Centralizing image and data management in radiation oncology with MOSAIQ® Data Director™

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Introduction

MOSAIQ Data Director provides the foundation for centralizing and controlling the management of all image, planning and data files relating to current and past patient care in the oncology practice.

Traditionally, oncology departments managed patient images, scans and clinical data files through paper and film records, stored in vast areas within the hospital. Since the birth of the electronic medical record (EMR) and oncology information systems (OIS) in the last few decades, paper records are gradually becoming less of the norm. The reduction in paper and film has transformed the cost of storage, with information initially being stored on disks and later on database servers.

Continued advances in technology and improvements in treatment techniques based on individual disease types have brought more complex and sophisticated imaging and planning tools to enable more targeted treatments and achieve better outcomes.

As a result, there has been a steady growth in the volume of patient and clinical data, CT images, scans, treatment plans and data files attached to the patient's EMR. Despite extensive database storage availavle within the modern OIS, hospitals have traditionally stored non-active images and files in a Picture Archiving and Communication System (PACS).

Because many countries now require patient records to be held by the medical practice for up to 30 years, this can present challenges for hospitals. These include the need to store this massive amount of information and the associated storage costs, the ability to easily access data when needed and the requirement to transmit archived information back to the EMR if subsequent therapy is required several months or years later.

This whitepaper discusses how the use of a centralized image and data management system, can help oncology practices achieve significant efficiency and productivity gains through better management of the growing volume of data and images in the clinic.

ELEKTA

Meeting the Needs of the Modern Cancer Clinic

In today's complex oncology environments there are an increasing number of oncology-based diagnostic imaging options: (Cone beam CTs, Multidimensional Dose data sets, PET), DICOM-RT based virtual simulation systems, along with increased adoption of DICOM-RT based transfer of treatment planning images and information, image guided radiation therapy (IGRT), set up, positioning and QA. Clinicians also are implementing new applications that produce increasingly larger volumetric data sets and increased patient volumes that require specialized data storage and retrieval functionality.
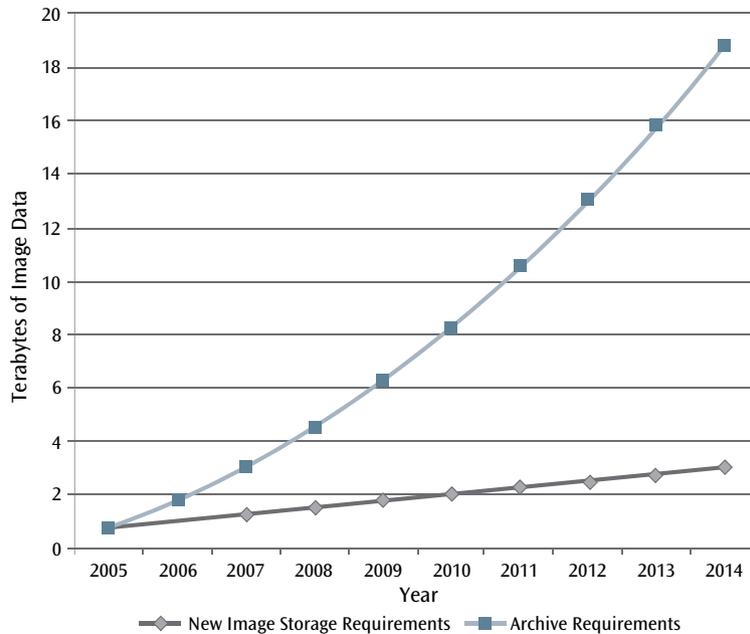
Potential Storage Needs

Table 1: Source Health Tech Wire

The clinical data mountain is growing at a rapid rate. Clinicians are using more images to make decisions and monitor progress over the course of cancer treatments. In IGRT, new images are generated at every step of the treatment process. The vast and growing amount of images and related information that must be stored, along with easy archiving and instant accessibility, is not available in a conventional PACS.

