Using IMPRV to Decrease Door-to-Needle Time in Stroke Patients

University of Maryland Harford Memorial Hospital
Maryland Patient Safety Center
10th Annual Conference
March 21, 2014
Objectives

• Describe the performance improvement “IMPRV” methodology to identify goals, barriers and solutions.

• Describe the rationale of reducing door-to-needle time for IV tPA in acute ischemic stroke.

• Identify potential targets for improving stroke care in the Emergency Department.
David Branch III
VP, Quality & Performance Improvement
University of Maryland Upper Chesapeake Health
Why IMPRV?

- Focus on population health
- Value vs. Volume reimbursement
- Focus on patience experience
- 20,000 incorrect drug prescriptions per year U.S.
- 500 incorrect surgical operations per week
- US Healthcare equates to approx. 18% of GDP
- Healthcare expense is embedded in the good and services we buy (GM reported that healthcare expenditures equate to approx. $1,600 per car)

UMUCH must become the best high VALUE, high QUALITY provider

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**U.S. Spends Much More on Health Care Than 12 Industrialized Nations, but Quality Varies**

The U.S. spends the most per person on health care annually.

- **$7,960** (US)
- **$5,352** (Norway)
- **$2,983** (New Zealand)

**Americans Pay More for the Same Health Care Goods and Services**

<table>
<thead>
<tr>
<th>Country</th>
<th>Most Commonly Prescribed Drugs</th>
<th>Physician Fee for Hip Replacement (Public payer)</th>
<th>In-Hospital Deaths After a Heart Attack Admission (per 100 patients)</th>
</tr>
</thead>
</table>
IMPRoVe is a business process improvement and engagement strategy designed to improve the patient experience and reduce operational waste within UM Upper Chesapeake Health. IMPRoVe is founded upon UCH’s Culture of Excellence and leverages industry leading techniques and tools from PDCA, Lean, Six Sigma, Business Process Reengineering, Project and Change Management disciplines.
IMPRoVe Phases

IDENTIFY
To clearly define the problem state and develop a solid business justification for executive and business sponsorship.

MEASURE
To thoroughly understand the current state of the process and collect sound data on process performance.

PROCESS
To assess and analyze process data for root cause identification of waste and inefficiency.

RE-THINK
To architect a more efficient process and draft full scale implementation plan of improvement solutions.

VALIDATE
To complete solution implementation, ensure process accuracy, and provide comprehensive training for improvement, sustainment and ownership.

Identify and Implement Kaizens & Quick Improvements when Possible

Helping SMART People Solve HARD Problems
Helping SMART People Solve HARD Problems

Standardization Approach

Consistent Toolkit

Capability Building

Best Practices

Consistent business engagement and methodology for improvement

Leverages both internal operating systems and industry best practices

Provides a mechanism for driving continuous improvement business principles enterprise-wide

Standard enterprise-wide Process improvement tools and templates
Project Management

The planning and organization of an organization's resources in order to move a specific task, event, or duty toward completion. According to the Project Management Institute, the processes are guided through five stages: initiation, planning, executing, controlling, and closing.

Change Management

Change management is the process of supporting Team Members impacted by a change from CURRENT state to a desired FUTURE state. The IMPRV methodology is focused on team change:
1. Readiness
2. Response
3. Reinforcement

Problem-Solving

Providing the critical thinking skill sets to analytically solve problems in a standardized approach. Utilizing data driven analysis to understand the root causes and factors for process inefficiency and failure.
Value Impact

Customers
(Better, Faster, Greater Value)

Culture
(The Way We Work)

Capability
(Tools & Methodology)

Performance Improvement is a Process, Continuous Improvement is a Mindset

Helping SMART People Solve HARD Problems
Barb Cysyk, BSN, RN, SCRN
Manager, Primary Stroke Center
Case Study

• 56 yr. old male, originally from Russia
• Working as an engineer when found by his manager at 9:35am to have difficulty talking.
• 911 called
• Arrived at UM HMH, awake with expressive aphasia, dysarthria and right sided facial droop.
• VS: Afebrile, BP 170/90, P= 88, Resp = 16, Finger Stick Glucose =144
• After contacting patient’s work, time last known normal was 7:40am when he was talking to a co-worker.
• No significant past medical history except former smoker
• Head CT is negative
• NIH Stroke Scale = 4
Stroke

