

## CASE STUDY

**Industry:** Healthcare

**Client:** Columbus Regional Hospital

**Event:** Lean Sigma

## 50 Words or Less

Using the Lean Sigma methodology and DMAIC roadmap, this case study illustrates a project which greatly reduced the cycle time required to discharge patients – from a baseline average of 202 minutes to 115 minutes – while improving patient satisfaction from a baseline of 47.6 percent indicating “Very Good” to 76.0 percent.

# Improving Inpatient Discharge Cycle Time and Patient Satisfaction



Columbus Regional Hospital (CRH) is a 325-bed hospital providing care to a 10-county service area surrounding Columbus, Indiana. CRH offers comprehensive services including acute care, emergency care, surgery, cancer care, birthing center, cardiac services, rehabilitation, a wide range of outpatient services and programs, psychiatric services and wellness services.

Since 2005, CRH leadership has been integrating Lean Sigma performance improvement into the way they do business. Understanding the hospital as an inter-dependent network of departments and activities, the program concentrated on linking and sequencing Lean Sigma projects across the organization.

## Project Background

Patient satisfaction surveys revealed that fewer than half (47.6 percent) of discharged patients rated the timeliness of the discharge process as “Very Good.” A preliminary review of the discharge process revealed that much of the work was being deferred until the day of discharge. An improvement in the discharge process will result in:

- Nursing staff: less time spent on the discharge process, more hands-on time with patients, and more time for personal development.
- Finance: cost savings from decrease in supply costs
- Patients: improved satisfaction with timeliness of discharge process; less wait time in ED for bed availability
- ED/Surgery: increase in surgical and emergency department capacity by providing timely access to inpatient bed; assured continuity of care through prompt transfer to the nursing unit.

The project focused on patients discharged home from an acute care Medical/Surgical floor. The project leader anticipates rolling out the improvements to other areas once results are validated.

The project was managed by a Black Belt following the DMAIC (define, measure, analyze, improve, control) roadmap. A cross-functional team supported the efforts. Classroom training and project mentoring were provided by SBTI.



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By evaluating the quantity produced and the cycle times, it became clear that Step 2 is the bottleneck of the process. This was one initial focus as it is the pacing item in flow of the entire process.

### Measure Phase

The key measure for this process is the cycle time from the physician telling the patient (s)he will be discharged until the bed is available for the next patient. In the baseline period, the average time was 202 minutes.

There are two secondary measures. One is the measure of patient satisfaction as described above. The second is the cost of non-chargeable items (dressings, etc.) sent home with the patient upon discharge. The rate at baseline was \$37.17 per discharged patient with a 20% reduction goal of \$29.74. Multiplied over the number of discharges from the study floor, the projected savings to the hospital from non-chargeable supplies exceeded \$64,000.

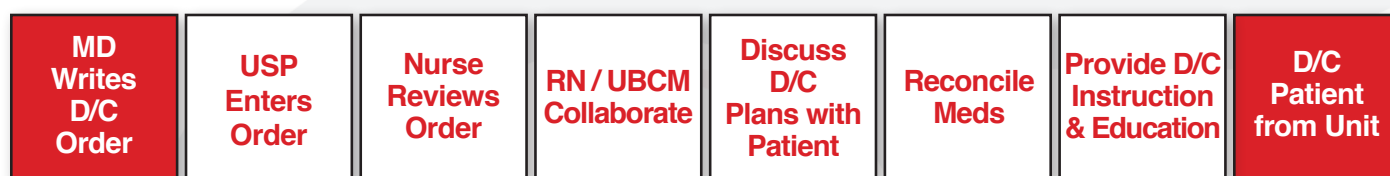


Figure 1 - High Level Process Map

### Analyze Phase

The team used a detailed process map and a Failure Modes and Effects Analysis to further study the process. These helped to identify areas of risk in the process and were used to find possible root causes of failure.

### Improve Phase

Based on the findings, the team revised the discharge process, loading more actions earlier in the patient's stay.

