

STRATEGIES FOR TOTAL QUALITY

PRACTICAL QUALITY IMPROVEMENT

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Strategies for Total Quality

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Practical Quality Improvement

Outline

1. Incident Learning Systems on a shoestring budget
2. Prospective risk analysis for the faint of resources (the abbreviated FMEA)

Strategies for Total Quality

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Practical Quality Improvement

Outline

1. Incident Learning Systems on a shoestring budget
 - Process Mapping???
2. Prospective risk analysis for the faint of resources (the abbreviated FMEA)

Purpose: Improve safety and quality of care through incident learning

Key Points:

- Co-sponsored by ASTRO and AAPM
- Protection and confidentiality thru US Patient Safety Organization (PSO)
- Web-based event logging and analysis
- Quality improvement reports to participants
- Beta testing: late 2013

□ Primary contact people:

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But what about reporting culture?

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The AAPM and ASTRO may have solved your implementation problem, but you still need to get staff to report incidents!

How do you change the culture?

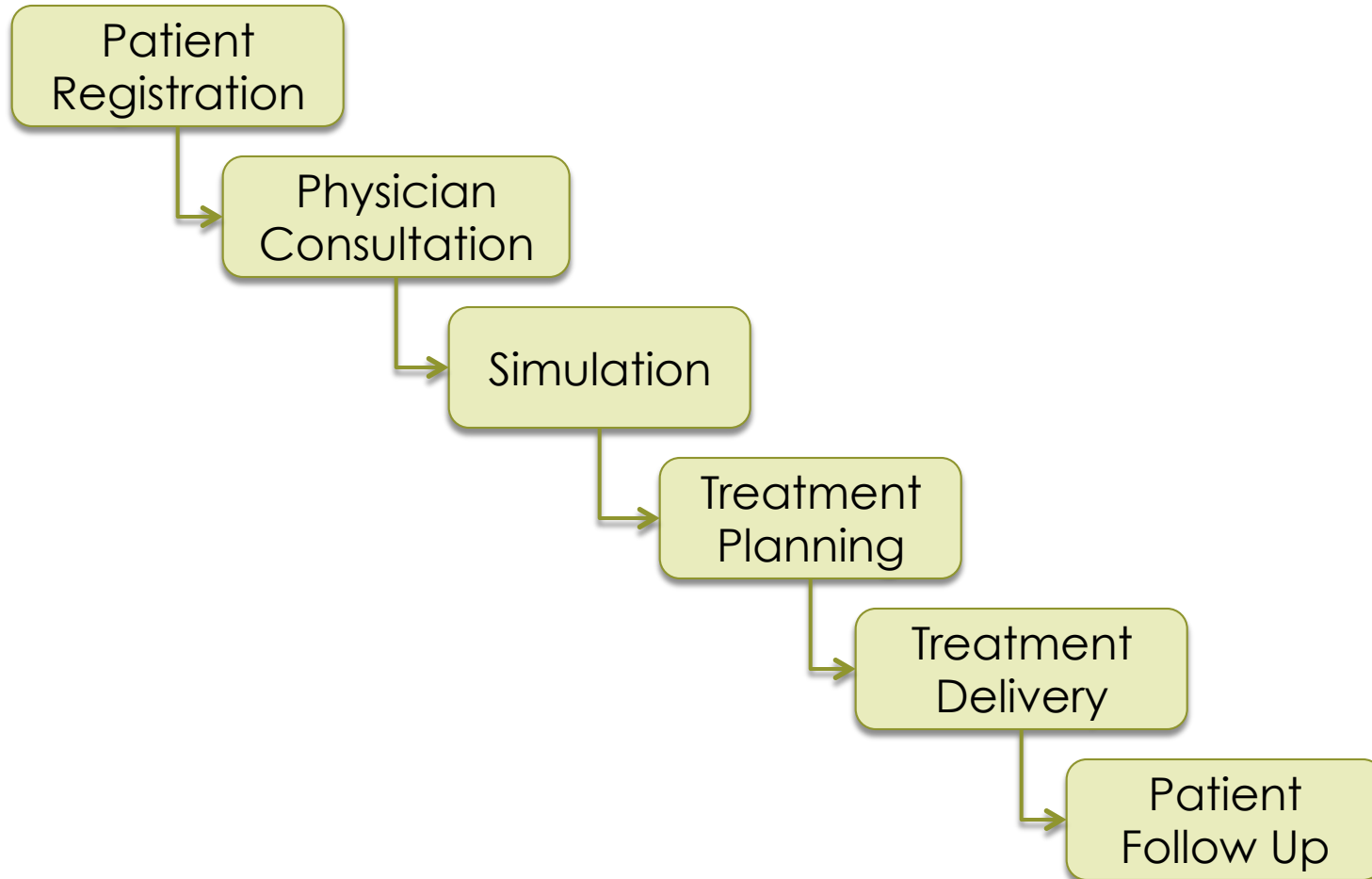
1. Involve staff in quality improvement projects!!
 - Process Mapping
 - Prospective risk analysis

