International Organization for Medical Physics

Scope and purpose of the Workshop

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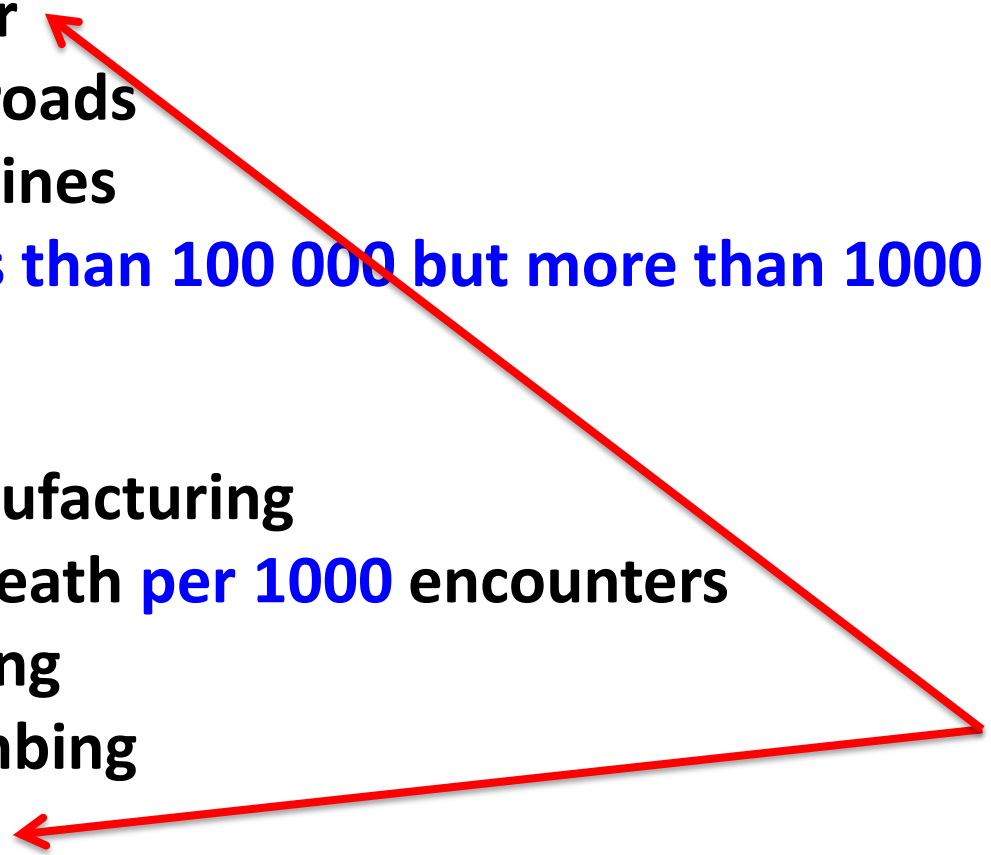
MGH 1811 MASSACHUSETTS GENERAL HOSPITAL

VE RI TAS HARVARD

How dangerous is health care?

- Less than one death per 100 000 encounters
  - Nuclear power
  - European railroads
  - Scheduled airlines
- One death in less than 100 000 but more than 1000 encounters
  - Driving
  - Chemical manufacturing
- More than one death per 1000 encounters
  - Bungee jumping
  - Mountain climbing
  - Health care

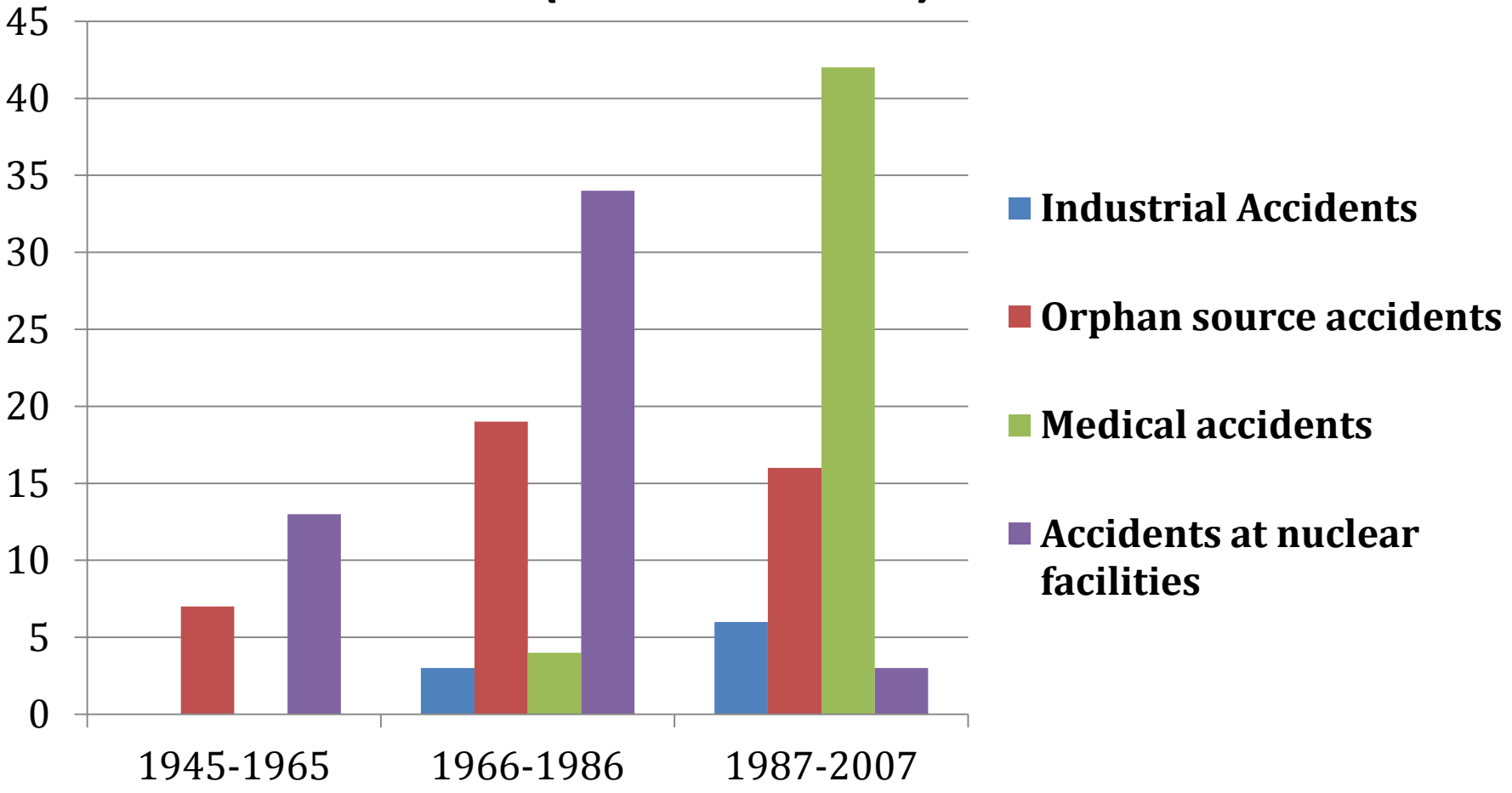


Medical errors

- **In the United States medical error results in at least 44,000 (and perhaps as many as 98,000) unnecessary deaths each year and 1,000,000 excess injuries**

