Reduction of Door-to-Balloon Time to 90 Minutes or Fewer for STEMI Patients at Rapid City Regional Hospital (RCRH)

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About Rapid City Regional Hospital

• Located in Rapid City, South Dakota.
• Nonprofit acute care hospital with 326 beds.
• Serves a geographically widespread area (radius of 250 miles).
• Has a cancer care facility and an inpatient rehab facility.
• Provides medical training for family practice medicine.
The Project Team

• Clinical Quality Coordinator (Leader)
• Physicians
• Department Directors (including Emergency Department)
• Hospital Vice President
• Director, Helicopter Transport Service
The Problem

- Rapid City Regional Hospital was not meeting the national standard (reduced from 120 to 90 minutes in 2006) for timely intervention and reperfusion for patients with **ST Segment Elevation Myocardial Infarction (STEMI)**.
- Evidence shows a patient experiencing a STEMI needs balloon angioplasty within 90 minutes of arrival to the emergency department or administration of TnKase, a clot-dissolving drug, within 30 minutes of arrival to open the artery and decrease mortality and morbidity. The prompt actions may be the difference between life and death for the patient.
- Direct percutaneous intervention (PCI) within 90 minutes is the preferred method of reperfusion.
Project Goals

• Key metric for STEMI patients: “door-to-balloon time.”
  – Average door-to-balloon time at RCRH for the first six months of 2006: 132 minutes.

• Goal: Decrease door-to-balloon time for STEMI patients to 90 minutes (national standard) or fewer.
Root Cause Analysis

• Initial data collection and analysis indicated time from arrival at the emergency department door to restoration of cardiac arterial blood flow with balloon angioplasty was considerably longer than desired and recommended for good patient outcomes.

• A number of elements were identified as root causes of delays for this door-to-balloon process, including:
  – Inconsistent application of protocols for STEMI.
  – Lack of order sets and group-page alerts for STEMI.
  – Capability for EKG field transmission (allows calling the STEMI alert from the field).
  – Perceived lack of need for improvement/change.
## Addressing Root Causes

<table>
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<tr>
<th>ISSUE</th>
<th>TOOLS USED</th>
<th>&quot;SOLUTION&quot;</th>
<th>PERSONNEL</th>
<th>TIME REQUIRED</th>
<th>COST</th>
<th>OBSTACLES</th>
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<tbody>
<tr>
<td>Lack of formal mechanism for establishing STEMI alert</td>
<td>Brainstorming, Literature search</td>
<td>Developed and implemented order sets for STEMI, Established Group Page Alerts for STEMI</td>
<td>Personnel representing ED, cardiology, cath lab, quality and communications department</td>
<td>4 months</td>
<td>Minimal (printing of order sets)</td>
<td>Process of introducing new order sets – resistance to change</td>
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<tr>
<td>Inconsistent application of protocols for STEMI</td>
<td>Brainstorming, Literature search, Use of experts</td>
<td>ED and cardiology physician champions involved in educating facilities and personnel, Transparent individual physician peer review process, Reward and recognition program, Placement of synchronized atomic clocks</td>
<td>Personnel representing ED, cardiology, cath lab, quality</td>
<td>Clocks - 1 month, Transparent review process – 5 months</td>
<td>Clocks – approx $1,000, Reward and recognition = approx $1,500</td>
<td>Resistance to change, Inability to accurately and consistently track STEMI times (atomic clocks needed)</td>
</tr>
<tr>
<td>Inconsistent capability for transmission of field data to ED</td>
<td>Brainstorming, Literature search</td>
<td>Emplacement of transmission equipment with the ambulance crews</td>
<td>Personnel representing ED, cardiology, cath lab, quality, EMTs</td>
<td>7 months</td>
<td>Equipment = nominal cost for printer (approx $300), (transmissions are done via Bluetooth and broadband access)</td>
<td>Cost, Resistance to change, ID specific educational needs</td>
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<tr>
<td>Lack of perceived need for improvement</td>
<td>Brainstorming, Literature search, Use of experts</td>
<td>Transparent physician peer review process, Reward and recognition program, ED and cardiology physician champions involved in educating facilities and personnel</td>
<td>Personnel representing ED, cardiology, cath lab, quality</td>
<td>5 months</td>
<td>Reward and recognition (see above)</td>
<td>Resistance to change, ID specific educational needs</td>
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Return on Investment

- Total cost of equipment and supplies ≈ $3,000
- RCRH’s average “door-to-balloon” time fell from 132 minutes in 2006 to 63 minutes for the first four months of 2009, a 52 percent decrease. This put RCRH’s average door-to-balloon time 30 percent below the national standard of 90 minutes.
- Data from July 2005 through June 2008 indicated that RCRH showed a readmission rate for heart attack patients that was 20 percent lower than the national benchmark (source: www.hospitalcompare.hhs.gov).
Monitoring and Evaluating Over Time

- Data are reported for each patient and compiled into monthly summaries.
- A report is sent to all key project participants, keeping them informed of the current status, and is reviewed in the monthly cardiology/emergency physicians staff meetings.
- As indicated previously, the project has been very successful, resulting in a 52 percent reduction in door-to-balloon time for STEMI patients presenting themselves to the emergency department at RCRH.
- RCRH’s current average door-to-balloon time of 63 minutes is 30 percent below the national standard of 90 minutes.
Efforts to Improve Door-to-Balloon Time for STEMI Patients

Efforts to Improve Time to Percutaneous Coronary Intervention (PCI) for ST Elevated Myocardial Infarction (STEMI)

- Concurrent data collection begins
- Clinical Effectiveness Team/Quality Division Initiated
- Reward and Recognition efforts Begin
- STEMI Alert Activation initiated.
- "group page" Report card distribution begins
- Collaboration with outlying hospitals regarding Transfer STEMI's
- Media coverage on STEMI process within a 3 month period. TV News, R.C. Newspaper, and R.C Weekly magazine. (Nov.-Jan.)
- Implementation of Transfer STEMI process to outlying hospitals. (Feb.-May)

* National standard was <120 mins until July 2006 when it became <90 mins.
For More Information

- Learn more about Rapid City Regional Hospital: www.regionalhealth.com.
- More case study presentations are available from the ASQ Healthcare Division: www.asq.org/health/quality-information/library.
- Read healthcare case study articles from ASQ: www.asq.org/healthcare-use/why-quality/case-studies.html.
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