Process Mapping

Relatively simple to do, big bang for your buck

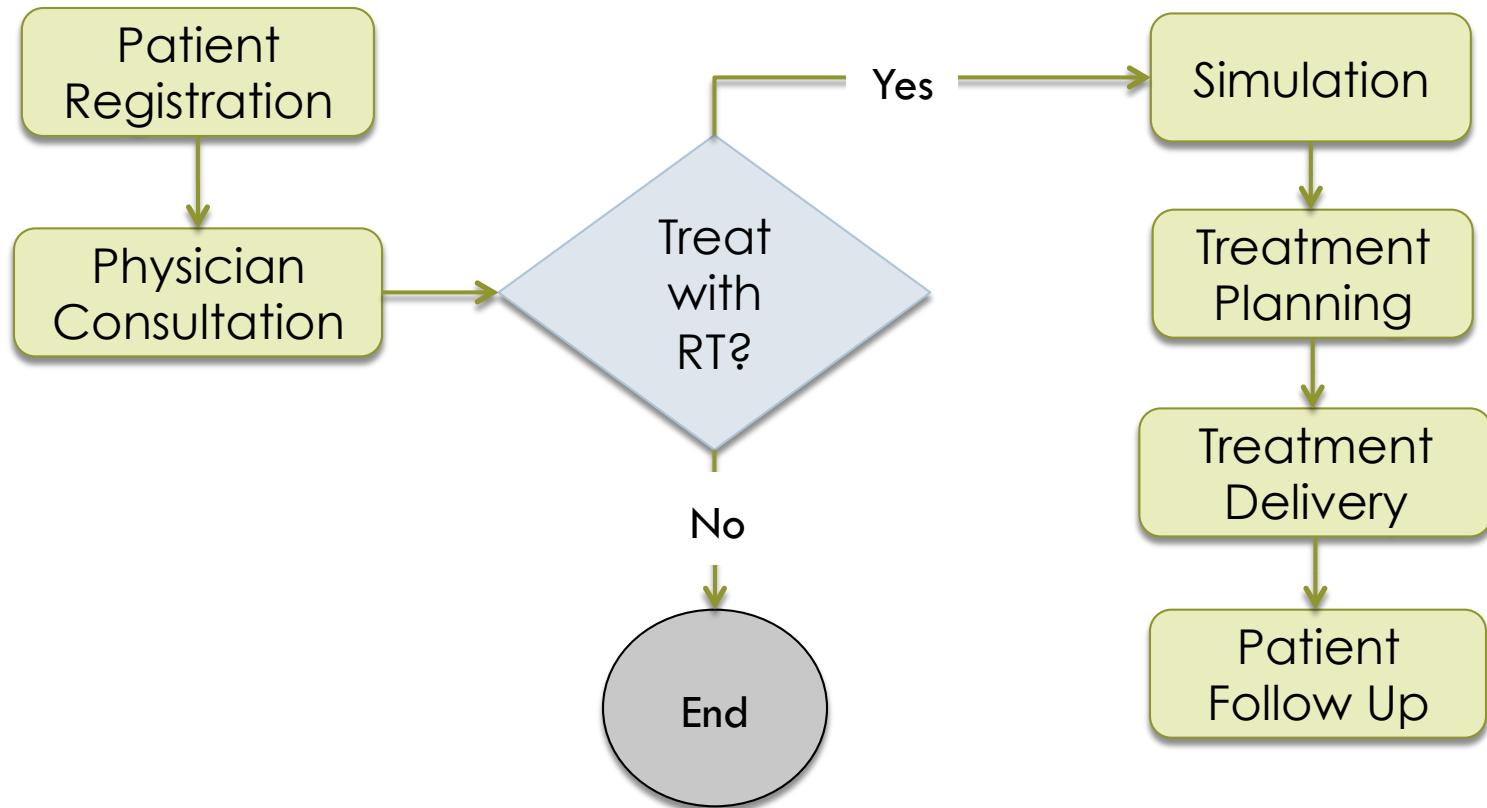
Examples of Process Maps

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