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Multiple Service System Involvement and Later Offending Behavior: Implications for Prevention and Early Intervention

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Abstract

Objectives—We investigated patterns of childhood and adolescent experiences that correspond to later justice system entry, including persistence into adulthood, and explored whether timing of potential supports to the child or onset of family poverty, according to developmental periods and gender, would distinguish among latent classes.

Methods—We constructed a database containing records for 8587 youths from a Midwestern metropolitan region, born between 1982 and 1991, with outcomes. We used data from multiple publicly funded systems (child welfare, income maintenance, juvenile and criminal justice, mental health, Medicaid, vital statistics). We applied a latent class analysis and interpreted a 7-class model.

Results—Classes with higher rates of offending persisting into adulthood were characterized by involvement with multiple publicly funded systems in childhood and adolescence, with the exception of 1 less-urban, predominantly female class that had similarly high system involvement coupled with lower rates of offending.

Conclusions—Poverty and maltreatment appear to play a critical role in offending trajectories. Identifying risk factors that cluster together may help program and intervention staff best target those most in need of more intensive intervention.

Crime has devastating effects on individuals, families, and communities. Prevention and early intervention have the potential to save millions of dollars in justice system and victim costs.¹ A vast literature has documented offense trajectories and risk and protective factors, but most of this research has focused on individual or peer characteristics in relation to types and persistence of offending.^{2,3} Scant research has viewed offender typology and offense trajectory from the perspective of public service systems encountered. Not only do these

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Contributors

C. L. Bright led the writing and conducted the final data analyses. M. Jonson-Reid contributed to writing, conceptualized the study, conducted preliminary data analyses, and supervised data management.

Human Participant Protection

The study received approval from the Washington University institutional review board as well as agency review committees or the appropriate agency administrative officer in the involved agencies.

data contain markers of risk, but they may also help identify promising systems to use as platforms for purposes of prevention and early intervention. Furthermore, it is important to understand whether key clusters of system involvement, along with individual and community factors, might inform models of collaboration to improve outcomes.

Although the connection between child welfare involvement and entry into juvenile and criminal justice systems has been well documented,^{4,5} evidence that offending risk accumulates with involvement in multiple systems is relatively limited. Children with child welfare system contact are likely to be poor and to experience other risk factors for criminal behavior. For example, children who were involved with both income maintenance and child welfare systems were about twice as likely to have delinquency petitions as other youths,⁶ and a sample of youths with income maintenance and child welfare histories had an average of 3 delinquency petitions per child.⁷

The relation between timing of service involvement and offending behavior has been largely unstudied. Adolescent and persistent child maltreatment have been found to be predictive of delinquency, as compared to maltreatment limited to early childhood.⁸ Repeated maltreatment reports have been associated with an increased likelihood of a range of adult outcomes such as perpetration of maltreatment and mental health service use, even controlling for delinquency and mental health treatment during adolescence.⁹ It is unknown, however, whether the timing of a child's or family's involvement with income maintenance or publicly funded mental health is related to later offending. Although contact with a system such as mental health occurs in recognition of a need, contact is not synonymous with adequate or timely service.¹⁰ For example, 1 study found that mental health and substance use services appeared to magnify the risk of juvenile justice entry for youths with child welfare system involvement,¹¹ when in reality youths contacting those systems may receive little or low-quality care.

INDIVIDUAL, FAMILY, AND COMMUNITY

Service contact exists within the context of individual, family, and community characteristics. Both gender and racial differences have been found in the association between risk factors and offending behavior. Among girls, trauma, family conflict, and mental health concerns are related to juvenile or adult arrests.¹²⁻¹⁴ Among boys, community- and peer-related antecedents may be more important.¹⁵⁻¹⁸ In a sample of African American boys, those with a history of maltreatment and mental health treatment records were more likely than boys with a maltreatment history alone to have a delinquency petition.¹⁹ Family characteristics, such as low parental education or parent mental health symptoms, have been associated with adolescent offending.^{20,21} Children who live in poor communities have also been found to have higher rates of delinquency²² as well as other risk factors for delinquency, such as maltreatment.^{23,24} It is unclear how these factors may operate together with system context to influence offense trajectories.

