Informatics & Technology for Quality & Safety

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Department of Radiology
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Hampton Symposium - March 25, 2016
Disclosures

Cook Medical Inc.
Best Doctors Inc.
Evolution in Quality & Safety

Hippocratic Oath:

“I will take care that they suffer no hurt or damage.”

http://wellcomeimages.org/indexplus/
Quality & Safety 2016

- Hospitals have to report on quality metrics.
- Quality metrics are tied to reimbursements.
- Licensing Boards require QI projects to show personal commitment.
Door to CT Scan: Median Time

MGH and Comparison Aggregate Data: This Get With The Guidelines (GWTG) Aggregate Data report was generated using the Outcome™ PMT® system.

Copy or distribution of the GWTG Aggregate Data is prohibited without prior written consent of American Heart Association and Outcome Sciences, Inc. (Outcome).

MGH and GWTG Data Report: June 23, 2014
While you were eating, CMS updated Medicare quality strategy

By NEIL VERSEL

Linking quality to payment

Medicare is changing the way it pays hospitals for services provided to people with Medicare. Instead of only paying for the number of services a hospital provides, Medicare is also paying hospitals for providing high quality services.

The Centers for Medicare & Medicaid Services (CMS), the federal agency that runs Medicare, is changing the way Medicare pays for hospital care by rewarding hospitals for delivering services of higher quality and higher value.

NOTE: To make decisions about where to get care based on measures of quality and efficiency, go to the Hospital Compare home page and start a search. This section provides information about how hospitals
Anatomy of a Quality Improvement Effort

From a review of some of the more than 500 examples from the Portfolio Program, here are the attributes of successful and relevant QI efforts.
Quality & Safety

Health Care Spending
Can You Improve Quality at Lower Costs?
NASA Budget as a Percentage of Federal Budget

Calendar Year

Percentage of Federal Budget
# Mars Missions

<table>
<thead>
<tr>
<th>Year</th>
<th>Mission</th>
<th>Cost (1997 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>Viking Missions</td>
<td>$3.5 Billion</td>
</tr>
<tr>
<td>1990</td>
<td>Can you develop a spacecraft within 3 years</td>
<td>&lt; $150 million</td>
</tr>
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</table>
Faster - Better - Cheaper
How Did They Do It?
Faster-Better-Cheaper in Healthcare?
ITQS Lab Mission

To improve patient safety and care quality through small pilot projects that incorporate informatics and technology.
ITQS Projects

1. CADI
2. Immersive Reality Training
CADI
Hospital adoption of EHR systems has increased more than five-fold since 2008.

Figure 1: Percent of non-federal acute care hospitals with adoption of at least a Basic EHR system and possession of a certified EHR: 2008-2013
Topol: Doctors Are Getting Squeezed

Eric J. Topol, MD | Disclosures
February 18, 2015
Hospital replaces EHR with new, efficient “paper chart” system
Improve Access to the EHR
Why Not Use Voice?
CADI = Voice + EMR
CADI
(Clinical Assist Decision Interface)
CADI: combines a mobile device, EHR, and voice - an intelligent clinical assistant
#mobilehealthhack

Winner
“MGH Favorite”
2014 MGH-MIT-Samsung Hackathon
Biggest bang for the buck?
Hard Stop
Time Out
Is this the correct patient?

My Gosh! Did anyone check his allergies?

Hmm... Are you sure the tumor was on the left?

Pssst... I hope platelets were fine
I think the Platelets are > 50k...

