



# Project Management of Quality Improvement in Radiology

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# What is Radiology

- ❖ Radiology is the medical discipline that uses Medical Imaging to **support** diagnosis and treatment of diseases within the bodies of animals and humans.

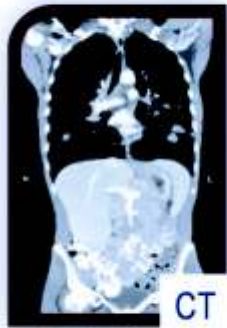




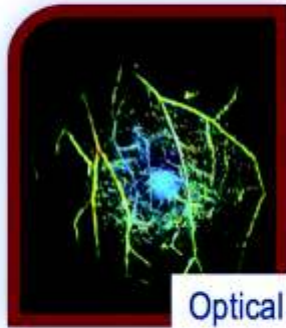
X-ray



US



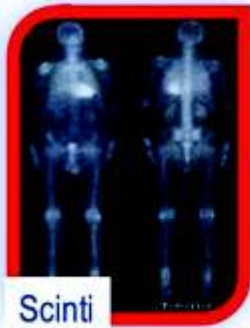
CT



Optical



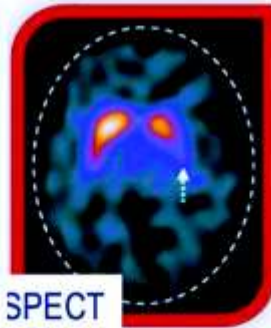
PET



Scinti



MRI



SPECT

# What is Radiology

Radiology departments can have different imaging modalities:

- ❖ X-ray
- ❖ Ultrasound
- ❖ Computed Tomography (CT)
- ❖ Magnetic Resonance Imaging (MRI)
- ❖ Positron Emission Tomography (PET).
- ❖ Nuclear Medicine (NM)





# International Day of Radiology

- ❖ X-ray accidentally discovered by Wilhelm Rontgen Nov 8<sup>th</sup>, 1895
- ❖ Won Nobel Peace Prize
- ❖ November 8<sup>th</sup>
- ❖ Promoting Role of Medical Imaging



Morgan Davidson, <https://www.inprnt.com/gallery/morgandavidsonart/see-through-me/>



# Quality Control (QC) & Quality Improvement (QI)

in Radiology







# Quality Control (QC) & Quality Improvement (QI)

Why have become important?

- ❖ Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009
- ❖ Healthcare Act of 2015
- ❖ Value-Based Care
- ❖ Reimbursement tied to Quality of Care, Efficiency and Effectiveness.
- ❖ Patient satisfaction based



# Quality Control (QC) & Quality Improvement (QI)

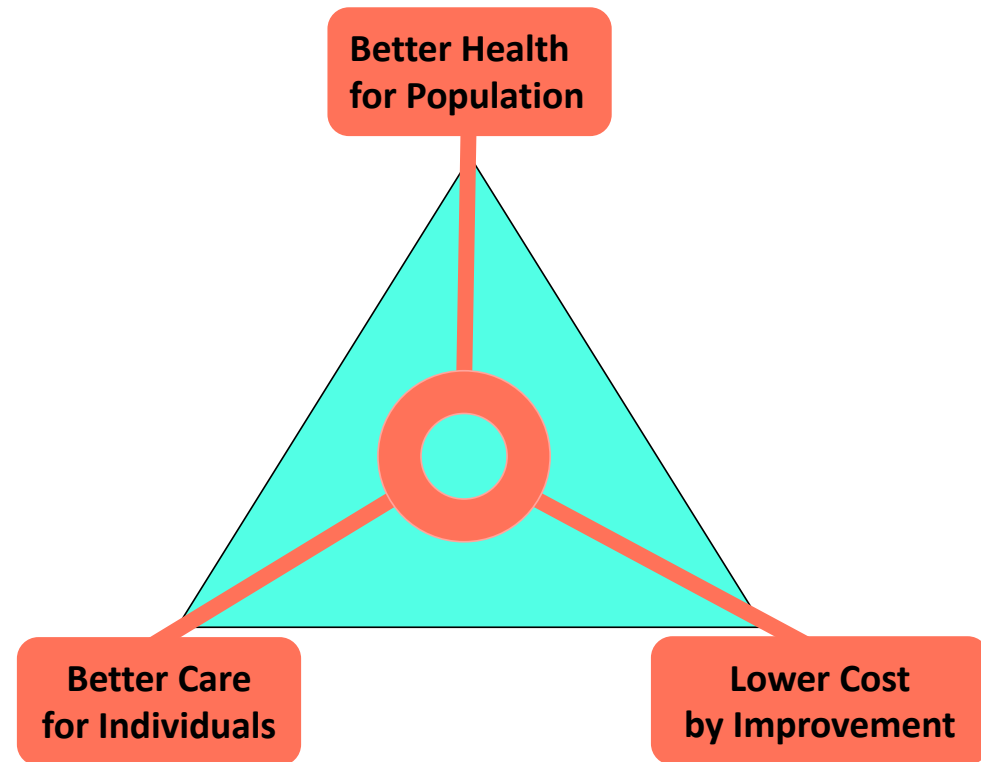
## How is it implemented?

