Process for the evaluation of the basis of hours in 35.390

Overview

The working group recommends 200 hours for the minimum didactic hours to be included in 35.390. This number represents an average number of hours that was determined from evaluating the course material in the NRC five week health physics course and five other health physics courses. Two totals were determined:

1. Hours from the evaluation of the five week course and supplementary information..... 185 hrs
   Hours from the evaluation of a group of five other courses .....230 hrs

   Average .....(207.5)...**200 hours**

Process

1. Started with the NRC 5 week course as a baseline, basic radiation safety curriculum.
2. Removed any topic not necessary for physicians, such as radon discussions.
3. Grouped the topics by category as outlined in the 35.390 "B" pathway.
4. Determined the number of individual hours devoted in the 5 week class to each "B" pathway category.

   Breakdown of topics hours covered in the 5 week course, associated with the 35.390 "B" pathway requirements:
   a. Radiation Physics and Instrumentation - 81.5 hours
   b. Radiation Protection - 28.5 hours
   c. Mathematics Pertaining to the Use and Measurement of Radioactivity - 18 hours
   d. Chemistry of Byproduct Material for Medical Use - 4 hours
   e. Radiation Biology - 7.5 hours

Total hours from this breakdown: **139.5**

5. From the evaluation of the material from the 5 week course, the working group determined that the 5 week course is not geared to physicians, and therefore did not adequately cover the material in sections (d) and (e) of the "B" pathway (Chemistry of Byproduct Material Medical Use and Radiation Biology material). These subjects are essential for proper radiation safety training for a .390 physician. Therefore the group evaluated the following other courses to gain some insight into the scope of topics covered and hours devoted in other health physics or medical based courses.
   - An Accepted Independent Physicians Radiation Safety Training Course (proprietary information)
   - Introductory Health Physics (NRC)
   - Basic Health Physics (NRC)
   - Health Physics Technology (NRC)
   - Diagnostic and Therapeutic Nuclear Medicine (NRC)

6. Using the curriculums from above listed training courses, the working group established a model for a radiation safety training program oriented toward 35.390 physicians. The following represents the breakdown of hours based 35.390 "B" pathway requirements:

Radiation Physics and Instrumentation	70 hours
Radiation Protection	30 hours
Mathematics Pertaining the Use and Measurement of Radioactivity	50 hours
Chemistry of Byproduct Material for Medical Use	30 hours
Radiation Biology	50 hours

Total.....**230 hours**

7. Based on the comparison between the 5 week course material and examination of the other courses it was determined that the following additional material would need to be covered to adequately meet the training needs of a 35.390 physician.

- Biological interactions with tissue ~ 2 hrs
- Biological ½ life and biodistribution ~ 2 hrs
- Concept of ALARA and occupational, non-occupational exposure as well as limits for members of the public and radiological workers. ~ 1.5 hrs
- 40 hours of additional training, to include specific radiological safety training specific to the radiopharmaceuticals and routes of administration that fall into the 35.390 category. Examples of these radiopharmaceuticals and routes of administration include:
  - I - 131 - oral NaI for hyperthyroidism, cardiac dysfunction and thyroid cancer treatment
  - I - 131 - Bexxar infusion, labeled antibodies for treatment of non-Hodgkin's lymphoma
  - Y - 90 - Zevalin infusion, labeled antibodies for treatment of non-Hodgkin's lymphoma
  - Sr- 89 - Metastron injection, for treatment of bone pain
  - Sm -153 - Quadramet injection, for treatment of bone pain
  - P- 32 - soluble phosphate injection, for treatment of polycythemia vera, leukemia and bone metastasises
  - Emerging technologies, such as the use of alpha emitters in therapy

Examples of what would be covered in the 40 hours for the 35.390 radiopharmaceuticals:

1. Biocompartmetalization of the radiopharmaceutical
2. Biodistribution of the radiopharmaceutical
3. Biological half life of the radiopharmaceutical, including sample calculations
4. Dose calculations for the radiopharmaceutical
5. Chemical reactions/interactions for the various administration routes for each radiopharmaceutical
6. Radiation safety aspects for the administration of the radiopharmaceutical
7. Radiation safety for the preparation of the radiopharmaceutical
8. Storage, handling and disposal the radiopharmaceutical
9. Shielding considerations for the radiopharmaceutical or the different administration routes
10. Special dosimetry considerations
11. Radiation safety considerations specific to patient and public for the specific radiopharmaceutical or administration routes
12. Manufacturer radiation safety/operational procedures related to the radiopharmaceutical

13. Lab practical time involving radiation safety for each of the above, specific to the radiopharmaceutical