



BAYCARE HEALTH SYSTEM: IMPROVING CLINICAL OUTCOMES & RAISING CARE QUALITY FOR JCAHO CORE MEASURES

APPLICATIONS DEVELOPED USING
THE DIVER SOLUTION:

MANAGEMENT OF LAB ORDERS

PRODUCT LINE PROFITABILITY ANALYSIS

PATIENT SATISFACTION

REIMBURSEMENT ANALYSIS

EAD DOWNTIME APPLICATION

PHYSICIAN PROFILING DASHBOARD

RISK MANAGEMENT

INSIGHT INTO DETAILED METRICS ENABLES BETTER CLINICAL OUTCOMES: *In 2002, BayCare Health System had a simple objective: To cut the time needed to perform angioplasty (“PTCA”) on a heart attack patient to 90 minutes or less¹. In 2002, the median time – the “Door-to-Inflation” time – for BayCare to perform angioplasty was 143 minutes.*

That much was known because BayCare started tracking clinical outcomes in 2000, following a direction initiated by its management board. The metrics adopted were 3 core measure sets published by the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO). These measures applied to three relatively common – and costly – acute conditions: Acute Myocardial Infarction (AMI), Congestive Heart Failure (CHF) and Community Acquired Pneumonia (CAP).

These measures cover simple procedural events, such as counseling heart failure patients to stop smoking and ensuring that patients receive complete written discharge instructions with details on medications, follow-up appointments, suggested dietary changes, and so on. But, there were more sophisticated measures of success too. For example, ensuring that AMI (heart attack) patients received angioplasty within 90 minutes of arrival at the emergency room.

QUANTIFIED BENEFITS:

- Reduced “Door-to-Inflation” time for a myocardial infarction (heart attack) patient by over 40 minutes (from a median of 136 minutes to 93 minutes).
- Enabled faster improvements in care quality by providing insight into clinical indicators weekly, not just quarterly as before.
- Delivered rapid return on investment by creating and deploying analytical application in only 4 days.

- Ease of implementing, deploying and maintaining the solution has allowed BayCare to quickly move beyond the initial 3 core measure sets. Now, the original application has been extended to include core measures for stroke, coronary artery bypass graft, total joint replacement, radical prostatectomy, and breast cancer.
- In the near future, the following clinical indicators will be added: Psychiatry, Peripheral Vascular Disease, Sepsis.



DATA → INFORMATION → ACTION

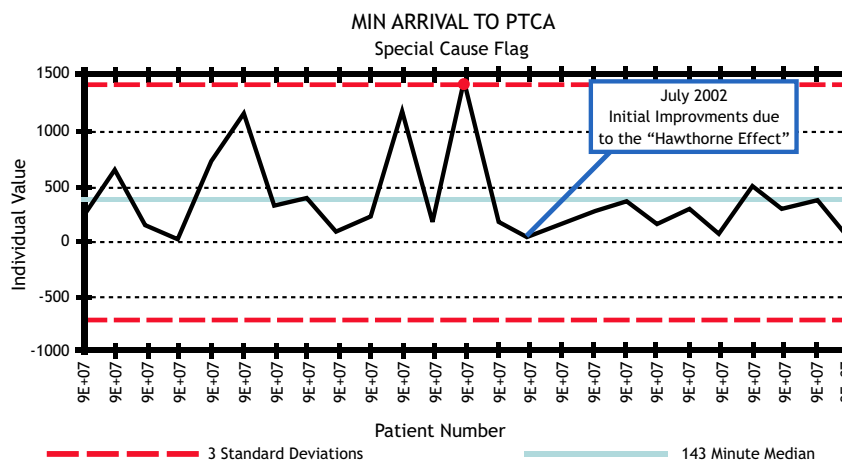
¹ An American College of Cardiology/American Heart Association guideline.

BAYCARE'S FIRST APPLICATION OF THE DIVER SOLUTION WAS CREATED TO HELP IMPROVE CLINICAL OUTCOMES.

