Board of Correction
City of New York

Jail Management Evaluation Index

Developed with assistance from the National Institute of Corrections under grant number 90J01GHH3.

City of New York
Board of Correction

James Bennett, Director of Information Services

Xiaosu Li
Shobitha Stanislaus
Orelia Felder

CONTENTS

Executive Summary

The New York City Board of Correction has been working to develop a management evaluation index to enhance its ability to analyze conditions in the New York City jail system. The index targets three broad areas of jail management; security, staff and service provision. We collected data from these areas and combined it into one broad indicator attempting to measure the overall well-being of individual jails in the New York City system.

New York City has over 22,000 inmates and over 13,000 Department of Correction staff including over 11,000 uniformed staff. The Board of Correction has a field staff of 13 with which to make sure that every housing area as well as all programs and services adhere to minimum standards in the City's 20 jail facilities and to try to resolve inmate grievances. The Board has 12 office staff to respond to infraction appeals, analyze data, perform research, make policy recommendations, and perform administrative duties. As with every other system in the country, the New York City system is growing rapidly every year while simultaneously faced with tighter budget constraints. As the correctional system continues to grow to unpredictable levels and becomes increasingly complex, it becomes more important to be able to simplify analyses without compromising their quality.

The index provides a framework for analyzing large amounts of data simultaneously, allowing the Board to collect and analyze a much larger amount of data than previously possible. In addition to increasing the quantity of data analyzed, developing the index has improved the quality of analyses performed by the Board by developing a wider base of information and providing a basis for evaluating it.

The process of developing the index created a need to identify the components of jail management, collect data that attempt to measure the components, evaluate how the indicators relate to each other, and based on that, make a judgement as to the relative importance of each indicator. Rather than focusing on one issue at a time, the objective was to develop a set of indicators that provide a broad picture of the status of a jail.

The index has the potential to allow the Board to analyze more fully and quickly the effects of various policy decisions and can provide the basis for developing models based on probability for projecting the effects of proposed policy initiatives before they are implemented.

The first step in developing the index was deciding what types of issues we were interested in knowing about jails. We grouped these issues into three basic categories, security, staffing, and service provision. The categories chosen reflect the basic issues which the Board of Correction has concerned itself with over the past several years. Other agencies in other jails systems may find it more useful to categorize their data differently.

The next step was to identify the specific variables to use as indicators to represent the four categories. The data was collected for a 36 month period from October, 1987 through September 1990 and was limited to jails for which consistent and distinct data was available for most of the period. This eliminated some of the more unique jails in the system including two jail barges which have gone in and out of service, changed location and been used for differing purposes (work release, drug programs) throughout the time period. Also, some of the smaller jails do not have distinct records available in every category as their records are sometimes lumped together with larger jails. All data used was collected and compiled from Department of Correction reports, logbooks, and other records and documents.

Once we identified the indicators and collected the data, the task was to combine it all in a meaningful way. We made the assumption that all the categories are interrelated to some degree. Staff issues such as overtime and absences may affect violence, security and service provision; violence affects staff absences and overtime, absences affect overtime, overtime affects absences and so on.

With the exception of inmate to staff ratio, we viewed the categories as both dependent and independent variables meaning that they both exerted influence and were influenced by the other variables. We viewed staff to inmate ratio to be causal only in that for a particular time period, the inmate/staff ratio could not be caused by any of the other variables.

Each indicator needed to be weighted to determine how much the index should be influenced by it. There is no set way of assigning weights. It can be accomplished merely by choosing weights based on intuitive or subjective knowledge of the jail system or by assigning equal weight to each of the indicators. We chose to assign weights using a quantitative approach based on the degree to which each of the indicators are correlated with the other indicators. We accomplished this by using a series of multiple regression models using each of the index variables as a dependent variable against the other variables.

Because of the general nature of the variables, precise estimates of cause and effect would be extremely difficult to determine. Instead we chose not to focus on cause and effect for any of the variables other than inmate staff ratio, and merely use the relative correlations of each as the basis for the weights of each of the variables. The more a change in the level of a variable is associated with the change in the level of the other variables, the greater the weight attributed to that variable, regardless of whether there is a direct cause-effect link. What this approach produces is the degree to which each variable acts as an indication of the state of the "rest of the system" as opposed to how much it affects or causes the state of the system.

Of the three categories, staff indicators turned out to have the heaviest combined weight (45.7%), followed by indicators for security (31.3%) and service provision (23.0%). Inmate/staff ratio was weighted the most heavily of the individual indicators (16.3%). Other indicators which were assigned relatively high weights were violence level (14.0%), weapon contraband infractions (10.3%), non line-of-duty-injury related absences (10.3%) and overtime spent (10.1%).

In order to calculate an index value, we had to determine a base value. There are two methods we considered for doing this. The first is to pick one time period to compare against the other time periods. The problem with this method is that it is not easy to determine what a normal value is for the index making it somewhat more difficult to analyze without comparing it to values from several other time periods or from several other facilities or both.

Another method is to use an average of all the time periods as the comparison. This allows us to immediately see from a single index value how well a jail is doing for that time period based on the average values. We chose to use average values as the base of the index.

We calculated the average in two ways, creating two different indexes. The first method was to calculate the average value for each indicator for each jail. In this way the index value for the jail would be a comparison to its own average values. This is a good way to measure the trends of a particular jail overtime or to compare the relative improvement or decline but this method for calculating the base may result in giving a higher rating to a jail that has not performed well but has improved somewhat than to a jail that has performed well but has not performed quite as well recently. This is not a problem as long as the statistic is interpreted as the relative performance of each jail

to its own past performance rather than as the absolute performance rating between he two jails.

We also calculated the average value for each indicator for all the jails to allow us to see how each jail ranked in relation to the others. This creates a better statistic for comparison across jails but in the model that we have developed, it gives an unfair advantage to those jails with easier to manage inmate classifications. This can be overcome by including the classification variables in the index. We have chosen not to do that because we are more interested in comparing the differences in jail performance depending on inmate classification (for example it is of interest to see how the performance of jails with high numbers of parole violators compares with jails housing few parole violators.

