Background & Purpose

Purpose

- ***Through this research, we intend to systematically record and manage the personal exposure dose of patients by expanding the exposure dose management system to all the studies and departments using the radiation.***

- As radiation exposure in the medical field increases worldwide, efforts are under way to manage the patient's exposure dose in various international organizations including the International Commission on Radiation Protection (ICRP).
- Nevertheless, only a handful of hospitals are reported to be conducting dose management in Korea, and the dose management program developed by the Korea Food and Drug Administration (KFDA) is limited to CT or radiology departments.
- Therefore, there is a problem that it cannot be applied to all the tests using radiation. We have purchased and applied a server for radiation dose recording and management through the QI activities in 2013, but the radiation dose records are missing.
- In addition, although the radiation equipment is used for other departments in the hospital, dose management of patients is not integrated by applying the dose management system only to the radiology department.

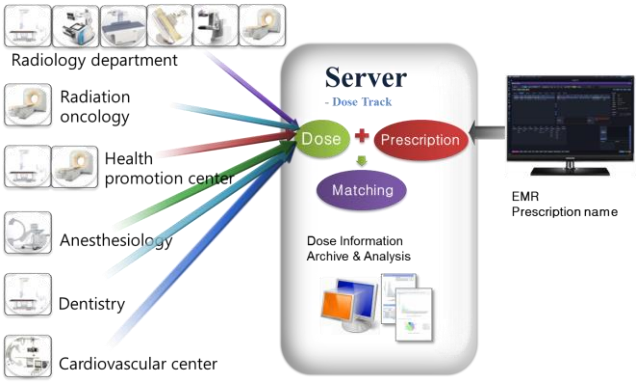
Methods : Schedule of improvement

- Since August, 2014, six departments including Department of Radiology, Health Promotion Center, Cardiovascular Center, Radiation Oncology Department, Dentistry and Anesthesiology Department were designated and team members were assigned to each department.

진행 사항	08월	09월	10월	11월
The patient information and the prescription name are provided from the electronic medical record (EMR), and the dose information is provided by each device and transmitted to the exposure management server.				
The conversion factor is applied to all prescriptions to express the patient's exposure dose equally as the effective dose.				
The dose information is matched to each patient's prescription.				
The cause of omission of radiation dose information was analyzed and improved in terms of inspection, equipment, facility, and system.				

Methods : Major improvement 1.

- We figured out all radiological medical devices of the six departments, identified whether individual devices generated dose information or not, and then connected all the devices generating the dose information to the radiation dose management sever.
- The patient information and the prescription name were obtained from the electronic medical record (EMR) while the dose information provided by each device was directly transmitted to the server.



Methods : Major improvement 2.

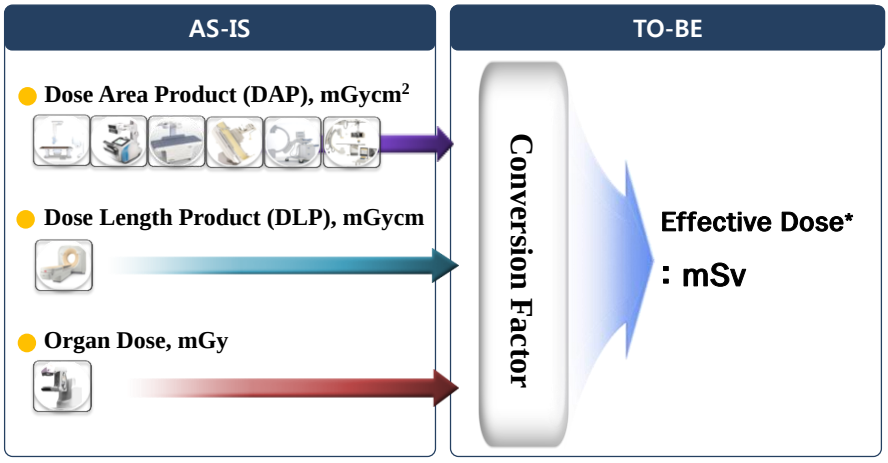
- We analyzed and interfaced interface method linked to the radiation dose management server.

