Radio Frequency Identification (RFID) in Anatomic Pathology

Lab Quality Confab
September 2008
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Specimen Management
GI/CRS Endoscopy

• **System details**
  • Practice Area
  • Three separate units
    • Gonda 9, Charlton 8, SMH/Alfred Main
  • Practitioners
    • Medicine and Surgery
  • Allied Health Staff
    • RN and LPN
  • Patients
  • Procedures
  • Databases
Specimen Management
Anatomic Pathology

• System details
  • Practice Area
  • Single Laboratory
  • Hilton 10
  • Practitioners
    • Pathologists, primary and secondary
  • Allied Health Staff
    • Accessioning, secretarial, HTs
• Cases
• Procedures/Stains
• Databases

Prior Process: Flow of specimens and patient information

Clinical Procedure

1. Enter endoscopic data into GI database

2. EMR
   • Dictated procedure note

3. Complete a requisition form
   • Bag Specimen

4. Accessioning

5. Pathologist
   • Report written

Lab Information System

• Data entered in the lab as tissue is processed
**Specimen Management**

- **System complexities**
  - Managing
    - Highest Quality
    - Guaranteed safety
    - High volume
    - Fast TAT
    - Numerous professionals
    - Varied databases
    - Labeling errors

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**Specimen Management**

- **Labeling error problems**
  - Impact - Clinical Patients
    - Misidentification
    - Wrong site surgery/medical treatment
    - Delay in treatment
Specimen Management

- **Labeling error problems**
  - Impact - Clinical Practice
  - Procedures delay
  - Corrective action/termination
  - Treatment confusion
  - SOP modifications

Specimen Management

- **Labeling error problems**
  - Impact - Laboratory
  - Accessioning/processing delay
  - Diagnosis/Report delay
  - Corrective action/termination
  - Garbage holds
### Wrong organ designation

#### Request for Surgical Pathological Exam

- **Container ID:** 2
- **Date:** 5/18/2006
- **Specimen From:** Organ
- **Specific Site:** Rectal
d
<table>
<thead>
<tr>
<th>Organ</th>
<th>Endoscopic Findings</th>
<th>Histology Use Only</th>
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<tbody>
<tr>
<td>Colon</td>
<td>Normal</td>
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#### History of (Circle) PRIOR / CURRENT

- Colitis
- Chemotherapy
- Non-steroidal anti-inflammatory
- Other drugs
- Infection: Specify
- Malignancy: Specify
- S/P Resection: Indication

### Wrong organ designation with misspelling

#### Request for Surgical Pathological Exam

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### Notes

- Time taken: 5/18/2006
RFID Specimen Management

- **Phase I: Jan ’06 – May ‘06**
  - **Scope (Tissue for AP):**
    - RFID tag stickers placed on specimen bottles
    - 3M File Tracker
    - Data capture and transfer
      - MERGE-3M-CoPath
      - RFID tags as unique identifier
  - Simultaneous tag reading
  - 8 data fields present
RFID System

- Data entered in the lab as tissue is processed
- Complete a requisition form
- Bag Specimen

Accessioning

- Enter endoscopic data into GI database

Pilot Process: Flow specimens, patient information, and RFID

Clinical Procedure

1. Enter endoscopic data into GI database
2. EMR
   - Dictated procedure note
3. Complete a requisition form
   - Bag Specimen
4. Accessioning
5. Pathologist
   - Report written

Lab Information System

- Data entered in the lab as tissue is processed
RFID Specimen Management

• Phase I: Jan ’06 – May ‘06
  • Scope (Tissue for AP):
    • 5 Endoscopy Suites
    • Gonda 9
    • Delivery routes
      • Tube rooms, Central Processing Lab
    • AP Laboratory
  • Parallel to paper requisition form

RFID Specimen Management

• Phase I: Results
  • Bottles ~3000
  • Cases ~1800
  • Paper comparison
    • 9.2 % discrepancy
    • MERGE, Paper, CoPath
  • Nursing feedback
    • Promising
  • Lab impact
    • 2.2 % Accessioning checks
RFID Specimen Management

• Phase II: March ’07 – March ‘08
  • Scope (Tissue for AP):
    • 41 Endoscopy Suites
    • Gonda 9, Charlton, SMH/Alfred Main
  • Delivery routes
    • Tube rooms, Central Processing Lab
    • AP Laboratory

RFID Specimen Management

• Phase II: Results
  • Bottles/tags ~30,000 (no failures)
  • Cases ~20,000
  • Paper comparison
    • 10.1 % discrepancy
  • MERGE, Paper, CoPath
  • Nursing feedback
    • Progressive buy-in
  • Lab impact
    • 2.0 % Accessioning checks
RFID Specimen Management

Phase II: Milestones
- Paperless Requisition
  - 9/10/07
  - CRS transition to GI
  - Estimated 1-5 min. saved/case
- AP Laboratory
  - 12/07
  - 0.5 FTE cost avoidance