The final result was two sets of index values for each facility and month. The first derived from using the average indicator values for each facility as the base values and the second using the average values calculated for the twelve facilities. The first index yielded results that had a smaller range which is understandable since we would expect more consistency when comparing one jail's performance over time then when comparing one jail to another. The standard deviation for the first index is 18.05 with a high value of 149.9 and a low value of 17.9 while the standard deviation for the second index is 30.57 with a high value of 177.3 and a low value of -4.7 (the only value less than 0). The high and low scores were not for the same facility and month for each index. The larger standard deviation of the second index is the result of greater variation between jails. Some jails tended to always be above 100 while others were nearly always below 100. When you look at each jail separately however, the variation from month to month is much less than for the first index.

For both indexes, jails tended to go for several months above or below 100 indicating that trends could be identified rather than the index scores being radically different from month to month which would diminish the usefulness of the index as a warning system.

To test the validity of the index values, we looked at several categories of "special incidents" to compare index values for when and where these incidents occurred. We do not expect the index to predict the occurrence of these incidents, however, when these incidents occur, the index value for the facility in which the incident occurred should be below 100 for that time period. For the categories of suicides, homicides and escapes there was no correlation between the index values and the occurrence of the incidents.

However these incidents generally involve few (usually one) inmates and may not represent an indication of the conditions in a jail facility but the random actions of individuals.

We obtained more encouraging results from the occurrence of inmate disturbances. Of eight incidents that can be categorized as serious inmate disturbances for the period of the study, six occurred in jails that had index values below 100 for that period. This is far from being statistically significant however and provides only anecdotal support for the validity of the index. Other tests need to be derived before we can feel confidant in the index values.

1. Introduction: Objectives of Developing a Jail Management Index

The New York City Board of Correction has been working to develop a management evaluation index to enhance its ability to analyze conditions in the New York City jail system. The index targets three broad areas of jail management: security, staff and service provision. We have collected data from these areas and combined it into one broad indicator attempting to measure the general well-being of individual jails in the New York City system.

The Board of Correction is a separate agency with a separate budget from the Department of Correction, the agency responsible for the custody and care of the City's inmates. The Board is a "watchdog" agency established to monitor the City's jail system. The City Charter mandates among other things, that the Board evaluate the performance of the Department of Correction. The development of the index is a step toward providing a better picture of jail performance and creating an objective tool for evaluating Department of Correction performance.

New York City has over 22,000 inmates and over 13,000 Department of Correction staff including over 11,000 uniformed staff. The Board of Correction has a field staff of 13 with which to make sure that every housing area and all programs and services adhere to minimum standards in the City's 20 jail facilities. Field staff also try to resolve inmate grievances. The Board has 12 office staff to respond to infraction appeals, analyze data, do research, make policy recommendations, and perform administrative duties. As with every other system in the country, the New York City system is growing rapidly every year while simultaneously faced with tighter budget constraints. As the correctional system continues to grow to unpredictable levels and becomes increasingly complex, it becomes more important to be able to simplify analyses without compromising their quality.

The index provides a framework for analyzing large amounts of data simultaneously, allowing the Board to collect and analyze a much larger amount of data than previously possible. Besides increasing the quantity of data analyzed, the purpose of the index is to improve the quality of analyses, develop a wider range of information and provide a basis for evaluating it. The process of developing the index has created a need to identify the components of jail management, collect data that attempt to measure the components, evaluate how the indicators relate to each other and make judgments about the relative importance of each indicator. Rather than focusing on one at a time, the

objective has been to develop a set of indicators that provides a broad picture of the status of a jail.

It is not always obvious from looking at one or two indicators if a problem is developing in a jail facility. Even by looking separately at all the indicators included in the index, the general status of a jail may not be clear and may even become more confused when analyzing more data. Two people looking at the same information can easily come to different conclusions if there is no objective standard for evaluating the data. Also, if data give conflicting messages, how do you evaluate it? For instance, if violent incidents are down but recovered inmate contraband is up, does the violence data indicate the facility is doing better or does the contraband data indicate it is doing worse?

The index addresses this issue by attempting to provide a basis for standardization making analyses more comprehensive, consistent and objective. Also, by combining the data using a system of weights for each variable, the total picture becomes easier to discern since the data is presented in a simpler form. In this way the index will be used to help identify trends in the general well being of jails in the New York City system and help point out jails that are developing problems.

A major advantage of this type of analysis is that it can be proactive. It is easy to tell there is something wrong with a jail when a riot breaks out. The challenge is to find ways to identify problems as they develop rather than when they have reached crisis proportions. Instead of simply "putting out fires," we hope that the index can act as an early detection device for deteriorating jail conditions. It also has the potential to allow the Board to analyze more fully and quickly the effects of various policy decisions and provide the basis for developing models based on probability for projecting the effects of proposed policy initiatives before being implemented.

Besides indicating when a jail is performing poorly, the index also should tell us when things are going well in a jail. It is equally important to look closely at jails when they are running well so that when conditions deteriorate, attention can be drawn to the problem. The jail can be compared to itself between the two different time periods and then problem areas could be isolated.

More generally, the index is an attempt to apply quantitative analysis to make management evaluations more efficient and useful. Although different jail and correction systems face different problems at any given time, we believe the basic variable

groups that comprise the index are the concern of many or most systems. The index provides a useful guideline for developing a comprehensive jail management tracking system including an objective quantitative method for evaluating data.

Because of the enormous size of the New York City system and that the objective of the Board is to capture a general picture of the Department of Correction's performance, the indicators included in this index may not provide as sharp a focus as jail managers may want for the actual running of a jail. For instance, we use total overtime incurred at each jail as an indicator whereas a jail manager may want overtime broken down by use, e.g., searches, hospital runs, etc.. However, the principles used in developing the index can be applied to suit any purpose by altering the specific data used.

