SEMI-ANNUAL PERFORMANCE REPORT
COVER SHEET

1. Grant Number: 90-FD-0058/05

2. Grantee Name and Address: Washington State Department of Social & Health Services, PO Box 9162, Olympia, WA 98507-9162

3. Telephone Number: (360) 664-5082

4. Project Title: Linking the Past and the Future: Building a Longitudinal and Predictive Child Support Knowledge Management System

5. Period of Performance: September 29, 2001 through September 29, 2006

6. Approved Project Period: September 29, 2001 through September 29, 2006

7. Period Covered by Report: (Check one)

   First Semi-Annual _____ Second Semi-Annual _____

   Third Semi-Annual _____ Final Report X

8. Principal Investigator's Name and Telephone Number: Kent Meneghin (360) 664-5084

9. Author's Name and Telephone Number: Carol Welch, Ph.D. (360) 664-5082

10. Date of Report: March 9, 2007

11. Report Number: (Number sequentially beginning with 1) 7

12. Name of Federal Project Officer: Michael Rifkin

13. Date Reviewed by Federal Project Officer: _____

14. Comments, (if any): Please note: The MAPS Unit is now part of the Operations Support Division within the Economic Services Administration (ESA) of the Department of Social and Health Services in Washington State. Its name is E-MAPS, ESA Management Accountability and Performance Statistics.

ESA Management Accountability and Performance Statistics
In Support of the Division of Child Support
Washington State DSHS
P.O. Box 9162
Olympia, WA 98507
Carol Welch, Ph.D.
cwelch@dshs.wa.gov
(360) 664-5082
FAX (360) 664-5077

Final Performance Report of the Research Project
Data Warehousing/Data Mining Grant

March 30, 2007

Submitted to the Office of Grants Management
Division of Discretionary Grants
Administration for Children and Families
U.S. Department of Health and Human Services
Washington, D.C.

Grant Number 90-FD-0058

PROGRAM SUMMARY ABSTRACT

The U.S. Department of Health and Human Services Administration for Children and Families Office of Child Support Enforcement awarded Washington State a grant to build a data warehouse to use for data mining in the Division of Child Support. This grant was awarded under Priority Area I: Projects which Use Data Warehousing and Data Mining and Build Capacity of the State Agency (Operations and Management of the Program and Financing of the Program). The name of the project is *Linking the Past and the Future: Building a Longitudinal & Predictive Child Support Knowledge Management System – A Data Warehousing and Data Mining Project to Build the Capacity of Washington State*. It was a research and demonstration program (announcement DCL-01-32), which ran from 2001 through 2006.

In this conceptual framework, Washington State used this grant to build its capacity to manage and make use of knowledge assets to get maximum returns for the Division of Child Support (DCS). This approach has been particularly valuable in a time of shrinking resources and increasing pressure to target dollars as wisely as possible and to perform at an unprecedented level. There has been an increasing emphasis on measurable performance for all public entities. This grant has allowed the state of Washington to create a data warehouse for child support, develop business rules to design data marts, and produce analysis ready tables for a variety of reporting purposes. Queries from these analysis ready tables are easy and straightforward for data mining purposes. Complementing this work is the continued emphasis on quantifying the benefits from regular child support in some of the public assistance programs, including Temporary Assistance for Needy Families (TANF), Food Stamps and Medicaid.

The report will focus first on the efforts of building a data warehouse. We present much of the information in the Appendices in schematics because the discussion lends itself to a graphical depiction of the architecture of the data warehouse. Second, there is an appendix dealing specifically with efforts to quantify the cost savings, or cost avoidance, which accrue to regular receipt of child support in the public assistance programs.

Background and History

To meet the challenge of bringing historical records and multiple databases under one structure, Washington State proposed developing a data warehouse, separate from the mainframe. It required the development of a network-attached storage (NAS) system. "NAS helps meet changing storage demands by simply attaching to the existing network."[1] NAS boxes are capable of handling heavy database I/O loads. NAS provides an excellent solution for file serving, file sharing and database applications. The NAS is a cost-effective solution to the many problems of large files that are continually expanding as the need for longitudinal data increases, managing volumes of data, hardware failures, viruses, faulty tapes, and lack of scalability for long-term growth.

[1] TechRepublic, Dec. 14, 2000, "Gartner Predicts NAS Market to Take Off."

The second major area of work was to make the data usable. As an on-line Fortune article stated, "Businesses are drowning, just drowning in data."[2] The article talked about the use of data mining to search for patterns and meaning in businesses' data oceans. We were aware that loading data on a NAS would create a better ocean of data, but we still needed to probe the contents of the data for relevant patterns and meaning. To that end, Washington State proposed a multi-year project for data warehousing and data mining. This project proposed not only to bring databases together in one place, but also to bring the collective skills and knowledge of mainframe programmers, researchers and database managers together in an unprecedented collaborative effort to build a data warehouse that would have data mining capacity.

In a Dear Colleague Letter,[3] several telephone conference calls were scheduled to solicit and to share information regarding states' efforts in using child support data to support performance and decision-making. There was recognition that each state holds a treasure trove of administrative data that could serve innumerable purposes. The letter also stated that "the nature of the databases in most States made it difficult to fully utilize this data in a timely and cost-effective manner." States were in various stages of progress in creating data warehouses and data marts to extract the data and make it more accessible.

The State of Washington's Division of Child Support (DCS) has a comprehensive automated system that provides operational support for the division through its mainframe system, the Support Enforcement Management System (SEMS), which dates back to the 1980s. SEMS is the tool that provides the means for the establishment, collection, and distribution of over a billion dollars annually in child support to children in Washington and throughout the nation. SEMS is an on-line, real time system with over 2,000 workstations. The database contains information on three million individuals and over one million child support cases. SEMS provides enforcement and collection action for over 355,000 active child support cases. SEMS contains information needed to work a case. There are over 10 million inquiry and update transactions to the mainframe each month.

As is true with many states, however, the mainframe system's historic data are very difficult or, in some instances, impossible to access, requiring a computer programmer to write a program to access the data. To meet the demand for historic data, the Management and Program Statistics (MAPS) unit within the Division began capturing data and storing it on CDs in 1996. The historic records, however, had not been linked together in an accessible format. If historic data were required for decision-making or policy analysis, data elements had to be pulled off each CD and linked for that specific purpose. Because it was very time consuming and required a considerable amount of storage space, it was rarely done. This limitation made it extremely labor intensive to study historical trends, making it difficult to research child support issues --

[2] Stuart F. Brown, Fortune.com, August 2001, "Making Decisions in a Flood of Data." http://www.fortune.com/indexw.jhtml?channel=artcol.jhtml&doc_id=203525

[3] Dear Colleague Letter (DCL-01-29), June 15, 2001.

including improvement of child support collections, paternity establishment, and the impact of child support collections on welfare expenditures.

Washington State has been at the forefront of increasing technological capacity over the years. Yet much work remained to add historical data, integrate various databases, build on line tracking databases and develop statistical models that could enable staff with little training and limited quantitative and computer skills to predict outcomes and determine cause and effect. The MAPS unit within the Division developed an intranet-based information system, the Decision Support System (DSS) in 1997, which is a point-and-click system that allows staff to access data and formulate ad hoc inquiries. Over time, the DSS has added more variables and allowed access to data down to the individual caseworker level.

Yet, the DSS was not a data mining operation. Data mining takes what Washington State has done to a different level. We created an integrated data mining system that would serve as a powerful information tool for every individual within the organization. The applications are many. Such a system provides all sorts of information to a variety of users. Line staff now track their performance over time on line. Or they use the data to correct data coding errors. They can also try interventions to improve collection outcomes by defining their samples and tracking before and after information between randomly assigned cases to control and treatment groups. Research staff draw their samples and data they need from the longitudinal database. Many more applications continue to flow from the increased internal capability of the Data Warehouse/ Data Mining system now in place.

In the data mining project, we also wanted to create a feedback loop to the caseworkers, known as Support Enforcement Officers (SEOs) so that they would know what effect their activities have on collections, and also on establishment outcomes. DCS had already begun the process of building a mathematical model that is based on the underlying notion that there are certain actions by SEOs that enhance collections. These actions could be captured and put into a data base that would then enable analysis to determine the relative efficiency of individuals (SEOs), teams, field offices and regions in managing their caseloads to maximize child support collections.

These databases can be stored to allow longitudinal analysis of historical performance data. We hoped to link these models to other performance measures, such as four of the five federal incentive performance measures and the Governor's performance measure on TANF and Former TANF paying cases. All the federal incentive performance measures except Cost Effectiveness can be tracked by individual SEO. By providing measurable feedback at the individual level, we thought it possible for SEOs to see how their efforts could be associated with improved performance for the agency.

Data Mining

DCS research results reported from 1999 to 2004 showed that DCS services in establishing child support orders and compliance with those orders avoided significant public expenses for other

State services – in Medicaid, TANF, and Food Stamps costs. The final report in 2004 estimated monthly savings of $1.8 million in Medicaid, $1.3 million in TANF, and $0.9 million in Food Stamps.

During the last part of this project, we began the process for taking these research findings to the next level. That level was to put the procedures for quantifying the cost savings in public assistance programs into production. To be useful, the quantifiable savings need to be generated at regular intervals, either monthly or quarterly.

We have recently found that the research results can be approximated by using summary caseload level data. For example, monthly cost avoidance in Medicaid can be approximated as 8.5% of total Medicaid monthly costs for DCS active custodial parents over the 36 months of results reported in 2004. [4]

Goals

The goals for this project were to:

GOALS	ACCOMPLISHED
1. Add the longitudinal data into the data system so that it is usable.	Yes
2. Integrate all program performance measures into the system.	Yes
3. Integrate interagency data regarding social services usage by both custodial and noncustodial parents.	Yes
4. Integrate internal databases with case management data that are held throughout the Division into the system.	Yes
5. Provide a link to personnel data that feeds to certain federal and management reports for various program performance measures, e.g., FTE counts, affirmative action allotments and actuals, evaluations and due dates.	We had access to the Personnel Warehouse, but it is undergoing major systems revision.
6. Build on-line transaction processing (OLTP) databases to allow tracking of projects without interference into the process.	Yes
7. Achieve cost avoidance in terms of pursuing uninformed interventions or implementing ineffective policies if good information were available for making informed decisions.	Yes
8. Create statistical models that allow predictability, cause and effect, and the development of a true outcome-based system.	Yes, but not integrated into system.

[4] See Appendix B "Cost Avoidance Indicator".

Objectives

To accomplish the goals above, the objectives stated were:

OBJECTIVES	ACCOMPLISHED
1. Obtain resources necessary for building increased capacity for the longitudinal and predictive child support information system	Yes
2. Integrate all performance measures in strategic plans and performance agreements within the Division and within the Economic Services Administration, the Governor's Office and the federal Office of Child Support Enforcement.	Yes
3. Review all data share agreements to ensure that the language is sufficient to allow expanded use of the data and draft data share agreements with other agencies that have public services data that we wish to integrate into our system, e.g., Food Stamps.	Yes
4. Contact other units that have data in Access and SQL to create links to the databases.	Yes
5. Personnel data are currently being developed into databases specific to the Division. Coordination with the staff involved in creating Division-specific databases will need to occur so that these inputs can be captured at the aggregate level for the information system.	We had access to the Personnel Warehouse, but it is undergoing major systems revision.
6. There is interest in building on-line transaction processing databases. One is a document review database that will capture comments on policy drafts that are currently posted on the Intranet. Currently, respondents can e-mail comments, but then someone has to compile the comments. The comments are used to edit the policy, but the content of the comments is not shared. The document database would capture the date the comment is sent, the reviewer, the comments, etc. This application will then guide the development of the online grant tracking database.	Yes, we have created a Digital Library and we are using SharePoint for document sharing.
7. Develop predictive modeling using neural network simulation modeling and decision tree modeling, which require longitudinal data. The objective was to build a "black box" that would allow end users to identify individuals who are most likely to build the largest arrears, for example.	Not integrated into the data warehouse architecture; requires additional resource in terms of enterprise software and additional development, which is beyond the resources in this grant time frame.

Results and Benefits Accomplished

The development of a data mining system has allowed many new applications and has moved the Division farther along into a knowledge management system instead of just an information management system. The distinction between the two is really a leap between worlds. To say that the Division is doing business in new ways is an understatement. The concept of building a knowledge system is still a long-term proposition that must continue to incorporate the flexibility to grow incrementally with internal capacity growth through training.

Some of the measurable benefits that have resulted from turning information into knowledge are streamlining operations, reducing costs, increasing collections, and improving internal and external customer service. The applications are numerous and many are invisible to the Child Support Knowledge Management System. Some users access prepared data while others make ad hoc inquiries using the Data Mart structure in conjunction with the Decision Support System. A much fuller menu of data elements is now available, perhaps the most important of which is historical data that enables users to do trend analysis on a variety of data elements, including their performance or their team's performance on a number of measures.

Another powerful set of data elements that will soon be added is types of public assistance programs used by both custodial and noncustodial parents. Cost avoidance can be more accurately determined when specific public assistance programs reside in an easily accessible data mart. Integrating individual databases that are held throughout the Division can enrich our knowledge of clients and their use of public assistance programs. Matching databases make it possible to mine for patterns hidden in individual databases.

The centerpiece in terms of results is the completion of the feedback loop from individual SEO actions to outcomes. The outcomes include collections, the Governor's measure on TANF and Former TANF paying cases and four of the five federal incentive measures:

- Paternity Establishment Percentage
- Percentage of Orders Established
- Percentage of Current Support Collected
- Percentage of Cases Paying Toward Arrears

By linking the individual in the organization with agency goals, the Division has the opportunity for the first time to have ready access to cause-and-effect relationships between the actions of an SEO to the outcomes of primary importance. This project also moves the organization to realizing the strategic value of information capital within the organization.

Child support is in a great state of change and will continue to experience fundamental changes. The only way for a state child support agency to thrive in times of rapid change is to build a comprehensive information technology system that maximizes the value of information capital. This project melds particularly well with the Governor's Strategic Plan and DCS's Strategic

Plan, in which technological solutions play a key role. In addition, this project has lent analytic vigor to the agency's complexity and multivariate world. In the recent past, much of management has been solely intuitive. This solution has allowed the dynamic use of information for decision-making and replaced limited, one-dimensional, point-in-time data analysis.

Technological solutions are available that can move current data capturing into a more fluid mining of data that helps draw out patterns and relationships previously buried in the columns of data. Most systems are good at delivering counts. Ask why something is happening, however, and it is much more difficult to determine underlying causes.

In an article by David Norton, he argues that it is time to bring back the systems approach, which "implies an interconnected complex of functionally related components. The effectiveness of each unit depends on how it fits into the whole, and the effectiveness of the whole depends on the way each unit functions."[5] Because the Division has a Strategic Plan that aligns well with the Office of Child Support Enforcement Strategic Plan and follows an approach to use data for decision making, this systems approach makes sense and is the underlying philosophy upon which it is built.

Dissemination Plan

The findings of the final report will be disseminated to the federal government. The final report is available as a link to our Internet and Intranet sites. The report can be found on the Internet site: http://www1.dshs.wa.gov/dcs/reports.shtml. We have presented at professional meetings, including the National Child Support Enforcement Association conference that was held in Dallas, Texas in the summer of 2006.

Future Plans

Additional data marts have been developed and tested. End user and quality control functions for the main infrastructure have been tested and implemented, automating and phasing out manual SAS runs. Training of staff on managing the interfaces and metadata and supporting the infrastructure is ongoing as new processes are developed.

The grant provided the opportunity to begin the data warehouse/data mining process. The data warehouse and data mining projects are on-going. Immediate plans include expanding the tribal information on the Data Dashboard and folding in key measures for the public assistance programs.

Our efforts allow users to analyze data from many different dimensions, categorize it, and summarize the relationships identified. As our work in data mining progresses, we expect to find correlations among dozens of fields in our large relational databases. The goal is to convert information into *knowledge* about historical patterns and future trends. This is the power of creating a data warehouse and a data mining process.

[5] David P. Norton, 2001, "Is Management Finally Ready for the Systems Approach?"

Appendix A

Cost Avoidance Indicator

Cost Avoidance Indicator

Carl Formoso, Ph.D.

Background and Previous Work

With changes in requirements and budgets for public safety net programs, the question of indirect benefits from the child support system has become more important at both the State and Federal levels. One possible indirect benefit of child support collections is a reduction in use of public safety net service programs, thus leading to a reduction (or an avoidance) in costs for those programs and greater self-sufficiency for custodial families.

Under contract from the US Department of Health and Human Services, the Lewin Group prepared a major review of the child support cost avoidance literature in 2000 (Barnow, Dall, Nowak, & Dannhausen, *The Potential of the Child Support Program to Avoid Costs to Public Programs*, April 2000, see http://www.lewin.com/NewsEvents/publications). Other studies have continued at the Federal and State levels (see publications by Laura Wheaton at http://www.urban.org).

In 1998, the Washington State Division of Child Support (DCS) began an investigation into cost avoidance due to child support services. Initial studies used welfare cohorts and covered the time frame from January 1993 to December 1997. Each study used all custodial parents in the DCS system who were on welfare at a given time and followed the outcomes for the cohort through subsequent time. Four outcomes were identified – *On Welfare without Work, On Welfare with Work, Off Welfare without Work*, and *Off Welfare with Work*. Custodial parents were classified by child support payment status as *Regular Payments* (CR) or *Irregular Payments* (CI). Classification as *Regular Payments* required nearly complete compliance with child support orders.

Outcomes for CR parents were compared to outcomes for CI parents on the basis of 'other things being equal' through logistic regression models that adjusted for the factors gender, race, primary language, age, location, number in family, initial outcome status, earnings history, and welfare history. These results showed that CR parents did indeed use less welfare, work more, and earn more than comparable CI parents, but the most critical results from welfare cohort studies came from looking at rates of transitions between outcome states through survival analysis.

Here the results were very clear. When adjusted for the other factors listed above, CR parents on welfare were no different statistically from CI parents on welfare in their rates of finding or losing employment or in their rates of welfare exit. It was only after welfare exit that CR parents fared better than CI parents did. The rate of welfare re-entry was much lower for CR parents - leading to less welfare use, and the rate of finding employment was higher with the rate of losing employment lower – leading to more work and higher earnings for CR parents. This was a very important finding because, first, it made sense: it is only after welfare exit that the

parent actually receives child support dollars; and, secondly, it suggests that the effect of CR may be general. Compliance with child support orders may serve as a private transfer safety net restricting the use of the public safety net for the entire caseload of DCS custodial parents.

