

# The Tracker

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## Calvin Johnson, Court Services and Offender Supervision Agency

Perhaps the last place one would look for an advanced lesson in information management is on the tough streets of Washington, D.C., home to the fourth-highest crime rate for big cities in 2008, according to CQ Press, which compiles crime statistics. In fact, the Court Services and Offender Supervision Agency (CSOSA), the federal agency that manages probations and paroles in the nation's capital, is using data warehousing and business intelligence in an intensive effort to reduce the city's recidivism rate and make its streets safer.

The results are impressive - and quantifiable. The agency's goal is to have 80 percent of the 15,000 offenders it supervises in a "successful posture," meaning that the people under CSOSA supervision are meeting the requirements of their parole or probation.

Over the past two years, the agency has made significant progress. In April 2007, that percentage stood at about 69 percent, according to Calvin Johnson, CSOSA's director of the Office of Research and Evaluation, but has since tracked up steadily. By February of this year, 74 percent of offenders the office supervises were found to be meeting requirements.

CSOSA's success can be traced back to 2002, when it went live with a homegrown case management system and statistical analysis software from SAS Institute. Over the years, it has built up its information management capabilities with BI, risk assessment, statistical mapping, GPS tracking and a data warehouse that links to a host of outside law enforcement databases. All the information flows into CSOSA's central repository where it is used by the agency to track offenders and their behavior, and also to track the organization's performance - from branch office operations to caseloads. That information helps supervisors better direct officers, who are able to more aggressively intervene in the field.

"We are better able to manage our resources," says Johnson, whose department is charged with being the agency's keeper of offender data and performance measures.

CSOSA faced many obstacles as it built up its analysis engine. Issues around systems requirements, data quality, metrics, training and change management all needed to be confronted and overcome.

Yet the agency persevered, and, earlier this year, CSOSA reached a major milestone. For years, CSOSA managers have had direct access to the case management system. But, in mid-April, the agency added 300 community supervision officers to the system. Front-line officers now have instant access to daily

caseload reports, offender employment status, re-arrest information and risk-needs screening data, empowering them to make decisions in real time. For instance, officers on one team are now able to check out what other CSOSA teams are doing during the day. And, if one team making home visits is near the address of an offender who's scheduled to be visited that day by another team, the first team can take care of that visit, freeing other officers to do other work. "It will make them much more efficient and effective," says Johnson.

Looking ahead, the agency is planning to use its technology arsenal to move into predictive analytics in an effort to forecast which offenders might benefit from being placed in certain programs. Analytics can also be used to predict the outcome of a variety of the agency's daily processes, such as the issuance of bench warrants.

"We're constantly going through a process of knowledge discovery. And the more we learn, the more we build into the system," says Johnson.

### **Smart Way to Handle Offenders**

Like all district agencies, CSOSA is a branch of the federal government, in this case responsible for parolees, people out on supervised release and probationers. "We're a federal agency with a local mission," says Bill Kirkendale, CSOSA's chief information officer. The total workforce is approximately 1,500, including many case officers working out of branches that deal with specific activities, such as substance abuse, mental health, domestic violence and sex offenders.

Since it was formed in 1997 with the merger of the city's probation and parole agencies, CSOSA has put information management at the center of its operation. It recognized from the outset that better tracking of its cases would allow it to spot potential problems, intervene accordingly and keep offenders from violating the terms of their parole or committing crimes.

But knowing which tools are needed to do a job right and having them in hand are not always one in the same. For instance, when the agency was formed, it managed disparate databases - one for the parole department and another for probation. So, one of CSOSA's first tasks was to consolidate the two data stores into one, but it didn't work out as planned. The system that was cobbled together, says Johnson, failed on "a regular and consistent basis." The agency needed something better.

So, in early 2002, CSOSA built a case management system, which it calls the Supervision and Management Automated Record Tracking (SMART) system. SMART is based on a Microsoft SQL Server database and software developed in house using Microsoft's development platform.

