THE PREVALENCE OF PSYCHIATRIC DISORDERS AMONG JUVENILES ADMITTED TO REGIONAL YOUTH DETENTION CENTERS OPERATED BY THE GEORGIA DEPARTMENT OF JUVENILE JUSTICE*

Technical Report

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SUMMARY

Objectives: This survey was designed for three purposes: to estimate the prevalence of substance use and other DSM-III-R psychiatric disorders among juvenile offenders entering Regional Youth Detention Centers (RYDCs), to evaluate the efficacy of the SCL-90-R questionnaire for screening new admissions for psychiatric problems, and to examine the association between psychiatric disorders and a history of child abuse in this population.

Study Population: The study is based on a stratified random sample of 693 of the 8490 youth admitted to the 20 RYDCs operated by the Georgia Department of Juvenile Justice between March 13,1995 and September 30, 1995. This excludes the Fulton County RYDC that is operated by the county and receives approximately 20% of statewide admissions. Sampling was stratified by RYDC and gender. The objective was for each RYDC to be represented in proportion to its share of statewide admissions and for females to comprise 33% of the sample rather than the 23% of admissions. Only youth who had been admitted to an RYDC within 72 hours of the interview time were eligible. There were no other exclusions. The sample was 69.0% male, 38.8% white, 58.0% African American, and 3.2% youth of other ethnicity. The mean age was 15.4 (sd = 1.3). 87.2% of youth approached completed the interview. The primary reason for non-completion was release from detention.

Methods: The interview consisted of the Childhood Trauma Questionnaire (CTQ), which asks about history of child abuse, the SCL-90-R which is a 90 item checklist of psychiatric symptoms which is widely used for screening in adults, and the Diagnostic Interview Schedule for Children Version 2.3 (DISC) which is a widely used structured interview for diagnosing DSM-III-R psychiatric disorders in epidemiological studies of children and adolescents. Conservative criteria for diagnosis were used: for each disorder, diagnosis required all symptom and duration criteria plus a report of impairment of home, school or social functioning which did not specifically consider present incarceration. Because the sample consisted of new admissions and the minimum required duration for the presence of any symptom is 14 days -- most disorders require longer duration, arrest and incarceration probably contributed little to symptom and diagnostic prevalence.

All components of the interview were integrated into a Computer-Assisted Interviewing program and required approximately 2-1/2 hours to complete. Sampling weights were computed based on RYDC, gender, number of admissions during the study period and duration of stay (poststratification to adjust for undersampling of youth who are released in under two days). All major analyses were computed using SUDAAN, which is designed for the analysis of unequal probability sampling data.

Results from this study were compared to a large general population study conducted at four sites, one of which was in Georgia (the MECA study). The MECA study used the same version of the DISC, the same computer program for administering the DISC, the same interviewer trainers and the same diagnostic algorithms as used in this study. Prevalence estimates from the MECA study were standardized to the sex, age and race distribution of the juvenile offender sample to maximize comparability.

Results:

- 61 ± 4% of the youth admitted to RYDCs had at least one psychiatric disorder, a rate which is 2.8 times higher than that of the MECA sample.

    - 30 ± 4% of the youth had at least one anxiety disorder; 2.7 times higher than in the MECA sample,

    - 19 ± 3% had a mood disorder; 4.3 times higher than MECA,

    - 35 ± 4% had a disruptive behavior disorder; 4.8 times the MECA rate and

    - 30 ± 5% had a substance use disorder; 7.5 times higher than MECA.

- 44% of youth admitted to the RYDCs had two or more DISC diagnoses.

The prevalence of disorders was much higher than in general population studies, with especially high rates of anxiety disorders, disruptive behavior and substance use disorders. Females had higher prevalences of anxiety and mood disorders than males, and males had higher prevalence than females for disruptive behavior disorders and substance use disorders. Males and females had similar prevalences for the presence of any disorder. African American admissions had significantly lower prevalence than whites for all disorders.

Although SCL-90-R scores were highly correlated with the presence of a psychiatric disorder, the screening characteristics indicate that it would not be an effective screening instrument in this population.

The Childhood Trauma Questionnaire was significantly correlated with 4 of the 5 diagnostic categories -- all except substance use disorders. We are concerned that fear of consequences of reporting child abuse resulted in substantial underreporting and may have limited the validity of response to this questionnaire.

INTRODUCTION

There is a growing appreciation that serious violent chronic juvenile offenders have multiple risk factors including community risk factors (availability of drugs, economic deprivation, etc.), family risk factors (drug use, antisocial styles, abuse, etc.), school (academic failure, lack of family support for education), and individual (substance abuse, coping styles, personality factors, peer group choice). It is also known that these risk factors interact; that one intensifies the effects of others.

Substance abuse and untreated mental illness are significant risk factors for these youth. Substance abuse often leads to involvement in drug distribution, repeated robbery and theft to finance drug use, and involvement in the subculture of drugs, gangs and violence. Anxiety disorders and attention disorders impair school performance and social adjustment, which become risks of their own with secondary effects as youth who have difficulty succeeding in socially appropriate ways may turn to criminal activities. Emotional problems which stem from abuse may set the stage for abuse of the next generation. The substance abuse and emotional illness of incarcerated youthful offenders are a tragedy for the youth involved and an enormous cost for society.

Yet, despite the general recognition of mental health clinicians that substance abuse and emotional problems are present at fairly high rates in the incarcerated delinquent population, we have not had a good measure of the problem. Surprisingly little research has been done on this population. There have been virtually no studies using good diagnostic instruments on probability samples of delinquents, and so the usefulness for planning of findings in the literature has been quite restricted.

In addition to applying sound, scientific methodology, we would like to understand the range of the problems which are treatable in a cost-effective manner. Such conditions include substance abuse, attention-deficit disorder (ADD), psychosis, and major depressive disorder. Disorders secondary to abuse, while difficult to treat in some ways, are important in order to target interventions which would reduce the likelihood of continuing the cycle of abuse into the next generation.

Research has indicated that a significant number of youth in the juvenile justice system meet criteria for diagnosable mental illness based on the Diagnostic and Statistical Manual of the American Psychiatric Association III-Revised (DSM IIIR). Disorders identified have included: Attention Deficit Disorder with Hyperactivity (ADHD)[3], Substance Dependence/Abuse[7], Personality Disorders[12], Mental Retardation[11], Anxiety Disorders[24], Affective Disorders[26] and Psychotic Disorders[2]. In addition, rates ranging from 25%-31% have been reported for childhood abuse and between 6% and 28% have a history of suicide attempts.

Some state juvenile corrections agencies have conducted their own studies to determine the prevalence of mental health problems in their populations. A study conducted in Wisconsin identified 15% of their institutionalized population as needing special services. These youth were described as having a longer history of emotional disturbance, more family problems, more evidence of school dysfunction, a higher prevalence of chronic substance abuse, a greater incidence of medical problems, a greater likelihood of being involved in crises situations, a greater risk for suicide and greater dependence on staff for routine functioning (Arling, 1985, unpublished).

A 1988 Ohio study based on clinical evaluations of delinquent youth committed to the state found that 19% met the criteria for Attention Deficit Disorder (ADD), 81% for

Conduct Disorder, 4% for organic mental disorder, 32% were diagnosed with Affective Disorders,17% exhibited developmental disorders, 17% were diagnosed with personality disorders and over half were found to have substance abuse problems. Overall, 35% of the youth needed some type of mental health intervention (Natalucci-Pesichetti & Hyde, 1988, unpublished).

A recent Virginia study on the mental health status of detained youth was conducted for one week in April, 1994. A total of 605 youth participated in the study. The results indicated that, on any given day, 8-10% of youth in secure detention have serious mental health problems which require immediate attention, but that only a few of them (14%) are receiving services. In addition, 39% percent of incarcerated youth, while not needing immediate services, were in need of mental health services. Neither the Community Services Boards nor the secure detention homes had sufficient fiscal and staff resources, staff training and system response mechanisms to address the needs of these youth uniformly and adequately (Mental Health Need of Youth in Virginia's Juvenile Detention Centers, December, 1994, unpublished report).

Psychological evaluations of a sample of incarcerated youth in Georgia determined that 84% could be diagnosed with Conduct or Oppositional Defiant Disorder and 25% were diagnosed with Anxiety Disorders. In addition, over one third of the sample exhibited ADHD, Affective Disorders, substance abuse/dependence, suicidal ideation/attempts and/or intellectual disability (IQ less than 70). Over half of the youth assessed received three or more diagnoses and approximately 25% had low IQ and a concurrent psychiatric diagnosis[10].

The Georgia Policy Design Home Team on Mental Health Issues in Juvenile Corrections was organized in 1993 in response to a national initiative to develop state level policies to address the identification and treatment of mentally ill youth in the juvenile justice system. Georgia was one of 5 states selected to participate by the National Coalition for the Mentally Ill in the Criminal Justice System. The Georgia team, which was appointed by the Governor's Office included representatives from the following: The Department of Juvenile Justice; Department of Human Resources; the Governor's Office; parent advocacy groups; the judiciary and the legislature. The team has since been expanded to include representation from the Department of Education and the Department of Corrections, which is now mandated to incarcerate juveniles under Senate Bill 440 (passed in the 1994 legislative session of the general assembly).

The need to establish the prevalence of mental illness in Georgia's juvenile corrections population was identified by the Home Team as a priority. This prevalence study, designed and implemented in collaboration with Emory University Schools of Medicine and Public Health, Georgia Departments of Children and Youth Services, Human Resources and Corrections was designed to:

1)   Estimate the prevalence of psychiatric and substance abuse disorders using sound research methodology;

2)   Test whether a cost-effective measure (SCL-90R) might be used as a screening tool to identify youth in need of further assessment or intervention;

3)   Assess the association between a history of child abuse, psychiatric disorders, and criminal behavior in this population.

