Paradigm for Quality Improvement in Imaging Services

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Objectives:

- Describe the imaging services value chain
- Explain why an information service model is superior to a professional service model in delivering high value care to patients
- Describe the standardized medical content specifications that will be created and implemented in Intermountain Imaging Services quality improvement projects
What is Value?

• Relative worth, merit, or importance.
• The worth of something in terms of the amount of other things for which it can be exchanged or in terms of some medium of exchange.
What is Quality?

• An essential or distinctive characteristic, property, or attribute:
• Character with respect to fineness, or grade of excellence
How does value relate to quality?

• If we were to differentiate between quality and value, we would be surprised to find that it is the customer who defines value of a product by making an analysis of the performance of the product relative to its cost.

• On the other hand, quality of a product is always in the hands of the organization and it depends upon the ability of a company to provide a product that gives a performance that customer is seeking.
Who are our customers?

- Patients
- Referring physicians
- Payers
- Hospital administration
- Departments
How do we measure quality and value of our services and products?

- We do it poorly, quality and value are often assumed.
- Our failure to document improvement in patient outcomes profoundly weakens the value of our services and could ironically have strongly negative impacts on the well-being of patients.
Radiologist Professional Services Performance Dashboard

- Turnaround Time
- Call Coverage
- Critical Findings Compliance
- Voice Recognition
- Peer Review
- Subspecialty Expertise
Measurement: We can do better

**World's hottest**

In India's Assam state, a home-grown chili pepper called bhut jolokia — known as 'ghost chili' — is gaining popularity. It could spice up the economy as well.

**Taking measure**

The heat value of a pepper is measured in Scoville units by calculating its content of capsaicin, the chemical that 'heats' a chili.

<table>
<thead>
<tr>
<th>Pepper</th>
<th>Scoville units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhut jolokia</td>
<td>1,001,304</td>
</tr>
<tr>
<td>Red Savina habanero</td>
<td>580,000</td>
</tr>
<tr>
<td>Thai Hot</td>
<td>60,000</td>
</tr>
<tr>
<td>Jalapeno</td>
<td>2,500-8,000</td>
</tr>
<tr>
<td>Tabasco sauce</td>
<td>2,500-5,000</td>
</tr>
</tbody>
</table>

**NOTE:** Approximate figures

SOURCES: Chili Pepper Institute, New Mexico State University
A value chain is a chain of activities that a firm operating in a specific industry performs in order to deliver something valuable (product or service). Products pass through activities of a chain in order, and at each activity the product gains some value.
Radiology’s Value Chain

Dieter R. Enzmann, MD

A diagnostic radiology value chain is constructed to define its main components, all of which are vulnerable to change, because digitization has caused disaggregation of the chain. Some components afford opportunities to improve productivity, some add value, while some face outsourcing to lower labor cost and to information technology substitutes, raising commoditization risks. Digital image information, because it can be competitive at smaller-economies of scale, allows faster, differential rates of technological innovation of components, initiating a centralization-to-decentralization technology trend. Digitization, having triggered disaggregation of radiology’s professional service model, may soon usher in an information business model. This means moving from a mindset of “reading images” to an orientation of creating and organizing information for greater accuracy, faster speed, and lower cost in medical decision making. Information businesses view value chain investments differently than do small professional services. In the former model, producing a better value chain leads to better business outcomes.
“A basic question posed by Peter Drucker, a management consultant, is: “What business are we in?”

For radiology, is it “read images” or “create information”?

A professional service emphasizes read images. A radiology information business emphasizes create information.”

