



State IT Recognition Awards

Informing and Enhancing the Work of the State Auditor to Drive Business Improvements across State Government

Category: Improving State Operations

Commonwealth of Massachusetts
Office of the State Auditor



Project initiated: May 2014
Project completed: April 2015

Contact:
Sandra Edler
Massachusetts Office of Information Technology
One Ashburton Place, Room 804
Boston, MA 02108
617.626.4620
sandra.edler@mass.gov



Executive Summary

In government auditing, we face a fundamental information problem. Before we start an audit, managers conceive of ideas and consult subject matter experts. We start with limited information and begin to gain knowledge in this first phase.

Audit staff are then dispatched to the agency under review to gather and review documentation, conduct interviews and do project work in the field. We gain knowledge rapidly in this phase, which leads to an audit report with findings and recommendations. We release the report and then begin the process anew with a new agency or program.

As time passes, the first auditee changes their behavior, or the circumstances surrounding the agency change, and our knowledge rapidly decreases over time until we re-engage the agency in a new audit, at which time we use our resources to re-learn the matter and conduct the same process.

To address this industry-wide challenge, the Massachusetts Office of the State Auditor has created a tool that seeks to address this knowledge gap. Although audit engagements at partner agencies are bound in time, our connections to their databases, and therefore our knowledge-base, does not have to be.

In the modern era, almost all productive work takes place in a database-drive application. We undertook this project to create a single application to connect to those disparate databases in order to mitigate, if not completely eliminate, our knowledge gap. And so was born the Rules-Based Risk Engine (RBRE) and the next era of government auditing. Flexibly and comprehensively making government better is the entire focus of its design.

An early success made possible by use of the tool occurred in the Commonwealth's MassHealth program. Thanks to analysis that would not otherwise have been possible, MassHealth has begun recouping \$233 million in questioned payments and the state was able to reduce annual funding to MassHealth by approximately \$11 million per year. We estimate an annual cost savings of approximately \$50 million thanks to this particular audit.

Overall, our analysis indicates that across all audits and investigations the application has contributed to over \$90 million in cost trend improvements to date, above and beyond its retrospective improper payments and fraud findings.

The RBRE provides a collaborative workspace that leverages the traditional skills of our auditors and investigators with the power of data analytics to dramatically increase our ability to gather, deploy, and preserve information.

Exemplar

One of the biggest challenges we face in government auditing is the static nature of an audit. Government auditors experience a fundamental information problem because the knowledge we gain during an audit period is not durable.

Oversight agencies, like state auditors, possess human assets skilled at risk detection and mitigation, but those human assets either are not connected to the data on an ongoing basis, or lack the ability to materialize their expertise in the form of a repeatable analysis. Audit teams spend significant resources researching and preparing for an audit, reviewing documentation from a specific time period, and providing findings and recommendations. However, the report eventually becomes stale as the agency's behavior changes, and at that point, the audit team has moved on to a new project.

In order to ensure impact, auditors want to maximize the amount of information they have prior to beginning an audit engagement so that they can identify the highest risk and plan the audit accordingly. In addition to information-gathering at the outset of a project, government auditors can better maximize an audit's impact and measure its effectiveness by improving the amount of information auditors continue to acquire following the conclusion of the audit engagement. Under the auditing model described above, that ability is limited if not impossible.

The potential for data analytics to resolve these challenges and ultimately make state government better is very high, but the assets required to make it happen are scattered and siloed. Individual agencies possess data about their own areas of operation, but are unable to combine those data sources in a systematic way. A large number of one-off analyses and metrics are generated for individual projects, but these analyses (and their underlying methods) are not actively shared, or made persistent. The challenge is to bring all of these assets together into one workspace, and make them available for deployment to solve problems.

This is where the Commonwealth's Risk-Based Rules Engine has become an innovative and valuable tool in government auditing. It maximizes the information available during the pre-planning period and creates a mechanism by which the audit findings continue to live in perpetuity after the completion of the audit.

When the Albuquerque Association of Government Accountants, which consists of accountability professionals at all levels of government, heard about the tool, they asked our Office of the State Auditor to present it at their annual conference. They wanted to hear not only about the tool itself, but also the steps required of a government agency to build and deploy such a powerful asset.

As word of the tool has spread across the industry, our state auditor's office has received additional requests to speak about it at both local and national conferences.

Concept

To address the fundamental information dilemma outlined in the previous section, the Rules-Based Risk Engine connects to individual source databases using a standardized transactional method, allowing disparate data sources to be combined – whether it is financial data, performance data, or case management data.