METHODS

Study population

This study is based on a stratified random sample of new admissions to the twenty Regional Youth Detention Centers (RYDCs) operated by the Georgia Department of Juvenile Justice (DJJ) between March 15 and September 15, 1995. The sample does not fully represent all juvenile offenders in Georgia because it was not possible to sample from the Fulton County RYDC, which is operated by the county, not DJJ. The Fulton county RYDC has most of the city of Atlanta as a cachement area and received 20.3 percent of statewide admissions to RYDCs in fiscal year 1994.

All youth present in an RYDC who had been admitted to that RYDC within 72 hours of the start of the interviewing day were eligible for participation. Because the interview was treated as part of intake evaluation, and served as a basis for referral for clinical services, interviews were initiated with all sampled youth except those who were released between the time they were selected for participation and were called to speak to the interviewer.

Of the 713 completed interviews, 20 (2.8%) were excluded. The reasons for exclusion were: missing release dates, which resulted in a missing sampling weight (9), corrupted interview files (2), interview of an ineligible subject (3), and subject interviewed on multiple occasions (6). The overall completion rate with respect to subjects approached was 87.2%

Table 1 shows the distribution of interviews among the RYDCs by gender and ethnicity.

The reference population for this sample is the 8490 individuals admitted to the 20 RYDCs during the 6-month study period. Because of recidivism and transfers, 11,632 admissions occurred among these 8490 offenders. The distribution of number of admissions during the study period in the entire DJJ population and in the study sample is shown in Table 2. The study sample contains significantly more youth who were on multiple occasions than the general admissions population. This reflects the fact that youth admitted multiple times have a greater chance of being admitted during a fixed period of active interviewing at the RYDC.

Table 1. Distribution of survey respondents by RYDC, gender and ethnicity. Percentages shown for each RYDC are the percentage of each gender-ethnicity combination within the Center.

| | White | | | | Black | | | | Other | | | | Total | |
| | Male | | Female | | Male | | Female | | Male | | Female | | | |
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Albany	10	23%	3	7%	22	50%	9	20%	0	0%	0	0%	44	6%
Augusta	8	42%	0	0%	11	58%	0	0%	0	0%	0	0%	19	3%
Blakely	5	23%	0	0%	11	50%	5	23%	0	0%	1	5%	22	3%
Chatham	7	12%	3	5%	33	55%	15	25%	1	2%	1	2%	60	9%
Clarke	5	36%	0	0%	8	57%	0	0%	1	7%	0	0%	14	2%
Claxton	4	67%	1	17%	0	0%	1	17%	0	0%	0	0%	6	1%
Clayton	8	16%	5	10%	28	56%	7	14%	1	2%	1	2%	50	7%
Columbus	8	14%	5	8%	24	41%	16	27%	6	10%	0	0%	59	9%
Dalton	13	43%	9	30%	4	13%	3	10%	1	3%	0	0%	30	4%
Dekalb	4	10%	1	2%	23	56%	12	29%	0	0%	1	2%	41	6%
Eastman	10	29%	4	11%	16	46%	5	14%	0	0%	0	0%	35	5%
Gainesville	16	41%	11	28%	4	10%	7	18%	1	3%	0	0%	39	6%
Griffin	14	40%	5	14%	19	54%	6	17%	1	3%	0	0%	45	7%
Lawrenceville	13	32%	8	20%	7	17%	3	7%	0	0%	0	0%	31	5%
Macon	10	21%	8	17%	21	45%	7	15%	1	2%	0	0%	47	7%
Marietta	15	31%	12	24%	14	29%	6	12%	1	2%	1	2%	49	7%
Rome	15	42%	10	28%	10	28%	1	3%	0	0%	0	0%	36	5%
Sandersville	1	4%	2	7%	14	52%	9	33%	0	0%	1	4%	27	4%
Thomasville	3	25%	0	0%	8	67%	0	0%	1	8%	0	0%	12	2%
Waycross	8	30%	5	19%	8	30%	5	19%	1	4%	0	0%	27	4%
Total	**177**	**26%**	**92**	**13%**	**285**	**41%**	**117**	**17%**	**16**	**2%**	**6**	**1%**	**693**	
Mean Age ± s.d.	15.6 ± 1.3		15.5 ± 1.2		15.3 ±1.4		15.2 ± 1.3		15.7 ± 1.2		15.9 ± 1.1		15.4 ± 1.3	

Figure 1 shows the distribution of offense types among study subjects. The largest proportion of admissions was for Property Crimes such as theft, shoplifting and criminal damage to property. The category Other Crimes includes a variety of generally misdemeanor offenses including traffic offenses other than DUI, public order violations such as simple battery and disorderly conduct, and other victimless crimes. Status Offenses include those violations, like truancy and running away from home which apply only to minors. Violations include violations of probation and other conditions of release, hence apply only to youth with prior adjudication. One half of the study sample was comprised of offenders admitted to the RYDCs for Status, Violation and Other offenses. This is more than twice the proportion of these offenses in the population of youth committed after adjudication. This reflects the primary function of RYDCs: detention prior to adjudication.

Figure 1. Prevalence of offense types among juvenile offenders in sample.
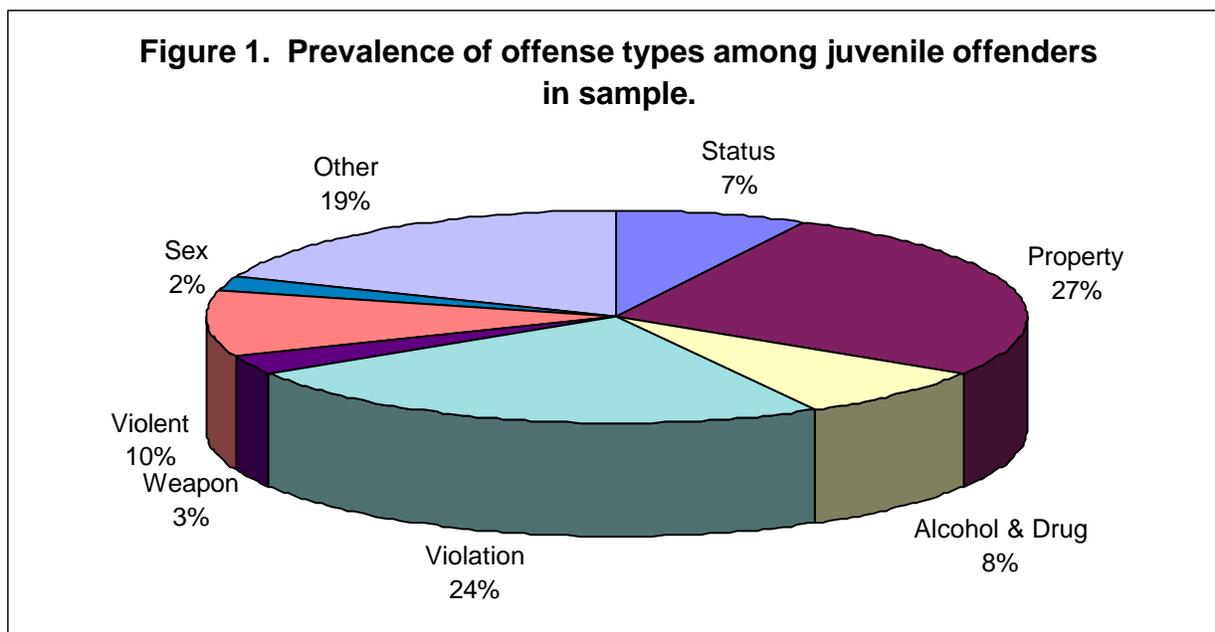
Stratified Random Sample

The method of selecting the sample of juveniles from the population of RYDC admissions was stratified random sampling. The primary stratification variables were RYDC and gender. Each of the 20 RYDCs operated by DJJ was included in the sample. Within each RYDC, an additional stratification variable was gender. Although one might anticipate a total of 40 strata for the survey (20 facilities and 2 genders within each facility), a total of only 37 strata were included because two RYDCs admit only males and at one (Thomasville) it was not possible to sample females.

Gender was used as a stratification variable so that females could be given a higher probability of being selected for the sample, compared to males. In other words, females were oversampled in this survey. Since females comprised about 24.2% of juveniles admitted to detention facilities during FY 1994, oversampling of females was done in order to obtain a large enough sample size of females so that gender specific analyses could be done. Sampling objectives targeted a sample proportion of 33% females. The target number of interviews for each RYCD was proportional to the RYDC's fraction of fiscal year 1994 systemwide admissions for each gender

A modification of systematic random sampling within each facility/gender stratum was used for practical reasons. Strict systematic random sampling within each facility/gender stratum would have required an interviewer assigned at almost every facility during the entire study period. This approach was too expensive. As a practical compromise, interviewers traveled to facilities cyclically throughout the period. Each day, when an interviewer arrived at a facility, two lists (sampling frames) were constructed. Each gender specific list contained all juveniles of that gender who had been admitted within the past 72 hours. Then a simple random sample was taken from each gender-specific list, with a higher sampling fraction for females than for males to achieve the desired oversampling of females. The sampling fractions were determined by the practical constraint of how many interviews could be conducted in one day. The juveniles selected for the sample were interviewed in the detention facility on the same day that they were selected for the sample. This procedure is assumed to be equivalent to systematic

Table 2. Percentage of all youth admitted to DJJ operated RYDCs between 3/15/95 and 9/30/95 due to offenders with 1, 2, . . ., 10 admissions during that period and corresponding percentage of individuals in study sample with that number of admissions during the study period. χ^2 statistic is used to test whether the distribution of number of admissions in the study sample differs from that of the entire population. The very small p (<< .001) indicates that the study sample differs very significantly from the entire population. Youth who were admitted more often during the study period were much more likely to appear in the sample. Data were missing for 13 study subjects.

N of Admissions per Individual	Percentage of All Admitted	Percentage of Sample
1	74.7%	57.1%
2	17.8%	26.3%
3	5.0%	10.1%
4	1.5%	3.4%
5	0.4%	1.0%
6	0.3%	1.3%
7	0.1%	0.4%
8	0.1%	0.1%
9	0.0%	0.0%
10	0.0%	0.0%
N of Admissions	11,632	1,164
N of Individuals	8,490	680
c^2 = 145.8, *df* = 9, p << 0.001		

random sampling within each facility/gender stratum, and we have no reason to suspect that this assumption is violated.