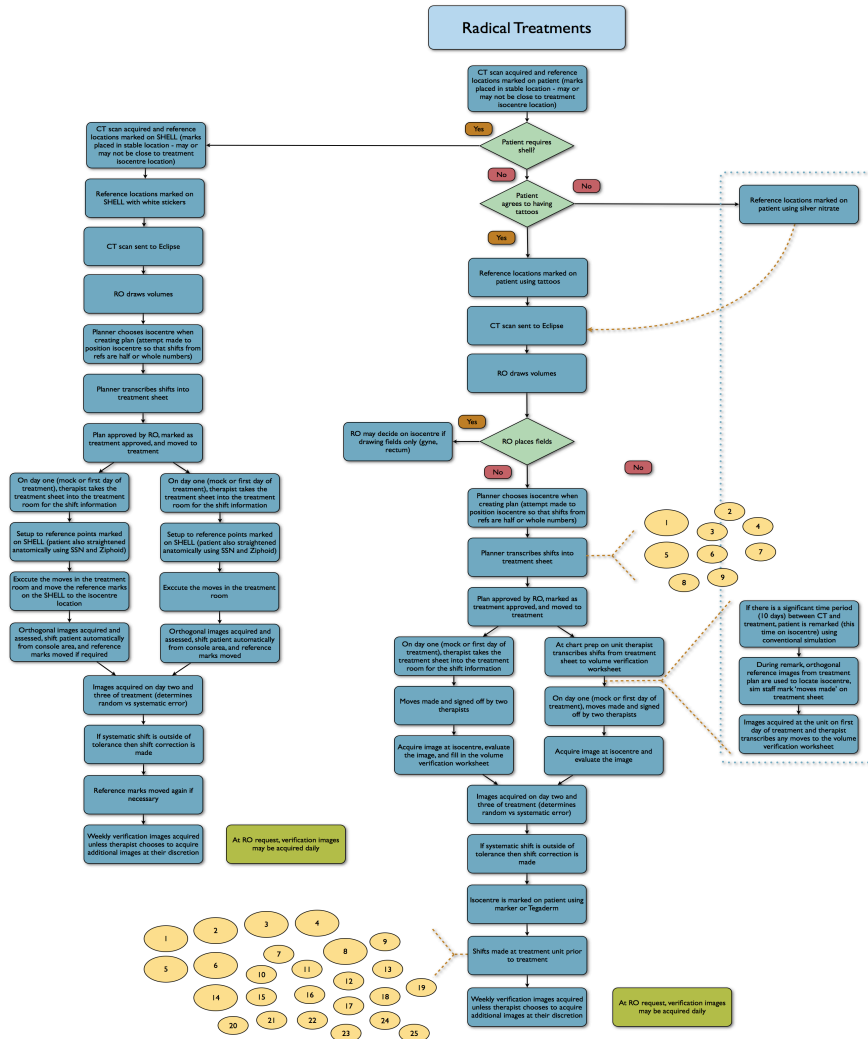


Process Maps - Examples

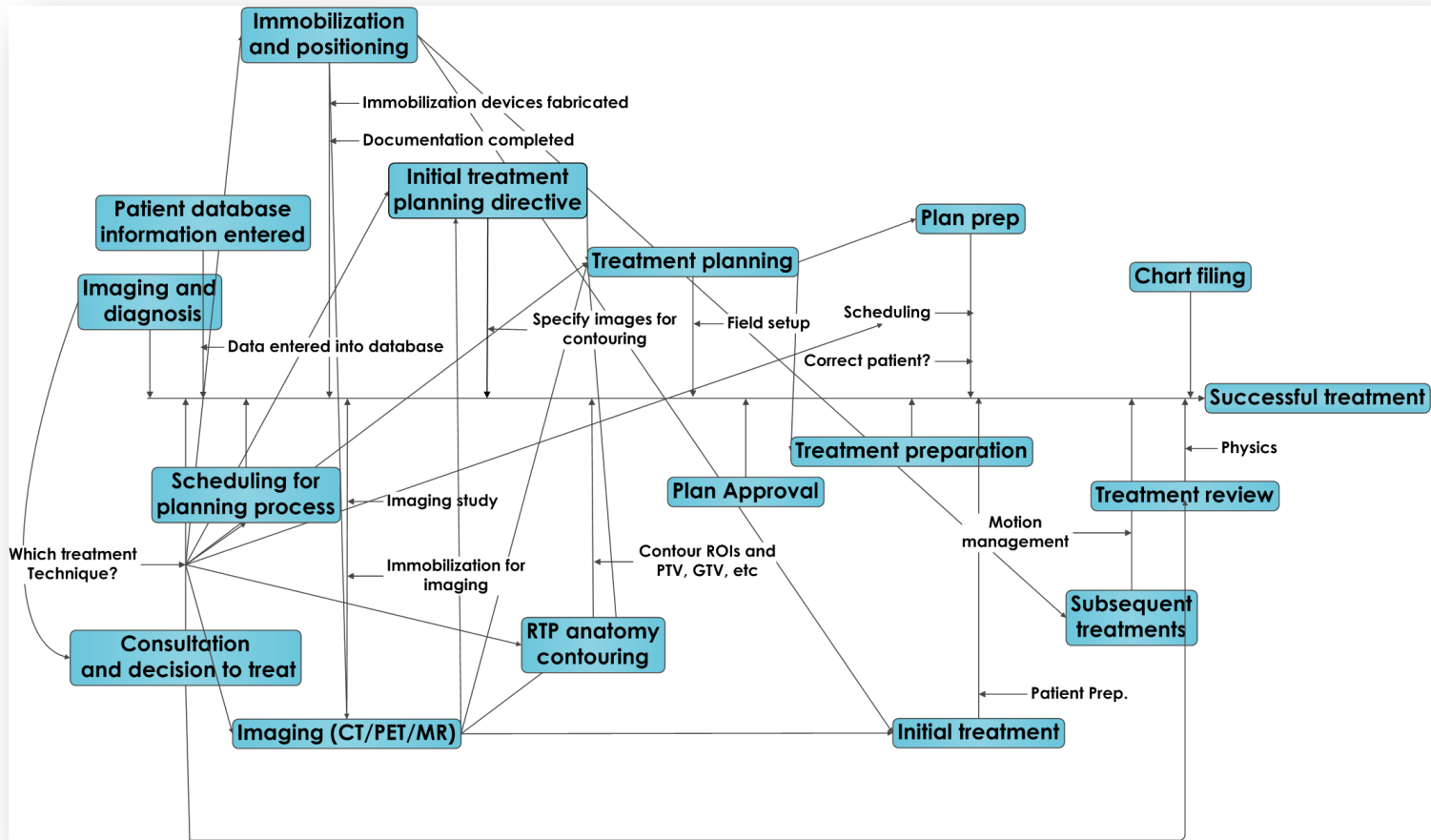
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Examples of Process Maps