Reports on the welfare cohort studies were published in May 1999, August 2000, and May 2002 and are available on a DCS website at

http://www1.dshs.wa.gov/dcs/reports.shtml

In 2002, DCS began a cost avoidance study using the entire caseload of DCS custodial parents and the entire caseload of associated children. This study included the costs of welfare (TANF), Medicaid, and Food Stamps. We found that for all services, the rates of exit were not different for CR and CI parents, but the rates of entry, when adjusted for other factors so that comparison are on the basis of 'other things being equal,' for CR parents were lower than for CI parents. Here, since we are working with a much larger number of individuals, we were able to use stratification techniques where parents are sorted into groups or cells where they are identical or very similar in the factors of gender, age, earnings history, tribal affiliation, location history, limited English, and death. Within each cell, CR parents were compared to CI parents. The results are striking. Over the period from January 1998 to December 2001, cost savings attributable to CR had a monthly average of $1.3 million for TANF, $1.8 million for Medicaid, and $0.9 million for Food Stamps. This is a total of $4.0 million per month or $48 million per year.

In looking at children's Medicaid cost savings, we also included the DCS service of establishing private medical coverage for children. The children are sorted into cells so that each cell contains only children who are identical or similar in other factors. Comparisons within cells lead to an estimated average monthly cost savings of $2.7 million for the period from January 1998 to December 2001 for the two DCS services of establishing regular payments and establishing medical coverage. This is equivalent to $32.4 million per year.

The DCS caseload study thus estimates an average of about $80 million per year savings attributable to DCS services for the period from January 1998 to December 2001. The majority of savings (over 95% for custodial parents and about 80% for children) arise from non-use of public safety net services, the remainder is from lower costs when safety net services are used. The caseload study was reported in February 2004 and is available at the website given above.

In 2006, as part of the Data Mining grant, Washington State DCS began working towards a routine production of cost savings estimates. We now have cost avoidance results for Medicaid, Food Stamps, and TANF up to December 2004, which means that we have a seven-year history of caseload cost savings attributable to DCS services. During this period, there was a general increase in cost savings, with $101.1 million being the total estimated caseload cost savings in calendar year 2004.

While the work has concentrated on Medicaid, Food Stamps, and TANF costs, any public costs associated with custodial parents or children could be included in the developed procedures.

A recent report released by the Federal Office of Child Support Enforcement estimates $2.6 billion nationally in child support cost avoidance in FY 1999. While this Urban Institute study differs from our work in Washington State in types of data, methodology, and somewhat different areas of cost savings, the overall picture is consistent. Public investment in child support enforcement pays big returns both directly through retained support and indirectly through cost avoidance in other public programs.

While we cannot directly compare our results with those of the Urban Institute study, our estimate of total cost avoidance in Washington State is $66.8 million for FY 1999 and $101.2 million for FY 2004. Assuming a constant ratio between Washington State results and Urban Institute results suggests $3.9 billion nationally in child support cost avoidance in FY 2004.

Data Mining Project

In the data mining project, we are working towards routine production of a cost avoidance indicator. New work is based on results reported in 2004 (see above) and expands from previous work.

In the 2004 report, subjects were sorted according to seven factors, but in the data mining project we discovered that only two factors – age and earnings history - are important. The other factors do have an effect but it is generally quite small, affecting cost avoidance estimates by 1% or less. To streamline production, the new process sorts subjects only by age and earnings history.

A second change is to abandon the cohort approach and develop a monthly approach. For each cost avoidance month, we obtain the client's earnings history and service costs (Medicaid, Food Stamps, or TANF) for the month. Clients are sorted into cells with cost savings determined within each cell, and with the caseload cost avoidance obtained by summing over the cells.

While this does produce a monthly cost avoidance indicator in dollars saved, the process is limited by the earnings history factor. Wage data is obtained from quarterly records obtained from employer's reports for employees covered by Employment Security Department (ESD). For a given quarter, it may take four to six months for ESD files to be complete due to lags in reporting. The process described so far can only produce a cost avoidance indicator that is four to six months old.

In the data mining project, we have used the cost avoidance history determined by the above process and developed a reliable process for projecting a cost avoidance indicator into recent times – in some cases up to the month previous to the current date. This projection is only limited by how recently service cost data are available.

The projection procedure is not based on comparison of individuals but uses only overall summary caseload values. We noticed that there was a relationship between cost savings determined by the above procedures, which we will call 'corrected' cost savings and 'uncorrected' cost savings. By 'uncorrected' we mean that comparisons are not made on the basis of other things being equal; in work with custodial parents, for example, we simply compare the entire caseload of CR parents with the entire caseload of CI parents. Corrected cost savings only makes comparisons within cells where custodial parents are similar. The relationship between corrected and uncorrected cost savings is used to estimate projected cost savings.

In the remainder of the cost avoidance discussion, we will be referring to date as month number, counted as the number of months since December 1997. This is a matter of convenience because the discussion covers a span of eight and one-half years. Table 1 shows how month numbers relate to calendar date.

year	jan`	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1998	1	2	3	4	5	6	7	8	9	10	11	12
1999	13	14	15	16	17	18	19	20	21	22	23	24
2000	25	26	27	28	29	30	31	32	33	34	35	36
2001	37	38	39	40	41	42	43	44	45	46	47	48
2002	49	50	51	52	53	54	55	56	57	58	59	60
2003	61	62	63	64	65	66	67	68	69	70	71	72
2004	73	74	75	76	77	78	79	80	81	82	83	84
2005	85	86	87	88	89	90	91	92	93	94	95	96
2006	97	98	99	100	101	102	103	104	105	106	107	108

Table 1: Relating Month Number to Calendar Date

Custodial Parent Food Stamps Cost Savings

Chart 1 shows the overall average monthly Food Stamps costs for CR parents and for CI parents. Throughout this period (Jan ’98 to Dec ’04) average monthly costs for CI parents are more than double those for CR parents.

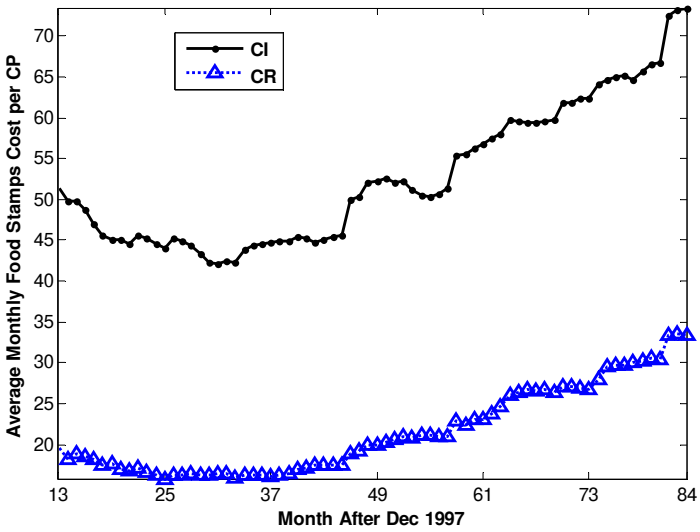


Chart 1: Comparing Overall Average Monthly Food Stamps Costs

From the values shown in Chart 1 and the overall monthly number of CR parents. we determine uncorrected cost savings. The uncorrected cost savings is compared to corrected Food Stamps cost savings in Chart 2.

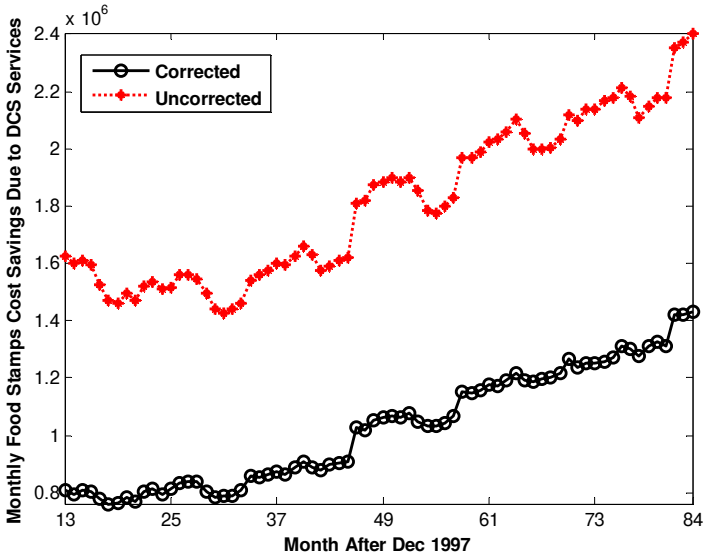


Chart 2: Comparing Corrected and Uncorrected Food Stamps Cost Savings

Uncorrected cost savings are always larger than corrected cost savings because the characteristics of CR parents are more favorable than those of CI parents. The corrected cost savings results are adjusted for these factors because we are only comparing individuals with similar characteristics. A first look at Chart 2 suggested the possibility of a stable ratio between corrected and uncorrected cost savings. Chart 3 shows that the ratio does in fact have an increasing trend over time.

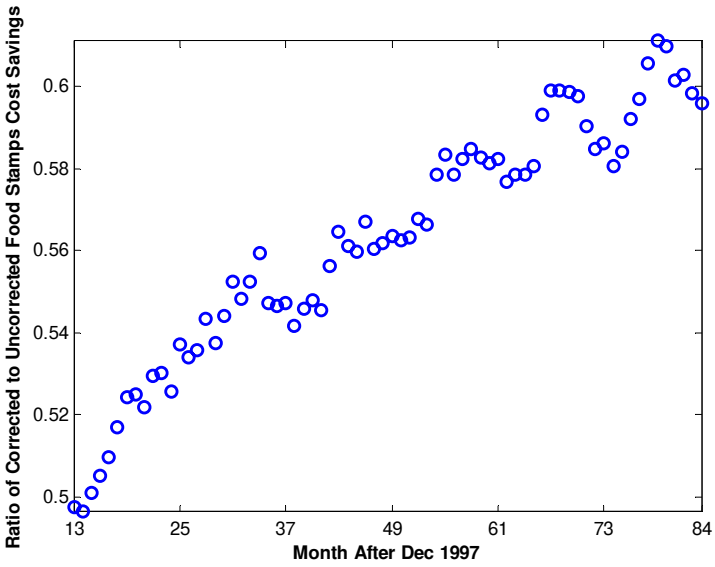


Chart 3: The Ratio of Corrected to Uncorrected Food Stamps Cost Savings

However, we found that this ratio is statistically related to the overall monthly number of CR parents (numCR):

$$Ratio = 9.73E\text{-}6 * numCR.$$

This means that corrected cost savings can be estimated using overall caseload values:

$$Sav = USav*(9.73E\text{-}6 * numCR)$$

where Sav is the estimate of corrected cost savings and USav is uncorrected cost savings.

Chart 4 shows the comparison of the corrected cost savings results and the estimate using the above equation. It is clear that the trend ratio estimation determined from overall values is doing a very good job of matching the corrected results obtained from comparisons within cells of similar individuals.

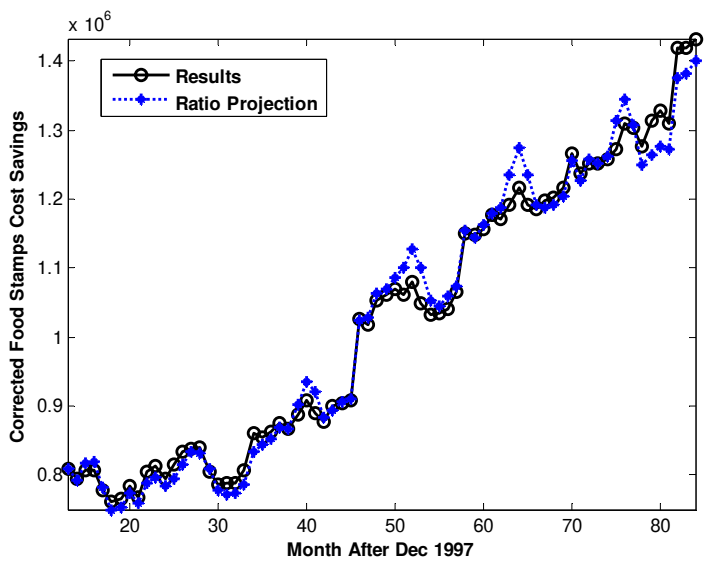


Chart 4: Trend Ratio Estimate Compared with Corrected Results

The percentage error in the projection is shown in Chart 5, which shows that the maximum error in the projection is about 5%.

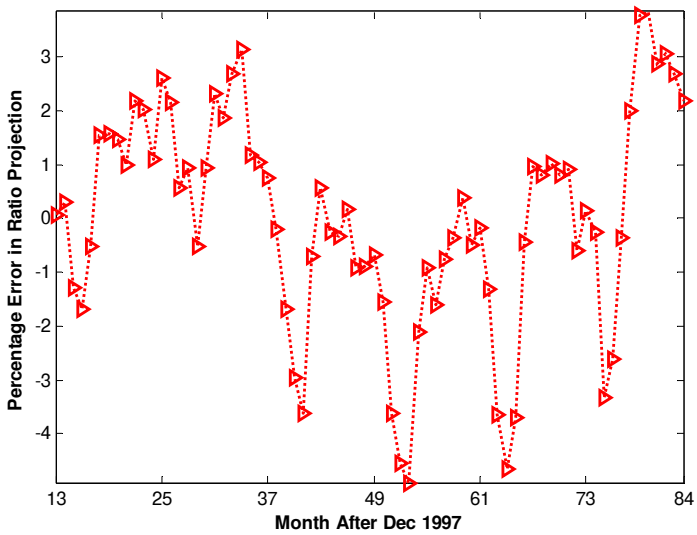


Chart 5: Percentage Error in Food Stamps Cost Savings Projection

We next determined a correction ratio relationship based on results for months 13 to 60 (Jan ’99 to Dec ’02) so that we could test this as a prediction forward in time. The relationship is virtually identical to that given above –

$$R = 9.71E\text{-}6 * numCR.$$

This is encouraging because it suggests that the relationship does not depend very much, if at all, on the window of time involved.

Chart 6 shows the percentage error in the prediction for corrected Food Stamps cost savings for months 61 to 84 (Jan ’03 to Dec ’04) where it can be seen that the maximum error in the prediction two years out is only about 5%.

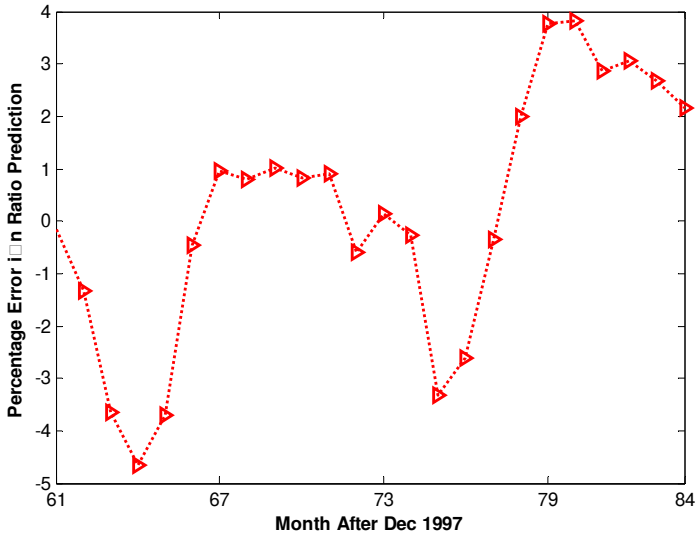


Chart 6: Percentage Error in Predicted Food Stamps Cost Savings

Custodial Parent Medicaid Cost Savings

Chart 7 shows that average monthly Medicaid costs were much higher for CI parents than for CR parents across the entire time period from Jan ’98 to Dec ’04. Except for a few months in this period, the average CI parent had more than double the Medicaid costs of the average CR parent.

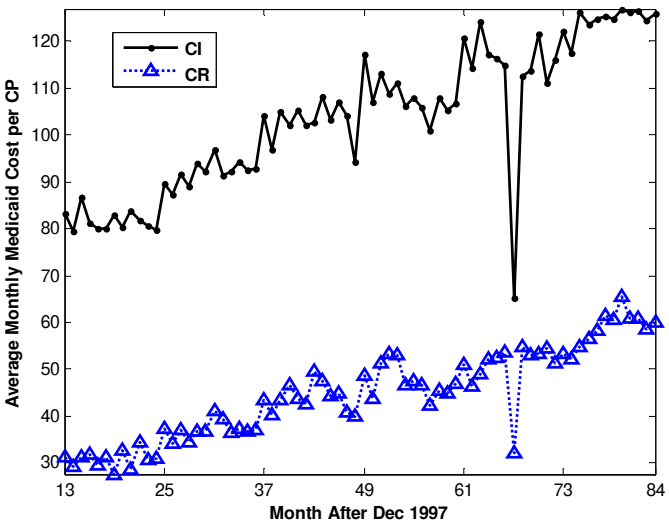


Chart 7: Comparing Overall Average Monthly Medicaid Costs

There is a month, #67, where our data source was not complete ,thus giving a low value for costs and both corrected and uncorrected cost savings.

Chart 8 shows Medicaid cost savings, comparing corrected savings with uncorrected savings.

For Medicaid the ratio of corrected savings to uncorrected savings is stable; there is no trend. The best statistical relationship tells us that corrected savings can be estimated as about 52% of uncorrected savings:

$$Sav = 0.5154*Usav.$$

Chart 8 also compares the corrected savings results with the estimate calculated as a percentage of uncorrected savings.

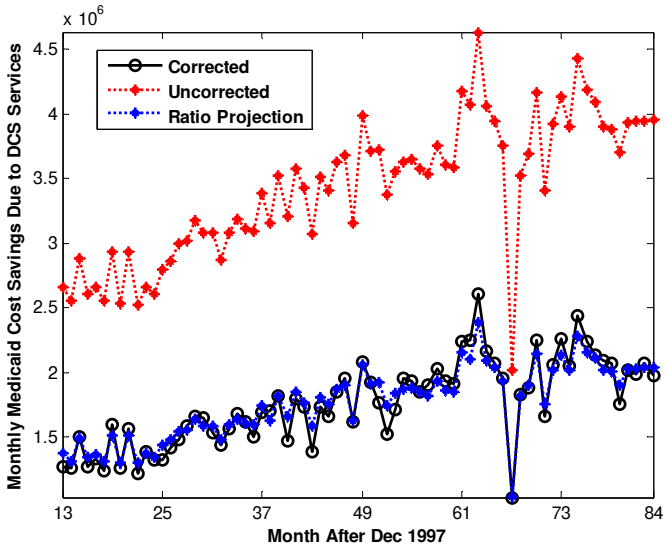


Chart 8: Comparing Corrected, Uncorrected, & Projected Medicaid Cost Savings

Chart 9 shows the percentage error in the ratio projection. Medicaid cost savings are harder to fit because there is more month-to-month variation inherent in Medicaid costs than for Food Stamps costs. However, the fit is quite good, even coming close to results in the month with known incomplete data.