❖ Centers for Medicare & Medicaid Services (CMS)

❖ External Regulatory Agencies

1. The Joint Commission (TJC)
2. American College of Radiology (ACR)
3. American Board of Radiology (ABR)
4. Food & Drug Administration (FDA)
5. State Health Departments
6. Occupational Safety and Health Administration (OSHA)
7. Nuclear Regulatory Commission (NRC)

## Three Pillars of CMS





# Quality Control (QC) & Quality Improvement (QI)

How is it implemented?

## ❖ Internal Regulatory Groups

- Varies from hospital to hospital
- Typical Committees (some required by TJC)
  1. Infection Control
  2. Radiation Safety
  3. Safety Committee
  4. Risk Management
  5. PACS committee
  6. ...
  7. Quality Management





# Quality Control (QC) & Quality Improvement (QI) in Radiology

## Areas to Investigate

1- People

2- Technology & Communications

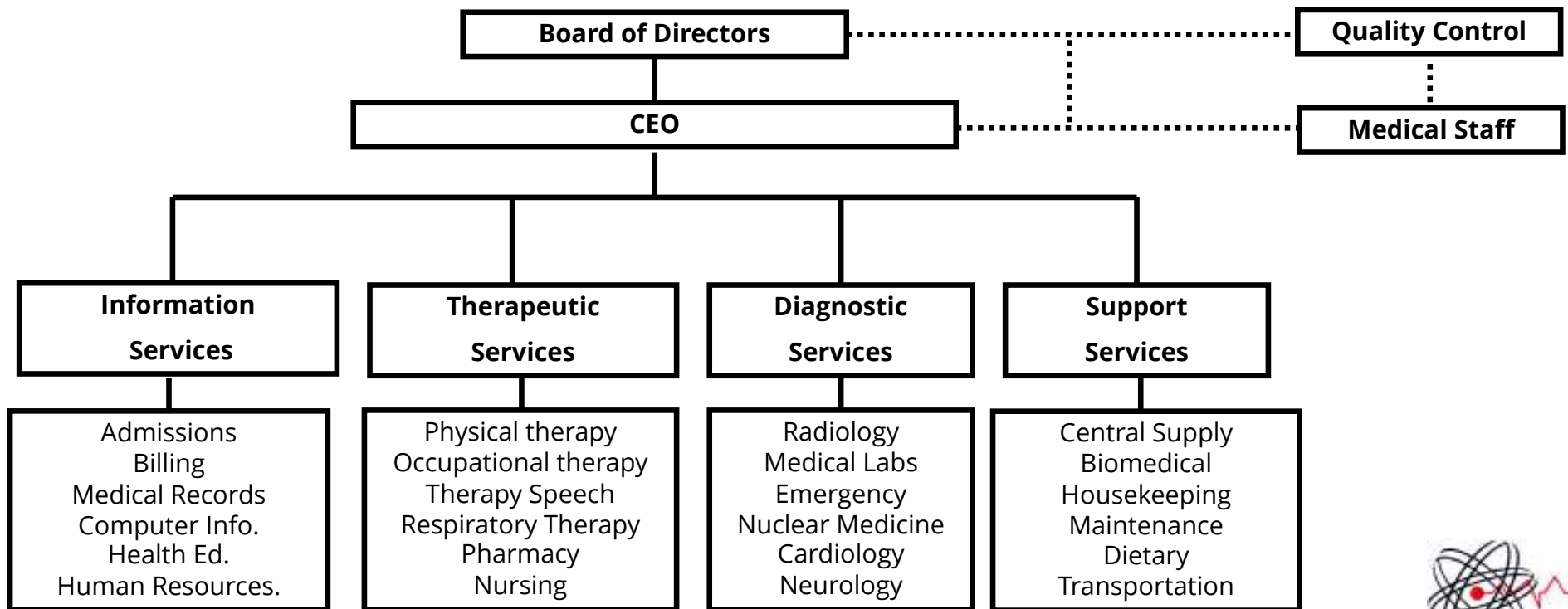
