to determine whether introduction of a needle exchange program would be associated with increased crime rates.

Methods. Trends in arrests were compared in program and nonprogram areas before and after introduction of a needle exchange program in Baltimore. Trends were modeled and compared via Poisson regression.

Results. No significant differences in arrest trends emerged. Over the study period, increases in category-specific arrests in program and nonprogram areas, respectively, were as follows: drug possession, 17.7% and 13.4%; economically motivated offenses, 0.0% and 20.7%; resistance to police authority, 0.0% and 5.3%; and violent offenses, 7.2% and 8.0%.

Conclusions. The lack of association of overall and type-specific arrest data with program implementation argues against the role of needle exchange programs in increasing crime rates. (Am J Public Health. 2000;90:1933–1936)
ations of arrests and up to 5 criminal charges were abstracted.

On the basis of input from law enforcement, crime, and drug abuse experts, as well as hypothesized associations of charges with needle exchange programs, arrest charges were categorized as follows: (1) drug possession, (2) economically motivated offenses, (3) resistance to police authority, or (4) violent offenses. Drug possession offenses included possession of drug paraphernalia and distribution/possession of heroin or cocaine. Economically motivated offenses consisted of property theft (e.g., nonvehicular breaking and entering, burglaries, vehicle break-in/theft) and prostitution, considered means of financing drug use. Resistance to police authority was defined as assaulting a police officer, resisting arrest, or violating parole/probation; these offenses were seen as indicators of increased frustration possibly resulting from law enforcement practices. Violent offenses included homicide, assault, rape, and armed robbery, which were considered potentially linked to drug trafficking.

We defined the area of maximum program impact with data from an ongoing evaluation of the program. We determined that 76% of participants reported walking to the program site and that travel time for these individuals averaged 15 minutes or less (median: 10 minutes). At an estimated speed of 2.0 mi per hour (3.2 km per hour), 84% of participants were estimated to live within a 0.5-mi radius of the program site. Therefore, areas within a 0.5-mi radius of the 2 program sites were combined and designated as “program areas,” while areas within the city limits but outside of these radii were deemed “nonprogram areas.”

Data Analysis

To examine the impact of the introduction of the needle exchange program on arrest trends in Baltimore City, we assessed the number of category-specific arrests before and after program introduction. Mean numbers of monthly category-specific and overall arrests for program and nonprogram areas were calculated (1) over the 6-month period before program introduction and (2) over the 14-month period after program introduction. Percentage changes in mean numbers of arrests were then calculated.

To formally assess trends in monthly arrests by proximity to the program site, we used Poisson regression models that considered overall and category-specific arrests. A regression line was fitted to log \( E(Y) \), the log of the expected number of monthly arrests at month \( t \), which allowed for different slopes and intercepts in program and nonprogram areas before initiation of the needle exchange program. At initiation, intercepts and slopes were allowed to change in both areas. The hypotheses tested were that changes in intercepts and slopes would not significantly differ in program and nonprogram areas before and after initiation of the needle exchange program and that changes in arrest trends in program areas would be similar to changes in nonprogram areas. We tested hypotheses using a likelihood ratio test with 2 degrees of freedom, accounting for overdispersion.\(^{15}\)

Results

Overall, there were 53,848 drug-related arrests in Baltimore City during the study period. Before introduction of the needle exchange program, there were 2,500 drug-related arrests per month. After introduction of the program, there was a slight increase in the number of drug-related arrests to 2,775 per month.

Wide fluctuations seen in monthly averages of drug possession arrests citywide were evidenced by high extradispersion values (cocaine: 5.3; heroin: 9.8) in the Poisson model. Overall, the mean number of monthly arrests for drug possession rose slightly in program areas, from 150 (range: 100–190) to 175 (range: 110–270). Average numbers increased gradually in nonprogram areas, from 1020 (range: 825–1240) to 1160 (range: 925–1370) per month.

Frequency of arrests for economically motivated offenses remained constant in needle exchange program areas, averaging 30 per month before and after introduction of the program (ranges: 25–40 and 15–40, respectively). Arrests for economically motivated offenses increased in nonprogram areas from 240 (range: 180–260) to 300 (range: 230–70) per month over the same period.

Similarly, numbers of individuals resisting arrest remained consistently low in program areas, averaging 30 per month before and after program introduction (ranges: 25–40 and 25–45, respectively). However, in nonprogram areas, the average number of individuals resisting arrest increased slightly from 300 per month (range: 270–350) to 325 per month (range: 285–370) during the same period.

Average numbers of arrests for violent offenses dropped in program areas from 90 (range: 70–100) to 80 (range: 70–100) per month after introduction of the program. Increases in arrests for violence were seen over the same period in nonprogram areas; the number of such arrests increased from 820 (range: 670–920) to 890 (range: 710–1100) per month.

Table 1 summarizes percentage changes in overall arrests and category-specific arrests in program and nonprogram areas in the period after introduction of the needle exchange program relative to the preprogram period. The unadjusted percentage change in overall arrests was higher in program (11.4%) than in nonprogram (7.6%) areas. However, there were no significant differences in arrest trends by category after program introduction relative to before program introduction in program vs nonprogram areas \((P > .05)\).