Weighting the Data

The sampling scheme that was used did not result in each juvenile having the same probability of being selected for the sample. For example, females intentionally had a larger probability of being selected than males. Also, juveniles in facilities with a large number of admissions had a somewhat smaller probability of being selected because, on a given day, there were generally more eligible youth from which to draw the two to three interviews which could be completed. Unequal probability samples like this are common in situations where one wishes to control the allocation of the sample (e.g. males versus females) and where practical constraints prohibit equal probability sampling.

As with all unequal probability samples, statistical analyses with the sample of 693 juveniles need to be weighted in order to make correct inference to the population of 8490 admitted juveniles. The value of the sampling weight was determined for each subject in the sample. For example, an interviewed juvenile with a sampling weight of 25 represents 25 juveniles like him/her in the larger population.

The weighting scheme was based on the number of juveniles admitted to and selected from a specific facility/gender stratum during the time period March 13 to September 15, 1995 (youth admitted on March 13 were eligible for participation when interviewing began on March 15). For example, if 700 male juveniles had been admitted to a facility *X* during the field work and 35 of them had been selected and interviewed for the sample, then each interviewed male juvenile in facility *X* would have an initial weight of 700/35 = 20. In addition, the weighting scheme adjusted this initial weight based on whether the interviewed juvenile had a short-stay or a long-stay at the facility. Length of stay at the facility was determined from DJJ records after the fieldwork had been completed. For our

purposes, short-stay was defined as 0 through 2 days and long stay was defined as 3 days or more. This adjustment to the initial weight was done because it was thought that short-stay juveniles might be slightly underrepresented in the sample because of the methods used to construct the facility/gender sampling frame of admissions during the past 72 hours and the possibility that a selected juvenile who was "short-stay" might not still be in the facility for interview. Hence, the short-stay and long-stay male juveniles in the sample from facility X, all with an initial weight of 20, might have an adjusted weight of 21 (short-stay) and 18 (long-stay).

In general, adjustment of initial weights as described above tends to increase the estimated variance, and hence the estimated standard error, of point estimates. An investigation of the degree of increased variance due to adjustment of the initial weights showed that such adjustment resulted in a negligible increase in the estimated variance of point estimates.

An additional adjustment was made to allow inference to the population of individual juvenile offenders (persons) rather than to the population of detention center admissions. This was done by dividing the adjusted weight (described above) for each person by the number of times that person was admitted to a detention center during the study period. These weights were then standardized to sum to the population size (8490). What this adjustment means is that a person in the sample with multiple admissions will have a smaller weight than a similar person with one admission, and will thus contribute less to the prevalence estimates for the population. This adjustment thereby addresses concerns about the differing distributions of number of admissions for the sample and the population (Table 2).

All analyses were conducted by using the adjusted (or final) sampling weight. The value of the final sampling weight ranged from 0.8 to 89.4 among the 693 juveniles in the sample, with the value of the middle 80% of final weights ranging from 3 to 21.

Human Subjects

These interviews served a twofold purpose: they served as part of the clinical evaluation of the juvenile offenders, screening for mental health treatment need; and for DJJ, they served as a pilot study of the mental health screening of new admissions and as a needs assessment for mental health treatment services. Because of the clinical use of the data obtained, the human subjects review boards of both Emory University and DJJ determined that parental consent was not required. This view was supported by the Georgia Attorney General's office for youth who had not yet been adjudicated.

At the beginning of the interview, each child was told that the assessment was part of a new program for the Department and that their answers were confidential with the exception that reports of child abuse or of intent to harm themselves or others would be reported to the necessary authorities. For purposes of facilitating timely referral, at the end of each interview a diagnostic summary was prepared and provided to the counselor at the RYDC.

Survey instruments

The instruments which were used for this survey are the SCL-90-R[8], which is a 90 item self-report screening checklist of psychiatric symptoms, the Diagnostic Interview Schedule for Children, Version 2.3 (DISC-C)[21,22,23] which provides complete DSM-IIIR diagnoses for most psychiatric disorders relevant to adolescents and the Childhood Trauma Questionnaire (CTQ)[1], which assesses the severity of childhood histories of physical and mental abuse and neglect and sexual abuse.

SCL-90-R

The SCL-90 has been included in this survey because fiscal and staffing constraints may make diagnostic interviews of all youths impractical in the RYDC environment. Accordingly, it was included to determine its screening efficacy for the psychiatric diagnoses obtained using the DISC. Administration and scoring of the SCL-90 was conducted using proprietary software provided by its publisher.

Diagnostic Interview Schedule for Children (DISC)

The DISC-C version 2.3 is the most widely used lay-administered diagnostic interview schedule for psychiatric diagnosis for children and adolescents. It has items covering most DSM-IIIR Axis I symptoms, including substance abuse, and includes skip patterns reflecting the DSM diagnostic protocol. The DISC was administered using a Computer Assisted Interviewing (CAI) package developed at Emory. There are two important diagnoses which were not obtained using the DISC in this study – Post-Traumatic Stress Disorder, because it is not included, and psychotic disorders. Data were obtained for psychotic symptoms using the DISC, but evaluation of the very high prevalence of symptoms (approximately 58% of respondents reported at least one symptom) and of the reported descriptions of the symptoms raised substantial concerns regarding the validity of responses to questions in this section by this population. Consequently, we decided to exclude this section from analysis.

Criteria for DISC Diagnosis

For this study DISC diagnoses were obtained using very conservative criteria. To meet criteria for a given disorder, the child had to meet both DSM-III-R symptom and duration criteria (ref.) and report at least one indicator of impairment *in addition to being incarcerated.* The covered indicators of impairment require that the respondent affirm that the symptoms of the disorder have caused him/her ". . . problems with how you get along at home?", ". . . problems with how you get along with friends or other people your age?" or ". . . problems for you at [school/work]?". Comorbidity exclusions included in DSM-III-R were not made. Inclusion of the duration criteria, the least of which is symptoms of at least two weeks duration, combined with the limitation of eligibility to the first 72 hours of detention minimizes the likelihood that diagnoses are the result of arrest, detention or conditions at the RDYC.

Childhood Trauma Questionnaire (CTQ)

The CTQ was chosen as the measure of history of childhood abuse and neglect because of its excellent face validity. The history of abuse and neglect was deemed important for this survey because it is an important treatable contributor to psychiatric symptomatology and substance abuse and is posited to be highly prevalent in this population. The CTQ was administered using a CAI program developed for this study.

Interviewer training and survey administration

Emory University is one of two certified DISC training centers in the country. Interviewers hired at the start of the study each attended a three day training in the DISC interview and CAI software. A fourth day of training was included for administering the CTQ, SCL-90 and for administrative reporting activities.

Training of interviewers also included strategies for converting highly oppositional and frivolous subjects. In cases where, in the judgment of the interviewer, valid interview results could not be obtained due to antagonism, opposition, frivolity/falsification and/or

language disability, the reasons were noted in the clinical report and in an interview termination report. In cases where scheduling permitted, at least one attempt to convert subjects deemed capable of completing the interview was made.

After initial training, each interviewer went through a two-week period of extended training during which he or she conducted supervised interviews at an RYDC in their home area. This extended training also served as a pilot study of interviewing and scheduling activities in the RYDC environment.

Replacement interviewers who were hired subsequently, each received two-days of individual training following the DISC training manual and conducted a minimum of five directly supervised interviews prior to beginning independent interviewing.

Supervision of interviewers was performed from Emory by two experienced research coordinators. The coordinators visited Centers with ongoing interviews on a rotating basis. During visits they monitored interviews, collect audio tapes and interview data and discussed questions and/or problems with the interviewer. The coordinators spoke with each interviewer either in person or by telephone at least twice per week of active interviewing.

The three CAI programs for the interview instruments were joined together with a customized shell program that also was used to assign a study ID and to obtain background information on the respondent. The information obtained included RYDC, date of birth, sex, race, offense, interviewers' evaluation of the understanding and truthfulness of the respondent and general interviewer comments.

The instruments were administered in the following order for all interviews: SCL-90, CTQ, DISC. All interviews were recorded on audio tape and interviewer supervisors reviewed a random sample of tapes to verify interview compliance with study protocols.

Data management and statistical methods

The computer assisted interviewing system which was used for all data collection resulted in survey responses being entered directly into four separate computer databases: one for demographics and one for each of the three instruments. Interviewing computers were returned to the office approximately every other week and the accumulated data copied to temporary databases. Data were then screened for inconsistent and contradictory responses and positive records were flagged and reviewed. SAS code for the DISC diagnostic algorithms developed by Jenn-Yeu Chen, PhD, Cindy Chang, MS, Prudence Fisher, MS, John Piacentini, PhD, and David Shaffer, MD at Columbia University for the MECA study [11,12] was used to transfer the DISC data from the flat file format generated by the interviewing program and to generate final DISC diagnoses.

Prevalence estimation

The software package PC-SUDAAN was used to calculate estimates of the prevalence of each DISC diagnosis of DSM-III-R psychiatric disorders and for the presence of a diagnosis in each of five diagnostic categories: *Any DISC Diagnosis, Any Anxiety Disorder, Any Mood Disorder, Any Disruptive Behavior Disorder, and Any Substance Use Disorder.* Prevalences were estimated for the entire population of 8490 juveniles and for demographic subgroups of interest, e.g. race and gender combinations. Because there were only 22 youth sampled in the "other" race group, estimates were not computed for that group, but those youth were included in estimating the total population prevalence. PC-SUDAAN also calculated an estimated standard error for each point estimate. PC-SUDAAN was used in all prevalence analyses because it performs weighted analyses, using the final weight, and, in addition, takes into account the stratified design of the survey in the calculation of estimated standard errors. Confidence intervals on population

prevalences were obtained by assuming that each point estimate was normally distributed and using tabled values from the normal distribution, a standard procedure in the analysis of sample survey data.

