One of the most stressful tasks nursing staffs undertake is administering patient medications. No matter the type of system used—whether highly automated, with sophisticated computer software and bar-code scanners; largely paper based; or some hybrid of the two—administering medications is a complicated process. Nursing staff are under constant pressure to fulfill their medicine administration duties while attending to their other responsibilities. A relatively new variable is the increased involvement of patients and their family members in the patient’s care management. In this spirit of heightened awareness, they ask numerous questions and seek clarifications about the medications, which, while a positive development in the overall care process, further affects the time needed to administer medications. Considering these and many other complicating factors, the medicine administration process lends itself well to a process improvement project.

**OVERVIEW OF THE MEDICINE ADMINISTRATION PROCESS**

Medicine administration can be broken out into five high-level process steps:

1. Prescribing
2. Documenting, transcribing, and verifying
3. Dispensing
4. Administering
5. Monitoring

As shown in Exhibit 1, steps 2, 3, and 4 are those in which nursing staff are most involved. To demonstrate the complexity of this series of steps, Exhibit 1 lists some typical problems or defects that occur in the execution of those steps.
Exhibit 1
Overview of the Medicine Administration Process

Substantial Nursing Involvement

Typical Problems
- Wrong med dose
- Order transcribed incorrectly
- Med stocking error
- Incorrect label
- Med not available
- Missed dose window
- Expired product

1. **Verify**—Confirm medication order accuracy.
2. **Remove medication and verify again**—Remove the medicine from the medicine room and check again for accuracy.
3. **Prepare medication**—Split pills, load syringe, or complete any other necessary preparation to administer it.
4. **Verify against electronic health record (EHR)**—Verify that the EHR is accurate and up to date.
5. **Deliver**—Verify the patient’s identity and administer the medication to the patient.

6. **Document**—Update the EHR to reflect that the dose was given and the patient was educated properly about the medication, adding any notes about the administration activity as appropriate.

Using our Lean Six Sigma tools, the VSA team completed an in-depth analysis of the hospital’s medicine administration process and discovered several opportunities for improvement. To address five of these issues, the hospital created five Six Sigma Green Belt teams each assigned to resolve an issue. Here we present the work of one of those teams, the NO Interruption Team.

**Eliminating Interruptions During Medicine Administration**

Nursing staff were constantly interrupted during the medication administration process, causing a high level of inefficiency (nursing was not meeting its goal of delivering all medication within 60 minutes of prescribed time) and creating a significant risk that distracted nurses would make mistakes in administering medicines. Led by Mary Beth Strauss, director of Magnet and special programs, and Carla Destramp, manager of quality/process improvement programs, the NO Interruption Team was charged with fixing this vexing and dangerous problem. To do so, the team adopted the DMAIC (define, measure, analyze, improve, control) methodology. Following is an overview of the team’s work in terms of its DMAIC approach.

**Define**

The NO Interruption Team crafted a project charter, which outlined the process problems and future objectives as well as project scope and metrics to be tracked. Project charters are essential to completing process improvement initiatives, as they establish a clear and focused approach to the project. The NO Interruption Team charter set the reduction of interruptions during the morning medicine pass (“med-pass”), when the majority of medications are delivered, as its focus. The med-pass activity was defined as a nurse delivering medicine to all of his or her patients during a particular time period, in this case the morning. Each nurse was assigned three to five patients and delivered 10 to 30 medicines during each med-pass.

To further define the issue of interruptions during the morning medication administration routine, the team determined the collective “voice of the customer” (VOC; see the Efficiencies column in the July/August 2012 issue of the *Journal of Healthcare Management* for details on how to gather these data) through interviews and surveys. In this project, the customers were the nursing staff. In collecting the VOC, the NO Interruptions Team found that nurses were very vocal about their concerns with the current process. The team arranged the VOC comments in an affinity diagram, a tool used to organize comments and thoughts into categories (visit the Affinity Diagram page of the ASQ website, http://asq.org/learn-about-quality/idea-creation-tools/overview/affinity.html, for more information about this tool). The
team next constructed a critical-to-quality characteristics (CTQC) tree (Exhibit 2) from the information collected from process stakeholders, along with research data on preventing medication administration interruptions (see, for example, http://www.mindtools.com/pages/article/ctq-trees.htm). The CTQC tree helped the team understand where it should focus its efforts to meet the larger customer requirement: preventing interruptions at peak med-pass time.

**Measure**

For the “measure” portion of DMAIC, the team created a process map detailing the nurses’ current activities during med-pass. As part of the mapping process, it also collected baseline metric data against which to compare future progress and compiled the following information:

- During morning med-pass, nurses were interrupted 93 percent of the time.
- The nurses passing meds encountered an average of four interruptions on every med-pass.

