

State of Michigan

Department of Community Health Department of Information Technology



Achieving Breakthrough Results in Health Care Delivery, Management, and Cost Containment

NASCIO 2007 Recognition Awards

Category:

“Data, Information, and Knowledge Management”

Executive Summary

One of the largest departments in the State of Michigan, the Michigan Department of Community Health (MDCH) is responsible for administering health services to approximately 2 million Michigan residents and overseeing an annual budget exceeding \$11 billion. MDCH administers many of the state's most critical programs, including Medicaid (fee-for-service and managed care); the Women, Infant, and Children (WIC) assistance program; the State's Childhood Lead Poisoning Prevention Program (CLPPP); and several others that affect the lives of the State's most vulnerable and needy citizens.

MDCH utilizes a true, broad-based Business Intelligence (BI) data warehousing solution to manage its health care programs and outcomes. MDCH has integrated 15 separate health-related program areas, encompassing 41 separate data sources, into a single environment. This integration has been critical since many of MDCH's beneficiaries are enrolled in more than one program. Today, MDCH can monitor the cost and care associated with a single individual across multiple programs, and the data warehouse has been instrumental in: improving the administration of health care services; conducting advanced data analysis to determine patterns; assessing which programs are most effective; detecting and reducing fraud and abuse; and improving and interpreting disease management and epidemiological patterns.

Michigan DCH was recognized for some of these integration and data-sharing efforts in 2002. Since then, the agency has expanded its BI/data warehouse to achieve even greater results – a continued improvement and evolution that keeps Michigan in a national leadership position in the use of BI/data warehousing technology to manage and assess its health care programs and outcomes. In the areas of government and operational improvements, and more importantly, in the public value the BI/data warehouse has produced for Michigan citizens, MDCH has made exponential strides in the intervening five years.

For example:

- The ability to conduct advanced health care analysis (forecasting, identifying program overlap, uncovering fraud and abuse, etc.) has resulted in MDCH achieving **annual financial benefits (savings, ROI, sanction avoidance, etc.) of nearly \$200 million.**
- The BI/data warehouse **was a key factor in investigators' identification of the biggest Medicaid fraud case in Michigan history** (148 counts of alleged fraud).
- Working with Michigan State University, MDCH conducts **health care analysis and outreach** to improve quality of care for Medicaid beneficiaries, and, through an epidemiology analysis, has studied the **impact of chronic diseases** on the Medicaid population.
- Through the linking of HIV/AIDS Reporting System data, Medicaid data, Vital Records data, and others, MDCH can determine **whether Medicaid beneficiaries with HIV are receiving health-care services.**
- The BI/data warehouse has been instrumental in Michigan's **childhood lead-poisoning prevention efforts**, and in the State's efforts to identify children with a **high risk of contracting influenza** and conduct outreach with physicians on prevention efforts.

The BI/data warehouse has dramatically changed MDCH's capacity and capability to assess, analyze, and act – as it fulfills its mission to protect, preserve, and promote the health and safety of the people of Michigan, with particular attention to providing for the needs of vulnerable and under-served populations.

A. Description of Project: Business Problem and Solution, Length of Time in Operation

One of the largest departments in the State of Michigan, the Michigan Department of Community Health (MDCH) is responsible for administering health services to approximately 2 million Michigan residents, overseeing an annual budget exceeding \$11 billion, and administering many of the state's most critical programs across the health care spectrum.

Michigan has long been considered a pioneer in its use of information technology to improve the operation of government and the quality of life for its citizens, and in 1994 MDCH invested in a data warehouse to monitor Medicaid claims for quality of care, as well as for overpayments, and fraud and abuse. Within the next few years, Michigan also used the data warehouse to evaluate primary care physicians, improve child immunization rates, and implement and analyze managed care within the Medicaid program.

The evolution to an enterprise approach began several years ago when MDCH integrated data from nine separate health-related program areas (and 27 data sources) into a single, tightly-integrated environment. These program areas include:

- Medicaid
- Vital Records
- Epidemiology
- Women, Infants & Children (WIC)
- Childhood Lead Poisoning Prevention
- Michigan Care Improvement Registry (MCIR)
- Pregnancy Risk Assessment Monitoring System (PRAMS)
- Newborn Metabolic and Hearing Screening
- Maternal and Infant Health Advocacy Services

MDCH was recognized by NASCIO for these integration and data-sharing efforts in 2002. Since then, MDCH has expanded its BI/data warehouse to include 6 additional program areas (41 data sources).