Modeling prevalence using logistic regression:

There were two objectives for performing logistic regression modelling. First, we wanted to determine whether measures obtained from the SCL-90-R could be used to predict the occurrence of psychiatric diagnoses as indicated by the DISC-C. If the resulting statistical models were to indicate that SCL-90-R is a reasonably good predictor of one or more psychiatric diagnoses, then this relatively quick and inexpensive instrument could be used as a screening tool to select children who are likely to have a psychiatric diagnosis. These children then could be referred for clinical evaluation.

A second objective for performing logistic regression modelling was to determine whether child abuse, as indicated by CTQ scores, was related to or associated with the occurrence of psychiatric diagnoses as indicated by the DISC-C.

Use of Logistic Regression:

Logistic regression was used with the absence/presence of any psychiatric diagnosis within each of five diagnostic categories as the dependent variable. The independent variables used in the models were scales from the SCL-90-R and the CTQ as well as the demographic variables Gender, Race and Age. The independent variables were a mixture of continuous variables, such as scale scores, and categorical variables, such as race and gender.

Five diagnostic categories were chosen for analysis in order to reflect the maximum range of psychiatric diagnoses that the DISC-C assesses. A separate logistic regression model was developed and assessed for each diagnostic category. The five diagnostic categories chosen for statistical modeling were:

1. Any DISC Diagnosis
2. Any Anxiety Disorder
3. Any Mood Disorder
4. Any Disruptive Behavior Disorder
5. Any Substance Use Disorder

For each category, the respondent was scored as positive if he/she had a DISC diagnosis for any disorder within the group.   For example, a child who was diagnosed as having Major Depression and no other disorder would be positive for both Any DISC Diagnosis, and for Any Mood Disorder.

Independent Variables From SCL-90-R for Predicting Psychiatric Diagnoses

We used the Global Severity Index (GSI) from the SCL-90-R as the primary SCL-90 variable. GSI is a joint measure of the number and average severity of symptoms. It is defined as the average severity of all 90 symptoms on the checklist. Derogatis [ref.] states that GSI is the best overall indicator of psychopathology. It can range from 0 to 4, with higher scores indicating higher average severity of symptoms. The raw GSI score was used in these analyses rather than the standardized "T-scores" because preliminary analyses indicated that the standardization for adolescents may not have fit the distribution of scores in this population very well. Future analyses will address this issue as well as the other SCL-90-R subscale scores.

Independent Variables from CTQ for Assessing Relationship with Psychiatric Classifications:

We only used one scale from the CTQ, the total scale score. This overall score is an indication of the severity of child abuse and neglect, where a higher value indicates more abuse/neglect. The range of possible values for the CTQ total is 5 to 25.

Demographic Variables Used in All Logistic Regression Models

The following demographic variables were used as control variables in each logistic regression model which was investigated: age, gender, and race. For simplicity, age was categorized using a median split, with young offenders being defined as less than 15.4 years old and older offenders being defined as 15.4 years old or older. The referent group for age is the older group, so that odds-ratios are of younger compared to older. The referent group for gender is females, so that odds-ratios are of males compared to females. The referent group for race is African Americans, so that odds-ratios are of whites compared to African Americans.

Model selection

For each of the five diagnostic categories, two models were developed: one for the GSI, and one for the CTQ Total Score. In each model, the continuous measure was included along with the three demographic variables and all relevant interactions among the independent variables.

Interaction terms are important to consider. For example, if gender interacted with GSI in the prediction of Any Mood Disorder with impairment, this would mean that the importance of the GSI score in predicting depression is different for males and females, but also make interpretation much more difficult. Since ignoring the possible existence of any interactions could result in a misleading model, a systematic investigation was done for each of the models to determine if statistically and clinically significant interactions were present. Initially, a graphical approach was taken to determine the potential significance of two factor and higher order interactions in a given model. For example, the relationship between GSI and any psychiatric disorder with impairment was assessed for combinations of race, sex and gender to determine whether the effect of GSI in predicting Any DISC Diagnosis differed substantially across the demographic groups. Other potential interactions were assessed in a similar manner. Those interactions which appeared graphically to be potentially important then were included as variables in the initially specified model.

The following procedure was used to arrive at each of the final models. For example, for the dependent variable of any psychiatric disorder with impairment, the independent variables for one initial model were age, race, gender and GSI. Interactions were added to this model based on the graphical investigation of possible interactions as described above.

PC-SUDAAN was used to fit the logistic regression model to the data since this software takes into account the sampling weights and the stratified survey design. Interaction terms in the initial model which were not statistically significant (i.e. $p > .05$) were eliminated from the model. All main effects were retained in the model. The revised model then was fit to the data. and any additional nonsignificant interactions were eliminated from the model. The intent was to fit a succession of models to arrive at a final model that included any statistically and clinically significant interactions, all main effects, and was also simple to interpret and use.

Selection of the final model for a particular situation was based on evaluation of the multiple R^2 which indicates how much of the variation of the dependent variable (presence of a psychiatric diagnosis within the specified group) is being described by the

variables (main effects and interactions) in the model. When two potential models had similar R^2 values for prediction of a diagnosis within the diagnostic group, the simplest model to interpret was chosen as the final model.

RESULTS

Prevalence of DISC Diagnoses

Table 3 shows the estimates of prevalence (± the 95% confidence interval width) of DISC diagnoses within diagnostic categories for demographic subgroups and for the entire sample. The prevalence in all categories is much higher than that reported in any study of youth in the general population[14,16,19,22,23]. As is typical in studies of juvenile populations, the prevalence of anxiety and mood disorders is higher among females. However, unlike other studies, disruptive behavior and substance use disorders are not significantly higher among males (Table 4). The differences in prevalence between males and females is generally lower than is typically found in the general population. Specifically, the prevalence of anxiety and mood disorders is typically 2-3 times higher among females than males, whereas the prevalence of substance use disorders is typically 2 - 3 times higher in males. This study is comparable to others in that the prevalence of youth with a psychiatric diagnosis (Any Diagnosis) is similar for males and females. For all diagnostic categories, the prevalence among white youth is significantly higher than for African Americans.

Table 3. Prevalence (%) and 95% confidence intervals of DISC diagnoses by diagnostic group among juvenile offenders entering RYDCs operated by DJJ March 15 - September 15, 1995. Prevalences of individual diagnoses are presented in subsequent tables.

	Male		Female		Total
	White	Black	White	Black	
Any Anxiety Disorder	36 ± 9	20 ± 5	47 ± 13	36 ± 11	30 ± 4
Any Mood Disorder	20 ± 6	12 ± 4	38 ± 12	23 ± 9	19 ± 3
Any Behavior Disorder	46 ± 10	27 ± 6	40 ± 12	27 ± 10	35 ± 4
Any Substance Use Disorder	43 ± 10	22 ± 5	36 ± 12	10 ± 6	30 ± 5
Any Disorder	***73 ± 8***	***48 ± 7***	***71 ± 11***	***55 ± 11***	***61 ± 4***
Sample Size	*176*	*280*	*92*	*115*	*685*

Race differences in prevalence have not been adequately considered in studies of the epidemiology of child and adolescent psychopathology. The National Comorbidity Study[15] [NCS] of 8098 subjects in the US included youth as young as 15 years old. In that study, African Americans were 70% as likely as whites to have any diagnosis in the past year and 47% as likely to have a substance use disorder. The prevalence among African Americans was lower, but not significantly different from whites with respect to anxiety and mood disorders. Because NCS was primarily an adult study, disruptive behavior disorders were not included. In this study, African Americans had a significantly lower prevalence in all diagnostic categories. In this study, as in others, it has not been possible to determine the extent to which the lower prevalence among African-Americans is due to true differences in the prevalence of psychopathology versus race-related differential reporting bias.

Table 4. Prevalence ratios (PR) and 95% confidence intervals comparing prevalence of DISC diagnostic categories among demographic groups of juvenile offenders. A PR = 1 indicates that the prevalence is equal in the two groups. If PR = 1 falls within the 95% confidence interval, then the PR is not statistically different from 1.

	Any Anxiety Disorder	Any Mood Disorder	Any Behavior Disorder	Any Substance Use Disorder	Any Diagnosis
Female vs. Male	1.51 1.14-1.99	1.88 1.35-2.64	0.97 0.74-1.26	0.70 0.50-0.99	1.06 0.91-1.24
White vs. African American	1.64 1.24-2.16	1.71 1.20-2.43	1.65 1.25-2.16	2.14 1.59-2.88	1.46 1.26-1.69

Table 5 shows the prevalence of anxiety disorders by sex and ethnicity. The rate of anxiety disorders is extremely high compared to previous studies of juveniles in the general population[14,16,19,22,23]. The distribution of disorders is somewhat different than would be expected. Separation anxiety and overanxious disorder tend to be more prevalent among children and younger adolescents, so we would expect the prevalence of these disorders to be relatively low in this population. The high prevalence for these disorders may reflect real concerns relevant to the communities in which these youth live. For example, symptoms of separation anxiety include fear that an attachment figure, usually a parent, may leave and not return, or that that person might die. In some communities these may be very real concerns, but pathological when they interfere with the normal functioning of the child. The prevalence of obsessive-compulsive disorder is also extremely high.

Table 5. Prevalence and 95% confidence intervals of anxiety disorders among juvenile offenders entering Regional Youth Detention Centers operated by the Georgia Department of Juvenile Justice, March 15 - September 15, 1995. Confidence intervals were not estimated for groups in which fewer than five diagnoses were recorded.