THE APPLICATION WAS BUILT AND DEPLOYED IN JUST 4 DAYS.

Through adopting and monitoring the JCAHO core measures as their benchmark for clinical outcomes, BayCare knew that its median door-to-inflation time in 2002 was 143 minutes – and far exceeded the standards it would like to achieve. Naturally, BayCare started paying closer attention to the door-to-inflation time for heart attack patients. As a result, by 2003 that process time had improved by seven minutes, to a median time of 136 minutes – an improvement that can also be observed in the last few months of 2002 (see Figure 1). But, this improvement was thought to be solely due to the “Hawthorne Effect”² – an improvement in the process that arises when the individuals involved are aware that their work is being scrutinized more than usual.

Figure 1: 2002 Door to Inflation Time



After further analysis, it was realized that conventional outcomes measures – such as mortality rate, readmission rate or average length of stay couldn’t provide the level of insight required to make further improvements. Therefore, BayCare introduced four new metrics to get deeper insights into the angioplasty treatment process.³ Those four measures were

- The time elapsed from the patient entering the hospital until EKG data is collected (“Door-EKG”).
- The time elapsed from the patient entering the hospital until they enter the catheterization laboratory - “cath. lab.” (“Door-Lab”).
- The time elapsed from EKG data collected from the patient arriving at the catheterization laboratory (“EKG-Lab”).

- The time elapsed from the patient arriving at the catheterization laboratory until percutaneous transluminal coronary angioplasty (PTCA) is completed (“Lab-Inflation”).

Tracking and analyzing these new measures was relatively simple. In the summer of 2003, BayCare had made a strategic decision to purchase The Diver Solution™ from Dimensional Insight. The Diver Solution allows providers to make higher quality, more timely decisions based on data that is current and timely, not weeks or months out of date. BayCare’s first application of The Diver Solution was created to help improve clinical outcomes. That application was built and deployed in just 4 days.

But, the overall project was broader in scope than Acute Myocardial Infarction (heart attack). The application was used to report on all 4 core measures. This application taps data from an Eclipsys Corporation Sunrise™ decision support system - formerly called TSI™ – on an IBM iSeries™ – formerly AS/400™ - platform. Without an electronic charting system, it’s still necessary for BayCare to pull the charts for the subset of the patient population included in the core measures. Data from those charts is then re-keyed into the Eclipsys system via a specially developed webform. From here, data can be extracted and loaded into The Diver Solution automatically, without further intervention.

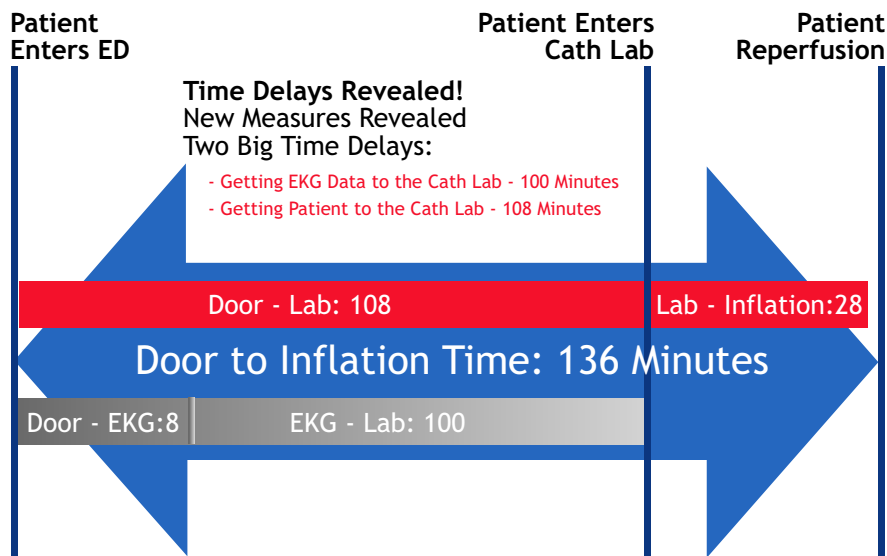
So, what did happen to a heart attack patient when they entered a BayCare hospital? The 4 new measures introduced provided some telling insights, as Figure 2 shows.