A better understanding of the connection between childhood and adolescent system involvement and offending behavior requires a comprehensive analysis of the clustering and timing of risk factors, as well as incorporation of data across multiple systems. To help fill

this gap, we used latent class analysis to examine an integrated dataset compiled from several administrative sources. The primary aim was to investigate patterns of childhood and adolescent experiences that correspond to later justice system entry, including persistence into adulthood. A secondary aim was to explore whether timing of potential supports to the child or onset of family poverty, according to developmental periods and gender, would distinguish among latent classes.

METHODS

The data were drawn from a larger longitudinal study that followed children aged birth to 11 years when first reported for maltreatment or when living in families receiving income maintenance as of 1993 or 1994 through 2009.²⁵ We created the sample by selecting every child with a first report of maltreatment in 1993 to 1994 (maltreatment), then matching that sample to income maintenance receipt during the same time period (maltreatment and poverty), and finally randomly selecting a comparison group from among youths in families receiving income maintenance but without a report of maltreatment (poverty only). In cases in which multiple children resided in the family, we randomly selected 1 child per family to be followed. In the maltreatment or maltreatment and poverty group, the selected child had to be named in the maltreatment report. Youths were retained in the sample regardless of whether maltreatment was substantiated, unless they entered out-of-home care immediately on first maltreatment report and never exited. Individuals identified as Latino in the original sample (approximately 0.2%) were excluded. All resided in a Midwestern metropolitan region (n = 12 409).

For the purpose of this study, we limited the sample to those aged 17 years or older mid-year 2009 to ensure we had lifetime records of child and adolescent service use and outcomes. Individuals were aged 17 to 27 years at the end of the follow-up period. We excluded from analysis those who started in the poverty-only group (n = 1231) but had later reports of maltreatment as a conservative indication of the longitudinal effect of poverty as distinct from maltreatment. Individuals with child welfare involvement had initial reports of maltreatment before age 12 years and before any juvenile court record. The final sample size for the current study was 8587. Data sources included vital statistics (birth and death records), child welfare (maltreatment reports), income maintenance (receipt of Aid to Families with Dependent Children and Temporary Assistance to Needy Families), and Department of Mental Health, Medicaid, and emergency department records (mental health- and health-related indicators). Data on alleged juvenile and adult offenses were collected through the juvenile court, highway patrol, state Department of Youth Services, and adult corrections. Data were linked by either a state-level common identifier or, when not available, by a combination of identifying information at the individual level. Addresses at the time of entry to the study were geocoded and linked to 1990 Census data. All identifying information was removed after linkage. It was not possible to assess the level of missing data for variables that were obtained by matching to other data systems because data on the true participation levels do not exist.

Variables

To conduct the analysis described below, we dummy-coded variables into binary categories.

Individual and caregiver demographic variables—We took race and gender, caregiver age at the individual's birth, caregiver high school graduation status, and city or county residence (a marker of urban vs suburban community as well as a control for potential variation in city and county system responses) from the child maltreatment and income maintenance records. All individuals were classified as African American or White, consistent with the demographics in the region at the time of sampling. Individuals of other racial and ethnic groups made up too small a portion of the study sample to be included in the analyses.

Indicators of individual and community risk—From birth and health records, we created a variable to indicate any health problem (heart condition, low birth weight, etc.) present at the time of the individual's birth or documented within the first 12 months of life. Neighborhood poverty was dummy-coded such that categories included individuals living in census tracts with a 40% or higher rate of child poverty or a below-40% rate of child poverty.

Service system indicators—Maltreatment reports from the child welfare agency documented whether an individual was ever alleged to have experienced neglect, sexual abuse, or physical abuse (the few cases referred solely for emotional abuse were excluded from the original study). We included an indicator of ongoing maltreatment, operationalized as 3 or more maltreatment reports during the individual's childhood. Mental health services provided through the state Department of Mental Health or paid through Medicaid were documented for the primary caregiver and for the individual before age 5 years (pre-elementary), ages 5 to 11 years (elementary), or age 12 years and older (postelementary). We coded income maintenance in the child's family to indicate whether Aid to Families with Dependent Children or Temporary Assistance to Needy Families support was received before the individual entered elementary school or during elementary years. We used emergency department records to develop a proxy for violence exposure, including treatment resulting from an act of violence, such as a rape, assault, or gunshot wound. We included treatment for sexually transmitted infection in any of the identified health records as an indicator of sexual risk behavior.