Although PACS have been used for many years as a data storage solution, they lack the direct integration with the EMR that would enable them to connect the information to the clinical pathway for each patient. PACS also typically lack an image viewer to permit display of DICOM-RT images, plans and objects that have been archived – or indeed, move them to the EMR when they are needed.

For oncology departments to exchange and coordinate patient data with other clinical departments — across multiple locations and multiple hospital and IT systems – they need a centralized approach.

MOSAIQ Data Director — Adding Value to the Oncology Practice

The ability to not only store files but to also intelligently archive, search, view and restore patient and clinical images, plans and data is key to making decisions about a patient's treatment course. It allows clinicians to understand the complete picture of care, both past and present.

MOSAIQ Data Director delivers a total image and data management solution on five distinct levels:

1. Complete image and data archiving and storage solution controlled contextually from within the patient's EMR

2. Centralized solution, providing seamless connectivity to streamline use of existing PACS, HIS and third-party systems

3. Comprehensive locate and search solution, working across internal and external hospital systems, allows for access to data stored in 3rd party systems from within MOSAIQ OIS

4. Advanced 3D RT Viewer to view web images and data, launched from within MOSAIQ

5. Advanced restore capability to move files back into the patient record or other destination as desired.

Complete Archiving and Storage

MOSAIQ Data Director is capable of archiving and storing large volume image and data files, including all the major imaging modalities such as CT, MR, PET, kV x-rays, cone beam CT and electronic portal images, in addition to non-DICOM radiotherapy treatment plans, dose levels, and other important treatment details that might be contained within MS Word docs and PDFs. Each of these file types is archived in their native formats, without having to convert them for storage or encapsulating them in "DICOM Wrappers."

Advanced automated archiving tools are used to store data based on clinically relevant indicators or time-related criteria. For example; archiving all CBCTs from patients who have completed treatment over 90 days prior. Archiving can be accomplished individually or "Batch Processed" at times when demand on IT resources is reduced.

MOSAIQ Data Director is completely integrated into MOSAIQ® EMR, linking the relationships between images and clinical decisions in the context of an entire treatment course. Conventional PACS lack this functionality, which is crucial to modern oncology care.

MOSAIQ Data Director enables automatic archival of associated structures when archiving images from MOSAIQ, enhancing data and image workflow when archiving objects. (Fig 1)
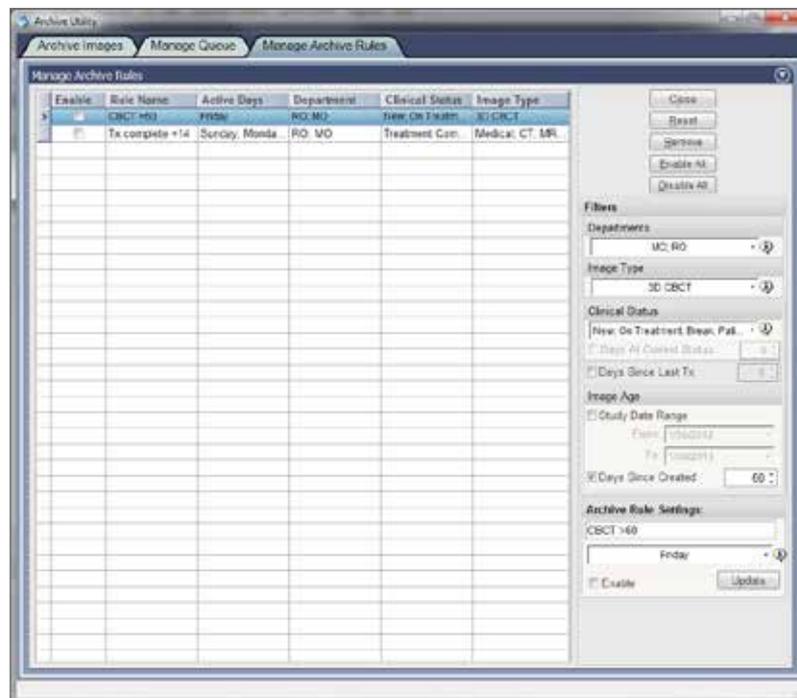

Figure 1: Archive utility in MOSAIQ enables archive rules to trigger automatic archiving.