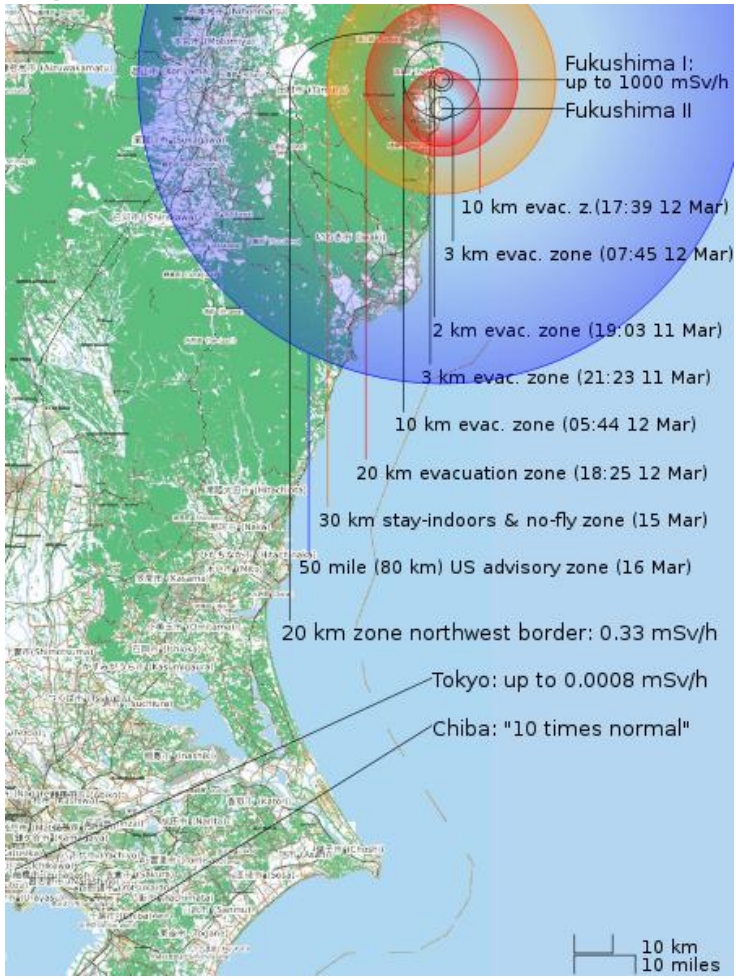
Radiation in Health Care & comparison with non-medical

Deaths in Radiation activities (UNSCEAR)*



*United Nations Scientific Committee on Effects of Atomic Radiation

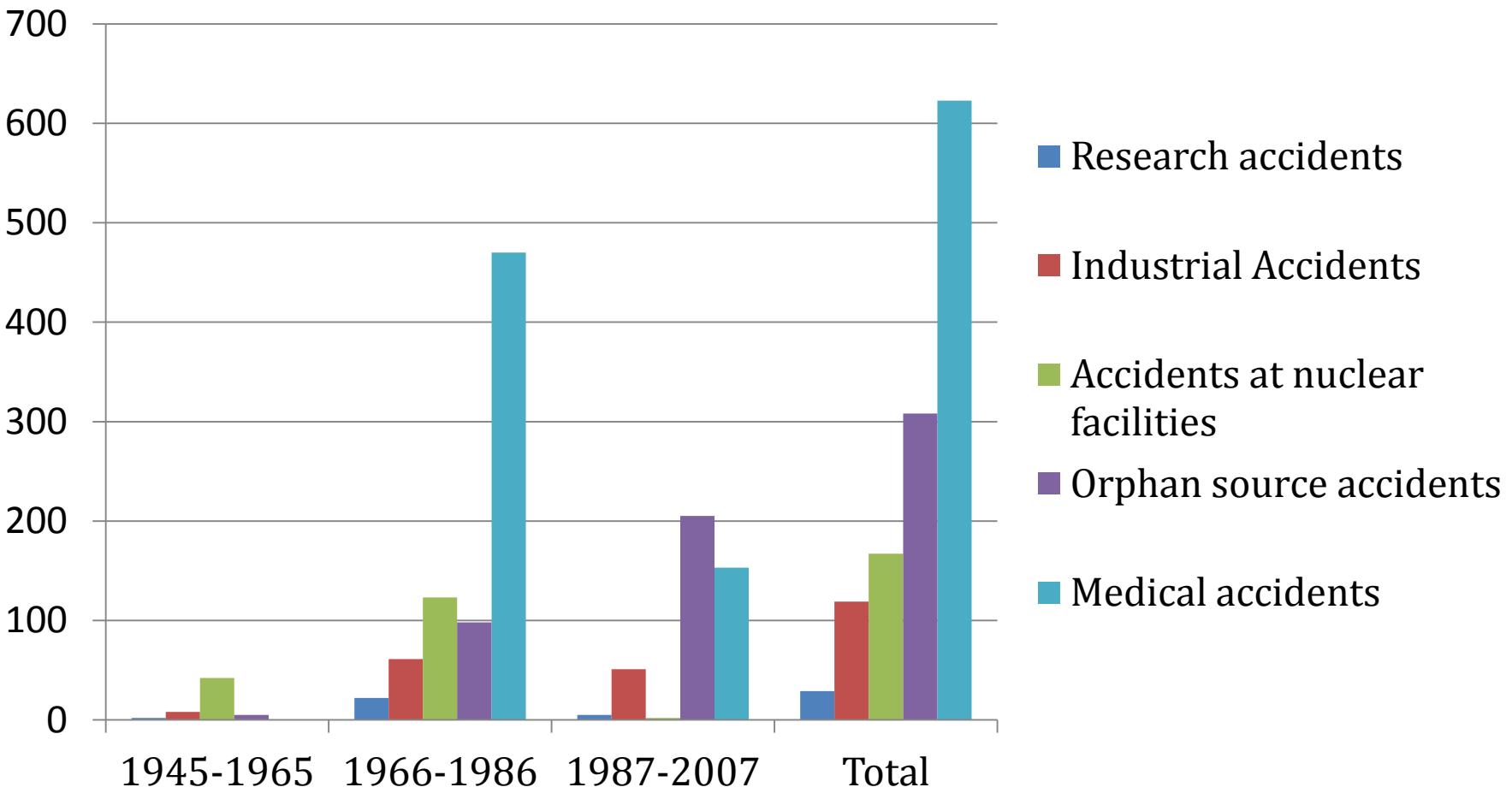
Fukushima



How many deaths because of radiation???


zero

Early Acute Health Effects

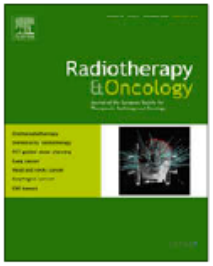


Radiotherapy and Oncology 93 (2009) 609–617

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com



Unintended exposure in RT

Unintended exposure in radiotherapy: Identification of prominent causes ☆

Mary Boadu [a,b,*], Madan Mohan Rehani [a]

[a] *International Atomic Energy Agency, Vienna, Austria;* [b] *Ghana Atomic Energy Commission, Accra, Ghana*

Table 3
Ten most prominent contributing factors with 10 or more instances of occurrence, arranged in descending order.

