TG 230 – MPPG 3: The Development, Implementation, Use and Maintenance of Safety Checklists

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MAYO CLINIC Radiation Oncology

Safety Checklist - Utilization

20% 1. We use Checklists effectively
20% 2. We use Checklists ineffectively
20% 3. We do not use checklists in our practice
20% 4. Checklists are a waste of time
20%

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Would our field benefit from guidelines on developing safety checklists?

20% 1. Yes
20% 2. No
20%
20%
20%

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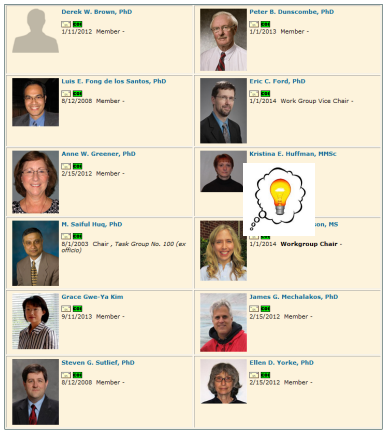
The Story

Work Group on Prevention of Errors in Radiation Oncology



Using simple and accessible tools

How can we improve safety and quality in our field??

Checklists

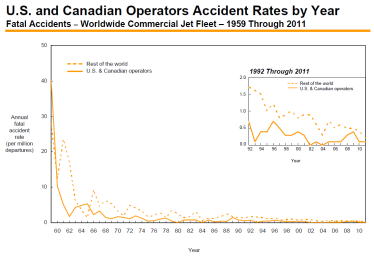
TG-230 / MPPG-3
The Development, Implementation, Use and Maintenance of Safety Checklists

Peter J. Pronovost, MD, PhD (Consultant)

Start: 6/26/2012

Checklists - Background

- Checklists have been extensively validated in non-medical and medical fields for many years, and have proven to be an effective tool in error management and a key instrument in reducing the risk of costly mistakes and improving overall outcomes.



Boeing 2012

Checklists - Background

- Pronovost P, *et al.* An intervention to decrease catheter-related bloodstream infections in the ICU. *New England Journal of Medicine* 2006
  - Reducing hospital-acquired infection rates by 70%.

- Haynes AB, *et al.* A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. *New England Journal of Medicine* 2009
  - Improved compliance with standards of care by 65% and reduced surgical mortality by nearly 50%

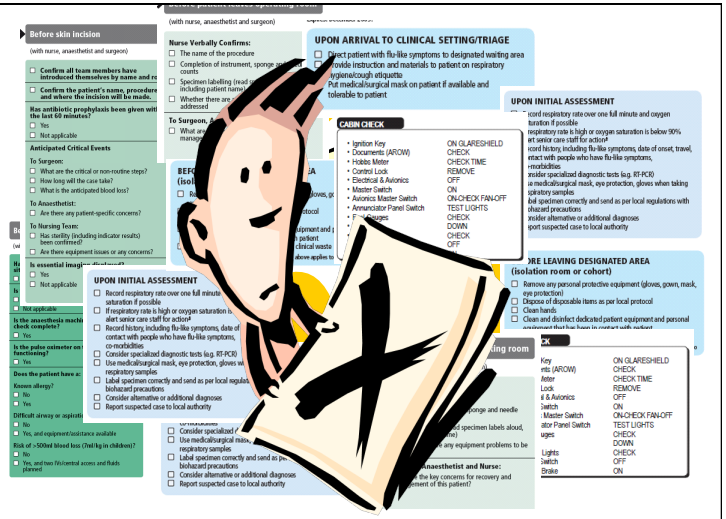
- What about **Radiation Oncology**, **Diagnostic Imaging**, **Nuclear Medicine** and **Medical Physics**?

Achievable Goals

- Compliance improvement of clinical protocols, procedures and processes
- Reduction of near-misses in critical clinical processes
- Enhancement of communication and team dynamic
- Improve practice standardization
- Streamline workflow

Role of Checklists in Error Management

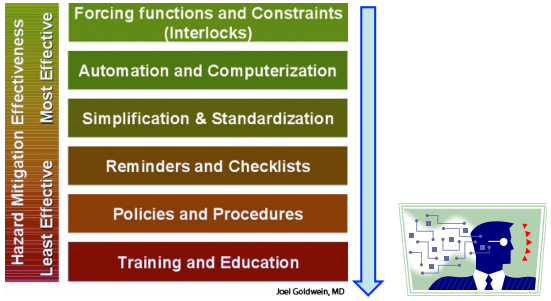
- Basic memory guide those tasks that are easily forgotten; allowing the team to concentrate on tasks that require full attention (Gawande 2009)
- Checklists function as a supporting interface among individuals, and between individuals and their environment (Patient Safety Primers: Checklists)



