

# **A new research program that aims to establish an external audit system to radiotherapy QA in Japan**

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## **ABSTRACT**

Last year, a three-year research program was started in order to establish an external audit system to radiotherapy QA in Japan. It consists of questionnaire surveys, mailed (off-site) dosimetry and visited (on-site) dosimetry at radiotherapy facilities in Japan. The first questionnaire was sent to all Japanese radiotherapy facilities in October 2001, surveying basic QA procedures at each facility. 628 answers were returned with the return rate of 87%. In February 2002, the second questionnaire was sent. Off-site and on-site dosimetry have been tested in several facilities, and will be started soon. We anticipate that this program will gradually grow to a radiotherapy quality control center similar to Radiological Physics Center at MD Anderson Hospital.

Keywords: Radiotherapy, Quality assurance (QA), Questionnaire survey, On-site dosimetry, Off-site dosimetry

## **INTRODUCTION**

Recent progresses in radiotherapy require more accurate and complicated procedures for quality assurance. Though QA in radiotherapy is the task of medical physicists in Western countries, it is usually given by radiation oncologists or radiotherapy technologists in Japan. This is because there are few positions for medical physicists in hospitals, while most of certified medical physicists in Japan (total number of them is approximately 100) belong to university faculty or research institute. The lack of QA experts in hospital is an obstacle to accurate therapy and might cause various accidents. In order to complement the lack of medical physicists and to establish an external audit system to QA in radiotherapy, a three-year research program was started in 2001, which consists of the questionnaire survey, mailed dose measurements and visited dose measurements. We anticipate that it will gradually grow to one of the radiotherapy quality control center similar to Radiological Physics Center at MD Anderson Hospital, and that its activities will help to increase numbers of medical physicists in clinical departments. Here we describe early activities in that program.

### **THE QUESTIONNAIRE SURVEY**

The first questionnaire was sent to all Japanese radiotherapy facilities in Oct. 2001 surveying basic QA procedures performed in each facility, as well as the number of patients per day, number of medical doctor, radiologist, and medical physicists. 628 answers were returned with the return rate of 87%. The survey shows that the QA is not satisfactory in Japan. For instance, there are only 40% facilities to correct the MU (monitor unit) value at one times per week. And 35% facilities do not check patient MU value by the second calculation.

Second questionnaire survey was made in Feb.2002 and now is under analysis.

### **OFF-SITE DOSIMETRY**

In off-site dosimetry, we send phantoms and grass dosimeters to each target facilities, and in the facility, persons in charge set the grass dosimeter at the certain position of the phantom and irradiate a certain radiation dose (for example

1.0Gy) to the grass dosimeter. After receiving the phantoms and dosimeters, we read the dose and compare it with prescribed dose. Measurements are made at the standard set-up (10x10cm), different field sizes and different dose levels. Coincidence of light and X-ray field is checked with film. The results of measurements are sent to the facility and may help to improve their QA procedures. The target facilities will be selected on the basis of the number of patients per day or on their requests. Off-site dosimetry has been tested in several facilities and will be started soon.

#### **ON-SITE DOSIMETRY**

In on-site dosimetry, we visit the facility to measure the irradiation dose. Measurement are made in the same conditions as off-site dosimetry, though we use calibrated ion-chambers as dosimeters. On-site dosimetry has been made as a trial in several facilities.

#### **CONCLUSION**

It is only a year since the program started. So far we have only performed the tests of off-site and on-site dosimetry except the questionnaire survey. This and next year we perform a systematic off-site and on-site dosimetry as well as repeated questionnaire surveys.