3- Processes & Procedures

4- Policies & Practices



# Quality Control (QC) & Quality Improvement (QI) in Radiology

## 1- People (Organizational Chart)



# Quality Control (QC) & Quality Improvement (QI) in Radiology

## 1- People

- ❖ **Administrators:** to schedule patients, record payments, manage human resources,
- ❖ **Nurses:** Perform procedures on patients that require imaging exam, ensure patient safety,
- ❖ **Radiographers or Technologists:** operate imaging hardware, transmit images (print or electronic) to radiologists
- ❖ **Physicists:** manage quality (resolution, calibrations) of imaging equipment, manage safety (radiation dose)
- ❖ **Radiologists:** are Medical Doctors. Interpret/read the images. His/her report is transmitted to the clinician who requested the imaging.

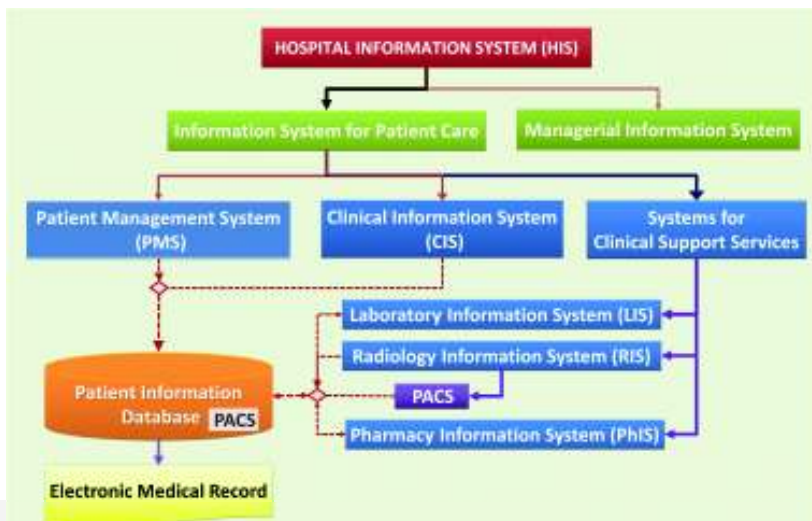
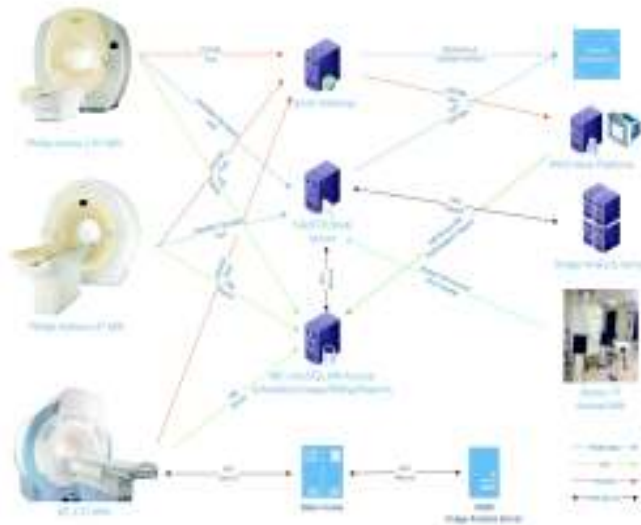




