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Anticipating Space Needs in Juvenile Detention and Correctional Facilities

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At some point, every facility administrator in the juvenile detention and corrections system will be called upon to answer the same question: How many beds do we need? In other words, how much space will be needed to accommodate the number of juvenile offenders expected to be placed in residential facilities in the future? The question may refer to a single local jurisdiction or to an entire State. It also may apply to the next budget period or to the next 10 years.

Policymakers ask questions about space needs for various reasons. Demographic trends may indicate that a jurisdiction will soon have a larger population of juveniles. Juvenile crimes may be occurring more frequently or less frequently, and the crimes themselves may be becoming more severe or less severe. A jurisdiction may be facing a financial crisis (or windfall). Deteriorating buildings may necessitate new construction, or a change in political leadership may bring new policies to the juvenile justice system. No matter what compels State and local officials to ask about future bedspace, their interest in the answer is usually urgent and intense.

Juvenile justice professionals who must respond to questions about space needs may be tempted to answer with simple statistical predictions based on recent trends in juvenile arrests and court commitments or even recent changes in detention and corrections populations. Simple answers are appreciated because they allow policymakers to proceed with budgeting and construction plans. Repeated experience with estimating future space needs, however, has taught policymakers and practitioners alike that there are no simple answers or, more accurately, that there are no simple and reliable answers. Statistical prediction models are only as good as the data elements that go into them and the assumptions on which they are built. Every juvenile justice administrator eventually learns that the actual demand for detention and corrections space has a way of proving statistical models wrong. Within a few years, policymakers will likely return to ask the same question: How many beds do we need?

This Bulletin provides policymakers with information to help them answer this question. It presents an overview of the roles of juvenile justice system policies and decisionmaking in determining space needs. It analyzes several methods for projecting juvenile confinement populations, noting the limits of simple projection models and presenting a detailed example of a comprehensive projection model. The Bulletin goes on to examine the practical implications of projecting detention and corrections populations and to outline the differences between forecasting and predicting future space needs. (The background of the space needs assessment study discussed in this Bulletin is summarized on page 2.)

A Message From OJJDP

One of the most difficult challenges facing State and local juvenile justice systems is anticipating space needs in detention and correctional facilities.

Underestimating future demands can lead to overcrowded and less safe facilities. Overestimating future demands can lead to mismanaged tax dollars and even misuse of the extra space, such as detaining juveniles who would not otherwise be confined. In either case, the cost of miscalculating the need for additional space in secure juvenile facilities can be considerable.

This Bulletin provides policymakers with information that will help them to determine the appropriate space needed to accommodate the number of juvenile offenders expected to be placed in residential facilities. An overview of juvenile justice system policies and decisionmaking that affect the process of assessing future space needs is provided, and an analysis of the different projection models is included.

Given the dynamic nature of juvenile justice policies, anticipating space needs in detention and correctional facilities will always be challenging. Adoption of the ongoing systematic forecasting approach set forth in this Bulletin, however, should enable policymakers to enhance the quality and usefulness of their projections.

Background of the OJJDP Space Needs Assessment Study

On November 26, 1997, as part of Public Law 105–119, Congress requested that the U.S. Department of Justice conduct a "national assessment of the supply and demand for juvenile detention space," including an assessment of detention and corrections space needs in 10 States. In particular, Congress expressed this concern:

> The conferees are concerned that little data exists on the capacity of juvenile detention and corrections facilities to handle both existing and future needs and direct the Office of Justice Programs to conduct a national assessment of the supply of and demand for juvenile detention space with particular emphasis on capacity requirements in New Hampshire, Mississippi, Alaska, Wisconsin, California, Montana, West Virginia, Kentucky, Louisiana, and South Carolina, and to provide a report to the Committees on Appropriations of the House and the Senate by July 15, 1998.

OJJDP responded to this request by taking two actions. The first action was to submit a report to Congress in July 1998 (see *An Assessment of Space Needs in Juvenile Detention and Correctional Facilities,* Report to Congress, Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention, July 1998). That report provided some of the background for this Bulletin. It was prepared by OJJDP with assistance from The Urban Institute, the National Center for Juvenile Justice, the National Council on Crime and Delinquency, and The American University in Washington, DC.

The second action taken by OJJDP was to fund a more extensive investigation as part of the Juvenile Accountability Incentive Block Grants (JAIBG) program. The investigation, known as the Assessment of Space Needs in Juvenile Detention and Corrections project, is being completed by researchers at The Urban Institute. The Urban Institute is focusing on the methods used by States to anticipate future demand for juvenile detention and corrections space. Products of the work will include new tools to forecast detention and corrections populations at State and local levels. Project advisors and consultants are listed below.

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For more information about this Bulletin or the Assessment of Space Needs in Juvenile Detention and Corrections project, contact the OJJDP Program Specialist responsible for the effort, Joseph Moone, at 202–307–5929 (phone) or moone@ojp.usdoj.gov (e-mail).

Space Needs and System Decisionmaking

Anticipating future space needs in juvenile detention and correctional facilities can be one of the most difficult challenges faced by administrators and practitioners. The costs of errors can be very high, considering the financial investment needed to construct and operate new facilities. Underestimating future demands for space can lead to overcrowding, inaccessible facilities, and political conflict. Overestimating future demands can lead to charges of financial mismanagement. In the worst case, system officials may be tempted to fill underused facilities with youth who would not have been confined if excess capacity had not been created.

The demand for confinement space is not simply a function of juvenile population trends and juvenile arrest rates. Policy decisions will also, in part, determine demand. For a small number of juvenile offenders in any jurisdiction, justice system intervention will always require secure confinement. Few doubt the need for such confinement in cases involving serious, violent, and chronic offenders; juveniles who have previously failed to appear for scheduled court dates; or youth who pose a serious danger to the community.

For another relatively small group of offenders, justice system intervention should almost never involve secure confinement. Youth who have not committed prior offenses, very young offenders, and youth charged with nonserious offenses nearly always should be handled in the community. The same is usually true for highly vulnerable youth and those with active, involved families and community support systems that can competently supervise the youth's behavior.

For a large middle portion of the juvenile offender population, however, the decision as to whether to use confinement is not obvious. It is a complex, uncertain, and sometimes highly contentious process involving a wide assortment of policymakers, practitioners, and even members of the community. Confinement decisions depend on the actions and beliefs of police officers, prosecutors, judges, probation officers, elected officials who make policies that allocate resources across the spectrum of juvenile justice programs, and members of the community who support or oppose

those policies by electing some officials and not others.

Moreover, the confinement space provided by detention and correctional facilities is just one type of resource available for accomplishing the varied tasks of the juvenile justice system—preventing juvenile crime, rehabilitating individual offenders, controlling the behavior of offenders, and holding offenders accountable for their behavior through the use of sanctions. Each of these responsibilities may sometimes involve the use of secure confinement, but none always requires it. Even controlling offender behavior and holding youth accountable can be achieved in certain cases without the use of incarceration. Each jurisdiction's particular combination of incarceration and nonincarceration is a function of its experiences, resources, values, and policy choices. (See "More Than One Type of Space" on this page.)

Appropriate Confinement Decisions

Every State or local jurisdiction with a juvenile justice system must build and manage a system that responds effectively to the actual (and, to some extent, perceived) level of juvenile crime in the community. To build an effective system, policymakers must regularly receive information about the volume and characteristics of the juvenile offender population in their jurisdictions, the quality and availability of their juvenile justice resources, and the mix of those resources, both residential and nonresidential.

Confinement decisions can be best understood by analyzing three dimensions:

- **Caseload.** How many offenders are coming into the juvenile justice system? What are the characteristics of those offenders from either a public safety or rehabilitation perspective?
- **Process.** What decisions does the juvenile justice system make concerning the handling of individual offenders? Who is involved in decisionmaking, and what information is used to reach decisions in individual cases?
- **Preferences.** What program options are available for implementing decisions made within the juvenile justice system? Who is involved in selecting and supporting available program options, what information do they use, and what values and beliefs underlie their choices?

The answers to these questions will vary from jurisdiction to jurisdiction and will be determined by the choices and policies of a number of agencies. Even the first dimension, caseload, is, in part, a function of the choices and policies of law enforcement agencies. One jurisdiction, for example, may arrest every youth caught with even the smallest amount of marijuana, while another may elect to use unofficial diversion for every first-time offender possessing less than an ounce. The second and third dimensions, process and preferences, are exclusively shaped by policy choices, including the statutory choices of elected officials.

Every young offender presents a challenge for juvenile justice officials. Which program options are best? What are the most cost-effective available options, not only for ensuring the safety of the public but also for preserving the chances of youth to have positive and productive lives? Every decision has ramifications. Some are direct and immediately apparent. Others are indirect and difficult to notice in the short term.

Impact of Preferences and Policies

Decisions made by legislators, judges, police and probation officials, social workers, and juvenile facility administrators help to determine which juvenile offenders are placed in detention or correctional facilities, when they are placed, and how long they stay. Some factors involved in these decisions are similar to the factors involved in adult jail and prison commitments. These include the severity of each offender's most recent offense and the extent and severity of his or her record. The juvenile justice system, however, often has more discretion in responding to these factors. For example, juvenile courts may sometimes place offenders in secure custody for their own protection and hold offenders in custody because they failed to appear for court hearings when released on previous charges.

Some aspects of juvenile justice decisionmaking may be unique to the juvenile justice system. Considerations that would be prohibited in the criminal justice system may influence a decision to place a youth in a secure facility. A juvenile court judge may decide to detain a youth or commit him or her to a correctional facility in part because the youth is thought to have a drug abuse problem, although no drug charges may be involved in the case. A juvenile with a precarious family situation and chaotic home environment may be placed in a secure setting to ensure the delivery of social services.

