Using Technology to Increase Productivity & Data Quality

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UCD Health System
The Production Automation and Quality Control (PAQC) Unit is developing automation solutions for various manual processes required for processing cancer cases to completion.

Specific Automation goals and objectives were outlined in our Scope of Work (SOW)
Goals & Objectives

• Reduce the cost of cancer case collection and source document processing

• Improve data quality through automation
  • System-wide “Continuous Quality Control”

• Provide more timely information to researchers
Automation Approach

• Utilize project management approach
  • Develop project team
  • Bi-weekly meetings
  • Status updates to management

• Implement a Step-by-Step process
  • Step One: Develop baseline metrics
  • Step Two: Analyze current manual processes
  • Step Three: Develop, test and implement automation action plan
Projects

• Manual Tumor Linkage – New tumor for existing patient

• Consolidation
  • Class of Case Rules

• Other
  • Corrections
  • Develop automation rules based on edits
  • Revise system auto-source and auto-consolidation logic to improve consistency and data quality
Step One: Overall Baseline

- Baseline metrics

- Calculation based on:
  - Time period 1/1/2013 to 12/31/2013
  - Total Admissions for time period: 289,166
Baseline metrics

Admissions Automatically Processed
n=138,496 (48%)
Baseline metrics

Admissions requiring manual processing
n=156,495 (52%)
Tumor Linkage
Current Status

• Background:

• Prior to this project, system would evaluate whether patient/tumor existed and if not, would auto-create a patient/tumor set

• Tumor Linkage automation project is focusing on auto-linking new admission to existing pt and tumor
Step One
Baseline Metrics

- Pre-Implementation January - December 2013

  - 48% - Automatically processed
    - System auto-processed cases to completion

  - 35% required manual review to link
    - New Admissions with corresponding existing patient/tumor
      - Manually reviewed to determine exact match, potential match, or non-match
Step Two
Step Two: Analyze

- Analyzed existing patient/tumor sets against SEER MP/H rules
- Determined appropriate structure of auto-rules
- Multiple iterations of potential auto-rules were drafted
  - Reviewed
  - Drafted
  - Revised
  - Re-drafted
- Rule required 20 revisions before finalization
A total of 468 hours were dedicated to the automation work effort.
Step Three
Step Three: Develop, Test, Implement

• Initial rule focused on incoming tumor that exactly matches existing tumor

• Rule was extensively tested by Business Analysts, Automation Programmer and QA Testing team
  • Passed all tests with flying colors!

• Exact Match auto-linkage rule was implemented in late December, 2013
Results

• Post Implementation December – March 2014

• 76,889 incoming admissions
  • 9.11% auto-linked per rules (exact match)
    • Decrease in cases requiring manual review
      • 26% as compared to 35% in 2013

• Estimating 1 minute per linkage
  • 1 FTE
  • 14 days (8 hours per day)
  • Approximately 3 weeks of manual work effort saved!
Next Steps

• Team will evaluate appropriateness of developing tumor linkage rules to address:
  
  • Potential Matches
    • In process: Colon, Breast, Prostate, Lung, Kidney
  
  • Non-Matches
Multi-document consolidation
• Moving towards multi-document consolidation requires new algorithms for automating consolidation logic.

• Multi-Document Consolidation Project is focusing on developing automation rules for source documents with different values between them.
• A spreadsheet has been developed outlining all source documents and every data field.

• Priority will be established by source document per data field

...but first things first ...
Class of Case is one data field that will be used to make consolidation decisions.

Therefore, it needs to be a reliable data item for these decisions.
Step One
Step One: Baseline Metrics

- Class of Case and/or related data fields inaccurately coded
Step Two
Step Two: Analysis

- Each Class of Case was analyzed to determine which data fields a visual editor would typically cross-check to validate.

- Automation rules were developed for each Class of Case based on results of this type of analysis
  - i.e., Date of Diagnosis and Date of Last Patient Follow-up; Vital Status; Type of Report Source, etc
Step Three
Step Three: Develop, Test, & Implement

- Class of Case automation rules have been developed, tested and implemented for the following:
  - Class 49 (Death Certificate Only)
  - Class 38 (Autopsy Only)
  - Class 43 (Path Only)
  - Class 00 (Dx @ facility; known Rx elsewhere)
Results

• Auto-corrections structured to occur any time a case is changed or uploaded at any level of system processing and BEFORE edits are run:

  • file upload
  • database inquiry
  • visual editing
  • corrections
Results

• Global fixes were applied to the database to correct cases identified with coding errors

Corrections per Class of Case
• Class 49: 1645
• Class 38: 518
• Class 43: 2340
• Class 00: 72971

• Post-Implementation – all incoming miscoded cases are immediately identified per automation rules and auto-corrected

(Database contains > 3.6 million cases; > 6 million admissions)
## Results

### Class of Case Automation Rules 1/2010 - 5/2014

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<th>Rule Number</th>
<th>Description</th>
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<td>Rule #15</td>
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**Total:** 37 distinct rules | 293
Next Steps

Class of Case automation rules currently in progress:

- Class 34 and 36
- Class 10-14
Conclusion
Converting manual processes to automation alternatives:

- Management commitment
- Metrics
- Team Members
- Challenge
  - Identifying CTRs that are comfortable learning advanced querying skills and interested in fine-tuning their analytic ability
Questions ?
Contact Information

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