Centralized Source for All Archived Files

MOSAIQ Data Director can connect to existing infrastructure to provide a centralized image and data solution. (Fig 2)
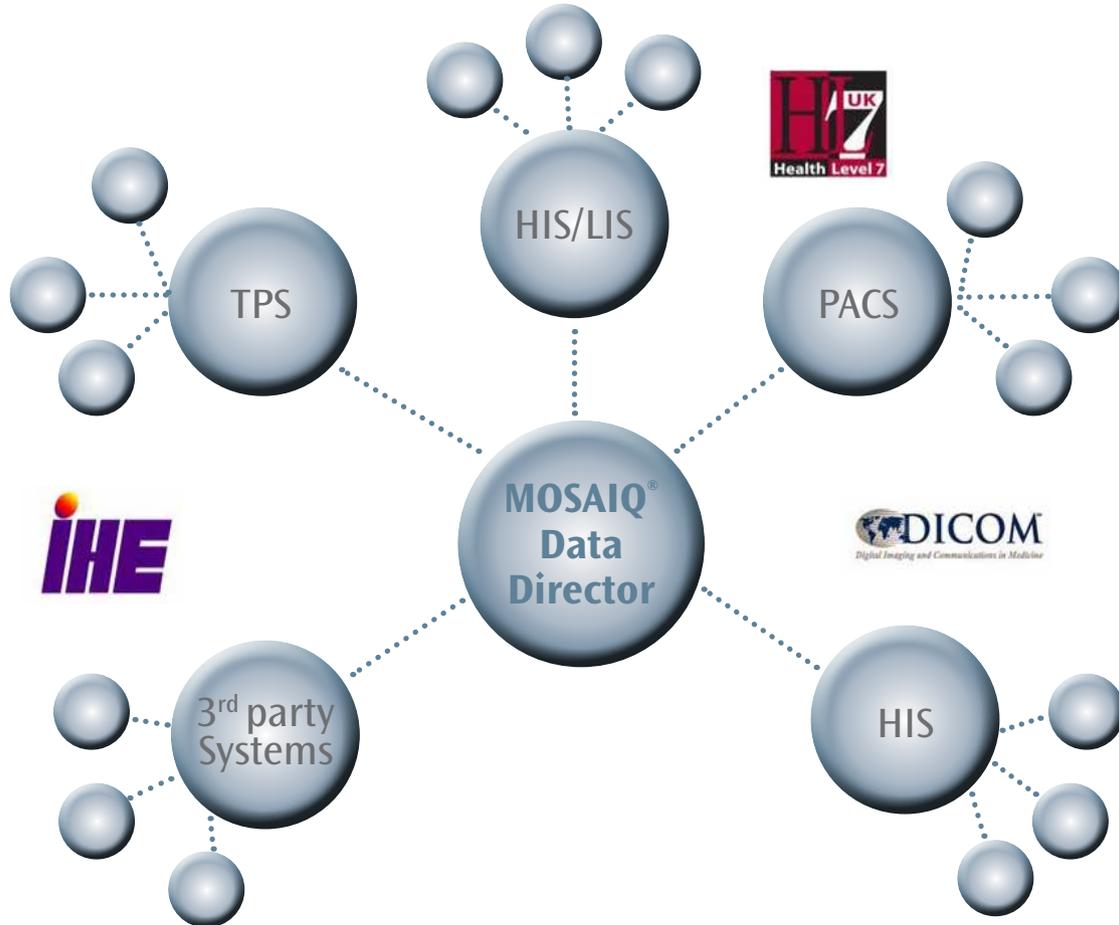

Figure 2: Elekta's open device connectivity with MOSAIQ Data Director.

