

Background: Healthcare providers are increasingly switching to electronic medical record systems (EMR). The challenge for Medical Physicists is how to transfer the functionality of the chart with respect to quality control and safety into the new EMR workflow.

Function of Paper Chart: The obvious function of a paper chart is to collect information on a patient. In addition to this content collection, a paper chart fulfills multiple functions. It can serve as:

- (1) *A task assignment:* e.g. the chart being handed over to a physicist means the chart is ready for second physics check.
- (2) *As checklist:* Is the 2nd check completed? Plan approved by the attending physician?
- (3) *information transmitter:* bolus required? Frequency of CBCT? TLD measurement needed?
- (4) *record of QA:* checkmarks verify weekly chart check was done; results for TLD measurements get recorded
- (5) *billing documentation:* special physics consult, block/MLC fabrication, etc.

All these functions together help structure the established safe process and document QA, and need to be preserved in the EMR environment. Depending on the quality of the EMR software, the availability of equivalent tools in the software can range from easy-to-use to nonexistent.

Tools to identify information flow: To match which chart functions need to be transferred to which tool within the EMR, a workflow diagram of the charts' path through the department needs to be created. This flow diagram should show the time progression on one axis, and the charts' location within the department (e.g. nursing station, dosimetry, resident's desk) on the second axis. Process entries list all the actions that need to be taken. Connectors indicate tasks and information flow.

EMR system functionality: The next task will be to match the flowchart to tools which are available in the EMR system. E.g., a pre-treatment checklist for the RTT can be implemented as a "Questionnaire" in ARIA. However, it will quickly become apparent that none of the currently available EMR systems have been designed to fulfill the functions of many layers of communication and safety check documentation. Several examples will be given in this lecture, and possible solutions discussed. In addition, the systems are not easily adapted to individual institution's needs. Inter-connectivity to other EMR systems within the same healthcare provider can be costly and time-consuming.

Implementation Plan: During the transition phase to an EMR there is considerably higher risk of quality checks failing to detect errors. Three strategies to manage the transition phase safely will be discussed listing the pros and cons of each approach. Once the department is paperless, each software upgrade will likely require some re-design of established procedures. Preparation, testing, and verification of the continued functionality of quality and safety checks across software upgrades demand additional resources. A special challenge for maintaining safety is where care team members across departments with separate, non-communicating EMR systems provide care.

Learning Objectives:

1. Understand the function of the paper chart beyond medical content.
2. Know how to design a flow diagram to chart handoffs, safety checks, and other communication.
3. Identify which tools their EMR system contains to take on essential quality control and safety functions.
4. Understand safety-critical situations in the transition and upgrade of EMR software