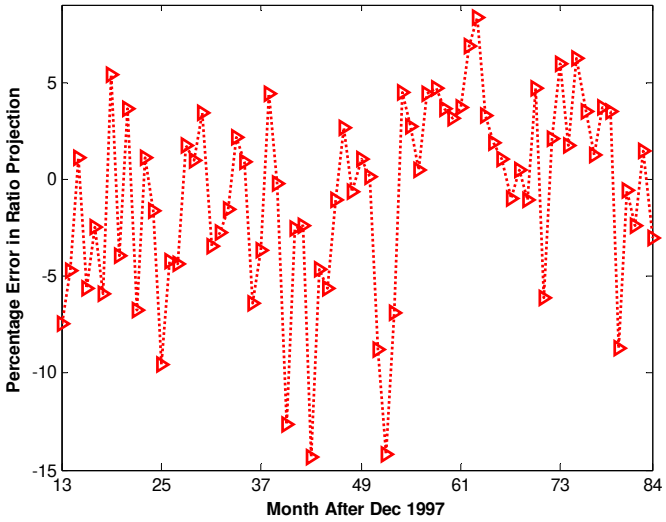


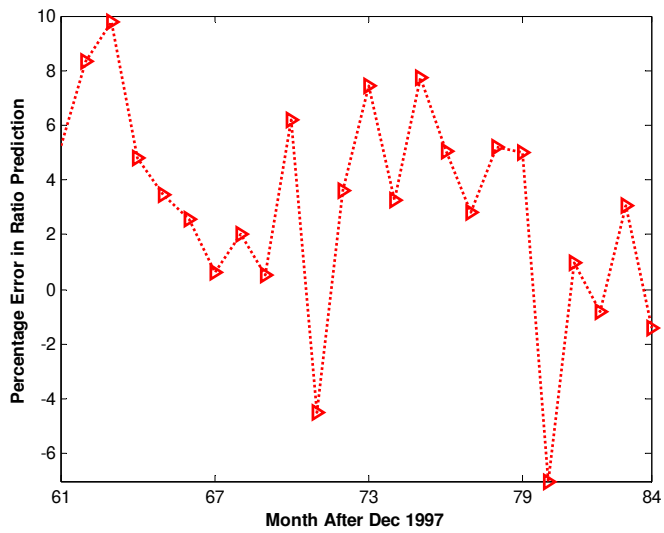
Chart 9: Percentage Error in Medicaid Cost Savings Projection

We next developed a stable ratio projection based on results for 1999-2002 and used that to predict corrected savings in 2003-2004. This relationship is only slightly different from that developed using the full six years of results:

$$Sav = 0.5072*Usav.$$

Chart 10 shows the percentage error in the prediction. The prediction appears quite good, matching the patterns of corrected savings with even an almost exact match in month 67 where cost data is known to be incomplete. However, the percentage error, shown in Chart 10, is somewhat larger than the error presented above for Food Stamps, most likely because of the greater month-to-month variation in Medicaid costs. The maximum error is still less than 10%. The cost savings results total $49.07 million for this 24-month period while the cost savings predictions total $47.36 million. This is an error in the prediction of only 3.5%.

Chart 10: Percentage Error in Predicted Medicaid Cost Savings



Custodial Parent TANF Cost Savings

TANF cost avoidance follows a similar pattern to Food Stamps cost avoidance even though TANF costs generally decreased from 1999 to 2004 while Food Stamps costs generally increased.

Chart 11 shows the overall average monthly TANF costs for CR parents and for CI parents. Throughout this period (Jan '98 to Dec '04) average monthly costs for CI parents are more than triple those for CR parents.

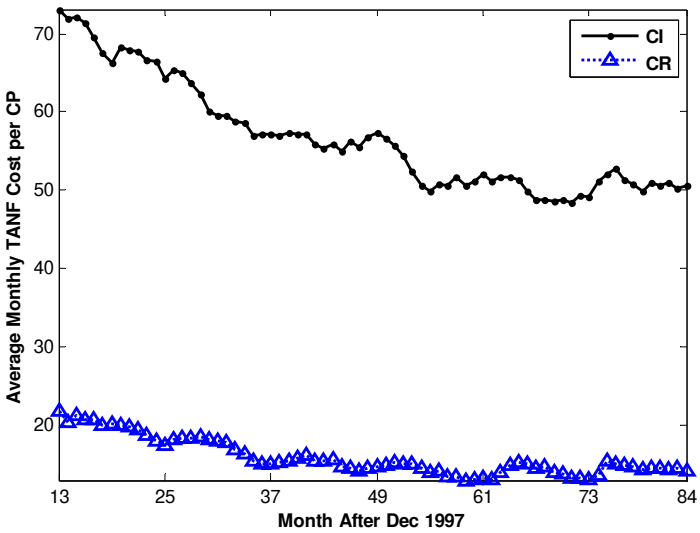


Chart 11: Average Monthly TANF Costs for DCS Custodial Parents

We next determine corrected and uncorrected TANF cost savings, which are shown in Chart 12. The TANF correction ratio – corrected savings divided by uncorrected savings – seen in Chart 13 shows both a time trend and a statistical relationship to the number of CR parents, which are very similar to those found for Food Stamps:

$$R = 9.59E\text{-}6 * numCR.$$

This means that corrected TANF cost savings can be estimated from uncorrected cost savings and the above relationship, or –

$$Sav = Usav * (9.59E\text{-}6 * numCR),$$

where Usav is the monthly uncorrected savings and Sav is the estimated corrected TANF savings.

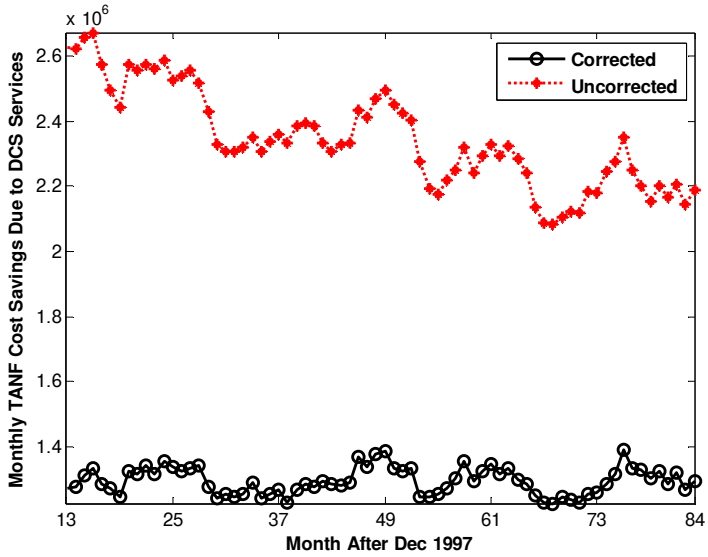


Chart 12: Monthly TANF Cost Savings for DCS Custodial Parents

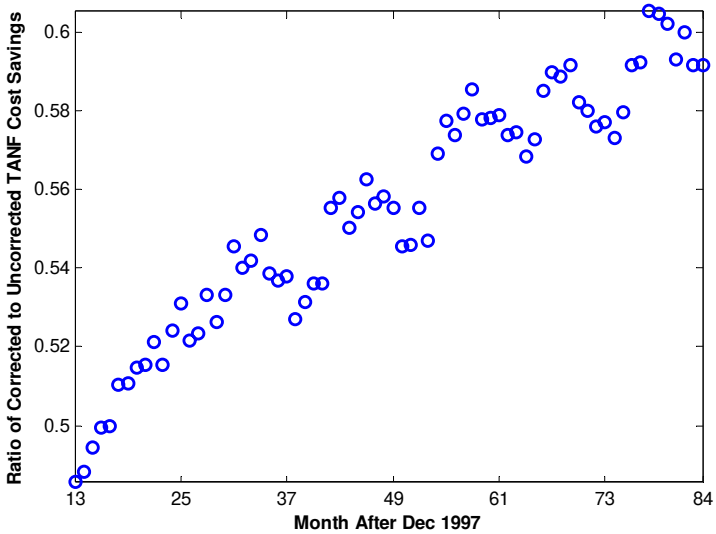


Chart 13: Correction Ratio for TANF Cost Savings

Chart 14 compares corrected TANF cost savings results with the estimated trend ratio projection.

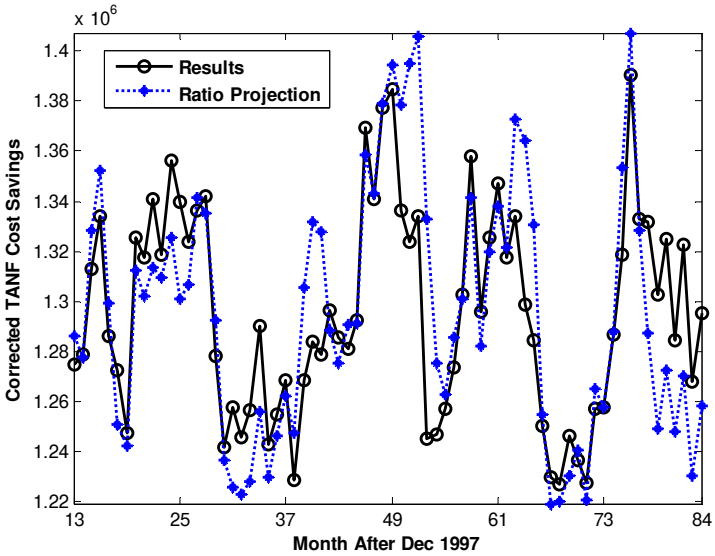


Chart 14: Corrected TANF Cost Savings Results and Projection

The differences may appear large because of the scale in Chart 14 but the percentage errors are very reasonable as seen in Chart 15. The maximum error is about 7%.

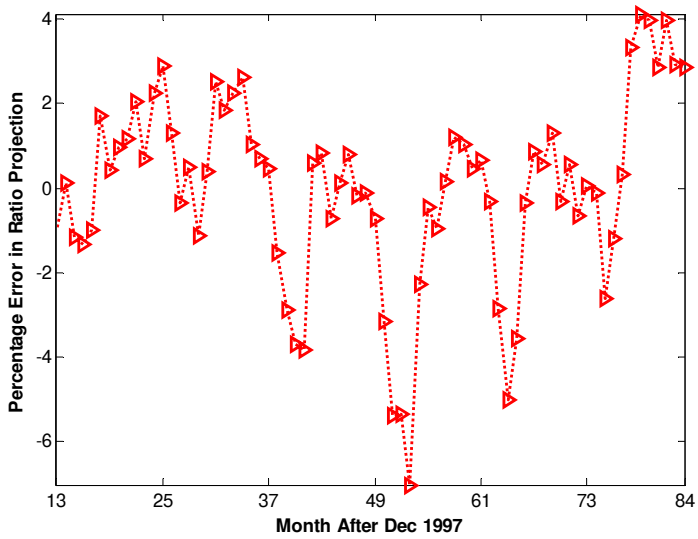


Chart 15: Percentage Error in TANF Cost Savings Projection

We next determined a correction ratio relationship based on results for months 13 to 60 (Jan '99 to Dec '02) so that we could test the prediction forward in time. The relationship is virtually identical to that given above –

$$R = 9.56E\text{-}6 * numCR.$$

This is encouraging because it suggests that the relationship does not depend very much, if at all, on the window of time involved. Chart 16 shows the percentage error in the prediction for corrected TANF cost savings for months 61 to 84 (Jan '03 to Dec '04) where it can be seen that the maximum error in the prediction is only about 5%.

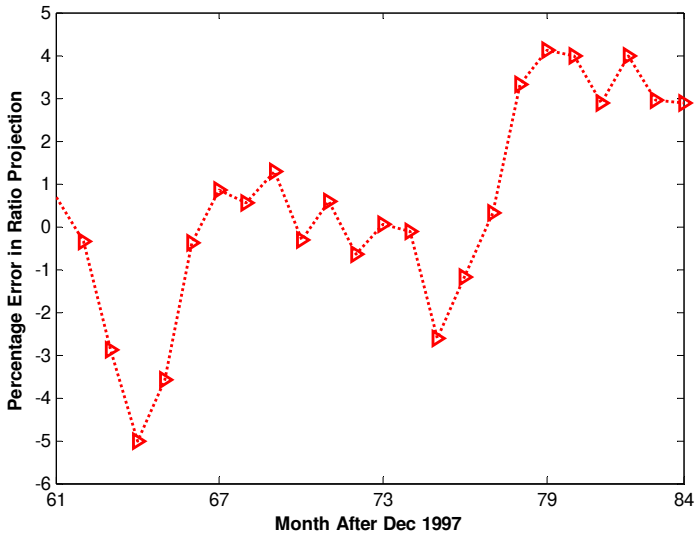


Chart 16: Percentage Error in TANF Cost Savings Prediction

Child Medicaid Cost Savings

Working with children's costs is much more complex because there are two DCS services that can lead to cost savings, and it is necessary to bring in information on each child's custodial parent(s). The custodial parent payment status is needed, and the earnings history factor combines the child's and the parent's earnings history.

Children are classified into four categories by medical coverage and custodial parent payment status: *No Cov & CI*, *No Cov & CR*, *Cov & CI*, and *Cov & CR*. *No Cov & CI* represents neither service and is the reference for the cost savings categories *No Cov & CR*, *Cov & CI*, and *Cov & CR*.

Chart 17 shows the average monthly Medicaid costs for children in the four categories. Costs are lower for children where DCS has established regular payments for the custodial parent or medical coverage for the children, and lowest when both services have been established. The average cost per *Cov & CR* child is typically about one-quarter the average cost per *No Cov & CI* child.

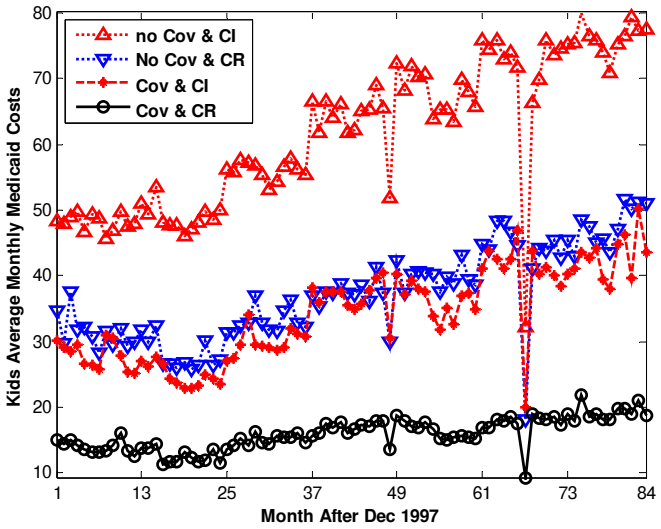


Chart 17: Comparing Overall Average Monthly Medicaid Costs

Combining the number of children in each cost saving category with the results shown in Chart 17 allows us to determine uncorrected cost savings. Using each child's birth year and his/her earnings history combined with the custodial parent's earnings history allows us to determine corrected cost savings. Work on child cost savings was performed after we were able to reconstruct wage data for calendar year 1997, thus corrected cost savings for children begins in month 1, January 1998. However, because of data problems with child identifiers we can only use months 16-84 for child cost savings.

Chart 18 shows the comparison of corrected and uncorrected cost savings for the category *No Cov & CR*. Month 67 gives low values as in custodial parent Medicaid cost savings because our cost data source was incomplete.

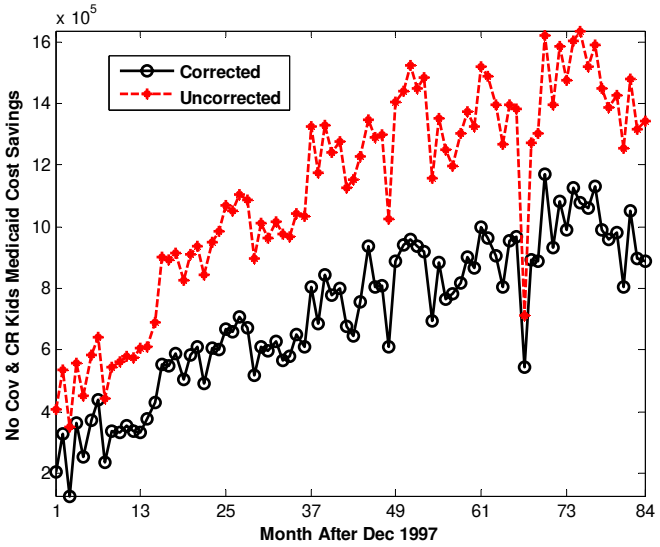


Chart 18: Comparing Corrected and Uncorrected Medicaid Cost Savings for *No Cov & CR*

Chart 19 shows the comparison of corrected and uncorrected cost savings for the category *Cov & CI*.

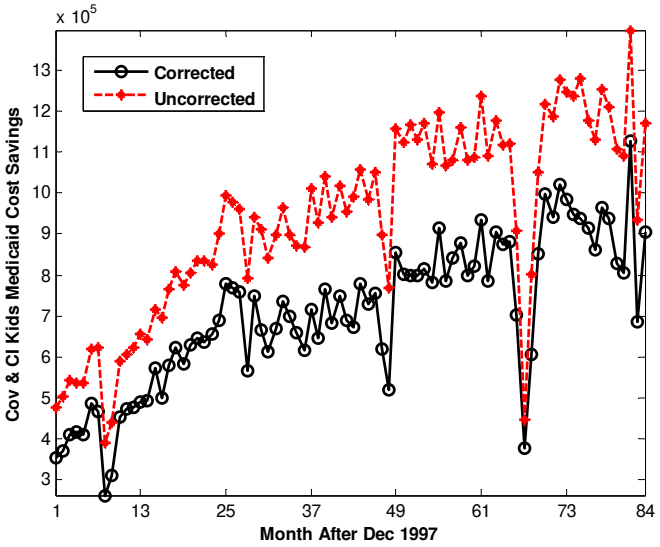


Chart 19: Comparing Corrected and Uncorrected Medicaid Cost Savings for *Cov & CI*

Chart 20 shows the comparison of corrected and uncorrected cost savings for the category *Cov & CR.*

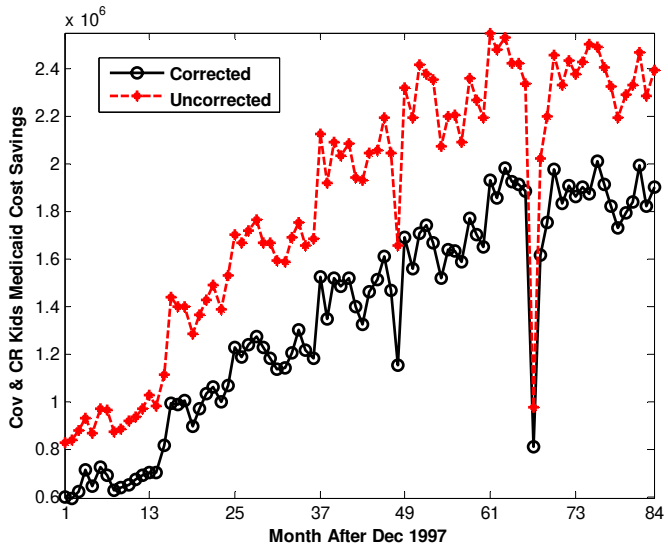


Chart 20: Comparing Corrected and Uncorrected Medicaid Cost Savings for *Cov & CR*

Chart 21 shows corrected cost savings results for the *No Cov & CR* category and the calculated projection based on the equation given on the chart. In the equation *s2* is uncorrected cost savings, *n2* is the number of children in the category, and *ci2* is the calculated projection. The projection does a very good job of matching corrected cost savings results. The Chart shows months 1-15 but that data was not used.