Contributing factor	Number of incidents, frequency	Normalized frequency (%) of total
5a. A lack of awareness or alertness or inattention to detail	39	14.0
3b. No independent check before treatment of beam calibration, source strength or decay curves	33	11.8
2b. A lack of clear and concise written procedures	19	6.8
1a. Insufficient formal training of the radiotherapy staff	17	6.1
3c. Failure to verify for consistency different sets of data	17	6.1
3a. A lack of harmonization or a lack of verification of the source strength delivered	15	5.4
2a. A lack of a programme or inappropriate or incomplete procedure for acceptance testing and commissioning	14	5.0
5c. Poor housekeeping including negligence	14	5.0
3d. A lack of compliance with documented and accepted procedures or protocols	12	4.3
6a. Failure to transmit essential information	11	3.9

Over exposures with CT Machines

Rehani & Srimahachota, Rad Prot Dos. Sep 2011:147(1-2):8-12

e 1. Skin injury in a patient with chronic total occlusion. a) 2 mths, b) 6 mths, c) 8 mths after last PCI, and d) after the flap surgery.

Safety issues

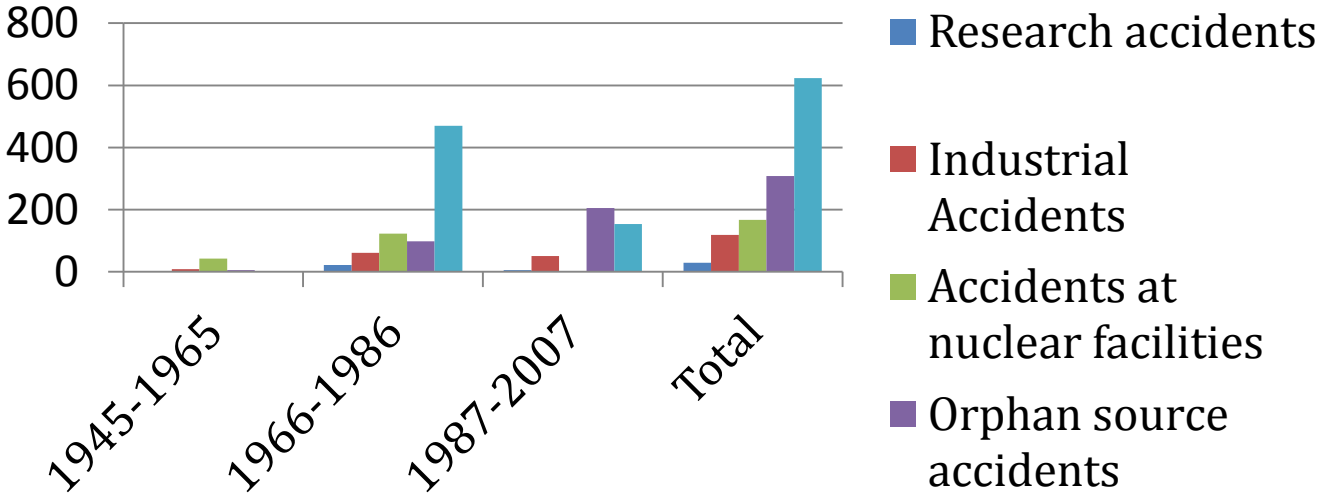
- **>3000 patients affected by radiotherapy incidents that led to adverse events (IAEA, WHO)**
- **About 40 patients died due to radiation overdose in RT (IAEA, WHO)**
- **> more than 4500 near misses (IAEA, WHO)**
- **Estimated 3600 skin injuries in interventional procedures (Rehani & Srimahachota 2011)**

Safety Issues

- **20-50% radiological examinations may inappropriate (IAEA)**
- **Scope for almost 50% dose reduction through optimization in imaging**
- **Misadministration in nuclear medicine**
- **Radiation safety issues in fluoroscopy outside radiology**
- **Cataract/Lens opacities in Interventionalists**

Safety actions

- **Optimization: Several papers every week**
- **Justification: Lot is ongoing**
- **Training**



Radiation accidents in medical facilities do have RISKS

For international organizations

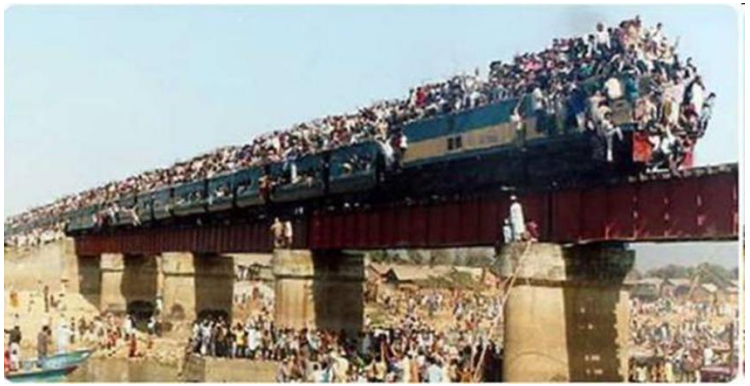
- A problem is considered worthy when it could solve a problem for a million people.

Global Scenario

United Nations Scientific Committee on Effects of Atomic Radiation (UNSCEAR)

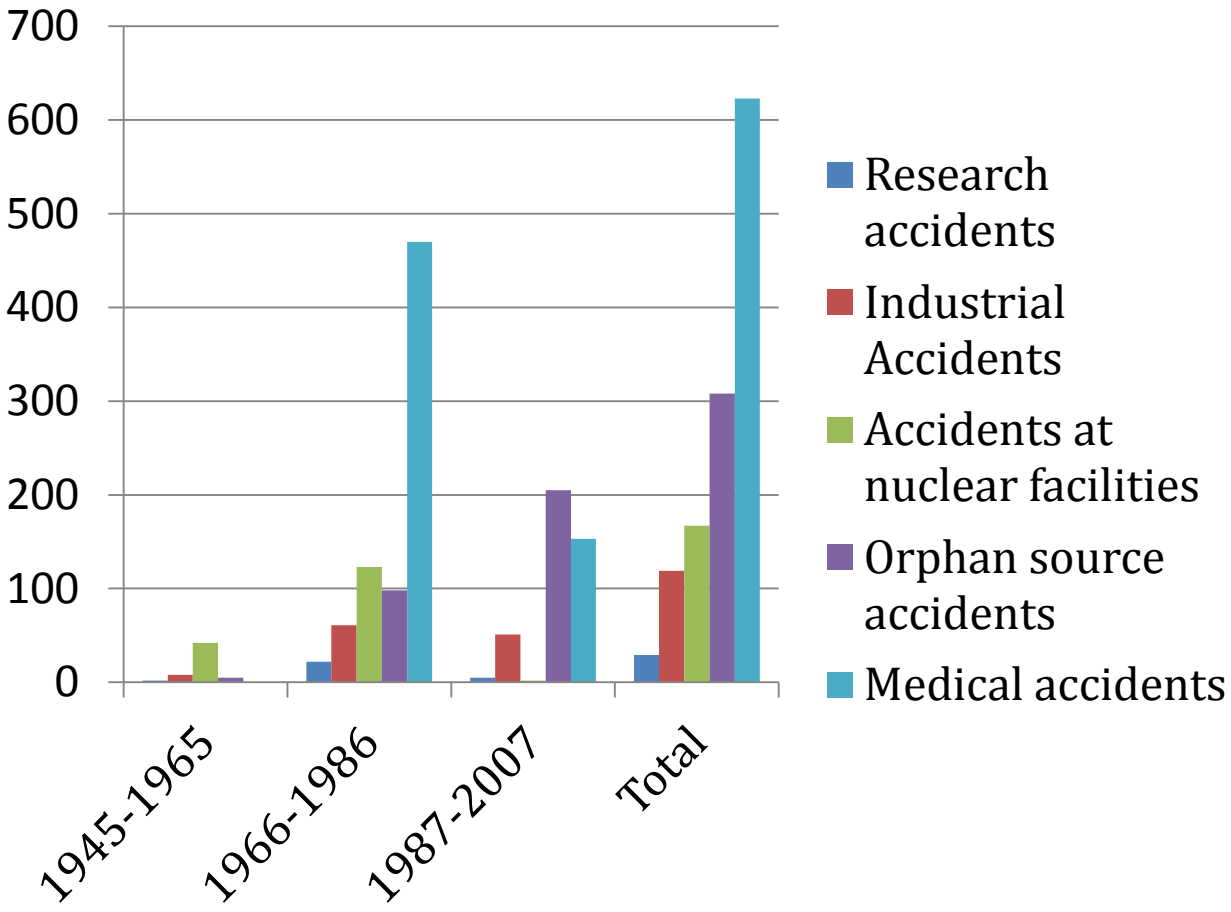
2010

- **3.6 billion medical X ray procedures/year**
- **About 35 million nuclear medicine examinations**
- **About 5 million patients radiotherapy treatments**



Challenge!!!!!