# Quality Control (QC) & Quality Improvement (QI)

## 2- Technology & Communications

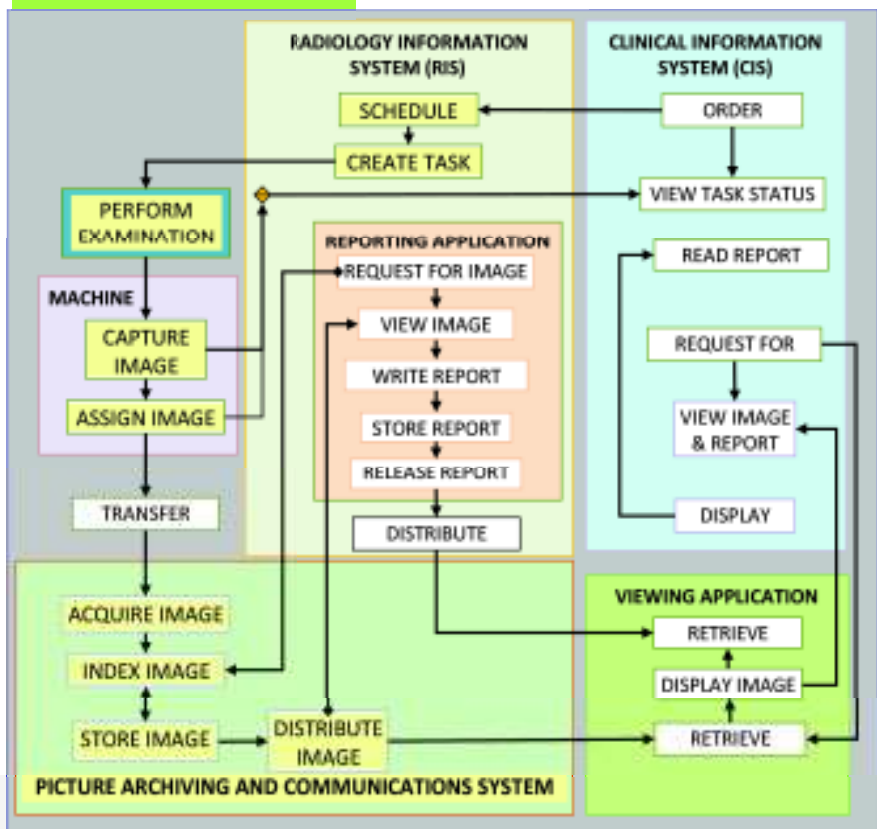
- ❖ Medical Imaging Instruments
- ❖ Radiology Information Systems (RIS)
- ❖ PACS (Picture Archiving & Communication System)
- ❖ EMR (Electronic Medical Record)
- ❖ Platforms to Send/Receive EHR to/from outside Organizations
- ❖ Reporting and Automation (AI & Machine Learning)



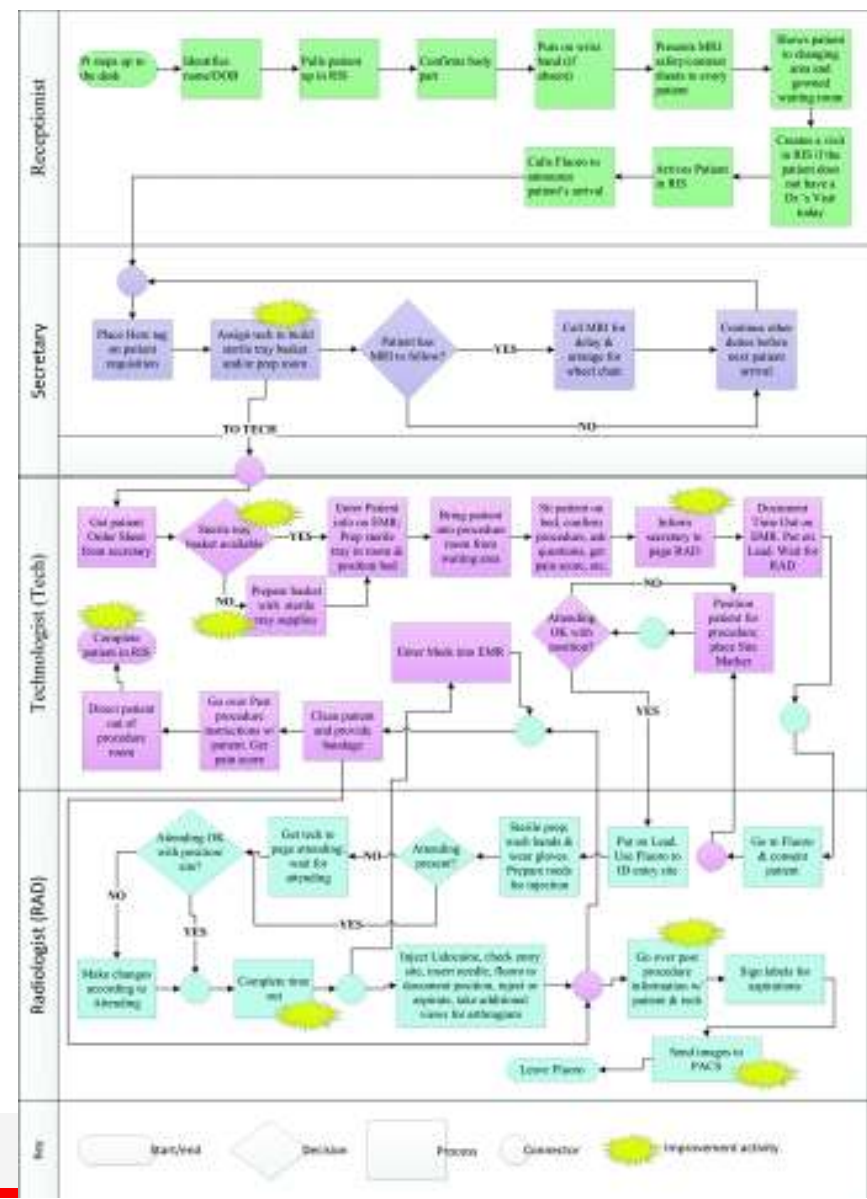
Dr. Salleh, <https://drdollah.com/radiology-information-system-and-pacs/> , Mar 2018