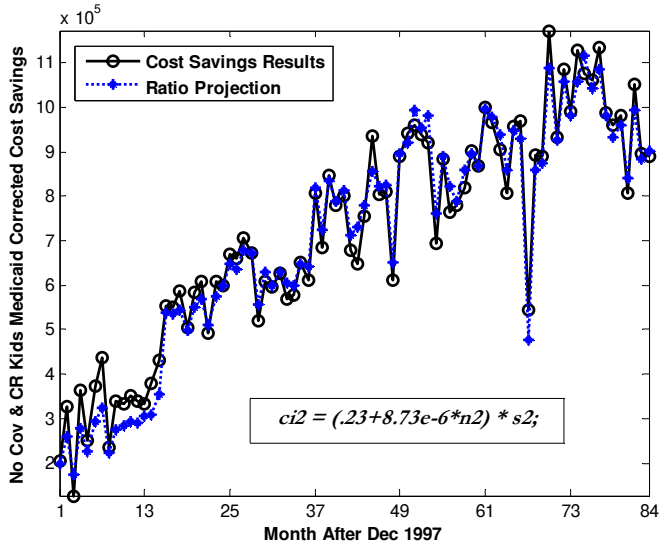


Chart 21: Trend Ratio Estimate Compared with Corrected Results for *No Cov & CR*

We next determined the best projection based on month #s 16-72 and applied that model to predict results in month #s 73-84. This is shown in Chart 22.

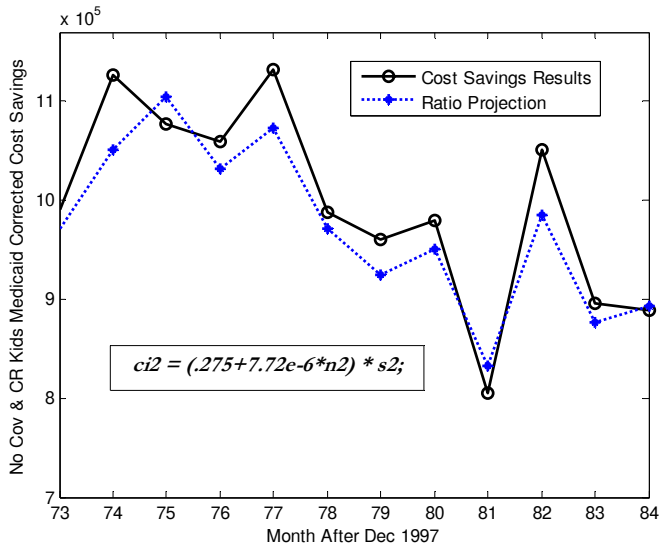


Chart 22: Trend Ratio Prediction Compared with Corrected Results for *No Cov & CR*

The maximum percentage error in this prediction is less than 7% as shown in Chart 23.

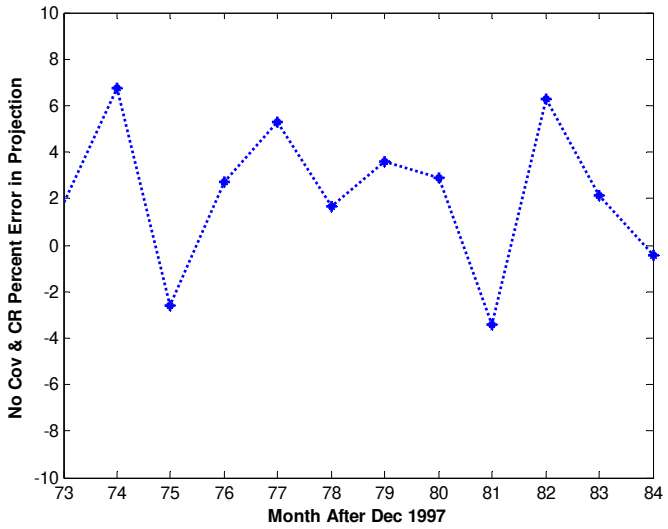


Chart 23: Percentage Error in Prediction for *No Cov & CR*

Next we show in Chart 24 the best statistical projection model for the *Cov & CI* category. In the projection equation shown on the chart *s3* is uncorrected monthly savings, *ncov* is the total monthly number of children with medical coverage, *ncr* is the total monthly number of children with CR custodial parents, and *ci3* is the calculated projection.

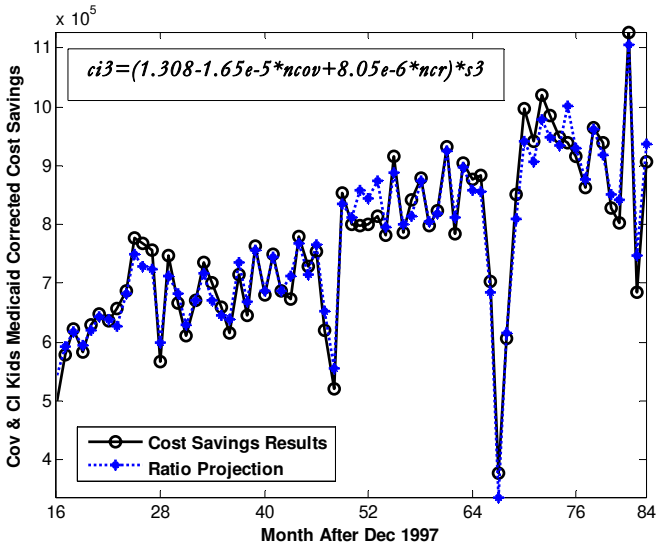


Chart 24: Trend Ratio Estimate Compared with Corrected Results for *Cov & CI*

We next determined the best projection based on month #s 16-72 and applied that model to predict results in month #s 73-84. This is shown in Chart 25.

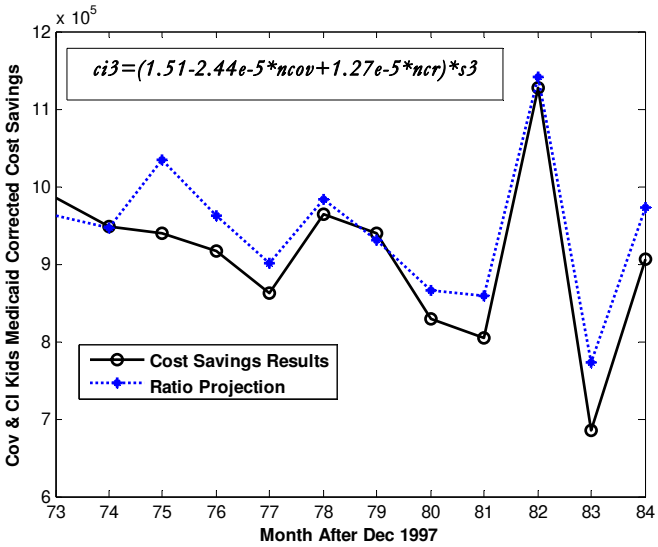


Chart 25: Trend Ratio Prediction Compared with Corrected Results for *Cov & CI*

While the fit looks reasonable the percentage error is larger than for other predictions presented in this report, with a maximum error of over 12%. But this is still a very small error for this type of prediction. Chart 26 shows the percentage error in the prediction.

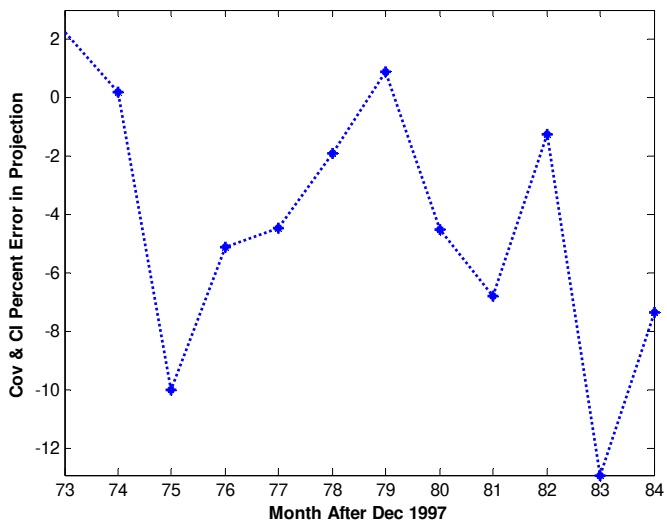


Chart 26: Percentage Error in Prediction for *Cov & CI*

Chart 27 shows the cost savings results and statistical projection for the category *Cov & CR*. The projection equation includes the factors *n4*, which is the monthly number of children in the category, and *ncr*, defined above, with *s4* the uncorrected monthly savings, and *ci4* the calculated projection.

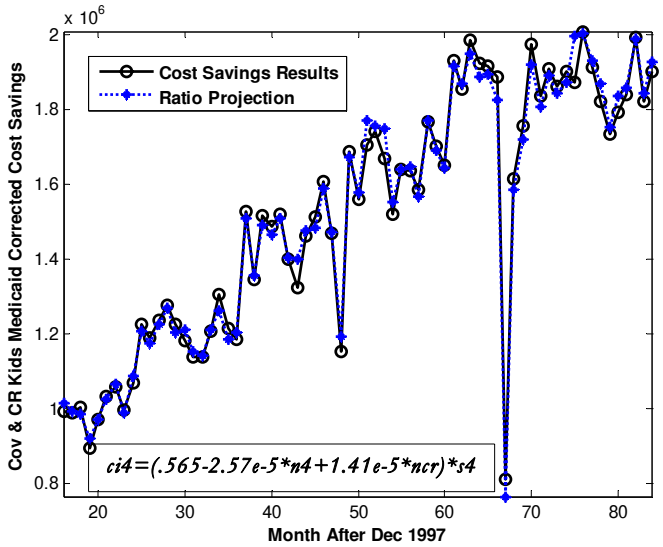


Chart 27: Trend Ratio Estimate Compared with Corrected Results for *Cov & CR*

Next a projection model was based on month #s 16-72 and used to predict results in month #s 72-84. This is shown in Chart 28.

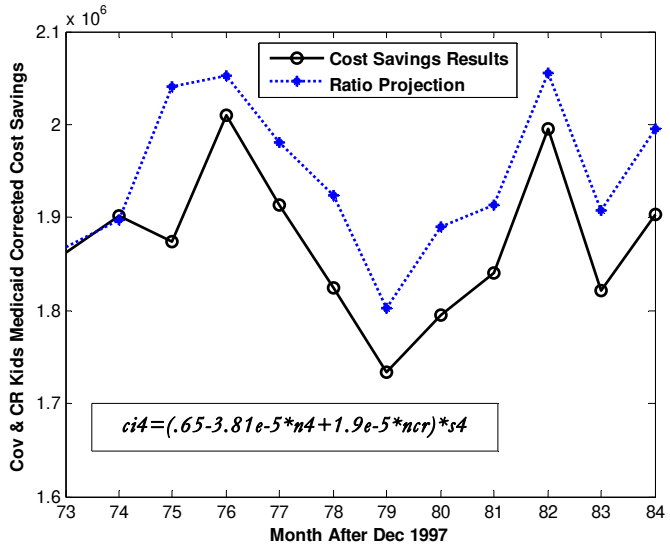


Chart 28: Trend Ratio Prediction Compared with Corrected Results for *Cov & CR*

Chart 29 shows the percentage error in this prediction. Except for month 75 the error is less than 6%.

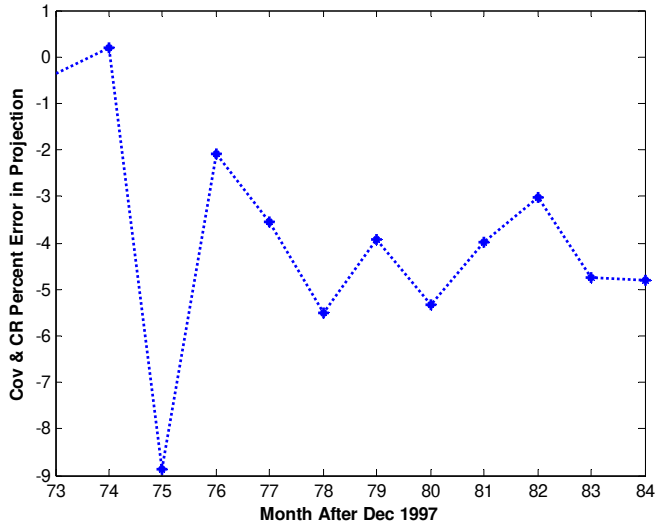


Chart 29: Percentage Error in Prediction for *Cov & CR*

Total Cost Savings

In this work, we have developed six categories of child support cost avoidance, but the processes developed could be applied to any other public costs associated with custodial parents or children in the child support system. The six categories of savings we have developed are Food Stamps, Medicaid, and TANF for the custodial parents and three categories of Medicaid savings for the children.

Chart 30 brings together uncorrected cost savings in three public service programs for custodial parents and the summed uncorrected cost savings for the three child Medicaid categories.

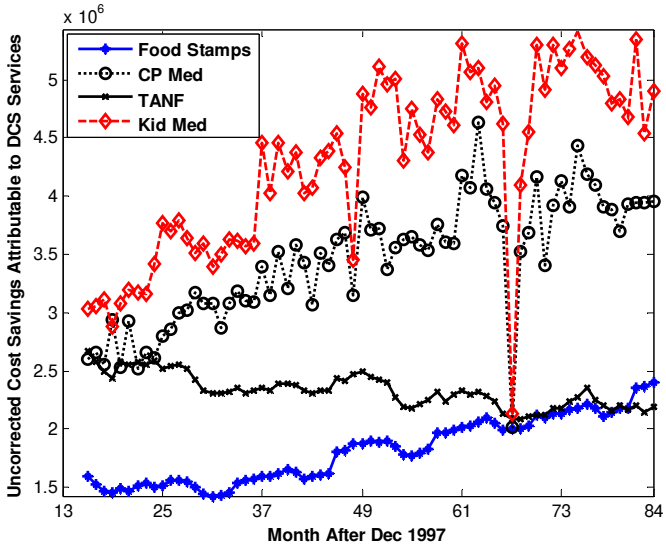


Chart 30: Uncorrected Cost Savings For Custodial Parents and Children

Chart 31 shows the corrected cost savings in the same categories. It is clear in both charts that children's Medicaid cost savings makes the biggest contribution; and this is particularly so in corrected cost savings. This finding will be further discussed toward the end of this section. Combined CP and child Medicaid cost savings averages 67% of total cost savings.

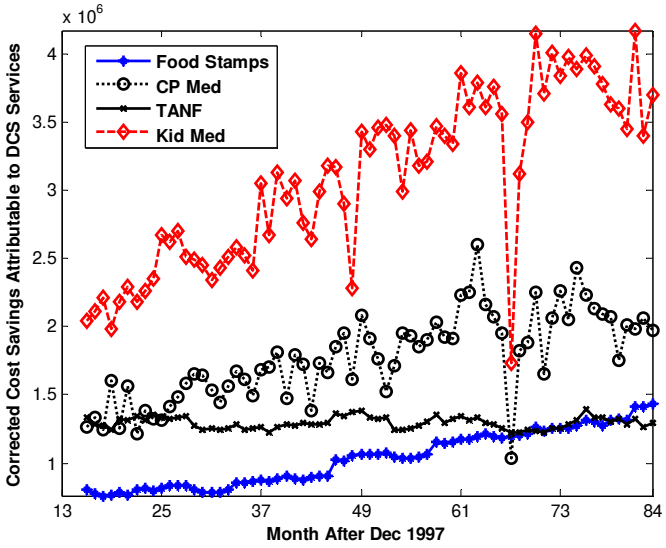


Chart 31: Corrected Cost Savings For Custodial Parents and Children

Chart 32 compares totaled corrected cost savings with totaled uncorrected cost savings.

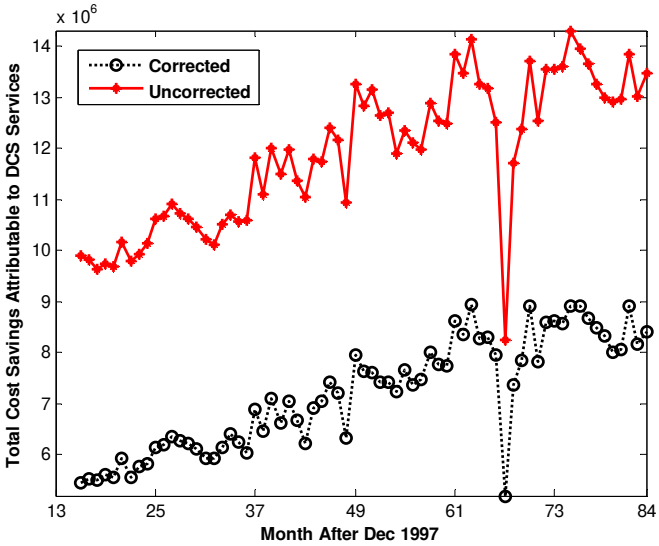


Chart 32: Totaled Cost Savings For Custodial Parents and Children

We next compare the totaled corrected cost savings with the sum of the ratio projections of corrected cost savings, using the relationships derived from months 13-84 for CPs and months 16-84 for children. Chart 33 shows that the projection fits the results quite well.

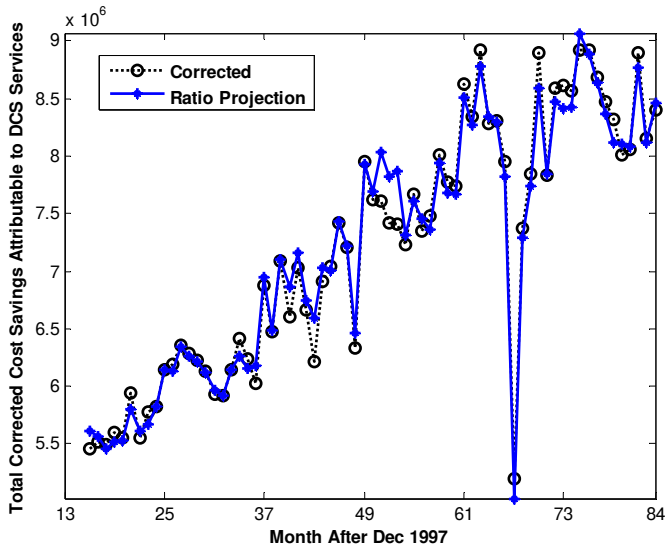


Chart 33: Total Corrected Cost Savings For Custodial Parents and Children

The percentage error in the projection of total corrected cost savings is shown in Chart 34 where the maximum error is about 6%.