Nonviolent delinquent offenses included petitions filed for offenses that would also be crimes for adults (e.g., sales of drugs, theft) for which the juvenile justice system had jurisdiction. Nonviolent offenses were also found in highway patrol arrest records for older juveniles. Status offense petitions for youths captured behavior such as running away or truancy that would not be crimes for adults. Violent offenses before age 18 years, including murder, manslaughter, or homicide; rape; sexual assault; or robbery, appeared in both the juvenile justice system and, in cases of transfer to the criminal justice system, in records from the highway patrol or corrections. Adult arrest indicated any arrest occurring after the individual's 18th birthday.

Data Analysis

Data management and descriptive analyses were completed in SAS version 9.3 (SAS Institute, Cary, NC). We used latent class analysis with MPlus software version 6.11 (Muthén and Muthén, Los Angeles, CA) to create classes using the TYPE = MIXTURE command, which applies robust maximum likelihood estimation.²⁶ Latent class analysis allows for representation of a latent variable—group membership—in which homogeneous clusters of individuals are created from a heterogeneous sample.^{26,27} Latent class analysis calculates latent class probabilities, which describe the number of classes and the proportion of the sample within each class.²⁸

To determine the number of classes most appropriate for the data, we added 1 class at a time to the model. We compared the Akaike information criterion, Bayesian information criterion, sample-size adjusted Bayesian information criterion, and entropy values in each potential model to determine the relative fit of each.²⁹ Beyond empirical criteria, each class needed to be conceptually distinct from all others in terms of item probabilities for a model to be selected as the best solution. The addition of each class demonstrated improved model fit on every metric, with the exception of entropy, until a 10-class model that did not converge. Table 1 contains fit statistics for the first 9 models tested.

RESULTS

Table 2 contains descriptive information on the sample, which was predominantly African American and urban. Most individuals lived in families receiving Aid to Families with Dependent Children or Temporary Assistance to Needy Families before age 5 years, between ages 5 and 11 years, or both. The most common maltreatment allegation was neglect, and more than one quarter of the sample experienced at least 3 maltreatment petitions. Delinquency petitions were filed for 29% of the sample, and 11.5% were arrested in adulthood.

We selected a latent class analysis model containing 7 classes on the basis of interpretability.²⁷ Each class was distinguishable from the others on the basis of the prevalence of the 23 indicators entered into the analysis. Classes reflected urbanicity, juvenile and adult offending, and exposure to public systems. We calculated latent class probabilities to estimate the proportion of the sample within each class.²⁸ Latent class probabilities ranged from .25 for class 1 to .07 for class 7. Conditional probabilities provided an average estimate of the probability that a particular individual appeared in a latent class, indicating how sensitive and specific the analysis was with respect to individuals.²⁸ Probabilities of correct classification were between 85.0% (class 2) and 98.1% (class 1).

Class 1 was the largest, with 2132 members, and was termed the city poverty low-offender group. Members of this class had almost no juvenile offending history and a relatively low adult arrest rate. Class members were nearly all African American and most likely to live in neighborhoods with a high level of childhood poverty. They were among the least likely to experience maltreatment allegations or mental health services for the caregiver or child. Members had low rates of treatment of violent injury.

Class 2 had 1838 members. The county poverty low-offender class was more racially mixed than most others. This group had high rates of family income maintenance history but very low rates of maltreatment; no member had 3 or more maltreatment reports. This class had low rates of juvenile and adult offending. Members of this class were most likely to have a caregiver with a high school diploma and had the second lowest rates of mental health services, known sexually transmitted infection, and violence.

Class 3, the county maltreatment low-offender class, consisted of 1314 members with relatively low levels of youthful petitions and adult arrests and no violent offenses. This group was 85% Caucasian; resided predominantly in suburban, lower poverty areas; and was least likely to have income maintenance use, to have been born to adolescent mothers or to have caregivers with histories of mental health treatment. Although a relatively high proportion had some history of maltreatment, few in this class experienced multiple reports. This group had the lowest incidence of treatment of sexually transmitted infections and injury resulting from violence and also had relatively low rates of mental health treatment.