2. Description of the Data

The first step in developing the index was deciding what types of issues we wanted to know about jails. We grouped these issues into three basic categories, security, staffing, and service provision. The categories chosen reflect many of the basic issues with which the Board of Correction has concerned itself over the past several years. Other agencies in other jails systems may find it more useful to categorize their data differently.

The next step was to identify the specific variables to use as indicators to represent the four categories. We collected data for a 36 month period from October, 1987 through September 1990. We limited our research to jails for which consistent and distinct data was available for most of the period. This eliminated some of the more unique jails in the system including two jail barges that have gone in and out of service, changed location and been used for differing purposes (work release, drug programs) throughout the period of study. Also, some smaller jails do not have distinct records available in every category. The Department of Correction considers these facilities part of a larger command and therefore sometimes lump their records together. We collected and compiled all data from Department of Correction reports, logbooks, and other records and documents.

2.1 Security

The indicators for security used in the index are infractions for contraband weapons, infractions written for contraband drugs, and violent incidents. The number of inmate infractions for contraband is mostly a function of the number of inmates possessing contraband and the resources and perseverance applied toward finding it. For instance, an increase or decrease in the number of searches or in the level of staff presence in inmate areas can affect the quantity of contraband found as much as a rise or fall in the actual amount of contraband. Because of this, increased contraband infractions associated with increased staff presence can be viewed differently from increased contraband associated with decreased staff presence.

The third measure of security is the number of reportable violent incidents that we usually think of as a separate category because of the high levels of violent incidents in New York City jails. Violence has two major components, violent incidents between inmates and staff and incidents between inmates and other inmates. There are several sub-categories for various types of violent incidents such as slashings, stabbings, assaults, use of force and so on. However, in analyzing the data, we found that violence trends tend to be more consistent and therefore more useful when combined into a total violence category rather than when looked at separately. The number of inmate slashings for instance, vary a great deal from month to month as do most of the other categories. When we use the total number of violent incidents however, the variance for the monthly data tends to be lower. We calculate infractions and violent incidents as a rate per 100 inmates to account for the difference in jail sizes.

2.2 Staff

Variables used to measure staff include inmate to staff ratio, overtime, absences due to line-of-duty-injury (LODI) and non-injury related absences. Inmate-staff ratio is merely inmates divided by staff. Overtime is an estimated amount of overtime. We received the data as overtime dollars paid per two week pay period. To be consistent with the other data collected, it had to be converted into monthly figures by taking overtime from pay periods that overlap two different months and assigning an amount of the overtime for the pay period in proportion with the number of days from the pay period in each month. The Department of Correction calculates absence rates as the annualized days lost per uniformed staff for both categories (LODI and non-LODI).

2.3 Service Provision

Service provision is probably the hardest category to measure. The service provision data has two components. The first is the number of inmate grievances filed. The Department of Correction separates grievances into 32 categories. We grouped the grievances into seven more general categories as follows:

DOC Policy and Procedures - classification, inmate discipline, rules and regulations, searches and transfers.

Personal Items - commissary, inmate accounts, packages, property, personal hygiene.

Living Environment - environment, equipment, noise, physical plant, food, laundry and clothing.

Services and Programs - transportation, grievance mechanism, mental health, medical, recreation, law library, religious services, school, social services, and visits.

Communication with the outside - telephone access, correspondence.

Inmate employment - not grouped with any other category.

It should be noted that the number of grievances filed in a facility can be determined as much by the number of grievance staff assigned to that facility and the availability of the staff to the inmates as it is by the conditions in the jail. Similar problems exist for other variables but these problems are overcome when using the first method descibed in section 3.2 for calculating base values (comparing a jail to itself).

The second component is the number of inmates participating in various programs or services. We collected inmate participation data for inmates going to the law library, receiving visits, going to indoor or outdoor recreation, inmates seen at the clinic, and receiving guidance and counseling services. The Department of Correction provided us with guidance and counseling data by type of counseling inmates received, including

crisis intervention, individual counseling, outside referrals (income maintenance, education, parole, probation, legal aid, etc.) and inside referrals (work release, ministerial services, general office, law library, etc.). We created an "other" category by adding orientation sessions, group counseling, discharge planning and voter registration together. We converted all numbers into rate per 100 inmates to account for differing jail sizes.

2.4 Special Incidents

We created a fourth category called special incidents, which are "serious" incidents that occur infrequently. We used the special incidents as a gauge with which to measure the validity of the index. Because of their infrequency, it is difficult to quantify the effects of these incidents and difficult to use them for measuring trends. However we would expect that at least certain types of these incidents would occur more often in jails with lower index values. Examples of these incidents are inmate disturbances (riots), escapes and suicides.

Of these incidents, inmate disturbances should be the most likely to coincide with a low index rating. While escapes and suicides involve very few inmates, inmate disturbances result from the actions of many inmates (and correction officers). If the conditions that lead to a disturbance develop over time and the index properly measures how well a jail is operating, the occurrence of an inmate disturbance should coincide with a low index rating for that facility and period. This is not to say that a low index value would predict a disturbance, only that disturbances should occur more often when a jail has a low index rating.

2.5 A Set of Base Variables

In addition to the index variables, we included a set of additional independent variables in the analysis. These variables also have an effect on the levels of the index variables but we do not feel they are appropriate to include in the index because they are not controllable by the individual jails or sometimes even by the correction system. The variables concern the classification of inmates, recognizing that the type of inmate housed in the jail affects the behavior of the jail. The classifications are parole violators, females, adolescent detainees, adolescent sentenced, and male adult detainees. We

represented each classification as a percentage of each jail's total inmate population.

We omitted male sentenced inmates because the nature of the statistical analysis requires that a perfect linear relationship not exist between any group of variables. By including male sentenced inmates, the classification variables would add up to 100% in every instance. This would constitute a perfect linear relationship, making it impossible to calculate the model. Therefore the coefficients derived to represent the effect of each of these variables, is in relation to a base of male adult sentenced inmates.

