



Lee Memorial Health System Case Study

The Diver Solution

Increasing Patient Satisfaction & Growing Margins Through Business Intelligence

As a leading not-for-profit community-owned healthcare provider, one of the primary aims of Lee Memorial Health System (LMHS) is to be a vital asset to the Southwest Florida community by providing high quality, cost effective services. This commitment to community goes beyond the facility's walls and the millions of dollars in uncompensated care that is provided to those unable to pay. To achieve this, senior executives at LMHS have an ongoing initiative to increase patient satisfaction, the key driver of profit margins, enabling them to give back more to their community. By partnering with Dimensional Insight, LMHS is able to:

- Increase patient satisfaction by reducing patient waiting time and providing exceptional nursing care.
- Reduce operating costs by increasing bed utilization and optimizing labor costs.
- Increase revenues by maximizing reimbursements.
- Continually improve its business efficiency by spending more time on intelligent analysis of data and less time waiting for detailed analysis of summary data.

Why LMHS Needed Dimensional Insight

As a thought-leader in non-profit healthcare in the United States, LMHS is always striving to improve patient care and the operational efficiency of their business. Dimensional Insight enabled this by tapping into years of accumulated clinical and financial data, providing new and timely

insights into the operation of the business. Many different applications have been developed by a LMHS/Dimensional Insight partnership to empower executive decision makers.

But, why did LMHS turn to Dimensional Insight? Very simply, no other tool than Dimensional Insight's The Diver Solution™ (Diver) would allow it to get true business information to executive decision makers in real-time – and anything other than real-time is a lost opportunity to grow revenue or manage costs. Like most healthcare providers, LMHS has a large number of disparate IT applications to manage both clinical and business operations, including some of the most popular in the industry:

- McKesson/HBOC Trendstar™ has been used for cost accounting at Lee Memorial for approximately 15 years. It has provided a very stable and robust system for transaction processing – accumulating a wealth of information on patient stays and treatments that can be used for cost analysis and budgeting. The platform supporting this application is a proprietary database on Open VMS.
- CliniComp™ is the clinical charting system that's been used for acute care on the Cleveland Avenue and HealthPark campuses for 12 years and, more recently, on the Cape Coral campus. Highly configurable and extensible, the system allows clinicians to record an array of detail about any patient condition; virtually any data that they believe may be relevant. CliniComp™ is supported by both proprietary and Oracle databases and the Linux operating system.

- Siemens Invision™, part of the SMS product portfolio acquired by Siemens, is housed on

About Lee Memorial Health System:

Lee Memorial Health System runs 3 acute care hospitals comprising nearly 1,000 beds, trauma services, obstetric and children services, physician offices, nursing homes and rehabilitation centers throughout Fort Myers and Cape Coral, Florida. More than 5,700 staff, including 830 physicians provide patient care with the support of 2,500 volunteers and auxiliaries. LMHS has excelled, winning numerous awards – ranking among the best hospitals in the nation for cardiac, orthopedic, strokes, and obstetrics. But it does face some unique challenges. For instance, it provides care in one of the fastest growing metropolitan areas in the US. Plus, the region has two other unique patient demographics. First the population almost doubles in the winter months, due to an influx of retirees and sun-seekers. Secondly, it cares for a larger than average – and growing – fraction of the local population dependent on Medicare, Medicaid, or charity. Consequently, LMHS can only thrive by providing the most cost-effective care and maximizing revenue from reimbursement. Dimensional Insight (DI) enables it to do both.



an IBM MVS mainframe with a proprietary database. It supports all patient care functions. Daily downloads are taken from this system to support billing and to track patient movements.

- GEAC Enterprise Solutions™ M Series financials is implemented using VSAM on IBM MVS. This application provides conventional financial applications, such as a general ledger. Summary data from this suite is used for forecasting and planning, plus payroll and human resources applications.

Like many of their peers, LMHS struggled to deliver timely information to decision makers. With over 200 standalone, best-of-breed solutions introduced over many years, distilling the knowledge needed to make strategic business decisions became increasingly difficult. While each individual application may be outstanding at recording the transactions necessary for a given medical or business function, many were conceived before the need to have a truly holistic view of a business was recognized. Many were not designed to share information easily with other applications and are based on several different platforms – including legacy systems such as VSAM and IMS.