- HIV/AIDS
- MICHild
- Substance Abuse
- Children's Special Health Care Services (CSHCS)
- Community Mental Health
- Long Term Care

This integration was critical since many of MDCH's beneficiaries are enrolled in more than one of these programs. As part of this enterprise integration project, MDCH also created a Unique Client Identifier (UCI) that links a beneficiary across multiple programs in a secure and confidential manner. This enabled MDCH to monitor services associated with a single individual across multiple programs.

More importantly, these program/data sources are fully integrated within the MDCH data warehouse, which also makes it possible to share data with other MDCH applications (e.g., MMIS, MCIR, PPRS) to achieve even greater results in:

- improving efficiencies
- streamlining operations
- reducing fraud and abuse
- conducting health care analysis and outreach, and
- improving children's health outcomes.

The true, broad-based Business Intelligence (BI) data warehousing solution is imperative to MDCH's capacity and capability to assess, analyze, and act – as it fulfills its mission to protect, preserve, and promote the health and safety of the people of Michigan. No other state health-care agency has used BI/data warehousing and the principle of data integration to achieve the kinds of benefits that Michigan has in the area of health care. Other states are now in the process of adopting the "Michigan Model" of integrating their health care environments for greater savings and improved health care outcomes for citizens.

B. Significance of the Project to the Improved Operation of Government

The BI/data warehouse has dramatically improved operations within MDCH and other areas of Michigan state government. While the focus of this application is on MDCH, it is important to point out that the BI/data warehouse in Michigan is the most sophisticated and broadly used solution in state government. More than 9,000 users in 5 major departments, 20 agencies, and 100+ bureaus make use of the BI/data warehouse solution. Michigan's technology strategy document reports that: "Michigan currently is sharing over 2 terabytes of information, which equates to approximately one-tenth of all of the books in the largest library in the world..."

Within MDCH, ever-increasing data sharing and user-driven analysis and reporting now enable staff analysts to look at the Department's "business" both retrospectively and prospectively. Bi-weekly BI/data warehouse Project meetings ensure that BI activities are closely aligned with MDCH major initiatives. The Unique Client Identifier (UCI) links data on all services an individual receives across all programs and enhances the ability to conduct comparative analysis. This also promotes consistent, more efficient reporting across programs.

All of this has resulted in more rapid decision-making, based on the most meaningful data and most comprehensive analyses. **MDCH analysts and staff members are able to conduct iterative ad-hoc queries quickly, and Medicaid administrative costs have been reduced by 25 percent.**

In addition, updated governance rules have assisted in workflow, security, and privacy issues. Departments initiate data sharing through Memorandums of Understanding (MOU) and Data Sharing Agreements (DSA). The future design for sharing data between departments involves a set of central "view" databases. All access to these views will be controlled by security roles. With this design in place, the State of Michigan has a consistent, secure, and auditable method for sharing data.

Beyond these broad areas that have evolved over time, there are some very specific advances that Michigan has made to improve the operation of government:

On-line Reports from the Data Warehouse

MDCH initiated a project to create production reports from the data warehouse to replace production reports currently produced from the MMIS mainframe system. Benefits of converting reports to the data warehouse have included:

- cost savings related to printing, sorting, distribution, supplies and postage (data warehouse reports are viewed on-line; if hard-copies are needed, specific pages can be printed locally)
- reduced potential for confusion and error by using the data warehouse as the single source for reporting and ad-hoc queries (rather than current multiple sources with data that are not always consistent across systems)
- ease of converting report data to standard tools such as Microsoft Excel, Access and Word; and alignment of reports with current user needs (existing mainframe reports do not necessarily reflect accurate data or current needs of report recipients).

An indirect benefit was the elimination of approximately 300 out of 600 existing reports because they are no longer useful and/or needed, based on analysis conducted for this project. While not all of these reports were planned for conversion to the data warehouse, elimination of these reports is expected to result in significant printing and distribution cost savings.

Claim Adjustment Generator

The Claim Adjustment Generator provides a data warehouse interface for MDCH to process adjustments by individual claim. The adjustments can be either replacements (e.g., rate changes, or payment corrections) or voids (e.g., to recover amounts paid for duplicate claims or death matches). MDCH submits either individual claims or batches of claims through the Claim Adjustment Generator. Submitted claims can then be "tested"

within the interface to simulate payment processing so the user can verify results. Once approved by an authorized individual, claim adjustments are **automatically sent from the data warehouse to the MMIS mainframe system's normal payroll process and the results loaded back to the data warehouse. The Claim Adjustment Generator allows tracking of all payments and adjustments to individual claims, which was previously impossible when adjustments were processed as gross adjustments.**

To date, over 488,000 replacement claims totaling over \$36 million in payment adjustments have been processed through the Claim Adjustment Generator. Over 83,000 voids have also been processed totaling over \$35.5 million in payment recoveries. Many of these adjustments were not identifiable prior to implementation of the Claim Adjustment Generator and the integration of data sets.