More Than One Type of Space

Space, in a juvenile justice context, is often measured in terms of beds. The number of juveniles that can be held in a detention or correctional facility is equal to its sleeping capacity. Thus, policy discussions about juvenile justice program resources often focus on the availability of "bedspace."

Bedspace Sometimes a Misnomer

Bedspace, however, can be a misnomer if the term is used too generally. The number of beds available in a jurisdiction is not equal to its juvenile justice program resources. Some programs can effectively supervise, control, and hold young offenders accountable without requiring them to be in residence for 24 hours each day.

Nonresidential programs may include home detention, intensive supervision, electronic monitoring, day reporting, and vocational training. Young offenders may spend much of their day under the control of these programs but then return to their own homes to sleep at night.

Effective Policy Requires a Broader View

To assess the validity of demands for additional bedspace, policymakers need information about all resources available in a juvenile justice system, not only the amount of residential bedspace.

Ultimately, the need for additional bedspace in a jurisdiction is related to

- The number of juveniles requiring treatment, supervision, and control.
- The availability and quality of existing bedspace.
- The availability, quality, and use of nonresidential program resources.

Placement decisions may also be influenced by the availability and perceived adequacy of program alternatives. Placement rates may be higher when juvenile courts have fewer nonresidential options to draw on in lieu of placement (e.g., in rural areas and impoverished communities). For these reasons, the use of secure confinement in the juvenile justice system is rarely a straightforward consequence of trends in juvenile populations and crime rates. Some researchers might even argue that a statistical model would perform better using the availability of bedspace to predict juvenile placement decisions than it would using placement decisions to predict bedspace.

Projections of Juvenile Confinement Populations

Sound projections require high-quality data. Without data, policymakers have only the opinions and beliefs of practitioners and administrators with which to project future needs for bedspace.

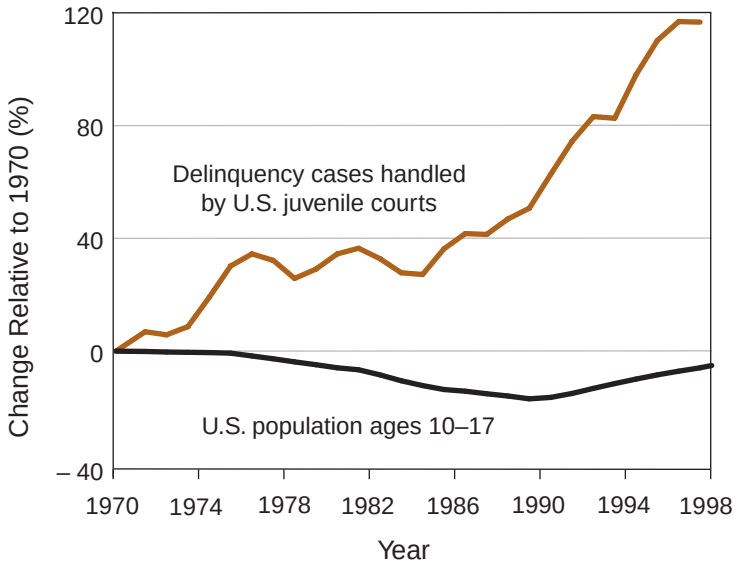
The superintendent of a detention center may offer his or her personal observations about crowding in detention. The administrator of a corrections facility may observe that young offenders are being placed on waiting lists because of insufficient space. A county sheriff may complain that officers are required to transport youth to a neighboring jurisdiction to find an opening in a secure facility. Although personal observations may be helpful in making projections, relying on anecdotal information alone may result in costly errors. Each individual involved in the juvenile justice process can explain the process only from his or her unique perspective. Few are aware of every aspect of the process and of the complex interactions between decisions made at various points in the process.

Once policymakers decide to look beyond personal opinions, they need data about the use of detention and corrections space. Unfortunately, the easiest information to assemble is rarely ideal. In some jurisdictions, the only readily available data may be about past uses of detention and corrections space. An agency might only know that admissions to juvenile corrections grew 50 percent during the past 10 years. Some policymakers might interpret this as a legitimate reason to fund an additional 50-percent increase in corrections space over the next 10 years, but this could be a poor decision. Obviously, a jurisdiction that increased its bedspace significantly in 1999 should not rely on the increase in admissions from 1998 to 2000 to argue for yet more bedspace in 2001. Similarly, it would be unfair to use the lack of an increase to argue that an agency does not require additional space. Perhaps a jurisdiction has not funded any new corrections space during the past 20 years. Flat funding would explain the jurisdiction's flat admission numbers, but this would not necessarily mean that additional space is unwarranted.

Policymakers are better served when agencies can generate additional information. For example, researchers could analyze trends in the use of waiting lists and early releases from confinement. An increase in these practices may indicate a growing demand for space. Even this information, however, does not eliminate the risk of misinterpretation. The fact that a juvenile detention center is constantly full with no waiting lists or early releases could have more than one explanation. It could mean that available space is precisely equal to demand, or it could mean that local decisionmakers have learned to refer just enough youth to detention so that a facility remains full without being oversubscribed.

What would policymakers conclude if the same correctional facility suddenly began to report crowding, early releases,

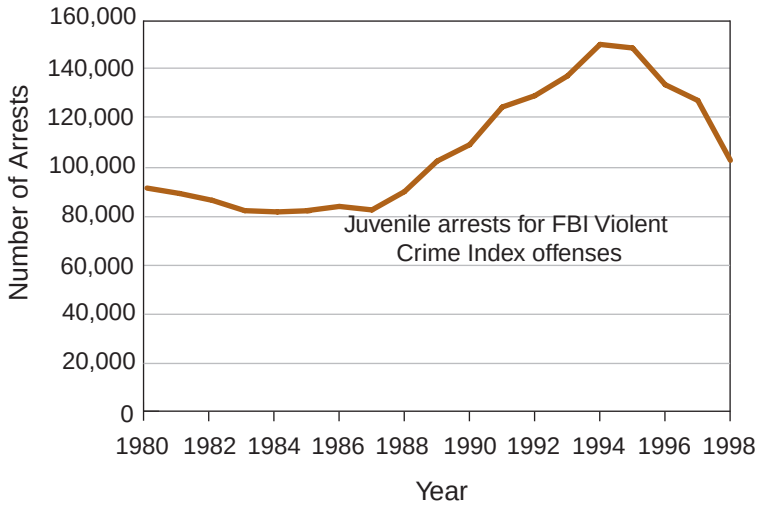
Figure 1: Using population alone, an analyst working in 1970 would have recommended no expansion in detention and corrections space through the 1990's—yet the number of delinquency cases nationwide doubled during that period



- Between 1970 and 2000, the U.S. juvenile population declined from 32 million to 27 million, then rebounded to nearly 32 million again.
- Between 1970 and 1997, the number of delinquency cases handled by the Nation's juvenile courts more than doubled, from approximately 800,000 to nearly 1.8 million annually.

Source: Data from U.S. Bureau of the Census' *National Residential Population Estimates* series and the National Center for Juvenile Justice's (NCJJ's) National Juvenile Court Data Archive (NJCDA). For population estimates prior to 1980, see *1970 Census of the Population,* Vol. 1. Characteristics of the Population, Part 1: United States Summary, Section 1, U.S. Department of Commerce, Bureau of the Census, June 1973. Estimates for 1971–79 were interpolated using 1970 and 1980 single-year age estimates and 1975 estimates for grouped ages. NJCDA national estimates prior to 1975 included status offenses. The average delinquency proportion of the delinquency/status totals for 1975–79 was used to adjust NJCDA data before 1975.

Figure 2: Predictions based on arrests since 1980 would have been very different depending on when they were generated



Five-Year Trend Predictions as Calculated in 1985, 1990, and 1993

Date of Prediction	Change in Prior 5 Years (%)	Predicted Arrests in 5 Years	Actual Arrests in 5 Years	Error
1985	–9	76,100	114,200	33% under
1990	37	156,400	147,700	6% over
1993	49	206,100	112,200	84% over

Source: Data from the FBI's *Crime in the United States* annual series. National estimates calculated by The Urban Institute using methods developed by NCJJ (see Snyder, 1999).

and waiting lists for admission? Such a development might indicate an increase in juvenile crime and the need for more space, or it might mean that local authorities had decided to begin referring all potential detention cases for placement and not concern themselves with availability. Projecting future space needs requires more extensive analysis. The question is what type of analysis?

Limits of Simple Models

Juvenile justice agencies often begin their efforts to project detention and corrections populations with relatively simple models. Simple models may provide projections quickly and at relatively little cost, but they can also produce misleading information. One of the most common simple models assesses the need for secure confinement resources according to expected changes in the juvenile population (e.g., youth ages 10 through 17). If a jurisdiction has 100 detention beds and its juvenile population is expected to increase 20 percent over the next 10 years, policymakers might recommend expanding detention capacity to 120 beds over the same period. This approach may be an improvement in a jurisdiction that has previously used only anecdotal methods to anticipate future space needs, but it has great potential for error. Consider the fact that the national population of juveniles was relatively unchanged between 1970 and 1998, a period when juvenile court caseloads more than doubled. An analyst working with population data alone in the 1970's or 1980's could have produced very misleading projections (figure 1).