We added a final base variable for a special case in which the Department of Correction created a centralized punitive segregation area in the James A. Thomas Center (JATC) on Rikers Island. The Rikers Island jails send inmates here to serve their punitive segregation sentence. Subsequently JATC houses a disproportionate number of the most difficult to manage inmates. To account for this we included a variable known as a "dummy" variable to filter out the effects of the centralized punitive segregation area on the other indicators. This variable has a value of 1 when the Central Punitive Segregation Unit is present in a jail and 0 when it is not.

2.6 Data Preparation

Some indicators are substitutes or proxies for phenomena they attempt to describe. Generally we found them to be useful measures for the three categories. We left out other variables because of unavailability. Since each facility is not wholly independent in every aspect of its operation, we omitted some potential indicators because they do not reflect the behavior of a particular jail but of the overall system. We omitted some obvious service provision variables such as commissary and court production.

There is a grievance category for commissary that partially measures this category, however a related category, inmate accounts, is the area where most of the problems associated with commissary occur. Inmate accounts is also a grievance category and is by far the most commonly grieved issue system-wide. Most of the inmate account problems arise from the transfer of inmates from one facility to another. Since each facility has its own bank account, the funds have to be transferred from one facility's accounts to another's. This results in delays but it is difficult to attribute the problem to a particular facility.

We also omitted court production, a primary function of any jail holding trial-prisoners, since no data on this topic was available for individual jails. The individual jails do not function independently in this process however, so it may not be a serious omission when evaluating the individual jails in the New York City system although borough houses located at the site of the courts would obviously have better court production figures than facilities on Rikers Island, which are not conveniently located for any of the courts to which inmates must be produced.

Since we represented all the variables as rates, there is an inherent difference in the variability of the values from different sized facilities. We calculated most of the rates as incidents or occurrences divided by the inmate population at a particular facility. Rates from smaller facilities will vary more widely than rates from larger facilities since the denominator (the number of inmates) for the ratio is smaller for the smaller jails. This condition creates a phenomenon known as heteroskedasticity. To correct for this, we divided the rates by the square root of the inmate population for that period. For instance, we calculated staff data as a rate per staff such as overtime per staff. We then divided the rate by the square root of the number of staff. This procedure is known as weighing by population.

3. Combining the Variables

Once we identified the indicators and collected the data, the task was to combine it all in a meaningful way. For the purposes of this model, we assumed that all the categories are interrelated to some degree. Staff issues such as overtime and absences may affect security and service provision; violence affects staff absences and overtime, absences affect overtime, overtime affects absences and so on.

Except for inmate to staff ratio, we viewed the categories as both dependent and independent variables meaning that they both exerted influence upon and were influenced by the other variables. We viewed inmate to staff ratio to be causal only in that for a particular period, the inmate/staff ratio could not be affected by any of the other variables. Many of the variables fit into more than one category. Most of the indicators behave as both independent and dependent variables simultaneously.

We weighted the variables in the index according to how changes in each indicator are associated with changes in the other variables. Because of the general nature of the

variables, precise estimates of cause and effect would be extremely difficult to determine. Instead we have chosen not to focus on cause and effect for any of the variables other than inmate/staff ratio and merely use the relative correlations of each as the basis for the weights of each variable. The more a change in the level of a variable is associated with the change in the level of the other variables, the greater the weight attributed to that variable in the index despite whether there is a direct cause-effect link. What this approach produces is the degree to which each variable acts as an indication of the state of the "rest of the system" as opposed to how much it affects or causes the state of the system.

This approach has a major deficiency in that without determining cause and effect, highly correlated variables during an earlier period, may cease to be correlated in later periods. This may happen for one of two reasons. One, the variables had no direct or indirect relationship and the correlation was due merely to chance, or two, an external factor caused the correlation for a while but then ceased to cause the correlation thus representing a change in the nature of the system. So it is important to continuously re-evaluate these relationships as we collect more data.

3.1. Deriving Weights For Each Indicator

We needed to weight each indicator to determine how much the index should be influenced by it. There is no set way of assigning weights. For example it can be accomplished by choosing weights based on intuitive or subjective knowledge of the jail managers or by assigning equal weight to each indicator for the model. For this model we have chosen to assign weights using a quantitative approach based on the degree to which each indicator is correlated with the other indicators. We derived the correlations using a series of multiple regression models using each index variable as a dependent variable against the other variables.

For each index variable we ran a series of regressions with one index variable used as the dependent variable and the other index variables along with the base variables used as the independent variables. For each subsequent equation, we removed one index variable and ran the regression again. We repeated this process until we had removed each dependent index variable for one equation. The first equation allowed us to determine the collective correlation between the dependent variable and the independent variables by looking at the R^2 value that measures the portion of the variability in the

dependent variable "explained" by the independent variables. The subsequent equations measured the effect of the loss of one variable by recording the corresponding drop in the level of R^2 for each omitted variable. We calculated a final equation with all the index variables removed leaving only the base variables. The resulting R^2 denoted how much of the variation in the dependent variable was explained by the base variables.

We subtracted each R^2 from the equations with the omitted variables from the R^2 of the original equation. Since the variables are not wholly independent of one another, the sum of the differences in the R^2 did not equal the difference in R^2 between the full equation and the equations using only the base variables. To account for this, we prorated the difference in R^2 for each index variable so that the sum of differences would equal the difference in R^2 when we removed all the index variables.

To measure the relative influence of an index variable, we calculated the correlations between that variable and all the other index variables. We combined the differences in R^2s with the R^2 of the full equation (with no variables omitted) minus the R^2 from the equation with that variable as the dependent variable and only the base variables used. This determined the net influence of the indicator.

