

International Conference
“Modern Radiotherapy: Advances and Challenges
in Radiation Protection of Patients”
Versailles/France, 02 – 02 December 2009

Education and Training

- The IAEA experience -

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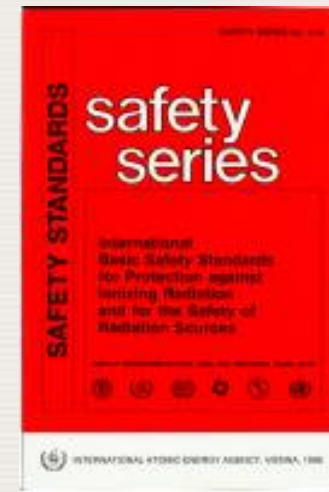


Development of Standards

Revision of Basic Safety Standards - BSS

- Responsibilities
 - More parties, greater clarity
- Education, training and competence
 - **Requirements for key personnel**
- Justification
 - Expanded in line with ICRP
- Optimization
 - Removal of technical details
 - Some strengthening of requirements
- Human imaging for non-medical purposes
 - Appropriate framework introduced

Changes in Medical Exposure



Application of standards

Five main mechanisms to provide for the application of standards:

1. Providing technical assistance
2. Fostering information exchange
3. Co-ordinating research
4. Rendering services
5. **Promoting education and training**



Education / training activities by IAEA

Overall objective:

... to achieve a sustainable system in place at national and/or regional level in order to develop and maintain an adequate number of trained personnel

Education / training activities by IAEA

Different types of activities in education / training in radiotherapy & medical physics

Organization of specialized training courses

- Regionally for participants from countries in specific part of world
- Nationally
- Direct training of professionals as well as train-the-trainers
- IAEA trains around 200 medical physicists per year through specialized courses on imaging and therapy (in addition to courses on radiation safety – more about these later)
- IAEA also trains other health professionals in radiotherapy: radiation oncologists, radiation biologists, therapy radiographers and oncology nurses.

Education / training activities by IAEA

Different types of activities in education / training in radiotherapy

- Support of training of professionals
 - Fellowships (up to 12 months) for candidates with minimum 2 years experience
 - Exceptionally: long-term (2-4 years) for academic and clinical training in radiation oncology and medical physics (planned under national TC projects)

Education / training activities by IAEA

Different types of activities in education / training in radiotherapy & medical physics

