

Education in Radiation Protection for physicians in training. A three year experience

Paula G. Castañón, Medical Physicist
Med. Phys. And Radiation Protection Department
University Hospital La Princesa, Madrid

Introduction

- ***Council Directive 97/43/EURATOM:***
 - Basic Radiation Protection education for physicians and other collectives involved in radiological practices



- ***Spanish Legislation:***
 - RD 815/2001
 - Resolution 2006/04/21

2007
Regional Council 

***Basic Radiation Protection Education
for Physicians In Training***

Introduction (II)

- ***Basic Radiation Protection Education*** for Physicians in training in Madrid:
 - Preclinical Period —→ Medical University Schools:
 - First year, every student
 - Clinical Period —→ University Teaching Hospitals:
 - ***Two levels of Education:***
 - **Basic level** —→ Two sublevels of complexity:
 - » Group A: Prescribers
 - » Group B: Interventional Procedures
 - **Advanced level:**
 - » Nuclear Medicine
 - » Radiotherapy
 - » Radiology

Objectives

- *The aim of the study is to analyze and evaluate the **Basic Level of education** for Physicians in training joining our Hospital since 2007*
- The education is provided to every physician in training joining each year the hospital
- Basic level:
 - Organization and teaching by Radiation Protection Departments
 - One day **course** in the hospital: 6 hours
- The assessment of the course is carried out taking into account:
 - Educational evaluations to the trainees, prior and after the course
 - Satisfaction questionnaire provided by Regional Council

Methodology

ORGANIZATION

2007

- ✓ 2 groups, 45 and 53 trainees each
- ✓ 2 following days
- ✓ Hospital's classroom
- ✓ 1 previous test
- ✓ Same final evaluation
- ✓ Satisfaction questionnaire

2008

- ✓ 1 group, 105 trainees
- ✓ 1 day
- ✓ Hospital's auditorium
- ✓ 1 previous test
- ✓ More thorough final evaluation
- ✓ Satisfaction questionnaire

2009

- ✓ 1 group, 107 trainees
- ✓ 1 day
- ✓ Hospital's auditorium
- ✓ 1 previous test
- ✓ Same final evaluation as 2008
- ✓ Satisfaction questionnaire

Methodology (II)

CONTENTS

2007

MEDICAL
PHYSICISTS
OF
OUR
DEPARTMENT

2008

MEDICAL
PHYSICISTS
OF
OUR
DEPARTMENT

Specialists in:
Radiology, Radiotherapy,
Nuclear Medicine

2009

MEDICAL
PHYSICISTS
OF
OUR
DEPARTMENT

Specialists in:
Radiology, Radiotherapy,
Nuclear Medicine

Methodology (II)

- **Previous test:**

- 20 questions
- Answer: Yes or No
- Basic Radiation Physics and Radiation Protection issues

- | | | |
|---|------------------------------|-----------------------------|
| 1. Ionizing radiations are detectable | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| 2. There are dose limits in exposures to patients | Yes <input type="checkbox"/> | No <input type="checkbox"/> |

- **Final Evaluation test:**

- 2007:
 - Same as previous test
- 2008 and 2009:
 - 20 questions
 - 4 possible answers
 - Basic principles of RP and specific concepts discussed in the course

- | |
|--|
| 1. An X-ray beam consists of: <ul style="list-style-type: none">a) Photonsb) Electronsc) Neutronsd) Positrons |
|--|

Methodology (IV)

- ***Satisfaction Questionnaire:***

- Provided by Regional council to the trainees in order to assess their degree of satisfaction regarding:

- Documentation provided: future use
- Teachers' evaluation: accessibility, clarity, methodology
- Contents: theoretical subjects, practical cases
- Organization: adequacy of location, duration, schedule
- Fulfilment with the course: ***usefulness for their job, degree of knowledge acquired***, previous expectations met
- **Global assessment**

Each item was evaluated between 0 and 10 points.

- Section of Comments and suggestions:

- Modifications they would like to include
- Contents in which they would like to get deeper into
- Any observation they would like to formulate

Results

- **Assessment of the educational evaluation:**

Average qualification	2007	2008	2009
Previous Test	7.7	7.4	7.6
Final Test	9.0	8.3	9.2