- Fourth Leading Cause of Stroke in U.S.
- Leading Cause of Adult Disability
Tissue Plasminogen Activator (tPA)

- tPA is the only FDA approved treatment for acute ischemic stroke
- A synthetic version of one of the body’s natural molecules that break down blood clots

Gadhia J et al. Stroke. 2010;41:300-306
Tissue Plasminogen Activator (tPA)

- Less than 5% of stroke patients receive tPA
  - Must be given within 3 hours (or 4.5 hours) of stroke onset
  - Patients often delay seeking care
  - Concern over bleeding
  - Overwhelming number of tasks required prior to administration
Tasks Required Prior to tPA Administration

- Triage
- Registration
- Room Assignment
- Notification of Stroke Team
- EMS report
- Finger stick for glucose
- History (locate witness)
- Physical
- Nursing Assessment
- Medication Reconciliation
- NIH Stroke Scale
- Draw blood for labs
- Head CT

- Apply telemetry leads
- Insert two IV lines EKG
- Obtain actual weight
- Radiologist to read CT and call ED physician
- Lab to post result
- Neurology consult
- Exclusion checklist completed
- Patient/Family Education regarding stroke and risk/benefit of tPA
- Order tPA
- Calculate tPA dose
- Pharmacy to mix and deliver tPA
- Time out
“Time Is Brain”

• Every minute the brain loses 1.9 million cells*
• Lower in-hospital mortality was associated with faster tPA administration **
• Symptomatic ICH is lower when receiving tPA < 60 min**
• Improved functional recovery ***/

*Saver J, 2006  
**Forarrow, 2011  
***Lansberg, MC, 2009
Target Stroke Initiative

Goal:
Achieve a Door to Needle (DTN) Time within 60 minutes in at least 50% of ischemic stroke patients treated with IV tPA
Conclusion: Hospitals with higher volumes of thrombolysis activity achieve statistically and clinically significant shorter delays in administering tPA to patients after arrival in hospital. Stroke. 2013, 44

UM HMH’s Ischemic stroke volume is 100/year. tPA volume is 15/year.
Putting IMPRV to Work

Judi Webster, BSN, RN
Performance Improvement Manager and Patient Safety Officer
Identify Phase

Percent Receiving tPA within 60 min.
Jan 2011-Oct 2012*

*Get With the Guidelines-Stroke Registry, Outcome, A Quintiles Company
Identify Phase - The “meeting before the meeting”

Let's have a little premeeting to prepare for the meeting tomorrow.

Whoa! Do you think it's safe to jump right into the premeeting without planning it?

Okay, let's get this preliminary premeeting meeting going.

You think you're funny, but you're not.
Identify Phase

- Include frontline who regularly use the process
  - EMS
  - ED Docs
  - Lab
  - Pharmacy
  - Nurses
  - Nurse Techs
  - Imaging
  - Unit Secretary
  - Patient Access

- Meeting Prep Work
  - Assign “Homework”
Measure Phase

- Defined Key Metrics
  - “Door Time”
  - “Needle Time”
- Agreed on Key Metrics to Determine Success
  - Mean and Median of all tPA patients
  - Percentage achieving goal of \( \leq 60 \text{ min.} \) (AHA/ASA)
- Identify steps and processes critical to patient care
  - Developed “Current State” map
Mapping the Current Process
Process Phase

• Identify “Waste”
  – EMS communication
  – Re-draw Labs in ED
  – CT Scanner availability
  – Patient to ED stretcher, undress, monitor, draw labs, then to CT; unhook monitor, etc
  – Pharmacy delay in mixing tPA; must be hand-carried to ED from 6th floor
  – Accurate weights not obtained at admission
  – Delay in processing Pink Stroke Labs
Stroke Process Flow

BEFORE

Patient Flow

Phone Call
• **Mapped New Process**
  - EMS call Dispatcher from scene, Dispatcher calls ED with ETA
  - Patient Access meets at door for essential information
  - Patient directly to CT after quick assessment by MD (never leaves EMS stretcher)
  - Transfer to ED stretcher after CT, use stretcher with built-in scale, already zeroed and use Hoover matt
  - Use labwork drawn by EMS
  - Unit Secretary hand-carry labs
  - Developed process for Walk-Ins
• Concerns about Safety with Cutting Time
  – EMS tied up longer with transport to CT
  – Continue with Actual Weights
  – Pharmacy continue to mix tPA
  – Inclusion/Exclusion Checklist
  – Obtaining Consent
  – Time out procedure
TARGET STROKE:
ED Charge Nurse:

1. Receive call from EMS red phone or “box” alerting of possible stroke
2. Call Switchboard at X3333 to announce:
   “EMS Stroke En Route _____ min. ETA”.
3. (If Walk-in—“Stroke on Site”)
4. Switchboard Operator to page facilitator to X5500
5. Notify Triage and MD
6. US to notify CT of ETA. Select Lab Order Labels to Print in Lab
7. Take ED Stretcher, hover mat and monitor to CT hallway
8. “Zero out” Stretcher
Re-Think

– EMS Medical Director for Harford/Cecil Counties on Team
– EMS Supervisors on Team
– All disciplines on Team, both leadership and frontline representation
– Use of Stroke Facilitators
Re-Think

- Education
  - EMS
    * Blood Draws
    * Last Known Normal
    * Notification of Dispatch
  - Directly Involved Departments
    * Process changes
    * Overhead announcement
  - All TM
    * Overhead announcement
Outcomes

Time Saved = 38 min
p = <0.01

Boxplot of Door to tPA Time

Pre-IMPRV
n=19

Post-IMPRV
n=16
Percent Receiving tPA within 60 min.
Nov 2012-Sep 2013

U.S.: 57%
Maryland: 56%
89%
Outcomes

- Did cutting time result in increased bleeding complications?
  - Nov 2013-Jan 2014
  - 19 tPA administrations
  - 0 cases with ICH

- What was the cost to implement the new process?
  - No additional cost except for time in 3 committee meetings
Validate

Post Process Meeting
• Revised Lab Delivery
• Hard Wired
• Success breeds success
• New Process at UM UCMC
• Share Data with EMS/ED
Case Study

-10 min

Patient Arrives

10 min

Door to CT Results in 20 min

20 min

30 min

Door to tPA 45 min

CT: Negative for Blood
Labs: Glucose= PLT= 203K INR =1.0
Neuro Consult: No exclusions for tPA
Case Study

- SLP Consult: Mild dysphagia, expressive and receptive aphasia
- NIH Stroke Scale = 3
- Started on ASA, Statin
- Transferred to Acute Rehab.
## Case Study

### Rankin Scale

<table>
<thead>
<tr>
<th>Post Stroke Time Period</th>
<th>Rankin Scale</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>3</td>
<td>Moderate Disability</td>
</tr>
<tr>
<td>12 months</td>
<td>2</td>
<td>Slight Disability</td>
</tr>
</tbody>
</table>
Sustainability

DTN by Case

Door to Needle Time (min)

01/11/11 02/12/11 03/13/11 04/14/11 05/15/11 06/16/11 07/17/11 08/18/11 09/19/11 10/20/11 11/21/11 12/22/11 01/23/12 02/24/12 03/25/12 04/26/12 05/27/12 06/28/12 07/29/12 08/30/12 09/30/12 10/31/12 11/30/12 12/30/12 01/31/13 02/28/13 03/27/13 04/26/13 05/25/13 06/24/13 07/23/13 08/22/13 09/21/13 10/20/13 11/19/13 12/18/13 01/17/14

Goal

New Process
Conclusion: Hospitals with higher volumes of thrombolysis activity achieve statistically significant shorter delays in administering tPA to patients after arrival in hospital.
Karen Mercaldo, ERDD
Laura Nengel, Pharmacy
Erin O’Donnell, RN, ED
Michelle Preston, Manager, ED
Diane Stevens, Lab
Judi Webster, PI/PSO
Gail Wilson, Lab
April Workman, ED Secretary

• Barb Cysyk, Stroke
• Bob Dodsworth, Nursing Admin/AC
• Linda Dousa, EMS
• Alisha Eggleton, Nursing ED Tech
• Robin Flight, Patient Access
• Mike Giordano, Emergency Medicine
• Pam Handshoe, Communications
• Jane Holcomb, Imaging
• Angie Johnson, IT
TEAMWORK

Coming together is a beginning. Keeping together is progress. Working together is success.

Henry Ford