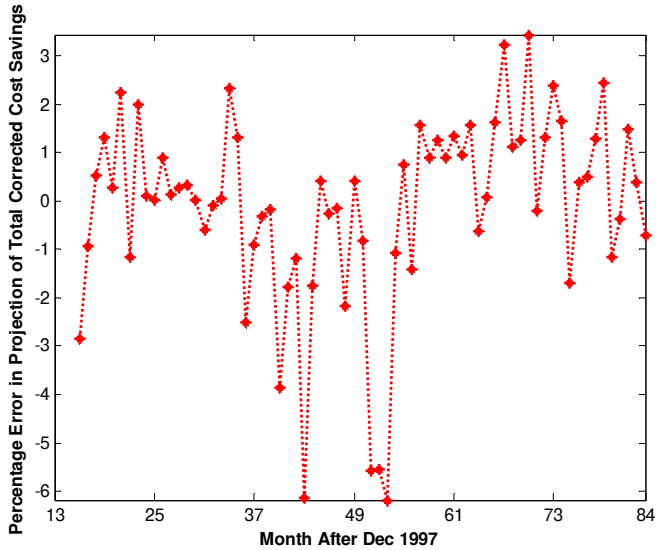


Chart 34: Percentage Error in Total Corrected Cost Savings Projection

Chart 35 compares the ratio prediction for 2004, based on results for 1999-2003, and the cost savings results.

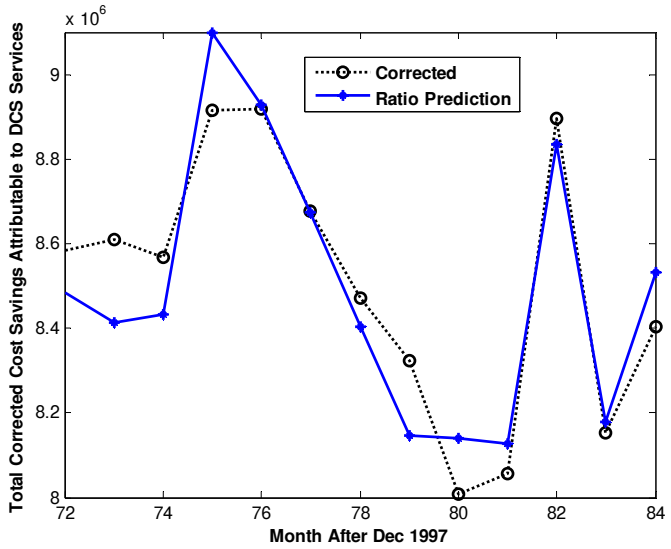


Chart 35: Total Corrected Cost Savings & Prediction For 2004

The prediction is very good as evidenced in the above chart and in Chart 36, which shows that the monthly percentage error in the prediction is less than 3%. The total corrected cost savings in 2004 was $101.1 million while the predicted was $101.3 million, a prediction error of less than 1%.

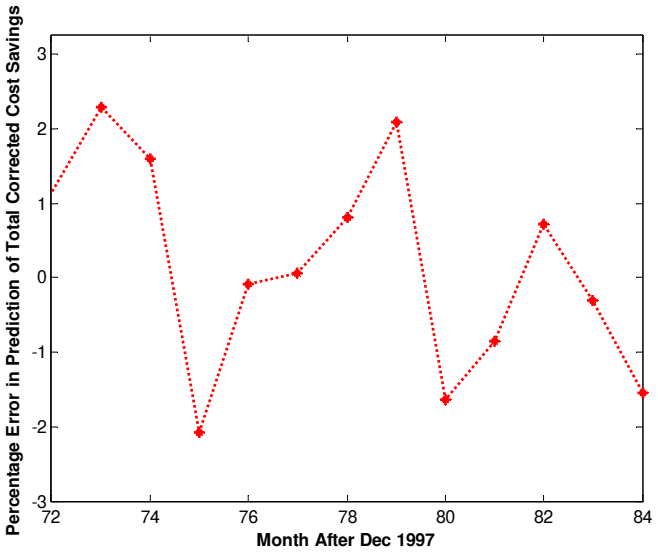


Chart 36: Percentage Error in Total Corrected Cost Savings Prediction For 2004

Finally, Chart 37 looks at the ratio of summed corrected to summed uncorrected cost savings for children, CPs, and the total for both children and CPs. The correction ratio for children is much higher than for CPs. It appears that this higher ratio is due to private medical coverage established by DCS. Over the sixty-nine months shown on the chart, the children's ratio averaged 71.8% while the CP's ratio averaged 54.2%. The total averaged 60.6%.

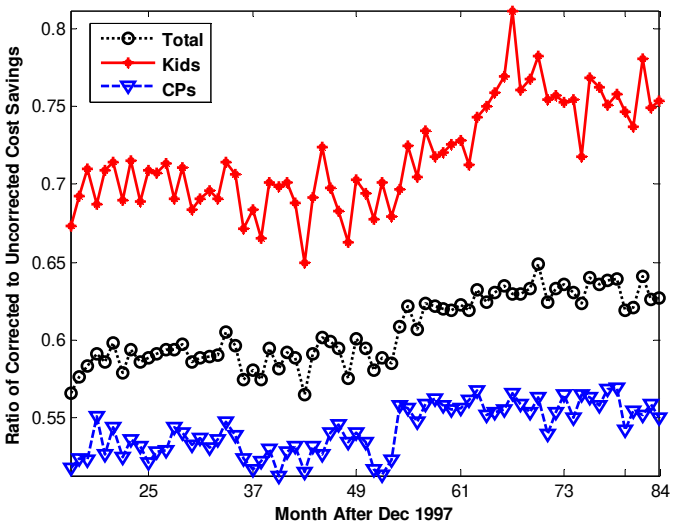


Chart 37: Comparing Correction Ratios for Custodial Parents & Children

Production of a Cost Avoidance Indicator

We are in the process of using the knowledge and programming established in this work to create a routine production of a cost avoidance indicator. We feel that the best indicator of cost avoidance is an estimate of the actual dollars saved. As reported above, this amount saved is about $101 million dollars for calendar year 2004 for DCS custodial parents and children.

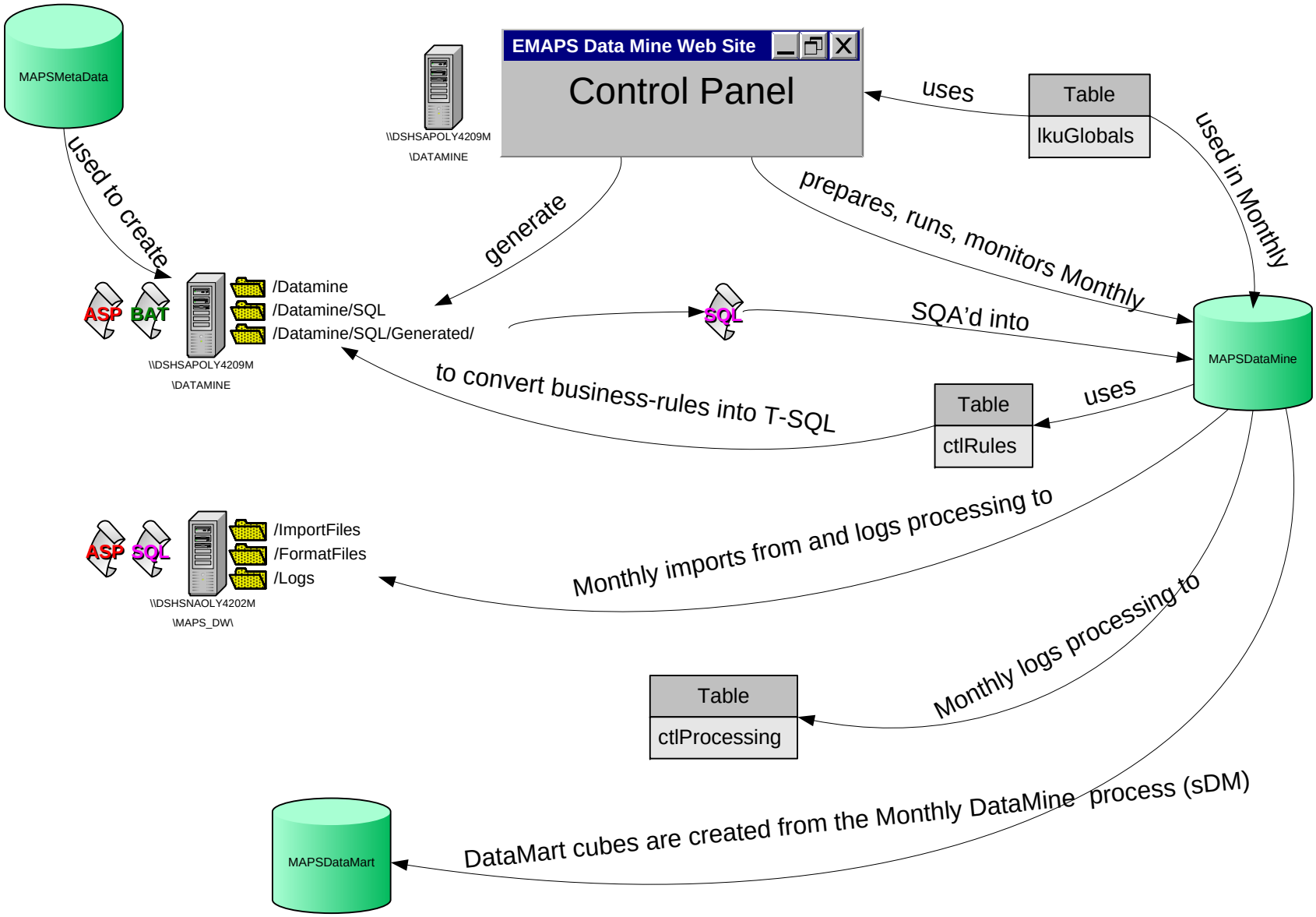
Data on DCS clients, data on TANF costs, and data for Food Stamps costs are available up to the month prior to the current month. This means that uncorrected cost savings can be determined up to the month prior to the current month, and, through the correction ratio relationships developed, corrected cost savings can be predicted up to the month prior to the current month. However, because the wage data necessary to obtain corrected cost savings results are quarterly, we anticipate producing a quarterly update of cost savings in TANF and Food Stamps expenses due to child support services.

Medicaid cost data from our present source lags by about two years with a yearly update. For example, we are expecting to obtain Medicaid costs for State Fiscal Year 2005 in March or April of 2007. Thus, we anticipate only a yearly update of Medicaid cost savings due to child support services and cost savings that are not current. This is unfortunate since the combined Medicaid cost savings for custodial parents and children is over two-thirds of the total cost savings.

Appendix B

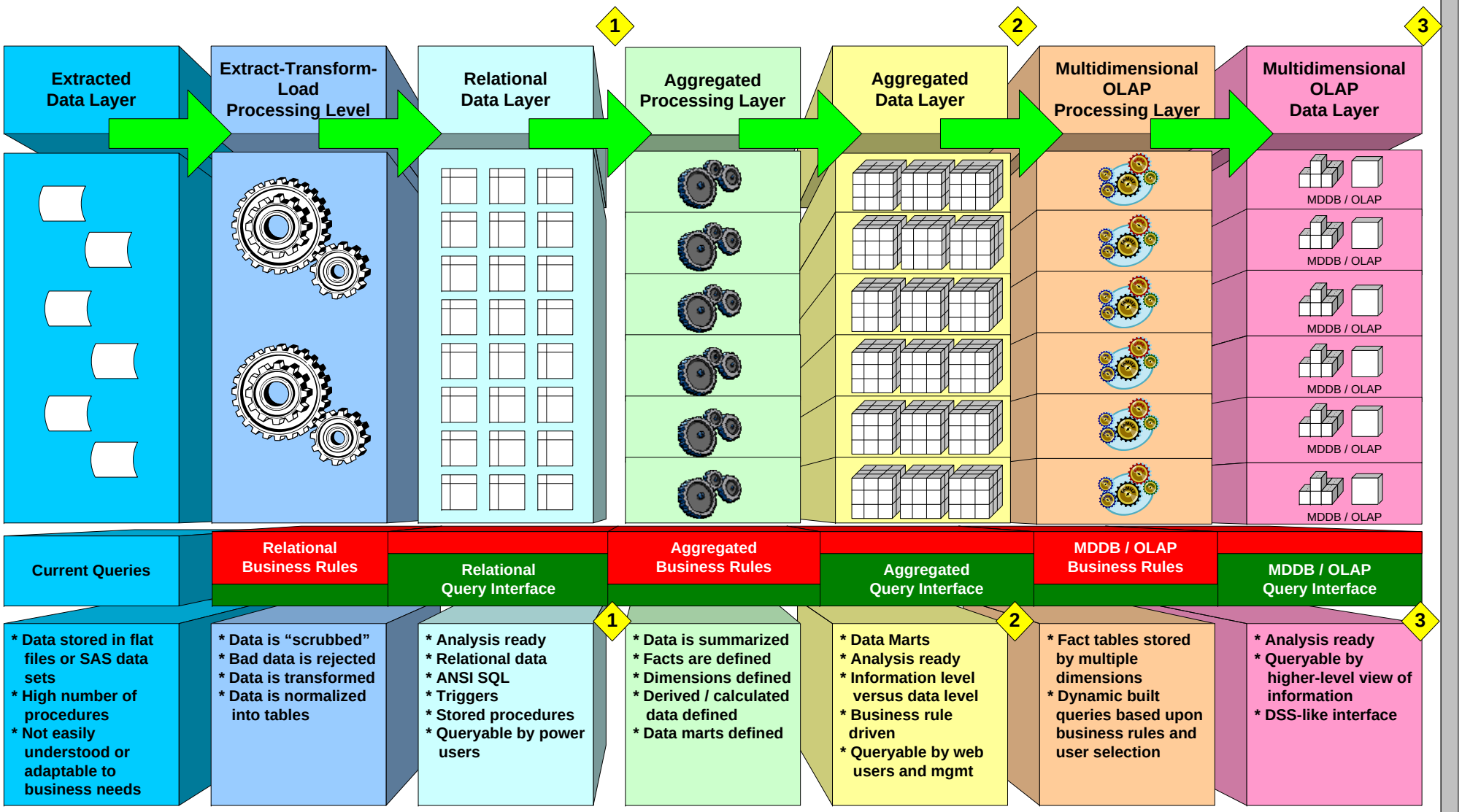
Architecture of the Data Mining Project

Physical Environment Overview



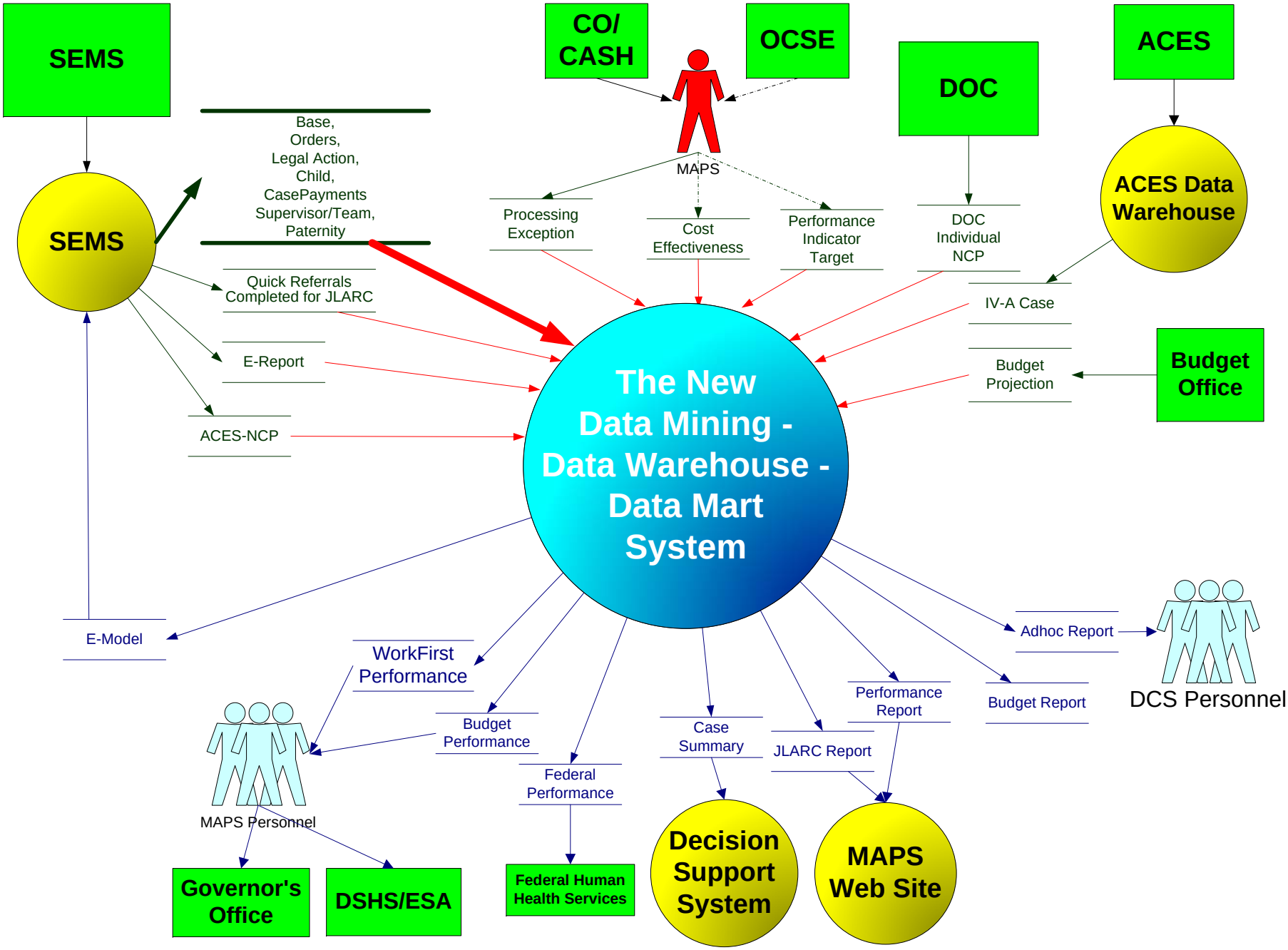
© Steve Lin Cognizant Design 2004-2007

Planned Data Warehouse Architecture



© Steve Lin Cognizant Design 2004-2007

System Context Model



© Steve Lin Cognizant Design 2004-2007

MAPS Databases

MAPSMetaData

Describes the system components in a manner so ASP or other language can regenerate the system components.