In fact, LMHS was so concerned at its inability to garner business intelligence from some operational systems that they were planning to spend several million dollars to replace them. Diver has eliminated this capital expense through a key competitive advantage: The ability to weave multiple disparate data sources – from any application or platform – into coherent knowledge to enable executive decision making. LMHS started building business intelligence applications with Dimensional Insight in November 2002. Numerous applications have already been deployed and some of the most significant are described below.

Reducing Operating Costs And Minimizing Capital Expenditures

One high-profile Diver application at LMHS is “Bedboard,” an executive level view of bed utilization across all 3 acute care hospitals. Adoption of this tool has been driven directly by the VP of Patient Care Services, Davy Crockett, with the objective of maximizing the use of existing facilities – with a resulting reduction

in capital expenditure and staffing costs. The data needed to drive this application is sourced primarily from CliniComp™, providing raw data on admissions, discharges, and transfers. Other data on staffing is sourced from the OneStaff™ staffing and productivity application.

At the highest level, Bedboard provides a summary of bed occupancy at the nursing unit level, showing utilization by shift or by time of day, as well as other metrics. From here, a user can interactively dive through the data, right down to the patient level, identifying who occupied a bed at what time and accessing all related clinical information. This rich picture is updated 3 times a day. Typically, Bedboard is used by nursing managers, the Vice President of Nursing, and the Chief Nursing Officer – in addition to other administrators and decision support staff.

Prior to Bedboard being implemented, optimizing bed utilization was almost impossible. Executives had only a paper report generated from disparate, manually generated data extracted from various sources. By implication, any concerns highlighted in the report had been ongoing for weeks before being recognized by senior management. Additionally, this report provided no view of utilization across multiple disciplines within an entire hospital. Further, the report was highly summarized – and being paper output, it clearly lacked drill-down functionality to access more detailed data. Hence, if more detailed information were required to investigate any apparent trends or issues, additional projects and reports would be required from the decision support group and nursing staff, incurring days of additional delay. In short, decisions on asset optimization were based on old, coarse-grained information.

The powerful Diver application has, however, taken just a few days of work to build and deploy. Yet, executives at LMHS have already gained powerful insights into ways that bed utilization could be tuned by reworking their patient discharge process. With further enhancements planned, it will be possible to obtain real-time snapshots of patient flow throughout the hospital, ensuring that patients are being treated in a timely manner. Not only will this optimize bed usage, but elimination of unnecessary waiting for patients will make a valid contribution to improving patient satisfaction.

An Executive Dashboard

The Chief Financial Officer and Chief Operating Officer, as well as department directors, all have access to “Daily Monitor,” an executive dashboard. Very simply, Daily Monitor pushes the key indicators for the business onto the computers of the most senior executives in LMHS. The key information in Daily Monitor provides both daily and monthly snapshots, including:

- **Financial information:** Revenue vs. budget – month-to-date, year-to-date, compared to the previous year – for example. Inpatient and outpatient revenue is also reported separately.
- **High level performance metrics:** Admissions, discharges and transfers, OB days, newborn days, ER admissions, etc.

Previously, reports containing similar summary information were produced daily, with an individual responsible for collating the information and re-entering it into a simple database application. Now, by using Diver, LMHS can tap the source data in real-time and upper management can dive into the data at will. As an example, it is very quick and simple for executives to discover which doctor has admitted the most patients on any given day, using the total number of admissions as the starting point. Further, Diver has automated the process of updating the reports and posting them to the intranet at LMHS overnight. In this way, new intelligence is immediately available to executives at the start of each business day. The data needed to drive this application is sourced primarily from Siemens Invision™, GEAC Enterprise Solutions™ M Series financials and Microsoft Access™ databases.

The potential is clear. Without Daily Monitor, executives could not measure or manage financial performance against budget to any degree in real-time, as the reports they used completely lacked the depth and flexibility attainable with Diver. Now financial performance can be reviewed daily, enabling immediate corrective action to minimize costs and maximize revenues.