# Quality Control (QC) & Quality Improvement (QI)

## 3- Processes & Procedures



Cheung YY. Radio Graphics, Vol. 36, No. 3, May 2016



Cheung YY. Radio Graphics, Vol. 36, No. 3, May 2016

# Quality Control (QC) & Quality Improvement (QI)

## 4- Policies & Practices

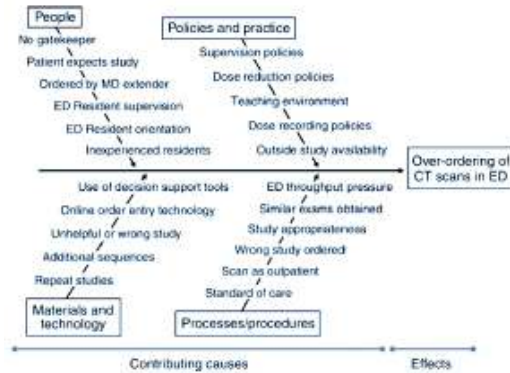
- ❖ National Guidelines
- ❖ ACR Practice Guidelines and Standards
- ❖ Internal Committees Guidelines
- ❖ Governmental Policies and Guidelines
- ❖ CMS Policies and Guidelines







Flow Chart



Cause & Effect Diagram

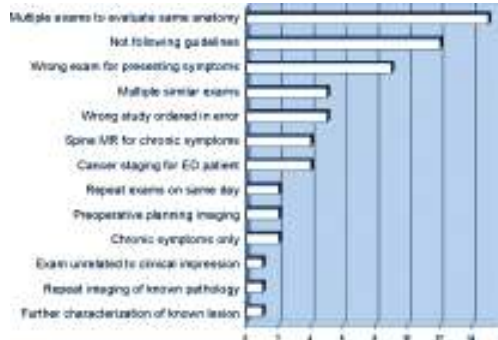
# Quality Control (QC) & Quality Improvement (QI)

## Tools

- ❖ Flow Chart: Analyze occurring steps
- ❖ Cause & Effect (Fishbone) Diagram: Identify cause of problem
- ❖ SWAT Analysis: Analyze opportunities and shortcomings
- ❖ Pareto Chart: Analyze spectrum and frequency of various events

Factor	Current State	Proposed Future State	Need for Change
Increased strengths and opportunities	<ul style="list-style-type: none"> <li>What are the strengths of our current processes or operations?</li> <li>What is our unique brand?</li> <li>How can we increase our market share?</li> <li>What strategic services do we offer?</li> <li>What resources do we have?</li> <li>What is our reputation in the local market?</li> <li>What are business opportunities exist for us?</li> </ul>	<ul style="list-style-type: none"> <li>What are the strengths of the proposed future state?</li> <li>What business opportunities does this new state offer?</li> <li>Are there opportunities exist elsewhere?</li> <li>Do they add value to our product?</li> </ul>	<ul style="list-style-type: none"> <li>Are the strengths and opportunities of the future state significantly more compelling than those of the current state?</li> <li>Are there opportunities exist elsewhere?</li> <li>Do they add value to our product?</li> </ul>
Unrecognized weaknesses and external threats	<ul style="list-style-type: none"> <li>What weaknesses exist in our current processes or operations?</li> <li>In local competition likely to increase?</li> <li>What disruptive technology is emerging?</li> <li>What will it take to overcome these weaknesses?</li> <li>Are the necessary resources and resources available to us?</li> <li>What external threats exist?</li> </ul>	<ul style="list-style-type: none"> <li>What weaknesses do we predict will exist in the proposed future state?</li> <li>What other threats are possible in the new state?</li> </ul>	<ul style="list-style-type: none"> <li>Are the weaknesses of our future state more significant than those affecting the future state?</li> </ul>

