Using Technology to Increase Productivity & Data Quality

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Background

- 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

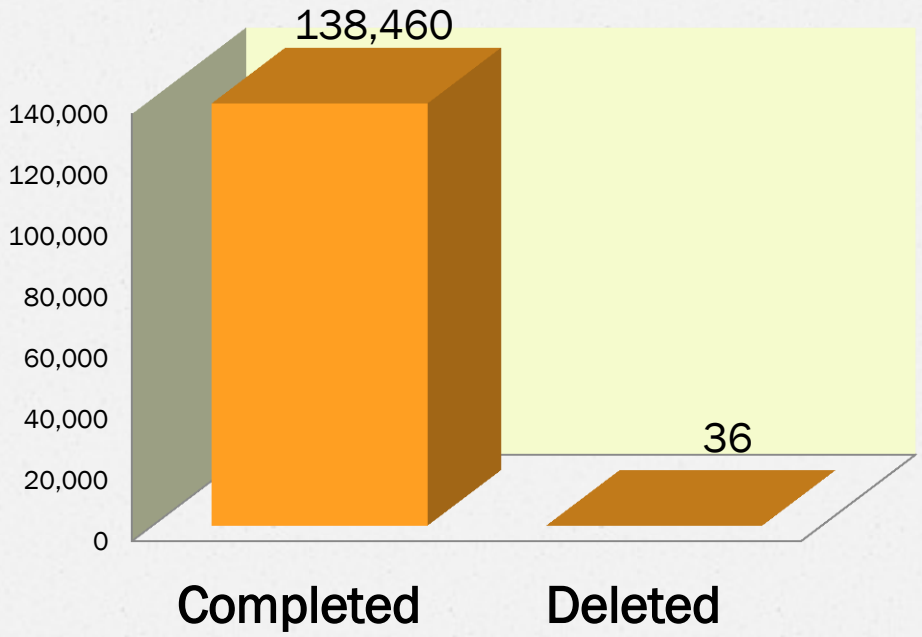
- Manual Tumor Linkage – New tumor for existing patient
- Consolidation
  - Class of Case Rules
- Other
  - Corrections
  - Develop automation rules based on edits
  - Revise system auto-source and auto-consolidation logic to improve consistency and data quality