Maximizing Reimbursements Revenues

One project still under development is aimed at growing income by maximizing reimbursement for treatments – while still providing the best possible patient care. Currently, LMHS managers work with reports generated from Trendstar™ to show which treatments were given to specific patients. That treatment data originates from the Siemens Invision™ application and is uploaded into Trendstar™ about 3-4 weeks after month end. With this situation, there is the potential for lost revenue. For example, suppose that a doctor had been prescribing a particular drug for a patient, yet that drug was not eligible for reimbursement by Medicaid (though other similar drugs were). With the current reporting system, that behavior could continue for as long as eight weeks (6 weeks on average) before it was recognized.

By using Diver’s ETL technology, Data Integrator, it will be possible for LMHS to build their first analytical application that directly combines data from both CliniComp™ and Trendstar™. In this way, they will be able to standardize treatment, identifying situations where treatments that are fully reimbursable may be substituted without jeopardizing patient welfare. Ultimately, this application will draw data directly from Siemens Invision™, reducing cycle times still further.

Increasing Patient Satisfaction

Dimensional Insight is assisting LMHS to join the Magnet Recognition Program by demonstrating sustained excellence in nursing. By becoming a “nursing magnet,” LMHS will be able to reap several mutually-reinforcing benefits:

- **Increase patient satisfaction:** The Magnet Recognition Program incorporates the highest quality nursing care, rigorously enforced by standards and measurable quality indicators. To date, only 63 hospitals in the United States have attained Magnet status – and those that aspire to it almost inevitably need to improve their standard of care in some way. Raising care quality increases patient satisfaction.
- **Attract and retain the very best nursing staff:** Increasing patient satisfaction will assist LMHS to face a growing challenge – a shortage of key skilled labor. Nursing magnets are better able to attract and retain the very best nurses. Naturally, a higher quality nursing staff is intrinsically linked to patient satisfaction.

- **Increase profit margins:** It has been empirically proven that customer satisfaction is directly linked to profitability and return on investment. In addition, knowledgeable consumers will seek out hospitals that have achieved Magnet status, sure in the knowledge that they will receive the finest nursing care. Higher profit margins provide more cash to be reinvested in care facilities and to finance charity care.

Diver's initial role in the Magnet Recognition Program is to enable LMHS to report on one of the defined quality indicators, the prevalence of pressure ulcers. To fulfill this quality indicator, LMHS must submit a report once every quarter on the incidence of pressure ulcers within all inpatient facilities. Historically, this has been an incredibly arduous task. On a designated day in the quarter, every patient must be visited and examined for pressure ulcers – that's 700-800 beds. For any ulcer found, 10-12 attributes needed to be recorded – altogether, a very labor intensive and intrusive process.

LMHS did routinely log pressure ulcers in their clinical systems every day. However, despite 12 months of trying, they were frustrated by the fact that they had never been able to extract the data and build the report they needed. The cause of the frustration was the complexity of the data structures created within the clinical recording system. While allowing clinicians the crucial flexibility to record every relevant detail on patients, it also allowed different nursing units to extend the application in different

ways. Reporting on that data was problematic, since related data could not easily be pulled together in a systematic way.

Fortunately, Diver's Data Integrator features a powerful set of manipulators to transform data extracted from multiple sources. In this case, the key was to unrotate the source data. Simplistically, this allows a number of records (say 50) to be manipulated into a single record with 50 fields. Ultimately, a report that LMHS had been unable to build in a year was constructed using Diver's tool set in less than 2 days.

The benefits were immediate. The first time this application was used, it was executed in parallel with the existing reporting method so that results could be validated. As fate would have it, the existing paper report raised concerns about care quality in a particular nursing unit. Ordinarily, this would have required further extensive investigation. However, managers were quickly able to verify the concern using the Diver application and then immediately dive down through the data to establish the root cause of the problem.

Although the ulcer prevalence report need only be submitted once every quarter for the nursing magnet program, LMHS is so thrilled with how easy Diver is to use that it will execute it daily. In this way, staff will be able to identify any potential problems sooner, quickly determine the root cause and take any necessary action. That can only increase patient satisfaction.

About Dimensional Insight

Dimensional Insight, Inc. is a leading provider of BI solutions with our BI platform and family of purpose-built applications. Our data integration, modeling, reporting capabilities, analytics, portals, dashboards, and applications empower users throughout the enterprise to make timely, data-driven decisions. Thousands of worldwide customers choose Dimensional Insight solutions for flexibility, ease of integration, and rapid time-to-value. Dimensional Insight consistently ranks as a top performing BI vendor in customer satisfaction.



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