Flexible Search and Locate Capability

The Query Spanning and Move Forwarding tools provided by MOSAIQ Data Director can search and locate images, plans and other data files that reside in the hospital PACs or other third-party IT system and, if necessary, bring them to a centralized location within MOSAIQ Data Director.

Move Forwarding also allows the clinician to move patient-specific images or data from one device to another, such as sending a specific treatment plan back to the treatment planning station, all without leaving MOSAIQ Data Director or the patient record.

Superior Visualization

MOSAIQ Data Director incorporates an advanced 3D web based RT viewer (Fig 3) to display RT images, plans and data files without the need to open a separate application.

By utilizing the built in graphics tools, the user can view DICOM datasets including dose, beams, structures, DVH and display archived images as well as documents and other non-DICOM objects in context with the patient record.
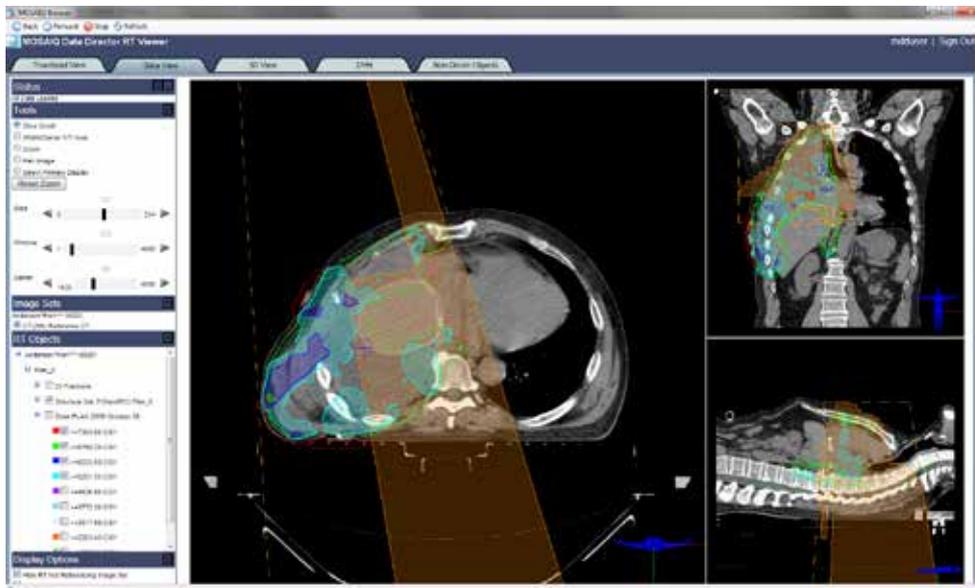
Figure 3: MOSAIQ Data Director web based RT viewer

Restore

Restoring archived datasets to MOSAIQ can be performed either directly from the patient chart or by using a Restore Utility for bulk transfer based on powerful filtering options. Restoration to MOSAIQ is immediate and allows full use of MOSAIQ imaging tools.

Total Control

Archive rules can be created in MOSAIQ Data Director to automatically archive RT images and objects that meet user-defined criteria.