Development of specialized training aids and material

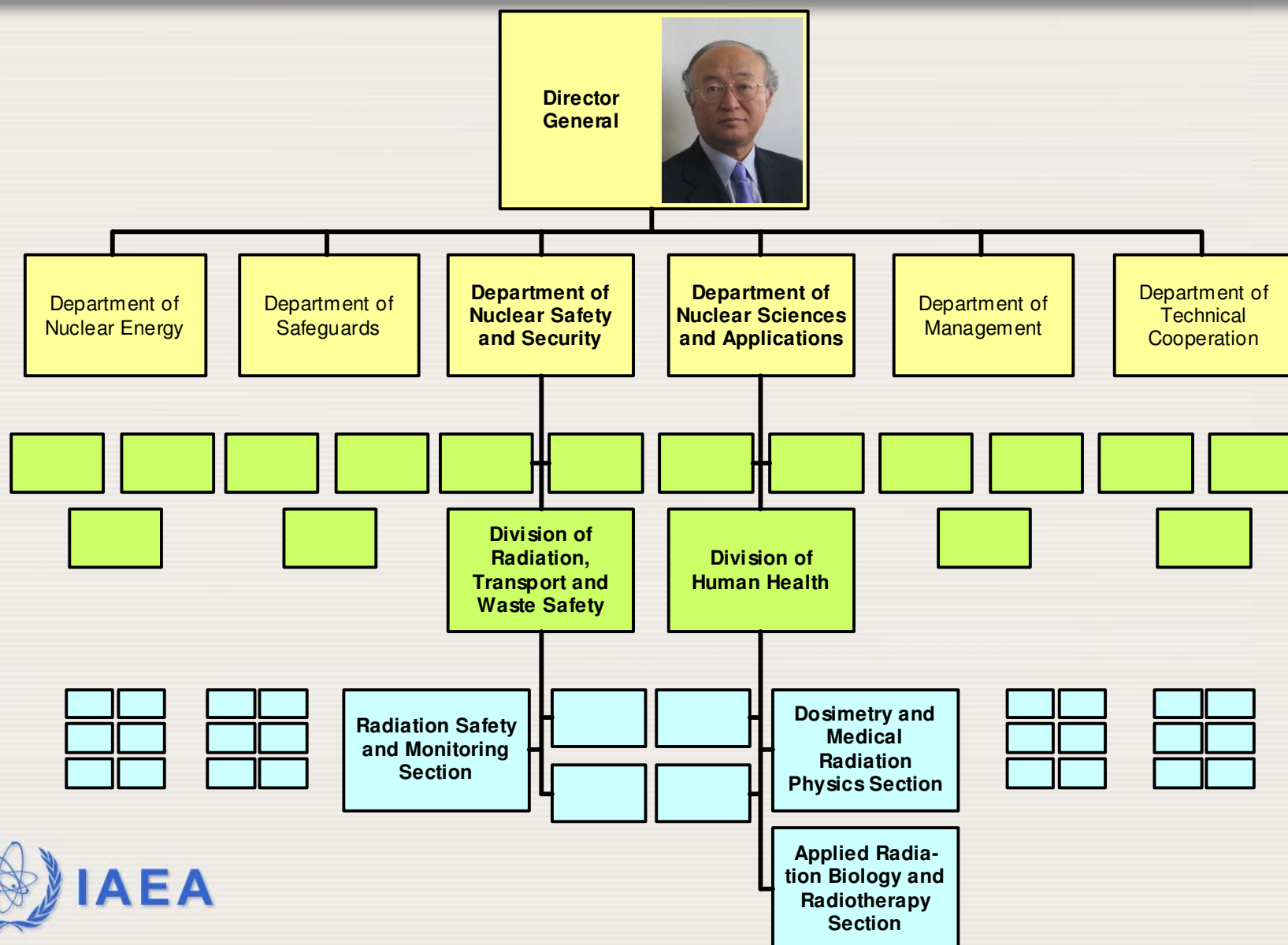
- Aim to develop in other languages than English
- Aim to make it available to all relevant health professionals
- Books, PowerPoint presentations, distance learning material

Education / training activities by IAEA

Different types of activities in education / training in radiotherapy

- Development of standardized syllabi for training of professionals in RT
 - Radiation oncologists, medical physicists, RTT's, radiation protection professionals, radiation oncology nurses
 - Aimed at programme directors of training programmes, institution managers and teaching staff
 - Keeping in mind limitation of resources available in many countries
- Assistance to develop training centres
 - Provision of experts until national trainers suffice