The tool identifies risky transactions in those source databases using queries that express a range of business rules, calculates the weight of each transaction's risk, assigns a share of that risk weight to entities associated with the transaction, and aggregates the results to identify the entities with the most risk.

The tool's navigation system is based on the [Code of Massachusetts Regulations](#) (CMR), which is updated on a bi-weekly basis, and an approximation of our state government employee organization chart, created by linking the RBRE with data from our enterprise-level human resources system. This approach allows us to move through state government operations in a systematic way, measuring what can be measured with existing data and identifying oversight gaps where agencies face legal obligations that currently available data sources cannot measure. This method of segmenting and aggregating transactional risk allows us to identify areas of operation with the highest risk, and entities associated with the greatest risk.

The tool also allows users to revisit analyses. Rather than the traditional method of auditing in which an analysis is done at one moment in time, the tool productionalizes one-off analyses and allows all users to benefit from them and reuse them in new contexts. Because its database connections are persistent, once rules are built they can continue to be run over time, allowing users to measure the impact of actions taken to mitigate risk or improve performance. Linear regression is used to generate specific measurements of changes in trend, based on specific mitigations. Overall progress in making productive change is aggregated up from these individual measurements.

The RBRE is also data-format neutral, which means that any number of business rules can be constructed by analysts working in parallel, and the results of those analyses can be combined into a series of risk views. This allows us to look forward to an end state where multiple oversight units working in parallel have marched through the CMR and brought the state government as a whole under ongoing risk assessment and measurement. Data-format neutrality also allows us to combine data from different agencies, and of disparate transactional types, into a single analysis. We have, for example, successfully combined Medicaid medical claim data and invoice data from the

Massachusetts Department of Education's Adult Food Program for an investigation into improper billing by Adult Day Health care providers. We are also in the process of combining Medicaid claims data with child welfare agency case management data to identify public safety risks.

Using the employee organization chart, we can also assign and map risk up and down individual chains of command to determine if risks are isolated at lower levels or concentrated among particular managers or units.

Significance

One of the RBRE's most valuable assets in a government auditing environment is how the tool is used on a day-to-day basis. It is set up in a way that allows non-technical experts to utilize its resources. It provides a workspace and a workflow that allows auditors, fraud examiners and other subject matter experts to perform analyses or work with data analysts and scientists to perform analyses that they are not necessarily trained to conduct, and would not otherwise be able to do. This transforms project-oriented subject matter expertise into persistent and ongoing data-centered risk assessment. Without this important usability feature, the tool would lose its relevance and ability to transform state government because audit staff could not effectively use it.

And the results it can produce are significant. The potential for risk management as the rule count grows is difficult to overestimate. Business rules in the system for Medicaid alone have already inspired over \$600 million in findings, and only a fraction of Division of Medical Assistance regulations have been brought under observation thus far.

In addition to these findings, rule construction based on past audits has identified areas where our audit recommendations did, and did not, produce successful program changes by our partner agencies. Our ability to test whether change actually happens, rather than merely recommending change, provides our office and potentially other oversight agencies with an entirely new tool in our repertoire. Understanding where there is risk and where there is not allows us to better utilize our resources to address the highest risk areas and make the biggest impact.

We have already begun enlisting subject matter experts from other agencies to help build the tool's stock of rules. For example, we are currently testing scalability of this type by building rules based on input from the Massachusetts Attorney General's Office, the MassHealth Pharmacy Unit, and the Drug Enforcement Administration of the US Department of Justice. All have recognized the significance and impact of the tool in improving government, leading to new and better collaboration between our agencies. If subject matter expertise can successfully be leveraged across multiple organizations, our analytic abilities will exponentially increase.

Impact

The RBRE is specifically designed to aid in the recommendation of changes across all audited program areas, and then to measure the impact of those changes. Flexibly and comprehensively making government better is the focus of its entire design. Because rules can be mapped to individual audit recommendations and/or fraud investigations, we are able to measure the impact of our work. Our fraud investigation unit's case management system supplies calculated fraud amounts on closed cases directly into the system. In addition, audit outcomes are determined by periodically re-firing all existing rules to refresh their results.