Essentially, the staff in the emergency room were able to test and evaluate the patient’s condition quickly and efficiently. This is shown by the Door-EKG time of only 8 minutes. Similarly, once the patient arrived in the catheterization laboratory, angioplasty was performed promptly – a median Lab-Inflation time of 28 minutes.

² First observed during studies at the Hawthorn Plant of Western Electric in Illinois, 1927-1932.

³ Additional measures taken from guidelines defined by the National Registry of Myocardial Infarction.

Figure 2: Key Components of Door to Inflation Time



However, the other two metrics were more troubling. The Door-Lab time – the elapsed time for a patient to reach the catheterization laboratory after entering the emergency room was – 108 minutes. Likewise, it was taking 100 minutes from the time the EKG results were available for the patient to reach the cath. lab. (EKG-Lab).

Armed with these fresh insights, a multi-disciplinary team was formed to investigate further. This team included ED physicians, cardiologists, nurses and nursing managers, together with a representative from BayCare’s own quality department. From these meetings, root causes for the time delays – and possible solutions – were determined. These are shown in Figure 3.

The three recommended solutions were put into action in March 2004. As a result of these changes, the median door-to-inflation time has dropped to 93 minutes during 2004. These are shown in figure 4. The ability to improve care quality faster is clear. In the past, it was only possible to report on the three JCAHO core measurements quarterly. Because the data needed had to be manually compiled from numerous sources, it was impractical to build a report more frequently. Now, with The Diver Solution™, reports can be compiled weekly – even daily if required. So, insights into care quality are available promptly, with more complete and up-to-date information to enable more detailed analysis.

Figure 3: Recommended Solutions for Improving Door-Inflation Time

PROBLEM: *The arrival of the cardiologist to perform the angioplasty was sometimes delayed – for example, if they were already working on another patient.*

SOLUTION: A second tier cardiology call schedule was created, ensuring that a backup cardiologist was always on-hand.

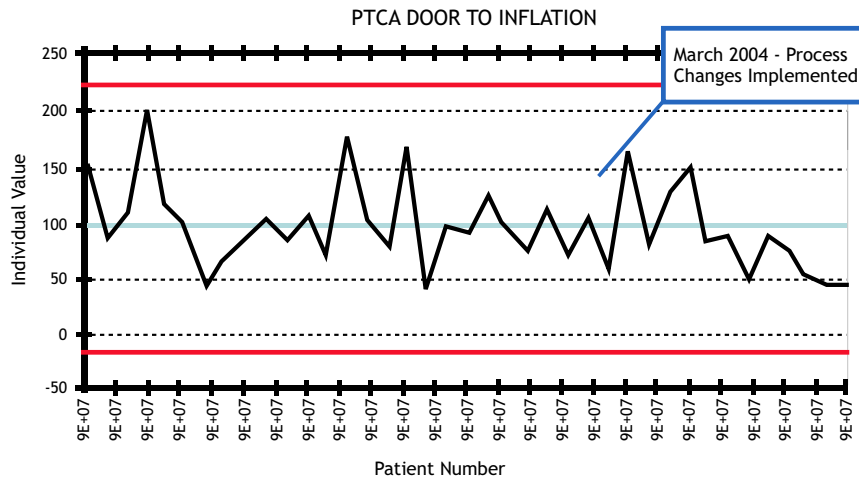
PROBLEM: *The decision to take the patient to the cath. lab. was sometimes delayed. This was because the cardiologist wanted to collect additional data and not rely on data already collected by the emergency room staff.*

SOLUTION: Conduct an individual case review. Those physicians who frequently requested additional data could quickly be identified using The Diver Solution™ application. Those physicians were individually counseled, by the Chief of Cardiology and Vice President of Medical Affairs. Many physicians changed their behavior as soon as they realized the implications of the delay incurred by performing additional tests.