CSOSA calls SMART a Web-based case management and information retrieval system that includes information on offenders, their arrests, violations of their probation or parole, details about meetings with supervision officers and lists of any treatments or programs in which the offenders are enrolled. Not only does SMART give case managers information at their fingertips, the system also sends out alerts notifying officers of missed appointments or drug treatments, for instance.

But the move to the new case management system presented both data and change-management challenges. When SMART was first rolled out, there were data quality and data integrity issues. "We were all over the place with respect to how data was being entered," says Johnson.

In some cases, managers weren't inputting information into the case management system. Instead, they were keeping their own records. These managers believed they were working with all the right data, but in many cases, the numbers differed from those in the case management reports.

Another problem was that different offices within the agency were using different BI tools from SAS or Business Objects, and still others were using a BI package from Microsoft.

Once managers realized that there were different sets of data, they grew wary of the reports coming out of the system. "To them the case management system was a black hole," says Johnson. They had entered information into the system, but they didn't know how the data was being processed or whether the information in the resulting reports was strong enough to act on.

There were other ripples as well. The same records needed by the agency were also used by the city to issue re-arrests and by the courts in handing out sentences. If the agency couldn't straighten out its own data, CSOSA credibility with the city's other agencies would be undermined. Johnson knew that he had to get to a single version of the truth.

### **Warehousing Data, Not Criminals**

Early on, Johnson reached out to the operations and technology departments within the agency and found agreement on the need for a data warehouse, a central data hub fed by multiple sources in which queries are performed without disturbing the source data.

Johnson's vision was to build a best practices data warehouse, one that would store only relevant, mission-critical data while being flexible and scalable. With the agency's approval, Johnson went ahead with the research team to lead the project.

Johnson, who has a Ph.D. in criminology, says it was natural for his research department to want to take charge because it's composed of statisticians, criminologists, social scientists and others who have a vested interest in accurate reporting. But Johnson also had the backing of Kirkendale, the agency's CIO. "One of the reasons this has been so successful is the respect I have for his drive [and] vision," Kirkendale says of Johnson. "There's been no territoriality."

In 2005, Johnson's team deployed a data warehouse using the SAS 9 enterprise intelligence platform from the SAS Institute. SAS 9 includes SAS Data Integration, which provides features for data connectivity, data quality, ETL (extract, transform and load), data migration and data synchronization. The integration product offers data cleansing tools from SAS subsidiary DataFlux. SAS 9 also includes SAS Business Intelligence, Analytics and Intelligence Storage, which stores and disseminates information for BI and analytic requirements.

The SMART case management system serves as the main source for the data warehouse. Data from local, state and federal law enforcement agencies - including records on court hearings, dispositions, sentencing, police bookings, prison release, drug testing and treatment and other files - is pulled into SMART and matched to the offenders in CSOSA's care.

Among the files feeding directly into the repository are arrest records from D.C.'s Metropolitan Police Department and drug test results from the city's Pre-Trial Services Agency. Both are loaded directly into SQL Server tables.

There's a separate data feed though a secured data exchange from the Bureau of Prisons. The SAS Data Integration Server pulls text files on all offenders adjudicated in D.C. Superior Court who are set to return to the streets in the next 90 days, which gives CSOSA critical information to ready itself before those offenders are released. The data is then analyzed to see what percentage of officer caseloads are in a successful posture, how officer performance compares, how branches stack up against each other and other performance metrics.

Even though the research group is in charge of the data warehouse, the project has received critical support from Kirkendale's IT team. Johnson's staff has been loaned two IT staffers to make sure the data warehouse is properly structured and loaded on a regular basis. And another IT person is assigned to the department to manage and control the BI portal, including content, format structure, metadata: "the whole nine yards," says Johnson.