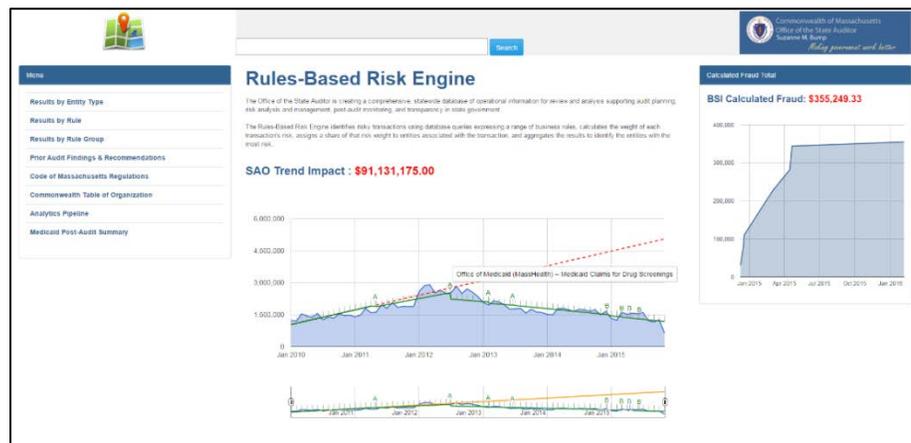
As shown here, users see a visualization of the change in trend achieved by individual audit actions and fraud investigations.

The pilot audit

conducted using the RBRE was recently awarded a National State Auditor's Association (NSAA) 2016 Excellence in Accountability award. We initiated our audit when preliminary analysis indicated a significant risk that MassHealth, the state's Medicaid program, incorrectly paid claims for services it had already paid as part of a payment to one of its Managed Care Organizations (MCO).

We tested over 25 million fee-for-service claims paid on behalf of enrollees in the MassHealth MCO program to determine whether those claims should have been paid by one of MassHealth's MCO contractors. Our audit team defined an audit scope and methodology using the preliminary data analytics work as a guide, and provided feedback to the data analytics staff on enhancements and refinements required for the original claim analysis model. This audit exemplifies the benefits realized when data analytics is comprehensively integrated into the audit planning, engagement, and post-audit process.

Through our audit, we identified 1,686,121 members who were enrolled in an MCO for all or part of the audit period, and downloaded 25,494,613 fee-for-service claim records that had been paid on behalf of those members during the audit period. We applied 43 distinct rules, representing different categories of covered and non-covered services under the state's standard MCO contract. These tests flagged each record as either a covered or non-covered service. These records were provided to the auditee for review, feedback and comment. Further adjustments to the set of records flagged as improper payments were made by the audit staff based on the feedback received from the



auditee. Following this validation process, the audit staff identified – down to the level of the individual claim, and without employing projection – **a total of \$233,208,842 in improper duplicate payments, representing 1,483,310 claim records.**

We provided MassHealth with a list of claims to be unwound and recouped – which would not have been possible using claim sampling and projection. MassHealth began recouping the \$233 million in questioned payments and the state was able to reduce its annual funding to MassHealth by approximately \$11 million per year; however, we estimate an annual cost savings of approximately \$50 million. MassHealth refined its system edits to better detect and deny fee-for-service claims for members' services covered by the MCOs moving forward.

In addition, MassHealth increased controls over its MCO contracts to ensure appropriate coverage and payment of contract services and has engaged the MCOs in the creation of a master code list to denote MCO covered versus non-covered services. MassHealth also reported that it has formed a multi-agency work group to review state agency pass-through claiming to further clarify policies and procedures as it relates to state agency claiming.

In the course of that audit, the team found an additional type of claim not previously detected, in which payments were not improper under the MCO contracts, but did not follow the contractor's usual and customary business practice. As a result, the team developed a second finding, and a second whole-population analytic test.

When the new test was applied to the universe of claims under consideration, **the audit team uncovered an additional \$288,952,449 in potentially unnecessary payments, representing 4,314,639 claims.** As a result of this additional work, the total findings of the audit represent more than \$500 million in potential overpayments.

Over time, these changes will allow MassHealth to have a better understanding of the true costs of providing healthcare to its members which will facilitate better budgeting and a more accurate calculation of MCO capitation rates. These changes will also result in better coordination of care as the MCOs will now be responsible for all covered healthcare services for their enrolled members.

Using data analysis, we conducted a post-audit review to gauge the success of our auditee in implementing our recommendations. We converted the analytic tests used for the audit into permanent production assets, which allowed us to subject new records to the tests and view the impact on the auditee's implementation of our recommendations while continuing to measure the risk. The auditee has made progress implementing our recommendation regarding improper payments, indicating that our audit broke a powerful and worsening trend that represented substantial cost to the Commonwealth and considerable ongoing risk. While work remains to be done, we expect ongoing savings to be realized.

Ultimately, the Commonwealth stands to gain continuously over time as we leverage the rules-based risk engine to flexibly and comprehensively make our government better.