	Male		Female		
	White	Black	White	Black	Total
Simple Phobia	0.3	2.0 ± 1.8	2.4	6.0 ± 4.9	2.1 ± 1.1
Social Phobia	11.4 ± 6.2	4.7 ± 2.6	5.9 ± 4.9	11.3 ± 6.9	7.8 ± 2.5
Agoraphobia	7.8 ± 4.2	7.0 ± 3.1	7.3 ± 5.6	10.6 ± 6.0	7.6 ± 2.1
Panic Disorder	1.8	1.4	1.2	0.0	1.3 ± 1.0
Avoidant Disorder	2.1	1.6	3.9	7.2 ± 5.9	2.7 ± 1.3
Generalized Anxiety Disorder	9.2 ± 4.6	3.0 ± 2.1	10.0 ± 6.9	6.6 ± 5.3	6.1 ± 2.0
Overanxious Disorder	11.7 ± 5.1	7.7 ± 3.6	14.2 ± 7.9	11.3 ± 6.8	10.0 ± 2.5
Separation Anxiety Disorder	18.7 ± 7.2	8.0 ± 3.6	29.5 ± 13.1	15.7 ± 8.0	14.5 ± 3.4
Obsessive-Compulsive Disorder	19.0 ± 6.9	6.1 ± 2.9	21.3 ± 10.2	13.7 ± 7.1	12.7 ± 2.9
Any Anxiety Disorder	*35.9 ± 9.0*	*20.5 ± 5.2*	*46.8 ± 12.9*	*35.6 ±10.6*	*29.7 ± 4.2*

Table 6 shows the prevalence of individual mood disorders. The predominant diagnosis is major depression. The higher prevalence of major depression among females is typical for this age group. The 4.5% prevalence of mania is extremely high for a child and adolescent sample. The irritability and impulsivity that characterize this disorder may contribute to risk of arrest. It is also possible, however, that some of the positive mania symptoms are due other disorders, such as Attention Deficit Hyperactivity Disorder, and that the structured lay-administered interview without clinical follow-up results in false positive diagnoses.

Table 6. Prevalence and 95% confidence intervals of mood disorders among juvenile offenders entering Regional Youth Detention Centers operated by the Georgia Department of Juvenile Justice, March 15 - September 15, 1995.

	Male		Female		Total
	White	Black	White	Black	
Major Depression	16.2 ± 5.8	7.1 ± 3.1	32.2 ± 11.8	16.6± 6.9	14.3± 2.8
Dysthymia	14.3 ± 5.5	4.6 ± 2.5	27.0 ± 10.2	10.5± 5.5	10.9± 2.4
Mania	2.2	4.4 ± 2.5	6.3 ± 4.8	3.1	3.8 ± 1.5
Hypomania	1.9	1.0	2.1	3.2	1.6 ± 1.0
Any Mood Disorder	*21.6 ± 6.4*	*12.4 ± 3.9*	*40.2 ± 12.4*	*22.2 ± 7.7*	*19.8 ± 3.2*

Table 7 shows the prevalence of disruptive behavior disorders. Because these youth were interviewed in a correctional facility, it would seem that the prevalence of conduct disorder and oppositional-defiant disorder are very low. There are problems with using the DISC or any other structured interview for the diagnosis of child and adolescent disorders, especially with only one informant. For example, children and adolescents are relatively poor informants with respect to externalizing symptoms, like those that are important for disruptive behavior disorders. As a result, it is nor surprising to find lower prevalences of disruptive behavior diagnoses when only child reports are used relative to when parent and/or teacher reports are also used.

Table 7. Prevalence and 95% confidence intervals of disruptive behavior disorders among juvenile offenders entering Regional Youth Detention Centers operated by the Georgia Department of Juvenile Justice, March 15 - September 15, 1995.

	Male		Female		Total
	White	Black	White	Black	
Attention Deficit/Hyperactivity	7.9 ± 6.5	5.6 ± 4.9	12.7 ± 7.9	4.3 ± 4.2	7.1± 3.1
Conduct Disorder	39.7 ± 9.3	22.1 ± 6.2	34.8 ± 11.4	14.0 ± 7.0	28.6 ± 4.3
Oppositional-Defiant Disorder	14.2 ± 5.9	10.6 ± 4.1	17.0 ± 8.5	16.3 ± 8.5	12.9 ± 2.9
Any Disruptive Behavior Disorder	*45.6 ± 9.5*	*26.8 ± 6.5*	*40.4 ± 12.1*	*27.4 ±10.1*	*34.8 ± 4.5*

Table 8 shows the prevalence of use of alcohol and other drugs during the past year by gender and race. The prevalence of use of intoxicating substances is more than twice as great as that reported for this age group in national general population surveys [e.g. NIDA's Monitoring the Future survey and the PRIDE survey]. The prevalence of use is lower among African Americans than among Whites for all substances, and much lower for substances other than alcohol and marijuana.   As discussed above, the extent to which these differences reflect actual differences in use vs. reporting bias is not clear.

Table 8. Prevalence and 95% confidence intervals of alcohol and other drug use during the past year among juvenile offenders entering Regional Youth Detention Centers operated by the Georgia Department of Juvenile Justice, March 15 - September 15, 1995. Confidence intervals were not estimated for groups in which fewer than five diagnoses were recorded.

Past Year Use	Male		Female		Total
	White	Black	White	Black	
Alcohol	84.3 ± 5.8	68.5 ± 6.1	90.5 ± 6.3	61.3 ± 11.2	75.5 ± 3.8
Marijuana	71.8 ± 7.2	53.3 ± 6.8	72.1 ± 10.7	27.0 ± 9.6	58.3 ± 4.4
Stimulants	31.8 ± 8.6	0.9	26.9 ± 10.4	0.6	13.3 ± 3.2
Hallucinogens	40.1 ± 9.2	1.8	29.9 ± 11.4	0.1	16.6 ± 3.6
Cocaine	17.2 ± 6.1	1.0	21.1 ± 9.9	0.8	8.1 ± 2.3
Opiates	15.0 ± 5.6	0.3	6.4 ± 6.7	0.3	5.5 ± 2.0
Depressants	9.8 ± 4.4	0.3	5.0 ± 4.4	0.3	3.8 ± 1.5
Tranquilizers	10.1 ± 4.8	0.4	10.7 ± 6.8	0.0	4.5 ± 1.7
Inhalants	15.7 ± 9.0	0.5	6.0 ± 4.8	1.1	6.0 ± 3.1

Table 9 shows the distribution of substance use disorders. Given the tendency for substance abusers in general and youth in particular to minimize the impact the substance use has on their functioning, and, given the fact that youth are particularly poor reporters of duration of substance use symptoms[9], these should be viewed as minimum estimates of prevalence.

Table 9. Prevalence and 95% confidence intervals of substance use disorders among juvenile offenders entering Regional Youth Detention Centers operated by the Georgia Department of Juvenile Justice, March 15 - September 15, 1995. Confidence intervals were not estimated for groups in which fewer than five diagnoses were recorded.

	Male		Female		
	White	Black	White	Black	Total
Alcohol Dependence	20.1 ± 9.7	9.2 ± 3.6	20.0 ± 8.9	6.5 ± 4.6	14.7 ± 4.1
Alcohol Abuse	0.9	1.8 ±1.8	0.0	0.0	1.2 ± 0.9
Marijuana Dependence	34.3 ± 9.7	15.2 ± 4.7	23.9 ± 10.3	6.8 ± 4.9	21.8 ± 4.4
Marijuana Abuse	6.1 ± 4.0	3.5 ± 2.2	2.2	0.0	3.8 ± 1.6
Other Substance Dependence	16.0 ± 7.2	0.7	17.7 ± 9.6	0.3	7.2 ± 2.7
Other Substance Abuse	5.4 ± 6.7	0.0	1.7	0.0	1.9 ± 2.2
Any Substance Use Disorder	*42.6 ± 9.6*	*21.6 ± 5.4*	*36.2 ± 11.9*	*10.2 ± 5.9*	*29.5 ± 4.5*

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Comparison of prevalence to a general population sample using the DISC version 2.3

The validation studies of the DISC version 2.3, which we used for psychiatric evaluation in this study, were conducted at four sites (metropolitan Atlanta, New York City, New Haven, CT and San Juan, PR) in the National Institute of Mental Health MECA study22. The MECA sample of 1,285 youth between 9 and 17 years of age was not fully representative of the U.S. general population because 1) inclusion of the San Juan site increased the proportion of Hispanic youth to approximately 26%, and 2) families which agreed to participate were slightly more affluent than the average for their locale, although inclusion of the San Juan site substantially reduced the average income of the entire sample. In addition, the MECA sampling scheme was devised to provide approximately equal numbers of subjects at each age from 9 to 17 years of age. This resulted in a sample which had a median age of 13, compared to the median age of 15.4 in the juvenile offender sample. Differences in the age distribution of the two samples might well affect the comparisons for some disorders. For example, separation anxiety is generally more prevalent in younger populations, while substance use disorders tend to be more prevalent in older populations.

Nonetheless, because of methodological similarity (same diagnostic interview, CAI programs, diagnostic algorithms and interviewer trainers), the MECA study provides the best basis for comparing the prevalence of psychiatric disorders in the Georgia juvenile offender population to the prevalence in a general population sample. To improve the accuracy of the comparison, we obtained a copy of the raw data from the MECA study and estimated the prevalence of major diagnoses which would result if the MECA population had the same age, sex and race distribution as our sample of juvenile offenders. This is the direct method of age/sex/race standardization, using the estimated race/sex/age distribution in the juvenile offender population as the standard.

In the MECA study, both the child and a parent or caretaker (usually the mother) was interviewed. The comparison presented here is for diagnoses based on the child interview only, using the same criteria for diagnosis and impairment as used in this study. Diagnosis is based on the same questionnaire and the same diagnostic algorithm in both studies.

Figure 2 shows the estimated prevalence of selected diagnoses from the two studies. Given the reservations regarding the differences in the two populations, it is clear that the prevalence of most DSM-III-R diagnoses is substantially higher in the juvenile offender sample than in the MECA sample.   Juvenile offenders are nearly three times as likely to have anxiety disorders than children in the MECA sample. This is due mostly to separation anxiety, for which offenders reported high levels of fear, possibly justified, that their parents or attachment figures would either leave them or die. The other contributor to this increased prevalence is probably obsessive-compulsive disorder, which is much higher in the offenders than in other studies, but was not reported for MECA.

Offenders were more than three times as likely as MECA subjects to suffer from major depression. It should be noted that a diagnosis of major depression requires that the child report that the symptoms be present together for a period of at least two weeks. Because offenders were interviewed within 72 hours of admission, the high prevalence of major depression is probably not due to the fact of incarceration.

