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Application of risk analysis methods to radiation medicine

The methodology of Risk Matrices has been used extensively for safety assessments in the risk industry. The method characterized by being systematic and simple, features that allow considering its application in hospitals. The practice of radiotherapy, where fatal accidents have occurred, needs to apply methodologies to anticipate and prevent potential accidents. The Ibero-American Forum of Radiological and Nuclear Regulators (FORO) has adapted and applied this methodology of risk matrices in teletherapy (Co-60 equipment and linear accelerators) and brachytherapy (high and low dose rate).

A large list of possible human error and equipment failure that could trigger accidents was analyzed. The main defenses (interlocks, alarms and procedures) that could prevent, detect, monitor and mitigate potential accidents were identified.

For the practical application of the Risk Matrices methodology, FORO has developed the SEVRRA tool. This allows a generic list of initiator events, barriers and reducers to be adapted to the specific conditions that work in a particular radiotherapy department.

In this way, it is possible to obtain an estimate of the risks in the working conditions of the radiotherapy department that has been evaluated and to propose an action plan to reduce the risks and to prevent the occurrence of accidents in Radiotherapy.

The methodology of Risk Matrices and the SEVRRA tool have been applied in more than 100 Departments of Radiotherapy in Spain and Latin America. In many of them, action plans have been developed to implement safety measures that have made it possible to reduce the risk of accidents.

Currently, FORO works to extend the application of this methodology and the SEVRRA tool to other radiotherapy techniques (IMRT, Radiosurgery, IORT) as well as diagnostic and therapeutic procedures in nuclear medicine.

The work done so far confirms the need for a prospective approach to the prevention of accidents in radiotherapy and is in full accordance with the "Bonn Call for Action No. 7" of the International Conference on Radiation Protection in Medicine developed in Germany in December 2012.

Author: DUMÉNIGO GONZÁLEZ, Cruz (Sociedad Cubana de Física Médica)

Presenter: DUMÉNIGO GONZÁLEZ, Cruz (Sociedad Cubana de Física Médica)

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