SAS UTILIZATION A TO Z:

HOW WE’RE USING SAS TODAY AND WHERE WE MAY BE HEADED!
EXTRACT
TRANSFORM
LOAD

ORACLE
Microsoft SQL Server
Microsoft Access
Microsoft Excel

SAS

ORACLE
WHAT WE TRANSFORM (AND HOW)

- ELIGIBILITY
- CLAIMS
- GROUP – CONTRACT – BENEFIT
- PROVIDER
- PREMIUM (PAID AND EARNED)
- CENSUS AND GEOGRAPHY DATA

- PASS THROUGH SQL AND INTERMEDIATE SAS DATASET TRANSFORMATIONS
- HASH OBJECTS JOINING LARGE DATASETS QUICKLY
- WAREHOUSE OBJECTS IN THE $10^8$ ORDER OF MAGNITUDE NIGHTLY (BUILT FROM SCRATCH!)
- COULD BE EVEN FASTER IF WE USED HASH FOR SORTING
REPORTING (BATCH AND ON DEMAND)
REPORTING (MORE DETAIL)

- THE FRONT END GRAPHICAL USER INTERFACE CAPTURES USER REQUESTS
- CRITERIA IS STORED IN ORACLE
- SCHEDULING (IN LIEU OF AD-HOC) IS ALSO AVAILABLE
- SAS INSTANCES “LOOP”, RUNNING IN PARALLEL, LOOKING FOR AD-HOC REQUESTS
- SAS INSTANCES “LOOP”, LOOKING FOR SCHEDULED “EVENTS”
MORE ON PARALLEL PROCESSING

- 5 SAS INSTANCES LOOKING FOR ON-DEMAND REQUESTS
- 2 SAS INSTANCES LOOKING FOR LONG-RUNNING REQUESTS
- 2 SAS INSTANCES LOOKING FOR PRE-SCHEDULED JOBS
- ALL RUNNING CONCURRENTLY
POWERPOINT PRESENTATIONS
POWERPOINT PRESENTATIONS

• AN EXCEL TEMPLATE CONTAINS VISUAL AND NON-VISUAL (DATA) COMPONENTS
• SAS IS USED TO UPDATE THE NON-VISUAL COMPONENTS
• VBA CODE CREATES THE FINAL POWERPOINT OUTPUT

• THE DESIGN IS DONE BY ONE TEAM
• THE DATA PREPARATION IS DONE BY ANOTHER
• AND THE RESULT LOOKS LIKE…
ORAL HEALTH WATCH

A closer look at your Delta Dental plan

This report examines data associated with your Delta Dental plan and membership. The report, produced by Delta Dental’s Research and Data Institute (RDI) is designed to reveal the oral health behaviors of plan members and highlight the importance of preventive dental care.

Established in 2005, our RDI is dedicated to using high-quality scientific research to generate evidence-based plan designs with a focus on whole health risks and prevention. As we continue to learn more about the connection between oral and overall health, one thing we know for sure is that visiting a dentist regularly can help maintain oral health and improve overall health and well-being.

Your Oral Health Watch is a retrospective tool that measures your continuously enrolled members’ utilization of certain dental services over a specific reporting period and benchmarks them against your industry peers.

**Members**—For the purpose of this report, members shall include all employees, spouses and dependents that were continuously enrolled during the reporting period.

**Reporting period**—Unless noted, your reporting period is January 1 through December 31, 2015.

**Industry peers**—Delta Dental clients whose location and type of business are such that we might expect you to recruit from similar personnel pools and hire employees with similar skills and educational backgrounds.

Above all, your company’s personalized Oral Health Watch is designed to demonstrate the value of your Delta Dental program. After reviewing the report, please contact us if you have any questions.
MAKING THE LINK:
ORAL HEALTH AND OVERALL HEALTH

Dental checkups are not just a way of taking good care of teeth and preventing oral health problems. Maintaining good oral health also can help you take care of your overall health!

**MOUTH**
Medications may cause dry mouth, increasing susceptibility to tooth decay and mouth infections.¹

**PANCREAS**
People with diabetes are more likely to have gum disease. And gum disease may make it more difficult for them to control their blood sugar.²

**REPRODUCTION**
Hormonal changes during pregnancy increase the risk of developing "pregnancy gingivitis" and the overgrowth of tissue called "pregnancy tumors."³

**BRAIN**
Gum disease translates into a higher risk level for stroke.⁴

**HEART**
Bacteria in the mouth can migrate into the bloodstream and lodge in the heart tissue.⁵

**BONES**
Osteoporosis can have a serious effect on the mouth and teeth when the jaw bone is weakened.⁶
MEMBER UTILIZATION AT A GLANCE

**Preventive**
3%
0,000 members had preventive care only (2 percentage points above industry peers).

**Acute**
3%
0,000 members had emergency or extensive care only (at par with industry peers).

**Other Services**
3%
0,000 members had a mixture of dental services (2 percentage points above industry peers).

**No Visits**
1%
0,000 members had no dental claims (2 percentage points below industry peers).

**MOUTH MATTERS:** Nondental medical costs are 40 percent lower for people with diabetes and stroke conditions if periodontal disease is treated.1
STUDIES AND RESEARCH

- Aggregate and synthesize information from big data
- Research in cooperation with many universities including U of M, MSU, UCONN and UCLA
- Genetic research
- Utilization patterns
- Random sampling
- Statistical analysis
- Pre-aggregation and de-identification for sharing with research partners
- Transfer of data in SAS datasets
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...AND MAPS

Kentucky Combined (Delta Dental PPO and Delta Dental Premier) Covered members as of August 31, 2016
\[ \int \cos(\ln x) \, dx = \int u \, dv \]

\[ = uv - \int v \, du \]

\[ = x \cos(\ln x) + \int \sin(\ln x) \, dx \]

- ACTUARIAL STUDIES
- RENEWAL RATE FORMULATION
- PROVIDER FEE SCHEDULES
- AD-HOC REPORTING
- RESEARCH
- OTHER MYSTERIOUS MACHINATIONS!
WHAT`S NEXT?

• VISUAL ANALYTICS
• PREDICTIVE MODELING
• …
• WORLD DOMINATION?
QUESTIONS?