Figure 2. Estimates of the prevalence of DSM-III-R psychiatric diagnoses obtained in this study and in the NIMH Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) study. Questionnaires and diagnostic algorithms were the same for both studies. The MECA sample was larger (1,295), had many more Hispanic youth (28%), was younger (approximate mean age was 13 years) and probably from more affluent families (average income in the MECA sample exceeded U.S. Census median household income at each site). MECA prevalence estimates are standardized rates using the estimated age, sex and race distribution of the juvenile offender population.
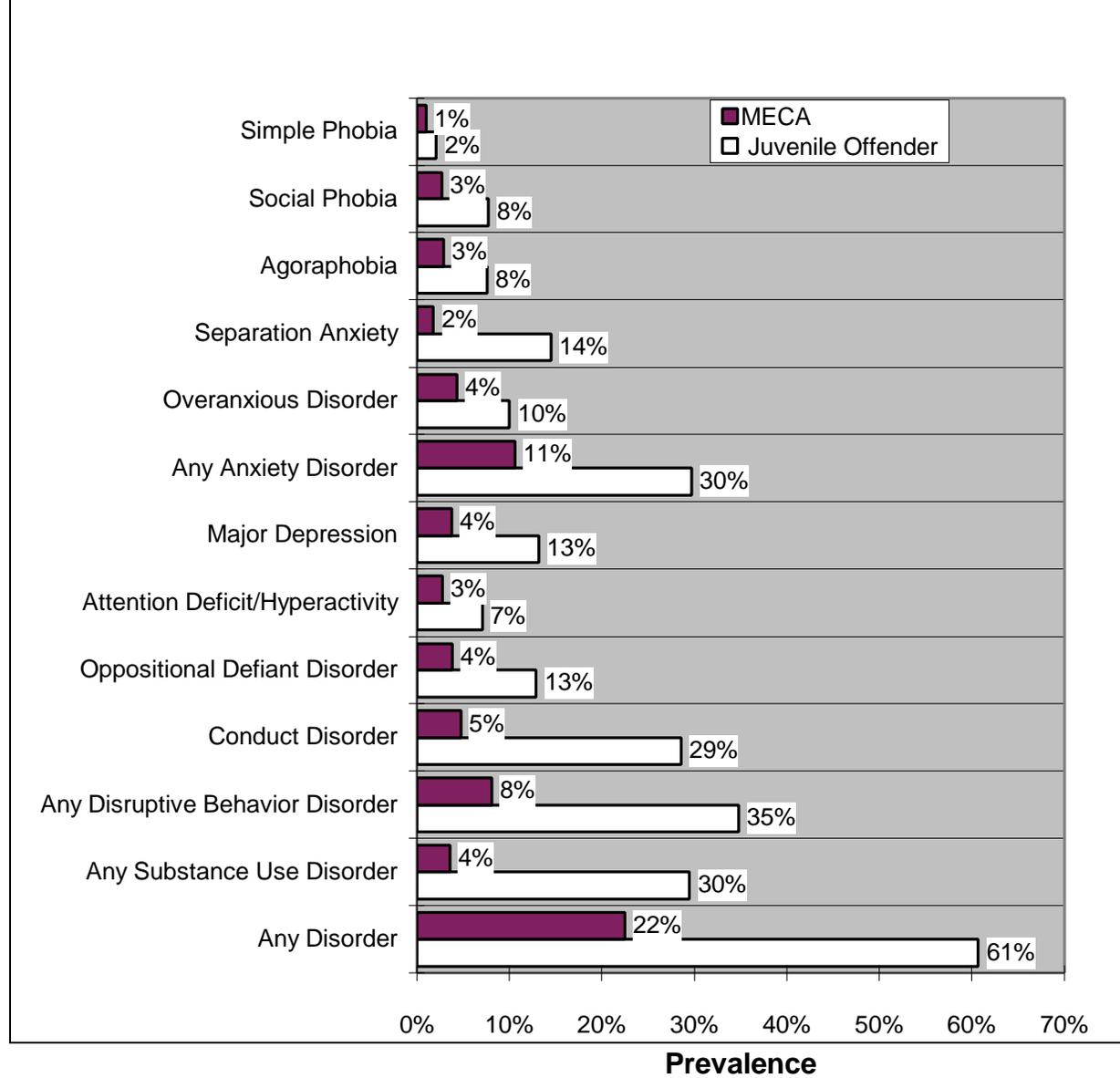
For disruptive behavior disorders, the offender population was more similar to the MECA population in the prevalence of ADHD, although the prevalence among offenders was still more than twice that in the general population sample, but much more likely to have oppositional-defiant and/or conduct disorders. This is clearly a defining characteristic of the offender population.

The single most striking difference in the two samples is in the prevalence of substance use disorders. Offenders were more than seven times more likely to report a substance use disorder than MECA subjects. This emphasizes the extremely high prevalence of these of significant problem associated with the use of alcohol and other drugs in the offender population.

Overall, offenders were nearly three times as likely as MECA subjects to have some DSM-III-R disorder. Although the differences were most notable for disruptive behavior and substance use disorders, the offenders had higher prevalences of disorders for all classes of disorder.

Comorbidity

Table 10 shows the estimated prevalence of youth entering RYDCs with differing numbers of disorders. Table 11 shows prevalence of comorbid diagnoses among admissions with diagnoses of substance use disorders. The level of comorbidity in this sample is within the range of comorbidity found in general population studies of adolescents. In other words, youth admitted to RYDCs with psychiatric diagnoses have about the same extent of multiple diagnoses as youth in the general population with psychiatric diagnoses. Many more youth admitted to RYDCs, however, have diagnoses. It is noteworthy, however, that over 80% of each demographic group other than African American males had comorbid disorders when they reported substance use disorders. Given this level of comorbidity, providing juvenile offenders with treatment for substance abuse problems without considering their nearly universal comorbidity may be ineffective.

Table 10. Prevalence (%) and 95% confidence intervals of differing levels of comorbidity among juvenile offenders entering Regional Youth Detention Centers operated by the Georgia Department of Juvenile Justice, March 15 - September 15, 1995. Confidence intervals were not estimated for groups in which fewer than five diagnoses were recorded.

	Male		Female		
	White	Black	White	Black	Total
No DISC Diagnosis	27 ± 8	52 ± 7	29 ± 11	47 ± 11	40 ± 4
1 DISC Diagnosis	14 ± 6	17 ± 5	19 ± 13	19 ± 9	17 ± 3
2 DISC Diagnoses	16 ± 7	12 ± 5	7 ± 5	8 ± 6	14 ± 4
3 or More Diagnoses	43 ± 10	18 ± 5	45 ± 12	26 ± 10	30 ± 4
Sample Size	177	285	92	117	693

Table 11. Prevalence (%) and 95% confidence intervals of comorbid diagnoses among youth with a Substance Use Disorder.

	Male		Female		
	White	Black	White	Black	Total
Any Anxiety Disorder	38 ± 16	26 ± 12	54 ± 20	65 ± 30	36 ± 8
Any Mood Disorder	26 ± 12	18 ± 10	61 ± 20	57 ± 30	28 ± 8
Any Disruptive Behavior Disorder	67 ± 16	50 ± 14	61 ± 22	69 ± 28	60 ± 10
At Least One Other Disorder	**82 ± 16**	**57 ± 14**	**83 ± 16**	**92 ± 16**	**73 ± 10**
Sample Size	69	62	34	14	187

The Association between Type of Offense, Number of Admissions and Diagnosis

Presence of a diagnosis in any of the diagnostic categories was not statistically associated with whether the primary offense was a felony, with the offense classifications shown in Figure 1, or with the number of times an individual was admitted to an RYDC during the study period.

Contact with Mental Health Services

Table 12 shows the prevalence of subjects with DISC diagnoses who report having ever "talked to a professional like a psychiatrist, psychologist, social worker or counselor" about the problems associated with the diagnosis. Examination of the interviewers' written comments indicates that much of the reported contact consists of two forms of non-therapeutic settings: talking with a school guidance counselor and attending a court-mandated psychiatric evaluation. The questionnaire format made it impossible to quantitatively determine the extent to which contact is overreported. It seems clear, however, that African American youth and particularly African American females have had less contact with needed services in any form.

Table 12. Prevalence of subjects with diagnoses who have "talked to a professional like a psychiatrist, psychologist, social worker or counselor" about their problem.

	Male		Female		
	White	**Black**	**White**	**Black**	**Total**
Anxiety Disorders	45 ± 15%	46 ± 14%	41 ± 22%	21 ± 15%	42 ± 8%
Mood Disorders	36 ± 17%	31 ± 17%	35 ± 17%	27 ± 23%	34 ± 9%
Behavior Disorders	53 ± 14%	41 ± 14%	43 ± 17%	15 ± 13%	44 ± 8%
Substance Use Disorders	19 ± 10%	11 ± 9%	24 ± 16%	0	16 ± 6%
Any Disorder	**61 ± 11%**	**43 ± 10%**	**63 ± 14%**	**36 ± 15%**	**52 ± 6%**

Screening for Psychiatric Diagnoses—The SCL-90

Figure 3 shows the mean Global Severity Index (GSI) scores from the SCL-90-R by diagnosis. Although the mean scores are low relative to the scale of the measure (0-4), youth with diagnoses have much higher mean scores than those without diagnoses for all categories except substance use disorders.