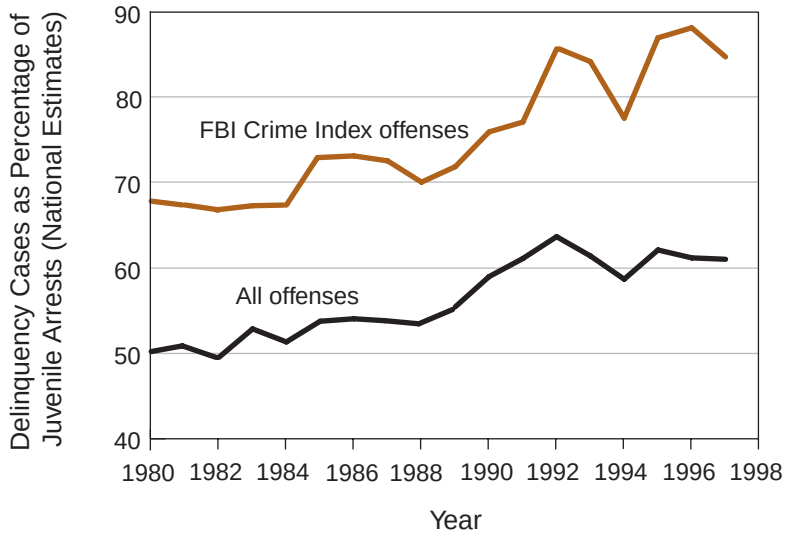
Most juvenile justice administrators know that projection efforts must include at least some data about the juvenile justice process because the number of offenders referred for placement can differ considerably from trends in the juvenile population. One approach commonly used by State and local agencies is to monitor trends in juvenile arrests and then estimate future demand for detention and corrections space based on expected changes in the number of arrests. For example, some jurisdictions base their projections on trends in juvenile arrests for the most serious offenses, such as the Federal Bureau of Investigation (FBI) Violent Crime Index offenses (i.e., murder and nonnegligent manslaughter, forcible rape, aggravated assault, and robbery). The logic behind this approach is that youth charged with violent and other serious offenses generate most of the space needs in any jurisdiction.

The complexity of juvenile justice decisionmaking, however, virtually guarantees that detention and corrections populations will not follow Violent Crime Index arrest trends so closely. National changes in juvenile arrests during the 1990's underscore this point. The 1990's were a virtual case study in how difficult it can be to predict juvenile justice trends. No statistical model could have anticipated the changes in serious juvenile crime that occurred between 1985 and the end of the 1990's (figure 2).

Consider what would have happened if an analyst working in 1985 had projected changes in the nationwide demand for bedspace using 5-year trends in FBI Violent Crime Index arrests. The projection of bedspace needs in 1990 would have been produced by multiplying 1985 levels of placement resources by the percentage change in Violent Crime Index arrests between 1980 and 1985—a decrease of 9 percent. Arrests for violent offenses, however, were about to jump sharply. A projection from 1985 would have underestimated the volume of arrests in 1990 by 33 percent. An analyst working in 1990 would have been more fortunate using the percentage change in arrests from 1985 to 1990 (up 37 percent) to project space needs in 1995. Yet, a few years later, in 1993, the same technique would have produced estimates for 1998 that were far larger than actual need. No statistician using this method in 1993 would have predicted that juvenile arrests for violent offenses would drop 25 percent between 1994 and 1998.

Extending the period of calculation by using 10-year trends rather than 5-year trends would ameliorate the problem

Figure 3: Predictions based on arrests since 1980 would fail to account for changes in how juvenile arrests were processed by prosecutors and the courts



Delinquency Cases and Juvenile Arrests: 1980, 1990, and 1997

	1980	1990	1997
All offenses			
Juvenile arrests	2,166,600	2,214,500	2,838,300
Delinquency cases	1,089,500	1,318,000	1,755,100
Ratio of arrests to cases	2 to 1	1.7 to 1	1.6 to 1
Index offenses			
Juvenile arrests	839,900	822,800	824,900
Delinquency cases	544,900	631,300	705,100
Ratio of arrests to cases	1.5 to 1	1.3 to 1	1.2 to 1

Source: Data from NCJJ's National Juvenile Court Data Archive and the FBI's *Crime in the United States* annual series. National estimates calculated by The Urban Institute using methods developed by NCJJ.

somewhat but not resolve it entirely because the number of arrests is not directly linked to the number of placements. Analysts will produce more useful projections when they include juvenile court processing data in projection models. The juvenile court process is the principal gatekeeper for placements in juvenile bedspace. The juvenile court usually approves detention decisions, or at least it must approve the continuation of detention beyond some statutorily defined limit (e.g., 72 hours). The juvenile court is also the main access point for placement in (or commitment to) long-term facilities. To be admitted to a juvenile correctional facility, young offenders must be referred to court, officially charged with delinquency, adjudicated a delinquent, and then committed by the court. Thus, changes in detention and corrections populations are likely to be more closely related to changing court actions than to changes in juvenile arrests.

This is clear when trends in juvenile arrests are compared over time with trends in juvenile court delinquency cases (figure 3). Between 1980 and 1997, for example, increases in delinquency cases outpaced increases in juvenile arrests. According to the Office of Juvenile Justice and Delinquency Prevention's (OJJDP's) Juvenile Court Statistics program at the National Center for Juvenile Justice, U.S. juvenile courts handled slightly more than 1 million delinquency cases in 1980, just half the number of arrests involving youth younger than age 18 that year. By 1997, the total number of delinquency cases handled by juvenile courts represented 62 percent of the number of arrests.[1]

Law enforcement's increasing use of court referrals for arrested youth is also apparent when the analysis examines only court cases and arrests that involved FBI Crime Index offenses (i.e., all offenses on the Violent and Property Crime Indexes). In the early 1980's, the number of court cases involving Crime Index offenses equaled about 70 percent of the number of juvenile arrests involving Crime Index offenses. By the late 1990's, the number of juvenile court cases involving these offenses represented nearly 90 percent of the number of arrests.

Projection efforts are more useful if they can account for changing patterns in court processing. A changing rate of formal prosecution in juvenile courts, for example, could have a dramatic effect on the number of youthful offenders placed in secure facilities. National data about juvenile court processing reveal, in fact, that the proportion of delinquency cases handled formally (with prosecutor petitions rather than informal agreements for diversion or dismissals) increased from 49 percent to 57 percent between 1983 and 1997 (figure 4).

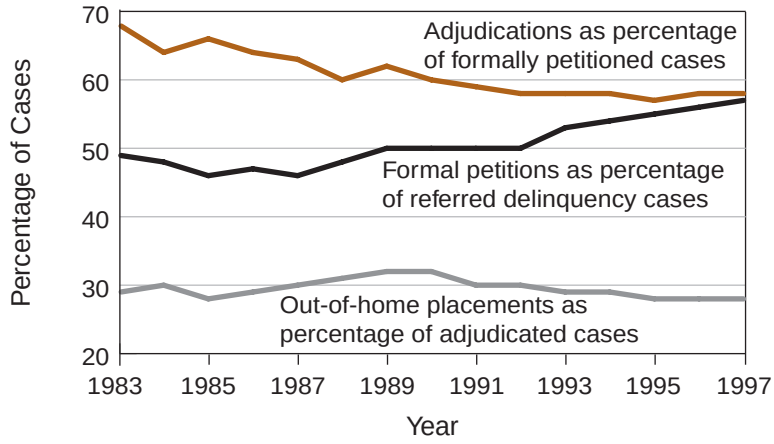
This shift toward more formal handling could have been expected to increase the number of juveniles eligible for out-of-home placement. An analyst projecting future space needs with this information might still have made significant errors, however, unless the analysis was amended to include an additional factor—namely, changes in the use of formal adjudication. Between 1983 and 1997, as the use of formal petitioning increased, the use of adjudication saw a corresponding decrease from 68 percent to 58 percent. When both changes are considered together, it is clear that the total rate of adjudication (adjudication as a percentage of referrals) remained unchanged between 1983 and 1997 (33 percent in both years). This example demonstrates that projection models are likely to perform better when they include more than a single source of information and when they

analyze more than a single point in the juvenile justice process.

Example: Projecting the Juvenile Commitment Population in 2002

The following section presents an example of a projection model using data about the national population of juvenile offenders committed to residential facilities.[2] The analysis provides several different projections, each based on a different set of assumptions. The results from each set of assumptions reveal the sensitivity of population projections to changes in policy and practice, including changes in the rate of referral, the rate of adjudication, the number of out-of-home placements, and the average length of those placements. The range of projections based on these varying assumptions helps to set upper and lower bounds on the future size of the national commitment population. The analysis uses data from 1993 to 1997 to project populations through 2002. The results suggest that a major determinant of change in the commitment population originates outside

Figure 4: Despite changing patterns in the handling of delinquency cases between 1983 and 1997, the overall use of adjudication and out-of-home placement remained relatively consistent



- In 1983, 49 percent of delinquency cases were formally petitioned and 68 percent of these were adjudicated, resulting in a total adjudication rate of 33 percent.
- In 1997, a 57-percent petition rate and 58-percent adjudication rate again resulted in a total adjudication rate of 33 percent.
- The use of out-of-home placement was relatively consistent between 1983 and 1997, varying between 28 and 32 percent of adjudicated cases throughout the period.

Source: Data from NCJJ's National Juvenile Court Data Archive.

Delinquency Case Processing, 1993–97

The number of juveniles in commitment increased from 37,700 in 1993 to 52,500 in 1997. The increase was due to a number of factors—the growth in the number of referrals to juvenile court, changes in the rate of adjudication, changes in the rate of residential placement, and changes in lengths of stay.

Referral

- The total number of delinquency cases referred to juvenile courts that involved youth ages 10 to 17 increased 19 percent between 1993 and 1997, from approximately 1.4 to nearly 1.7 million.
- Cases involving property offenses accounted for half of all court referrals in both years.
- The rate of growth was largest among drug cases, which more than doubled, and for public order offenses, which grew more than 30 percent.