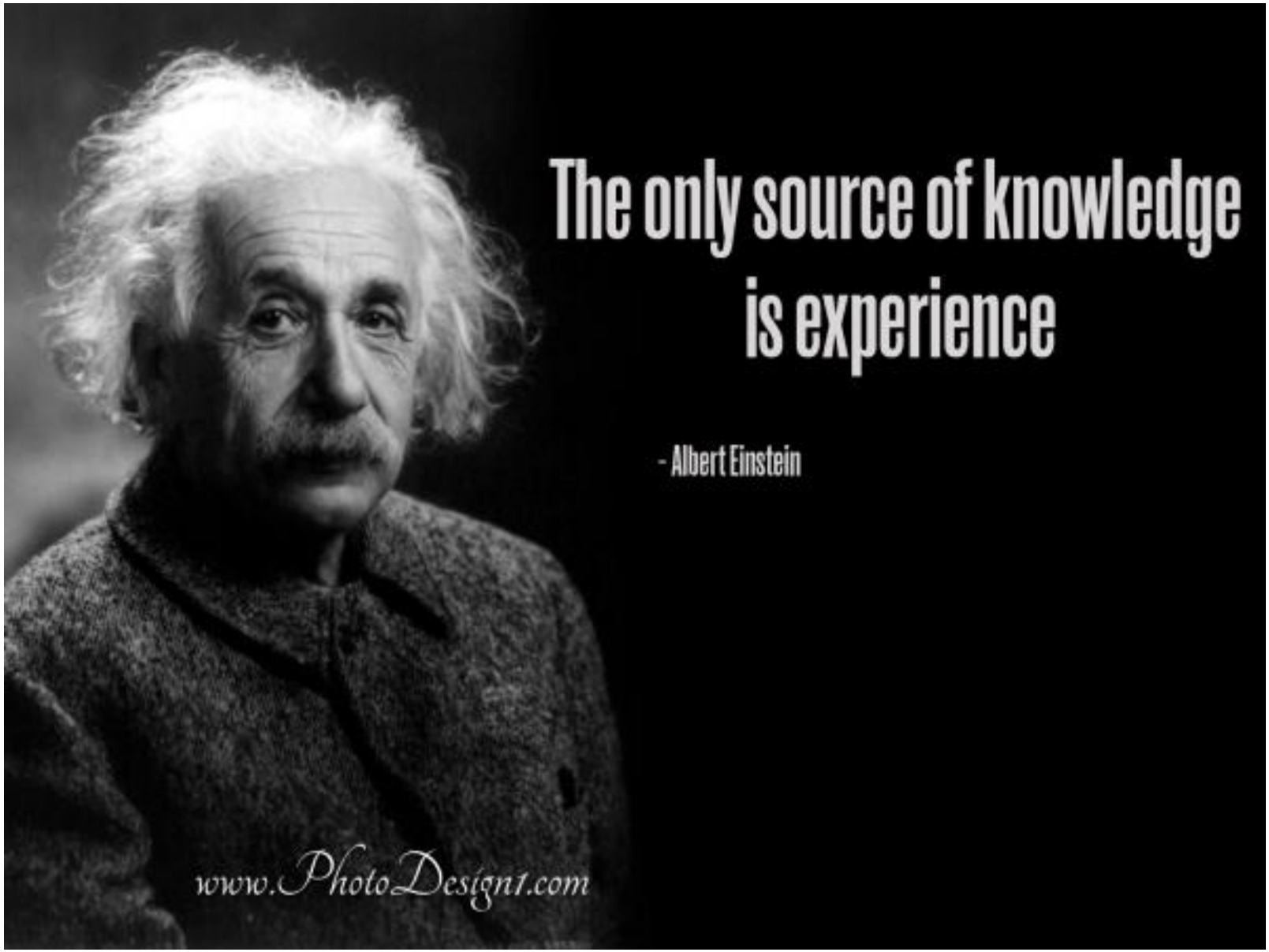
Can we afford to be silent?



Cultural shift needed

Radiation Protection Culture

Addition of the attitudes, beliefs, perceptions and values that employees share in relation to safety


The only source of knowledge is experience
- Albert Einstein
www.PhotoDesign1.com

MASSACHUSETTS GENERAL HOSPITAL

QUALITY & SAFETY

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QUALITY AND SAFETY AT MGH:
IMPROVING EVERY DAY SINCE 1811

REPLAY

Serious Reportable Events

See the complete list of the Serious Reportable Events at MGH for 2013, with descriptions and improvement actions. This posting is in accordance with the Department of Public Health requirements and our own commitment to transparency in healthcare.
Learn more »

Improvement Stories:

Patient Safety Awareness Week: At MGH, It's the Week that lasts all year…
A lot has happened since Ether! Watch a video of our 2015 Patient Safety Awareness Week forum, and learn about some of the patient safety improvements over the years at MGH.
Learn more »

Performance Reports:
Our Performance, Our Goals and How We Compare

At Massachusetts General Hospital, we track many measures of our institutional performance. We compare our performance to our goal and take steps to improve.

Explore this Web site to see for yourself how we are doing and what we do to ensure that all of our patients receive the highest quality and safest care possible. Read More »