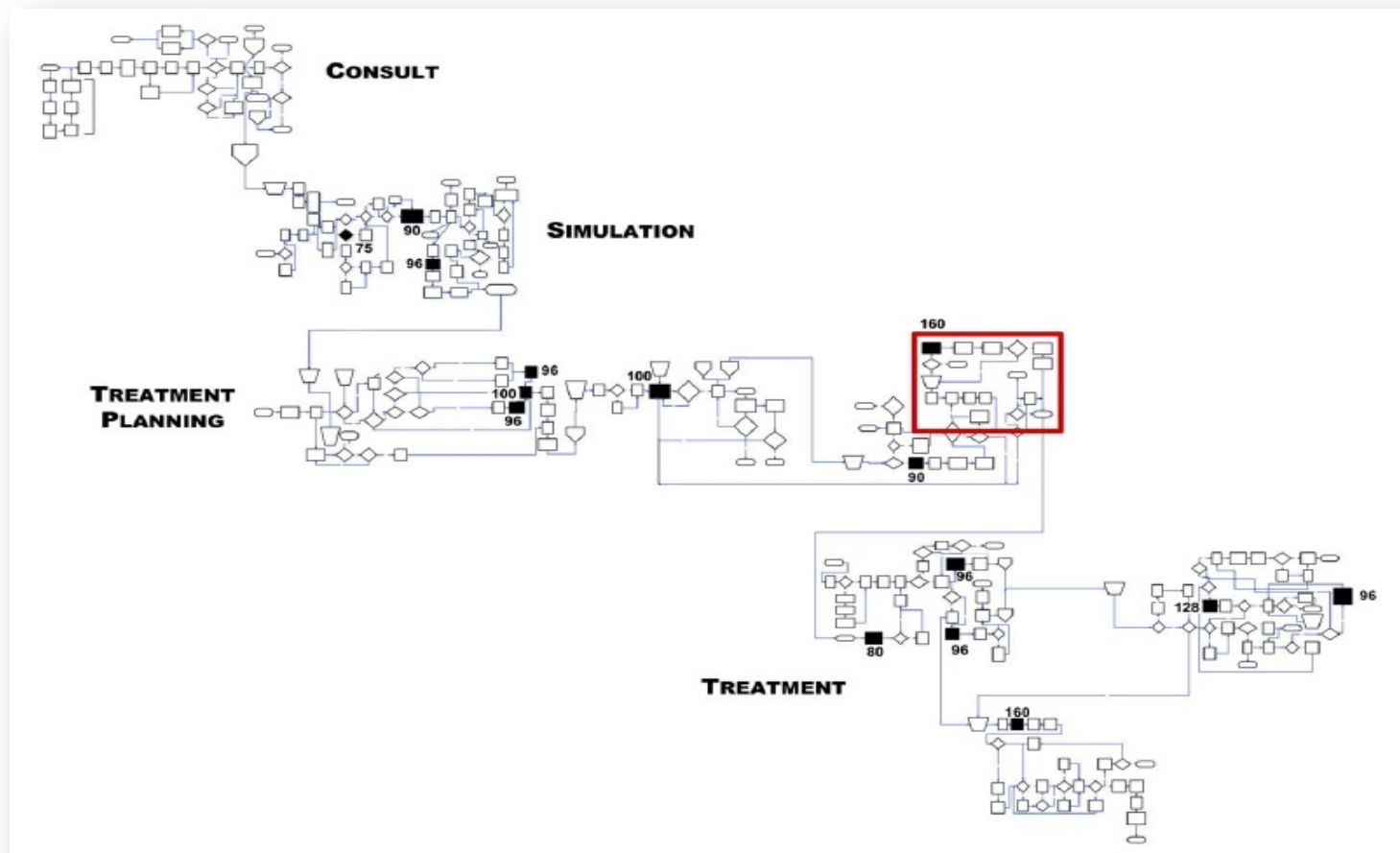


Examples of Process Maps



Examples of Process Maps

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The Rough Guide

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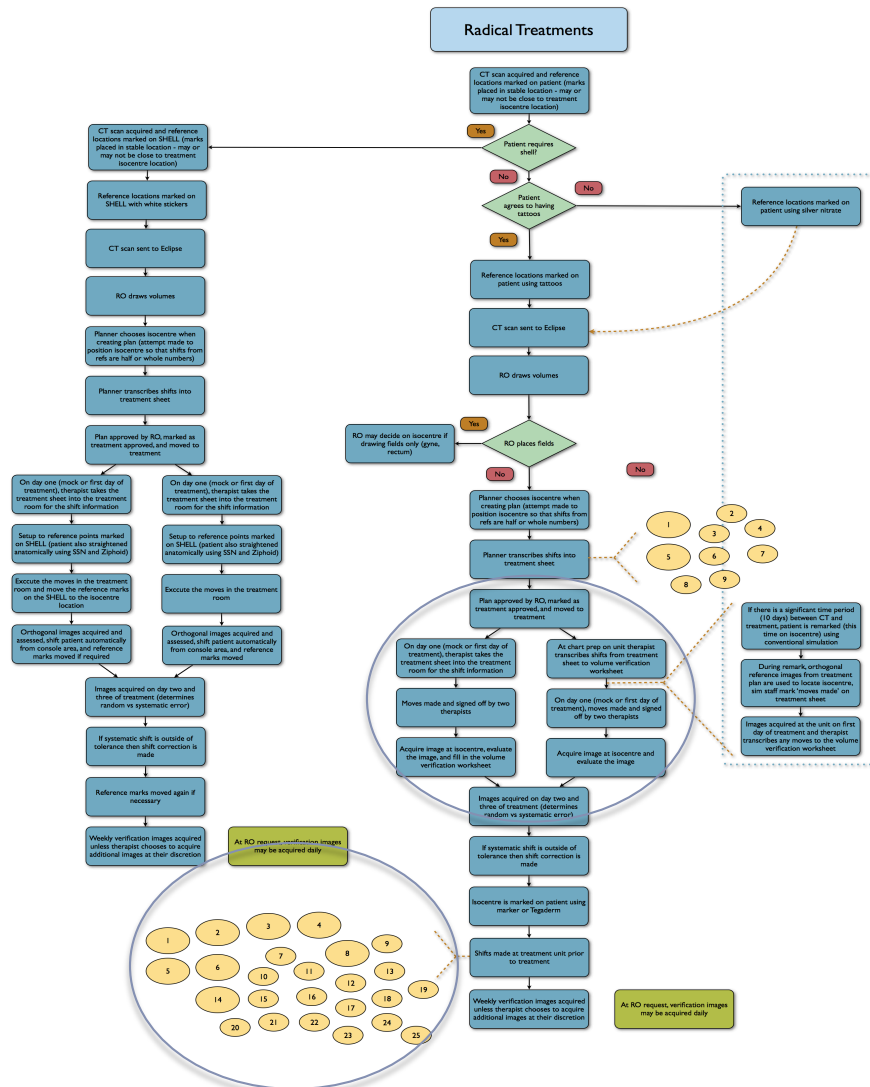
- **Step 1:** Decide what process to map. The scale of the process is an important concern here. Don't bite off more than you can chew!
- **Step 2:** Form a group and identify a team leader. It is really important that all professional groups are represented in this process.
- **Step 3:** Create an initial process map. It is often useful to make a first draft that does not attempt to capture the entire process in detail but rather the workflow at a more general level.

The Rough Guide

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- **Step 4:** Iterative mapping. The process map is refined with the input of all staff involved.
- **Step 5:** Check with external resources to make sure that no steps have been missed.
- **Step 6:** Use the process map!

What are the Benefits?



What are the Benefits?