Adjudication

- Between 1993 and 1997, the number of cases resulting in adjudication increased 26 percent.
- The number of adjudicated cases increased in every major offense category.
- The rate of adjudication (the number of adjudications divided by referrals) increased 2 percent. The rate was stable for all major offense categories.

Placement

- From 1993 to 1997, the percentage of adjudicated cases involving youth ages 10 to 17 that resulted in residential placement was relatively stable at 31 to 32 percent.
- The use of placement was constant for property and public order offenses. For drug offenses, the use of placement decreased from 32 to 27 percent.
- For person crimes, the use of residential placement dropped from 35 to 32 percent of adjudications.

Length of Stay

- The average length of stay for committed juveniles increased 14 percent between 1993 and 1997, from 96 to 109 days.
- Most of the growth in length of stay was driven by person crime offenders (whose average length of stay increased from 162 to 180 days) and by property crime offenders (89 to 104 days).
- Length of stay increased from 22 to 49 days for public order offenders and decreased from 148 to 113 days for drug offenders.

Note: These data differ from other published analyses of National Juvenile Court Data Archive data because cases involving youth under age 10 or older than age 17 are excluded, as are technical violation cases. Percent changes were calculated using unrounded numbers.

Source: Urban Institute analysis of data from NCJJ's National Juvenile Court Data Archive. National estimates of delinquency cases involving youth ages 10 to 17.

Table 1: Juvenile Offenders in Residential Placement, 1993–97

Population	One-Day Count of Juvenile Offenders in Custody (delinquency offenses only) 1993	1995	1997
Total population of juveniles committed to residential placement	**52,000**	**59,500**	**71,700**
Private-facility-adjusted population*	**55,200**	**61,600**	**71,700**
Age-adjusted population†	**37,700**	**43,500**	**52,500**
Person offenders	14,800	18,300	19,800
Property offenders	16,600	17,800	21,300
Drug offenders	4,300	4,600	5,500
Public order offenders	1,900	2,800	5,900

* Adjustments were made to 1993 and 1995 committed populations to compensate for undercounts of juveniles in placement in private facilities in those years. This was done by applying the ratio of delinquent youth in private facilities to delinquent youth in public facilities in 1997 to the reported population of youth in public facilities in 1993 and 1995, respectively, to obtain an estimate of the number of delinquent youth in private facilities for those years. These estimates were added to the reported number of delinquent youth in public facilities for 1993 and 1995, respectively, to obtain private-facility-adjusted commitment populations for each year.

† The Children in Custody (CIC) census for 1993 and 1995 does not disaggregate committed and detained delinquent populations by age. To obtain this information for youth ages 10–17, offense-specific adjustments were made based on the proportion of 10- to 17-year-olds in the overall detained and committed populations in 1997, which is provided by OJJDP's Census of Juveniles in Residential Placement 1997. The assumption is that the proportion of 10- to 17-year-olds in the detained and committed populations in 1993 and 1995 was the same as that actually observed in 1997. This assumption is supported by the age distribution of the overall custody population during 1993–97, which remained quite stable. (CIC data provide the age distribution for the overall juvenile custody population but do not distinguish between offenders and nonoffenders or between delinquent and status offenders. The universe for this study is delinquent offenders only.) The 10- to 17-year-old portion of the overall custody population was remarkably stable during 1993–97: 87.4 percent in 1993, 87.8 percent in 1995, and 87.5 percent in 1997. These age-adjusted custody populations also exclude youth in facilities for technical violations.

Note: Detail may not add to totals due to rounding. These counts include committed youth only; detained youth are excluded.

Source: NCJJ analysis of OJJDP's Children in Custody census 1993 and 1995 data files and OJJDP's Census of Juveniles in Residential Placement 1997 data file.

the juvenile court—namely, the number of referrals by law enforcement. The relative rates of adjudication and placement and changes in average lengths of stay also affect the size of commitment populations. (Trends in these components of delinquency case processing between 1993 and 1997 are summarized on page 7.)

According to data collected for OJJDP by the U.S. Bureau of the Census, the daily size of the committed juvenile population in custody for delinquency offenses increased 38 percent between 1993 and 1997, from 52,000 to 71,700 (see table 1). For this example, however, several adjustments to these data are necessary.[3] First, the raw data most likely underestimate the number of juveniles in private facilities during the 1993–95 period. Adjusting for this undercount produces slightly higher figures.[4] The data are also adjusted to account for the fact that although many youth in the commitment population at any given time are older than 17, very few are older than 17 at the time of their commitment. Adjusting the data for age allows the analysis to compare more directly the data on commitment populations with data on commitment admissions.[5] The analysis also limits the commitment population to juveniles who were placed in residential facilities for new offenses. Juveniles committed for technical violations of probation are excluded. After making these adjustments, the analysis suggests that the juvenile commitment population increased 39 percent between 1993 and 1997, from 37,700 to 52,500.

To generate estimates of the future commitment population, a statistical flow model is used that analyzes the processing of delinquency cases to the point of placement and models the lengths of stay in placement. The model begins with a starting population and calculates transition rates (or probabilities that cases will move from one stage of the juvenile justice process to the next). The flow model includes the following stages: (1) referral to juvenile court, (2) adjudication, (3) commitment to residential placement, and (4) length of stay for youth in residential placement. Transition probabilities include the adjudication rate (the percentage of referred cases that are adjudicated), the use of residential placement (the percentage of adjudicated cases that are committed to residential facilities), and the average length of stay in facilities (measured as a stock-to-flow ratio; see discussion of length of stay, pages 12–13).[6] These transition probabilities are shown in table 2.

Changes in the commitment population can be shaped by a variety of case processing components, including the number of juvenile court referrals, the percentage of those referrals that result in adjudication, the number of those cases that end in residential placement, and the length of those placements. As these components increase or decrease, they exert an influence on the size of the commitment population. It is possible to isolate the changes in each component and determine the share of the total change in the commitment population for which each is responsible (see Methodology on page 17). Certain components may contribute to growth, while others may have the opposite effect. For example, if the number of court referrals increases, this will contribute to an expansion of the commitment population. At the same time, other elements of the system could curtail growth. A decrease in the use of placement could offset part or all of the growth generated by increasing referrals. Adding up the "shares" from all components of juvenile justice case processing yields the overall net change in the commitment population.

Table 2: Referrals to Juvenile Court and Transition Probabilities for Youth in Residential Placement, 1993 and 1997

Offense	Number of Referrals to Juvenile Court			Rate of Adjudication (%)		Rate of Residential Placement (%)*		Length of Stay (stock/flow ratio)†		
	1993	1997	Change (%)	1993	1997	1993	1997	1993 (days)	1997 (days)	Change (%)
Total	**1,427,600**	**1,693,600**	**19**	**31**	**33**	**32**	**31**	**96**	**109**	**14**
Person	309,200	378,200	22	31	33	35	32	162	180	11
Property	784,000	812,600	4	30	32	29	29	89	104	17
Drug	86,200	177,300	106	37	37	33	27	148	113	–24
Public order	248,200	325,500	31	34	37	37	37	22	49	123

* Percentage of adjudicated cases committed to residential facilities.

† Stock/flow ratio of the number of juveniles in residential facilities divided by the number of cases resulting in residential placement during the year. The ratio is converted to the unit of days.

Source: OJJDP's Children in Custody census 1993 data file, OJJDP's Census of Juveniles in Residential Placement 1997 data file, and NCJJ's National Juvenile Court Data Archive 1993 and 1997 data files.

Table 3 and figure 5 show how each component of the system contributed to the amount of overall change in the commitment population between 1993 and 1997. Several factors contributed to the expansion of this population from 37,700 to 52,500 juveniles. Increases in the number of court referrals, the rate of adjudication, and the average length of stay all contributed to the expansion, while the decrease in the use of residential placement had a curtailing effect.

Of the four major offense categories (person, property, drugs, public order), person and property offenses accounted for most (each about one-third) of the total change in the commitment population. Increases in the number of commitments for public order and drug offenses accounted for approximately 27 percent and 9 percent, respectively, of the change in the commitment population.