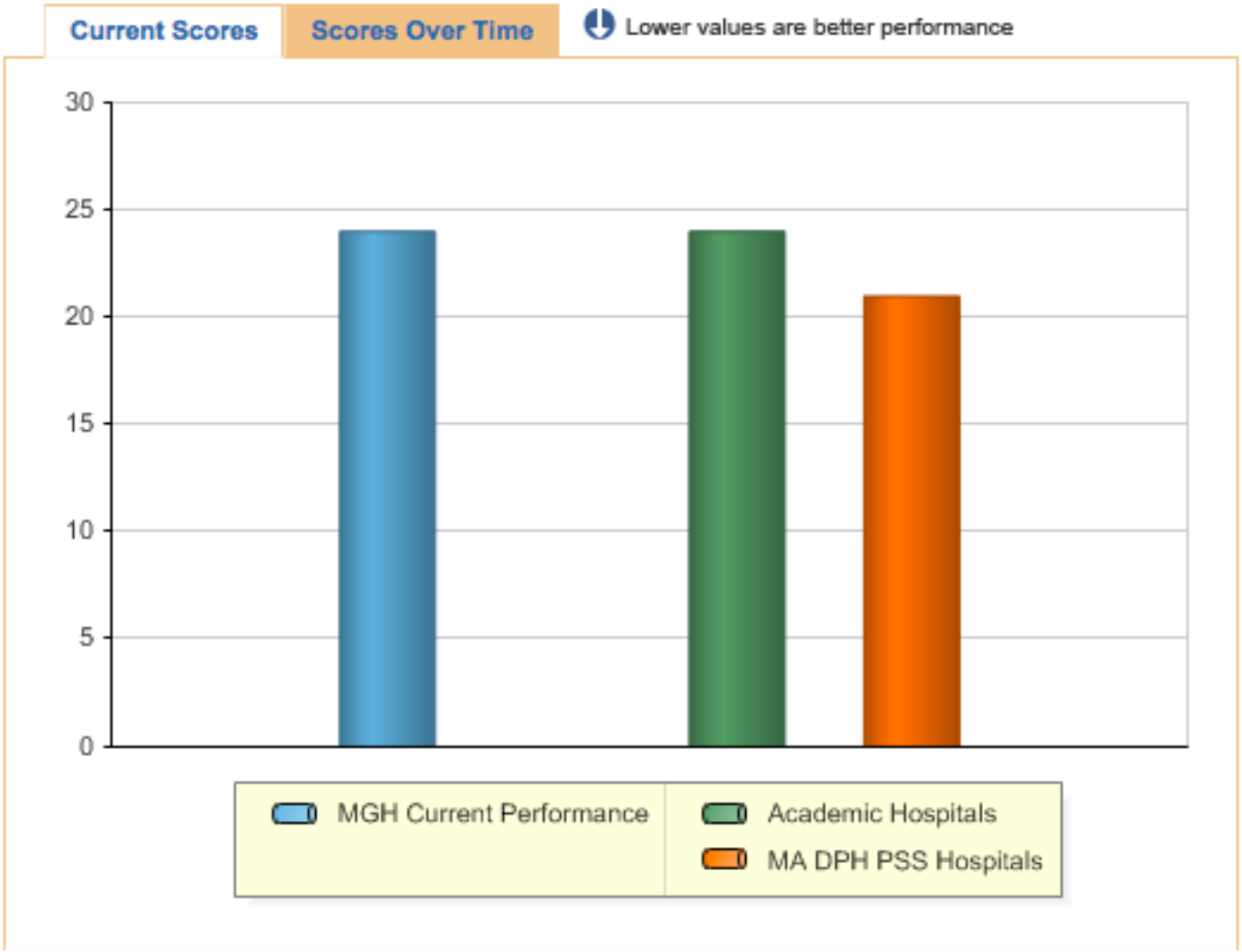
Go to a specific measure:

Stroke: Door to CT Scan: Percent (%) within 25 Minutes

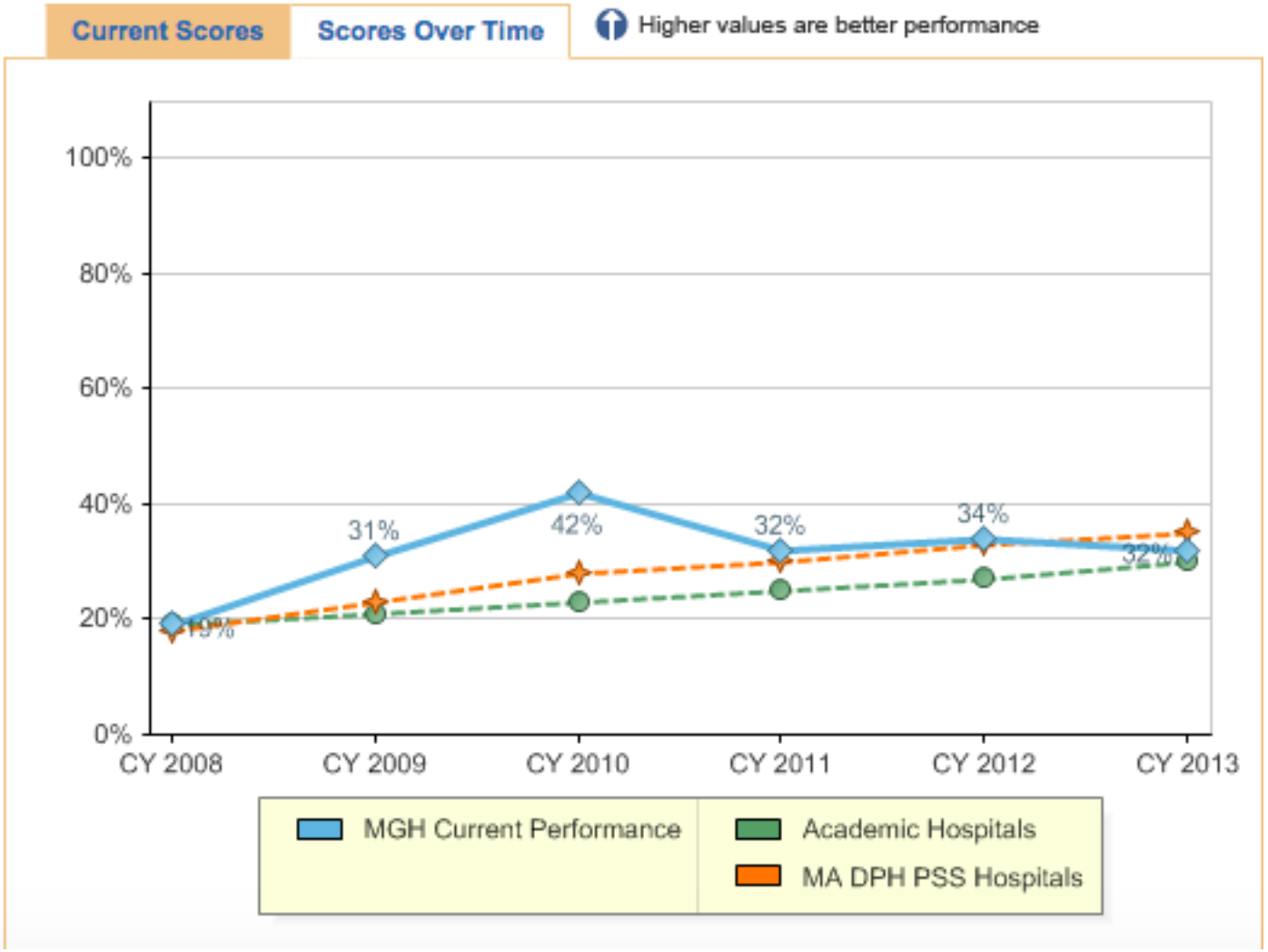
Patient Experience-Adult Inpatient: Communication about Medications
Patient Experience-Adult Inpatient: Communication with Doctors
Patient Experience-Adult Inpatient: Communication with Nurses
Patient Experience-Adult Inpatient: Discharge Information
Patient Experience-Adult Inpatient: Overall Rating
Patient Experience-Adult Inpatient: Pain Management
Patient Experience-Adult Inpatient: Quiet at Night
Patient Experience-Adult Inpatient: Recommendation
Patient Experience-Adult Inpatient: Responsiveness of Hospital Staff
Patient Experience-Adult Inpatient: Room Cleanliness
Pneumonia: Selection of Antibiotics (PN)
Pneumonia: Timing of Blood Cultures
Providing Equitable Care: ACE-I/ARB at Discharge (AMI)
Providing Equitable Care: ACE-I/ARB at Discharge (HF)