Enzmann
Imaging Value Chain: Professional Service Model

- Communicate
- Problem
- Order
- Schedule
- Prepare
- Protocol
- View
- Report
- Image

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Disaggregation

Figure 1: Top: Illustration of links in the radiology value chain in its simplest form. The components are image acquisition, radiologist “read” images, report, and medical decision. It represents the classic professional service model and relies primarily on professional fees although technical fees can be included. Bottom: Illustration of disaggregated links. Disaggregation of image acquisition into three components is as follows: image acquisition, image processing, and image analysis. The radiologist “read” images box is deconstructed into the following components: search, characterization, interpretation, and integration. Disaggregation provides greater insight into potential areas of value creation, productivity improvement, and commoditization. This disaggregation is more representative of the “information business model,” which encompasses both professional and technical fees.
“Disaggregation challenges the "centralized" foundation of radiology’s business model and reveals candidates for outsourcing, a feared forerunner of commoditization. It can also reroute disaggregated components onto faster technological improvement trajectories, hastening the disruption.”

Enzmann
“Given radiology’s historical dependence on centralization and large economies of scale, decentralization is potentially disruptive to the large physical department paradigm. Consequently, there is consternation about the risk of commoditization, which may follow the decentralization-to–lower-cost sequence appearing in US. Professional services decry lower prices; information businesses leverage them.”

Enzmann
Disruptive Innovation

- Businesses that hold firm to old business paradigms struggle and potentially fail when the paradigm shifts. The paradigm in medicine is shifting rapidly and radiologists that hold firm to the professional service model will find themselves competing in a commodity marketplace.
No “U” Turn
Marketing

• Important, but not going to solve the problem
“Recalling that the raison d’être of radiology is to answer a clinical question, it has a better chance of thriving by centering on the idea of creating actionable information for decisions, rather than on the narrower focus of reading images.”

Enzmann
“In information businesses, radiologists become accountable for more of the value chain than reading images.” Enzmann

“Diagnostic radiologists should take on the challenge of becoming accountable for the entire imaging value chain.” White
Imaging Value Chain: Information Service Model
• The Radiology value chain is only a part of a larger comprehensive value network.
• Radiology processes must be optimized in the context of this health care value network.
• The profit paradigm for this global value network is changing rapidly… radiology is in most places tagging along or being left behind.
“In addition to Kaiser Permanente in California – Intermountain Healthcare in Utah, Geisinger Health System in Pennsylvania, Via Christi Health System in Kansas, and the massive Veteran’s Health Administration are among the institutions that have the scope to create within themselves a new disruptive value network.”

Christensen
Three Key Disciplines

Clinical Medicine

Technology – IT

Business
Imaging Operational Value Chain Analysis

- Assessment
  - Request Study
    - Schedule Study
      - Prep Patient
        - Protocol Study
          - Patient Arrives
            - Images Acquired
              - Interpretation
                - Results Communicated
                  - Billing & Coding
Assessment

Input
- Patient
- Prior Images
- PT History
- Physical Exam
- Appropriateness Criteria

Process
- EMR/EIA Review
- Patient Assessment
- CPM
- +/- Radiology consultation

Output
- Context
- Key Questions
- Imaging Request (exam, reason, special needs)

Value Metrics
- Right request
- Appropriateness Score
- Requests for radiology consult

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Order

Input
• Right Request

Process
• Manual request (fax, hand delivered)
• Electronic (4medica, HELP2, CPOE, Medicity)

Output
• Accurate Order

Value Metrics
• Exceptions
• Operational Errors
Schedule

Input
- Right Order
- Pt Preferences
- Payer
- Standard Prep
- Tech Exam Specs

Process
- Pre-Auth
- Registration
- FAIR
- Communication
- ID Special Needs

Output
- Scheduled Exam
- Pt Education
- Provider Notification

Value Metrics
- Pt Pref ?
- Time required
- Accurate Billing Info.
- Adequacy of Prep
- No-show rate
Arrive – Pre imaging

**Input**
- Prepped patient
- Appropriate scheduled event
- Appropriate order
- Standard prep

**Process**
- Patent checks in and verified
- Arrived in RIS, Tandem, Dig
- Order verified
- Tech notified
- Assessment
- Forms completion
- Patient taken to changing room
- Final preparation
- Tech reviews history sheet/labs
- There is ambiguity and variability in the process portion.
- Patient wait time