Before adding the R^2 differences, we had to establish polarity for each difference. We consider some indicators to be negative, such as violence, while others we consider positive such as inmate visits. We assigned polarity to all the dependent variables subjectively. Positive indicators are inmate visits, inmates using recreation, the law library, seen at the clinic and receiving guidance and counseling services. Negative indicators are violence, overtime, staff absences, grievances and infractions for contraband. However, the association a "positive" indicator has with the others may not always be positive. Similarly with negative indicators, the associations are not always negative. Therefore we used the polarity of the sign of the coefficient from the regression equations to determine whether the effect of the variable was positive or negative. For a variable associated with an increase in a positive indicator or a decrease in a negative indicator we added the difference in R^2, otherwise we subtracted the difference.

Once we calculated the sum of the differences in R^2 for each indicator, we calculated the relative weight for each indicator by dividing the sum for each variable by the sum of the differences in R^2 for all the variables. The resulting ratio for each indicator was equal to one.

3.2 Determining a Base Value for the Index

To calculate an index value, a base value had to be determined. There are two methods we considered for doing this. The first is to pick one time period to compare with the other time periods. The problem with this method is that it is not easy to determine what a normal value is for the index. This makes it somewhat more difficult to analyze without comparing it to values from several other time periods or from several other facilities or both.

Another method is to use an average of all the time periods as the comparison. This allows us to see immediately from a single index value how well a jail is doing for that time period based on the average values. We chose to use average values as the base of the index.

We calculated the average in two ways, creating two different indexes. The first method was to calculate the average value for each indicator for each jail. In this way the index value for the jail would be a comparison to its own average values. This is a good way to measure the trends of a particular jail overtime or to compare the relative improvement or decline but this method for calculating the base may result in giving a higher rating to a jail that has not performed well but has improved somewhat than to a jail that has performed well but has not performed as well recently. This is not a problem if we interpret the statistic as the relative performance of each jail to its own past performance rather than as the absolute performance rating between the two jails.

This method has the added benefit of compensating for reporting differences between jails. For instance if one jail has a larger grievance staff than another jail of the same size, the first jail could likely receive more grievances from inmates, not because there was more to complain about but because there was more opportunity to complain. We negate this difference when we compare each jail to its own previous performance.

We also calculated the average value for each indicator for all the jails to allow us to see how each jail ranked in relation to the others. This creates a better statistic for comparison across jails but it gives an unfair advantage to those jails with easier to manage inmate classifications. This can be overcome by including the classification variables in the index. We have chosen not to do that because we are more interested in comparing the differences in jail performance depending on inmate classification. For example, it is of interest to see how the performance of jails with high numbers of parole violators compared with jails housing few parole violators.

3.3 Calculating the Index

Once all the previous steps were completed, the actual computation of the index was possible. To do this we started with the indicator values for one facility for one time period (month) and took each indicator value for that facility and month and divided it by the base value for that indicator (average value for the indicator). This provided a ratio for that indicator value in relation to the base value. We arbitrarily decided an index value greater than the base would mark better than average jail performance while values less than the base would mark less than average performance. Therefore a positive indicator value above the base value would create a ratio greater than 1 while the same indicator/base value ratio for a negative indicator would produce a converted ratio that is less than 1 by the same amount that the original ratio is above 1. In other words a negative indicator with an indicator value/base value ratio of 1.2 should have a converted ratio that is equal to 0.2 less than 1 or 0.8.

We converted ratios for negative indicators by using the equation 1-((indicator value divided by the base value)-1) or 2-(indicator/base). This equation produces the desired result that for negative indicator values greater than the base value, the index is downwardly influenced by the same amount that a positive indicator increases when the ratio is greater than one. For indicator values less than the base, the resulting value from the equation produces an index value less than 1 by the same amount that the ratio for a positive indicator with a value greater than 1 is greater than 1. For example, if there were two indicators each with a value of six and a base of five and one indicator was positive while the other was negative the respective ratios would be calculated as follows:

Positive indicator: Indicator value (6) / base value (5) = 1.2 or 0.2 above the base.

Negative indicator: 2 - indicator value (6) / base value (5) = 2 - 1.2 = 0.8 or 0.2 less than the base.

It should be noted that a negative ratio will result from this formula if a negative indicator value is more than twice the base value.

We then multiplied the ratio by the weight assigned to that particular indicator. We repeated this procedure for each indicator with the resulting ratio times weight products

added together producing the index value for that facility for that month. The procedure yielded an index with a base value of 1. For aesthetic purposes we took the option of multiplying the result by 100 so that the base index value would 100. Values over 100 would be considered better than average, while values less than 100 would be considered less than average. We then calculated the index values in the same way for each facility and month for the period of the study.

4. Results of the Weighing Procedure

The weighing procedure yielded the following results:

Security		(0.313)
	Weapons contraband	0.103
	Drug contraband	0.069
	Violence	0.140
Staff		(0.457)
	Inmate/staff ratio	0.163
	Overtime	0.101
	LODI absences	0.090
	Non-LODI absences	0.103
Service Provision		(0.230)
	Grievances	(0.083)
	DOC Procedures	0.004
	Personal items	0.035
	Living Environment	0.009
	Services and programs	0.015
	Communication	0.010
	Inmate employment	0.010
	Guidance and Counseling	(0.060)
	Crisis intervention	0.008
	Individual counseling	0.006
	Outside referrals	0.024
	Inside referrals	0.014
	Other services	0.007
	Law Library	0.039
	Recreation	0.030
	Clinic	0.016
	Visits	0.003

4.1 Some Findings From the Regression Analyses

Despite the large number of variables used, there were several significant t-scores (greater than 2 or less than -2) values that appeared from the series of regressions performed and many t-scores were greater than 1 or less than -1 showing some interaction existing between the variables. It is likely that with more data (there were 403 observations used in this study) many of these relationships will turn out to be statistically significant. There were some surprise relationships such as Individual Counseling and Inmate/Staff ratio pertains to uniformed staff while civilian staff, not accounted for in the index, perform guidance and counseling services. However, civilian staff and uniformed staff levels may be highly correlated and individual counseling is highly dependent on there being enough staff available to perform the service.

