A CULTURE OF INNOVATION

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Problem

Cancer Registry data quality assurance can be a complex task for organizations responsible for maintaining and supporting the CDC Registry Plus suite of applications. The task is made more difficult because of frequent software and metafile updates, and changes in policy and procedures.

Background

The Maryland Cancer Registry (MCR) has been in operation since 1982. Currently MCR utilizes CDC Registry Plus suite of applications to store, consolidate, edit, and report on the incidence of cancer in the State of Maryland. Beginning in January 2019, Myriddian LLC assumed operations of the MCR, and began transitioning daily processing tasks and backlog processing of nearly 30,000 cases from the prior contractor. During this process, Myriddian identified several areas where improvement in the quality assurance process translated into increased productivity, accuracy, and accountability.

After a year of working with the MCR, The State of Maryland identified several cases where race, ethnicity, gender, patient addresses, census data, and geospatial fields had changed on established medical summaries from values at the beginning of the contract. After careful review of internal procedures and the consolidation process in CRS Plus, Myriddian identified that these data anomalies originated from several sources:

1. The Prep Plus to CRS Plus import process follows automatic consolidation rules that will override established medical summary values with incoming values from an abstract in certain cases (e.g. ethnicity, race, gender). These must be identified manually by a CTR, often using DX notes and text from the case as a source of truth.
2. Manual consolidation presents old, new, and consolidated values in CRS Plus, and it is the CTR's responsibility to choose the proper value. Certain values such as race, ethnicity, gender, birthdate, SSN, DX address, DX Date etc., should not change in most circumstances. Any changes must be identified quickly so that the CTR can evaluate the reason for the change and take corrective action.
3. During the course of write-backs from vital statistics, death index, and other field-level adjustments obtained from the State, values may change that are inconsistent with recently consolidated records. These discrepancies must be identified so that the integrity of write-back values are preserved, or changed when appropriate.

For these reasons, a quality assessment and control process must be established to review data entered into the Registry, and identify situations where corrective actions are necessary.

Solution

Myriddian realized that addressing quality control challenges would be a multi-pronged approach. Implementing Robotic Process Automation (RPA) would be a starting point to minimize errors introduced during repetitive tasks. RPA enables data entry staff to work *smarter* by leveraging a software bot to handle the data collection and data entry. This frees the CTR to focus on cases where ambiguity or missing data necessitates human follow-up. Myriddian has employed RPA to scrape data from electronically-received Death Certificate Only case information, and input that data directly into Web Plus. Faced with a tight deadline to load cases, Myriddian was able to reduce the number of data entry personnel required to accomplish the task, while improving the accuracy of the data. In all cases, a CTR initiates and monitors an RPA process. The bot will alert the CTR when the process is complete or if a problem is encountered. Upon completion of the process, the CTR will review for accuracy.

Additional measures would need to be implemented to support real time monitoring of the database. For that we developed and deployed the Myriddian Quality Assurance Tool (MQAT pronounced M-CAT). The essence of MQAT is a combination of SQL Server trigger-based record tracking and ongoing query analysis which permits the CTR Lead to readily identify changes in specific "watch" fields. These watch fields are identified as those which are more likely to have accidental or high-impact changes in the medical summary. By evaluating the entire Patient and Medical Summary database tables for any change, regardless of timing or purpose, and recording those changes over time, the MQAT tool allows for a comprehensive snapshot over time of how the data evolves – along with accountability of who changed the data, what data changed, and when it changed.

MQAT works directly with the WebPlus SQL database and evaluates the contents of all NAACCR bundles on a line-by-line basis. Each line is compared to the critical data fields in the Registry SQL Database. If a line contains unique case data, it is exported for processing by Prep Plus. If the line contains duplicate data, it is skipped. This process has reduced the number of duplicates that traverse the Registry Plus workflow, and in turn reduced the amount of time CTRs spend voiding cases that should not have been imported. Another key MQAT benefit is reconciliation of cases that were never re-sent following rejection: Facility submitted bundles are rejected if they have even a single error. Facilities often re-submit the bundles, excluding the cases that caused errors. MQAT provides an opportunity to verify resubmission of the cases, while eliminating any duplicate submissions.

