Volume 4 / Issue 2 / 2009 - Features

Oncology HIS System

Author

Andrew Hoole,

Addenbrooke's Hospital,

Cambridge University, UK.

Edwin Claridge,

University Hospital,

Birmingham, UK.

A Mini HIS for Oncology

The selection and integration of appropriate information systems is one of the challenges facing hospital managers in their quest to achieve organisations offering a high level of clinical care, coupled with efficiency, and good financial and clinical governance.

The issues become particularly difficult when 'top down' systems, such as EHR, HIS and PACS come into contention with established departmental systems. This article considers Oncology Management Systems (OMS), where issues of integration between departmental systems and corporate systems currently engender debate.

OMS offerings have developed from the real-time computer systems used in radiotherapy (RT) departments, mainly with linear accelerators, to control treatment delivery. Complex daily treatment fractionation is tracked through Record and Verify (R&V) modules that maintain a complete record of each radiation beam's contribution to the overall dose.

OMS Components

R&V modules and the machine verification aspects are specialist and unique RT features, now incorporated into OMS systems. These encompass other modules covering medical history, to record tumour diagnosis and staging, scheduling, not only for patient preparation and therapy attendances, but also for activities in treatment preparation that do not involve patient attendance.

Additionally, with modules for the organisation and delivery of Chemotherapy (Chemo) regimes and RT protocols, concurrent treatments can be tracked. Clearly this OMS functionality now overlaps with some features found in 'top-down' Hospital Information Systems (HIS).

OMS Structural Options

OMS suppliers serve the international market and can offer independent systems or can create hybrid systems by linking OMS with DICOM to related RT systems and to PACS, and with HL7 to HIS systems dealing with demographics and more.

One can also envisage systems in which almost all oncology records are maintained on the main HIS system. The departmental system would then receive treatment machines requests for work-lists and treatment parameters from the HIS and in turn submit treatment delivery records back to the HIS.

The growing maturity of the RT extensions to the DICOM standards and their adoption across the community makes moves towards this model potentially possible although the many unresolved integration issues suggest that the hybrid system model is the pragmatic choice for now. Whatever model is adopted, within the sphere of oncology the appropriate use of OMS technology can considerably aid the process of achieving the necessary clinical, efficiency, financial and governance objectives.

Benefits to RT Processes

Patient pathways through oncology are complex, involving input from various professionals. Developments within OMS introduce the possibility of actively tracking 'back-office' tasks such as tumour delineation on planning images and the subsequent RT planning processes.

Careful mapping of preparation processes and available staff skills makes it possible to devise ways in which the scheduling capabilities of an OMS can be used to more clearly define and allocate the associated tasks within the processes. This precise definition and allocation of tasks can also improve the sense of ownership, accountability and control that staff feels. Such techniques also enable the audit of pathways. This kind of audit highlights areas of resource bottlenecks, enabling managers at all levels to address such issues by training or physical resource provision. The need to meet stringent waiting time targets requires the overall process to be intelligently controlled.

Over the past decade or so the technology behind RT and chemo has increased in complexity. The ability to safely utilize new technologies has been due largely to the parallel development of OMS, handling information on patient configurations, image guided RT, or the complex regimes associated with chemo. As treatment complexity increases, it is important that treatment management does not become fragmented across too many information systems. This would increase the difficulty of maintaining an overall picture of a patient's treatment. Potential conflicts arise in that context, such as whether it is best to have a chemo prescribing system that serves clinics distant from a cancer centre and is part of an OMS, or whether it is better to prescribe chemo from individual hospital pharmacy systems?

Other Advantages

Integration:

To achieve good integration, OMS providers should be encouraged to provide solutions that both embrace the newly developing technologies and that integrate with HIS and other corporate systems. This is most likely to be achieved by ensuring that systems support developing standards, for example, HL7 for general message passing, and the maturing RT components of the DICOM standard, for PACS integration, both encouraged by the Integrating the Healthcare Enterprise (IHE) initiatives for exchanging data between systems using agreed definitions.

Time and Space Management:

Oncology management falls at the complex end of the spectrum of hospital activities. Work is largely out-patient oriented and both RT and chemo are likely to involve many treatment sessions. The scheduling is complex because slots in treatment bays and rooms are used so intensively. The treatment pathways are many; their modification as treatments regimes and protocols progress is quite common.

When using an OMS database a distinction between activities concerned with the provision of patient treatment and those intended to provide management statistics needs to be appreciated. For costing/billing and process/revenue allocation managers must choose between collecting large volumes of daily data from incomplete prescriptions, or lower volumes of summary data, which has been through more quality screening and deals with finished prescriptions. For monitoring the use of treatment rooms, the various waiting times and the techniques in use, the OMS is also a rich resource.

Dissemination of Information:

A challenge for the oncology community is to make local data appropriately available across a broader spectrum in a manner that is not open to misinterpretation; uses could include audit and resource planning.

Unfortunately the terminology used in oncology and OMS is not standardised and comparisons between centres are therefore difficult. The wide availability of PACS systems, themselves based on the DICOM standard and in some countries becoming integrated across the nation, make them a potential platform for achieving this wider dissemination of information. The operational differences between radiology and oncology departments make it difficult to envisage a real-time integration with OMS, but the retrospective uploading of a completed RT episode summary DICOM data object into PACS is a potential way in which this data may be "protected" for the benefit of the patient across a broader geographical spectrum.

Data Security:

Data protection is often viewed as ensuring that data does not fall into the wrong hands. Another important aspect is to ensure that the data held remains available for continued use, in the context of both current and future treatments. The centralized storage of data in local OMS facilitates this process. Note that statutory Oncology data storage periods are usually greater than many OMS software life cycles, implying that evolutionary planning must include archive data.

Conclusion

In conclusion an OMS is now a critical component in the dayto- day operation of Oncology facilities and a potentially rich data resource for management to meet larger goals. Currently the level of integration, for example for the assimilation of OMS elements beyond R&V into HIS and/or PACS, is not completely developed. The standards for the definitions required for national and international data exchange have also not yet been agreed. It is necessary to consider these issues when purchasing an OMS solution and essential to engage in an active debate about future relationships between OMS, HIS and PACS.

Imaging Technologies and HIS Convergence

As observed in this article, Oncology Management System (OMS) suppliers offer both independent systems as well as hybrids linking OMS with DICOM and to related RT systems and PACS, and with HL7 to HIS systems dealing with demographics and more.

Some of the most dramatic technology advancements in recent years have indeed concerned imaging systems, from acquisition and display to storage, retrieval and transmission. Imaging technologies, in turn, are acting as the fundamental push-side drivers to convergent hospital information systems. Digital images from cardiology, pathology, radiology, or for that matter oncology and other specialties, are being linked to each other's databases, and accessed seamlessly. This has begun improving workflow, cut costs and enhanced patient safety, the Holy Grail for any healthcare IT manager.

A key challenge facing imaging data integration with HIS systems was messaging standards between DICOM and Health Level-7 (HL7). This has been addressed by socalled 'brokers' – which accept HL7 messages from the

RIS and then translate them to produce DICOM messages which are then transmitted to the PACS. Further developments in RIS/PACS to HIS connectivity are being addressed at Integrating the Health Care Enterprise (IHE) initiative, which has been covered in the previous issue of Healthcare IT Management.

Published on : Wed, 4 Feb 2009