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- Immediate benefits
 - Improving communication – everyone is on the same page!
 - Harmonizing clinical practice and ensuring that everyone operates with a shared model.
 - Improving efficiency. Workflow inefficiencies can become obvious when mapped out visually

What are the Benefits?

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- Longer term benefits
 - Process maps also allow one to codify where along the workflow incidents are occurring, which is potentially powerful information for incident learning.
 - **If you involve enough people, you already have a captive audience to listen to your pitch about the benefits of incident learning...**
 - Maps are really helpful when starting a prospective risk analysis...

Another excellent resource

**Safety Profile Assessment:
A tool for Improving Safety and
Quality in Radiotherapy**

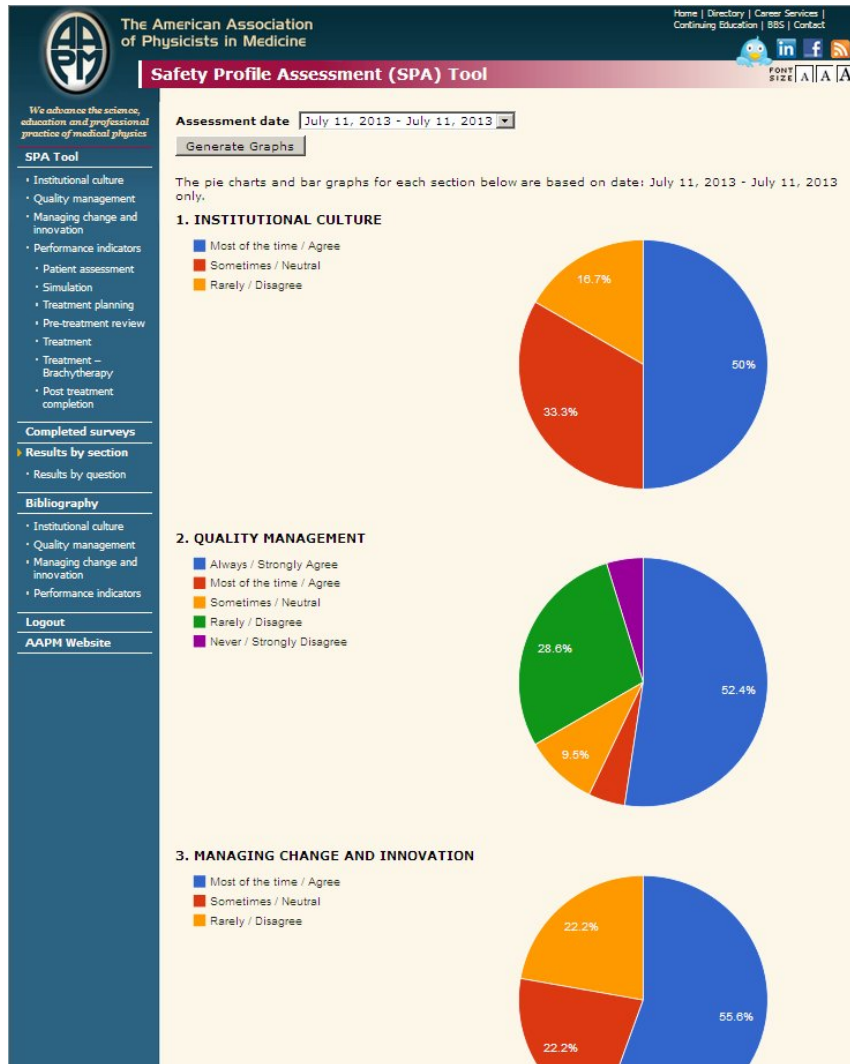
Eric Ford, PhD
University of Washington, Seattle

AAPM Work Group on Prevention of Errors

Presented Monday at 2 pm



Safety Profile Assessment



View your results by topic area

Compare your results to those of last year

Compare your results to other institutions

Failure Modes and Effects Analysis

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- FMEA is...
 - ▣ Complicated
 - ▣ Resource intensive
- But it really doesn't have to be!!!
 - ▣ Completion of the exercise takes precedence over performing the exercise in the most perfect way possible
 - ▣ The result is not as good as it could be, but at least you've moved the needle in the right direction

Failure Modes and Effects Analysis

The abbreviated version

Failure Modes and Effects Analysis

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Image of my kids surfing on the bed

Failure Modes and Effects Analysis

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□ **Some questions**

1. What do you think could go wrong?

- Fall off the bed and hit his head
- Successfully lands on the surfboard but the surfboard breaks

2. On a scale of 1 – 10, how severe would it be?

- It could be fairly severe – **9** out of 10

Failure Modes and Effects Analysis

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3. Can you describe how that could happen?
 - Surfboard slips out from underneath him
 - His brother falls and knocks him off the bed...
4. How likely is the incident to occur?
 - It's fairly likely – **7** out of 10
5. How likely is it that we can stop this from happening?
 - It is unlikely that we will be able to stop it – **10** out of 10

Failure Modes and Effects Analysis

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□ Failure Mode

- Fall off the bed and hit his head
 - Severity = 9

What could go wrong?