MAPSWork

Used to store test/pre-production versions of code and data.

MAPSDataMine (a.k.a. the MAPS Data Warehouse)

The underlying relational database containing master tables, scripts, functions, etc. necessary for ETL and monthly calculation and building of the data marts.

MAPSDataMart

Repository of all aggregated facts organized by the dimensions of time, location, etc. stored by subject areas of interest called data marts.

MAPSHistory

Stores all previous versions or snapshots of control and lookup tables. For backup purposes as well as affording the opportunity for reruns or what-if runs using the business rules, control and lookup values from a prior period.

MAPSArchive

Stores all previous versions of stored procedures, functions, tables, etc. Just in case of need. Also affords one the opportunity to see how business rules and processing changed over time. What is the difference between MAPSArchive contents and MAPSHistory? Archive has items you should never need to see again where as History could contain the actual data from prior periods for scripts needing data from all-time versus scripts that process only the current month.

Flat Files

MAPS Import Folders

The MAPS Import Folders contain al of the text files from our interface systems. These text files are Bulk-Inserted into impTables in MAPSDataMine. They are then processed to remove or correct any erroneous data. This data is then stored in our relational database tables for use in subsequent data mining and data warehousing processes.

Naming Conventions

Script Naming Conventions

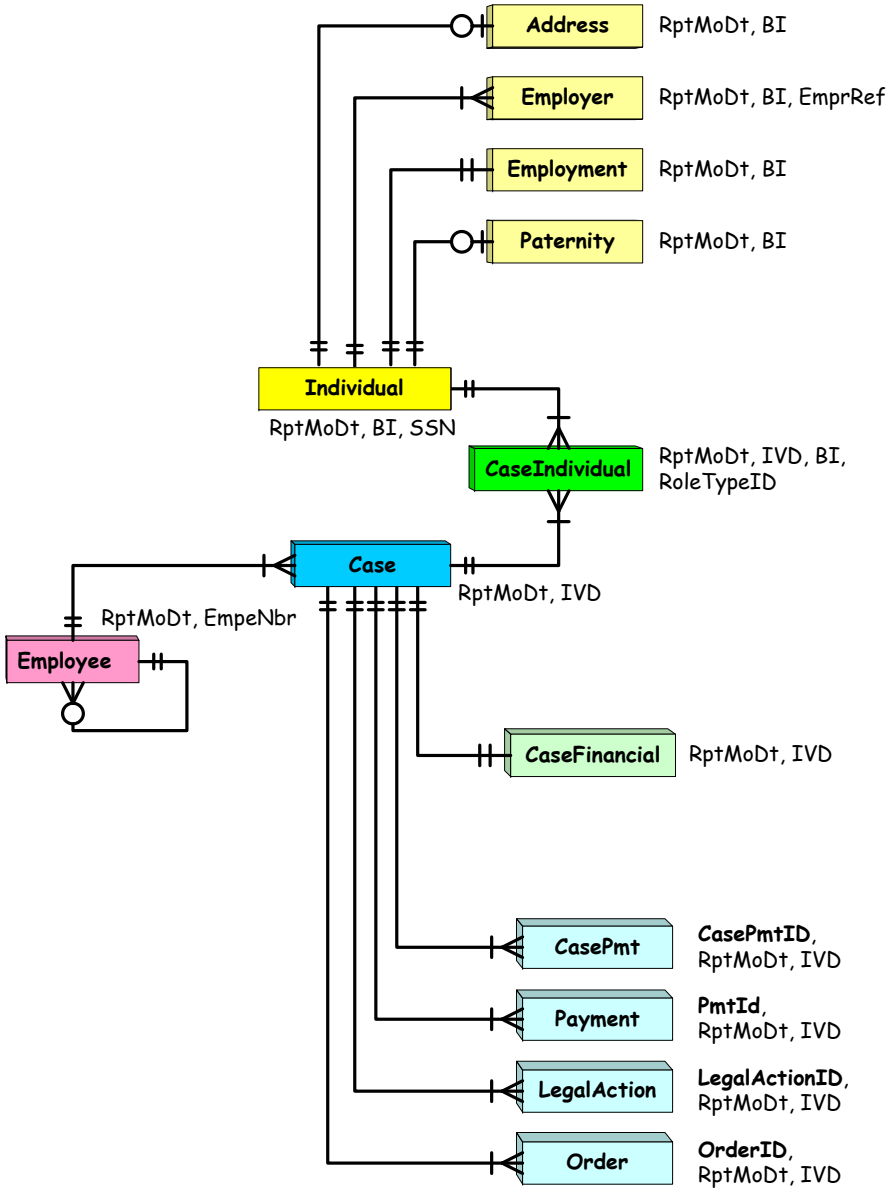
Prefix	Name	Example
%	Functional Script Name	Anything
scr%	Metadata-generated script	scrAnything
scrimp%	Metadata-generated script for import process	scrimpBulkInsertimpBase
scrxfm%	Metadata-generated script for transform process	scrxfmLoadxfmCase
s%	High-level Script Name	sMonthly
sProcess_%	Process Abbreviated Name	sETL_MonthlyLoad
sDataMartName_%	Data Mart Abbreviated Name	sPI_Cases
utl%	Utility Script Name	utlExtractMonth

Table Naming Conventions

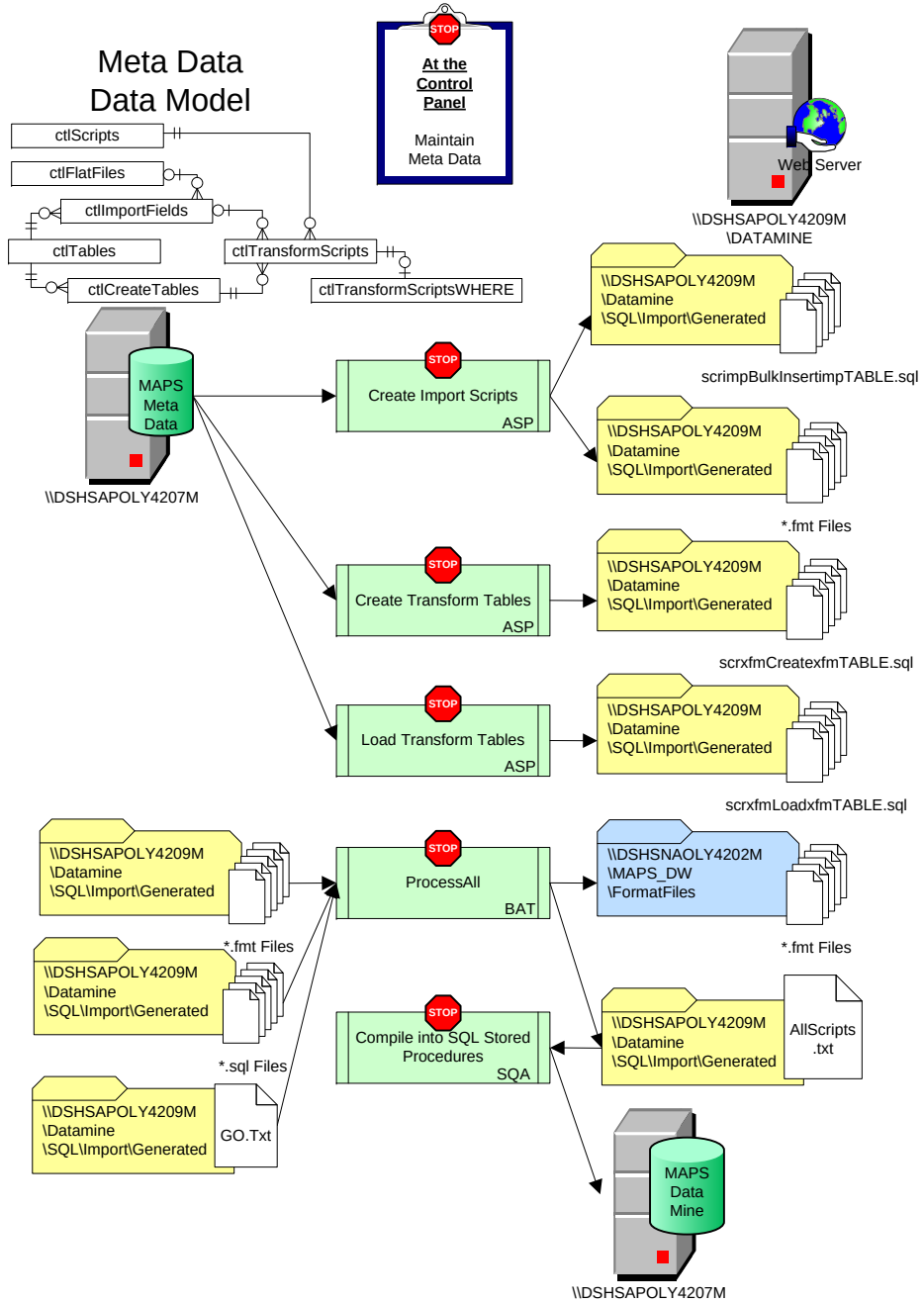
Prefix	Name	Example
%	Functional Table Name	Anything
wrk	Generic Work Table Name	wrkTempCases
wrkProcess_%	Work Table for a process	wrkETL_Duplicates
wrkDataMart_%	Data Mart work tables	wrkPI_Cases
{no prefix}%	Master table	Case
imp%	Import Tables to hold raw contents of text files	impBase
xfm%	Transform Tables to hold normalized imported data	xfmCase
mth%	Tables for a specific Reporting Month extracted prior to (re)running the data marts	mthCase
sumDataMart%	Summary tables of facts by our defined dimensions (Stored in DataMart DB)	sumPI_Cases
cubDataMart%	Cube tables of facts by our defined dimensions (Stored in DataMart DB)	cubPI_Cases

© Steve Lin Cognizant Design 2004-2007

Data Mine Data Model

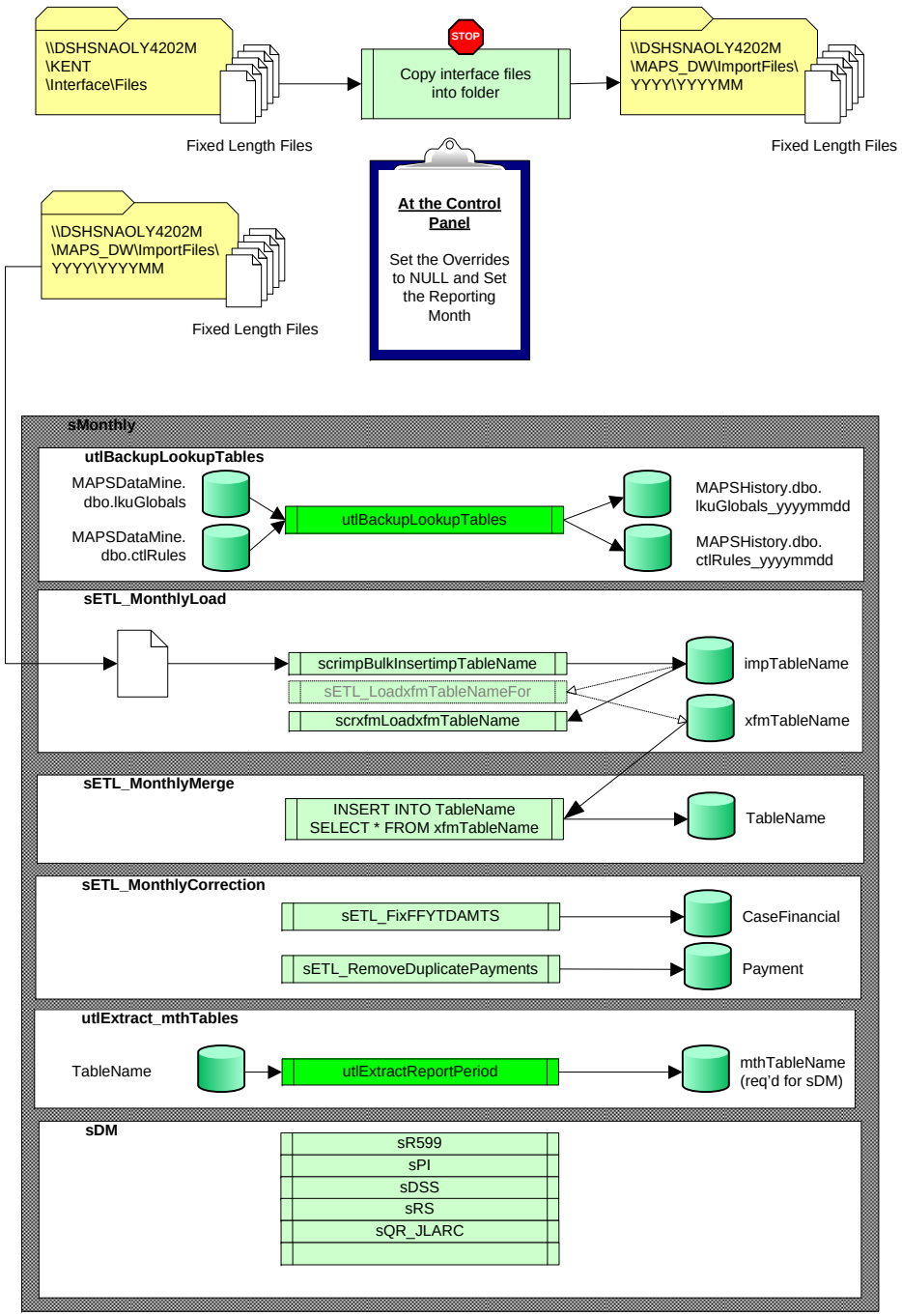


Meta Data Process



© Steve Lin Cognizant Design 2004-2007

Extract-Transform-Load Process



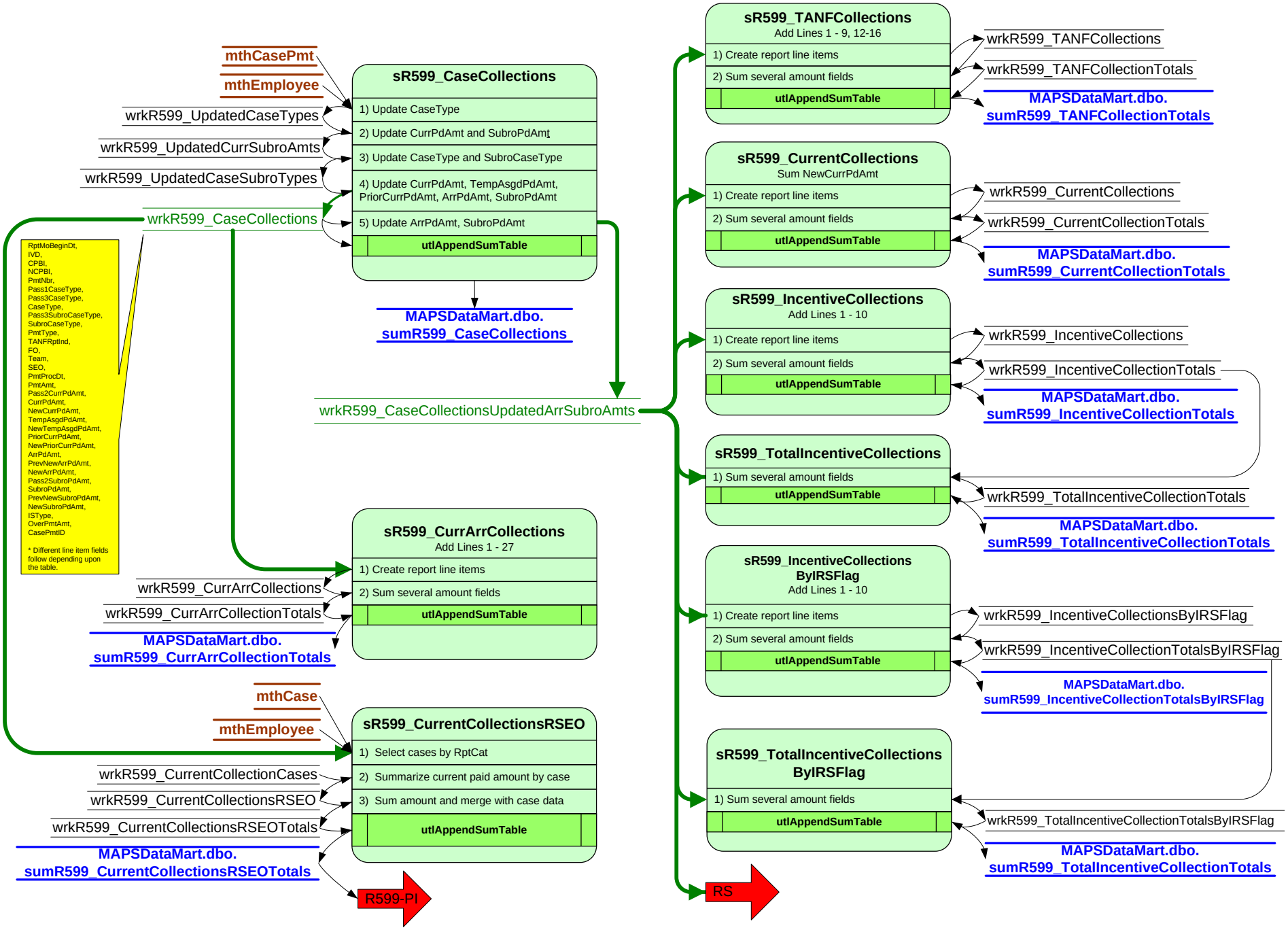
Extract-Transform-Load Cross Reference

Text File	Text File Alias	Import Scripts	Import Tables
009F01.fil	Base.txt	scrimpBulkInsertimpBase	impBase
004F34.fil	Child.txt	scrimpBulkInsertimpChild	impChild
010F04.fil	ARAD.txt	scrimpBulkInsertimpARAD	impARAD
119.txt	CasePmt.txt	scrimpBulkInsertimpCasePmt	impCasePmt
003F34.fil	LegalAction.txt	scrimpBulkInsertimpLegalAction	impLegalAction
003F32.fil	Order.txt	scrimpBulkInsertimpOrder	impOrder
003F33.fil	Payment.txt	scrimpBulkInsertimpPayment	impPayment
486F01.fil	Supervisor.txt	scrimpBulkInsertimpSupervisor	impSupervisor
723F02.sdf	Paternity.txt	scrimpBulkInsertimpPaternity	impPaternity
081F01.fil	QuickReferrals.txt	scrimpBulkInsertimpQuickReferalls	impQuickReferrals