**Output**
- Patient prepped and ready
- Pre documentation complete
- Staff/equipment ready

**Value Metrics**
- Arrive to begin time
- PPQ
- Accuracy/completeness of documentation
- Reschedule rate
- Pt. wait time
Protocol

**Input**
- Ready Pt
- Imaging Protocols

**Process**
- Identify Protocol
  - Automatic
  - Manual
  - Radiologist input

**Output**
- Completed imaging plan

**Value Metrics**
- Protocol errors
- Pt Satisfaction
Acquire Images

Input
- Patient
- Equipment
- Standard imaging protocol

Process
- Patient consent obtained
- Begin exam in RIS
- Verify patient ID
- Time out
- Administer contrast/medication
- Acquire images to modality
- Intra-procedure documentation
- Post processing
- Send images to PACS
- Verification that images arrived in PACS
- Image QA +/- radiologist
- Final documentation
- Complete in RIS

Output
- Images available in PACS
- Complete documentation available

Value Metrics
- Image quality
- Repeat analysis
- # patients rescheduled
- Procedural complications
- PPQ
- Procedure completion time
- Time images complete to time available
- Tech hours/RVU
- Radiation exposure
- Documentation compliance
**View - Interpret**

**Input**
- Images
- Order
- Documentation
- Clinical context

**Process**
- Review history
- Review images
- Compare priors
- Review literature
- Access reference documents
- Make diagnosis/interpretation
- Prepare report
- QA images
- Sign report +/- transcription
- +/- consultation (peer)
- +/- over reading

**Output**
- Report
- Key questions answered
- Tech QA
- Annotations
- Key images

**Value Metrics**
- Percentage self edit
- Percentage subspecialty reading
- *Accuracy/completeness
- Relevancy of report (key answers)
- Turnaround time
- RVU productivity
- Consultation frequency
- Frequency of over reading
Communicate Results

- **Input**
  - Complete report
  - Complete exam
  - Communication standards
  - Critical findings
  - Call reports
  - Physician preference
  - Physician contact information
  - Patient preference

- **Process**
  - Communicate to
    - Patient
    - Referring physician
  - Modes
    - Electronic
    - Phone call
    - Personal
    - Manual/mail
    - Manual/mail carrier

- **Output**
  - Right report communicated to right person

- **Value Metrics**
  - PPQ
  - Referring physician office satisfaction
  - Discrepancy rate
  - My Health Report use
  - Lost reports
  - Call requests for clarification
Code and Bill

**Input**
- Correct exam performed
- Correct RIS documentation
- Correct radiologist report
- Exam status
- Insurance verification

**Process**
- Complete billing process in RIS
- Accurate transfer of RIS data to I series
- Document appropriate charges
- IR documentation
- CPT

**Output**
- Billable exam

**Value Metrics**
- Adequate billing information derived from report
- Claims denied
- Revenue
- I series exception report
Goals

• Using the information service paradigm to optimize the imaging value chain for core operational processes.

• Apply core medical processes to the value chain to optimize clinical quality and value.
Medical Process Optimization

- Required Content
  - Context definition(s)
  - Key question(s)
  - Appropriateness criteria
  - Standardized prep
  - Standardized imaging protocol(s)
  - Standardized report content (template)
  - Synoptic elements
  - Reference materials
  - Communication protocol
  - Quality/Value metrics
How will we assure quality and value?

- Assume quality and value?

Measure
Measurement tools

- Structured report data
- Manual data input
  - Peer review
  - Tech review
  - Events/complications
- Surveys
  - PPQ
- Audits
- Medical outcomes
- Cost analysis
Challenge

- Let’s commit to the information service model.
- Let’s commit to make standardization, measurement, and improvement fundamental properties of our system.
Plug

• Consider enrolling in Intermountain’s ATP (Advanced Training Program for Health Care Delivery Improvement) course.

• http://intermountainhealthcare.org/qualityandresearch/institute/courses/atp/Pages/home.aspx