Increases in length of stay accounted for 80 percent of the growth in the commitment population of offenders charged with public order offenses. For those charged with drug offenses, increases in the number of youth referred—which more than doubled between 1993 and 1997—overrode the generally downward trend of all other transition probabilities

Table 3: Change in Number of Juveniles Committed to Residential Placement Between 1993 and 1997, by Category of Offense and Components of Change

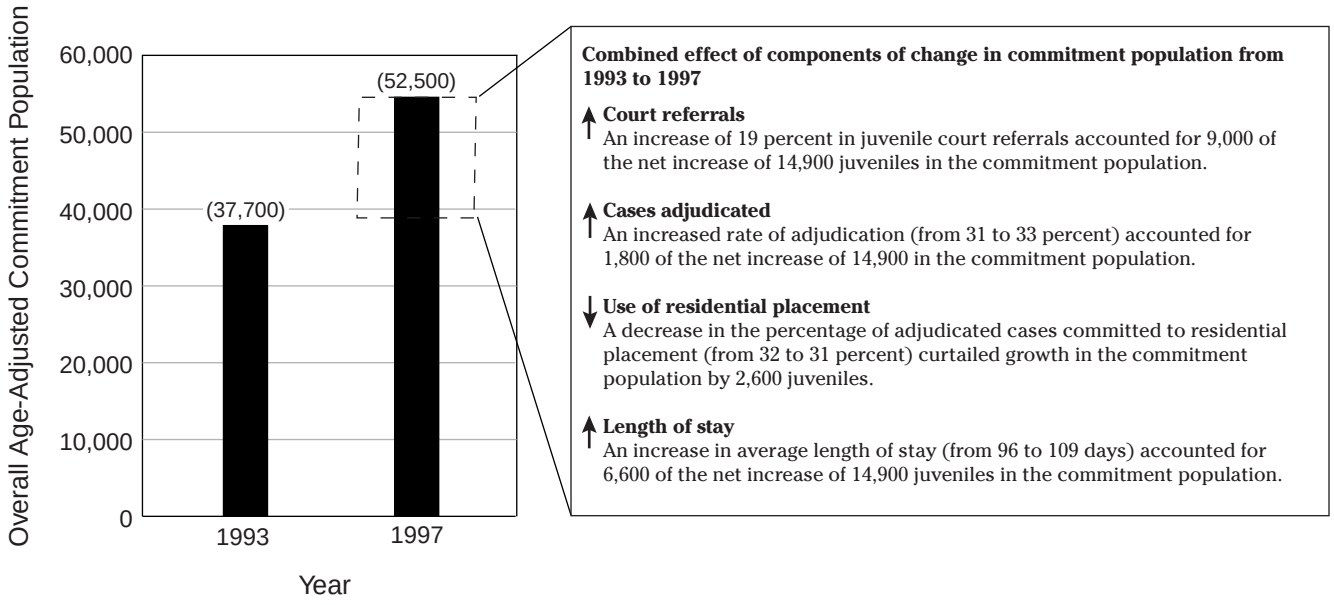
Offense	Number of Juveniles Committed		
	1993	1997	Net Change
Total	**37,700**	**52,500**	**14,900**
Person	14,800	19,800	4,900
Property	16,600	21,300	4,700
Drug	4,300	5,500	1,300
Public order	1,900	5,900	4,000

Offense	Change in the Juvenile Commitment Population Between 1993 and 1997 Due To:				
	Referral	Adjudication	Use of Placement	Length of Stay	Net Change
Total	**9,000**	**1,800**	**–2,600**	**6,600**	**14,900**
Person	3,300	900	–1,200	2,000	4,900
Property	600	900	100	3,200	4,700
Drug	4,500	–100	–1,700	–1,500	1,300
Public order	600	200	0	3,200	4,000

Note: Detail may not add to totals due to rounding. Calculations were based on unrounded numbers.

Source: OJJDP's Children in Custody census 1993 data file, OJJDP's Census of Juveniles in Residential Placement 1997 data file, and NCJJ's National Juvenile Court Data Archive 1993 and 1997 data files.

Figure 5: How much did each source of change contribute to the overall change in the population of juveniles in commitment from 1993 to 1997?



Note: Components of change may not add to total due to rounding.

Source: Urban Institute analysis of OJJDP's Census of Juveniles in Residential Placement 1997 data file, OJJDP's Children in Custody census 1993 data file, and NCJJ's National Juvenile Court Data Archive 1993 and 1997 data files.

(the adjudication rate, the use of placement, and average length of stay) associated with these offenders. Although there were minor offense-specific variations from the overall sources of change, all of the major offense categories contributed to the increase in the number of juveniles committed to residential facilities (table 3).

The commitment population through 2002 is projected in the analysis by using a mathematical flow model based on the approach first developed by Stollmack (1973) to project prison populations (see "A Brief History of Corrections Population Projection Methods" on page 14). Future populations are projected by relating flows to stocks by length of stay—the inverse of which represents the turnover rate of the population. The model requires explicit assumptions about the case processing factors that might influence the size of confinement populations. For example, the model must include assumptions about changes in referrals and length of stay. Will the number of court referrals continue to rise through the year 2002, or will it stabilize at the 1997 level? Will average length of stay increase or decrease? Assumptions about how these components will or will not change after 1997 have a significant effect on projections of the juvenile population in facilities. The following analysis considers several possible scenarios to project a range of 2002 commitment populations.

Five projections of the commitment population were developed, each based on a different set of assumptions (figure 6). These projections (referred to as A, B, C, D, and E) yield commitment populations ranging from almost 53,000 to more than 102,000 by the year 2002 (figure 7). For example, if 1997 conditions were to persist for 5 years after 1997 (projection A), the number of juveniles in commitment facilities in 2002 would be expected to remain at the 1997 level (about 53,000 juveniles). In other words, if juvenile courts were to continue to commit juveniles to residential placement at the 1997 rate, to adjudicate cases at the 1997 rate, and to hold juveniles in facilities for an average of 109 days, just as in 1997, the commitment population would remain at the 1997 level.

Conditions in the juvenile justice system rarely remain unchanged for several years at a time. There are specific reasons to doubt that the conditions of 1997 would continue for very long beyond 1997. First, the commitment population was growing at an increasing rate between 1993 and 1997. Second, the number of cases referred to juvenile courts also increased, and this was responsible for a large part of the total increase in the commitment population. In addition, the average length of stay changed between 1993 and 1997, growing from 96 to 109 days. Improbable changes in case processing would have had to occur for admissions and length of stay to have remained constant after 1997. For admissions to stabilize, for example, the increase in the number of referrals to juvenile court between 1993 and 1997 would have had to reverse itself after 1997 or the use of residential placement would have had to decrease sharply. These changes are unlikely, given trends observed between 1993 and 1997.

On the other hand, if changes in case-processing practices were incorporated into the projections, the expected population could follow the paths of projection lines B, C, D, or E. These projections show how the juvenile population in residential placement would change based on varying assumptions about admissions and the average length of stay for committed youth. Under projection B (stable length of stay, admission trends continue), the population would increase to almost 69,000 in the year 2002. Under projection C (stable admissions, trends continue in length of stay), the population would grow to about 75,000 by 2002. Projection D shows how the population would change given the assumption that admissions and length of stay each continue the trend observed from 1993 to 1997. It projects that the commitment population would grow at a steep rate, increasing to just more than 98,000 by 2002.

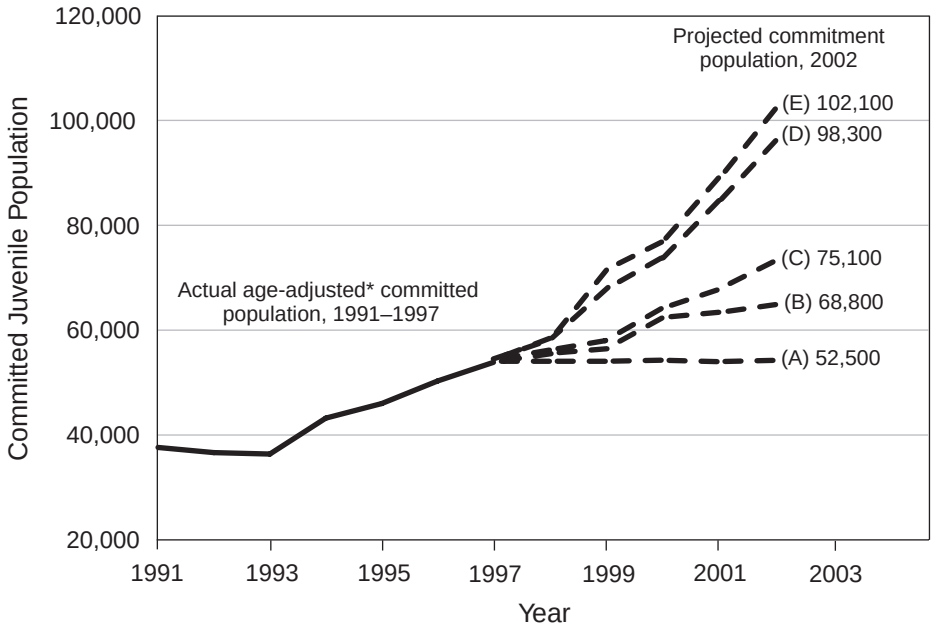
These projections point out the importance of the key policy variables (the rate of referral to court, the rate of adjudication, the use of placement, and the length of stay of youth in residential placement) in anticipating future demand for bedspace. Each of these variables represents important considerations for policy and practice. The number of youth referred to court reflects the volume of delinquent acts in the community, but it also reflects the policies and priorities of the juvenile justice system, the availability of alternatives to secure confinement, and the range of diversion options. The amount of time juveniles spend in residential facilities is a function of offense seriousness, but it also reflects policy decisions about the use of secure confinement and the availability of postrelease supervision. (For a discussion of why length of stay is important and how it is measured, see pages 12–13.)

These relatively simple projection models can also be used to consider different policy and program choices and to simulate their effects. For example, suppose juvenile justice officials know that the average length of stay for youth committed for drug offenses will increase significantly because of plans to administer more drug treatment during confinement. Assume that the new drug treatment programs will increase the average length of stay for drug offenders by 5 percent each year between 1998 and 2002. For all other offenders (nondrug), length of stay will

Figure 6: Five assumptions are used to define alternative projections of the juvenile commitment population, 1998–2002

	Assuming admissions remain at 1997 level	Projecting admissions based on 1993–97 changes
Assuming average length of stay remains at 1997 level.	**Projection A**	**Projection B**
Projecting average length of stay based on 1993–97 changes.	**Projection C**	**Projection D**
Fixing length of stay for drug cases to increase 5 percent annually; projecting length of stay for all nondrug cases based on 1993–97 changes.		**Projection E**

Figure 7: Projections of the juvenile commitment population vary greatly according to assumptions about future conditions



Assumptions:

A. Admissions and length of stay (LOS) remain at 1997 levels.

B. LOS remains at 1997 levels; admissions projected based on 1993–97 trends.

C. Admissions remain at 1997 levels; LOS projected based on 1993–97 trends.

D. Admissions and LOS projected based on 1993–97 trends.

E. Admissions based on 1993–97 trends; LOS for drug offenders increases by 5 percent each year; LOS for all other offenders is projected based on 1993–97 trends.