AS-IS	TO-BE
1. Providing patient and radiation dose information on equipment itself	1. **MPPS* way** : Acquiring patient information and exposure dose on equipment itself
2. PACS provides exposure dose	2. **Dicom header way** : Acquiring dose information on PACS
3. Incase dose information data doesn't exist on radiation equipment	3. **Mean value way** : Checking an average value of 100 same examination cases in another equipment which express radiation dose
4. Incase radiation dose value comes out for a moment and doesn't remain	4. **Database way** : Incase radiation dose has same exposure dose in each examination, inputting dose value for each examination to Dose track server
5. Incase exposure dose value isn't remaining, having a lot of different dose values in same examinations	5. **Manual way**

* **MPPS** : Modality Performed Procedure Step

Methods : Major improvement 3. (Conversion factor)

- Relevant conversion factors were applied to all prescriptions to represent the patient's exposure dose equally as the effective dose



* **NRPB** : National Radiological Projection Board
** **ICRP 60. 102** : International Commission on Radiological Projection

Methods : Major improvement 4. (Consistent management plan)

System	➢ Confirming daily, weekly, monthly checklists and monitoring by each department ➢ Updating new prescriptions about diagnosis x-ray or introduction devices ➢ Dose management for each device and radiation technologists on a same examination
Process	➢ Training method of use to control dose management program and monitoring : When the person in charge has been changed : When dose management program has been updated ➢ Process checking and reeducation when verifying omission

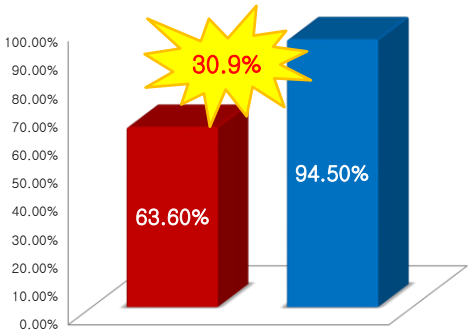
Result 1.

➢ There were 55 diagnostic radiological medical devices in our hospital. Among of them, 52 devices were connected to the dose management server, yielding 94.5% of the management rate of radiological medical devices.

First Index	Before	After	Target value
The management rate of radiological medical devices	63.6%	94.5%	95%

Quantitative effect

	Total	Connect	Disconnect
Radiology department	39	38	1
Cardiovascular center	5	5	0
Health promotion center	4	3	1
Dentistry	5	4	1
Anesthesiology	1	1	0
Radiation oncology	1	1	0
total	55	52	3



7

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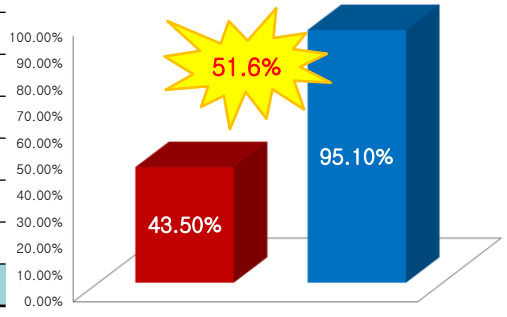
Result 2.

➢ 1,176 examination codes were connected to the dose management server. the recording rate of radiation exposure dose was 95.1%.

Second Index	Before	After	Target value
The recording rate of radiation exposure dose	43.5%	95.1%	90%

Quantitative effect

	The recording rate of radiation exposure dose
Radiology department	97.3
Cardiovascular center	99.1
Health promotion center	99.2
Dentistry	75.1
Anesthesiology	100
Radiation oncology	100
total	95.1



8

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Result 3.

- The conversion factor is applied to all prescriptions to express the patient's exposure dose equally as the effective dose.
- Through this study, we succeeded in systematically recording and managing the personal exposure dose of patients by expanding the dose management to cover all the examinations and departments using the radiation in our hospital.

Conclusion

1. Through this study, it was possible to systematically record and manage the exposure dose of patients by expanding the exposure dose management system to all the inspections and departments using the radiation in the hospital. And database for the radiation exposure dose of the patient was established and the basis for optimized dose management was established.
2. In order to improve the lack of interlocking of radiation generating equipment and missing dose information of radiation examination, check list of daily, weekly, and monthly inspection items for each department was created and managed continuously.
3. In addition, it was possible to standardize dose by protocol QA and dose management education by keeping the dose constant according to equipment and radiation technologists at the same examination.
4. However, in this study, Mobile CT, dental cone-beam CT, and dental panoramic equipment have limitations in that they cannot be linked with the exposure management server because there is no information on the station name and institution name in the dicom tag. Therefore, a continuous effort to solve is required.