Medicaid Analytics Pilot Project

This report is submitted jointly by the Department of Health and Human Services (DHHS), and the Department of Information, Technology Government Data Analytics Center (GDAC) to the Joint Legislative Oversight Committee on Health and Human Services, the Joint Legislative Oversight Committee on Information Technology, and the Fiscal Research Division.

Background and Context

Legislative Request

Session Law 2015-241, Section 12A.17, directed the DHHS to coordinate with the GDAC in the development and implementation of a pilot program for Medicaid claims analytics and population health management. Further, it directed the pilot to utilize the GDAC's existing public-private partnership to apply analytics to maximize healthcare savings and efficiencies to the State while improving health outcomes. Seven hundred and fifty thousand dollars ($750,000) of nonrecurring funds and two hundred and fifty thousand ($250,000) of recurring funds were appropriated to support this effort.

Session Law 2015-241, Section 12A.17, set forth the following timeline:

- November 30, 2015, execute contractual and data sharing agreements
- January 15, 2016, submission of a progress report to the Senate and House Appropriations Committees on Health and Human Services and the Fiscal Research Division
- May 31, 2016, the Department of Health and Human Services and GDAC shall provide a final report on findings and recommendations on the pilot program to the Joint Legislative Oversight Committee on Health and Human Services, the Joint Legislative Oversight Committee on Information Technology, and the Fiscal Research Division.

DHHS and GDAC have partnered in the delivery of this Medicaid Pilot Program (Pilot). Leveraging the State's public-private partnership managed by GDAC, the Pilot was able to utilize and extend the existing GDAC technical environment, licensing and tools to expedite the development of analytics.

Summary

The General Assembly, under Session Law 2015-241, Section 12A.17, sponsored and funded a Medicaid Analytics Pilot (NC MAP) project comprising resources from DHHS (Information Technology Division (ITD) & Division of Medical Assistance (DMA)), GDAC, and SAS. The objective of the pilot was to "apply analytics to provide information to identify savings and efficiencies with an ultimate goal of improving health outcomes."

An initial planning session comprising DHHS, DIT, and SAS was conducted November 3, 2015 to further define the project. The objective, scope and approach for the pilot project were necessarily focused and defined to fit within the schedule and other parameters prescribed by the legislation. The scope and approach are summarized in the following:

> Apply existing SAS-provided health analytics models from the SAS Health Analytics Framework (HAF) to 27 months of NC Medicaid claims data; to demonstrate the value of data visualization and drill-down capabilities of SAS visual Analytics tool; and to transform data into information and provide point-in-time and trending information regarding the Medicaid program.

The pilot was executed according to the mutually agreed-upon schedule and milestones that are articulated later in this report.

Scope and Approach

The pilot project approach was defined to deliver the Pilot and final report recommendations within the timeframe established in the legislation. The Pilot leveraged the GDAC infrastructure to support the delivery of a proof of concept upon which recommendations could be based. This pilot used 27 months of Medicaid claims data to support this analytics effort. The 27 months comprised claims from 7/1/2013 (NCTracks go-live) through 9/30/2015 (ICD-10 go-live). SAS provided existing health analytic models with limited configurations and drill-down capabilities to transform data into information.

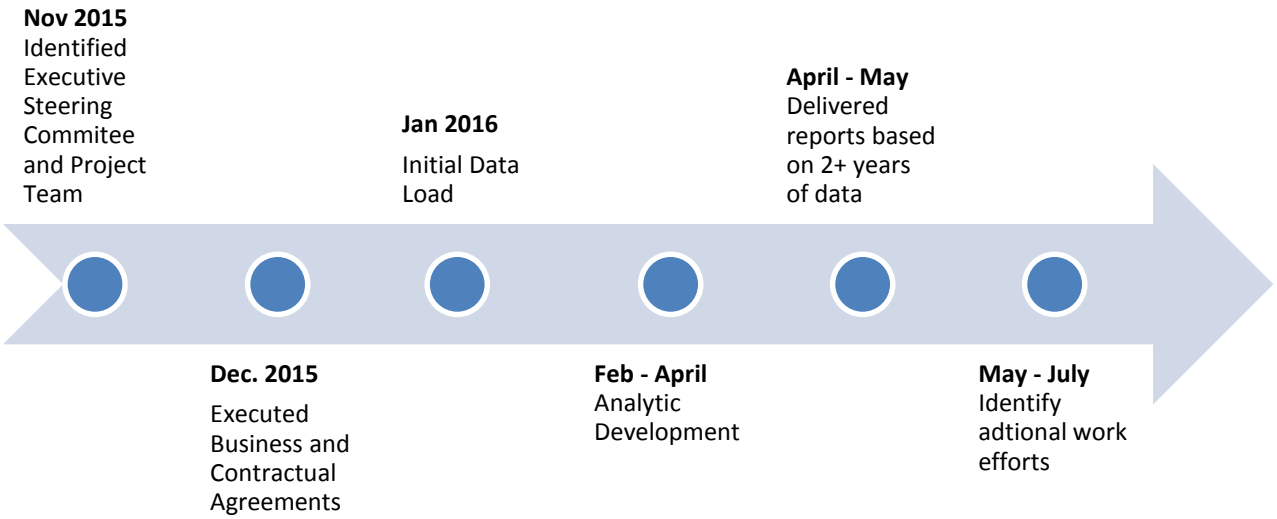
The analytic reports were initially developed using one month of data. During the months of March and April, DHHS users had the opportunity to evaluate the reports prior to finalizing them and executing against the entire 27 months. User input was incorporated where feasible, and the 27 months of data loaded into the Pilot. This work established a foundation for evaluation and recommendation related to the value and usability of data visualization of analytics in the delivery of information.