Sociocultural Component of Checklists

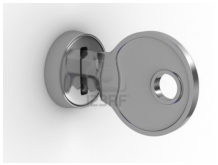
- The mistake of the "simple checklist" story is in the assumption that a technical solution (checklist) can solve and adaptive (sociocultural) problem." (Bosk et al. 2009)

Hazard Mitigation Effectiveness

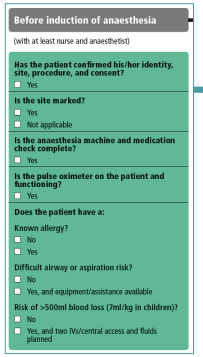


Courtesy of J. Goldwein, Elekta, AB.

Forcing Function



Checklist



- Procedure
- Process
- System

- Motivation
- Perception
- Interpretation
- Discipline
- Fatigue
- Distraction
- Compliance
- Mood
- Cooperation
- Etc.

Drill Bit

+

Drill Bench

Checklist in Airline Industry

Checklists

+

Crew Resource Management (CRM)

CRM focuses on:
interpersonal communication,
leadership, and
decision making

Checklist in Medical Industry

Checklists

+

Safety Culture

Factors of Safety Culture:
Commitment of upper level management to safety
Shared attitudes towards safety and hazards
Flexible norms and rules to deal with hazardous situations
Organizational learning

Pidgeon and O'Leary 2000

The Organization and Checklists

Pronovost's - Michigan Keystone ICU experience:

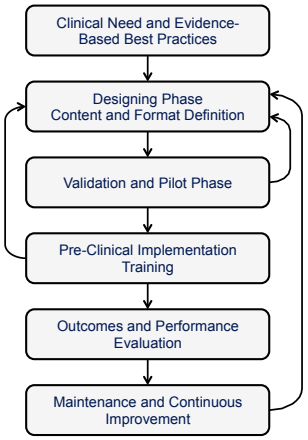
- Summarizing, simplifying and standardizing the process,
- Creating internal social networks with shared sense of mission and mutual reinforcement mechanisms,
- Gathering, measuring and providing feedback on clearly defined outcomes,
- Developing and supporting a Just and Safe Culture

(Dixon-Woods et al. 2011)

Checklists – What's Next?

- The first step on developing checklists is to find those areas or processes with the strongest evidence and clinical impact and have the lowest barriers for implementation and utilization (Bosk et al. 2009)
- Poor selection or ambiguity on the checklist goal, role or tasks will most likely lead to failure on the checklist intervention (Gurses et al. 2008)
- The selection process should concentrate on the "killer items"

Checklist Development and Implementation Process



TG-230 – *in progress*

Simple versus Complex Environments and Processes

Single physicist practice with one linac and developing a checklist for setting water tank

- Multidisciplinary group developing a checklist for a specialized procedure
  - Examples: SBRT, SRS, Angiogram, CT Scan, etc.

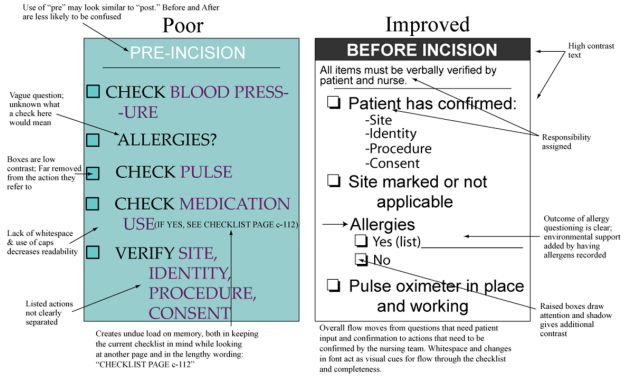
- Large practice developing a checklist for pre-treatment physics plan check

Gather the Team

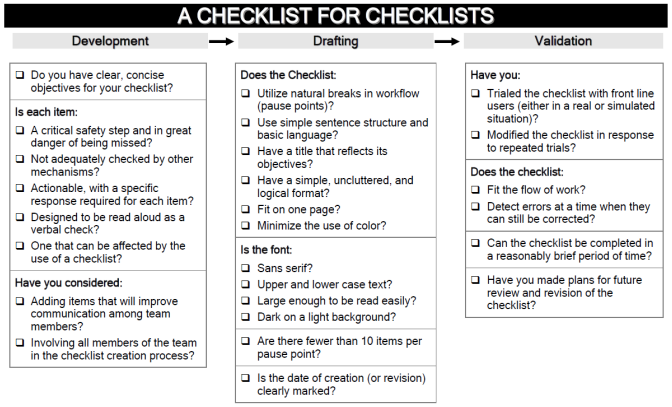
- Team approach should be used throughout all the phases of development, implementation and maintenance of a specific checklist