This section presents a summary of some of the statistical relationships between the indicators to give an idea as to what caused the weights to be distributed as they were. The discussions center on the t-scores derived for coefficients when performing the series of regressions. T-scores measure the significance level of the coefficient. The coefficient is a quantitative measure of the relationship between the two variables. Both of these, along with how much a certain indicator varies over time, determine the R^2 or the percentage of change in one variable explained by the change in other variables. Significant findings are those with t-scores above 2.00 or below -2.00, "lesser" relationships as referred to in this section are those with t-scores between 1.00 and 2.00 or -1.00 and -2.00.

4.1.1 Findings For Index Variables

Inmate/Staff Ratio

This indicator had more significant relationships with the other indicators than any other indicator. It was strongly tied to overtime and both categories of absences. Officer injuries are closely tied with violence although the relationship between Inmate/staff and violence is negative and significant. This shows that as officers per inmate decreases, violence decreases. We later broke this down and looked at inmate/inmate and officer/inmate incidents and found that there was no relationship between inmate/inmate

incidents and inmate/staff ratios. There was however, a strong negative relationship between inmate/staff ratio and officer/inmate incidents meaning that as there were more inmates per staff there were fewer use of force incidents, which is contrary to what we expected. This information combined with the LODI result suggests that although officer/inmate violence decreases as the inmate/staff ratio increases, officers involved in confrontations under these circumstances are more likely to be injured.

Inmate/staff had less of an association with contraband, neither sign was significant but they both had t-scores greater than 1 although they had opposite signs. Infractions written for weapon contraband are positively associated with higher inmate to staff ratios.

A negative relationship with inmate/staff meaning that as inmates per staff increased, fewer drug contraband infractions are written. We interpreted this outcome as "negative" since any decrease in infractions under these circumstances is most likely due to a lessened ability of staff to find the contraband.

Among the grievances, the category most strongly correlated with inmate/staff ratio is the programs and services category. There is also an unexpected positive association with recreation, and law library and to a lesser extent, visits. Inmates seen at the clinic is significantly and negatively associated with increased inmate/staff as well as guidance and counseling as mentioned earlier.

Logically one might guess that the inmate/staff ratio would be a very significant factor in how well a jail runs. The data appears to bear this out.

Overtime

Along with inmate/staff ratios, overtime is also strongly related to absences especially non-LODI absences. The relationship is obvious in that when officers call in sick their posts are very likely to be filled using overtime. The relationship with injury related absences is much less strong. Violence is also significantly and positively associated with overtime. Much of the correlation is due to increases in violence leading to increases in overtime. Overtime is also strongly and positively associated with several guidance and counseling categories and with inmates seen at the clinic. It is negatively associated with law library attendance and was significant with a t-score of -3.44. Why there is a correlation between these to indicators is unclear.

Absences - LODI and Non-LODI

As with overtime, absence rates modify the inmate/staff ratio, as absences decrease the number of staff available. Naturally increases in absences correlate with increases in overtime. As expected, there is a strong relationship between violence and line-of-duty-injury related absences. In fact the t-ratio for these two indicators is 5.18. As non-LODI absences increase, violence decreases being consistent with the relationship between inmate/staff ratio and violence. The t-ratio is only -1.66 however.

Weapon contraband is significantly associated with increased non-LODI absences as it was with increased inmate/staff ratios. No relationship appears to exist between infractions for weapon contraband and LODI absence rates.

Drug contraband is negatively associated with non-LODI but with a t-score of -0.98 it is not significant. With LODI absences the relationship is positive with a t-score of 1.66 it is also not significant.

Violence

Violence - violence has a very strong relationship with weapon contraband probably for two reasons. In violent jails, inmates are more likely to arm themselves for protection, and staff will tend to search for weapons more thoroughly in a violent jail. A positive relationship exists between violence and grievances concerning personal items ($t = 1.32$), recreation ($t = 1.46$) and visits ($t = 2.24$). Violence was also negatively associated with some of the guidance and counseling categories especially individual counseling ($t = -1.71$)

Contraband - in addition to the relationships already discussed, contraband infractions of both types seem to be negatively related to grievances with three exceptions. Weapon contraband and grievances in the communication group (telephone and correspondence) seem to be positively and significantly correlated ($t = 3.10$). The Policy and Procedures ($t = 1.52$) and Living Conditions ($t = 1.78$) categories have positive correlations with drug contraband although not significant.

Infractions for drug contraband are not associated with violence. Not surprisingly, it is associated with the number of inmate visits, inmates seen at health clinics and with

lower inmate-staff ratios.

Grievances

Grievances concerning DOC policy and procedures had positive, significant associations with recreation and clinic visits as well as grievances concerning programs and personal items. We found lesser associations with LODI and contraband weapons. We found no significant, negative associations however there were lesser associations with drug contraband infractions, employment grievances and in-house referrals from guidance and counseling.

Personal item grievances had positive significant associations with non-LODI absences, DOC policy and procedure grievances, program grievances, employment grievances, communication grievances, and in-house referrals from guidance and counseling. We found lesser positive relationships with violence and crisis intervention counseling. We found negative, significant associations with recreation and law library and lesser negative relationships with clinic visits, individual counseling, living environment and contraband drug infractions.

Communication grievances are significantly and positively associated with contraband weapon infractions, personal item grievances, employment grievances, outside referrals from guidance and counseling, and visits. We found lesser positive relationships for non-LODI absences, in-house referrals from guidance and counseling, and recreation. We found negative and significant relationships with overtime, drug contraband infractions and individual counseling. We found a lesser negative relationship with other guidance and counseling services.

Grievances concerning living environment had positive and significant association with program grievances and no other variable. We found lesser positive relationships with drug contraband infractions and all the guidance and counseling categories except for crisis intervention. We also found negative, significant associations were found with non-LODI absences, law library usage and visits. We found lesser negative associations with inmate/staff ratio, violence, weapon contraband infractions, personal items grievances and crisis intervention counseling.