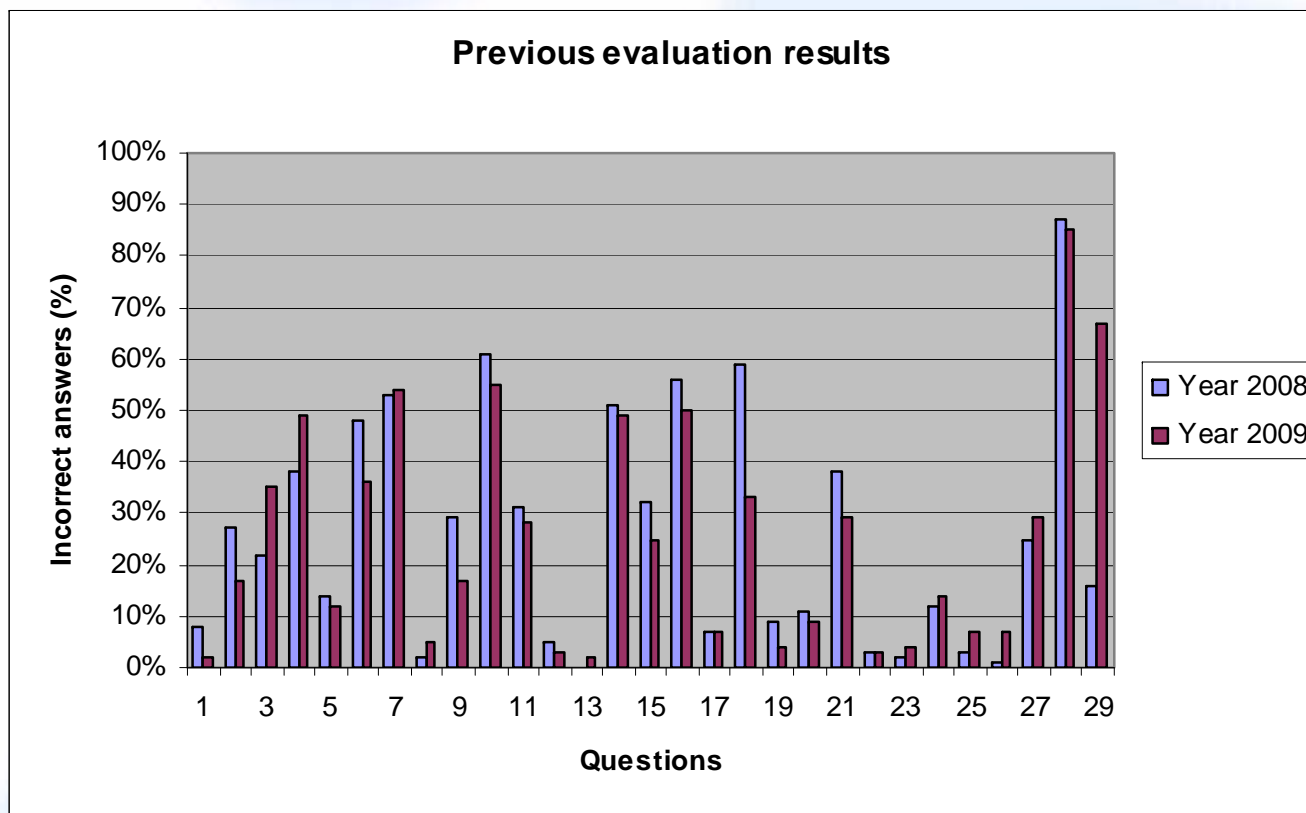
- **Previous test:**

- Almost same previous knowledge each year
- Almost same incorrectly answered questions: **radiation physics**

