Clinical Implementation of Electronic Charting

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Outline

I. Implementation Team
II. Process Mapping
III. External Beam Radiation Therapy Workflow
IV. Brachytherapy Workflow
V. Clinical Implementation

EMR – Where Do We Start?

- Ideal situation – open a brand new department as a complete electronic department
- Reality – established department with established processes that need to transition to an electronic format

Reality of the Situation

- Two Hospitals
- 6 Elekta Accelerators
- 2 CT Simulators
- 2 Conventional Simulators
- 2 Nucletron HDR units
- 1 GammaKnife
- 150 Staff

Implementation Team

- Team makeup
- Role of team members
- IT education and relationship to Radiation Oncology
- Evaluation of staff skill set

Team Members

- Clinical Users
  - Physician
  - Physicist
  - Dosimetrist
  - Therapist
  - Nurse
  - Clerical
  - Administrator
- IT support
  - Radiation Oncology
  - Hospital/Clinic

Role of Team Members

- Clinical User
  - Lead
  - Investigate
  - Educate
  - Implement
- IT Support

IT Education and Relationship

- Treatment
- Pretreatment and post-treatment
- Maintenance

Siochi, R., et al. Journal of Applied Clinical Medical Physics, Volume 10, Number 4, Fall 2009, “Information technology resource management in radiation oncology”

Treatment

- Treatment Area Design
- Installation
- Multiple resources
  - Radiation Oncology
  - Hospital IT
  - Vendor staff
  - Physicist as project coordinator

Support

- Physicist first line of response for IT related problems at the treatment unit
- Prompt response to issues within 3 minutes
- Determine support needed to solve problem
  - Internal to Radiation Oncology
  - Hospital/Clinic IT staff
  - Vendor or in house engineering staff

Business Continuity

- Contingency plans need to be made up front for potential down time
- Contingency plans need testing and verification prior to put into practice
- Hospital/Clinic IT staff involved along with medical physicist for collaboration

Pre and Post Treatment

- No longer a simple R&V system
- Centralized database with multiple inputs
  - Hospital Information System
  - CT Simulation
  - Treatment planning system
  - Radiation Oncology Software
- Data transfer to other institutions

Maintenance

- Backup and archiving
- Database maintenance

Evaluation of Skill Sets

- Poor “computer skills”
- Staff used to a simple technology
- Need to start with the basics
- What is simple and obvious to you isn’t to everyone else

Obstacles to EMR

- Poor “computer skills”
- Benefit not immediately tangible to all involved
- Established habits due to partial use of the record and verify section of the EMR

Benefit is not Immediate

- Not everyone hunted for paper charts
- A specific task may take longer to perform electronically than in paper
- The overall process time is shorter

Habits to break

- Currently using R&V and not really reading the rest of the chart
- Going straight to the treatment fields
- Not transferring paper process into electronic process

Process Mapping

- Evaluation of department workflows
- Conversion of paper files to electronic files
- Implementation of new processes

Department Workflow

- Implementation team members need to evaluate all process within the department
- EMR serves department clinical workflow
- Outline the path to implementation
  - Eliminate sections of the paper chart systematically
  - Cold turkey, EMR overnight

Example: Workflow triggers

- Physical charts previously used as trigger for multiple events
- Electronic charts need electronic triggers
- Utilize measures within EMR to move the patient through the department

Conversion of paper files to electronic files

- Develop electronic documents to replace documents completed by hand
- Import documents that must still be completed on paper
- Import outside records

Implementation of new processes

- Evaluate all documentation for equivalent replacement in electronic version
- Don’t necessarily need to create a document for every document that exists in a paper chart
- Change in process for documentation

Pathway to EMR

- Eliminated sections of the chart until the paper chart was no longer of any use
- Targeted sections of the paper chart and developed an electronic equivalent
- Trained staff and implemented
- Tried to minimize duplication of documentation
- Standardization of the chart layout

External Beam - Workflow

- Simulation
- Treatment planning
- Treatment delivery

Simulation

- Diagnosis
- Orders
- Simulation Setup parameters
- Simulation Note
- Billing documentation
- Handoff to dosimetry

Handoff to Dosimetry

- Quality check list item is generated informing dosimetrist a case is ready for import into treatment planning system

Treatment Planning

- Target volume delineation
- Radiation treatment prescription
- Treatment planning
- Transfer of treatment beams and plans
- Treatment plan verification

Target Volume Delineation

- Quality Checklist
- Email
- Paging

Treatment Plan Verification

- Treatment plan printed to EMR
- Implement electronic sign off of treatment plans and prescription
- Verification of treatment beams against TPS information
- All other physics/dosimetry documentation moved to EMR

Additional Physics Documentation

- Diode documentation
- Secondary monitor unit calculation
- Pacemaker/ICD documentation
- IMRT or VMAT QA