Habilitation Support Waiver (HSW) Web Application

The HSW program is one of Michigan's Home and Community Based Waiver programs, authorized by the federal government to cover cost effective services to beneficiaries in their own homes, as opposed to institutional services. Providers enter enrollment data directly into the HSW web application, which edits the data for accuracy and completeness (including validating against Medicaid beneficiary information), then forwards the data to the MDCH program area for approval and notifies the provider when approval is received. **The web application is also used by providers and MDCH to access and maintain enrollee information, create the monthly payment and recoupment file (including a "lookback" to verify that encounters have been submitted), send the payment file to the mainframe payroll system for processing, update data based on a return file from the payroll system, and produce 24 reports used to monitor activity within the HSW program. Over 1,000 transactions were processed in the first week after implementation.**

The HSW web application combined with the data warehouse provides a single, common application and storage point for HSW data. Previously, multiple unlinked applications and databases were maintained by individual providers, who then manually submitted their data to MDCH on diskettes. MDCH then loaded each provider's data into a central Microsoft Access database.

Post Payment Recovery System (PPRS)

The PPRS application links to the data warehouse to extract paid claims for beneficiaries with third party liability insurance, then produces electronic and paper recovery claims to the applicable insurance carriers. **Responses from the insurance carriers are entered into the PPRS application, sent to the data warehouse for update, and automatically submitted to the Claim Adjustment Generator to void the Medicaid payments. To date, these voids have resulted in over \$500,000 in recovered payments.** The new Post Payment Recovery process eliminated the manual process of reviewing Medicaid payments to determine third party liability coverage and manually processing adjustments.

C. Public Value of the Project

Michigan's MDCH BI/data warehouse has resulted in immense value for Michigan taxpayers and program beneficiaries – in the broad areas of cost savings and program benefits. The ability to conduct advanced health care analysis (forecasting, identifying program overlap, uncovering fraud and abuse, etc.) has resulted in MDCH achieving **annual financial benefits (savings, ROI, sanction avoidance, etc.) of nearly \$200 million.** The BI/data warehouse has enhanced MDCH's ability to evaluate managed care plans, payment rates and policies, thus maximizing Medicaid program savings while sustaining quality care. It is most effective to **describe a few strong examples to illustrate the Public Value already achieved by MDCH by making use of the speed, flexibility, versatility, data sharing benefits, and analytical capabilities of the BI/data warehouse:**

Fighting Medicaid Fraud and Abuse

In January of 2006, legislation was signed to continue efforts to eliminate Michigan Medicaid fraud, and provide incentives for citizens to report suspected fraud to the authorities. Referrals and complaints are reviewed by MDCH's Program Investigation Section, **which depends on the BI/data warehouse for fee-for-service paid claims and managed care encounters data as part of their referral/complaint investigations.**

As a result of this effort, in August of 2006, criminal charges for Medicaid fraud were brought against the president of a pharmaceutical company **in the biggest Medicaid fraud case in Michigan history** (148 counts of alleged fraud). The charges included: billing Medicaid for deceased beneficiaries; billing Medicaid for drugs not consumed by Medicaid beneficiaries; and billing Medicaid for drugs for terminally ill Medicaid beneficiaries who were in hospice. The investigation lasted three years and included MDCH Program Investigation Section, the Attorney General's Health Care Fraud Division, the U.S. Department of Health and Human Services, and the FBI. The parent company has set aside \$54 million for litigation of these charges.

Health Care Analysis and Outreach in partnership with Michigan State University

Michigan State University's Institute for Health Care Studies (IHCS) works with MDCH to improve the quality of care for Michigan Medicaid beneficiaries. By using the BI/data warehouse, Maternal and Infant Health Program Services were evaluated by comparing outcomes with interventions. Data used in these comparisons comes from multiple program areas such as WIC, Vital Records, Michigan Care Improvement Registry (MCIR), and Medicaid. This additional analytical/evaluation capacity by MSU provides MDCH with program analysis and policy reports on topics specified by MDCH, and collaboration for joint grant development on longer range, more complex processes.

For example, **Newborn Metabolic and Hearing Screening** analysis was performed by **linking screening records to Medicaid beneficiaries** to determine the percentage of Medicaid population receiving screenings. By matching Medicaid beneficiaries with positive metabolic screenings to the **MCIR** data, the State was able to determine whether beneficiaries were receiving their immunizations. Immunization data is particularly important for children with Sickle Cell Anemia, as they are at greater risk of increased infection.