- **Final test:**

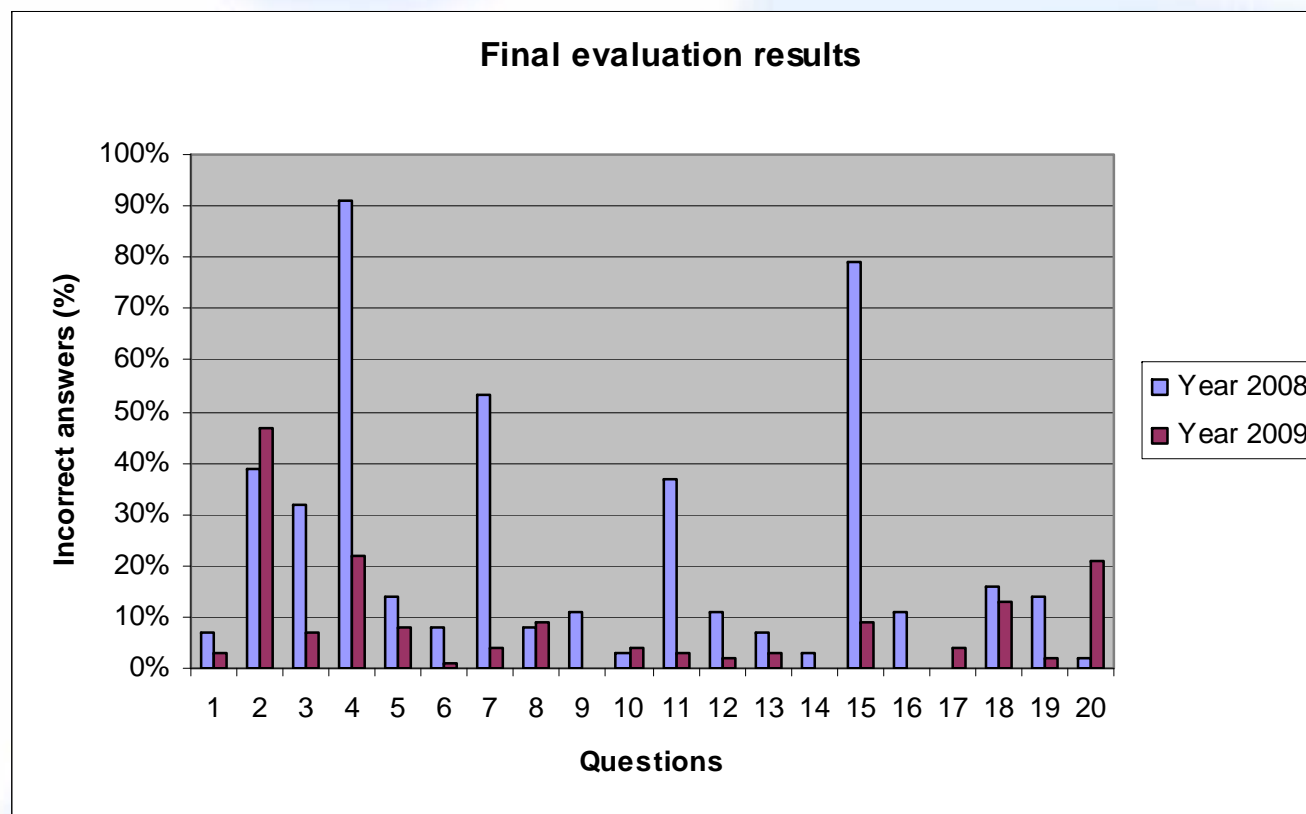
- **2007:** better qualifications probably due to the test itself
- **2008:** almost same contents as 2007 but harder exam, worse qualifications
- **2009:** best qualifications, though harder exam
 - In average
 - Question by question

Results (II)



Almost same wrong questions and in the same proportion both years
(results non available in 2007)

Results (II)



Year	Questions incorrectly answered by over 30% of trainees	Questions incorrectly answered by less than 5% of trainees
2008	6	4
2009	1	12

Results (IV)

- Most often incorrectly answered question in previous tests through all editions, with *85-90% wrong answers* :

There are dose limits in exposures to patients Yes No

- The same question was proposed every year in the final test as well:
 - **2007:** 82% correct answers
 - **2008:** 86% correct answers
 - **2009:** 91% correct answers
- Almost every frequently wrong question through final tests dealt with physics subjects:
 - ***X ray beam:*** approximately 40% wrong answers 2008 and 2009

Results (V)

- ***Assessment of satisfaction questionnaire:***

Year	2007	2008
Global assessment of the course	6.70	6.20
Course contents	6.25	6.40
Documentation provided	7.25	7.25
Organization	6.70	6.25
Usefulness for their job	6.50	6.10
Degree of knowledge acquired	6.50	5.90


- **Suggestions and comments:**

- Include practical cases
- Get deeper into radiobiological effects: children, pregnant women
- Less Physics, contents more accurate to physicians' knowledge and jobs
- Too much information in just one day
- Review of knowledge acquired during preclinical period of education

Discussion

- Due to the results found, some adaptations were progressively carried out:
 - Remove, in the last edition, almost every physics' subject
 - Diminish complexity of those subjects still remaining in the syllabus
 - Broad perspective of procedures present in a hospital using:
 - Ionizing Radiations
 - In 2009, also ***NON Ionizing Radiations***
 - Hand 90 minutes over to three specialists in radiology, radiotherapy and nuclear medicine, 30 minutes each: *responsibility in the justification process*
 - Just ***ONE DAY COURSE***: focus mainly on basic Radiation Protection Principles, illustrated with some ***PRACTICAL CASES*** in the last edition

Discussion (II)

- Trainees seem to have been more fulfilled with the course the last edition:
 - Specialists' experience
 - Practical cases
 - Less Radiation Physics
- Nevertheless, it would be advisable by the Regional Council to reconsider first edition's organization:
 - Two or more groups
 - Small classrooms }  Easier to catch the trainees' attention

Conclusions

- *Continuous evaluation of the course is essential to achieve a more effective programme for the physicians in training*
- The programme, currently, provides the trainees with at least a *broad perspective of the procedures involving radiations* which they might further on prescribe
- The physicians, above all, become ***aware of the importance of Radiation Protection***, particularly of the Justification Principle
- The course also serves as a *refresher of previous knowledge acquired in university schools*



Hospital Universitario
de La Princesa

Comunidad de Madrid

The end

Thank you for your attention