Step One: Overall Baseline

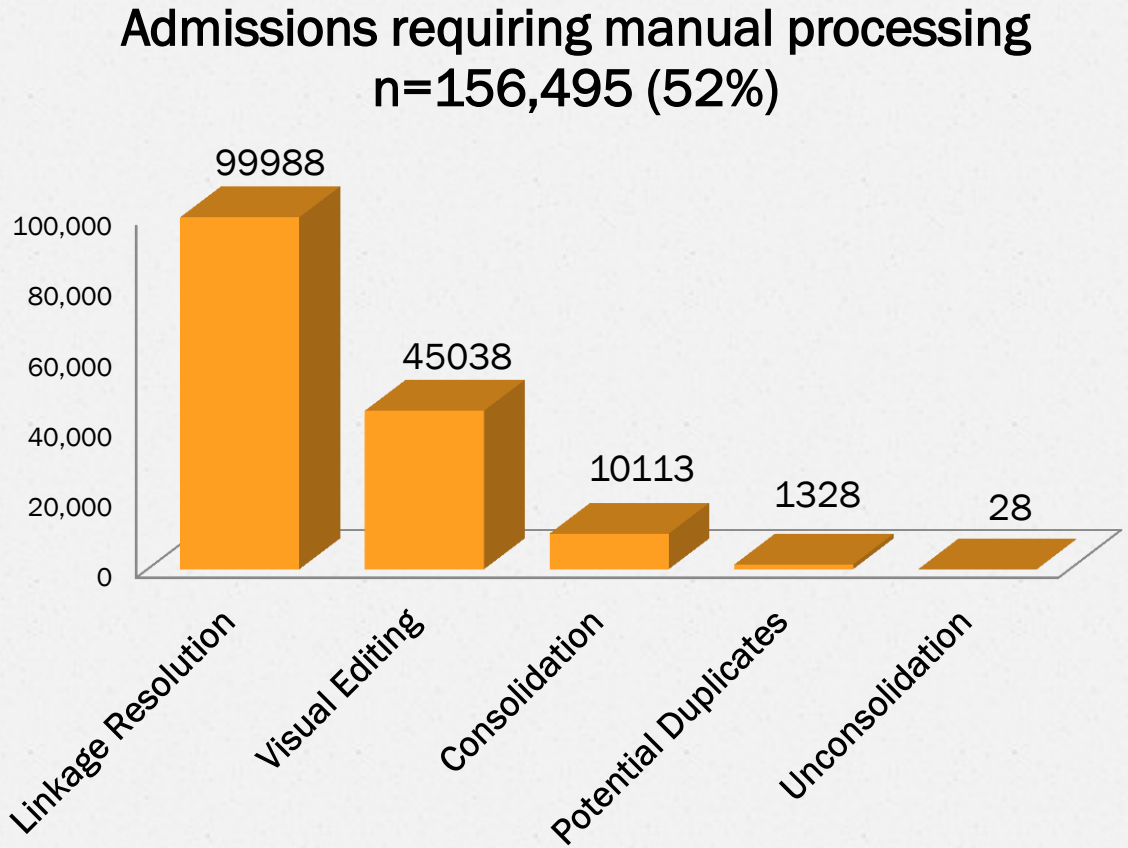
- Baseline metrics
  - Calculation based on:
    - Time period 1/1/2013 to 12/31/2013
    - Total Admissions for time period: 289,166