SWAT Analysis



Pareto Chart



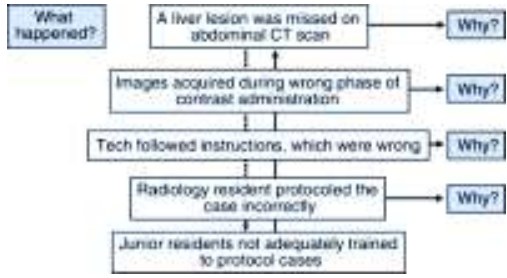
# Quality Control (QC) & Quality Improvement (QI)

- Tools

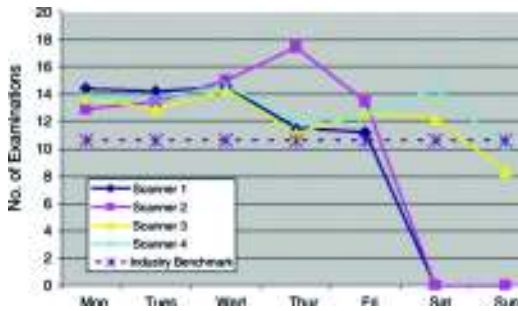
- ❖ Check Sheet: Analyze frequency of various events
- ❖ RCA Diagram: Five-why's approach
- ❖ Productivity Run chart: Find process improvement performance
- ❖ Statistical Process Control Chart: Process changes over time

Reason for call	Monday	Tuesday	Wednesday	Thursday	Friday	Total
Tech needs x-ray protocol	AAA	0	0	0	0	3
Tech needs protocol verified	AAA	0	AAA	0	0	3
Get patient from CT suite?	0	0	0	0	0	0
Stat read needed	0	0	0	0	AAA	3
Tech needs image checked	0	0	0	0	0	0
MD reading not ready	0	0	0	0	AAA	3
Contrast needed	0	0	0	0	0	0
MD needed	0	0	0	0	0	0
Extrusion of contrast	0	0	0	0	0	0
Wrong number	0	0	0	0	AAA	3
Total calls	3	0	0	0	3	6