In addition, MSU **helped undertake an Epidemiology analysis using the MDCH BI/data warehouse**, which provides access to at least six years of data and information linked between a variety of legacy sources (e.g., WIC, Pregnancy Risk Assessment Monitoring System, Maternal and Infant Health Advocacy Services Program, etc.). This analysis was to determine: the impact of chronic disease (diabetes, asthma, cardiovascular disease, cancer, etc.) on the Medicaid population of Michigan; and the prevalence of diabetes and diabetes complications in Michigan, and determine how this compares with other states

HIV/AIDS Reporting System (HARS) Registry and Data Warehouse Model

The HARS data was originally loaded to the data warehouse to ensure that all Medicaid beneficiaries actively receiving treatment for HIV were included in the HARS registry. HARS is a surveillance system that was designed to provide insight to the communicable disease burden in Michigan and to secure funding for HIV care and prevention. HARS data is linked to Medicaid data (including fee-for-service claims and managed care encounter data) and Vital Records data on the warehouse using the UCI. **Adding HARS to the data warehouse allows for improved public health surveillance case findings for Medicaid beneficiaries with HIV and provides the ability to determine whether or not this population is obtaining HIV-related health care services.** The data warehouse and the security it provides made it possible to link the HARS registry to Medicaid data while providing access to this extremely sensitive data by only two authorized individuals.

Childhood Lead Poisoning Prevention Efforts

When Public Act 55 was enacted in April 2004 mandating compliance with federal standards for lead screening for children enrolled in Medicaid, only 41% of Michigan Medicaid-enrolled children were receiving initial blood lead screenings. **Today, 67% of Michigan Medicaid-enrolled children receive initial blood lead**

screenings, due to several steps that have been taken as part of Michigan's goal to eliminate childhood lead poisoning. Data stored on the BI/data warehouse has been a critical component for analyzing the program's progress and success. The data warehouse is instrumental in monitoring screening levels on a monthly basis and assisting in outreach efforts to improve screening percentages.

In the first population-based study of its kind, the University of Michigan's Child Health Evaluation and Research (CHEAR) Unit conducted an MDCH-funded study on the context that follow-up testing after an elevated screening blood lead level is a key component of lead poisoning. CHEAR used data from the warehouse to assess: proportion of children who had at least one follow-up after an elevated screening blood lead level; relationship between screening blood lead level and first follow-up; and missed opportunities for those children who didn't receive additional follow-up testing. **The results of this important study were published in the May 11, 2005 issue of the *Journal of the American Medical Association (JAMA)*.**

This important assessment was conducted in conjunction with the work undertaken by the **Childhood Lead Poisoning Prevention Task Force in Michigan**. The Task Force's objective is to lead a statewide project to address the barriers preventing Michigan's children from becoming lead poison free by 2010. The Task Force's Health Subcommittee used information available from the DCH data warehouse to identify children with elevated blood levels, children with elevated blood levels that are also covered by Medicaid, and children receiving follow-up treatment.

Because a majority of Medicaid-enrolled children receive their health-care services from Medicaid Health Plans (MHP), the MHPs are the focus of MDCH's education and outreach efforts. The Unique Client Identifier (UCI) allows linking of Medicaid data with CLPPP data on the warehouse to: produce data extracts for the MHPs and local health departments to assist in improving screening percentages and reduce missed opportunities; and generate reports for MHPs quantifying their testing performance as part of their external quality review. This report is also used by the MDCH Director and Michigan's Surgeon General to monitor the status of the state's lead-screening efforts.

Identifying High-Risk Children for Influenza Vaccination

The pilot implementation of the MCIR high-risk indicator was put into operation for the 2006-07 influenza season using (CY) 2005 data obtained from the MDCH data warehouse. Using CDC influenza vaccination guidelines, MDCH identified children with one or more high-risk conditions. A dichotomous indicator that identifies a child as being at high-risk for influenza complications was developed using Medicaid paid claims for any inpatient, emergency department, and outpatient services reported for a high-risk condition or Medicaid pharmacy claims for those with four or more annual asthma medication dispensing events. Children with high risk conditions were also identified using diagnosis codes that included any of the high-risk conditions specified in influenza vaccination guidelines; **in total over 59,000 children with one or more high risk condition were identified in this manner.** This information was merged into MCIR system files based on Medicaid ID number. When a record is accessed in MCIR for a child with a high-risk condition, a reminder notice automatically appears for physicians to evaluate the child for influenza vaccination eligibility; the message does not display for those who have received the influenza vaccine for the current influenza season.