Program related grievances were positively and significantly associated with inmate/staff ratio, DOC procedure and policy grievances, personal item grievances and living

environment grievances. We found lesser positive associations with overtime, LODI absences, employment grievances, recreation, clinic visits and law library usage. We found a negative, significant relationship with weapon contraband infractions and a lesser negative relationship with outside referrals from guidance and counseling.

Grievances concerning inmate employment were positively and significantly associated with LODI absences, personal item grievances, communication grievances, individual counseling, outside referrals from guidance and counseling, and clinic visits. We found lesser positive relationships with program grievances, other guidance and counseling services, and recreation. We also found negative and significant associations were non-LODI absences and in-house referrals from guidance and counseling. We found lesser negative relationships were found with violence, weapon contraband infractions, policy and procedure grievances, crisis intervention counseling and law library usage.

Guidance and Counseling

Many of the strong relationships for guidance and counseling categories are with other guidance and counseling categories meaning that facilities providing a high rate of services per inmate tend to do so in more than one counseling category.

Crisis intervention counseling had significant and positive associations with clinic visits and other guidance and counseling services. We found lesser positive relationships with violence, LODI absences and personal items grievances. We found no negative, significant relationships and lesser negative relationships with non-LODI absences, living environment grievances and employment grievances.

Individual counseling was positively and significantly associated with non-LODI absences, employment grievances, in-house referrals from guidance and counseling, recreation, law library usage and visits. We found lesser positive relationships with overtime, weapon contraband infractions and living environment grievances. We found negative and significant relationships with inmate/staff ratio ($t = -8.55$), communication grievances and clinic visits and lesser, negative relationships with violence, personal items grievances, and other guidance and counseling services.

Outside referrals were positively and significantly associated with communications grievances, employment grievances, in-house referrals from guidance and counseling, other guidance and counseling services and clinic visits. We found lesser, positive

relationships with inmate/staff ratio, living environment grievances, and recreation. We found negative and significant relationships with weapon contraband infractions and visits and lesser relationships with program grievances and law library usage.

In-house referrals from guidance and counseling services were positively and significantly associated with overtime, personal items grievances, individual counseling, outside referrals, and other guidance and counseling services. We found lesser positive relationships with violence, weapon contraband infractions, communication grievances and living environment grievances. We found negative and significant relationships were found with employment grievances and clinic visits. we also found lesser negative relationships with inmate/staff ratio, drug contraband infractions, procedure and policy grievances and law library usage.

For other guidance and counseling services, we found positive and significant associations with overtime, crisis intervention counseling, outside referrals and in-house referrals from guidance and counseling. We also found lesser positive associations were found with non-LODI absences, living environment grievances and employment grievances. We found no negative and significant relationships but found lesser negative relationships with violence, drug contraband infractions, communications grievances, individual counseling and law library usage.

Recreation

Recreation is significantly and positively associated with inmate/staff ratio, grievances concerning Department of Correction procedures, and individual counseling. Recreation is positively but not significantly associated with outside referrals from guidance and counseling, employment, communication and program grievances, visits, and violence. It is negatively and significantly correlated with non-LODI absences and to a lesser degree with weapon contraband infractions and LODI absences.

Clinic Visits

Clinic visits is positively and significantly associated with visits, law library, outside referrals from guidance and counseling, crisis intervention counseling, employment and DOC procedure grievances, drug contraband infractions and to a lesser degree with overtime and program grievances. It is negatively and significantly associated with

inmate/staff ratio, LODI, individual counseling (t = -6.62), in-house referrals from guidance and counseling and to a lesser degree with grievances concerning personal items.

Law Library

Inmates using the law library is positively and significantly associated with LODI (t = 5.47), individual counseling (t = 5.41), inmate/staff ratio, clinic visits, visits and to a lesser degree program grievances. It is negatively and significantly associated with overtime, grievances concerning personal items and living environment, and drug contraband infractions. To a lesser degree it is associated with employment grievances, outside referrals, in-house referrals and other guidance and counseling services.

Visits

Inmates receiving visits is positively and significantly associated with violence, communication grievances, individual counseling, clinic visits, and law library usage. To a lesser degree it is positively associated with inmate/staff ratio, and recreation. Visits are negatively and significantly associated with non-LODI absences, living environment grievances and outside referrals.

4.1.2 Findings For the base Variables

All the associations discussed in this section, refer to how the following classifications compare to adult male sentenced inmate populations except the discussion of the Central Punitive Segregation Unit, which is with respect to the rest of the jail system.

Parole Violators

The percentage of parole violators among the inmate census in a facility is positively and significantly associated with inmate/staff ratio, non-LODI absences, violence, individual counseling and in-house referrals. We found a lesser positive relationship was found with crisis intervention counseling. We found negative and significant relationships

with overtime, weapon contraband infractions, personal items grievances, outside referrals and law library usage. We also found lesser negative relationships with visits and other guidance and counseling services.

Females

The percentage of females in the inmate population is positively and significantly associated with living environment grievances, individual counseling, outside referrals, recreation, visits and visits to the clinic. We found lesser positive associations for inmate/staff ratio, non-LODI absences, drug contraband infractions, and other guidance and counseling services. We found negative and significant associations were found with weapon contraband infractions and employment grievances. We found a lesser negative association with LODI absences.

Adolescent Detainees

The percentage of adolescent detainees is positively and significantly related to overtime, contraband weapon infractions, living environment grievances, other guidance and counseling services, law library usage and visits. We found lesser positive associations with violence and in-house referrals, we found negative and significant associations with LODI absences and crisis intervention counseling. We found lesser negative relationships with non-LODI absences, program grievances, individual counseling and clinic visits.