Timeline and Accomplishments

The team collaborated to provide an initial review of the Pilot and assisted with formulation of recommendations.

The following key milestones were achieved during the pilot:

- Defined the scope and approach of the pilot
- Executed necessary Data Use Agreements, Business Associate Agreements, and Contractual Agreements
- Completed secure data transmission process testing
- Established technical environment for developing and executing pilot components
- Provided Medicaid Pilot data to support analytic activities
- Completed exploratory data analysis of Medicaid claims data consisting of 700 million claim lines
- Collaborated to understand complexity of the data and the transformation of same into analytic reports
- Transformed NC Medicaid claims data into formats needed for selected automated reporting and analysis
- Configured 5 key focus areas for reporting and analytics. Each focus area included approximately 10 interactive multidimensional report "views" of the data
- Completed user testing and training
- Performed user evaluation



The Pilot reporting areas of focus included:

1. Site of Service Analysis – Assist the State in understanding the amount and type of care being provided for qualified Medicaid beneficiaries by facility type (site) – hospital inpatient, doctor's office, emergency room, clinic, etc. – and the cost associated with that particular care. Additional analysis understanding the populations within the site include types of patients, where they are from, where are they being treated, and services received and projected trends.

2. Eligibility Category Analysis – Assist the State in understanding member participation (Medicaid or CHIP) or program aid category (aged, blind and disabled; pregnant women, refugees, etc.) to understand cost, utilization, demographics, and projected trends.

3. Prescription – Assist the State in understanding the therapeutic drug codes (e.g. GC3, GCN, NDC) being prescribed within population categories, their utilization, and trends.

4. Super-utilizers - Assist the State in understanding associated costs within population types. An analysis of the percentage costs associated with the top 1%, 2-5%, and 6-10%. A correlation with the types of conditions, demographics, services, and identification of what triggers them as a super utilizer. Please refer to Appendix A for a sample report and explanation.

5. Cost overview – Assist the State in a visual representation of the weekly cash management report highlighting budgeted and actual expenditures within category of services.

Pilot Evaluation

The pilot was evaluated by users in two phases. The users comprised both management and analyst perspectives. The first phase evaluated the usefulness of the initial reports "out of the box" using 1 month of data. The results of the user feedback were incorporated where feasible to improve the value of the information provided in the reports. The pilot project was subsequently supplied with weekly check-write information for visually depicting actual vs. budgeted expenditures.

The second phase of the pilot assessed the reports – incorporating Phase 1 comments to the extent feasible – running against 27 months of claims data.

Additionally, the pilot was informally evaluated in terms of technical architecture, application architecture, extensibility and customizability, performance and other factors.

The following summarizes the DHHS evaluators' comments. These comments comprise those of end-users who were not directly involved in the pilot execution, and DHHS personnel who were actively involved throughout the project.

1. The reports are useful in visually depicting data. The nature of the architecture is that it is very powerful in providing drill-down capabilities to pre-defined levels. It does not (as currently implemented) provide the ability to drill-down to the most granular level of data, as required for detailed analysis. As such, the reports are best purposed for providing a retrospective view into the "who, what, when, where" to varying degrees of specificity.

2. The reports have the potential for providing very valuable information. However, there is the potential for users to misinterpret or draw inaccurate conclusions without proper context. The current SAS HAF will require considerable amount of customization and enhancements to accurately represent the information to the end user community.

3. There were performance issues encountered in the second phase of evaluation with 27 months of data which led to a less desirable user experience and prevented the users from exploring the complete benefits of the tool.