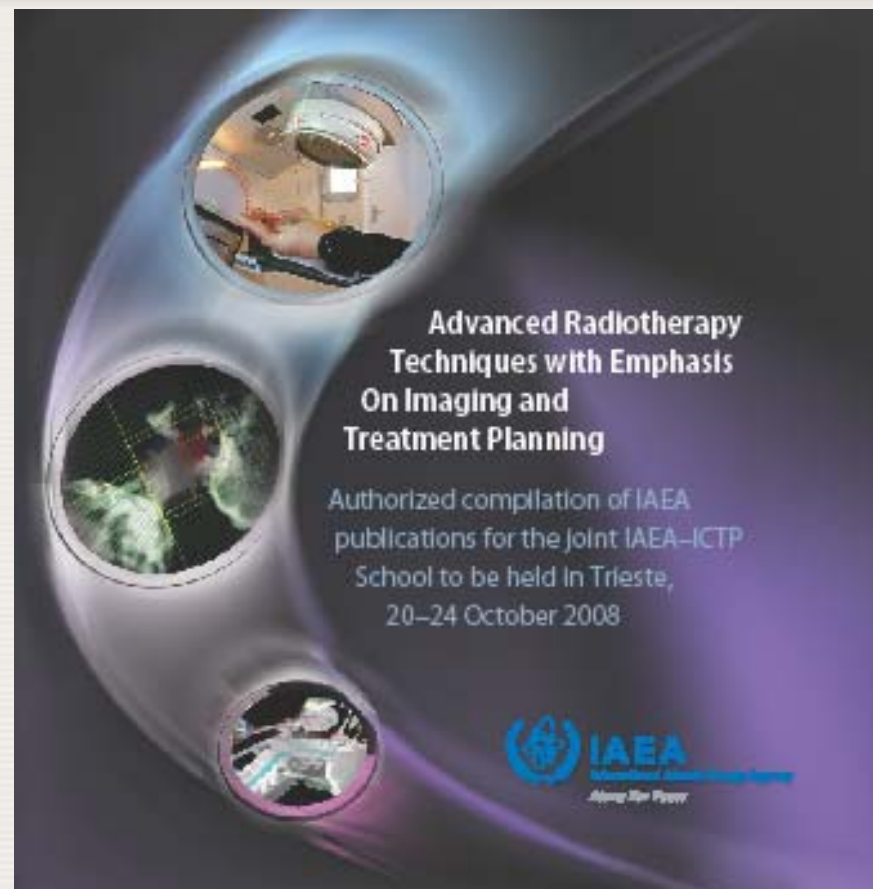
Education / training in radiotherapy



IAEA-ICTP specialized courses

Joint IAEA-ICTP training activities

- Imaging in Advanced RT Techniques, 2008
- QA in Radiotherapy, 2008
- Dosimetry in Diagnostic Radiology, 2009
- Internal Dosimetry, 2010



INT/6/054 project: 2009-2012

The project objective is to strengthen medical physics in radiation medicine

- Define internationally endorsed role of MPs & requirements for education & training
- Identify gaps in education & training and develop educational materials
- Raise awareness & recognition of medical physics as a profession



Education / training in RT safety

Next: Focus on experiences from two specialized training courses covering prevention of accidental exposures in radiotherapy

Radiation Protection in Radiotherapy

Prevention of Accidental exposure in Radiotherapy

Regional training has been given for these two courses 2002-2009 in:



Around 600 professionals have been trained at these courses.

Specialized training courses

IAEA Training Course on Radiation Protection in Radiotherapy

- Two-week course
- Released as approved training package in 2005
- Developed in collaboration with WHO, PAHO, ILO, IOMP
- Accident prevention in radiotherapy is one topic of many (2 modules of 18 in total) – the overall objective is to create awareness about the application of the Basic Safety Standards in the practice of radiotherapy



CD-cover for training package

Specialized training courses

IAEA Training Course on Prevention of Accidental Exposure in Radiotherapy (1)

- One-week course
- Released as approved training package in 2008
- Developed in collaboration with WHO








CD-cover for training package

Accident prevention in radiotherapy is the main topic of the course. This enables deeper exploration of topic and more extensive sharing of experiences – of value due to this being a “sensitive topic”.

Specialized training courses

IAEA Training Course on Prevention of Accidental Exposure in Radiotherapy (2)

- Six modules of the course:
 - Review of the International BSS
 - Case studies of major accidental exposures in radiotherapy
 - Analysis of causes and contributing factors
 - Clinical consequences of accidental exposures in radiotherapy
 - Reporting, investigating and preventing accidental exposures
 - Case studies of major accidents with abandoned radiotherapy sources

