PROBLEM STATEMENT

A not-for-profit hospital system noticed that many of its patients were routinely leaving the E.D. without providing complete insurance verification information or making appropriate financial arrangements. This information was critical to ensure a timely and accurate billing process and cash flow.

In addition, the hospital system was only collecting 30% of the charges billed for E.D. patients that were treated and released and less than $300 per day in co-pays.

PROJECT GOAL

The hospital’s goal was to increase the collection ratio to 40% within six months by securing each patient’s financial responsibility information before they were discharged. It sought a clearly defined and consistently applied process to capture this information for every patient, every time.

In addition, the hospital wanted to increase the amount of cash collected from patients at the time of service from $300 per day to $1,200 per day.

BUSINESS CASE

The business case for this project was clear. An eight-week analysis of E.D. gross revenue charges identified that $356,000 was not collectable because of incomplete patient registrations. This translated to an average of $177,000 per month in lost revenue. The collection ratio in the E.D. was 31%, which meant there was a net revenue potential of $55,000 per month ($177,000 x 31%), translating to a potential $660,000 net revenue per year.

The hospital was collecting less than $300 per day in co-pays, with a potential to collect $1,200 per day. Increasing collections by $900 per day would translate to collecting an additional $330,000 per year.

PROJECT

A multidisciplinary project team was selected to improve the billing process in the E.D. The team consisted of representatives from finance, medical staff, legal services, support services, and nursing.

The project scope was unsecured patient accounts. The beginning boundary for the project was the time a patient arrived in the E.D. The ending boundary was when the patient was discharged from the E.D. and financial responsibility was secured.
 DMAIC Process - The team selected the DMAIC process as its improvement method. A Six Sigma DMAIC project is defined as a project that eliminates a chronic problem that is causing patient dissatisfaction, defects, costs of poor quality, or other deficiencies in performance.

Current Process Capability - Using the previous year’s data, the hospital outlined its current process capabilities. There were total charges of roughly $71 million and 65,756 hospital visits. The median billed charge per visit was $1,080. As previously calculated in its eight-week analysis of E.D. gross revenue charges, there were $356,000 in unbilled accounts. This translated to 41 defects per week ($356,000/$1080/8 weeks).

The estimated current process capability was:
- Sigma Level: 3.4 (short term)
- % defects: 3%

The target sigma level was 4.0 or greater, meaning there would be less than one incomplete account per day.

Voice of the Customer and CTQ Matrix - In order for the hospital to appropriately meet the needs of its internal and external customers, it had to accurately measure and understand their issues. Once the key issues were identified, the team translated them into “critical-to-quality” (CTQ) needs.

<table>
<thead>
<tr>
<th>Customer</th>
<th>Voice of Customer</th>
<th>Key Issues</th>
<th>CTQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance/Patient Accounting</td>
<td>“Complete all patient information and secure amount, for every patient, every time. Collect all applicable co-pays.”</td>
<td>E.D. is “porous.” Patients can easily exit E.D. without checking out with registrars.</td>
<td>Patient account information secured and verified before patient leaves E.D. Any applicable co-pays collected.</td>
</tr>
<tr>
<td>Regulators</td>
<td>“Don’t violate patients’ right to be seen for emergency and right to privacy.”</td>
<td>The Emergency Medical Treatment and Active Labor Act (EMTALA) regulations impact what information can be collected before medical screening completed.</td>
<td>EMTALA risk mitigated: Appropriate information collected at appropriate times.</td>
</tr>
<tr>
<td>Ancillary Departments, Medical Consultants, E.D. Coders</td>
<td>Same as Finance/Patient Accounting.</td>
<td>Same as Finance/Patient Accounting.</td>
<td>Same as Finance/Patient Accounting.</td>
</tr>
<tr>
<td>Patients and Family Members</td>
<td>“Treat me first: then ask questions.”</td>
<td>Process that complements the patient care process. Be quick, efficient and accurate.</td>
<td>Collect accurate account information in a way that does not delay medical services or extend the E.D. visit.</td>
</tr>
<tr>
<td>Payers</td>
<td>“Bill us accurately – the first time.”</td>
<td>Patient doesn’t consistently have current insurance card.</td>
<td>Accurate, current insurer/guarantor information.</td>
</tr>
</tbody>
</table>

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COMPANY
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RESULTS
$600,000 and increased E.D. patient flow

TOOLS USED
Six Sigma DMAIC

TIMELINE
Six months

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**Process Design** - After understanding and analyzing its current process maps, the team concluded that:

- The most important element of quick registration was the accurate identification of the patient.
- Bedside registration added to patient wait times. Missed opportunities were occurring when the patients were in the main waiting room.
- Bedside registration did not work well when the patient wait times were minimal.
- Checkout at a patient’s bedside was awkward and inefficient for both patients and registrars.
- The registrar’s toolset did not support bedside registration.
- The registration and checkout processes were highly dependant on the patient care process and patient flow.