The final logistic regression model for predicting each of the five major diagnostic categories using the GSI indicated that GSI is a statistically significant predictor of the presence of a DISC diagnosis within each of the five diagnostic categories at a p-value of .005 or less. The estimated odds-ratios for GSI is similar and very large for two of the categories -- Any Anxiety Disorder (OR=8.7, 95% CI 5.3-14.2) and Any Mood Disorder

Figure 3. Mean SCL-90-R Global Severity Index scores by diagnosis

Mean SCL-90R Global Severity Index ($\pm$ 95% CI)
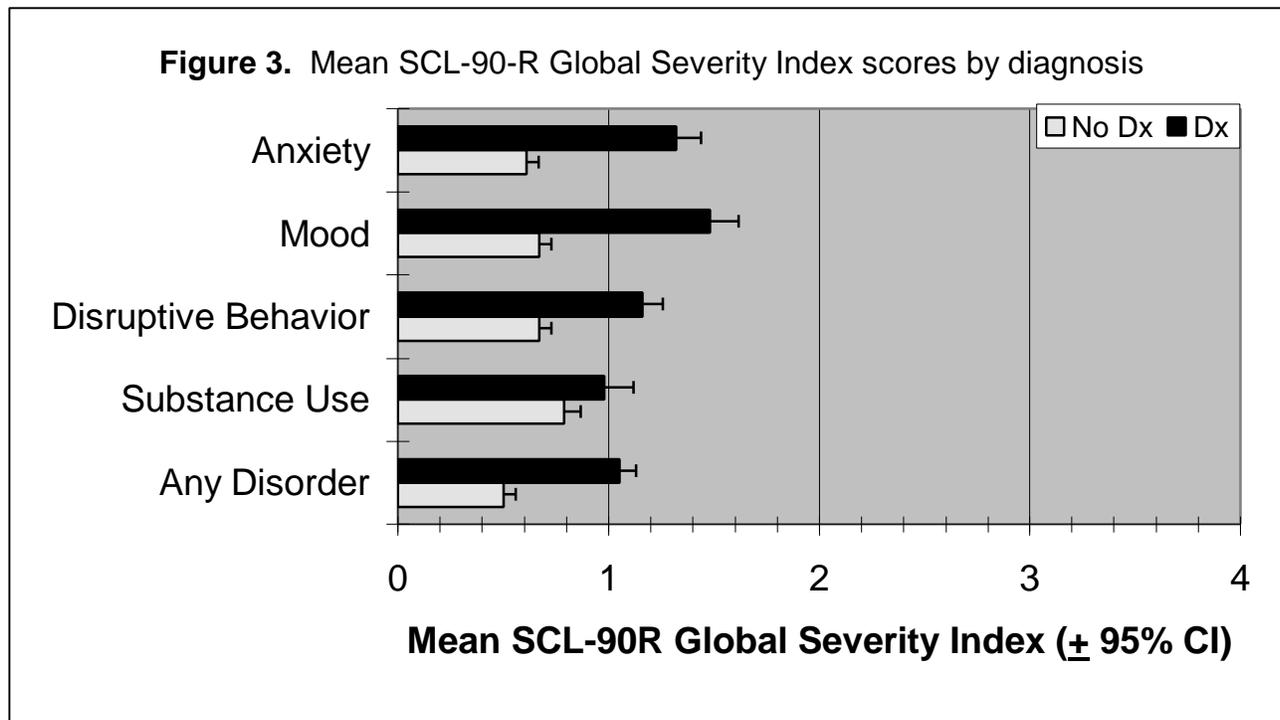
(OR=8.5, 95% CI 5.9-12.3). The relationship of GSI with the other two diagnostic categories, Any Disruptive Behavior Disorder (OR=3.3, 95% CI 2.3-4.8) and Any Substance Use Disorder (OR=1.5, 95% CI 1.2-2.1), although statistically significant, is not quite as strong. The odds ratios can be interpreted as the number of times that juvenile's odds of having a diagnosis in the particular category with each increase of 1 in the GSI score.

For Any Disorder, there is a significant Race x GSI interaction. The odds ratio for GSI is 4.9 (95% CI 2.9-8.2) and for the GSI x Race interaction the odds ratio is 3.5 (95% CI 1.2-10.2). What this indicates is that for African Americans, the odds of having a diagnosis increase about 5 times for each increase of 1 in GSI score. For whites, however, the odds increase by about 17 times for each increase of 1 in GSI. In other words, the SCL−90−R is much more strongly associated with DISC diagnosis among whites than among African Americans.

Sensitivity and Specificity of GSI in Screening for DISC Diagnoses

In order to justify using the SCL-90-R to screen for psychiatric disorders among juvenile offenders admitted to RYDCs, it is not sufficient to demonstrate that the GSI is highly

associated with diagnosis as demonstrated above. It is also necessary to consider the extent to which screening errors would affect its effectiveness. The two major measures that are used to determine screening effectiveness are sensitivity and specificity. Sensitivity, in this case, is the proportion of offenders with diagnoses who would screen positive using the GSI at a given cutoff – in other words, the proportion of youth who actually require services, as indicated by a DISC diagnosis, who would be detected by screening. Specificity is the proportion of youth without DISC diagnoses that screen negative. The complement of specificity (1-Specificity) is the proportion without DISC diagnoses who screen positive and who might be referred for services that are not needed. In the case of a continuously scored measure like the GSI, sensitivity and specificity of screening depend on what cutoff is chosen: if a low cutoff is chosen, most cases will (hopefully) be detected, but there will be more false positives, so sensitivity will be high, but specificity will be low. Conversely, if a very high cutoff is chosen, then fewer cases will be detected, but there will also be fewer false positives. Hence, with a high cutoff, sensitivity is relatively low and specificity is relatively high.

To examine the screening efficacy of the GSI for detecting DISC diagnoses in this sample, the sensitivity and specificity of the GSI in detecting Any Diagnosis was computed for all possible cutoff scores of both the raw and standardized GSI scores. Analyses were conducted on the unweighted data separately for whites and African Americans because of the results of the logistic regression analysis reported above, which indicate that the association between GSI and Any Diagnosis differs by race.

The results do not support using the SCL-90-R for screening psychiatric diagnoses in this population. For whites, the cutoffs at which 90% of youth with DISC diagnoses would be detected (sensitivity), resulted in a specificity of 34% and at that cutoff, 84% of the total population would screen positive. For African Americans performance was slightly better because of their lower prevalence of diagnoses. At the cutoffs that provided 90% sensitivity, the specificity was 37% and 77% of the population would screen positive. This analysis indicates that screening with the SCL-90-R using cutoff scores that would miss 10% of admissions needing services would result in referral of approximately 80% of the population for further mental health evaluation and/or services. Of those referred, approximately 30% would not need services (i.e. would be false positives).

The Association between Child Abuse and Psychiatric Diagnoses—The Childhood Trauma Questionnaire (CTQ)

Figure 4 shows the mean total scores from the CTQ by diagnostic group. As with the GSI, mean scores are low relative to the scale of the score (5-25). As with GSI, the mean scores for youth with diagnoses are much higher for youth with psychiatric diagnoses than for those without in all categories except substance use disorders.

The final logistic regression model indicated that the CTQ total score is statistically significantly related to four of the five psychiatric diagnoses at a p-value of less than .001, i.e. every disorder except Any Substance Use Disorder. The estimated regression coefficient for CTQ is virtually the same for the four diagnoses Any DISC Disorder, Any Anxiety Disorder, Any Mood Disorder and Any Disruptive Behavior Disorder. The odds ratio for CTQ is about 1.30 for all four of these diagnoses.   These odds-ratios indicate that for each increase of one point of CTQ total score is associated with a 30% increase in the odds of having a DISC diagnosis in each of the diagnostic categories except Substance Use Disorders.

Note that CTQ is considered as a continuous variable in these five models. The odds ratio of 1.30 means that each additional increase in the CTQ total score of 1.0 increases that juvenile's odds of having a diagnosis within a given category by 30%.

It is clear from that the CTQ score is strongly related to four of the five psychiatric diagnostic categories: all except Substance Use Disorders, in the anticipated direction, all with about the same degree of strength as indicated by the odds ratio. It is surprising that CTQ reports of child abuse are not associated with substance use diagnoses, since there are very consistent reports of strong associations between child abuse and substance use disorders in the literature[1,5,6,13,20,25]. It is possible that informing subjects that we were required to report child abuse substantially affected the validity of responses to the CTQ, resulting in underreporting of history and weakening or entirely masking an underlying association with diagnosis.

Figure 4. Mean Childhood Trauma Questionnaire Scores by Diagnosis
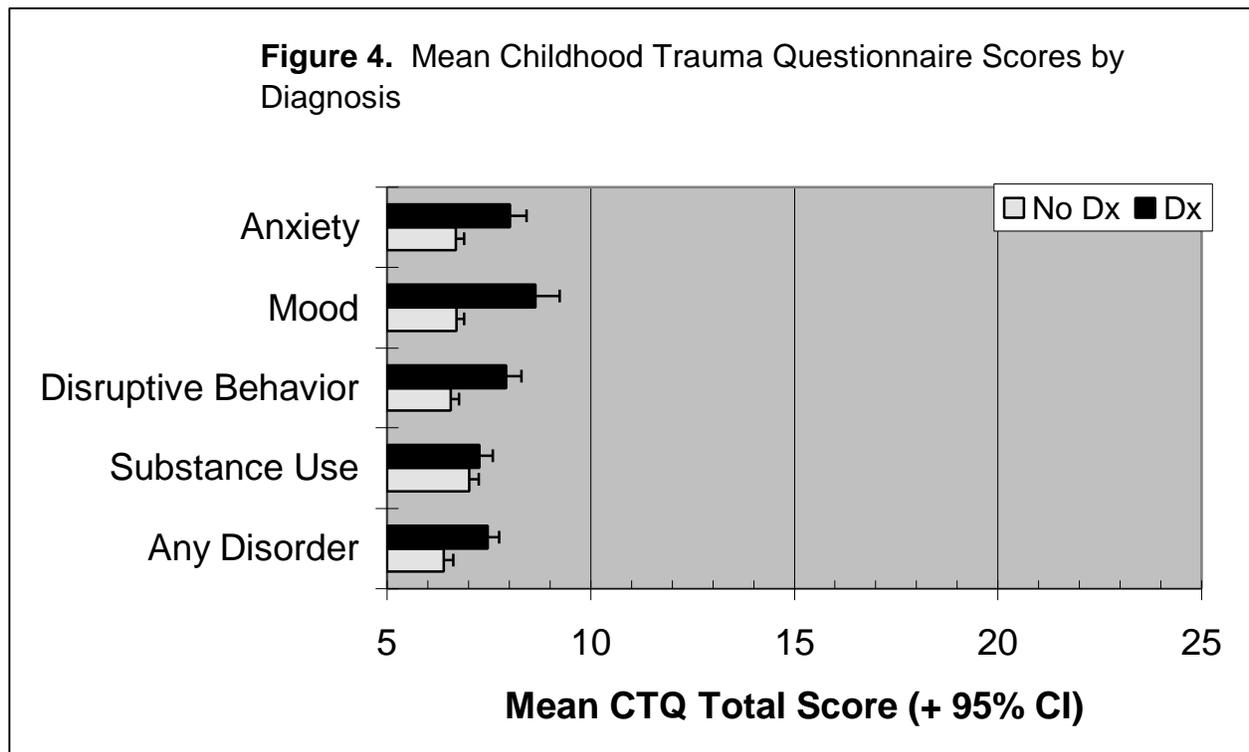
DISCUSSION

This study gives us the best assessment of any study to date regarding the level of mental illness and substance abuse in the incarcerated delinquent population. The rates are high: 61% had a diagnosable condition. A recent study[22] reports on prevalence of adolescent disorders at four sites -- one of them being Georgia-- as reported by children on the DISC 2.3.