 International Atomic Energy Agency 			
WORKSHOP			
Prevention of Accidental Exposure in Radiotherapy			
LECTURE MODULES	LECTURE MODULES	REFERENCES	OTHER DOCUMENTS
0.1 Introduction 1.1 BSS principal requirements 1.2 BSS appendix 2 (medical exposure) 2.1 Incorrect decay data (USA) 2.2 Erroneous use of TPS (UK) 2.3 Accelerator software problems (USA and Canada) 2.4 Computer file not updated (USA) 2.5 Incorrect repair of accelerator (Spain) 2.6 Miscalibration of beam (Costa Rica) 2.7 Error in TPS data entry (Panama) 2.8 Accelerator interlock failure (Poland) 2.9 HDR unit malfunction (USA)	3.1 Other cases (external beam therapy) 3.2 Other cases (brachytherapy) 3.3 Incidents in any clinic 4.1 Clinical consequences of accidental exposures in radiotherapy 5.1 Preventive measures 5.2 Reporting and investigating 6.1 Source not under control (Brazil) 6.2 Source not under control (Mexico) 6.3 Source not under control (Turkey and Thailand)	1. BSS 2. Costa Rica accident report 3. Panama accident report 4. Poland accident report 5. SRS 17 6. Brazil accident report 7. Turkey accident report 8. Thailand accident report 9. TecDoc 1040	1. Group exercises 2. Practical 3. MCQ 4. Manual for lecturers 5. Handouts 6. Other material 7. Lecture for managers  
			
2005-01-24 / Ola Holmberg			

Contents of training package

Specialized training courses

IAEA Training Course on Prevention of Accidental Exposure in Radiotherapy (3)

- Characteristics:
 - Multidisciplinary
 - Radiation Oncologists
 - Medical Physicists
 - Dosimetrists
 - RTT's
 - Engineers
 - Radiation protection officers
 - National regulators
 - Educators and trainers
 - Very interactive course



Training course held in Khartoum, 2004

Specialized training courses

IAEA Training Course on Prevention of Accidental Exposure in Radiotherapy (4)

- Exercises:
 - Practical exercise
to enable the participants to learn about reviewing material for errors estimate impact, suggest actions for mitigation of consequences, suggest preventive actions


CASE 1

Background

Patient XX is planned for treatment of the prostate to 74 Gy (37 fractions) with one anterior and two lateral fields. After 3 fractions, a senior radiographer on the treatment unit where the man is treated notices that something doesn't seem right in the treatment chart. The radiographer comes to you and asks you to check the chart.

Supporting material

1. Patient history and treatment plan (description) and calculation of monitor units) field parameters) (treatment) 10 cm² field for Linac 1 (18 MV) can or patient from happening again



الوكالة الدولية للطاقة الذرية
International Atomic Energy Agency
Agence Internationale de l'Énergie Atomique
Organismo Internacional de Energía Atómica

Workshop on Prevention of Accidental Exposure in Radiotherapy

Practical exercise

Dear participant,

In this practical exercise you will find three cases, resembling errors that have actually occurred in a hospital. For each case you will have 10 minutes to:

- Try to find what is wrong in the case
- Try to estimate the seriousness of the error
- Suggest actions to take for the individual patient
- Suggest actions to take to avoid this error from happening again

You will be given a short background for each of the cases, as well as all supporting material required. After each case (10 minutes), the lecturer will discuss the case with all participants, basing this discussion on feedback from participants and connecting with the actual error and actions that happened in the hospital.

No calculators are necessary in this practical exercise.

Practical exercise with several cases

Specialized training courses

IAEA Training Course on Prevention of Accidental Exposure in Radiotherapy (5)

- Exercises:
 - Group exercises
 - *to make the participants connect the issues included in the lectures with the practical realities in their own clinical environment*
 - *to let the participants become at ease with the difficult subject of the workshop and make them see that these specific issues are equally important in any radiotherapy clinic*



Group exercise 2

G2: Case studies

- Realistically what would happen in your own centre in either of two typical accidents described?
 - Treatment units
 - Treatment planning systems
- What processes / procedures / recommendations would you make in order to improve the response?