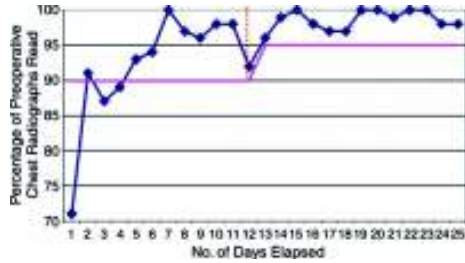
Check Sheet chart



RCA Diagram



Productivity run chart



Statistical Process Control Chart



# Quality Control (QC) & Quality Improvement (QI) in Radiology

## Project Selections: Project Prioritization Matrix

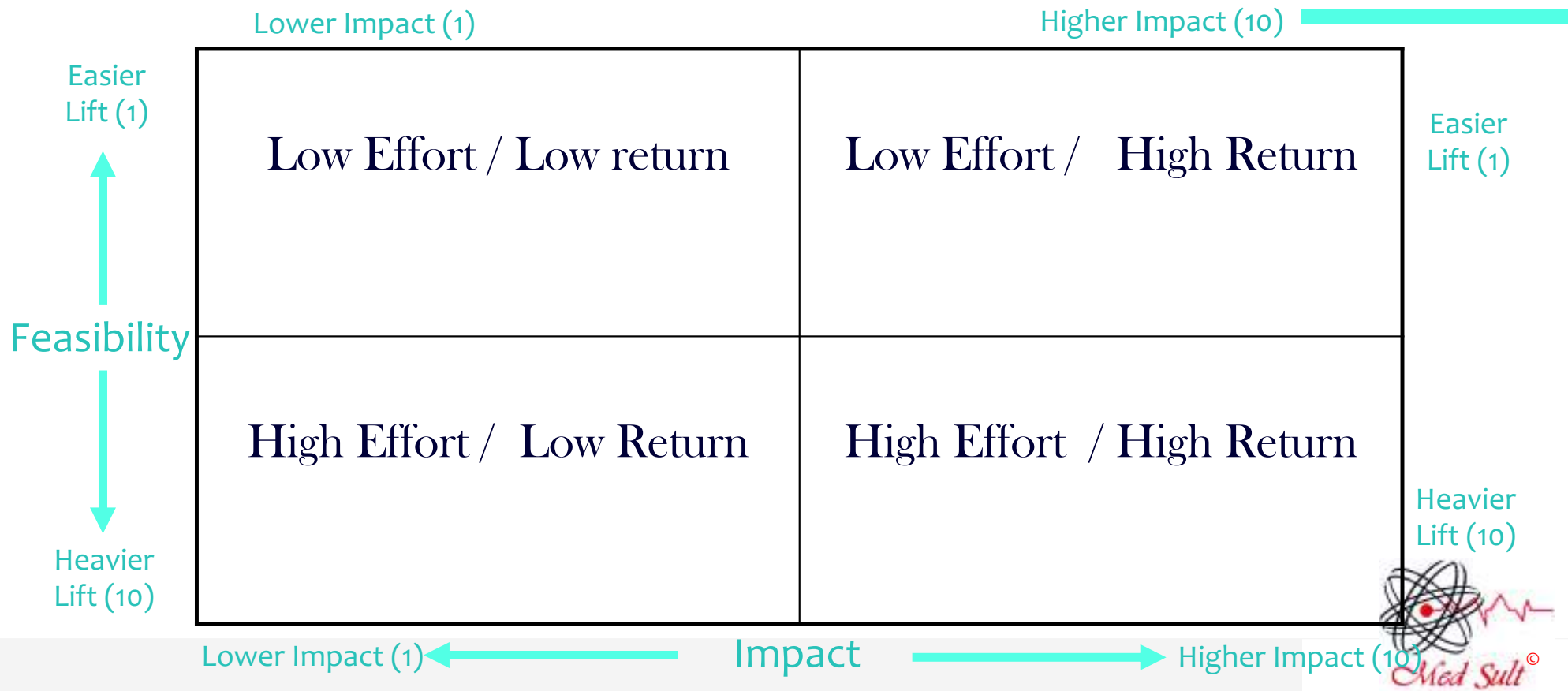
		Patient Safety	Positive Financial Impact	Referring Clinician Satisfaction	Patient Experience Satisfaction	Internal Stakeholder Priority	Total Impact	Time	Financial Cost	Process Changes	Cross-Department Coordination	IT Systems	Total Feasibility
<b>Criteria Scoring:</b>	<b>Circle Size:</b>												
No Impact: 1	Size of circle represents impact on patient safety												
Low Impact: 4													
Medium Impact: 7													
High Impact: 10													
LABEL	PROJECT												
<b>Bx Orders</b>	Decrease incorrect biopsy orders in IR	10	4	10	7	7	7.0	10	4	10	10	10	8.8
<b>Ins Auth</b>	Decrease insurance authorization denials	1	10	7	7	7	7.8	10	4	10	10	10	8.8
<b>MR Pt Satisf</b>	Improve patient satisfaction scores in outpatient MRI	4	7	4	10	10	7.8	10	4	10	7	4	7.0
<b>MRI Sched</b>	Increase the percent of patients scheduled for MRI within 24 hours	4	7	10	10	10	9.3	7	7	10	7	4	7.0
<b>Ordering</b>	Improve correct ordering of ED examinations	10	4	7	4	10	6.3	7	4	10	7	7	7.0
<b>Outpt Wait</b>	Decrease time from patient arrival to x-ray completion at outpatient site	1	4	10	10	10	8.5	7	7	10	7	4	7.0
<b>Positioning</b>	Improve positioning on inpatient radiographs	4	4	7	1	7	4.8	7	7	7	4	1	5.2
<b>Protocol</b>	Decrease the time and effort required to protocol examinations	4	4	5	4	10	5.8	7	4	7	4	10	6.4
<b>Pt Hx</b>	Improve patient history provided to radiologists	7	1	7	4	10	5.5	7	1	7	4	4	4.6
<b>STAT Time</b>	Decrease report completion time for STAT inpatient reads	7	4	10	7	4	6.3	7	1	10	10	10	8.2
<b>Transport</b>	Decrease inpatient transport time to radiology	4	7	7	7	7	7.0	4	4	7	7	4	4.6
<b>X-ray Pt ID</b>	Reduce misidentified patients in inpatient x-ray	10	1	7	7	7	5.5	10	1	4	4	4	5.8