Their results can be used as an estimate of prevalence in the general population.   In comparison to the general population, incarcerated delinquents have approximately double the overall rate of mental disorder. Rates of anxiety disorder were about 1.5 times higher than the general population, mood disorders were about 3 times as common, and substance abuse disorders were about 14 times as common than in the general population. One would expect rates of behavior disorder to be much higher in delinquents because of the frequency of conduct disorder and this was found. Of particular interest, however, the rate of attention deficit hyperactivity disorder was only slightly (20%) higher than the rates in the general population.

Of particular interest are the rates for those conditions for which highly cost-effective pharmacological treatments are available. One out of six subjects met criteria for mania or major depression. A surprisingly low number (6.2%) met criteria for ADHD. The measure used did not yield accurate rates of psychotic disorders.

Substance abuse and dependence were also quite common, present in about one third of the sample.   If anything, one would expect that youth are under-reporting their substance use. Marijuana was the most commonly abused drug; about one quarter of the sample reported abusing or being dependent on it. Being in detention has certain advantages for treatment of substance abusers, because attendance at treatment can be compelled and the availability of drugs can be restricted.

Whites had significantly higher rates in all categories (although there were a few specific diagnoses more frequent in blacks: phobias in both sexes and mania in males). It is not clear to what degree this reflects actual prevalence vs. under-reporting by African-Americans.

Recent reports also point to some of the limitations of the DISC. The most common diagnoses in the general population are those of anxiety symptoms of mild severity (13%)[21]. While our procedure did not directly assess severity of anxiety disorders, the high rates of anxiety disorder we found (31%) may well reflect many cases of mild severity. A recent study which examined the validity of DISC interviews found that diagnoses based on youth report agreed most with clinician diagnoses for conduct disorder and major depression, agreed least on ADHD (for which we found surprisingly low rates) and were marginal for other diagnoses (Schwab-Stone et al[21]). Younger children have been shown to be less reliable reporters (cites). Schwab-Stone et al included children aged 9 to 17, while our study included primarily middle to older adolescents, which may attenuate the applicability of the findings of Schwab-Stone et al to our study.

Screening

The DISC is a time-consuming measure, and so is not useful as a screening instrument. An ideal screening instrument for this population would be easy to administer by lay personnel, have a low false positive rate, and have a low false negative rate for those conditions that are most amenable to treatment. The SCL-90 is a paper and pencil test, and as such is relatively easy to administer (for those subjects who can not read, the questions can be read to them by a tape). It can be scored to provide a numerical score of severity. SCLl-90 scores did correlate fairly well with the presence of a diagnosis.

Unfortunately, picking any particular cutoff score would lead to either an unacceptably high false positive rate or an unacceptably high false negative rate.

History of Abuse

A history of abuse as reported on the CTQ significantly increased the likelihood that a youth would have a psychiatric diagnosis. Surprisingly, however, drug use was not associated with a history of being abused.

Implications

The most striking finding in this study is the high rate of psychopathology among detained youth in Georgia. Untreated psychopathology interferes with socially adaptive coping, and is a risk factor for further offenses. Detention offers an opportunity to assess and enforce compliance with treatment. Given limited resources, it is important to target interventions in a cost-effective manner. Of particular concern are those conditions which are most amenable to treatment: substance abuse, ADHD, psychosis, major depression, mania, and some of the less common anxiety disorders, such as panic disorder and obsessive compulsive disorder. At present, however, only very limited services are available to treat these problems.

Further work is needed to define a screening instrument that would be useful in this population. Perhaps a subset of questions from the DISC which address the presence of major depression, substance abuse, and psychosis, reworded and reformatted to be used as a paper and pencil test, would be an effective approach to screening. In the absence of a screening instrument, clinicians working in juvenile correctional settings need to be aware of the high rates of multiple diagnoses in this population, and have a high index of suspicion for multiple problems when they evaluate a detained youth.

The data cited in this report highlights the need for intervention and treatment services for emotionally disturbed juveniles entering Georgia's juvenile justice system. The high prevalence rates among youth admitted to RYDCs suggests that many of these youth might have benefited from community based programs before they came to the attention of the juvenile courts. Such interventions, if early enough, might also reduce the high recidivism rates (70%) experienced by the Department of Children and Youth.

Not all youth admitted to RYDCs are committed to the DJJ. In fact, of the 24,455 youth admitted to RYDCs in FY 1996, only 2,917 (11.9%) were committed to DJJ. A comprehensive risk and needs assessment conducted on all committed youth, using an internally developed rating scale revealed the following: 41% of youth committed in FY96 were classified as being in need of mental health intervention; 15% were classified as being in need of alcohol and/or other drug intervention. While these rates are considerably lower than those reported for RYDC youth, they constitute a significant proportion of this population. Of those youth assessed as being in need of mental health treatment: 18.6% were returned home or placed with a relative in the community; 27% were placed on Youth Development Campuses (YDCs); 10.6% were placed in short-term residential programs; and less than 1% were placed in alcohol/drug or mental health treatment programs. Of those assessed as having a high need for alcohol and/or other drug treatment: 5.8% were placed at home or with a relative in the community; 29.9% were placed on a YDC; and 12.9% were placed in a short term residential program; and less than 4% were placed in a mental health or alcohol and drug treatment program.

In Georgia and in the nation, funding patterns for child mental health treatment have created a system of services which is unbalanced. The majority of state funding (hospital funding through the Division of MHMRSA and residential treatment funding through the DHR MATCH program) has gone toward a small number of "high-end" children and adolescents. Too little money has been available in the community when it is most needed for early and effective intervention and money has been spent on intensive

service only when a child's problems escalate to crises.

Mental Health/Mental Retardation/Substance Abuse services for youth committed to DJJ are very limited. An agreement with DHR allocated 8 long-term residential mental health beds for youth from DJJ statewide. However, fiscal constraints in FY97 have resulted in a 50% reduction in acute child and adolescent inpatient psychiatric beds. There are only 23 slots in the Outdoor Therapeutic Program reserved for youth from DJJ.

Alcohol and Drug Block Grant funds provide only 36 residential addiction services beds reserved for DJJ youth. The results of this study indicate that 29.5% of youth who enter RYDCs (or approximately 7,000 youth each year) have significant substance abuse problems. Clearly, the need for additional treatment/intervention services exceeds their availability.

Services for delinquent youth, who may also need mental health treatment are limited. Committed youth with special needs (SED, some sex offenders) are screened for placement with private mental health providers. These youth may remain in YDCs for extended periods of time awaiting placement due to limited resources. While in detention, these youth are monitored by Division of Community Programs staff to assure that they are not detained longer than necessary. Currently, the DJJ has approximately 167 youth in specialized placements where they receive treatment for emotional, psychiatric and/or behavioral disorders.

Beginning in January 1996, comprehensive medical services in Regional Youth Detention Centers (RYDCs) were initiated through a private contract with Correctional Healthcare, Inc. The contract includes mental health screening, in addition to other health services. Mental health screening, conducted by a registered nurse, includes an assessment of suicide risks as well as a alcohol and drug use history. One outcome of the collaborative work by the Policy Design Team has been the implementation of "Crisis Intervention Teams" at four RYDCs in the northern region of the State. Through a contractual arrangement with the Department of Human Resources, these Crisis Teams provide staff training and onsite consultation in the management of youth in acute psychological distress, as well as those with chronic psychiatric problems.

Services provided to probated youth are often provided through community based programs, many of which are grant funded through the Children and Youth Coordinating Council (CYCC). Many youth committed to DJJ pose a significant risk to public safety because of their delinquent behavior and require secure residential placements. Often the only such placements available are Youth Development Campuses (YDCs).

Youth who are placed in YDCs do receive some limited mental health and substance abuse treatment services including: sex offender treatment at the Lorenzo Benn and Augusta campus; alcohol and drug treatment at three campuses; as well as individual and group counseling. There are four full time clinical psychologists positions among the eight YDCs (Ireland, Wrightsville, Lorenzo Benn and Augusta). The remaining YDCs are served by private providers from the community. Psychiatric consultation is provided through contracts with private providers from the surrounding communities. Proposed expansion of services include a dedicated mental health unit for youth whose emotional or behavioral problems require more intensive treatment. In recognition of the need for training in identification and intervention with mentally ill youth, DJJ is currently exploring the feasibility of implementing regional training opportunities for RYDC and YDC staff.

Severely emotionally disturbed (SED) youth who are also eligible for special education services receive some services thorough DJJ educational programs, which are partially supported through Title VIB funding from the Department of Education.

Recommendations for Future Research

- While it is clear that many delinquent and at-risk youth are in need of mental health interventions and/or treatment, it is also true that many of these youth pose a significant risk to public safety. There is a need for additional clinical research to determine the most effective treatment/intervention approaches for these youth in both community based and residential settings.

- There is a need for replication and clinical validation of the prevalence study, to determine levels of impairment associated with psychiatric disorders in this population.

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