

VALUE OF MEDICAL PHYSICISTS TO HEALTHCARE

AN ICONOCLASTIC ADMINISTRATOR'S PERSPECTIVE
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UNDERSTANDING VALUE

$$\text{Value} = \frac{\text{Quality}}{\text{Cost}}$$

PRODUCTION PROCESS QUALITY

- ACCESS
 - Scheduling: Flexibility, Ease, Time
 - Lead Time, Proximity/Convenience
- PLANNING
 - Communication: Appointment Confirmation, Directions
 - Prep: Instructions, Compliance
- CARE EPISODE
 - Pt Exper: Waits/Delays, Overall Care, Response to Concerns
 - Safety: Influenza, Hand Washing, Codes, Falls
 - Hospital Acquired Conditions: Radiation Exposure, Infections, Allergic Reactions,
 - Process and Human Errors: Inadequate Procedures, Medication Errors, Blood type errors, Hospital Readmissions

PRODUCTION PROCESS QUALITY

- Documentation & Reporting
 - Timeliness
 - Pre-existing conditions
 - Accuracy
 - Clarity: Use of Structured Reporting, Referring Provider Satisfaction
 - Communication: Critical Findings, No Patient Left Behind!

ACR – SCARD - AAARAD



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Imaging Physics Quality

Image Quality

- Look at the contrast on that thing
- The contours are so well defined
- The gray levels are exquisite
- You can even see texture

Quality Control

- Performed 200 QC checks today alone!!!

SO WHAT?

...TO TODAY'S ADMINISTRATOR

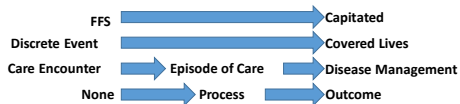
$$\text{Value} = \left[\frac{\text{Outcome}}{\text{Cost}} \right]^n$$

WHY?

V B P

POPULATION HEALTH

Direction of Risks and Metrics



Domain Weights Under Four Domain Structure

Domain	FY 2013	FY 2014	FY 2015	FY 2016
Clinical Process of Care	70%	45%	20%	10%
Patient Experience of Care	30%	30%	30%	30%
Outcomes of Care	-	25%	15%	40%
Efficiency	-	-	20%	20%

Source: Advisory Board

PROFESSIONAL OUTCOMES QUALITY

- Who should be imaged:
 - Use of evidence based imaging practice, Adherence to clinical prediction rules, ACR Appropriateness Criteria
- How Often:
 - NCCN Guideline for Lymphoma patients
- What imaging approach:
 - DSS in CPOE, Diagnostic Yield, Repeat procedures with higher modalities
- Interpretation:
 - Sensitivity vs Specificity, correlating to clinical scenario, Ratio of adverse false positive outcomes vs Rate of adverse false negative outcomes

MID Project Description

- US Centers for Medicare and Medicaid Services (CMS): Purpose of MID:
 - Evaluate the efficacy of clinical decision support systems for ordering diagnostic imaging studies
 - The importance of immediate feedback to the physician ordering exams
- (5) Conveners (vary in size, specialty mix, academic and private practice, and geographic location)
 - Brigham & Women's Hospital consortium (included Geisinger, U of Penn, and Cornell)
 - Henry Ford Health System
 - Maine Medical Center
 - University of Wisconsin Health
 - National Imaging Associates (NIA)
- 24 month project (Oct 2011-Oct 2013)
 - 6 months of data without use of DS
 - 18 months with DS available for clinicians

MID Project Description

- Up to 10 Million\$ budgeted for this project
- 12 exams were selected (based on high Medicare/Medicaid utilization)
 - CT: Abdomen, abdomen & pelvis, brain, lumbar spine, pelvis, sinus, thorax
 - MRI: Lumbar spine, brain, knee, and shoulder
 - SPECT: myocardial perfusion
- The results were disappointing
 - Small improvements in the baseline to intervention phase on the number of rated appropriate studies
 - High degree of dissatisfaction from the physicians related to the guidelines usefulness, workflow impacts, etc. Some concerns that the guidelines were not valid/comprehensive
 - There was not a change in utilization patterns, even though a slightly better rate of appropriate studies did occur.