4. The pilot demonstrated the value of visually depicting Medicaid information as a basis for effective communication of Medicaid performance statistics.

Summary Findings

The pilot provided a good point of entry for Medicaid advanced analytics down the road. The utilization and cost of Medicaid services were visually represented in the SAS Visual Analytics tool across several dimensions such as recipient, providers, locations, types of services, and actual expenditures against budgets. The pilot also helped to gain insight into potential value of data visualization capabilities by representing complex Medicaid data in a pictorial and interactive way to enhance better decision making. However, a large number of concerns were expressed in terms of the accuracy of the reports as the SAS Health Analytics framework looks at data and aggregation differently than the standard reporting within NC DHHS. It was realized that reports might be misrepresented and cause confusion without proper communication and training to the target audience. Limitations were noted on the ability to save filters to be able to share the report analysis with other users. The tool is intuitive for investigative reporting but additional capabilities are needed for seamless integration into business operations workflow. Performance issues were encountered during the second phase of the user assessment (27 months of claims data) which impeded the ability to experience the full power of the SAS Visual Analytics tool and capabilities. However, sufficient evaluation was performed upon which to render findings and recommendations.

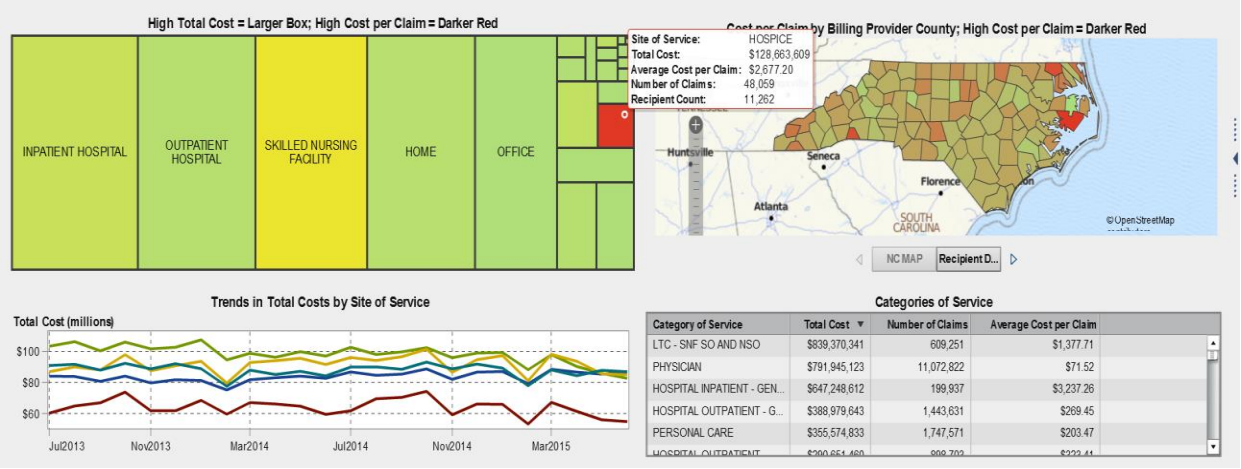
Recommendation

The pilot has certainly opened the door for enhancing visualization capabilities and transforming complex Medicaid data into information that would assist in better decision making at NC DHHS. Potential value can be more quickly realized if data visualization capabilities are set-up in the current DHHS analytical environment supporting the Medicaid platform; using the remaining resources from Session Law 2015-241, Section 12A.17. This recommended next-step approach would reduce the need for hosting Medicaid data within multiple State environments and reduce substantial amount of non-value-added tasks and data manipulation activities to replicate the data environment.

Appendix A: Sample Report

The pilot was developed to present data consistently across the report views. Each focus area initiates with a heat map presenting claims cost and volume, a NC county map of utilization and cost, a line graph presenting trends and a chart detailing aggregated details. Each quadrant is interactive and provides a user the ability to view targets by clicking on an area of interest and viewing the changing/impact to each quadrant.

This sample dashboard shows cost and claims utilization distributed where the healthcare services were performed. In the top left graphic, the user is hovering over the red box to see that Hospice comprises a relatively low volume of claims, but has an extremely high cost-per-claim. This dashboard also allows users to see where the highest volume and highest cost providers are located.



The user drills down into hospice and is now able to analyze this taxonomy, as well as the individual providers that make up this taxonomy.

The left three graphs show how the cost per recipient for hospice services varies by patient demographic characteristics, as well as by clinical condition. The table on the right shows the individual providers billing hospice claims. Clicking on an individual provider updates the trend graph below.

Drilling down another level, the user can analyze which specific procedures may be driving higher-than-average costs.