Summary of Benefits

- Designed to manage the ever increasing volumes of large datasets in radiotherapy – CT scans, plans and more
- Provides an easily accessible image and data archive for all DICOM images and non-DICOM data, including RT objects and Treatment Planning files
- Almost everything can be accomplished within the context of the patient chart, providing the right information at the right time, ensuring the practice has the timely, relevant, and reliable data it needs, when it is needed
- No separate stand-alone applications or workstations
- No separate log-ins or patient searches
- A single list containing objects from MOSAIQ, Data Director and any third-party systems (Fig 4)
- Enhances oncology workflow and increases practice efficiencies
- Eliminates the need to use specialized applications or workstations, thus saving hardware costs
- Meets increased data demand while supporting a paperless department
- Automatic archival of associated structures when archiving images from MOSAIQ
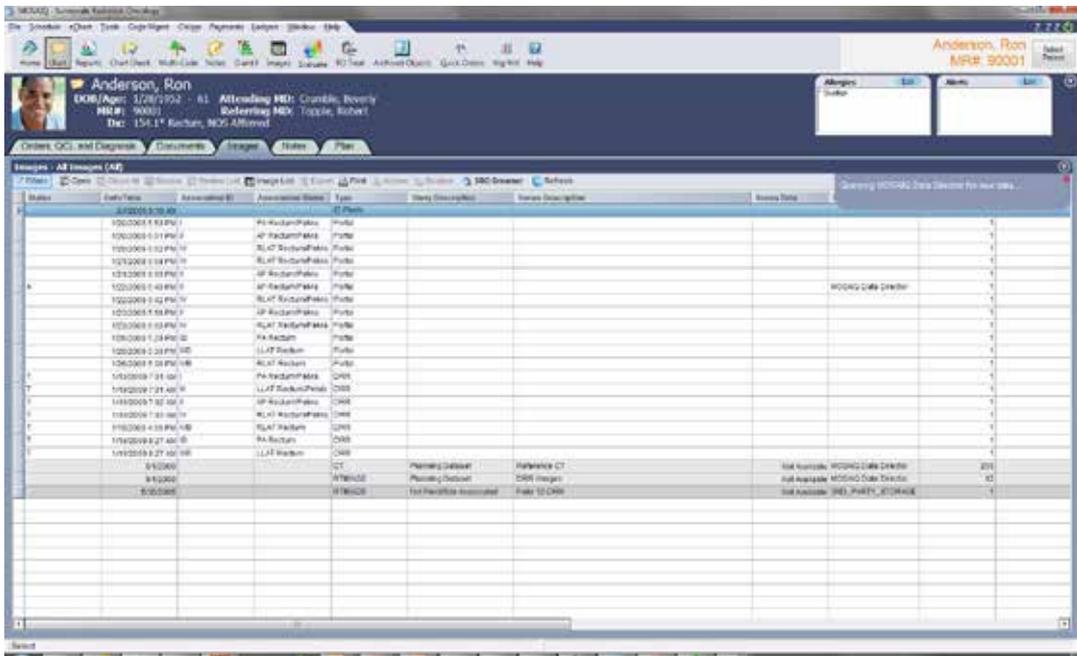
Figure 4: Single list of images and objects from MOSAIQ Director and other third party systems displayed in the MOSAIQ EMR.

MOSAIQ Data Director Product Matrix

Feature	MOSAIQ® Data Director
Archive and store DICOM objects and data files	✔
Archive and store non DICOM objects and data files	✔
Centralized search and find query spanning	✔
Move forwarding from other systems	✔
Restore files back to the patient record	✔
EMR integration	✔
Powerful 3D viewer	✔
Web based data management solution for easy access	✔

MOSAIQ Data Director at Mary Bird Perkins Cancer Center — Case Study

With over 25 years experience, Mary Bird Perkins (MBPCC) in Baton Rouge, Louisiana, USA and its recent alliance with Our Lady of the Lake Cancer Center (OLOL), provides a unified healthcare center at the forefront of cancer care. Through its participation in the National Cancer Institute Community Cancer Centers Program (NCCCP) since 2007, MBPCC helps ensure the most coordinated care and personalized experience for cancer patients.

Mary Bird Perkins has been using MOSAIQ since 1997. The center implemented MOSAIQ Data Director in Spring 2010. Following implementation of MOSAIQ Data Director, significant time savings have been achieved.

Time Savings Realized at Mary Bird Perkins Cancer Center (MBPCC)

During the course of normal clinical activities, MBPCC must perform a number of activities involving the archival and restoration of patient images and data sets from external devices and systems, such as treatment planning systems and imaging devices. Before MOSAIQ Data Director, MBPCC had been employing standard magnetic tape and DVD systems to archive images and data, along with manual index lists and spreadsheets to help track file storage locations. After implementing MOSAIQ Data Director, these tasks were dramatically streamlined.