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**E X H I B I T  2**

**Critical-to-Quality Characteristic Tree**

<table>
<thead>
<tr>
<th>Need</th>
<th>Driver How will you do it?</th>
<th>Critical-to-Quality Characteristics What does that mean?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent interruptions at peak med time</td>
<td>Establish time-out “rules” and support</td>
<td>No interruptions time: 8:30 a.m.–9:30 a.m.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No interruptions unless emergency (phone calls, pages, patient inquiries, clinician inquiries)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Define and assign specific roles: RN, CA, AA, and lead nurse</td>
</tr>
<tr>
<td></td>
<td>Buy-in from clinical staff</td>
<td>Get them involved in process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Display baseline interruption data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physician/interdepartmental education</td>
</tr>
<tr>
<td></td>
<td>Education/training</td>
<td>Script for AAs and CAs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Define the handoff to LCN (consider assignment issues)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patient and family brochure/posters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Signage about process/explain time-out</td>
</tr>
<tr>
<td></td>
<td>Create awareness during time-out</td>
<td>Signage explaining it is time-out</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A way to identify a nurse involved in med admin process</td>
</tr>
</tbody>
</table>
The length of time taken up by interruptions ranged from 1 to 25 minutes; the average time per interruption was 6 minutes.

With these data, the team could update its charter to reflect its project goals, as follows:

- Reduce the number of morning med-passes in which interruptions are encountered to 25 percent.
- Reduce the average number of interruptions per med-pass to one.
- Reduce the average time per interruption to one minute.

Many team members thought these improvement goals would be tough to achieve given the ingrained cultural acceptance of current practices. However, the team leadership's research indicated that the goals were achievable, and the NO Interruptions Team adopted them then moved on to the “analyze” and “improve” phases of DMAIC.

**Analyze, Improve**

Using the CTQCAs as a guide, the team analyzed the current med-pass process, outlined its key problems, and proposed potential solutions to those problems. A partial sample of the solution matrix created as part of the analysis is shown in Exhibit 3; it included training for staff regarding how to address physician, patient/family, and other types of clinical interruptions and how to develop signage to reinforce the message about medication pass safety.

One improvement the team recognized was the need to develop a visual tool that alerts all staff and clinical personnel in the area that a nurse is engaged in a med-pass. After several trials, the NO Interruptions Team unveiled the sign shown on the right-hand side of Exhibit 4.

**EXHIBIT 3**

Portion of the NO Interruptions Team’s Problem-Solving Matrix

<table>
<thead>
<tr>
<th>Problem</th>
<th>Ref #</th>
<th>Potential Solution</th>
<th>Who</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interruptions from family</td>
<td>1</td>
<td>Script for AA and CA</td>
<td>CD</td>
<td>3/2/2012</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Signage to alert families and inform</td>
<td>CD</td>
<td>3/10/2012</td>
</tr>
<tr>
<td>Interruptions from MD</td>
<td>3</td>
<td>Script for AA and CA</td>
<td>MB</td>
<td>3/10/2012</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Conversation with MDs</td>
<td>MB</td>
<td>3/10/2012</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Visual alert so MDs know that nurse is engaged in med-pass</td>
<td>CD</td>
<td>3/2/2012</td>
</tr>
<tr>
<td>Lack of standard work</td>
<td>6</td>
<td>Create visual system for nursing</td>
<td>same as #5</td>
<td>3/10/2012</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Document standard work</td>
<td>Team</td>
<td>3/12/2012</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Train nursing and other clinical staff</td>
<td>Team</td>
<td>3/16/2012</td>
</tr>
</tbody>
</table>
Now, when a nurse begins a med-pass, he or she attaches the sign in a prominent place on the mobile med-pass cart (shown on the left-hand side of Exhibit 4). Because the nurses do not always pass meds to each patient consecutively in one dedicated block of time, the time between med-pass activities affords opportunities for questions from colleagues without unintended disruption to the patient med-pass process. Physicians on the floor learned not to interrupt nurses engaged in passing meds (sign up) with nonemergency questions. Most of the time, physicians found, they could get their questions answered by consulting with other nurses who were not conducting a med-pass (sign down) or the lead clinical nurse.

Control
The new process is universally viewed as a success by stakeholders. The clinicians appreciate that a safe and understandable process is now in place to ensure the accurate and timely administration of medications. Patients and families overwhelmingly supported the process once they realized it was developed to improve patient safety and indeed did so.

To ensure the viability and sustainability of the new process, the NO Interruptions Team created a control plan and a rollout procedure for other units at the hospital. A control plan is a tool used to ensure sustainment of an improved process; it outlines critical sustainment activities and metrics that the process owners must address once the project team has disbanded. All nursing units are expected to be following the process by the end of 2012.
After 30 days from the start of the med-pass improvement initiative, the team had made excellent progress toward its goals:

- The number of interruptions per med-pass dropped from four to one on average.
- The percentage of med-passes interrupted dropped from 93 percent to 50 percent.
- The time per interruption dropped from an average of 6 minutes to 0.3 minutes, saving the nursing staff an estimated 15,000 hours of time per year, the equivalent of gaining seven staff members.

**CONCLUSION**
Hospitals that engage staff in the improvement effort can greatly increase efficiency and patient safety. But perhaps the most satisfying results involve the satisfaction the staff derived from the project described in this article. Following are some comments that illustrate the extent of the project’s success.

**RN Perspective**
"Less interruptions makes passing meds more efficient."
"I think if it makes it safer for the patient, it is well worth it."
"People don’t bother me constantly."

**Physician Perspective**
"I didn’t like it at first, but now it is working well, I am able to get my questions answered without interrupting the RN on a med-pass."

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