-- Select One --
Healthcare Associated Infections: Central-Line Associated Bloodstream Infections in the ICU
Healthcare Associated Infections: Hand Hygiene
Healthcare Associated Infections: MRSA Incidence
Healthcare Associated Infections: VRE Incidence
Heart Attack: ACE-I/ARB at Discharge (AMI)
Heart Attack: Aspirin at Arrival
Heart Attack: Aspirin at Discharge
Heart Attack: Beta Blocker at Discharge
Heart Attack: Time to Primary PCI of Less Than or Equal to 90 Minutes
Heart Failure: ACE-I/ARB at Discharge (HF)
Heart Failure: Discharge Instructions (HF)
Heart Failure: LVF Assessment
Influenza (Flu) Vaccination Rate: Employee Influenza Vaccination Rate
Leapfrog Quality Measures: Maternity Care: Maternity Care Standard Precautions
Leapfrog Quality Measures: Maternity Care: Maternity: Rate of Early Elective Deliveries
Leapfrog Quality Measures: Maternity Care: Maternity: Rate of Episiotomy
Leapfrog Safety: Appropriate ICU Staffing
Leapfrog Safety: Managing Serious Errors
Leapfrog Safety: Prevent Medication Errors (Use of CPOE)
Leapfrog Safety: Reduce Central-Line Infections in ICUs
Leapfrog Safety: Steps to Avoid Harm (Safe Practice Score)
Nursing Sensitive: Patient Falls with Injury on Medical Units
Nursing Sensitive: Patient Falls with Injury on Surgical Units
Nursing Sensitive: Pressure Ulcer Prevalence on Medical Units
Nursing Sensitive: Pressure Ulcer Prevalence on Surgical Units
OSHA Illness/Injury Rate: Occupational Illness and Injury Rate
Patient Experience-Adult Inpatient: Communication about Medications
Patient Experience-Adult Inpatient: Communication with Doctors
Patient Experience-Adult Inpatient: Communication with Nurses
Patient Experience-Adult Inpatient: Discharge Information
Patient Experience-Adult Inpatient: Overall Rating
Patient Experience-Adult Inpatient: Pain Management
Patient Experience-Adult Inpatient: Quiet at Night
Patient Experience-Adult Inpatient: Recommendation
Patient Experience-Adult Inpatient: Responsiveness of Hospital Staff
Patient Experience-Adult Inpatient: Room Cleanliness
Pneumonia: Selection of Antibiotics (PN)
Pneumonia: Timing of Blood Cultures
Providing Equitable Care: ACE-I/ARB at Discharge (AMI)
Providing Equitable Care: ACE-I/ARB at Discharge (HF)
Providing Equitable Care: Antibiotic Selection for Surgical Cases

Door to CT scan median time



Stroke: Door to CT time



Overall Rating

What are we measuring and why?

As part of a survey about their experience at Massachusetts General Hospital, hospital patients are asked to rate their overall experience at the hospital on a scale of 0 (worst possible hospital) to 10 (best possible hospital). This information gives us a broad view of how patients perceive their experience with us.

How are we doing and how do we compare to best practice?

Seventy-nine percent (79%) of MGH inpatients gave the hospital the top ratings of 9 or 10. This exceeds the current Centers for Medicare & Medicaid Services (CMS) national average of 71% and the Massachusetts State average of 69% (Jan 14-Dec 14, reporting for both). MGH has been surveying patients about their experiences routinely for more than a decade and we typically score very highly on these summary measures. Our improvement efforts are directed at more specific aspects of the patients' experience, which help to enhance our overall rating.

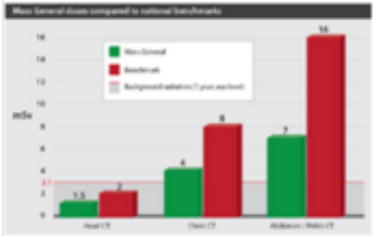
Our Commitment to Minimizing Radiation Exposure

- Mass General is a world leader in the development and implementation of dose-reduction technologies and methods.
- Our typical dose levels for CT exams are at minimum 30% lower—and as much as 95% lower—than reference levels used by the National Council on Radiation Protection.
- We customize CT exams for each patient based on weight, age, history, and other factors.
- Minimizing radiation exposure includes using radiation-free alternatives, such as ultrasound and MRI, when clinically appropriate.
- We maintain, upgrade, and replace equipment to ensure patient safety and take advantage of technology advances.

Although the life-saving value of imaging technology is undeniable, Massachusetts General Hospital Imaging understands the concerns that patients and their doctors have over radiation exposure, especially from CT (computed tomography) exams. Patient safety is a top priority for Mass General Imaging, and our entire organization—including radiologists, the technologists who administer most exams, researchers, and equipment engineers—is engaged in the effort to prevent accidental exposure and minimize the amount of radiation used in every exam.

The American College of Radiology (ACR) publishes guidelines on radiation levels for various types of scans. Mass General Imaging comes in well below these levels for most exams, according to Dr. Dushyant V. Sahani, Director of CT Imaging. For certain exams our doses are similar to the normal amount of background radiation a

RADIATION LEVELS



Radiation levels for common CT exams at Mass General, compared with national benchmarks and annual background radiation. Radiation measured in mSv (millisieverts).

PROGRESS OVER TIME

Reduction in average CT radiation dose:

25% - Head
28% - Chest
39% - Abdomen/pelvis
42% - CT enterography
55% - Kidney stone

» Delivering the Right Care
» Keeping Patients Safe
» Listening to Patients
» Providing Equitable Care
» Keeping Employees Safe

Key:

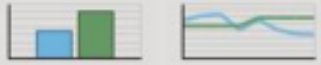
- The best possible results
- Better than comparison group
- Similar to comparison group
- Lags behind comparison group
- Not applicable
- Click on this icon to read an Improvement Story related to this measure

Keeping Patients Safe

Over the past decade, patient safety has become a topic of national concern and during this period, the health care industry has learned about improving patient safety from scientific study and from studying other industries, such as the aviation industry. Massachusetts General Hospital physicians, nurses, and scientists alike have been at the forefront of efforts to identify and address the various threats to safety in a hospital setting. All staff and employees at MGH are now, more than ever, focused on making our patients' hospital experiences free from harm.

Click on any of the measure names below to see a detailed description of the measure, our performance over time and what we are doing to improve. On the chart below, hover your mouse over the data columns or icons to see more information.