Baseline metrics

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



Baseline metrics



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

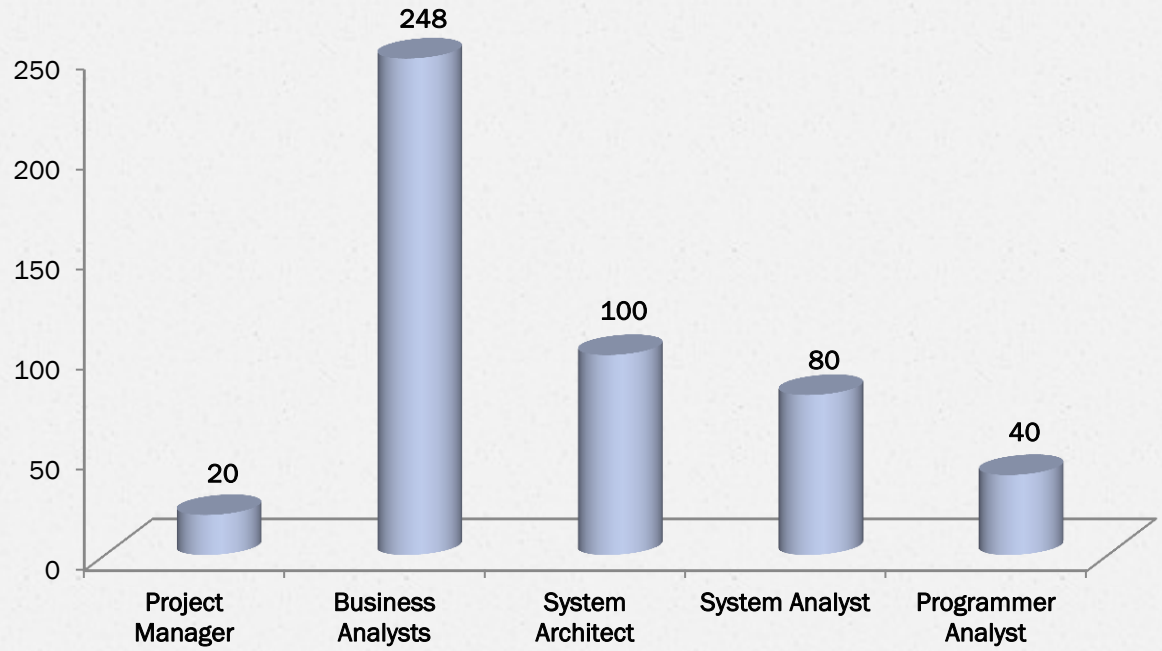
Step Two

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

Work Effort

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

Background

- 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

Background

- 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 …

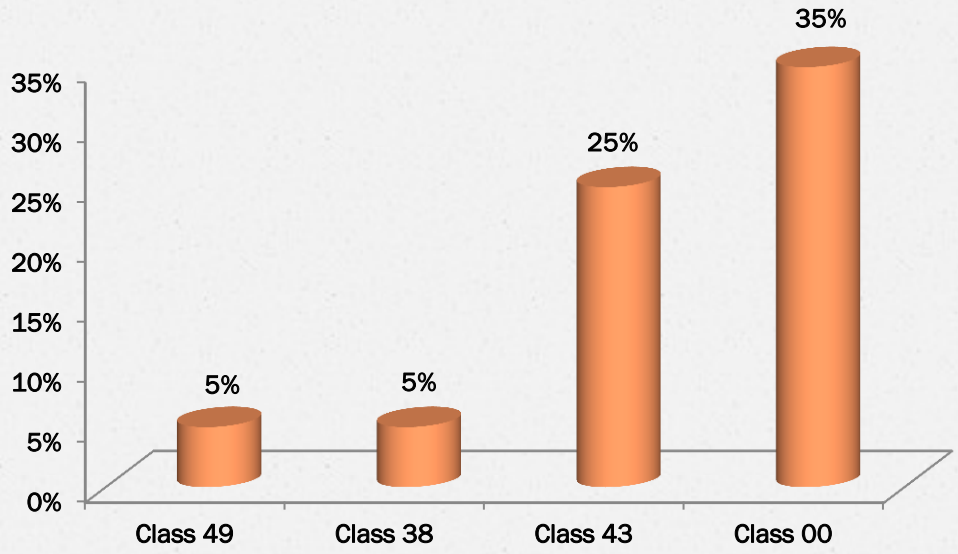
Background

- 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

Activity Type	Rule Number	Description	Count
Audit	Rule #114	c00-2 Change (Class of Case)	1
	Rule #60	c43-2 Change (Class of Case)	4
Edit Errors	Rule #114	c00-2 Change (Class of Case)	29
	Rule #115	c00-3 Change (Hosp Ref To)	1
	Rule #117	c43-17 Change (Hosp Ref To)	1
	Rule #63	c43-5 Change (Type Admis)	1
Manual Review	Rule #114	c00-2 Change (Class of Case)	75
	Rule #115	c00-3 Change (Hosp Ref To)	5
	Rule #12	c38-2 Change (Class of Case)	1
	Rule #15	c38-5 Change (Date DX)	9
	Rule #16	c38-6 Change (Reporting Source)	2
	Rule #61	c43-3 Change (Reporting Facility)	5
Miscellaneous	Rule #114	c00-2 Change (Class of Case)	1
	Rule #12	c38-2 Change (Class of Case)	2
	Rule #15	c38-5 Change (Date DX)	1
	Rule #61	c43-3 Change (Reporting Facility)	2
	Rule #62	c43-4 Change (Date DX)	4
SEER Edit	Rule #114	c00-2 Change (Class of Case)	1
	Rule #12	c38-2 Change (Class of Case)	2
	Rule #15	c38-5 Change (Date DX)	1
	Rule #16	c38-6 Change (Reporting Source)	3
	Rule #8	c49-7 Change (Reporting Source)	3
	Rule #9	c49-8 Change (DX Confirmation)	1
Visual Editing	Rule #114	c00-2 Change (Class of Case)	26
	Rule #116	c00-4 Change(Hosp_Proc)	1
	Rule #12	c38-2 Change (Class of Case)	2
	Rule #13	c38-3 Change (Date DX)	4
	Rule #16	c38-6 Change (Reporting Source)	1
	Rule #60	c43-2 Change (Class of Case)	1
	Rule #61	c43-3 Change (Reporting Facility)	28
	Rule #62	c43-4 Change (Date DX)	10
	Rule #63	c43-5 Change (Type Admis)	48
	Rule #66	c43-8 Change (Reporting Source)	5
	Rule #68	c43-16a Change (Out Of State	1
	Rule #9	c49-8 Change (DX Confirmation)	7
	Rule #94	c43-16e Change (Out Of State Trans/Endocr)	3
	Rule #99	c43-12 Change (Out Of State DateDX)	1
Total	37 distinct rules		293