During year-end review, any discrepancies in counts between the facility and central registry can be resolved by verifying the source bundles line by line against the Registry Database.

In addition, the ability to process cases based on DX year is a real benefit to submission workflow. Facilities will frequently mix cases in a single bundle from multiple DX years, while the Central Registry is focused on processing a single year. By only exporting those cases for the current processing year and skipping cases from other years, CTRs can remain focused on the highest priority cases. This also allows for holding certain year cases for metafile updates.

Finally, MQAT provides a consistent way to verify that all bundles uploaded to WebPlus have been successfully processed all the way through consolidation in CRS Plus. If bundles contain

cases that have been skipped or voided in error, they are flagged for manual review and re-import if necessary.

Meaningful Use processing is a burden to all State Registries. The workflow necessary to collect, process, and dispatch MU data is both time consuming, and prone to losing critical data. To ensure that every HL7 and XML files received are processed, MQAT crawls through the Secure Document Server file repository looking for data that is not in the Registry Database. If a new case is identified, that file is copied to a work folder where EmaRC can pick it up and process it. Crawling much like a search engine on the Internet, this process will catch files that may have been missed by human operators.

Lessons learned through RPA and MQAT are directly translated into training opportunities for the CTR staff. Myriddian has regular in-house training sessions to ensure that all CTRs are familiar with the challenges identified in the quality control process.

ROI Benefits

The improvements made by Myriddian to the Registry work flow and quality assurance processes have produced a solid return on investment.

During 2019, Myriddian voided several thousand cases attributed to duplicate submissions. Each of these cases were manually evaluated by a CTR, determined to be a duplicate, and voided in CRS Plus. Taking an average of 2 minutes each, this activity represents thousands of minutes that could have been spent on other tasks. By eliminating duplicate cases prior to import into Prep Plus / CRS Plus we have improved productivity. Example: at an average hourly cost of $35 per CTR hour, if there were 10,000 duplicates, it would take 20,000 minutes to resolve. 20,000 minutes represent 333.3 hours of lost productivity at an average cost of $11,666.66. MQAT can eliminate the vast majority of these duplicates.

The MQAT tool is also capable of identifying missing cases from previously processed WebPlus bundles, and submitting those cases for independent export and processing. This directly translates into more complete and accurate case counts, and an easier time to meet ever-increasing NPCR standards to reach Gold Status. Reaching this Gold Status may translate into financial incentives for both the State and contractors working on the project.

Future Goals

1. Utilize Robotic Process Automation to transfer faxed and mailed abstracts directly into Web Plus so CTRs time is focused on tumor related decision making and quality review.
2. Crawl through all HL7 and XML files on the server's file system, compare the contents to the Registry SQL Database, and export only those that are missing for processing by EmaRC.

3. Enhance MQAT to copy geospatial fields from the Registry Database to NAACCR bundles where DX addresses are a perfect match, preserving geotags, census tract, and DX County information.
4. Add NAACCR V160 file compatibility to MQAT to find older cases that may have been missed while processing bundles in the past. This will improve completeness of the Registry Database.

Conclusion

Through a combination of RPA and MQAT, Myriddian has improved the workflow and data quality of State Cancer Registry data processing through the identification of data anomalies in real-time; pro-active de-duplication of cases coming through WebPlus; and a consistent approach to managing incoming HL7 and Meaningful Use data.

Regular training of CTR staff reduces or eliminates many common issues identified in the quality control process, and improves ROI.

Future development of MQAT will permit Myriddian to proactively reduce workflow errors between submission and consolidation. These improvements will reduce the burden on CTRs, while ensuring their expertise is best applied to appropriate challenges instead of routine repetitive tasks.

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