Current Process: Flow of specimens and patient information

1. Enter endoscopic data into GI database

- EMR
  - Automated procedure note created and signed
- Pathologist
  - Report Entered
- Lab Information System
  - Data transferred in the lab as tissue is processed
- Accesioning
**RFID Specimen Management**

- **Phase II: Practice Improvements**
  - Paper Requisition Elimination
  - Specimen labeling discrepancies
  - Letter to letter match
  - No abbreviations

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<th>Q1 ’08</th>
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<td>Bottles-</td>
<td>8231</td>
<td>8539</td>
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<td>Defects-</td>
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<td>Error Rate-</td>
<td>8.93</td>
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<td>Process sigma-</td>
<td>2.85</td>
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- **Q2 and Q3 ’08**
  - ~16K bottles with 32 discrepancies/defects (4.68)

**Hard Stops**

**Patients Affected**

**GI/CRS Endoscopy**

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RFID Specimen Management Paperless

• Phase II: Practice Improvements
  • “Rule Out” request expansion
    • >45 clinical questions
    • Flexible/tailored by GI/CRS and AP
  • First Transcription point emphasis
    • Redistribution to endoscopist
    • Elimination of second nurse
  • Institutional label standard
    • Complete compliance

RFID Specimen Management Paperless

• Phase II: Practice Improvements
  • Practice integration
    • Nurses’ white book
    • Details specifications for specimens
      • CMV, KOH, Sprue, etc
  • Collaborations across Divisions
    • Microbiology
    • AP/Cytopathology
    • Endoscopy
RFID Specimen Management

Paperless

- Phase II: Practice Improvements
  - Practice integration outcomes
  - All AP specimens RFID tagged
  - Unique specimens:
    - Endoscopic mucosal resections
    - Pancreas tru-cut biopsies
    - Refractory celiac disease

RFID Specimen Management

- Specimen Labeling Costs - Clinical
  - Discrepancies-
    - Minor: $300/instance
    - Major: $3000/instance
  - 2006 clinical estimate
    - $36,000 in personnel time
RFID Specimen Management

• Specimen Labeling Costs - Laboratory
  • Discrepancies-
    • Minor: $2-3/instance (plus delay)
    • Major: $225/instance (plus delay)
  • 2006 laboratory estimate
    • $73,000 in personnel time

RFID Specimen Management

• Specimen Tracking (pre-RFID)
  • Joint Commission-
    • Issue resolution
      • RN time day after procedure
      • Limited destination knowledge
  • 365 personnel hours
    • Physicians, Nurses, Administrators
    • ($30,000 to $124,000)
RFID Specimen Management

• Specimen Tracking (RFID)
  • Real time tracking
    • All points identified
      • Procedure room
      • Tube staging (refrigerator)
      • Central Lab
      • Accessioning Area
  • Destination verified
  • Near immediate resolution

RFID Specimen Management

• Specimen Tracking (RFID) Case
  • Patient with GI bleed
  • Emergent Endoscopy
    • Weekend case
    • Specimen labeled
      • Tagged, verified
      • Delivered
      • Accessioned
  • No issues during specimen movement
RFID Specimen Management

• Specimen Tracking (RFID) Case
  • Biopsy shows adenocarcinoma
  • Imperfect fit with Endoscopy
  • Dx Shared and communicated
  • Follow-up resection
    • Minute lesion
    • Secondary dx encountered
    • Gross specimen/exam questioned

RFID Specimen Management

• Specimen Tracking (RFID) Case
  • Biopsy tracking reviewed
RFID Specimen Management

• Specimen Tracking (RFID) Case
  • Biopsy tracking integrity
  • Laboratory integrity
    • gross exam/glass slide
• Conclusion
  • Match*

RFID Specimen Management

• RFID Specimen Benefits
  • Reduced
    • discrepancies
    • lost personnel time
    • clinical question delay
    • staff frustrations
RFID Specimen Management

• RFID Specimen Benefits
  • LEAN Laboratory Operation
    • Specimen delivery data
    • Paperless Accessioning
      • Transcription point elimination
  • Launching pad
    • XR pilot
    • In-lab tracking

RFID Specimen Management

• Project financial estimates (annual)
  • Discrepancy Resolution $109,000
  • Lab Efficiency $ 15,000
  • $124,000

• Non-financial gains
  • Staff satisfaction

• Additional procedures/day
  • 99 minutes/day gained without requisition forms
RFID Specimen Management

• Next Steps
  • Expand to capture all specimens in GI/CRS Endoscopy
    • Microbiology
    • Cytopathology
  • Expand into Breast Imaging/Radiology
  • Investigate enterprise solution
    • Mayo Clinic Scottsdale
    • Mayo Health System
  • Expand software capabilities