Import Tables	Transform Scripts	Transform Tables
impBase	scrxfmLoadxfmCase	xfmCase
impBase	scrxfmLoadxfmCaseFinancial	xfmCaseFinancial
impBase	scrxfmLoadxfmEmployer1	xfmEmployer
impBase	scrxfmLoadxfmEmployer2	xfmEmployer
impBase	scrxfmLoadxfmEmployment	xfmEmployment
impBase	sETL_LoadxfmIndividualNCP	xfmIndividual
impBase	scrxfmLoadxfmIndividualNCP	xfmIndividual
impBase	scrxfmLoadxfmIndividualCP	xfmIndividual
impBase	scrxfmLoadxfmCaseIndividualCP	xfmCaseIndividual
impBase	scrxfmLoadxfmCaseIndividualNCP	xfmCaseIndividual
impBase	scrxfmLoadxfmAddressNCP	xfmAddress
impARAD	scrxfmLoadxfmAddressCP	xfmAddress
impChild	sETL_LoadxfmIndividualCHILD	xfmIndividual
impChild	scrxfmLoadxfmIndividualCHILD	xfmIndividual
impChild	scrxfmLoadxfmCaseIndividualCHILD	xfmCaseIndividual
impCasePmt	scrxfmLoadxfmCasePmt	xfmCasePmt
impLegalAction	scrxfmLoadxfmLegalAction	xfmLegalAction
impOrder	scrxfmLoadxfmOrder	xfmOrder
impPayment	scrxfmLoadxfmPayment	xfmPayment
impSupervisor	scrxfmLoadxfmEmployee	xfmEmployee
impPaternity	scrxfmLoadxfmPaternity	xfmPaternity
	sETL_LoadIndividualSpecial	xfmIndividual