Lower values are better performance unless otherwise noted

Measure	Our Current Performance	Comparison Group	How We Compare
Healthcare Associated Infections			
MRSA Incidence 	0.29 new cases	0.39	
VRE Incidence 	0.36 new cases	0.61	
Central-Line Associated Bloodstream Infections in the ICU	1.27 infections	1.4	
Hand Hygiene	93% before	90% before	


PATIENT SAFETY
AWARENESS WEEK
"At MGH, It's the Week that Lasts all Year"

Number 1

MGH 1811

MASSACHUSETTS GENERAL HOSPITAL

Rank	Tie	Hospital	Points*	High-ranking specialties*
1		Massachusetts General Hospital, Boston	29	16
2		Mayo Clinic, Rochester, Minn.	29	15
3	T	Johns Hopkins Hospital, Baltimore	26	15
3	T	UCLA Medical Center, Los Angeles	26	15
5		Cleveland Clinic	26	14
6		Brigham and Women's Hospital, Boston	22	12
7		New York-Presbyterian University Hospital of Columbia and Cornell, N.Y.	20	12
8		UCSF Medical Center, San Francisco	18	12
9		Hospitals of the University of Pennsylvania-Penn Presbyterian, Philadelphia	15	11
10		Barnes-Jewish Hospital/Washington University, St. Louis	14	12
11		Northwestern Memorial Hospital, Chicago	14	9
12		NYU Langone Medical Center, New York	12	9
13		UPMC-University of Pittsburgh Medical Center	11	8
14		Duke University Hospital, Durham, N.C.	9	6
15		Stanford Health Care-Stanford Hospital, Stanford, Calif.	8	6

Scope & Purpose of this Workshop

1. **Learn from experience of others**

Exploring 30 years of Safety Culture

22–26 February 2016
Vienna, Austria

Organized by the

IAEA
International Atomic Energy Agency
Atoms for Peace

CN-237

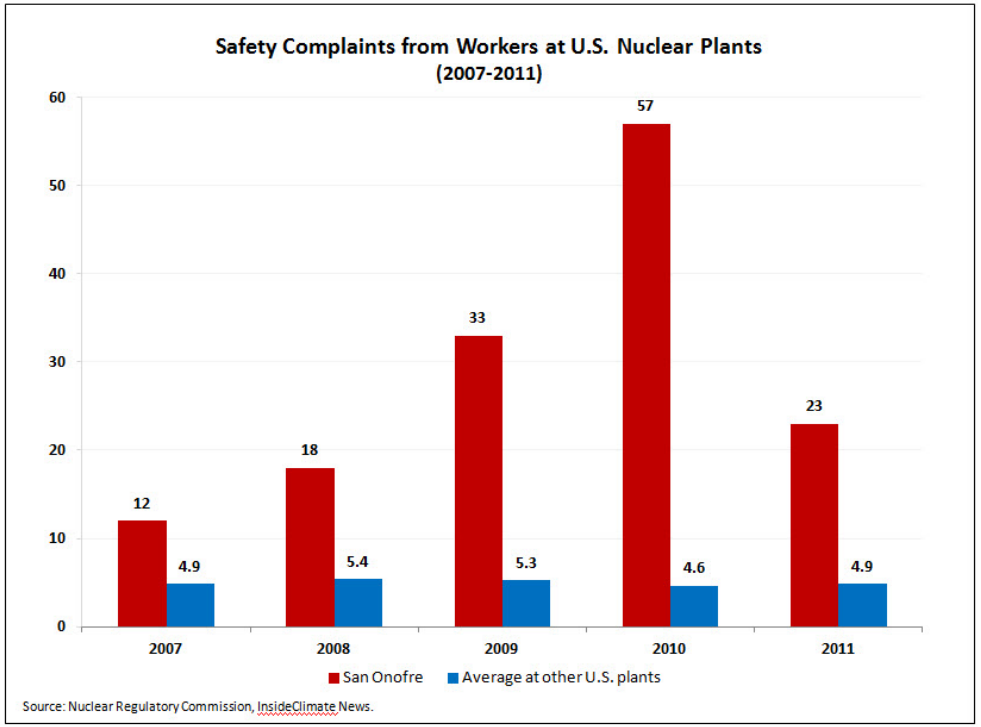


Figure 3. Button handed out upon completion of the Patient Safety Culture Survey

Do we have experience in implementing radiation safety culture in medicine?

Scope & Purpose of this Workshop

1. **Learn from experience in radiation protection culture from others (IAEA, WHO, IRPA, many others..)**
    a. **Concepts and understanding**
    b. **Results achieved**
2. **Agree on terminology**
    a. **Radiation safety culture or Radiation protection culture**
    b. **In Medicine or in Health Care**

Scope & Purpose of this Workshop

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3. **Work together to prepare a program for implementation in thematic areas**
   - **X-ray imaging (within & outside radiology)**
   - **Radiotherapy**
   - **Nuclear Medicine**

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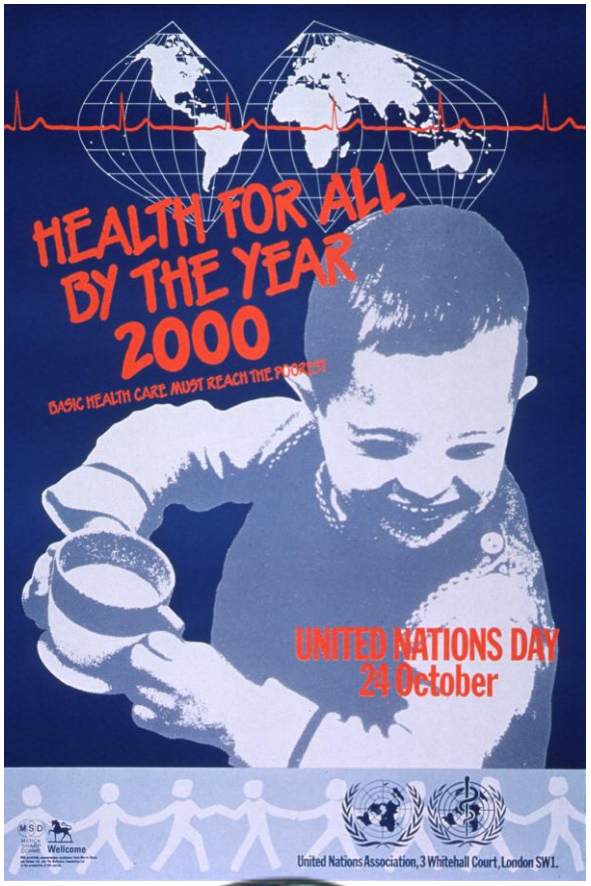
    - **X-ray imaging (within & outside radiology)**
    - **Radiotherapy**
    - **Nuclear Medicine**
4. **Organizational management level and Facility management level**

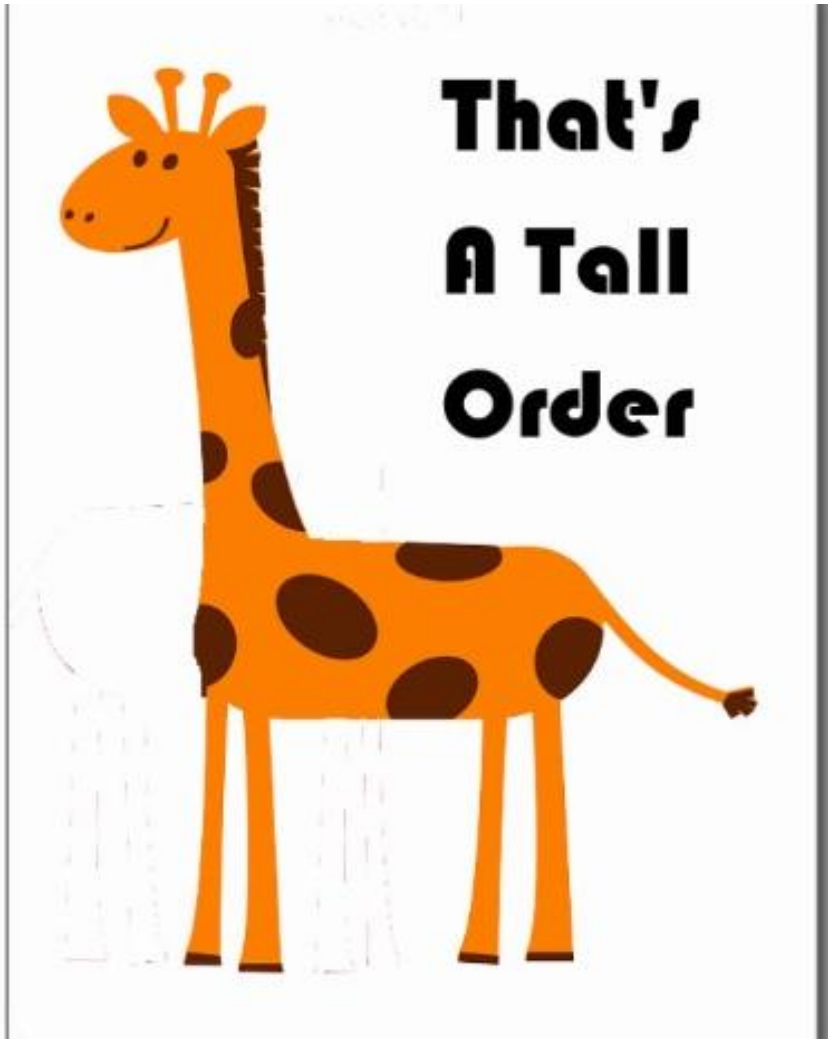
How to address issues (1)