How bad would it be?

□ Failure Pathway

- Surfboard slips out from underneath him
 - Occurrence = 7
 - 'Stop-ability' = 10

How could that happen?

How likely is it to occur?

How likely is it that we stop it?

Failure Modes and Effects Analysis

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Risk Priority Number (RPN)

RPN = Severity x Occurrence x Lack of Detectability

RPN = 9 x 7 x 10 = 630

- Within the same Failure Mode, go back and repeat the process for all Failure Pathways
- Repeat for all Failure Modes

Failure Modes and Effects Analysis

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What's the point of all this?

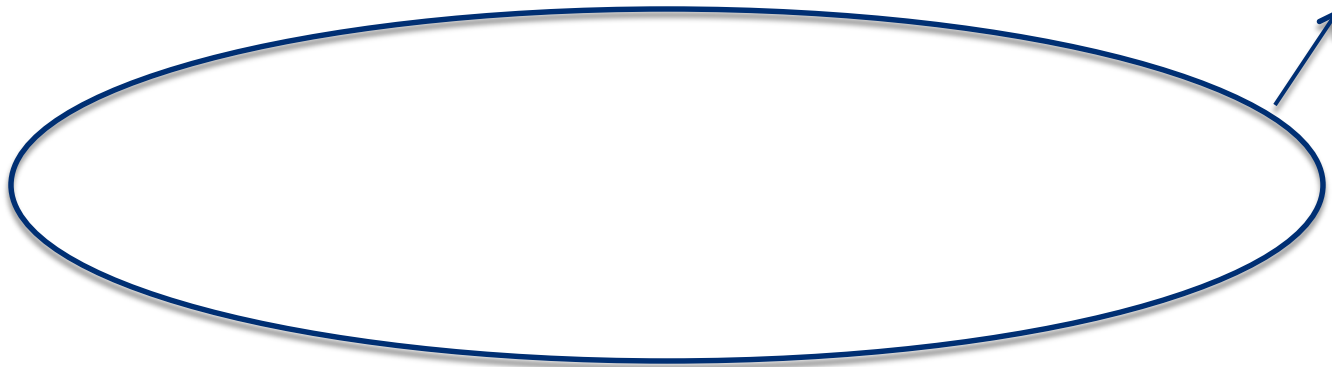
- Ranking Failure Modes and Pathways allows you to focus your quality improvement efforts on those Modes and Pathways that are most relevant
- FMEA is a great way of prioritizing your risk reduction strategies

Failure Modes and Effects Analysis

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Image of my kids surfing
on the bed

Quality and
Safety
Improvement



Failure Modes and Effects Analysis

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1. Potentially allows you to identify issues before they occur in the clinic
 - FMEA is most useful when used prospectively
2. It allows you to prioritize your QA efforts and interventions
 - FMEA allows you to focus your quality improvement efforts

Failure Modes and Effects Analysis

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3. Doesn't have to be used prospectively – It is a great ongoing QA tool
 - FMEA can also be used on a process that already exists, and can be easily updated when processes change

Tips for Performing an FMEA

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- Identifying Failure Modes/Pathways
 - Should be comprehensive and unambiguous
 - FMEA team?
 - Be reasonable – focus your efforts on Modes/Pathways associated with more severe outcomes

Tips for Performing an FMEA

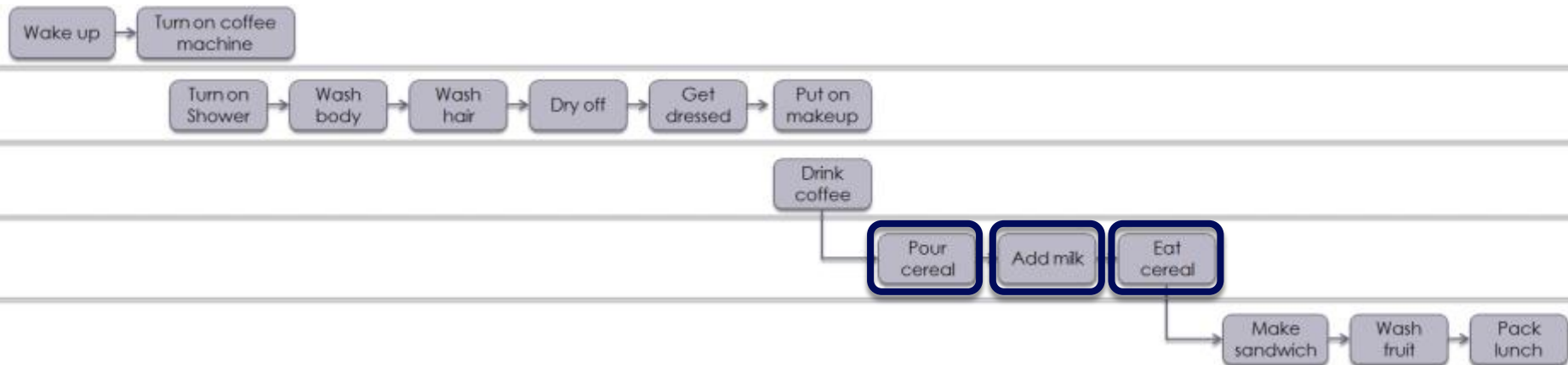
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- Identifying potential effect(s) of failure mode
 - Where there's a range use the most severe (within reason)
- The analysis is relative
- Don't get bogged down in the details
 - Group discussions here can be as valuable as the analysis itself