The five specific clinical data activities studied were:

- Archive Pinnacle TPS to Tape/DVD vs. MDD
- Restore Pinnacle TPS from Tape/DVD vs. MDD
- Archive TOMO Therapy 30 Pat. Batch to Disk vs. MDD
- Archive CT /PET to DVD vs. MDD
- Restore CT /PET from DVD vs. MDD

Some of these activities are performed daily, some weekly, some monthly or less frequently, but in every case, significant reductions in time required were measured using MOSAIQ Data Director and are detailed in Charts 1 and 2. The minimum percentage time reduction using MOSAIQ Data Director versus standard tape or DVD methods was 67%, with a maximum of 92% improvement. At MBPCC these activities were typical performed by a Dosimetrist; using MOSAIQ Data Director resulted in an overall efficiency and productivity improvement of 12% over a one-year period.
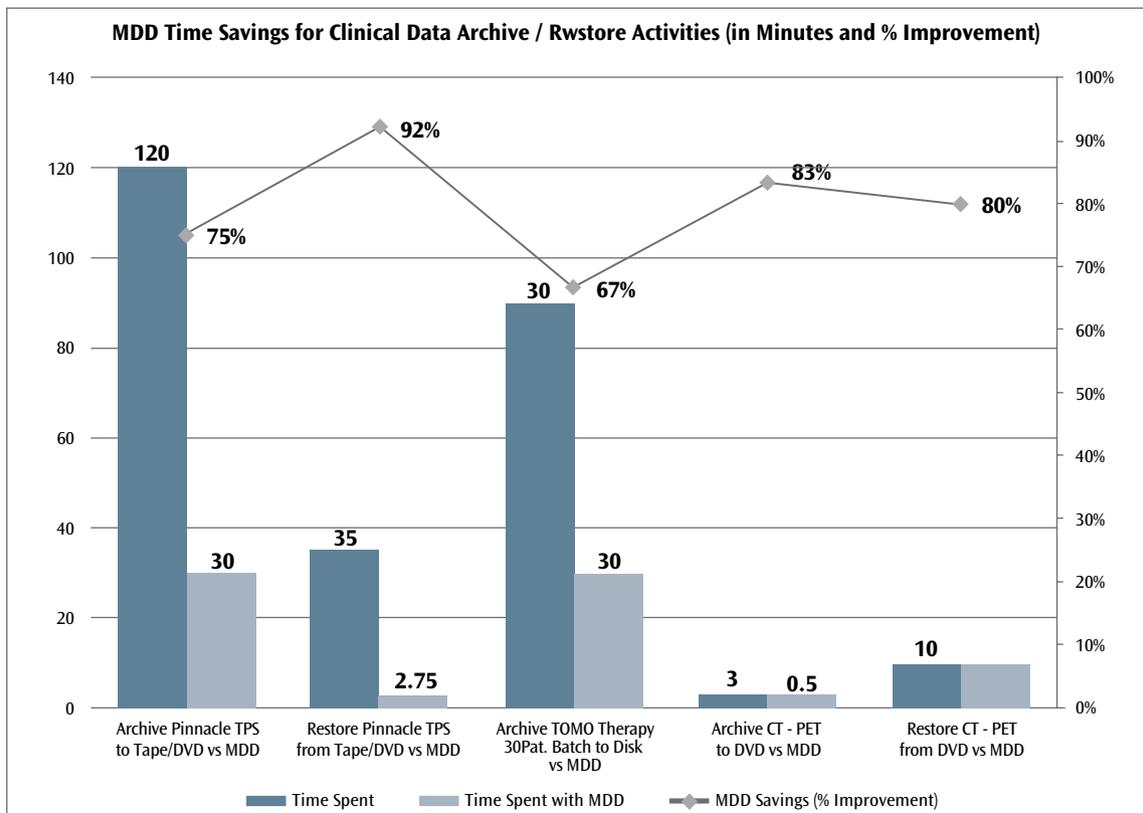