Top down approach. Prescriptive

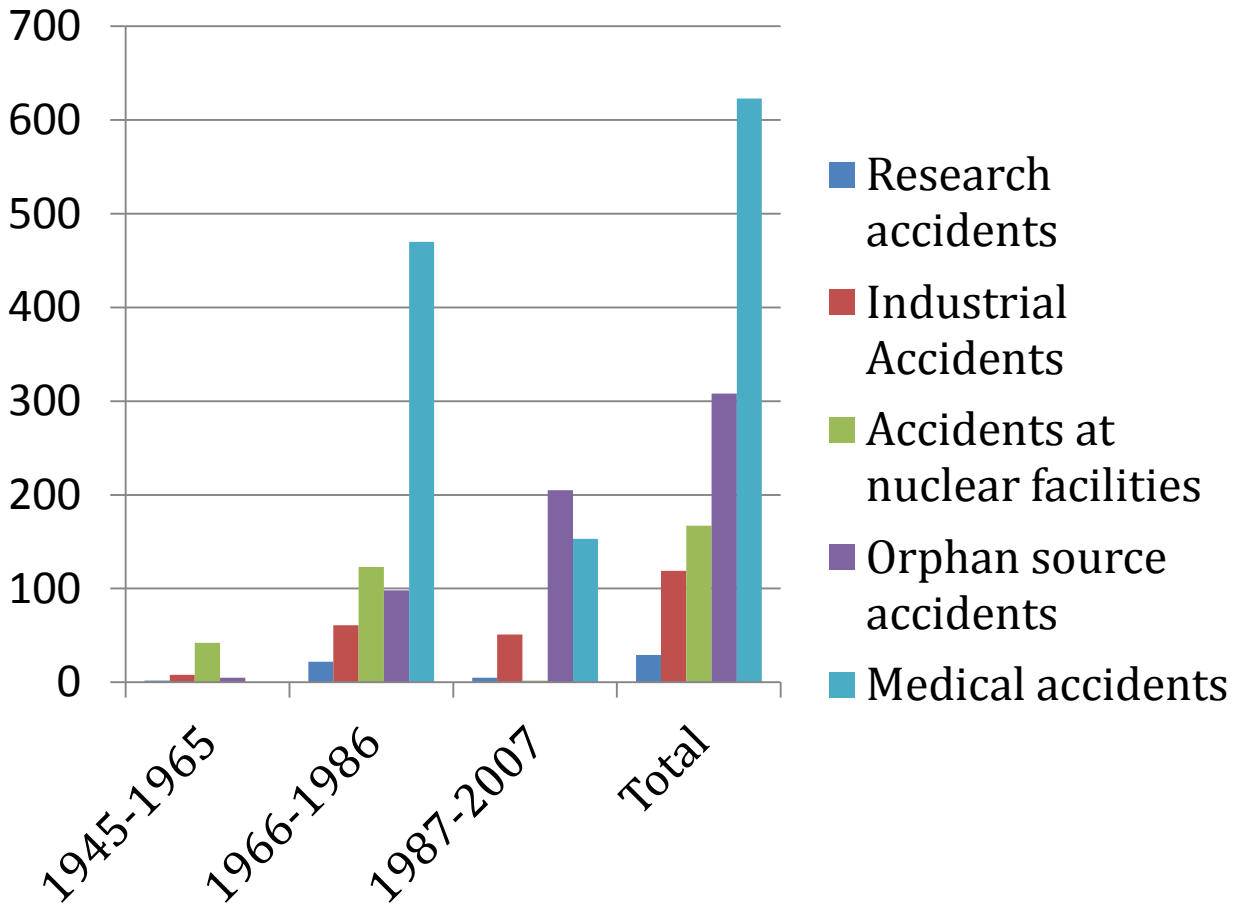
Addressing Problems (2)

Setting goals (3)





Reasonable Goals



?

2025

before → after

Further Expectations

- **Preparing a program for implementation**
- **Table of contents of a proposed document**
- **Few pages of the document**

Tentative Table of Contents (1)

1. **Defining culture and terminology**
2. **Radiation Safety culture in the medical applications**
3. **Safety culture in medicine as a part of organizational management**
4. **Tools for establishing and maintaining safety culture in medicine**
5. **Assessment of radiological protection culture in medicine**

Tentative Table of Contents (2)

1. **Defining culture and terminology**
2. **Radiation Safety culture in the medical applications**
3. **Safety culture in medicine as a part of organizational management**
4. **Tools for establishing and maintaining safety culture in medicine**
5. **Assessment of radiological protection culture in medicine**
6. **Examples of RP culture in medical facilities**
7. **Conclusions and recommendations**
8. **Annexes**

Tentative Table of Contents

1. **Defining culture and terminology**
   - What is safety culture & what is not
   - Radiation safety culture/ radiation or radiological protection culture
   - Current trends and need for actions in medicine
   - Need and Motivation for this document
   - Links with previous initiatives: BSS, IRPA Guiding Principles & Bonn Call to Action

Chapter 2

2. Radiation Safety culture in the medical applications

- Specific considerations applicable in medical settings
- Identifying stakeholders to build and maintain a RSCM or RPCM
- *???*

Chapter 3

Safety culture in medicine as a part of organizational management

- International guidelines
- Roles & responsibilities

Chapter 4

4. Tools for establishing and maintaining safety culture in medicine

- Policy statements
- Standards and regulations
- Role of voluntary actions
- Communications (Posters, flyers,…)
- Audit activities
- Education &training of various staff groups

Chapter 5

5. Assessment of radiological protection culture in medicine

- Tools for assessing RPCM
- Indicators of the level of RPCM
- Audit of RPCM

Chapter 6 and 7

- **Examples of RP culture in medical facilities**
  - Different scenarios & modalities (e.g. radiology departments, interventional radiology operating rooms, teletherapy and brachytherapy services, nuclear medicine departments, dental facilities, use of radiation outside the radiology department, places where referring physicians work, medical schools, other settings/scenarios)
    - what to do (issues)
    - what was done (actions)
    - what was achieved (results)

Chapter 7: Conclusions and recommendations

Appendices

- **Appendix 1:** Abbreviations
- **Appendix 2:** Glossary
- **Appendix 3:** References
- **Appendix 4:** Resources to learn more
- *Other/s ??*

International Organization for Medical Physics

IOMP

Thank You

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HARVARD

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