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MWSUG 2012 – Paper PH08

The Health Care Information Factory: An Overview of the SAS® Enterprise Business Intelligence Environment at the Minnesota Department of Human Services

Mike Baldwin  Minnesota Information Technology Services

ABSTRACT

In these times of tight budgets and rapid increases in health care costs, agencies who administer health care programs are under increasing pressure to monitor, analyze and report on health care data. The Minnesota Department of Human Services (MN DHS), which oversees the state’s Medicaid program, is answerable in this respect to many different stakeholders, including federal and state authorities. Turning volumes of raw health care data into salient, actionable information can be a formidable task; the SAS® Enterprise Business Intelligence Platform makes this task easier by providing an integrated solution for both data analysis and information dissemination. This paper offers a brief overview of how MN DHS uses the SAS EBI Platform to address health care reporting and analysis needs.

INTRODUCTION

Through its largest health care programs, Medical Assistance (Minnesota’s Medicaid program) and MinnesotaCare, the Minnesota Department of Human Services administers or oversees health care coverage for more than 800,000 persons each month1. These two means-tested programs are paid for by a combination of State and Federal funds, or, in the case of some MinnesotaCare eligibility subgroups, state funds only. With so many people receiving health care coverage, large volumes of data are produced on a regular basis (we typically add around 166 GB of health care data each month to our data warehouse that retains about ten years of historical data). Administering these health care programs involves many reporting and analysis obligations, including:

1. Monitoring and reporting on current health care enrollment, utilization, and cost
2. Predicting future trends of enrollment and expenditures
3. Measure performance and quality of care
4. Detecting and hopefully preventing fraud, waste, and abuse

In order for the raw health care data we collect to be of value, it must be distilled into the relevant information that can be used for reporting and analysis, then delivered to appropriate stakeholders and decision makers. Using SAS EBI Platform tools, data analysts at MN DHS extract raw data from our data warehouse or import it from other sources, cleanse and transform the data into timely, meaningful information, and distribute that information to appropriate audiences.

OUR ENVIRONMENT

1 “Minnesota Health Care Programs” DHS-4932-ENG 2-12  https://edocs.dhs.state.mn.us/lfservlet/Public/DHS-4932-ENG 31 May 2012
At present MN DHS’s SAS BI environment is deployed across three machines: A dedicated metadata server, a compute server, and a web server. MN DHS data analyst “Power Users” (roughly equivalent to a BI Content Developer in SAS parlance) use the SAS BI client tools Management Console, Enterprise Guide, OLAP Cube Studio, and Information Map Studio to extract and refine data. Oftentimes, the end product is in turn disseminated to content consumers – policy staff, managers, help desk staff – via Web SAS Report Studio or the SAS Information Delivery Portal.

The primary source of raw data is the MN DHS Data Warehouse, a Teradata platform housing raw enrollment, claims, screening, demographic, and other records for our Medicaid and MinnesotaCare participants.

**HOW SAS SUPPORTS OUR REPORTING AND ANALYTICAL NEEDS**

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So how do we bridge the gap between the raw information from our data warehouse and a finished product a decision maker can use? To illustrate, I will use three brief examples representative of what occurs in our production environment on a routine basis.

**MN DHS Example Project One:**

“I don’t want to have to ask for this report each month – is there any way you can update it automatically?”

This is a direct quote from a request a data analyst received from a content consumer, and certainly redolent of many requests content consumers have had over the years. In this case the consumer wanted a weekly update of a price list for nutritional supplements covered by our health care programs – a very simple list report. The data analyst who completed this project decided to schedule a report to run every Sunday, deployed the report in the Information Delivery Portal, and notified the content consumer of the report’s update schedule so she could have access to it whenever she wished.

To accomplish the task, the data analyst employed SAS Enterprise Guide to write a program that utilizes the SAS ACCESS Interface to Teradata in order to pull down the necessary information from the data warehouse, built an information map, a report, and used the schedule manager in SAS Management Console to ensure the information was updated every week. An overview of the workflow displays in Figure 2.

![Figure 2: MN DHS Example Project One Workflow](image)

An example of the deliverable from that project, the “Nutritional Supplements Report,” appears in Figure 3.
MN DHS Example Project Two:

The Minnesota Department of Human Services expenditure forecast is completed twice each year in February and November. The forecasting process involves merging information from many different sources into a Microsoft Excel workbook. Methods used to complete the forecast vary, but data in a time series format (e.g., a data set containing one observation for each month of a year, ordered sequentially, showing aggregate monthly expenditures) is a constant theme. As the forecast information ultimately resides in an Excel workbook, the SAS Add In for Microsoft Excel is a very efficient way to deliver the data to a consumer.

Figure 3: MN DHS Example Project One Deliverable

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The following example assumes an economist would like to forecast the number of people eligible for a health care program and the expenditures they will incur. Accordingly, the economist asks a data analyst for historical monthly counts of persons eligible for that health care program and their associated expenditures. The data analyst amasses the data per the economist’s specifications via SAS Enterprise Guide and the Access to Teradata module. The resulting SAS table in then directly opened into a Microsoft Excel table (or pivot table) via the SAS Add in for Microsoft Excel; the workflow is shown in Figures 4 and 5 below.

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The deliverable is a Microsoft Excel table as shown in Figure 6 below.

![Microsoft Excel table](image)

Figure 6: MN DHS Example Project Two Deliverable

**MN DHS Example Project Three:**

A great strength of SAS Enterprise Business Intelligence web tools is flexibility. When required, one has the ability to create dynamic reports that are more robust than traditional static list reports (like the one shown in MN DHS Example Project One).

The final example project assumes the need for a report whereby a Help Desk staff person would be prompted for some basic information in order to receive a report on health care provider specialties (e.g., Neurosurgery; Gerontology; etc.), with the ability to display the report results by state region and by one or more provider specialty code. In the “old days” producing such a report would have required either the time and expense to obtain a license for a “thick client” application plus a considerable investment to train the consumer how accurately to extract the...
information, or the request would command the time of a data analyst who could otherwise be working on something else.

With SAS EBI web tools and some judicious planning, a data analyst can create a dynamic report that is intuitive and easy to use that meets Help Desk staff requirements. To accomplish the task the data analyst once again compiles the relevant data, creates an Information Map, then builds a report in Web Report Studio that employs a couple basic filters to allow the Help Desk staff person to specify input parameters needed for a particular request; an overview of the workflow displays in Figure 7.

![Figure 7: MN DHS Example Project Three Workflow](image)

The addition of a filter when building the SAS Report (or Information Map) prompts the Help Desk staff person in this example to enter one or more “Region” codes and “Provider Specialty” Codes. So, let’s say a Help Desk staff person wants to see a list of providers in the metro area who specialize in Internal Medicine –he simply selects the values he wants and then views the report:

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Figure 8: MN DHS Example Project Three Process

The deliverable is a SAS report as shown in Figure 9.
Figure 9: MN DHS Example Project Three Deliverable

As different requests for information are received the Help Desk staff person simply modifies the values he is prompted to enter. Let’s say he now has a request to see Radiologists regardless of their regional location; he modifies the prompted input values as shown in Figure 10:

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Figure 10: MN DHS Example Project Three Process (2)

And the deliverable is a SAS report as shown in Figure 11:
CONCLUSION

While there are many ways to accomplish reporting and analysis tasks, the SAS Enterprise Business Intelligence Platform offers an integrated, flexible, and robust enterprise solution that helps immensely in the Minnesota Department of Human Services’ endeavor to manage its health care information.

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