* For the definition of the "age-adjusted" juvenile commitment population, see table 1, second footnote.

Source: Urban Institute analysis of OJJDP's Census of Juveniles in Residential Placement 1997 data files, OJJDP's Children In Custody census 1991, 1993, and 1995 data files, and NCJJ's National Juvenile Court Data Archive 1993 and 1997 data files.

Length of Stay: Why It Is Important and How It Is Measured

Changes in the size of juvenile corrections populations can be understood in relation to the number of people who move into and out of facilities (or "flow") and the length of time that they stay in facilities (length of stay). Length of stay is a critical ingredient in projections of juvenile custody populations. A corrections or detention population can change dramatically if a facility's length of stay begins to change, even if admissions are stable. Measuring length of stay, however, can be challenging. There are three commonly used methods of estimating length of stay.

Estimation Methods

Exit Cohort

The most popular measure of length of stay is the average amount of time spent in corrections by a group of youth released during a given period of time. Known as an "exit cohort" estimate, this technique for estimating length of stay is easy to calculate and easy to interpret. However, it can underestimate the length of time individuals actually spend in correctional facilities. By definition, exit cohorts contain a disproportionate number of individuals who had short stays.

Calculating an exit-cohort estimate of length of stay is easy once the necessary data are assembled. The following example shows the data for an exit cohort of five individuals released between April 1 and June 1. By combining their admission dates and release dates and calculating each person's length of stay, it is possible to determine that this cohort's average length of stay was 87 days.

Calculating Average Length of Stay With Data for an Exit Cohort

Cohort Members	Admission Date	Release Date	Length of Stay (in days)
Person A	January 1	April 1	90
Person B	January 1	April 10	100
Person C	February 1	April 23	82
Person D	February 1	May 15	104
Person E	April 1	June 1	61
Average			**87**

Days Since Admission

Another common measure of length of stay is the average number of days that the current population of a detention or correctional facility has been in the facility as of a certain day. This measure is easy to calculate, but it can also involve considerable bias. As with the exit-cohort estimation technique, it involves just one source of data (the current "stock").

In addition, average "days since admission" can significantly overestimate length of stay because the current population of any facility necessarily contains a disproportionately large number of individuals who have had long stays.* If "days since admission" is the only estimate possible with existing data, however, it can still be useful. The following is an example of a "days since admission" estimate for a population containing five individuals. Using only today's date and the admission dates for all members of the population, it is possible to determine that the average length of stay for this population is 39 days.

Calculating Average Length of Stay Using "Days Since Admission"

Members of the Population	Admission Date	Today's Date	Days Since Admission
Person A	January 1	April 1	90
Person B	February 1	April 1	59
Person C	March 1	April 1	31
Person D	March 15	April 1	16
Person E	March 31	April 1	1
Average			**39**

Stock/Flow Ratio

A third method of estimating length of stay is to calculate a ratio of "stocks" and "flows," where stock and flow are defined as follows:

Stock = the number of youth in a population on a given day (or some measure of average daily population).

Flow = the number of youth released from the population over a given period of time, usually monthly or annually. (If data on actual releases are not available, admissions data can be used to estimate "flows," but this assumes admissions and releases are in equilibrium over the time period of interest.)

A stock/flow ratio can also be a biased estimator for length of stay if the size of the population or the release rate is changing rapidly. The extent of the bias, however, may be less than that of other estimates since stock/flow ratios involve information from two sources (stock and flow). Calculating length-of-stay

* Using "days since admission" to estimate a facility's total length of stay would be similar to estimating the life expectancy of Americans by calculating the average age of all people alive now.

follow the average annual trends seen during the 1993–97 period. Under these assumptions, the commitment population would nearly double from 53,000 in 1997 to about 102,000 in 2002 (projection E). Thus, the addition of drug treatment programs and their effect on length of stay for drug offenders could increase the commitment population by almost 4,000 (the difference between projection D and projection E).

These examples suggest how projection models could be used to anticipate future commitment populations, given varying assumptions about future conditions. The value of these examples is limited by the lack of more detailed data. For instance, the models presented here divide the commitment population into only four

Length of Stay—*Continued*

estimates with stock/flow ratios can be fairly simple once the appropriate information is available. The following two examples present length-of-stay estimates as stock/flow ratios.

Example 1: Assume that a juvenile correctional facility had an average daily population of 300 during the preceding year, and assume that 425 juveniles were released during the year. Using this information, an analyst could estimate the facility's length of stay by dividing the stock (300) by the flow (425), which would suggest that juveniles stayed in the center for an average of (300/425) years—or 259 days.

Calculating Average Length of Stay as a Stock/Flow Ratio: Example 1

Stock—average daily population in placement	300
Flow—juveniles released during previous year	425
Stock/flow ratio in years (300/425)	0.71
Length of stay in days (0.71 X 365)	259

Example 2: Assume that a juvenile detention center has a population of 100 today, and assume that the director of the center considers today's population typical. If 85 juveniles were released from the center during the previous month, a forecaster could estimate the center's length of stay by dividing the stock (100) by the flow (85), which would suggest that juveniles stayed in the center for an average of (100/85) months—or 36 days.

Calculating Average Length of Stay as a Stock/Flow Ratio: Example 2

Stock—average daily population in placement	100
Flow—juveniles released during previous month	85
Stock/flow ratio in months (100/85)	1.18
Length of stay in days (1.18 X 30.4†)	36

Estimation Bias

As any measure of length of stay is likely to involve bias, corrections planners may want to use several estimators to understand how the length of time served is changing. By understanding the conditions that characterize the corrections system—such as increasing admissions and slowing rates of release—the user of length-of-stay information can assess the likely direction of the bias in the measures of length of stay. Once the potential direction of the bias in each measure is assessed, the measures can be compared and conclusions can be drawn about whether persons are spending more, less, or about the same amount of time in custody.

† Number of days in the average month, 365/12.

Length of Stay in This Bulletin

This Bulletin presents an analysis of the change in the juvenile commitment population between 1993 and 1997, and it projects the commitment population for the year 2002. Both these analyses require measuring average length of stay. After considering and computing several measures of length of stay, including "exit cohort" and "days since admission" measures, the authors decided to use stock/flow measures to provide the estimates of length of stay used in these analyses. The bias inherent in a stock/flow ratio is usually less than it would be for other length-of-stay measures (i.e., exit cohorts and days since admission), and using the stock/flow ratio provided a consistent and uniform method of measuring length of stay that was conducive to measuring the change in length of stay over the period.

A stock/flow measure for length of stay was calculated for 1993 and 1997 using data on the number of out-of-home placements taken from NCJJ's National Juvenile Court Data Archive (NJCDA) and data on the number of youth in corrections taken from OJJDP's Children in Custody (CIC) census and its Census of Juveniles in Residential Placement (CJRP). The use of admissions rather than releases is required because national-level data on releases are not available. This choice assumes that releases are estimated by admissions. Under this assumption, if admissions are greater than releases (likely during the study period), then a stock/flow ratio may underestimate length of stay. Conversely, if admissions are less than releases (unlikely during the study period), then a stock/flow ratio would overestimate length of stay. The table below displays the stock/flow ratios used in the analyses presented in this Bulletin.

Offense	1993 CIC Stock/NJCDA Flow Ratio (days)	1997 CJRP Stock/NJCDA Flow Ratio (days)
Total	**96**	**109**
Person	162	180
Property	89	104
Drugs	148	113
Public order	22	49

categories of offenders—person, property, drug, and public order. Obviously, projections would be even more useful if offenses could be divided into additional categories (e.g., felony or misdemeanor, weapon or weaponless, drug possession or drug sales). Moreover, when agencies wish to apply projection models in actual decisionmaking situations, they would prefer even more data. In addition to dividing the juvenile population by offense, projection models can sometimes be calculated separately for juveniles who are drug dependent, those who are known flight risks, those who have school problems, those with educational deficits, etc. Ideally, projection models should be calculated for any categories or factors that may be involved in actual agency decisions about the use of juvenile bedspace in detention or correctional facilities.

Population Projections in Practice

The previous discussion demonstrates how assumptions about future conditions are critical to the results of projection models. The most effective projection models allow decisionmakers to consider a wide range of policy choices and to incorporate those choices into a series of different models so that their effect on future populations can be seen. (A brief history of corrections population projection methods is presented below and a summary of commonly used projection models follows on page 15.) If used in this way, population projections can be flexible tools for understanding the ramifications of various policy choices and the use of confinement resources. Projection models, however, should not be offered

A Brief History of Corrections Population Projection Methods

Beginning in the early 1970's, corrections researchers began to develop increasingly sophisticated methods for projecting adult prison populations. Their methods drew largely from the fields of demography and operations research. Since the 1970's, population projection models and the data available for those models have improved considerably. The fundamentals of population projections, however, are still based on the work of a few original innovators.

In 1973, Stephen Stollmack published one of the first "mathematical flow" models for projecting prison populations. The model used an input-output analysis of the corrections system. It incorporated data about how offenders "flowed" through the stages of the justice process—for example, from arrest to indictment, conviction, and incarceration. Prison populations were projected by relating flows to "stocks" (or the starting point of a prison population) and by incorporating information on the average length of time individuals stay in prison. The model even allowed for limited evaluations of policy changes (for example, the impact of policies that change length of stay can be built into the model and their impacts can be assessed by seeing how the prison population is affected).