Group exercise 3

G3: Cobalt source stick

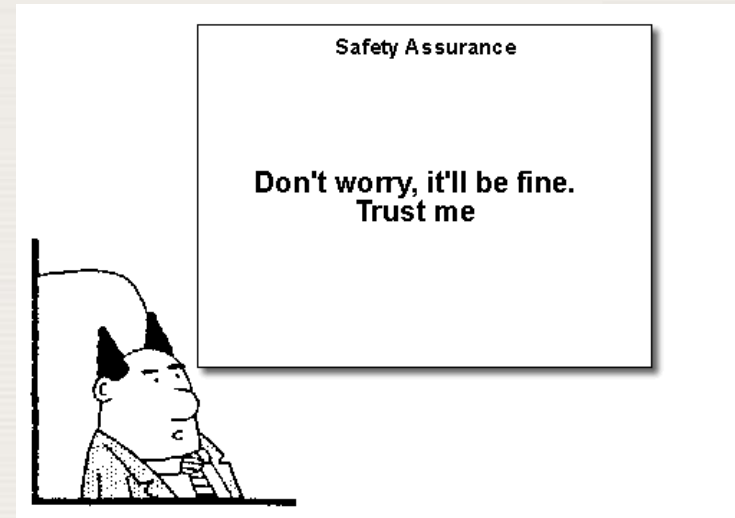
- Based on your knowledge of the problems associated with source stick and the procedures and protocols in place in your own department, draw up a procedure to follow in the event of a Cobalt source stick incident.

Group exercises for discussion and sharing

Specialized training courses

IAEA Training Course on Prevention of Accidental Exposure in Radiotherapy (6)

- General experiences:
 - Regional differences in response
 - *Readiness to acknowledge that accidents can potentially happen in any hospital or clinic has been seen to vary greatly*
 - *Readiness to discuss own errors varying*
 - *Approach to safety culture varying*



Specialized training courses

IAEA Training Course on Prevention of Accidental Exposure in Radiotherapy (7)

- Regional development of course:
 - Latin American Region
 - *March'09 in Santiago de Chile*
 - *Together with FORO, PAHO and Chilean Authorities*
 - *In addition to previous course contents, participants learned to use risk-matrix approach*
 - *1-year work plan designed including exercise to apply the learned approaches in participants' respective radiotherapy departments*



Participants at course in Santiago 2009

Specialized training courses

IAEA Training Courses on RT safety

- Material available for free:
 - On RPoP website
 - Course material from “Radiation Protection in Radiotherapy” subject to 400 downloads per month
 - Course material from “Prevention of Accidental Exposure in Radiotherapy” subject to 230 downloads per month
 - Course material is being translated into Spanish (to be finalized 2010)
 - RPoP website also contains other material on accident prevention in radiotherapy (total hit rate for website is more than 500,000 per month)

Radiation Protection of Patients (RPoP) Search RPoP:

Additional Resources | Special Groups | Member Area

Home > Training

Free Material



[Diagnostic and Interventional Radiology](#) →
[Radiotherapy](#) →
[Nuclear Medicine](#) →
[Prevention of Accidental Exposure in Radiotherapy](#) →
[Cardiology](#) →
[PET/CT](#) →

The training material on this site is available for free downloading (subject to conditions specified in 'Intended use' and 'Disclaimer' below), and are on the topics of Radiation Protection in:

English

- Diagnostic and Interventional Radiology
- Radiotherapy
- Nuclear Medicine
- Prevention of Accidental Exposure in Radiotherapy
- Cardiology
- PET/CT

Spanish

- Radiodiagnóstico y Radiología Intervencionista **New!**

Download area for training material

Accidentes en braquiterapia		
Categoría	No. de casos	%
Diseño del equipo	5	15
Solicitud y envío de la fuente	3	9
Calibración	5	15
Preparación	6	18
Planificación y cálculo de dosis	11	34
Retiro de la fuente	3	9

IAEA Página 12: Accidentes

Material in Spanish

Conclusions

1. IAEA aims towards sustainable safety in radiotherapy
2. Education / training is one mechanism to reach this goal
3. There are MANY health professionals to reach, dissemination mechanism is important
4. Different types of solutions might be better suited for different regions
5. Connecting topic with health professionals own clinical reality is vital