Larson D., Mickelsen L., American Journal of Radiology, 205, Nov. 2015



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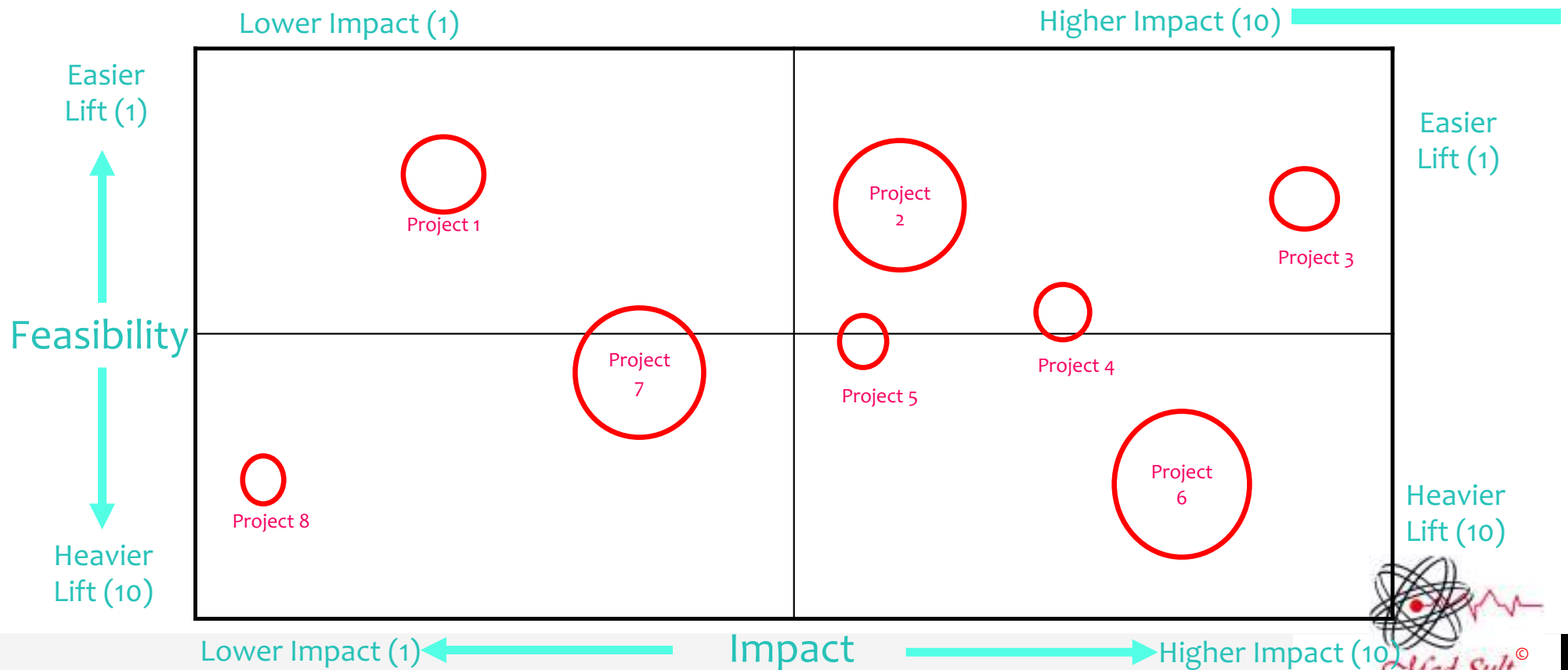
## Project Selections: Project Prioritization Matrix



# Quality Control (QC) & Quality Improvement (QI) in Radiology

Project Selections: Project Prioritization Matrix

Circle Size: Impact on Patient Safety





# Quality Control (QC) & Quality Improvement (QI)

## Project Implementation

- ❖ Project Sponsor: Organizational oversight and support
- ❖ Project Leader: Responsible for success and failure of project
- ❖ Project Participants: Provide expertise and help
- ❖ Project Coach: Help and guide the project team.

# Quality Control (QC) & Quality Improvement (QI)

## Sustaining Improvement

- ❖ Once Quality Improvement Achieved:
  - Project is handed back from Improvement Team to Operations Team
  - Ongoing Measurement and Reporting







# Thank You

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Questions?