Stollmack's model took population projections beyond traditional statistical models (e.g., time series and regression). Statistical models projected future populations by linear extrapolation of trends in prior populations. Statistical models continue to be used today because they allow forecasters to make projections without having to assemble a great deal of data about case processing. With statistical models, however, forecasters cannot disaggregate projections for subpopulations, nor can they analyze the impact of policy changes that affect only certain types of offenders. In addition, statistical models are effective only when data are available for extended periods, and they can be difficult to interpret for nontechnical audiences.

In 1980, Alfred Blumstein and his colleagues continued the development of mathematical flow models by making two enhancements to the Stollmack model (Blumstein, Cohen, and Miller, 1980). First, they disaggregated population projections by racial and crime categories. Second, instead of assuming a constant rate of admissions into the population, their model projected admissions as age-specific proportions of the general population. They developed these proportions with census projections and historical data on prison admissions. Their innovation acknowledged that rates of crime, arrest, and incarceration varied among groups in the general population. Population projections were calculated as a weighted sum of the separate projections for each subpopulation.

Arnold Barnett (1987) introduced another refinement to mathematical flow models based on the concept of "criminal careers." Barnett's model began with age-specific probabilities that nonincarcerated offenders are actively involved in crime. His model estimated the incarceration rate for offenders based on several factors—age, criminal activity, and the expected rate of desistance. The probability of criminal activity could be revised within the model to account for policy changes, and the impact of these changes could be factored directly into projections of prison populations.

While Blumstein and his colleagues and Barnett were improving Stollmack's mathematical flow model, other researchers were developing an entirely different approach to population projections. This second approach would become known as "microsimulation." By the end of the 1990's, 24 States and the Federal Bureau of Prisons were using some form of microsimulation to project prison populations (Sabol, 1999).

Microsimulation models project prison populations by simulating what happens to individual offenders as they are processed by the justice system and enter and leave prison. Early microsimulation models began by estimating the length of time individual offenders were likely to remain in prison. For each prison admission, a path (or "trace vector") is mapped. Future prison populations are projected by adding together the number of individuals remaining in prison at any given point in the future. The California Department of Corrections developed one of the first functional microsimulation models in the early 1970's (Chaiken and Carlson, 1988).

In the early 1980's, the National Council on Crime and Delinquency drew from the experiences of California when it developed its "Prophet" model (National Council on Crime and Delinquency, n.d.). The Prophet model was constructed on the concept of "ID groups"—subpopulations of offenders categorized according to how they were likely to be handled in the justice system. Each group could be modeled through various decision points in the criminal justice system, and lengths of stay were estimated using sentencing variables or data on time served by previous cohorts of released offenders. Incarcerated populations were projected by estimating the number of offenders in each ID group who were expected to be in prison at certain points in the future.

Unfortunately, many State and local agencies are still unable to produce the detailed data necessary to make full use of microsimulation models. In practice, most jurisdictions continue to use grouped data rather than individual-level data in their population projections. Whenever grouped data are used, microsimulation models function essentially as disaggregated flow models.

Note: Much of this history is drawn from Sabol (1999).

to policymakers as a simplistic mechanism for predicting future corrections populations.

Because projection models are unable to account for all of the details involved in the juvenile justice process, they will never be foolproof. Moreover, until State and local agencies are able to support significant expansions in their data collection and analysis capabilities, it is unlikely that any projection model will ever represent the true diversity of the juvenile population. For this reason, juvenile justice agencies should resist the temptation to rely on any single prediction of future demand for space. Instead, they should invest in an extended process of "forecasting."

Forecasting Rather Than Predicting

Forecasting is different from predicting, although both strategies involve statistical projections of corrections populations.

Models Commonly Used To Project Corrections Populations

Projecting corrections populations is often incorrectly understood as an effort to "get the right number." This assumes that a projection is inferior if it produces a number that turns out to be different from actual need or if a projection becomes irrelevant after a change in policy. It is more appropriate to view projections as conditional statements of a future corrections population that will hold true only if current assumptions about the factors that generated past populations persist into the future. A comprehensive forecasting effort should include not only population projections but also policy debates and analyses to understand why actual populations depart from projections and to demonstrate the role of policy in shaping demands for space.

Type of Model	Method or Approach	Comments
Microsimulation	◆ Projects the movement of individual entities through the justice system using detailed information about real individuals who have gone through the system or are still in process. ◆ Permits users to aggregate information at the end of a simulation into whatever categories are needed.	◆ Offers the greatest flexibility/power in projecting populations under various policy assumptions. ◆ Requires extensive data about individual offenders. ◆ Most State and local jurisdictions are not able to meet the data requirements. ◆ For national-level projections, data requirements for microsimulation will likely never be met.
Disaggregated flow	◆ Uses rates of flow between the stages of the justice system (e.g., odds of adjudication after arrest, odds of incarceration after adjudication). ◆ Rates can be entered and then altered for various subpopulations for repeated projections over time.	◆ Generates projections based on the movement of groups through the justice system. ◆ Next to microsimulation, offers the most flexibility for anticipating future conditions. ◆ Requires grouped data only.
Statistical	Uses methods such as time series or multiple regression to project populations based on changes in other, related variables.	◆ Requires less data but does not provide much flexibility for modeling future policy changes. ◆ Generates projections based on past values of the variable to be projected and their relationship to other factors. ◆ May require the values of independent or causal variables to be projected as well.
Mathematical	May involve various methods, ranging from simple growth-rate projections to more sophisticated stochastic models.	◆ Requires minimal data but is very inflexible. ◆ Projections are generated by adding a constant to existing populations or by multiplying populations by calculated growth rates. ◆ Assumes future conditions will be the same as past conditions. ◆ May include parameters that relate inflow to outflow or that model length of stay in corrections.

Forecasting Juvenile Corrections Populations in Oregon

The Oregon Youth Authority obtains twice-yearly forecasts of the number of young offenders likely to be in its "close custody" programs 10 years into the future. (Close custody refers to youth housed in the State's MacLaren and Hillcrest facilities and also those in "accountability camps," "work study camps," and Oregon's Juvenile Intake Center.) Forecasts are generated by Oregon's Office of Economic Analysis using models developed by the office and overseen by an interdisciplinary advisory committee. Members of the committee include researchers from a local university, court and probation officials, and the Director of the Oregon Youth Authority.

Each forecast incorporates the most recent data on intake trends, arrest trends, and future population growth for Oregon youth ages 12 through 17. Separate models are used to forecast important subpopulations within the juvenile offender population, including youth affected by Oregon's "Ballot Measure 11," which automatically transfers certain categories of offenders to the criminal court.

The forecasts are provided to policymakers and other officials in the State to foster discussions about recent trends and their effect on future corrections populations. The Office of Economic Analysis advises officials that each "forecast is not what the population **will be,** but what the population **would be** if current practices and policies were applied to future conditions" *(Oregon Youth Authority Close Custody Population Forecast: Biennial Review of Methodology,* page 2*).*

Source: *Oregon Youth Authority Close Custody Population Forecast* (April 2000), a biennial series, and *Oregon Youth Authority Close Custody Population Forecast: Biennial Review of Methodology* (June 1998). Salem, OR: Oregon Office of Economic Analysis. Also available on the Internet at www.oea.das.state.or.us/oya/oya.htm.

Differences Between Predicting and Forecasting

	Predicting	Forecasting
Focus	Future	Recent past
Goal	Accurately predict the future	Examine recent developments and their relevance for the future
Methods	Statistical projections	Statistical projections, policy discussions, program reviews
Personnel Involved	Analysts	Policymakers, administrators, practitioners, analysts
Frequency	As needed	Regularly
Definition of Success	Accuracy	Utility/learning

Forecasting relies on reflection instead of speculation. In a prediction context, researchers focus on the future. They use data about the past to speculate about the future, and they encourage policymakers to act on their statistical vision of the future. In a forecasting context, researchers focus on the recent past. They use data to understand how the recent past turned out to be different from previous expectations. By identifying and examining these differences, policymakers and other professionals increase their understanding of the factors that are likely to influence future trends, but they do not place undue faith in anyone's ability to predict those trends accurately.

A forecasting approach also encourages decisionmakers to review their assumptions about their own policies and practices on a regular basis. Some agencies may engage in a forecasting process on an annual or even semiannual schedule. They conduct repeated projections of their corrections populations and compare actual developments with their previous expectations of demand for bedspace. Administrators and policymakers use the occasion of each forecasting exercise to review their assumptions about their system and how it uses bedspace. In such an environment, population projections can be used to encourage sound policy and practice decisions. (See "Forecasting Juvenile Corrections Populations in Oregon" on this page for a description of one agency's approach to integrating forecasts into its policy process.)

No single projection exercise should drive policy and budgetary decisions. Every projection should be used in conjunction with policy debates about the type of programs a jurisdiction wishes to support. Decisionmakers can use a forecasting process to reflect on current policies and practices and to ask critical questions about their use of bedspace: If current trends continue, which type of offenders will be committed to secure confinement and which will be placed in community-based programs? What type of offenders will stay the longest in secure facilities? Which facilities will see the largest increases in daily populations or length of stay? Which areas of the State will experience the greatest changes in expected demand? Projections of future custody populations can be powerful learning tools that serve the twin goals of making communities more secure and providing appropriate treatment programs for youth.