### **Screening Stats, Satellites**

In 2006, CSOSA expanded SMART's risk-needs screening capabilities to help it figure out the right level of supervision for offenders and to assess their treatment and support services needs. A new tool was developed, called Auto Screener, that allows CSOSA officers to compile a long list of historical and social data points about an offender. The system classifies that person based on a scale developed by CSOSA - classifications include minimum, medium, maximum and intensive for the level of intervention needed - and then applies algorithms to generate a Prescriptive Supervision Plan for managing the offender's case.

"It is probably the most sophisticated screening instruments that parole, probation or supervision is using," says Kirkendale.

Based on predictive tendencies, Auto Screener allows CSOSA to identify if someone is high-risk. An example might be an offender who has tested positive for drugs and is not showing up for office appointments. The PSP then recommends a plan to intervene and to help the officer stay on top of the offender and his treatment.

Along with managing risk through records of violations, PSP can also take into account that an offender hasn't completed high school, which could be a separate risk factor. In those cases, PSP might then prescribe educational or vocational training. Kirkendale says CSOSA is planning to add categories for

offenders who fall right at the line between two classifications so that the agency can be more precise and better tailor its efforts.

And CSOSA continues to expand its analytic capabilities. About two years ago, the agency added a presentation tool called SMART-STAT, modeled in part on the New York City Police Department's well-known CompStat system. SMART-STAT plots offender addresses and then, reaching into the data warehouse, pulls and displays information on offender drug treatment compliance, known contacts with other offenders, re-arrests and other data on a map of the city.

Problems are grouped so that trouble spots can be easily seen. Results from SMART-STAT are delivered to desktops throughout the agency, allowing CSOSA management to drill down to the performance of specific branch managers and case officers. "Nothing fancy, but it works," says Johnson.

CSOSA also monitors in real time some 800 offenders ordered to wear GPS ankle devices. The program is administered with a company called Satellite Tracking of People, or STOP, which provides the devices and collects information on battery and signal strength and on whether offenders violated curfews, entered "stay-away" zones or tampered with the device. The data is transferred from STOP to the CSOSA data warehouse over a secure FTP connection, giving CSOSA a high-level of visibility into the activities of those under house arrest.

### **A Look Into the Future**

As mentioned earlier, CSOSA is looking to use its data warehouse and business intelligence tools to leverage predictive analytics in real time for decision support.

Predictive analytics would give the agency the ability to conduct what-if analyses - plugging offender, behavior and historical reference data into the system to suggest a likely outcome to everyday activities. One such use case is the issuance of arrest warrants, an involved process that requires supervision officers to spend a lot of time gathering records, sign-offs and other documentation. Even then, the courts may decide not to issue a warrant for an offender's arrest. With the use of predictive analytics, the agency can plug information on certain offenders, their behavior and prior histories and model the data against past cases to determine if a warrant's execution is likely to result in an arrest.

Predictive analytics could also be used to look at offenders with drug problems and, by analyzing their histories against available treatment programs, see which offenders are likely to benefit from placement in a given program.

Predictive analytics should make an officer's day more productive and supplement the skills he or she takes to the streets. "We need to develop intelligence - artificial intelligence - so the officer doesn't have to guess at it," says Johnson.

Even though predictive capabilities remain under development, Kirkendale says what CSOSA has done with its data warehouse and BI capabilities has already helped make the city's streets safer through its ability to track and intervene with offenders. They give the agency a critical tool to fine-tune its

operations. And in many respects, they offer a powerful risk management system, ensuring that the organization doesn't miss a beat.

What CSOSA does in practice is not much different than the ways other IT shops tackle risk management, says Kirkendale. It absorbs large amounts of data, correlates it, and presents risk levels and threats that can then be prioritized and managed.

There is one distinction that keeps Kirkendale especially attentive to his duties. Because CSOSA's greater mission is to reduce recidivism and crimes that include armed robberies and murder, as he puts it, "The stakes are a lot higher."

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