PROBLEM: *During off-hours, other members of the cath. lab. team were not called in until the cardiologist was present and made the decision to go to the cath lab.*

SOLUTION: Contact the cardiologist and cath. lab. team members simultaneously once the EKG interpretation results were available and the patient met criteria for intervention.

Figure 4: 2004 Door to Inflation Time



OTHER APPLICATIONS DEVELOPED USING THE DIVER SOLUTION™: Dimensional Insight's Diver Solution™ software suite has enabled BayCare Health Systems to gain timely insight into clinical outcomes. In addition to the application described above, other applications are being developed to empower management decision makers. These include:

- Management of laboratory orders. Providing insights into lab tests and results will enable, for example, possible transportation delays to be investigated and better cost management by integrating laboratory data with cost accounting data. Other benefits will include more efficient transcription and a more optimal use of IT resources.
- Product line profitability/utilization analysis. This application is used by Clinical Outcomes, Finance, Managed Care, Reimbursement, Decision Support, Materials Management, Risk Management, Medical Affairs and Clinical Managers. In the near future, this application will be enhanced by including charge detail data, enabling profitability analysis at the CPT code and procedure level.
- Patient satisfaction. Analysis of survey results showing patient's satisfaction with physician's care. Used by Risk Management and Clinical Outcomes departments.
- Reimbursement analysis. Using 835 electronic remittance files submitted by payors as a data source, this solution

- will provide timely insights into reimbursements, denials and outpatient (APC) profitability for the first time.
- Denials management. To provide ad hoc reporting on all denied accounts. Ultimately, this may be integrated with the product line profitability application. This will replace the current process that requires IT intervention to build custom reports.
- Risk management. Risk occurrence data will be integrated with event, claim and cost data that will enable analysis of risk service, outcome and cost.
- Physician profiling dashboard. This project is planned to create a dashboard of key indicators, profiling physician outcomes, service, cost and impact on profitability.
- EAD downtime application. To allow simple lookup of medical record numbers when core clinical systems are not available to admissions, registration or other staff.

ABOUT BAYCARE HEALTH SYSTEM: BayCare Health System is a Joint Operating Agreement (JOA) among the Tampa Bay area's leading hospitals, creating the region's only full-service, community owned health care system. BayCare is organized into three Community Health Alliances: St. Anthony's Health Care, which includes St. Anthony's Hospital; St. Joseph's-Baptist Health Care, which includes St. Joseph's, St. Joseph's Children's, St. Joseph's Women's and South Florida Baptist hospitals; and Morton Plant Mease Health Care, an entity providing administrative and certain patient care services for Morton Plant, Morton Plant North Bay, Mease Countryside and Mease Dunedin hospitals. However, Mease Countryside and Mease Dunedin are not themselves part of the BayCare JOA. The number of BayCare team members, including non-hospital team members is approximately 16,000.

LIKE MOST HEALTHCARE PROVIDERS, BAYCARE HAS A LARGE NUMBER OF DISPARATE IT APPLICATIONS THAT PROVIDED THE SOURCE DATA FOR THESE ANALYTICAL TOOLS. THESE INCLUDE:

- ECLIPSYS SUNRISE™ (FORMERLY TSI) DECISION SUPPORT SYSTEM (IBM ISERIES™ OR AS/400™)
- CERNER PATHNET™ LABORATORY INFORMATION SYSTEM (ORACLE)
- CERNER FIRSTNET™ (ORACLE)
- SIEMENS ENTERPRISE ACCESS DIRECTORY™, EAD (DB2)
- SOFTMED CHARTSCRIPT™ AND CHARTFACT LOCATOR™
- QDM PATIENT/PHYSICIAN SATISFACTION™
- IDX IMAGECAST™ RADIOLOGY INFORMATION SYSTEM (ORACLE)
- MEDICARE ANSI 835 ELECTRONIC REMITTANCE FILE