Class 4 had 1299 members and was labeled the mixed-residence multirisk low-offender class. This class was similar in racial composition to class 2 and had the highest proportion of females, health problems during infancy, and mental health service history during and before elementary school. The majority of this class lived in families relying on income maintenance before elementary school; about half also lived in high child-poverty areas. This class had the highest incidence of reported sexual abuse and the second highest rate of physical abuse, with nearly all experiencing 3 or more maltreatment reports. Despite these early challenges, this group had a low rate of juvenile offending, with only slightly higher adult arrest rates than class 1 and no allegations of violent offenses.

Class 5, the city high-poverty persistent offender group, had 773 members and the second highest proportion of males. Members were primarily African American, all experienced delinquent offense petitions, and they had relatively high rates of status petitions, violent offenses, and adult arrests. This class was least likely to have a sexual abuse allegation or multiple reports of maltreatment. This group had relatively high rates of treatment of sexually transmitted infections and being born to an adolescent parent, and it had the second highest rate of emergency department treatment of violence.

Class 6, with 666 members, was termed the county multiproblem persistent offender class. All members of this group had delinquent petitions, and this class had the highest proportion of violent offenses; along with class 1, this class had the greatest incidence of adult arrests. This class consisted primarily of male county residents and was the most heterogeneous in race. Class 6 had a relatively high proportion of members with neglect reports, and a moderate proportion with multiple maltreatment reports. Although nearly half had records of income maintenance, no members of this class resided in neighborhoods with child poverty rates higher than 40%. This class had the second highest rate of mental health services during adolescence.

Class 7 was termed the city multiproblem persistent offender group. The 565 members of this class were the most likely to be born to an adolescent mother, had the lowest rate of

caregiver completion of high school, and had the highest incidence of caregiver mental health care use. Members of this class experienced high rates of elementary-age income maintenance and mental health services and had the highest rate of mental health service during adolescence. Multiple reports of maltreatment were the norm, and this class had the highest rates of physical abuse and neglect. This class had the highest rates of treatment of injury resulting from violence and sexually transmitted infections (twice that of class 6). This group had the highest rates of status petitions, each member had a delinquency petition, and the group as a whole had a high incidence of adult arrest (24%). See Table 3 for item probabilities within each class.

DISCUSSION

We investigated patterns of risk factors, service use, and later justice system involvement. Extending some existing literature,^{6,7,9,11,19} multiple system involvement in childhood was generally indicative of justice system involvement in adolescence, adulthood, or both, but not always. In most cases, the clusters of problem behaviors and resulting justice system involvement lent support to the import of cumulative risk rather than a single, more powerful factor predicting violent or long-term offending.³⁰ Those classes with higher rates of offending persisting into adulthood appeared to have high multisystem involvement in adolescence (e.g., violent injury, sexually transmitted disease, and mental health treatment).

The exception was class 4, the mixed-residence class, which had rates of most risk factors similar to those of the city persistent offender groups but low rates of offending. This resilient class had a higher proportion of females and number of county residents than the multiproblem city groups. This class was also much less likely to reside in very high-poverty neighborhoods. It could be that this group experienced unmeasured protective factors, such as school attachment, posited to facilitate greater success among individuals facing multiple risks than among their counterparts who experience the risk factors we have described.³¹ Although it was not possible to measure such factors directly, county and lower poverty areas generally have higher performing schools and more community resources for youths. Moreover, high-poverty areas expose youths to greater opportunities for criminal behavior.²² The classes with more female members, including the mixed-residence class, had the lowest offending rates; this is consistent with national statistics on gender and arrest.³²

As mentioned, clustering of problem behaviors and multiple risks including maltreatment were the norm for 1 county and 1 city class of persistent offenders (classes 6 and 7). Class 5, the city high-poverty persistent offender class, seemed to display concentrated poverty as a key feature and may represent a group of individuals best described by classical delinquency theories involving peers and community disorganization.³³ Although attention has been paid to the need for more trauma-informed intervention in public systems,³⁴ assuming that all juvenile offenders would benefit from this may be a mistake. It is possible that for the youths in class 5, universal prevention programs might be more powerful.