Forecasting and the Policy Process

The juvenile justice process has many unique features that need to be accounted for in projection methodologies. These features include a wide use of diversion, great discretion at all levels, and the juvenile court's ability to base dispositions on not only the public safety but also on the best interests of the juvenile. Because juvenile court dispositions are sometimes for indeterminate periods of time, lengths of stay are often linked not only to the severity of the offense but

Methodology

Decomposition Methods

A statistical flow model is used in this analysis to decompose changes in the national juvenile commitment population between 1993 and 1997. The model segments the overall change in the commitment population into offense-specific groups (person, property, drug, and public order). Within each group, the model decomposes the overall change in the commitment population into the portions of total change that can be attributed to the following factors:

- Changes in the number of juvenile court referrals.
- Changes in the number of referred cases that result in adjudication.
- Changes in the number of adjudicated cases that result in residential placement.
- Expected length of stay in residential placement (using a stock/flow estimate of length of stay).

The offense-specific changes in these components of growth are then aggregated to obtain the total change in the juvenile commitment population over the period of analysis.

The population change model used in this Bulletin follows the approach of Abrahamse's (1997) method for assessing change in prison populations. The number of juveniles committed to residential placements at the end of a year is defined as follows:

POPULATION = REFERRALS x ADJUDICATION x PLACEMENT x LENGTH OF STAY

Where each element is defined as follows:

POPULATION	=	the juvenile population committed to residential placement facilities.
REFERRALS	=	the total number of delinquency cases referred to the juvenile court system.
ADJUDICATION	=	the proportion of referred cases that results in adjudication.
PLACEMENT	=	the proportion of adjudicated cases that results in commitment to residential placement facilities.
LENGTH OF STAY	=	the expected length of stay, estimated by a "stock/flow" ratio (see discussion on pages 12–13).

The amount of change in the juvenile commitment population between 1993 and 1997 is a function of the offense-specific changes in each individual component of change as measured in the above model. Thus, the difference in the population is a "weighted sum" of differences in each component, where the weights equal the offense-specific contribution to change in the population. The decomposition of change is applied separately to each offense group, and each of the offense-specific changes in the juvenile commitment population can be summed to obtain the total change in the population between 1993 and 1997.

Projection Calculation

Using data for the 1993–97 period, a mathematical flow model is used to project the juvenile commitment population for the years 1998 through 2002. The model follows the approach developed by Stollmack (1973) to project prison populations. The analysis uses the following equation to project the juvenile committed population for each year, from 1998 to 2002:

$$P(t) = A(t) \times LOS(t) + [P(t-1) - (A(t) \times LOS(t))] \times \exp[-1/LOS(t)]$$

Where each element is defined as follows:

$P(t-1)$	=	the population in the previous year ($t-1$).
$A(t)$	=	admissions or commitments to residential placement during the year.
$LOS(t)$	=	the estimated length of stay in commitment.
t	=	the time unit for flows (in this example, years).

This model requires three data inputs for each time period: the starting population, which is the population from the previous time period [$P(t-1)$]; admissions during time t; and length of stay. The projection scenarios described in this Bulletin use the 1997 juvenile commitment population as the initial starting population and assume that admissions either remained at 1997 levels throughout the 1998–2002 period or that they increased each year based on applying the average annual changes observed from 1993 to 1997. Similarly, average length of stay is either assumed to remain at 1997 levels or projected for each year based on the average annual change observed from 1993 to 1997.

As with the decomposition model, the projection models presented in this Bulletin were apportioned into offense-specific components (person, property, drug, and public order) and then summed to obtain the total populations projected for each year from 1998 to 2002. Since data on the number of committed youth released from residential placement were not available for all years in this analysis, the model presented in this Bulletin must assume that admissions and releases were in equilibrium.

also to a youth's progress in treatment programs and the availability of space. As a result, juvenile detention and corrections systems have much less stable information on which to build forecasts than criminal justice agencies.

Researchers must encourage policymakers and administrators to understand that no projection methodology will ever be able to model the complexity of the decisionmaking processes that lead juvenile offenders to be placed in secure facilities or that determine how long juveniles will stay in those facilities. It will always be necessary for decisionmakers to review the results of a projection model and consider its value for policy and practice. However simple it may appear at first, estimating a jurisdiction's future need for detention and corrections space requires an extensive examination of the justice system and of the processes used to select juvenile offenders for placement.

An effective forecasting process should take into account the important role played by each jurisdiction's policy preferences and professional practices. Forecasting should include at least three general areas of activity:

- First, decisionmakers should have regular access to extensive data about trends in juvenile crime and juvenile justice processing within their jurisdictions, and they should use that information to project the size of future detention and corrections populations.
- Second, they should develop a thorough understanding of their jurisdiction's policies and practices regarding the use of secure confinement for juvenile offenders, including how the diversity and depth of juvenile justice resources are related to the need for secure space.
- Third, they should host a rotating series of strategy meetings with a variety of audiences from the juvenile justice system and the larger community. These meetings should focus on the relationships among the availability of juvenile justice program resources, recent trends in the use of those resources, and projections of future confinement populations.

The validity of any projection model rests on the reasonableness of its assumptions and the persistence of these assumptions into the future. When projections fail to anticipate future conditions, forecasters should seek to explain why actual populations differ from projected populations. Decisionmakers then have the opportunity to learn about the effects of practice and policy actions that were not included in the projection.

The success of a forecasting process is not determined by its predictive accuracy. A projection that turns out to be wrong (or one that produces population estimates that deviate from actual future populations) is not necessarily an invalid projection. An invalid projection is one in which the differences between a projected population and the actual population cannot be explained. A projection that turns out to be inaccurate as a prediction may still be a useful projection if analysts are able to explain which critical assumptions were violated and what impact these violations had on corrections populations.

Conclusion

Efforts to anticipate future space needs in juvenile detention and juvenile corrections facilities should involve more than an occasional analysis of juvenile arrest trends. Ideally, juvenile justice decisionmakers should anticipate future demands for space by engaging in a population forecasting process on an annual or semiannual basis. Forecasting involves statistical predictions (or projections) of future corrections populations, but the results of such projections serve as the beginning of an agency's decisionmaking process rather than the end. Forecasting encourages policymakers and practitioners to use statistical projections to reflect on recent trends and discuss their expectations of the future in light of those trends. The accuracy of their expectations can then be reviewed during the next forecasting session. Over time, a forecasting process helps decisionmakers to anticipate the consequences of policies and practices regarding secure bedspace without undue reliance on statistical analysis.

No projection method is infallible, but juvenile justice officials must choose some method for planning for future space needs. Without careful projections of the likely demand for detention and corrections space, policymakers and administrators make important decisions about the need for additional facilities based primarily on the immediate pressures of crowding. However, crowding is an indicator of past demand. Budgeting and policymaking must prepare an agency for the future. Making important decisions without attempting to project future conditions can leave the juvenile justice system unprepared and lead to inefficient uses of costly resources.

Projecting future demand for bedspace will always be challenging because the policy environment in juvenile justice is highly dynamic. As Allen R. Beck once observed: "Using the past to 'see' the future is like driving a car by looking into the rear view mirror. As long as the road is straight or curving in wide arcs, the driver can stay on the road by looking backward. However, if a sharp turn occurs or a bridge is out, the driver will crash" (Beck, 1998). The policy environment in juvenile justice has taken many sharp turns in recent decades. Agencies can improve the usefulness of population projections by investing in a forecasting process that generates projections on a regular basis and exposes each set of projections to the scrutiny of a broad range of audiences and stakeholders.

Endnotes

1. These numbers represent different units of count, and this analysis should not be interpreted as suggesting that exactly 62 percent of all arrested youth were referred to juvenile courts in 1997. Changes in the relationship between juvenile arrests and juvenile court cases, however, do indicate law enforcement's shifting emphasis on court referral.

2. This example is intended as a demonstration of projection methodology and not an analysis of national custody populations that could be used to formulate State or Federal policy. For this reason, all data, including population counts, are rounded.

3. The juvenile custody population numbers in table 1 are drawn from the Census of Juveniles in Residential Placement (CJRP) in 1997 and from the Census of Public and Private Juvenile Detention, Correctional, and Shelter Facilities, also known as the Children in Custody (CIC) census, in the years prior to 1997. CJRP differs fundamentally from CIC, which collected aggregate data on juveniles held in each facility. CJRP collects individual data on each juvenile held in each residential facility in the census. Since there was a change in data collection instruments, it is difficult to determine how much of the increase in the number of delinquents in custody is real and how much is due to the change in methods. According to OJJDP (see Snyder and Sickmund, 1999), the "roster" format of the CJRP data, along with electronic reporting, may have facilitated a more complete accounting of juveniles in facilities. In the years when CIC was used, there were many private facilities that did not report juveniles in custody. It is therefore likely that the reported number of juveniles in private facilities is understated. The population counts presented here do not match the data reported in other analyses of OJJDP's CJRP data due to the various adjustments in this analysis.

4. Adjustments were based on the assumption that the 1997 population represents an accurate count of juveniles in custody in both private and public facilities. The ratio of the private to public populations in 1997 was applied to the

1993 and 1995 reported counts of juveniles in public facilities to adjust the number of youth in private facilities in those years.

5. The number of "admissions" into residential facilities is required to compute the relative rate of placement for any given year. A count of admissions is also essential input for projecting future juvenile commitment populations. Data on true admissions, however, are not available from any national data collection program (e.g., the National Juvenile Court Data Archive, the Census of Juveniles in Residential Placement, or the Children in Custody census). The National Juvenile Court Data Archive, however, can provide data on the number of adjudicated juvenile court cases resulting in commitment to residential placement during each year of the analysis. These data are used as a proxy for the number of "admissions" into residential placement.

6. Transition probabilities were calculated for 1993 and 1997 on an offense-specific basis. The overall change in the commitment population between 1993 and 1997 was then decomposed into the changes in these transitions from stage to stage during the period.

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