FMEA Process

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- The first step in performing an FMEA is to define the process
 - Let's use our Process Map from the previous presentation



FMEA Process – 5 Questions

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- For each sub-step, ask
 1. What could go wrong? – Failure Modes
 2. How bad would it be? – Severity
 3. How could it go wrong? – Failure Pathways

FMEA Process – 5 Questions

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- For each Failure Pathway, ask
 4. How likely is it to occur? – Occurrence
 5. What is the chance we can detect and stop it? – ‘Stop-ability’ (Lack of Detectability)

On a Scale From 1 – 10...

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Rank	Occurrence (O)		Severity (S)		Detectability (D)
	Qualitative	Frequency	Qualitative	Categorization	Estimated Probability of failure going undetected in %
1	Failure unlikely	1/10,000	No effect		0.01
2		2/10,000	Inconvenience	Inconvenience	0.2
3	Relatively few failures	5/10,000			
4		1/1,000	Minor dosimetric error	Suboptimal plan or treatment	1.0
5		<0.2%	Limited toxicity or tumor underdose	Wrong dose, dose distribution, location or volume	2.0
6	Occasional failures	<0.5%			5.0
7		<1%	Potentially serious toxicity or tumor underdose		10
8	Repeated failures	<2%	Possible very serious toxicity or tumor underdose		
9		<5%		20	
10	Failures inevitable	>5%	Catastrophic		>20

FMEA Process – Prioritize and Act

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- Calculate Risk Priority Number
 - Sort Failure Modes/Pathways by Risk Priority Number
- Make process changes
 - Reduce 'Occurrence'
- Introduce QA steps
 - Reduce 'Lack of Detectability'

TreatSafely's Online FMEA Tool

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- www.treatsafely.org
 - Quality Improvement Toolbox
- Create an account free of charge
 - Define Failure Modes/Pathways
 - Rank Severity, Occurrence, and Lack of Detectability
- Can be conducted as a group, or individually

TreatSafely's Online FMEA Tool

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The screenshot displays the 'FMEA Results' page of the TreatSafely online tool. The page features a header with the text 'The Flexible FMEA Prospective Patient Safety' on a background of autumn leaves. Below the header, there is a section for 'FMEA Results' which includes a login status notification 'You are logged in as global' with 'Logout' and 'Change Password' buttons. The main content area contains a table of FMEA results, sorted by Risk Priority Number (RPN). The table has seven columns: Process, Failure mode, Severity, Failure Pathway, Occurrence, Detectability, and RPN. The results are as follows:

Process	Failure mode	Severity	Failure Pathway	Occurrence	Detectability	RPN
Imaging	Suboptimal image quality	2	Inadequate artifact suppression	4	4	32
Therapy Imaging	Incorrect manual shift applied (5mm for head and neck, or 10 mm for prostate treatment)	1	Incorrect patient orientation recorded in imaging software (ex. head first instead of feet first)	5	5	25
Imaging	Suboptimal image quality	2	Omission of contrast	3	3	18
Therapy Imaging	Incorrect manual shift applied (5mm for head and neck, or 10 mm for prostate treatment)	1	Non-identical coordinate systems	4	4	16
Imaging	Incorrect anatomical site imaged	1	Communication failure	3	3	9
Immobilization	Inadequate immobilization (patient is able to move, ex. 5mm for head and neck, or 10mm for prostate treatment)	1	Incorrect/inappropriate immobilization method used	3	3	9
Therapy Imaging	Incorrect manual shift applied (5mm for head and neck, or 10 mm for prostate treatment)	1	Inadequate QC of registration/shift software	3	3	9

Summary

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- We've performed a mini-FMEA
- We've looked at the benefits of FMEA
- Discussed some practical guidelines for performing an FMEA
- Looked briefly at our online FMEA