There was some indication that timing of services combined with other characteristics mattered. For example, there appeared to be some association between elementary-age

youths with mental health symptoms and persistent childhood poverty, as well as with maltreatment preceding higher offense rates than poverty alone. Likewise, the lowest rate of caretaker education, highest rates of having an adolescent mother, and highest rates of ongoing income maintenance were common across the persistent offender categories. Identifying risk factors that cluster together may help program and intervention staff best target those most in need of more intensive intervention. It may also help highlight potential areas for prevention at the caregiver level. Family poverty repeatedly experienced during the adolescent period has been found to be strongly associated with negative behavioral and health outcomes.^{35,36} It follows that intervening in caregiver education to prevent ongoing poverty might have beneficial effects.

Strengths and Limitations

This study allowed for the investigation of novel questions regarding service system involvement, offending behavior, timing of certain system contacts, and gender. A comprehensive dataset provided a wealth of information on these system contacts. Because agency data by definition capture only those individuals known to these systems, it does not represent any phenomenon in its entirety. Maltreatment may be unreported, mental health symptoms may go untreated, and offenses may not result in arrests. It is unknown to what degree our findings may generalize to individuals experiencing similar problems without associated system involvement. The measurement of system contact in terms of child developmental stage, rather than in years, did not allow for the consideration of changes that might have occurred within the systems themselves during particular time periods. Moreover, service systems, quality of services, and population characteristics vary by region, so replication of this research will be important to see whether the typology can be generalized. Relatedly, findings from this study point to the risk of system involvement and should not be interpreted in terms of individual behavior. Although several of the identified classes were heterogeneous in terms of race, the findings reinforce the existing literature on disproportionate minority contact with juvenile and criminal justice systems, which may be influenced not only by individual risk but also by community factors and police surveillance effects.³⁷

By limiting the analysis to individuals served in various systems, this study advances the knowledge base regarding optimal timing for implementation of prevention and intervention services. As is evident from these findings, youths who experience maltreatment, poverty, or both do not make up a single group in terms of their later outcomes. This study adds to the literature through its use of an appropriate method to capture such variability. Person-centered analyses have been criticized, however, for implying that latent profiles and trajectories are equivalent to actual groups of individuals.³⁸ Although indicators contain known information about specific people, the resulting classes are, by definition, latent rather than observed. An additional limitation relates to potential violations of the local independence assumption, which asserts that correlations among parameters should result from the analysis alone.³⁹ Because of the correlational nature of risk behavior, associations may exist in these data for other reasons. Furthermore, because the number of latent classes was not determined solely from the data (i.e., each additional class improved model fit until models could no longer converge), we applied judgment to selecting the most meaningful

number of classes. The solution we selected is not the only plausible interpretation of the data; other researchers might choose otherwise.

Conclusions

This study demonstrates patterns of service use and behavior among a sample of youths who experienced maltreatment, poverty, or both in early childhood. The sample displayed heterogeneity in both indicators of risk and problematic outcomes. Although group-based analyses are useful in identifying risk factors, person-centered analyses remind us that not all children who experience similar risks will follow similar developmental trajectories. These forms of analysis also bring to the fore the vast disparity in the experience of poverty and cumulative risk faced by some children. Although less than 25% of this vulnerable child population developed offending behaviors, this does not lessen the import of the need to address these vast social inequalities as a part of a public health approach to preventing serious and persistent offending.

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TABLE 1

Latent Class Analysis Model Fit

Class No.	AIC	BIC	Sample-Size Adjusted BIC	Entropy
1	189 828.243	189 990.577	189 917.487	NA
2	181 961.683	182 293.410	182 144.052	0.830
3	176 032.440	176 533.558	176 307.933	0.868
4	173 116.481	173 786.992	173 485.099	0.874
5	171 556.404	172 396.306	172 018.145	0.875
6	170 292.330	171 301.625	170 847.197	0.877
7	169 472.321	170 651.008	170 120.312	0.884
8	168 777.471	170 125.550	169 518.587	0.882
9	168 244.251	169 761.722	169 078.490	0.887

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; NA = not applicable. The sample size was $n = 8587$.

