

# Building an Integrated Radiotherapy Information System to Improve Patient Safety

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**Abstract.** In our hospital, the medical records of patients receiving tumor radiotherapy were paper-base. The purpose of this study was to develop an integrated radiotherapy information system to improve the quality and efficiency of treatment for patients with cancer. What's more, it's expected that the system can reduce time and errors caused by manual record.

**Keywords.** Radiation oncology, data integration, patient safety

## 1. Introduction

Cancer is one of top ten causes of death in Taiwan. Clinically, about 50-60% of cancer patients need radiotherapy. The course of radiation therapy usually takes 6-8 weeks, 3-5 times a week. Each time, the treatment site, medications for treatment, the dose of each medication and the cumulative dose should be recorded in detail [1]. However, the records and treatment courses of patients receiving radiation therapy in our hospital were in paperwork (Figure 1). Manually checking patient records of treatment is inefficient and prone to having errors. Therefore, in order to solve the above problems, it is necessary to develop an integrated radiotherapy information system to provide a consecutive care during entire process to improve patient safety [2].

## 2. Methods

The system was developed by the information department and coded using C#.net. The system analyzed the database of the radiotherapy machine and integrated the data with manual record into the hospital electronic medical record system to provide physicians references for treatment. Also, other healthcare professionals could easily follow up patient's treatment schedule through this new system (Figure 2). A satisfaction survey was used to evaluate the effectiveness of the system.

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3. Results

After the information system was implemented, we found (1) our medical professionals could view data immediately, track progress and confirm the correctness of the information; (2) it reduced manpower and errors; (3) it saved the consumption of paper and storage space. The satisfaction survey results show that high medical team members’ satisfaction with the usability of system was observed.

4. Conclusion

The data record for patients with radiotherapy was through handwriting in our hospital. It took a lot of time and was unable to make sure the correctness of data. By establishing the integrated information system, we obtained treatment information for patients immediately, which not only improved work efficiency, but also reduced errors and promoted patient safety.

Figure 1 shows a handwritten medical form titled "放射治療照射紀錄單" (Radiotherapy Treatment Record Sheet) from Yih Jhen General Hospital. The form includes fields for patient name, date, and treatment details. It features a table with columns for "Position", "RT", "TX", "TY", "TZ", "RX", "RY", "RZ", and "劑量" (Dose). The table contains handwritten entries for treatment sessions, including dates and doses.

Figure 1. Paper-base form.

Figure 2 shows a screenshot of the Integrated Radiotherapy Information System. The interface displays patient information, including name, gender, and age. It lists treatment details, such as "Left \*Rectosigmoid junction [liver tumor] 療程 1 - 2018/12/27" and "Liver tumor - IMRT x06 Does: 5,940.00 cGy @180 cGy x 33". A table at the bottom summarizes the treatment plan, showing the total dose, fractionation, and dates.

Figure 2. Integrated Radiotherapy Information System

References

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