Adolescent Sentenced Inmates

The percentage of sentenced adolescent inmates is positively and significantly associated with overtime, living environment grievances, clinic visits, recreation and visits. We found lesser, positive relationships with non-LODI absences, individual counseling and in-house referrals. We found negative and significant relationships with violence, weapon contraband infractions, employment grievances and outside referrals. We also found lesser negative relationships with communication grievances, program grievances, crisis intervention counseling and law library usage.

Adult Male Detainees

The percentage of male adult detainees in a facility is positively and significantly associated with overtime, non-LODI absences, personal items grievances, living environment grievances, other guidance and counseling services, recreation, visits to the clinic and visits. We found lesser, positive relationships with individual counseling and in-house referrals from guidance and counseling. We also found negative and significant associations with program and employment grievances and lesser and negative relationships were found with violence, weapon contraband infractions, procedure and policy grievances, crisis intervention counseling and outside referrals from guidance and counseling.

Central Punitive Segregation Unit

The existence of the Central Punitive Segregation Unit at the James A. Thomas Center is positively and significantly associated with violence ($t = 7.22$), contraband weapon infractions, personal items grievances, communication grievances, outside referrals and law library usage. We found lesser positive associations with inmate/staff ratio, overtime, drug contraband infractions, living environment grievances and employment grievances. We found negative and significant relationships with LODI absences, non-LODI absences, recreation and visits and a lesser negative relationship with program grievances.

4.2 The End Result

The result was two sets of index values for each facility and month. We derived the first from using the average indicator values for each facility as the base values. The second uses the average values calculated for the twelve facilities. The first index yielded results that had a smaller range, which is understandable since we would expect more consistency when comparing one jail's performance over time then when comparing one jail to another. The standard deviation for the first index is 18.05 with a high value of 149.9 and a low value of 17.9. The standard deviation for the second index is 30.57 with a high value of 177.3 and a low value of -4.7 (the only value less than 0). The high and low scores were not for the same facility and month for each index. The larger standard deviation of the second index is the result of greater variation between jails. Some jails were almost always above 100 while others were nearly always below 100. When you

look at each jail separately however, the variation from month to month is much less than for the first index.

For both indexes, jails tended to go for several months above or below 100. This indicates that trends could be identified rather than the index scores being radically different from month to month, which would diminish the usefulness of the index as a warning system.

5. Using Special Incidents To Test the Index

To test the validity of the index values, we looked at several categories of "special incidents" to compare index values for when and where these incidents occurred. We do not expect the index to predict the occurrence of these incidents, however, when these incidents occur, the index value for the facility in which the incident occurred should be below 100 for that time period. For the categories of suicides, homicides and escapes there was no correlation between the index values and the occurrence of the incidents. However these incidents generally involve few (usually one) inmates and may represent an indication of the conditions in a jail facility but the random actions of individuals.

We obtained more encouraging results from the occurrence of inmate disturbances. Of eight incidents that can be categorized as serious inmate disturbances for the period of the study, six occurred in jails that had index values below 100 when the incident occurred. This is far from being statistically significant however. Of the two major disturbances, the index values were below 90 when the incidents occurred. The first major incident occurred on February 18, 1988 at the Anna M. Kross Center (AMKC) on Rikers Island. The index value for AMKC for then month of February was 87.5. AMKC also had low index values for several months before the incident as shown in the table.

AMKC

October, 1987	89.9
November, 1987	84.1
December, 1987	69.6
January, 1988	87.1
February, 1988	87.5

The second major incident occurred on August 14, 1990 at the Otis Bantum Correctional Center (OBCC), also on Rikers Island. The major contributing factor to this incident was that correction officers blockaded Rikers Island as part of a job action in which they allowed no one on or off the island. The blockade was touched off by an incident that occurred at OBCC on August 7 in which inmates badly injured a correction officer while stealing his jewelry. Although all the jails on Rikers Island were operating under very difficult circumstances, the disturbance occurred in the facility with the lowest index value on the island.

August, 1990

Otis Bantum Correctional Center	72.4
Anna M. Kross Center	91.4
Adolescent Reception and Detention Center	96.9
Correctional Institution For Men	92.4
James A. Thomas Center	116.4
Rose M. Singer Center	incomplete data
George Motchan Detention Center	99.6

Although OBCC had a high index value for the previous month, it had low values for several months previously.

OBCC

March, 1990	82.8
April, 1990	89.7
May, 1990	74.5
June, 1990	88.2
July, 1990	104.0
August, 1990	72.4

This analysis provides only anecdotal support for the validity of the index. Other tests need to be derived before we can feel confident in the index values.

6. Automating the System In A Database

Obviously it takes a great deal of work to develop and maintain an index, but a lot of the work can be automated. Once the system is set up, most of the work required for maintenance is inputting new values for the indicators. Periodically the weights for each indicator should be reevaluated. This process also can be automated but not as easily. We kept most of the indicators in individual data files as part of a larger database system. We keep them separate for several reasons. One is that we receive some of the indicators in different formats either daily, monthly or bi-weekly for example. We receive some as rates, others as raw numbers that we need to convert to rates. It is also more convenient to work with files that have fewer fields in them. A database program collects the data used in the index and converts the data into month and rate format. We keep a separate record for each facility for each month. This allows the regressions to be performed on the file without any further conversions. We wrote a special regression program to read the database files directly and perform the regressions on the fields indicated on the command line.

A file needs to be established to hold the weights that are stored with the other information derived from the regressions including the R^2 differences, coefficients and t-scores. We keep the base values in a separate file with one record for each facility. Each record contains the average values of each indicator for each facility. There is a last record containing the average for all facilities that we use for the second base value. These averages can be updated as new data becomes available. This would require continual updating of prior index values meaning that the index rating for a facility in a previous month may change as more data is gathered. The advantage is that 100 would always refer to the mean index value, making interpretation easier. This may be undesirable for many users because the index values for previous periods would have to be adjusted. It may be better to use the original average without recalculating it. In this case it may even be more desirable to use the one time period approach for establishing the base values.

A last file contains the final index values for each facility and for each month.