- During Pre-Admission Testing (PAT), surgery patients:**
  - Learn the anticipated discharge date and time
  - Receive pre-printed discharge instructions, including supplies needed at home after discharge and where to purchase them
- During inpatient stay:**
  - Patients with one of five top medical diagnoses receive pre-printed discharge instructions
  - Anticipated discharge date and time is communicated to physician(s), staff, patient, and patient's family (important because the primary reason patients don't leave when ready is because the ride is not available)
  - Nursing ensures education, hygiene addressed before discharge day, the bath being offered to the patient by the evening shift nurse the day prior patients were still assisted with "minor" hygiene care the day of discharge
  - Patients pre-purchase supplies for use at home
- On day of discharge:**
  - Night shift nurse notes any last day education needs
  - Discharge nurse, in "protected" status completes discharge process:
    - Assure medication reconciliation



- Complete discharge instructions
  - Arrange physician follow-up
  - Update PAM
  - Call physicians, if necessary
  - Provide final education
  - Assemble 2 days worth of patient home dressing supplies
  - Attending physician confirms medication reconciliation is accurate
  - Unit Support Partner (USP) assembles discharge packet with:
    - Orders
    - Instructions
    - Prescriptions
    - Face Sheet
    - Portal
  - Care Partner dresses patient and gathers supplies, takes patient to car when ride ready
4. If patient is discharged sooner than expected:
- USP prompts entry of discharge orders
  - The chart is flagged by the attending physician

### Control Phase

A control plan was put in place to ensure that these improvements would continue in the future. Control charts were used to monitor ongoing performance of the key variables. With a highly people-dependent process, the control chart can be an essential tool to verify compliance.

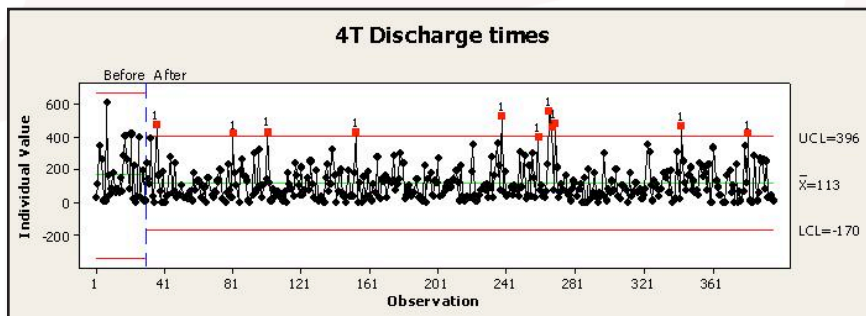


Figure 2 - Control Chart

### Conclusion and General results

Using the Six Sigma methodology and DMAIC roadmap, the project team greatly reduced the cycle time required to discharge patients from a baseline average of 202 minutes to 115 minutes. In addition, within a few weeks of implementing the

changes, patient satisfaction with timeliness of the discharge process improved from a baseline of 47.6% indicating "Very Good" to 76.0%. Finally, the team was able to reach the target of \$29.67 for the cost of non-chargeable items per discharge, resulting in substantial savings to the hospital.

A particularly obdurate issue, waiting on ride time, continues to perplex the team and accounts for most of the variability in current discharge time. The team is working on this issue as well as rolling out the changes to the rest of the hospital.

### References:

1. Wedgwood, Ian. *Lean Sigma: A Practitioner's Guide*. Prentice-Hall: Upper Saddle River, NJ, 2006.
2. Zinkgraf, Stephen. *Six Sigma: The First 90 Days*. Prentice-Hall: Upper Saddle River, NJ, 2006.



### Value Proposition

Recognized as thought leaders and innovators in business process improvements, Sigma Breakthrough Technologies Inc. (SBTI) is a global management consulting firm specializing in the deployment of Six Sigma and Lean methodologies. SBTI delivers innovative and sustainable business process excellence solutions by developing future leaders with core competencies to drive superior top and bottom line results. We advance our clients with best-in-class results in revenue growth, cost reduction, new product development and process improvement.

### What We Provide

SBTI offers a full range of programs and services. These offerings include leadership workshops, asset maximization, strategic planning and assessments, multilevel managerial workshops and specialized “belt” training at the tactical level.

### Results. Guaranteed.

SBTI delivers the fastest and highest return on investment in the industry. Always incorporating a measurement benchmark, most of our clients experience an average of 30X return on investment (ROI) within the first 24 months of engagement.

### Global Resources

Throughout our history, SBTI has demonstrated a track record of quickly responding to clients’ global needs. Our international offerings are handled through regional offices in Latin America, Europe and Asia. Materials are available in English, Spanish, Italian, French, German, Mandarin, Korean and Japanese. Others in process of being translated.

### Our History

Dr. Stephen Zinkgraf, one of the original Six Sigma developers, founded SBTI in 1997. Beginning with two corporate clients, SBTI has grown to more than 50 global corporate deployments and an additional 50 clients using SBTI methodology.

SBTI Executive Directors and Master Consultants have a minimum of 10 years industry experience – some 25 or more. Our international offices provide the same unmatched experience and capabilities as in the states, while offering local language and bilingual instructors. All of SBTI’s consultants have lead multiple waves of training, completed numerous projects and continually mentor Black Belts.



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