I hope the fellow is correct.
### Standard Paper vs CADI

<table>
<thead>
<tr>
<th>Variable Measured</th>
<th>Standard UP Hard Stop N=96</th>
<th>CADI Hard Stop N=105</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Stop Duration (sec)</td>
<td>47.39 (15-151 sec)</td>
<td>89.07 (60-143 sec)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Demographics Confirmed</td>
<td>100% (96/96)</td>
<td>100% (105/105)</td>
<td></td>
</tr>
<tr>
<td>Procedure Confirmed</td>
<td>96.8% (93/96)</td>
<td>96.1% (101/105)</td>
<td>p=0.791</td>
</tr>
<tr>
<td>Site Confirmed</td>
<td>36.4% (35/96)</td>
<td>58.1% (61/105)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Laboratory Values Verbalized</td>
<td>8.3% (8/96)</td>
<td>100% (105/105)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Anti-coagulation Medications Verbalized</td>
<td>3.1% (3/96)</td>
<td>90.4% (95/105)</td>
<td>p&lt;0.001</td>
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<tr>
<td>Allergies Verbalized</td>
<td>90.3% (84/96)</td>
<td>98.1% (103/105)</td>
<td>p&lt;0.003</td>
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<tr>
<td>Specimens to be sent Verbalized</td>
<td>19.7% (19/96)</td>
<td>95.2% (100/105)</td>
<td>p&lt;0.001</td>
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</table>
More than just a pretty voice

- Electronic Checklist – update clinical checklists from the cloud.
- Data Analytics - monitor compliance with high accuracy and less overhead.
Quantifying Time-Outs

<table>
<thead>
<tr>
<th>DATE OF RETRIEVAL</th>
<th>3/1/15 [SIMULATED]</th>
</tr>
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<tbody>
<tr>
<td>NAME</td>
<td>MONTH</td>
</tr>
<tr>
<td>Peter Chan, MD</td>
<td>NOV</td>
</tr>
<tr>
<td></td>
<td>DEC</td>
</tr>
<tr>
<td>Larry Chapman, MD</td>
<td>JAN</td>
</tr>
<tr>
<td></td>
<td>FEB</td>
</tr>
<tr>
<td>Melissa Gleason, MD</td>
<td>NOV</td>
</tr>
<tr>
<td></td>
<td>DEC</td>
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<td></td>
<td>JAN</td>
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<tr>
<td></td>
<td>FEB</td>
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<tr>
<td>John Goode, MD MSc</td>
<td>NOV</td>
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<td></td>
<td>DEC</td>
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<tr>
<td>Martha Harris, MD</td>
<td>NOV</td>
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<tr>
<td></td>
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<tr>
<td>Steve Hippi, MD PhD</td>
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<tr>
<td></td>
<td>DEC</td>
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<tr>
<td>Gloria Salazar, MD</td>
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<tr>
<td></td>
<td>DEC</td>
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<tr>
<td>Lisa Stehle, MD PhD</td>
<td>NOV</td>
</tr>
<tr>
<td></td>
<td>DEC</td>
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<tr>
<td></td>
<td>JAN</td>
</tr>
</tbody>
</table>

![Graphs showing time-out rates for Raul Uppot, MD and Peter Chan, MD.]
“This is Ms. Jane Doe. Medical Record Number 123456. Date of Birth March 16, 1965. Touch ‘Yes’ to Confirm”
Immersive Reality Training
Current Medical Training

Lectures
Textbooks
Rotations

“Hands-on” learning on Real Patients
Is there a role for immersive simulation in IR training?
Virtual Reality Is Coming to Medical Imaging

Thanks to new equipment, doctors can see, and feel, a body in entirely new ways. WSJ's Amy Westervelt explains what happens when medical imaging meets virtual reality. Photo: EchoPixel
Study of Immersive Reality in Interventional Radiology

1. Record IR Procedures
2. Play back procedures to trainees and staff
3. Survey participants
Recording
360 Video
Methods

12 participants
- 6 Attendings
- 5 Fellows
- 1 Resident
How do you rate your experience?

- Excellent
- Good
- OK
- Poor
- Very poor

Rating scale:

0 1 2 3 4 5 6

- Very poor
- Poor
- OK
- Good
- Excellent
Will immersive virtual reality modules complement current IR training methods?
Participant Comments

- Motion sickness
- Need to incorporate radiology images
- Interactive content
Future Directions
Future Directions

1. Formalized addition to the IR orientation

2. Embedded questions and answers to engage user

3. Expand to include “advanced” procedures – i.e. Y-90 setup and handling
"I’d prefer a win-win solution — but I’m open to just a win."
QUESTIONS?