Next Steps

Class of Case automation rules currently in progress :

- Class 34 and 36
- Class 10-14

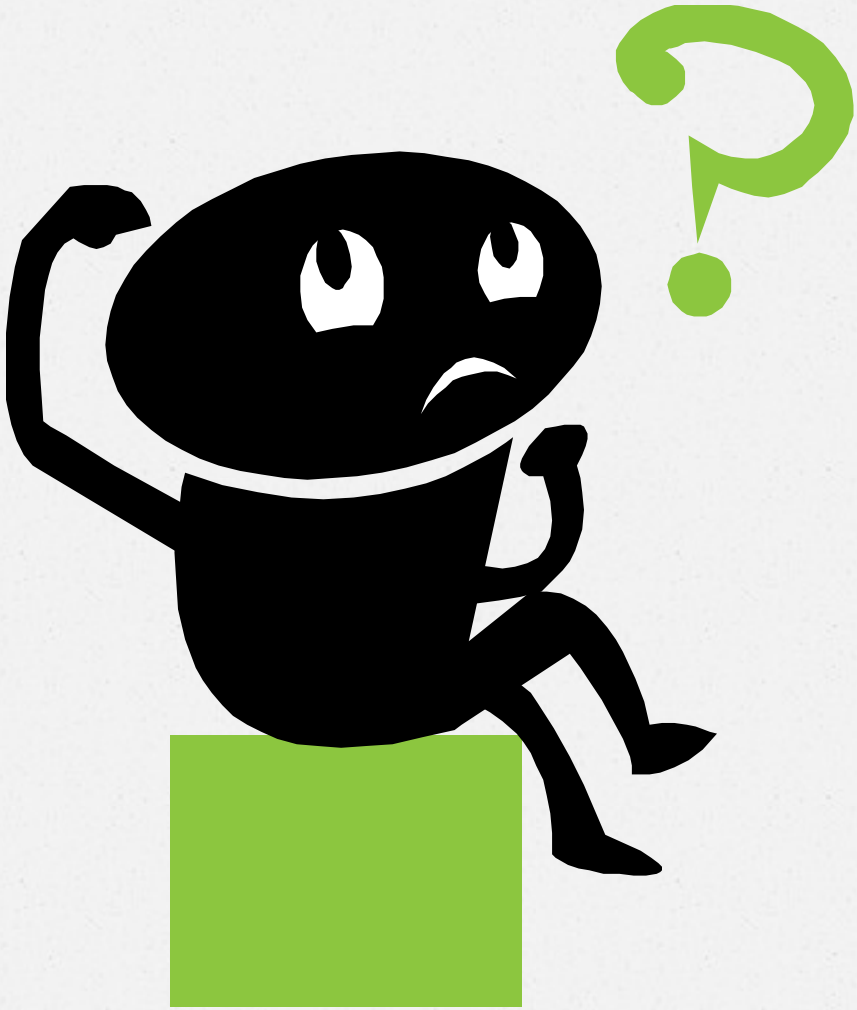
Conclusion

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 ?



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