**Measure: Cause-and-Effect Diagram** - Using a cause-and-effect diagram, the hospital team identified some of the major factors that were contributing to unsecured accounts. They included:

- **People**
  - Probable root causes included each person’s level of training and experience, possible bad habits, and which registrars were available.
- **Patients**
  - Probable root causes included the severity of the patient’s physical state, as well as their lucidity. Each patient’s primary language was also a factor, along with whether or not he or she had their insurance card on hand.
- **Facility**
  - Probable root causes included the location of the registration station(s), as well as the number of unsecured exits from the E.D. In addition, there was no defined checkout process or location within the E.D.
- **Regulatory**
  - Probable root causes included meeting EMTALA, HIPAA, and JCAHO/CMS requirements.
- **Tools**
  - Probable root causes included the proximity of computers, access to wireless Internet, access to the online eligibility system, and access to Medipac.
- **Process**
  - Probable root causes included inconsistency in registration and the checkout process.

**Measure: E.D. Activity** - The hospital system tracked the total E.D. visits by day of the week and time of the day over an 18-month. It found that patients generally arrived in a predictable pattern, regardless of the day. Peak times were highest on Mondays and lowest on Saturdays. With this knowledge the hospital could appropriately develop staffing patterns that matched patient arrival patterns.

**FMEA** - Failure Modes and Effects Analysis (FMEA) is a tool that identifies possible failures in a process or product. Using FMEA the hospital found that:

- Left Without Being Seen (LWBS) was the primary reason for unsecured accounts. The majority of accounts were not secured because of patients who left from the lobby without being seen. Over a third of the accounts were not secured because the patient left before being checked out.
- Co-pays were being collected on just more than 3% of the patients in the E.D.
The majority of E.D. patients did not have co-pays due. The top three reasons co-pays were not collected were:
1. Self-pay patients were not asked for a deposit.
2. Patients requested to be billed.
3. The hospital was simply not asking.

There was a lack of a defined, consistent checkout process; patients were “escaping” from the E.D. before account information had been collected or verified.

For patients who were seen, the providers or nurses were discharging them before the registrar could return to the room or simply losing track of them after they had seen a provider.

Communication was poor between clinical staff and registrars.

Registrars needed help in knowing when the patient was available to interview and verify information.

There were problems with patient flow; patients were leaving from several exits.

Vital Few Xs - Utilizing Juran’s Pareto Analysis, the hospital team was able to identify the vital few Xs that were contributing to the unsecured patient accounts. They found that:

- Patient activity impacted the unsecured accounts: Higher patient volumes were predictive of a greater number of unsecured accounts.
- Patient flow in the E.D.: There were many ways for patients to exit undetected and there was no defined checkout process. Checkout at a patient’s bedside was inconsistent.
- Collected patient account information was not integrated into the patient care process: Providers were discharging patients without involving the registrars and not telling the registrars when patients were waiting for test results.
- Patients who left without being seen were a major source of unsecured accounts: No attempts were being made to collect registration information for patients who were waiting in the lobby.
- Process was not designed for transparency and self-control: Registrars had no visual cues to know when the process was in control or out of control.

Implementation and Control - Once detail-level designs were created and approved, the project team developed an implementation and control plan that included:

- Bedside registration of emergency patients using wireless data entry.
- Central intake/registration of non-emergent patients (level 3-5).
- A hardwired checkout process where all patients are to be escorted to the checkout desk.
- Integrated clinical care process and registration.
- Visual alerts to improve communication between providers and registrars when patients were available to complete registration.
- Process transparency and operational metric reporting.
- Training for registrars and clinical staff of the process changes and new data collection tools.
- Adding a back-up workstation to the checkout desk for peak periods of patient flow.
- Collecting data on key metrics at the end of every shift.
- Instructing hospital registrars to always ask for co-pays and inform patients of their financial obligation.

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RESULTS
The number of incomplete accounts for patients leaving the Emergency Department declined from 4% per month to less than 1% per month within a six month time frame. This was a statistically significant difference and represented an improvement in the number of accounts the hospital could now bill and expect to collect on.

This meant the hospital had successfully reached its target sigma level of 4.0, meaning there would be less than one incomplete account per day.

The annualized financial impact and increase in collections because of fewer incomplete accounts was $535,000. The improvement in co-pays was an additional $73,000 annually. The total annualized benefit was approximately $600,000.

Other benefits from the Six Sigma implementation included:
- An enhanced checkout experience for patients leaving the E.D.
- All patients directed to check-out.
- Improved patient flow – all patients see a nurse on check-in.
- Improved staffing pattern and assignments of registrars at the hospital.
- More clearly defined roles for hospital personnel.

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