Human Factors Engineering (HFE)

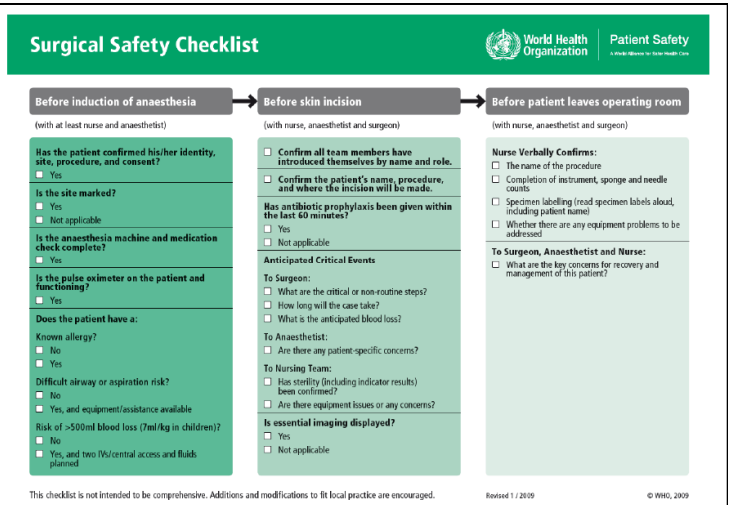
- HFE uses knowledge about human characteristics, both capabilities and limitations that are relevant during any designing process and aims to optimize the interactions among people, machines, procedures, systems and environments
- Checklist design recommendations can be classified into three main areas:
  - Physical Characteristics
  - Content
  - Layout and Format

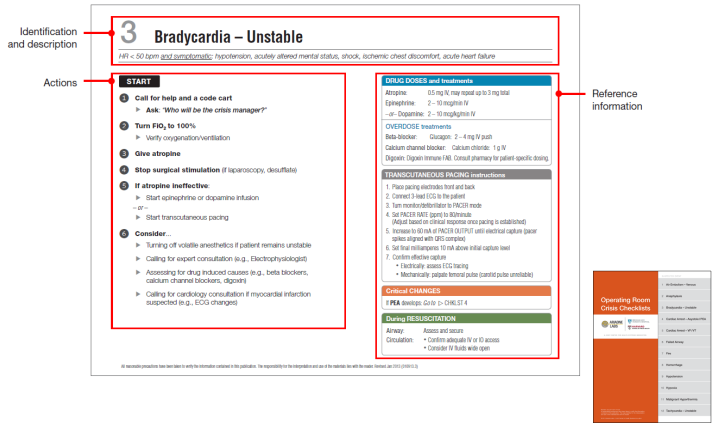


McLaughlin, A. C. (2010). What Makes a Good Checklist. In, (AHRQ) - http://www.webmm.ahrq.gov/perspective.aspx?perspectiveID=92



Atul Gawande's website Project Check (http://www.projectcheck.org/checklist-for-checklists.html)





Operating Room Crisis Checklist - Brigham and Women's Hospital - http://www.projectcheck.org/crisis-checklist-templates.html

TP Smart Planning Checklist

Patient Name: TEST Patient MRN: 00000000

Demographic Information:

Treatment Category: ☑ Plan ☐ Calc / TBI
Treatment Machine: 444 Modality: 6X
Planning Technique: ☐ Wedges ☑ DMLC
Beam Modifiers: ☐ Bolus ☐ Blocks ☐ Spoiler
IGRT/Motion Monitoring: ☑ 2D OBI ☑ 3D OBI
Respiratory Monitoring: ☐ Gating/DIBH
Patient/Plan Specific: ☐ Pacemaker/Defib ☐ Prev Treatment ☐ Iso Shift ☑ Couch Kicks
Site: ☐ Breast w/ PAB ☐ H&N w/ LAN ☐ Thorax
Immobilization Type: Body Stereo Cradle IV

Review each item:

☑ * New TP Database has been filled in and checked over *
☑ 1. **Isocenter:** Confirm consistency of:
- transfer from Pinnacle/GE to TPS
- transfer of CT from TPS to ARIA
☑ 2. **Prescription:** Confirm consistency of Dose per fraction and prescription isodose level between:
- Prescription
- Plan cover sheet
- MU calc sheet
- ARIA
☑ 3. **Transmission Factors:** Considered if necessary and if so, *are for correct energy*
- Consider Imaging Couch factor
- Consider Body Stereo Cradle IV factor
☑ 4. **Aria:**
- **MU's consistent between MU calc sheet and Aria**
- **DRR's have correct iso coordinates burned into image**
- **DMLC Run # consistent b/w TPS and Aria and MLC Check shows "match" for all fields**
- Fields with couch kicks use "A" tolerance tables (except cranial SRS)
☑ 5. **Spin/Imaging**: Field ID's / images are correct in SPIN

Planner: ABC Covering Planner: DEF

Necessary additional supporting documentation:
- 3D OBI Pre-Treatment QA and Shift Record

Group at Memorial Sloan-Kettering Cancer Center

HDR Breast Brachytherapy Record

Patient ID

Planning

- ☐ Isodose plan printed
- ☐ Treatment times printed
- ☐ Plan approved
- ☐ Plan validated
- ☐ Physics check performed
- ☐ Consents verified
- ☐ Lengths entered

Dose/Fx on Rx: ____ Gy
Dose/Fx on Plan: ____ Gy
Number of Fx on Rx: ____
Number of Fx circled below: ____

Fraction:	1	2	3	4	5	6	7	8	9	10
Date:										
Time:										
Patient Survey Before Tx:										
Time Out										
On hand: Survey Meter, Lead Container, Tongs										
Two Forms of I.D										
Tx times compared with printout										
Applicator Imaging Verified by: (MD initials)										
Applicator Connected by: (initials)										
Connection Verified by: (initials)										
Backup Timer Set (Minutes & Seconds)										
Authorized User Signature										
Post Treatment										
Survey room & record										
Review Post Tx printout (sign and file)										
Dose per Fraction (Gy)										
Total Accumulated Dose (Gy)										
Operator (initials)										
Authorized Medical Physicist (initials)										

ABS 2013 Revised on 07-30-2013

Same Clinical Process – Different Groups

Physics Checklist: Weekly QA of Chart

- ☐ Prescription signed in Diagnoses and Interventions (D&I) in MOSAIQ
- ☐ Treatment fields scheduled correctly and match in D&I
- ☐ CBCT scheduled correctly (if applicable)
- ☐ Weekly SSD checks performed and correct
- ☐ Check notes
- ☐ Complete chart check module

For new-start cases only:

- ☐ Case presented at QA rounds
- ☐ Attending ordered CBCT (if applicable)
- ☐ Attending ordered weekly physics check
- ☐ Diode measurements complete and signed (if applicable)
- ☐ IMRT or VMAT QA document complete and signed (if applicable)

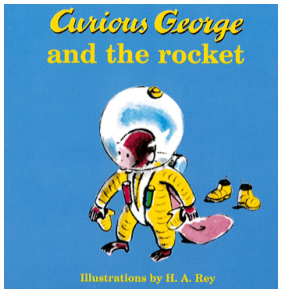
Medical Physics Treatment Planning Weekly Chart Check

- ☐ Prescription complete and consistent
- ☐ Plan consistent to prescription
- ☐ Plan QA complete
- ☐ Treatment parameters verified
- ☐ Bolus verified
- ☐ Compensators and field modifiers verified
- ☐ Fractions delivered check
- ☐ Fractions remaining check

Further action(s) required:_____

Emphasize the fact that each practice needs to go through their **own** implementation and validation process

Checklists **meets their specific** needs



Successful Checklists

- Effective checklists support the human thinking and creativity, allows constructive team member interactions, and facilitates a systematic care delivery.
- Effective checklists require a strong organizational and social infrastructure, as well as the application of well-defined human factor engineering concepts for their success.
- Checklists alone cannot do much; checklists in the appropriate organizational environment can definitely be an exceptional safety management tool.

Acknowledgements

MPPG - #3 (TG-230): The Development, Implementation, Use and Maintenance of Safety Checklists

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•Lynne A. Fairobent, BS

Is **safety culture** a fundamental component of safety checklists?

Complex processes and environments

20% 1. Yes. Safety Culture provides the foundation for effective safety checklists

20% 2. No. Top-down approach is the most effective way to implement checklists

20%

20%

20%

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MPPG 3 - Utilization

20% 1. I am planning on using the MPPG-3 in my practice

20% 2. I am planning on doing my own research on checklists

20% 3. I still do not believe in checklists. In fact next time I go camping, I am planning on using the MPPG 3 document to start my fire.

20%

20%

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