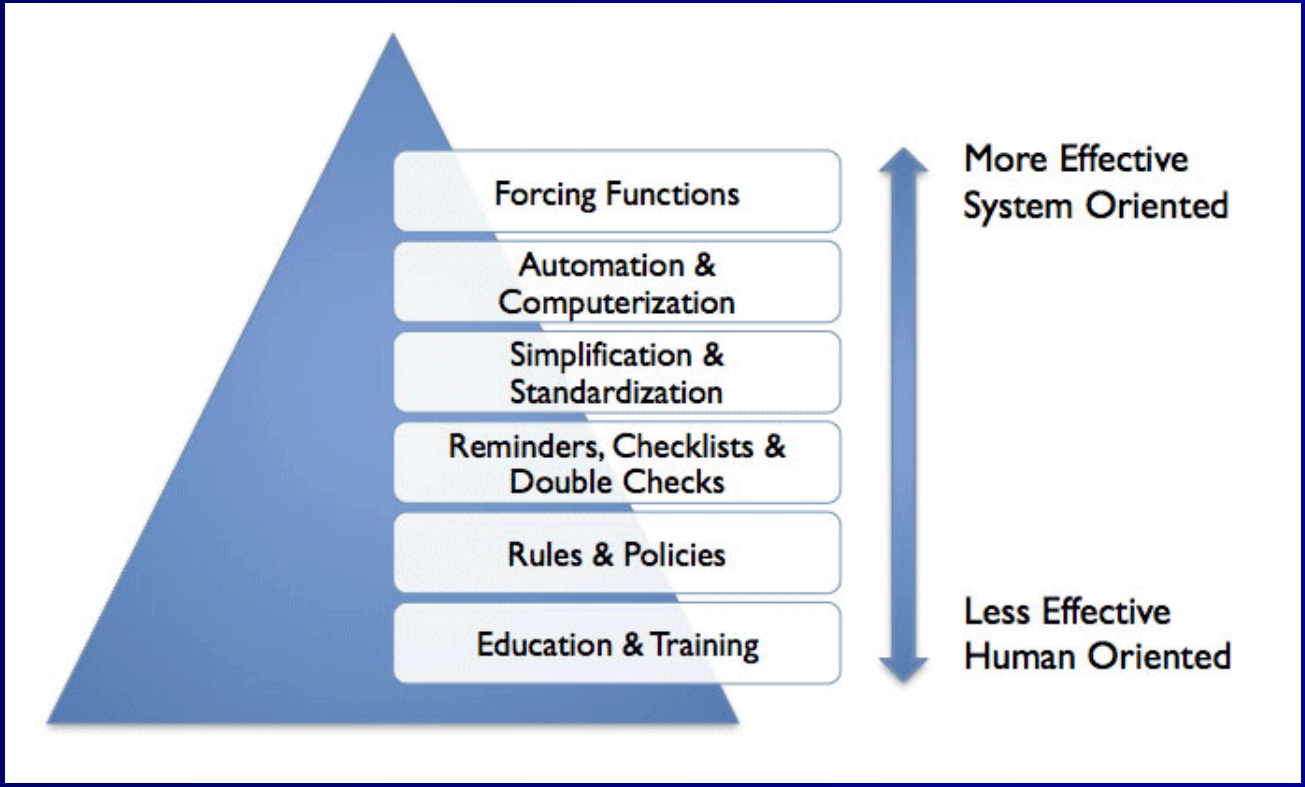
Prior to Treatment Delivery

- Verify treatment prescription and plan is approved by physician
- Verify physics has completed the calculation check
- Verify patient has signed the consent form
- Create treatment calendar

Treatment Delivery

- Prescription Review
- Site Setup review
- Patient verification
- Treatment beam review
- Treatment delivery

Error Prevention



- McDaniel, C. Designing Healthcare. *Hierarchy of Effectiveness: The Process.* February 10, 2012, from http://www.cassiemcdaniel.com

Potential Errors

- Treating without signed prescription or plan
  - Interlock treatment units so treatment beams cannot be delivered without approvals
- Set up distance incorrect
  - Treatment beams have a table position tolerance

Potential Errors

- IMRT beams did not transfer to treatment machine as planned
  - All IMRT beams are measured and analyzed before treatment delivery

Potential Errors

- No interlocks everything is good to go
  - Possible error wrong person, wrong site, wrong procedure
    - Joint Commission requires time out process
    - Time out implementation similar to surgery
    - Implemented manual verification of patient identity on treatment screen

Brachytherapy

- Caution – Proceed at your own risk
- Work with your hospital Radiation Safety Department/Regulatory Compliance Department
- Know your regulators – Agreement State or the NRC

Regulatory Compliance

- Is an electronic approval of a written directive the same as a signed written directive?
- Unclear and could be dependent of reviewer
- HITECH ACT of 2009, penalties if not utilizing an EMR in 2015

Electronic Signature

- FDA considers an electronic signature to be valid provided the following:
  - Unique to one individual
  - Two distinct identification components
  - Utilized by their genuine owner

Ref: 21 CFR part 11

Conference of Radiation Control Program Directors

- Presentation by Bruce Curan at the 2010 CRPD annual meeting

- Survey sent out to CRCPD membership
- 11 of 14 states accepted electronic written directives

Brachytherapy Workflow

- Treatment prescription – written directive
- Treatment planning
- Treatment delivery
- Regulatory compliance

Written Directive

- Written directive must be signed and dated by an authorized user
- HDR – must include: radionuclide, treatment site, dose per fraction and total dose

Treatment Delivery

- Export of treatment information to the HDR control system
- Verification of all treatment parameters in the control system against those in the plan
- Approval of pretreatment report by physician and physicist

Post treatment

- Post treatment report exported from HDR control system reviewed and approved by physicist
- Treatment note written documenting verification of implant, treatment delivered and patient survey
- Brachytherapy progress note written by the physicians

Clinical Implementation

- Preparation
- Installation
- Post-installation

Preparation

- Checklist for conversion from one database to another
- Task assignments prior to conversion

Installation

- Checklists for install
- Task assignments at install

Post-Installation

- Patient chart checklist for verification of treatment records
- Task assignments

Thank you