Implementing a comprehensive Oncology Information System in a multi-vendor environment at Tokushima University Hospital

When seeking an alternative solution to its existing Lantis™ software, Tokushima University Hospital took advantage of Elekta’s open systems philosophy by connecting all of its existing planning systems and delivery devices through implementing MOSAIQ® Oncology Information Management System.
Background
The Tokushima University Hospital, located in Tokushima, Japan, has 35 departments with 696 beds in total. The hospital is also certified as an advanced treatment hospital in the area.

The radiation oncology department treats about 800 people per year including new and recurrence treatments (60-80 patients per day, about 15 new patients per week).

Data Management
Before implementing MOSAIQ®, the hospital had many disparate systems that did not communicate together. Primeview™ was used for recording and verifying treatments (R&V), along with Lantis™* for plan import and a separate radiology workflow system.

The management of multiple systems meant a long and complicated patient treatment workflow which required regular manual data input and re-keying and users moving from one system to another to complete tasks.

Patient Workflow before MOSAIQ Implementation:
1. Schedule of the patients is done with Excel spreadsheet for each treatment machine.
2. Plan is created with TPS and then imported in the Lantis server.
3. When a patient comes to hospital for a treatment, the patient is queued in a separate system, then selected in R&V.
4. Treatment starts with R&V.
5. After the treatment is done, the treatment record is sent to Lantis.
6. Charge information is sent to the accounting system.
7. Association of plan with treatment record is done on a different system.

Challenges
With the existing patient workflow, the hospital had to deal with multi-systems throughout a patient’s course of treatment. As a result, administrators, doctors and the radiation therapists needed to work on each system separately for specific purposes and tasks. With this multi-system environment, Tokushima had a number of issues:

1. The association of plan with diagnosis information as well as dose information was manually entered by doctors. Additionally, an isocenter could only be associated with one plan. So if a patient had more than two plans, the second plan remained in the system with no association.

2. Necessary data or documents such as dose distribution were not attached to the plan in the system. This also had to be done manually, but it was actually done by with papers and/or other PC separately.

3. Treatment information and/or patient status was not shared with other departments which meant that other departments had no idea what the Radiation Oncology department was doing. As a consequence, the Radiation Oncology department was a closed department to others.

4. There was no storage mechanism of DICOM-RT documents. They only had a hospital PACS system and DICOM-RT and other documents were not able to be stored in the PACS.

There were many time-consuming and inefficient processes associated with this multi-system environment. So, at the time of purchasing new linac (replacing MEVATRON), Tokushima reviewed all the systems in their department. At this point,

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Radiation Therapist

*Lantis is Multi-ACCESS rebranded, and is trademarked to Siemens Medical Systems, Inc
their linacs are all from Siemens (Primus x2 and MEVATRON x1). During the selection process, three to four candidates were considered. For the Oncology Information System, the department had many requirements and conditions that needed to be met:

1. Full Data conversion from Lantis to new system
2. Capability to connect multi-vendor (linacs and Treatment planning)
3. Consolidate systems into a single oncology solution (RT RIS, R&V, and PACS all together)
4. Patient-centric data management (not linac-centric data management or operation)
5. One database for all linacs (No separate database for each linac)
6. The same operation for all linacs
7. Unified plan number
8. Automation for associating diagnosis information with plan and treatment records
9. DICOM and non-DICOM documents storage

Many operations were done manually which required a systemization of their workflow.

During the decision making process, many people were involved, including doctors, therapists and the Medical IT Center at Tokushima. In the end the decision was made to implement MOSAIQ and MOSAIQ Data Director to provide a comprehensive oncology information management solution. The main reason for choosing MOSAIQ was that was the only solution which could meet all of the conditions above. They needed to have all the data stored in Lantis server transferred to MOSAIQ and since MOSAIQ is the succession solution of Lantis, the data conversion was much easier compared to other vendors. Furthermore, Elekta offered the widest open system connectivity to link together all of Tokushima’s existing systems including its treatment planning and linear accelerators.

The Results after MOSAIQ Implementation:

1. Patient Registration, imaging and diagnosis and Scheduling of treatment of the patients is captured and managed within MOSAIQ.
2. The Plan is created within the Treatment Planning System and then imported into MOSAIQ including all treatment fields, dose and parameters included.
3. When a patient comes to hospital for a treatment, the patient is verified and queued in MOSAIQ and selected with all treatment parameters checked and validated.
4. Treatment starts.
5. After the treatment is done, the treatment is recorded in MOSAIQ along with any notes required and billing codes captured for reimbursement.
6. MOSAIQ Data Director stores images and plans which can be restored back to the patient record if and when needed.

With implementing MOSAIQ, a patient’s course of treatment (importing plan, scheduling, queuing patient, sending plan to a linac, verification, recording treatment results, and code capturing) can now all be managed by one system. Since implementing MOSAIQ, the system capability is much greater than Lantis and staff needed to get used to the MOSAIQ operation. However, once settled, users believe that by having a systematic process in a single system leads to more efficiency and accuracy for patient treatment.

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Mr. Yasuo Hara, Radiation Therapist at Tokushima University Hospital explained, “The data conversion from Lantis to MOSAIQ was straightforward and there was no loss of treatment records. We had confidence that Elekta could transfer all of the data due to their previous association with Lantis and its strong compatibility with MOSAIQ. Tokushima University can now also share patient and treatment information with other departments including connecting with the Hospital Information System so that these departments know exactly what the Radiation department is doing. Elekta’s open systems philosophy means that MOSAIQ can connect to virtually any treatment planning or treatment delivery system the customer chooses so connecting to Tokushima’s existing and new systems was simple.

Mr. Yasuo Hara, commented, “Utilizing one database and one system means that patient workflow can be much more streamlined. There is no manual association of diagnosis information with plan and treatment records and so less opportunity for error. We have also reduced errors with sending codes for reimbursement as the charge codes are chosen at the time of scheduling patient appointments”

Creating, changing, and deleting patient appointments can be done once rather than doctors having to create, change, or delete appointments one by one. MOSAIQ can automatically check for open appointment slots and schedule a series of appointments in one step. As a consequence, doctors no longer have to manually schedule appointments and the process is more efficient, reducing delays to treatment.

Dr. Hitoshi Ikushima, Radiation Oncologist said, “Establishing a systematic workflow with MOSAIQ which automates previously manual driven workflow processes in our department has meant that doctors have more time to spend with patients and patient care”.

Integrated safety alerts and checks in MOSAIQ ensure that the right patient is being treated, the treatment plan matches the prescribed plan and all pre-treatment and quality assurance checks are completed before MOSAIQ allows treatment to take place.

Mr. Yasuo Hara, said, "Utilizing MOSAIQ in Japanese local language helps significantly. Many systems are still in English and people sometimes have a hard time understanding, especially pop up messages. MOSAIQ in the Japanese language is helping users to utilize it more effectively and to communicate more easily. Also, any staff who is involved with patient treatment, such as nurses and receptionists, could work with the system if it is in Japanese. I consider that a big advantage”.

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Dr. Hitoshi Ikushima Radiation Oncologist