Chart 1

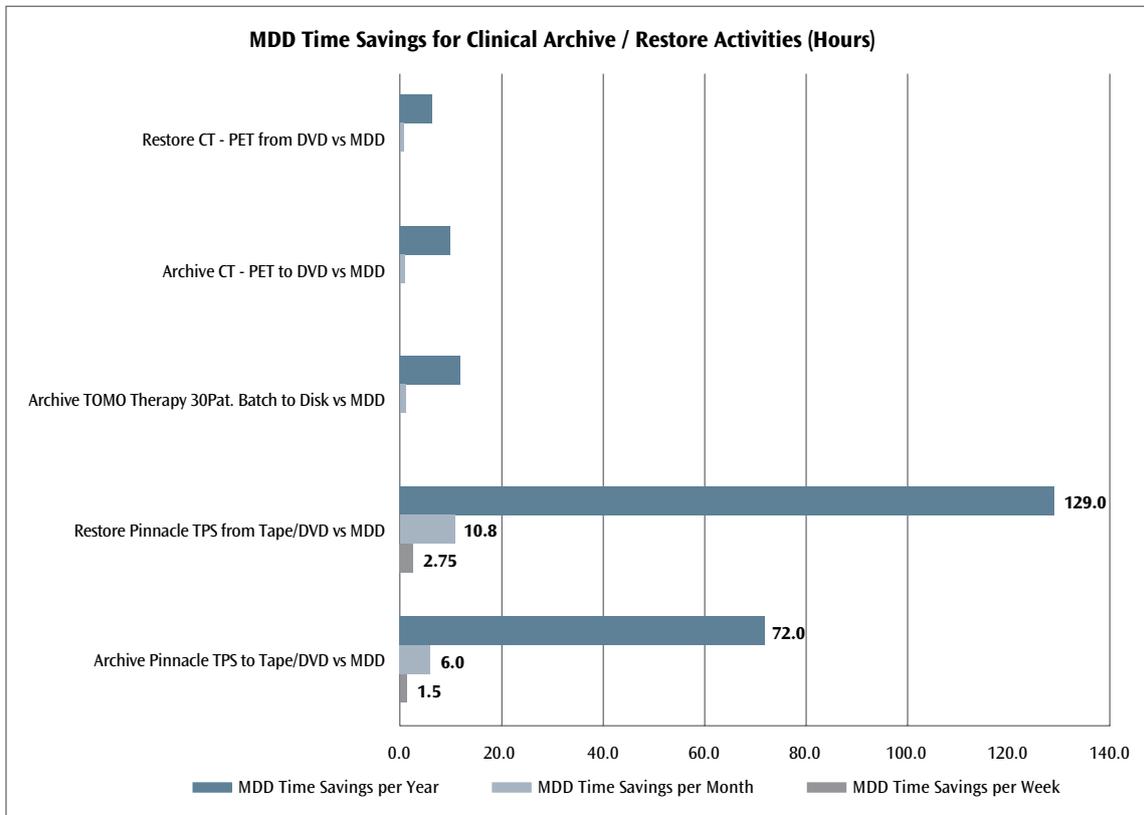**MDD Time Savings for Clinical Archive / Restore Activities (Hours)**

Chart 2

Chart 2 illustrates the time savings in hours per week, month and year for the data archival and restore activities studied at Mary Bird Cancer Center. *The result was over 229 hours saved per year using MOSAIQ Data Director.*

Conclusion

Mary Bird Perkins' use of MOSAIQ Data Director has significantly improved operational efficiency and effectiveness – through time savings achieved in managing large volume datasets, images and plans through the software – in comparison with standard tape or DVD methods.

Not only has archiving of CTs, PET images and treatment plans from multiple devices become more streamlined and manageable, restoring of these files back to MOSAIQ is also quick and easy to achieve. This frees up time for physicians and clinicians to focus on patient care.

Acknowledgements

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Find out more about MOSAIQ Data Director at:

www.elekta.com/MOSAIQ

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