Data recorded

- Actionable Alerts:

• Pre-Intervention Period:	7.9%
• Post-Intervention Period:	5.7%
- Rate of 'inappropriate' orders:

• Pre-Intervention Period:	3.7%
• Post-Intervention Period:	2.6%
- Rate of 'appropriate' orders:

• Pre-Intervention Period:	28.3%
• Post-Intervention Period:	27.3%
- Rate of 'not covered by guidelines' orders:

• Pre-Intervention Period:	63.1%
• Post-Intervention Period:	66.4%

Impact of MID CDS

- Providers ignored 98.9% of alerts
 - Modified 1.07% of orders
 - Cancelled 0.03% of orders
- Looking just at the Actionable Alerts (only 5.7% of alerts)
 - Modified 7.9% of orders
 - Cancelled 0.20% of orders
- So 8 times more likely to modify or cancel if alert is actionable
 - Of those changed, 97.7% of actionable alerts led to alternate imaging studies (2.3% cancelled)

OUTCOMES

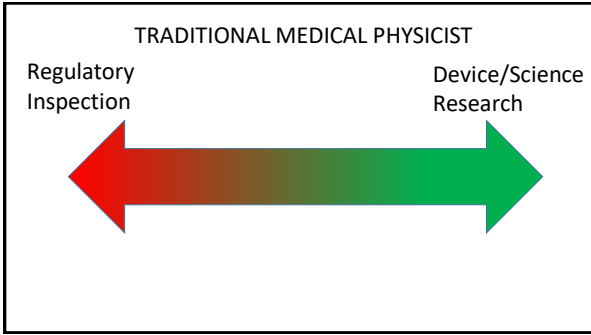
- Diagnostic Imaging
 - Effect of imaging on patient care: rates of therapeutic interventions (eg: High predictive value of CT for appendicitis should result in a decrease in exploratory laparotomies.
 - High Predictive values of Coronary CTA should result in decrease in diagnostic cath)

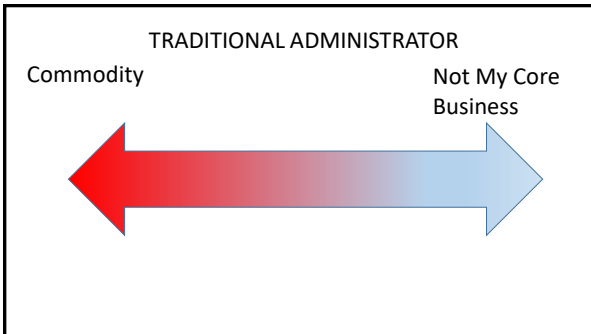
Outcomes – Goals and Objectives

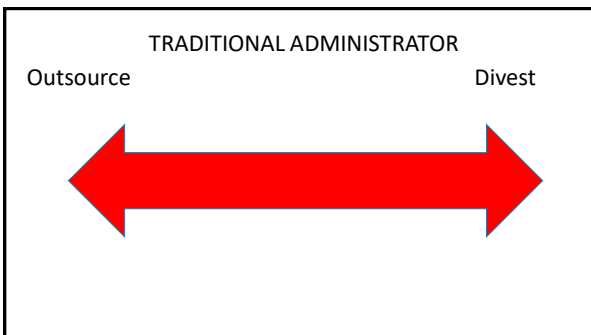
- Improve Outcomes data collection by:
 - Identifying Outcomes measures relevant and important to stakeholders
 - Ensuring data integrity and alignment with patient-centered care
 - Building the Big Data infrastructure for sustainable Outcomes Research
 - Using structured reporting to drive integrity of Outcomes registries

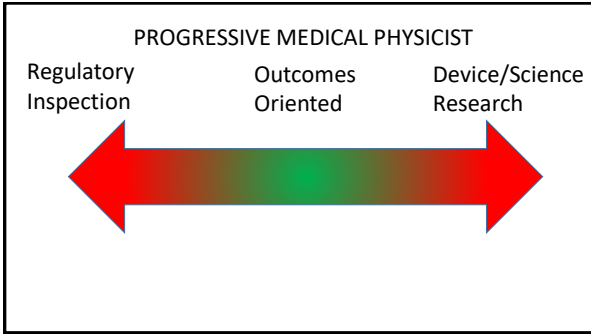
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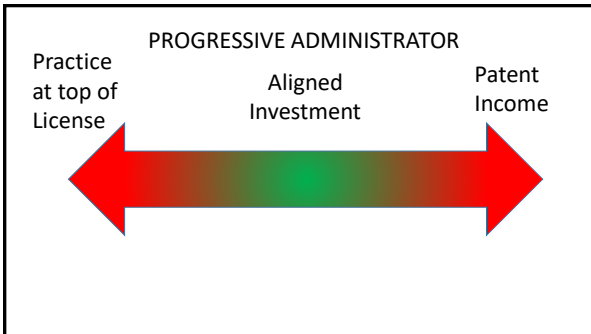
- Prioritize Outcomes research in decision-making and allocation of time and resources by:
 - Developing and training for faculty in the use of registries
 - Leveraging screening programs, genetic testing, community outreach
 - Publishing outcomes-related research
 - Develop then Follow evidence-based algorithms and protocols and reduce variation in orders and deviation from standards (the appropriate procedure for the appropriate patient at the appropriate time).











... each physicist should attain the necessary clinical knowledge, get involved in the entire clinical process, and apply his/her problem-solving and analytical skills to process improvement and **patient outcome** analysis.

Samei et al Medical Physics, 45 (9), September 2018

THANK YOU