Discussion

We found that increases in drug-related arrests were not more pronounced in needle exchange program areas than in other areas of Baltimore after establishment of the program. Although there were some differences in category-specific arrest trends in areas of close proximity to the program relative to outlying areas, these differences were not statistically significant.

If the needle exchange program had directly influenced rates of drug use, a disproportionate increase in drug possession arrests would have been expected in program areas relative to nonprogram areas. Although increases in heroin and cocaine arrests after the program had been established were slightly more pronounced in program than in nonprogram areas, trends were not significantly different. Variability in heroin and cocaine arrests reflected in the high model extradispersion values might be explained in part by “police sweeps,” which are common and variable in Baltimore, especially in drug trafficking areas. Anecdotal reports indicate that police sweeps were occurring early after program introduction, and we hypothesize that these sweeps may have contributed to the increased number of drug possession arrests observed in program areas at that time.

If the program had indirectly resulted in increased drug use rates, we would expect to see drug users committing, and being arrested for, a relatively higher number of economically motivated crimes in program areas than in nonprogram areas. Our data did not support this hypothesis. In fact, a decrease was observed in numbers of arrests for break-ins and burglaries in program areas after the opening of the needle exchange program, whereas a slight increase was observed in nonprogram areas.

If the needle exchange program had increased drug users’ perceptions of lawlessness in areas of close proximity to the program, an increase in instances of resisting arrest might have occurred. However, numbers of arrests for assault on a police officer decreased in program areas while increasing slightly in nonprogram areas. The opposite was true for numbers of arrests for parole or probation violation, which increased slightly in program areas and decreased in nonprogram areas. None of these differences were statistically significant.

If introduction of the needle exchange program had resulted in a perception of anar-
TABLE 1—Changes in Numbers of Arrests Before and After Introduction of the Needle Exchange Program (NEP): NEP and Non-NEP Areas, Baltimore, Md, 1994–1995

<table>
<thead>
<tr>
<th></th>
<th>NEP</th>
<th>Non-NEP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean No. of Arrests, Time 1</td>
<td>Mean No. of Arrests, Time 2</td>
</tr>
<tr>
<td>Overall</td>
<td>278.3</td>
<td>299.4</td>
</tr>
<tr>
<td>Drug possession</td>
<td>147.2</td>
<td>173.3</td>
</tr>
<tr>
<td>Cocaine</td>
<td>101.5</td>
<td>117.8</td>
</tr>
<tr>
<td>Heroin</td>
<td>59.8</td>
<td>80.2</td>
</tr>
<tr>
<td>Paraphernalia</td>
<td>17.5</td>
<td>17.4</td>
</tr>
<tr>
<td>Economically motivated</td>
<td>32.5</td>
<td>32.4</td>
</tr>
<tr>
<td>Break-ins and burglaries</td>
<td>27.0</td>
<td>24.1</td>
</tr>
<tr>
<td>Theft from vehicles</td>
<td>1.8</td>
<td>3.0</td>
</tr>
<tr>
<td>Prostitution</td>
<td>3.8</td>
<td>5.5</td>
</tr>
<tr>
<td>Resistance</td>
<td>32.8</td>
<td>33.2</td>
</tr>
<tr>
<td>Assaulting officer</td>
<td>11.3</td>
<td>9.6</td>
</tr>
<tr>
<td>Resisting arrest</td>
<td>16.3</td>
<td>17.6</td>
</tr>
<tr>
<td>Probation/parole violation</td>
<td>10.7</td>
<td>11.6</td>
</tr>
<tr>
<td>Violence</td>
<td>89.0</td>
<td>82.6</td>
</tr>
<tr>
<td>Rape</td>
<td>3.8</td>
<td>4.6</td>
</tr>
<tr>
<td>Murder</td>
<td>5.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Assault</td>
<td>79.0</td>
<td>76.0</td>
</tr>
<tr>
<td>Robbery</td>
<td>16.7</td>
<td>19.1</td>
</tr>
</tbody>
</table>

Note. Time 1 = 6-month period before NEP implementation; Time 2 = 14-month period after NEP implementation. Arrest categories and types are not mutually exclusive and thus will not sum to overall drug-related arrests.

*Based on likelihood ratio test derived from Poisson regression model.

In conclusion, based on results of analyses of Baltimore City arrests, needle exchange programs do not appear to be associated with increases in crime rates. This suggests that such concerns should not be a basis for formulating policy regarding these programs.

Contributors
M. A. Marx and B. Crape participated equally in the writing of the article. M. A. Marx assisted with study design, directed study progress and planning, served as a liaison with the city health department, and wrote the manuscript and revisions. B. Crape assisted in study planning and design, served as a liaison with the city police department, compiled and analyzed the data, and contributed to the writing of the manuscript.

R. S. Brookmeyer directed and supervised data analysis and contributed to the writing of the methods section of the manuscript. D. Junge conceived and planned the study and performed the preliminary data analyses. C. Latkin directed study progress and reviewed the final manuscript. D. Vlahov oversaw study progress and contributed to major sections of the manuscript. S. A. Strathdee assisted in interpretation of the statistical analysis and contributed to the writing, editing, and revision of the final manuscript.

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