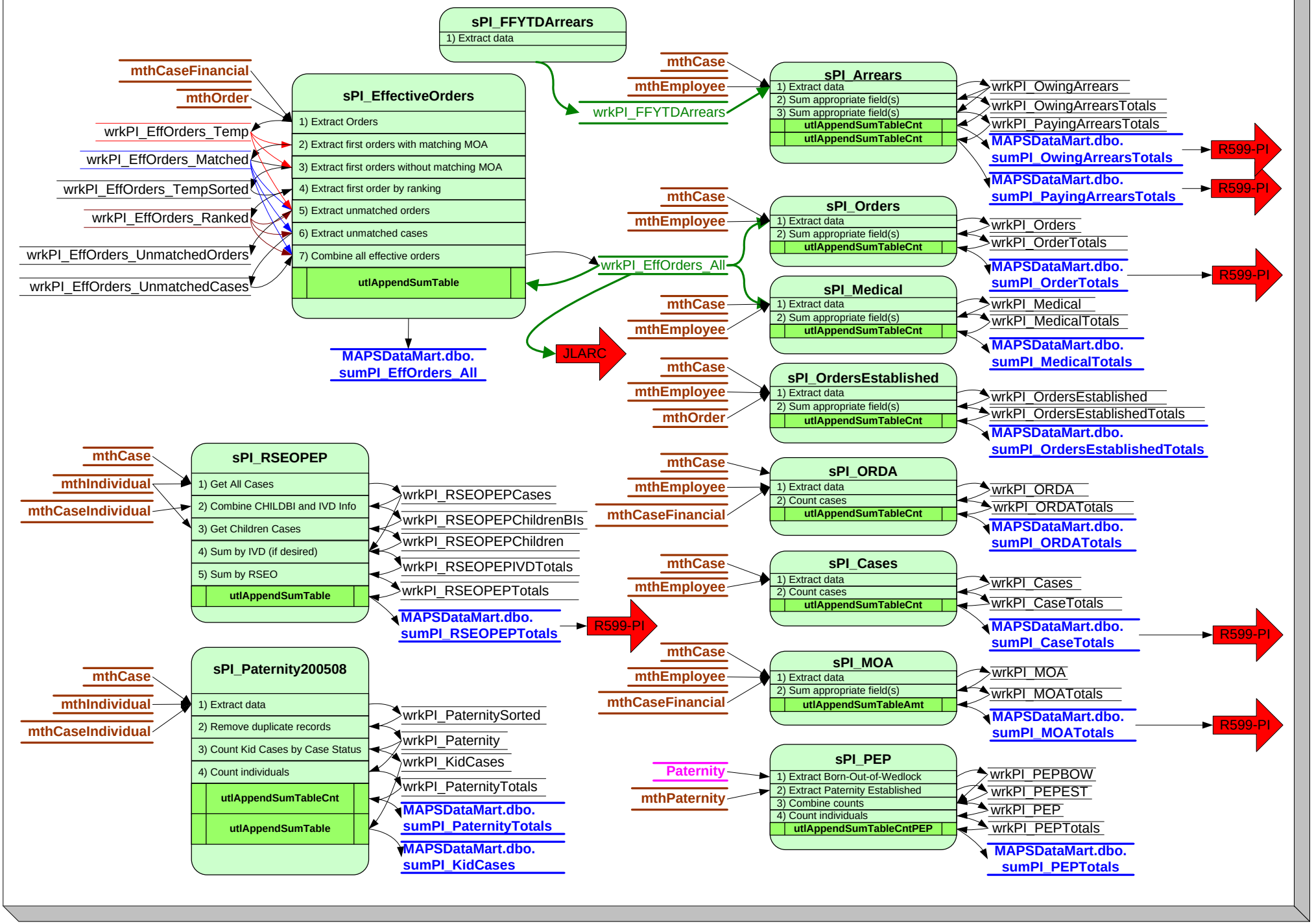
© Steve Lin Cognizant Design 2004-2007

R599 - Case Collections Data Mart Process



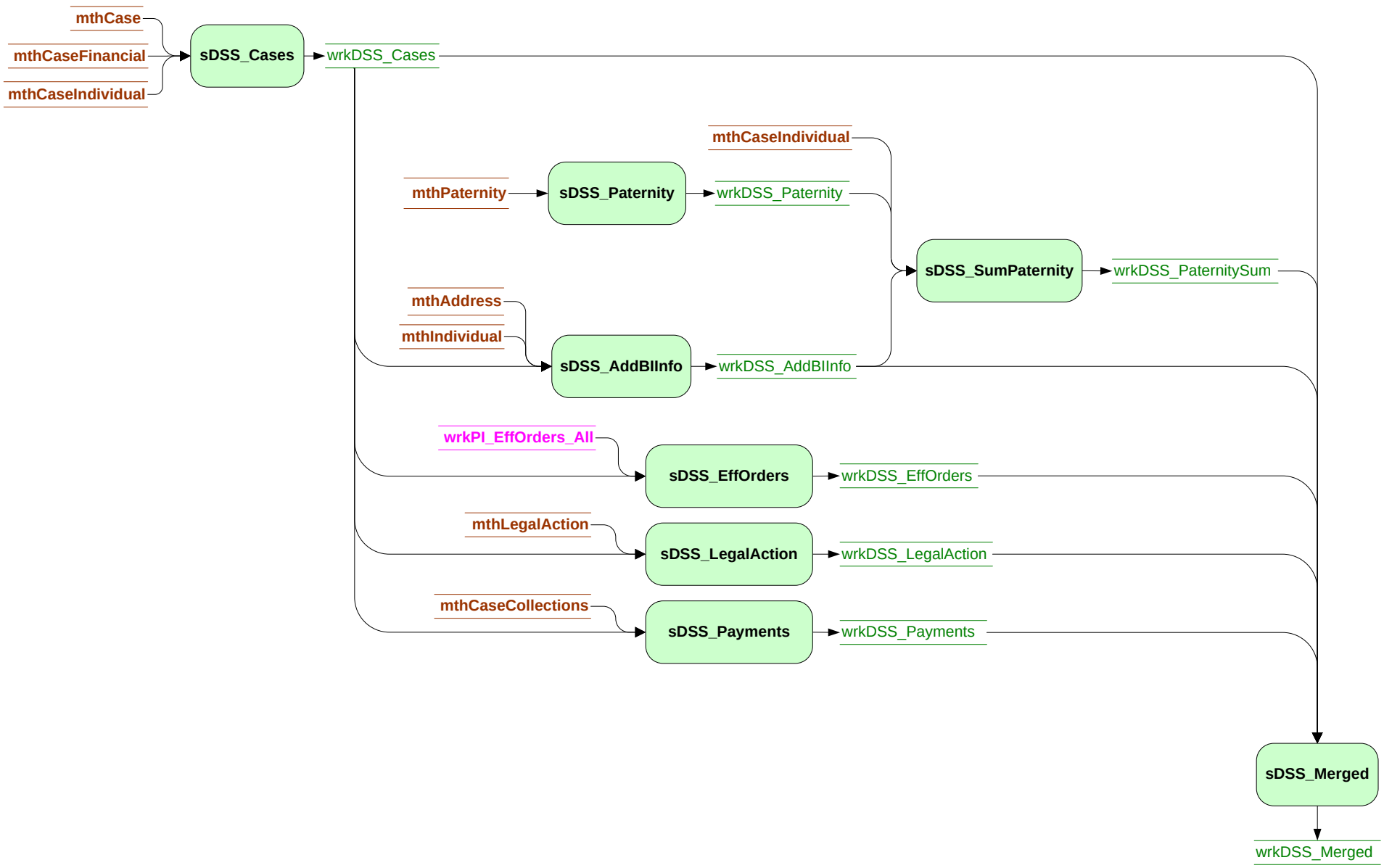
© Steve Lin Cognizant Design 2004-2007

PI - Performance Measures and Federal Incentives Data Mart Process



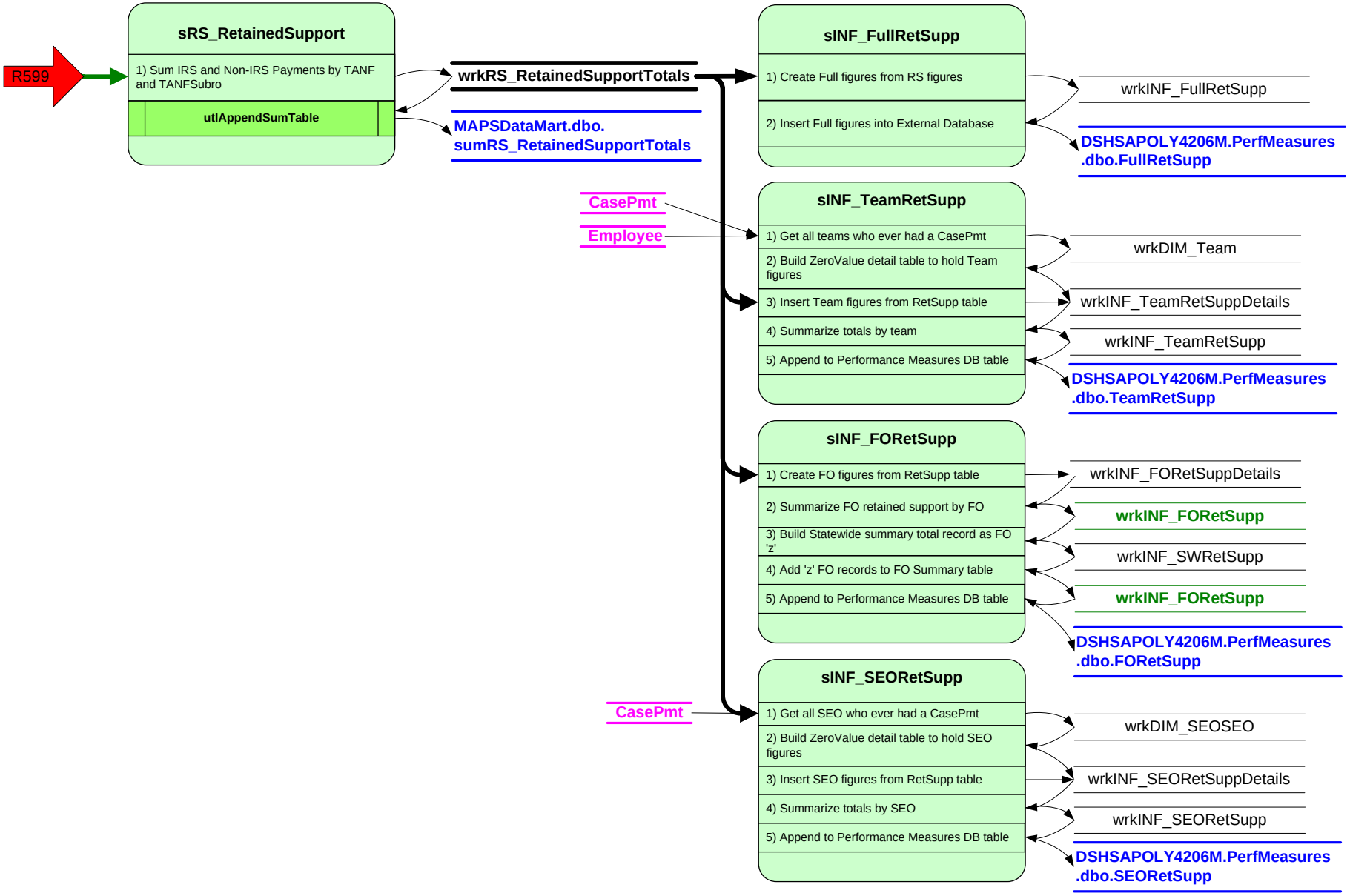
© Steve Lin Cognizant Design 2004-2007

DSS - Decision Support System Data Mart Process



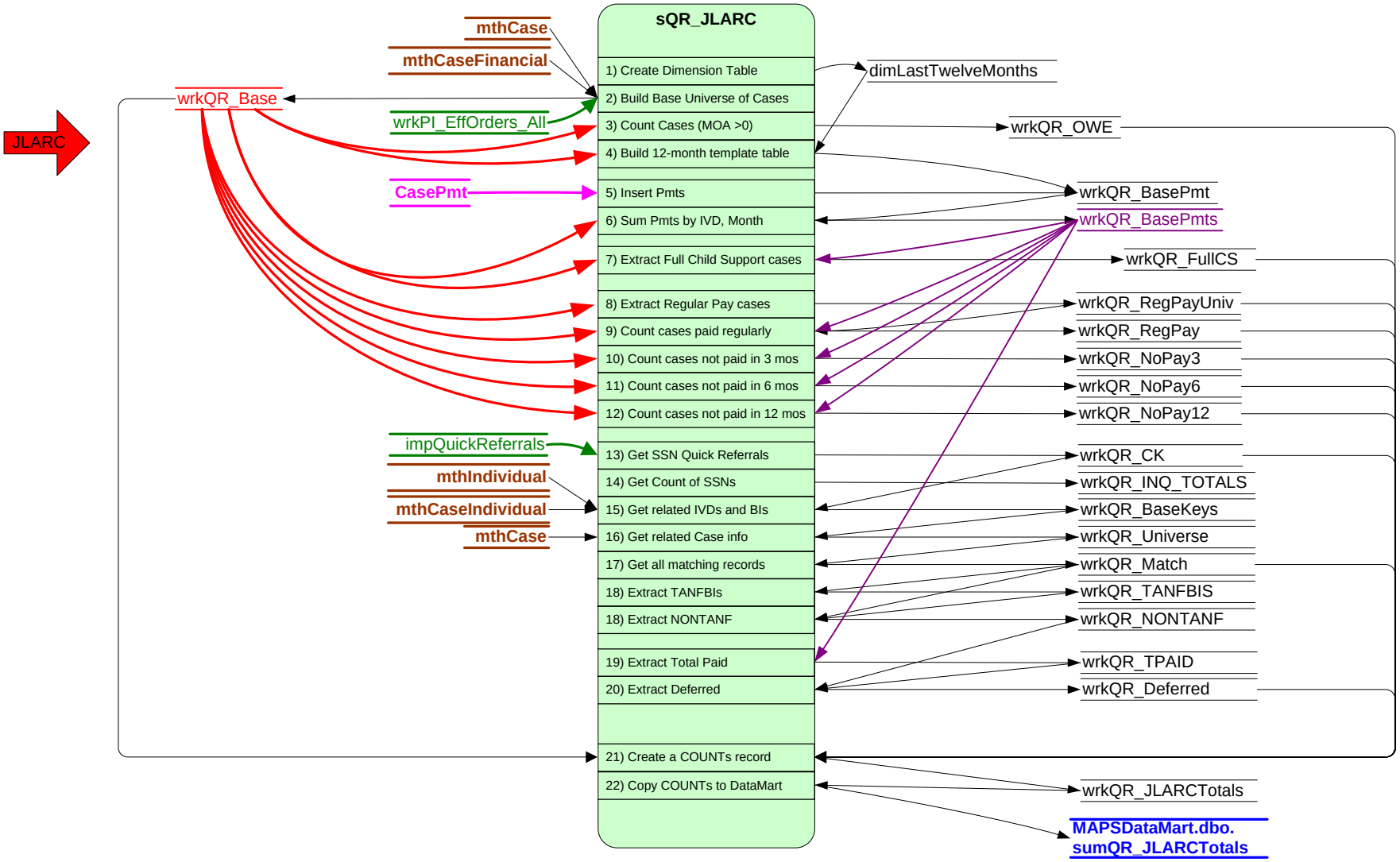
© Steve Lin Cognizant Design 2004-2007

RS - Retained Support Data Mart Process



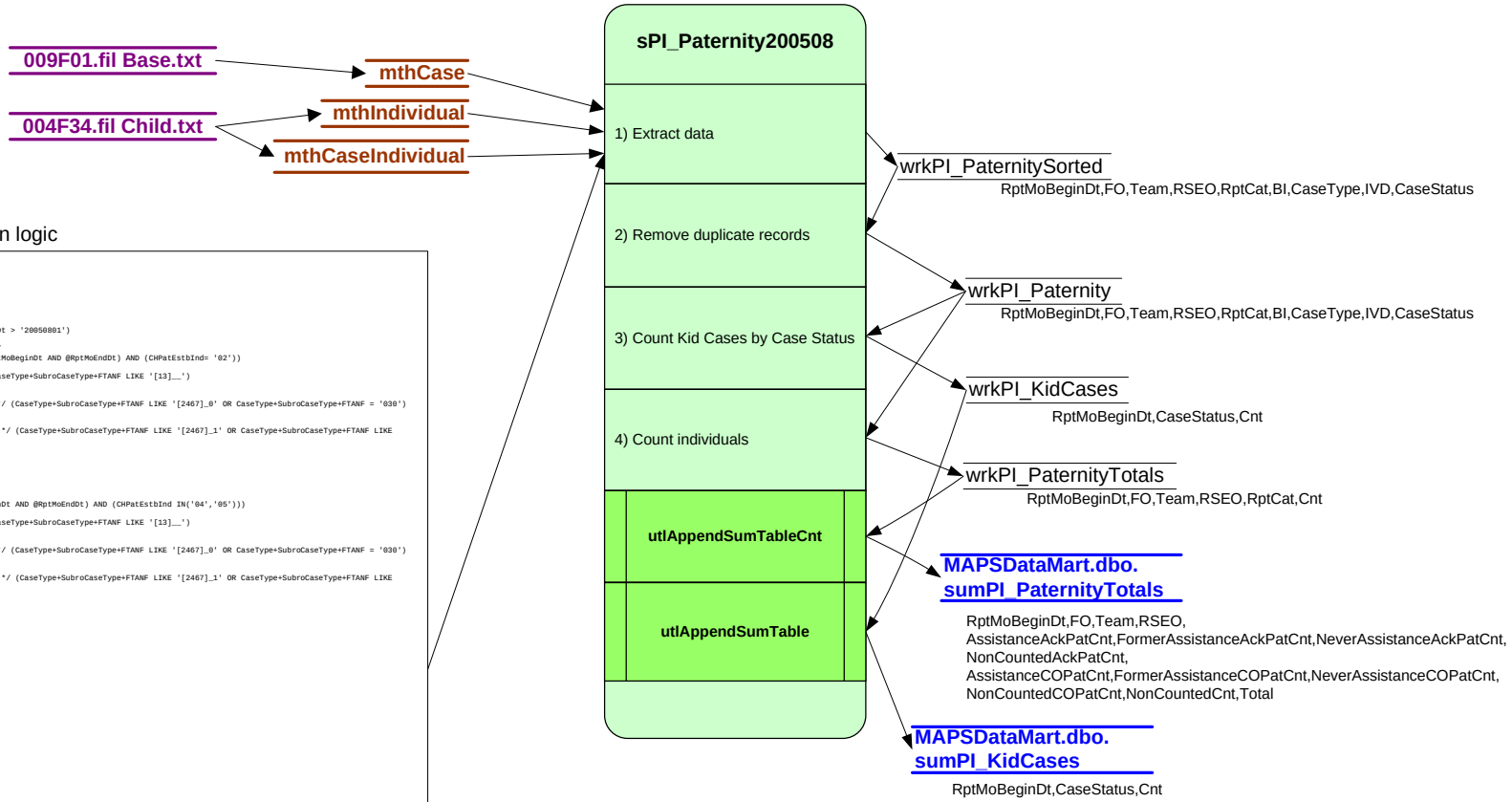
© Steve Lin Cognizant Design 2004-2007

Quick Referrals - JLARC



© Steve Lin Cognizant Design 2004-2007

Total Paternities Established by Affidavit and by Court Order

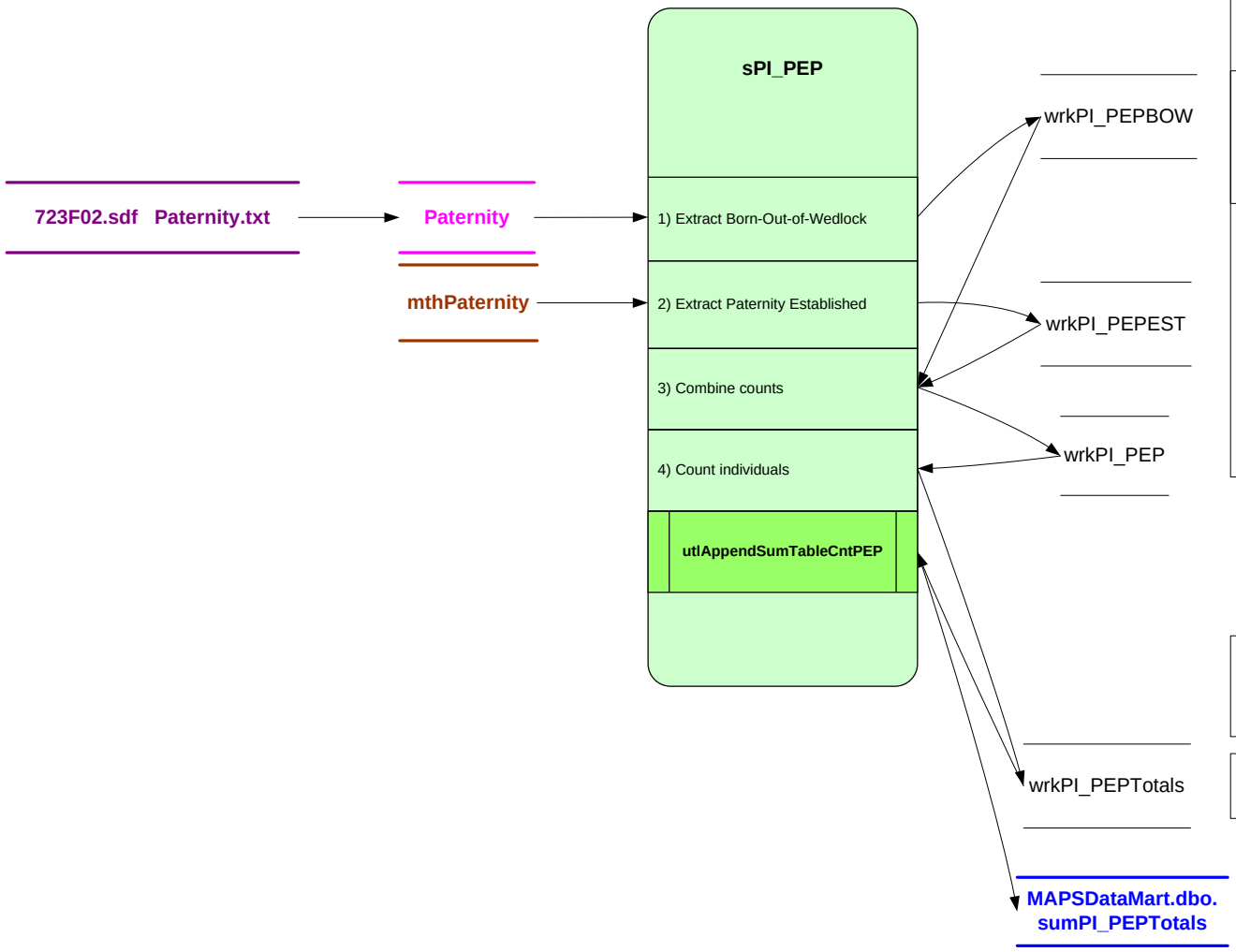


Selection, inclusion and exclusion logic

```
SELECT
-- DIMENSION fields
    CONVERT(datetime,@RptMoBeginDt, 112) AS RptMoBeginDt,
    aCase.FO,
    dbo.mthEmployee.Supervisor AS Team,
    aCase.RSEO,
    RptCat =
        CASE WHEN   /* dbo.IsAfter200508() */    (@RptMoBeginDt > '20050801')
             THEN
                CASE WHEN  /* dbo.IsCourtOrderedPaternity() */
                        ((CHPatEstbByCourtOrderDt BETWEEN @RptMoBeginDt AND @RptMoEndDt) AND (CHPatEstbInd= '02'))
                     THEN
                        CASE WHEN /* dbo.IsAssistance() */ (CaseType+SubroCaseType+FTANF LIKE '[13]__')
                                  THEN 'AssistanceCOPat'
                        ELSE
                        CASE WHEN /* dbo.IsNeverAssistance() */ (CaseType+SubroCaseType+FTANF LIKE '[2467]_0' OR CaseType+SubroCaseType+FTANF = '030')
                                  THEN 'NeverAssistanceCOPat'
                        ELSE
                        CASE WHEN /* dbo.IsFormerAssistance() */ (CaseType+SubroCaseType+FTANF LIKE '[2467]_1' OR CaseType+SubroCaseType+FTANF LIKE
'0[12]_' OR CaseType+SubroCaseType+FTANF = '031')
                                  THEN 'FormerAssistanceCOPat'
                        ELSE
                                 'NonCountedCOPat'
                        END END END
                ELSE
                CASE WHEN   /* dbo.IsAffidavitPaternity() */
                        ((CHPatEstbEntryDt BETWEEN @RptMoBeginDt AND @RptMoEndDt) AND (CHPatEstbInd IN('04','05')))
                     THEN
                        CASE WHEN /* dbo.IsAssistance() */ (CaseType+SubroCaseType+FTANF LIKE '[13]__')
                                  THEN 'AssistanceAffPat'
                        ELSE
                        CASE WHEN /* dbo.IsNeverAssistance() */ (CaseType+SubroCaseType+FTANF LIKE '[2467]_0' OR CaseType+SubroCaseType+FTANF = '030')
                                  THEN 'NeverAssistanceAffPat'
                        ELSE
                        CASE WHEN /* dbo.IsFormerAssistance() */ (CaseType+SubroCaseType+FTANF LIKE '[2467]_1' OR CaseType+SubroCaseType+FTANF LIKE
'0[12]_' OR CaseType+SubroCaseType+FTANF = '031')
                                  THEN 'FormerAssistanceAffPat'
                        ELSE
                                 'NonCountedAffPat'
                        END END END
                ELSE
                     'NonCounted'
                END END
        ELSE
                'NonCountedDateRange'
        END
        ,

-- FACT fields
-- SORT fields
    dbo.mthCaseIndividual.BI,
    aCase.CaseType,
    aCase.IVD,
    aCase.CaseStatus
INTO
    dbo.wrkPI_PaternitySorted
FROM
    dbo.mthCase AS aCase

-- >>>>>>>>>>>>>>>>>> JOIN LOGIC >>>>>>>>>>>>>>>>>>>>>>>>>>>>
INNER JOIN dbo.mthCaseIndividual ON dbo.mthCaseIndividual.IVD = aCase.IVD
INNER JOIN dbo.mthIndividual ON dbo.mthIndividual.BI = dbo.mthCaseIndividual.BI
LEFT OUTER JOIN dbo.mthEmployee ON dbo.mthEmployee.EmpeNbr = aCase.RSEO
-- Must use LEFT OUTER JOIN in order to include RSEO = '0000' transactions


WHERE
-- >>>>>>>>>>>>>>>>>> INCLUSION RULES >>>>>>>>>>>>>>>>>>>>>>>>>
        dbo.mthCaseIndividual.RoleTypeID = 3
    AND
    (     /* dbo.IsCaseOpen() */ (CaseStatus IN ('1','2'))
    OR
         /* dbo.IsClosedDuringMonth() */ ((StatusDt BETWEEN @RptMoBeginDt AND @RptMoEndDt) AND (CaseStatus = '3'))
    )

-- <<<<<<<<<<<<<<<<< EXCLUSION RULES <<<<<<<<<<<<<<<<<<<<<<<

    AND NOT   /* dbo.IsAdminEnforceCase() */ (EnfSvc='06' AND ISType='02' AND RegistrySrc IN('07','08') AND aCase.FO='S')
    AND NOT   /* dbo.IsAccountingCase() */ (aCase.IVD
IN('0013801787','0000922941','0001002580','0001449386','0001468439','0001558453','0001564503','0001590434','0001599616','0001659124','0001624135','000165
9120','0001723872','0001724067','0001724069','0001658548','0001757211','0001757215'))
    AND NOT   /* dbo.IsPSOCase() */ (CaseType = '5')
    AND NOT   /* dbo.IsRetainedEarningsCase() */ RetainedEarningsCase = 'Y'
    AND NOT   /* dbo.IsMedCostCase() */ (CaseType='0' AND SubroCaseType = '4')
    AND NOT   /* dbo.IsPatCostCase() */ (CaseType = '0' AND SubroCaseType = '5')
    AND NOT   /* dbo.IsLocateCase() */ (aCase.FO='L')

ORDER BY  dbo.mthCaseIndividual.BI,aCase.CaseType,aCase.IVD
```

© Steve Lin Cognizant Design 2004-2007

Total PEP




```
/*-----------------------------------------------------------------
   Get FFY Begin Control Totals for Born-Out-Of-Wedlock for each FO
  -----------------------------------------------------------------*/

DROP TABLE dbo.wrkPI_PEPBOW

SELECT
-- DIMENSION fields
    CONVERT(datetime,@RptMoBeginDt,112) AS RptMoBeginDt,
    FO,
-- FACT fields
    RptCat =
        CASE WHEN  /* dbo.IsAssistancePEP() */ (CaseType+SubroCaseType IN('01','02','10','30'))
                AND /* dbo.IsBornOutOfWedlock() */ (PatInd IN('01','02','03','04','05'))
             THEN  'AsstBOW'
                   ELSE
        CASE WHEN  /* dbo.IsNonAssistancePEP() */ (CaseType+SubroCaseType IN('03','20','21','40','60','61','70','71'))
                AND /* dbo.IsBornOutOfWedlock() */ (PatInd IN('01','02','03','04','05'))
             THEN  'NonAsstBOW'
                   ELSE 'NonCounted'
                   END END
    ,
    BI
INTO
    dbo.wrkPI_PEPBOW
FROM
    dbo.Paternity

-- >>>>>>>>>>>>>>>>>> JOIN LOGIC >>>>>>>>>>>>>>>>>>>>>>>>

WHERE
-- >>>>>>>>>>>>>>>>> INCLUSION RULES >>>>>>>>>>>>>>>>>>>>>>
    (
            /* dbo.IsAssistancePEP() */ (CaseType+SubroCaseType IN('01','02','10','30'))
            OR
            /* dbo.IsNonAssistancePEP() */ (CaseType+SubroCaseType IN('03','20','21','40','60','61','70','71'))
    )
    AND     /* dbo.IsBornOutOfWedlock() */ (PatInd IN('01','02','03','04','05'))

-- <<<<<<<<<<<<<<<< EXCLUSION RULES <<<<<<<<<<<<<<<<<<<<<

ORDER BY BI
```

```
/*-----------------------------------------------------------------
   Get Paternity Established for each FO
  -----------------------------------------------------------------*/

DROP TABLE dbo.wrkPI_PEPEST

SELECT
-- DIMENSION fields
    CONVERT(datetime,@RptMoBeginDt,112) AS RptMoBeginDt,
    FO,
-- FACT fields
    RptCat =
        CASE WHEN  /* dbo.IsAssistancePEP() */ (CaseType+SubroCaseType IN('01','02','10','30'))
                AND /* dbo.IsPaternityEstablished() */ (PatInd IN('02','04','05'))
             THEN  'AsstEst'
                   ELSE
        CASE WHEN  /* dbo.IsNonAssistancePEP() */ (CaseType+SubroCaseType IN('03','20','21','40','60','61','70','71'))
                AND /* dbo.IsPaternityEstablished() */ (PatInd IN('02','04','05'))
             THEN  'NonAsstEst'
                   ELSE 'NonCounted'
                   END END
    ,
-- SORT fields
    BI
INTO
    dbo.wrkPI_PEPEST
FROM
    dbo.mthPaternity

-- >>>>>>>>>>>>>>>>>> JOIN LOGIC >>>>>>>>>>>>>>>>>>>>>>>>

WHERE
-- >>>>>>>>>>>>>>>>> INCLUSION RULES >>>>>>>>>>>>>>>>>>>>>>
    (
            /* dbo.IsAssistancePEP() */ (CaseType+SubroCaseType IN('01','02','10','30'))
            OR
            /* dbo.IsNonAssistancePEP() */ (CaseType+SubroCaseType IN('03','20','21','40','60','61','70','71'))
    )
    AND     /* dbo.IsPaternityEstablished() */ (PatInd IN('02','04','05'))

-- <<<<<<<<<<<<<<<< EXCLUSION RULES <<<<<<<<<<<<<<<<<<<<<

ORDER BY BI
```

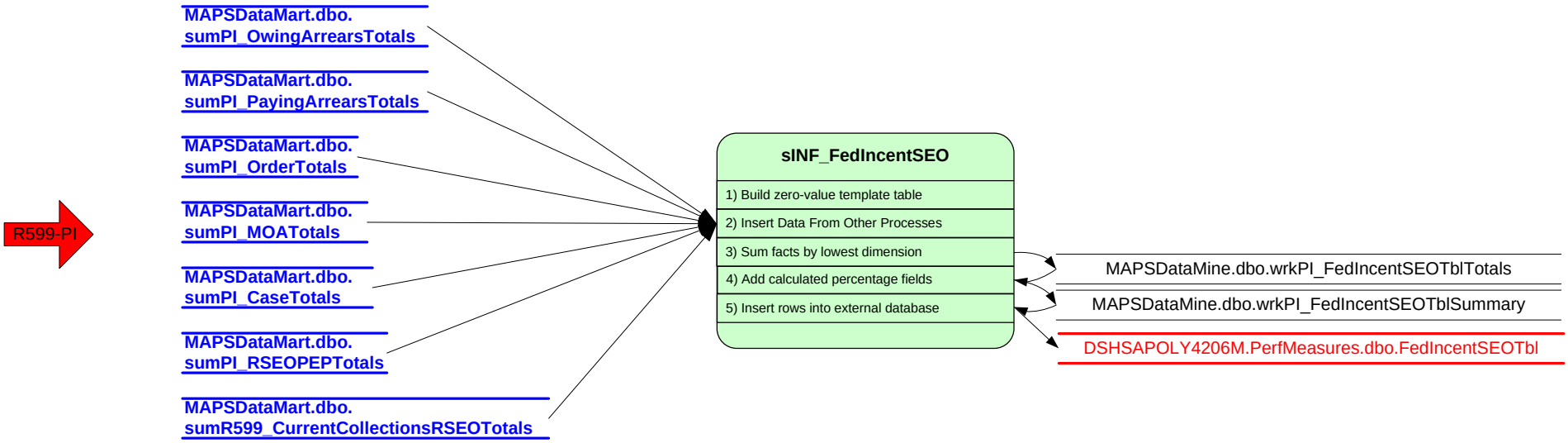
```
/*-----------------------------------------------------------------
  Combine Born-Out-Of-Wedlock Counts with Paternity Established Counts
  -----------------------------------------------------------------*/
SELECT * INTO dbo.wrkPI_PEP
FROM [dbo].[wrkPI_PEPBOW]
UNION
SELECT *
FROM [dbo].[wrkPI_PEPEST]
```

```
SELECT RptMoBeginDt, FO, RptCat, Count(BI) AS Cnt
INTO [dbo].[wrkPI_PEPTotals]
FROM [dbo].[wrkPI_PEP]
GROUP BY RptMoBeginDt,FO, RptCat
ORDER BY RptMoBeginDt,FO, RptCat
```

RptMoBeginDt,FO,AsstBOWCnt,NonAsstBOWCnt,AsstEstCnt,NonAsstEstCnt,NonCountedCnt,Total

© Steve Lin Cognizant Design 2004-2007

Performance Measures and Federal Incentives Summary Process



© Steve Lin Cognizant Design 2004-2007