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TABLE 2

Frequencies and Percentages of Sample Characteristics of Individuals Born Between 1982 and 1991: US
Midwestern Metropolitan Region

Characteristics	No. (%)
Gender	
Female	4231 (49.3)
Male	4356 (50.7)
Ethnicity	
African American	5827 (67.9)
White	2760 (32.1)
Residence	
City	4760 (55.4)
County	3827 (44.6)
Census-tract poverty	
40% children in poverty	3744 (43.6)
< 40% children in poverty	4843 (56.4)
Caregiver education	
high school graduate	4768 (55.5)
< high school graduate	3819 (44.5)
Caregiver mental health services	
Yes	506 (5.9)
No	8081 (94.1)
Born to mother aged < 19 y	
Yes	1386 (16.1)
No	7201 (83.9)
Health problem at birth	
Yes	929 (10.8)
No	7658 (89.2)
Income maintenance preelementary school	
Yes	4869 (56.7)
No	3718 (43.3)
Income maintenance in elementary school	
Yes	5477 (63.8)
No	3110 (36.2)
Mental health services preelementary school	
Yes	133 (1.5)
No	8454 (98.5)
Mental health services in elementary school	
Yes	830 (9.7)
No	7757 (90.3)
Mental health services after elementary school	
Yes	1417 (16.5)

Characteristics	No. (%)
No	7170 (83.5)
Physical abuse allegation	
Yes	2609 (30.4)
No	5978 (69.6)
Sexual abuse allegation	
Yes	940 (10.9)
No	7647 (89.1)
Neglect allegation	
Yes	4383 (51.0)
No	4204 (49.0)
Maltreatment allegations	
3	2263 (26.4)
2	6324 (73.6)
Injury resulting from violence (ED)	
Yes	482 (5.6)
No	8105 (94.4)
Sexually transmitted infection	
Yes	741 (8.6)
No	7846 (91.4)
Delinquency offense petition (nonviolent)	
Yes	2488 (29.0)
No	6099 (71.0)
Status offense petition	
Yes	1276 (14.9)
No	7311 (85.1)
Charged with violent offense before adulthood	
Yes	1085 (12.6)
No	7502 (87.4)
Adult arrest	
Yes	988 (11.5)
No	7599 (88.5)

Note. ED = emergency department. The sample size was n = 8587.

TABLE 3

Item Probabilities

Item	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
Female	.54	.52	.49	.56	.40	.30	.41
White	.09	.34	.85	.32	.08	.45	.10
City resident	.94	.26	.11	.67	.90	.11	.88
Caregiver high school education	.56	.68	.56	.44	.49	.64	.35
Caregiver MH service use	.04	.04	.00	.12	.06	.06	.17
Born to adolescent mother	.18	.16	.05	.20	.21	.12	.25
Infant health problem	.13	.11	.00	.18	.11	.07	.15
Prelementary income maintenance	.66	.69	.06	.79	.54	.43	.68
Elementary income maintenance	.75	.68	.09	.80	.80	.57	.88
Neighborhood poverty > 40%	.93	.00	.01	.52	.83	.00	.78
Prelementary MH service use	.01	.01	.00	.05	.01	.01	.02
Elementary MH service use	.06	.09	.03	.19	.11	.12	.17
Postelementary MH service use	.08	.09	.10	.27	.17	.33	.41
Physical abuse allegation	.12	.14	.43	.55	.18	.49	.60
Sexual abuse allegation	.05	.07	.17	.22	.04	.12	.18
Neglect allegation	.30	.29	.54	.95	.39	.65	.96
3 maltreatment reports	.00	.00	.15	.95	.00	.42	.98
Injury resulting from violence	.04	.03	.01	.06	.12	.09	.17
Sexually transmitted infection	.09	.04	.01	.11	.17	.09	.23
Delinquent petition	.02	.06	.06	.05	1.00	1.00	1.00
Status petition	.01	.03	.06	.06	.44	.54	.58
Violent offense	.00	.00	.00	.00	.48	.62	.54
Adult arrest	.07	.07	.09	.09	.24	.25	.25

Note. Class 1 = city poverty low offender; Class 2 = county poverty low offender; Class 3 = county maltreatment low offender; Class 4 = mixed-residence multirisk low offender; Class 5 = city high-poverty persistent offender; Class 6 = county multiproblem persistent offender; Class 7 = city multiproblem persistent offender; MH = mental health.