NORTH CAROLINA

North Carolina Central Cancer Registry (NCCCR); Nigar Salahuddin, CTR; Melissa Pearson, CTR

Converting HL7 CDA Records into Viable Cancer Cases

NATIONAL PROGRAM OF CANCER REGISTRIES SUCCESS STORY

SUMMARY: Electronic cancer reporting using Certified Electronic Health Record Technology (CEHRT) has been one of the Centers for Medicare & Medicaid Services (CMS) objectives for Meaningful Use (MU) since 2014 under MU Stage 2 (MU2) and MU Stage 3 (MU3) guidelines. Electronic reporting of cancer records for all ambulatory clinics that operate outside of the realm of hospitals is mandated by State of North Carolina (N.C.). Prior to MU, physician practices in N.C. had only one way of reporting their data to the N.C. Central Cancer Registry (CCR), by training physician practice staff to abstract cases directly into the WebPlus application. Therefore, MU reporting was well received by physician practices that had certified EHR software and whose physicians qualified for the incentive as Eligible Providers. In order to successfully report cancer cases via MU, practices need to follow the process of registering their providers on the N.C. Department of Public Health (DPH) Meaningful Use portal, go through an initial discussion with the N.C. CCR MU team, send their cases for testing to N.C. DPH's Secure File Transfer Protocol (FTP) site, ensure all cases go through validation and re-send cases after making requested modifications and finally get to the Go Live stage once they receive a submission confirmation from the N.C. CCR MU team.

Since the inception of MU2 cancer reporting in 2014, the focus at the N.C. CCR has been to manage the MU reporting process in such a way that it would be easy to continuously monitor the data and to ensure a seamless data validation process. Upon completion of the MU reporting steps, the N.C. CCR then sought a way to import Health Level Seven International Clinical Document Architecture (HL7 CDA) records from eMarc into the registry's database, CRSPlus, without extensive manual manipulation. This process of converting HL7 CDA records into good quality actionable data that is fit enough to be loaded in the database was a component of the initiative in which there was no defined process or technology to assist with the conversion. The N.C. CCR developed a successful process for finalizing data contained in HL7 CDA records along with incorporating a review process to validate the quality of the coded data and converting the data to the North American Association of Central Cancer Registries (NAACCR) record layout that would be ready for import directly into PrepPlus.

CHALLENGE: The N.C. CCR MU team has made substantial progress in MU reporting by collaborating with physician practices and EHR vendors through the MU2 trajectory. As a result, 53 providers from 10 physician practice groups (30 office locations) have been sending production level data since the beginning of 2017. At this time, production submissions are coming only from dermatology practices using the same EHR. Even so, the process of converting, finalizing and importing the HL7 CDA records from the eMarc database into CRSPlus was a manual and cumbersome process. There were data discrepancies and mapping issues that had to be resolved. Many cases had missing data such as address, county code, race, ethnicity, stage and treatment. The N.C. CCR had to determine what data could be feasibly obtained through the MU record and what could be coded by N.C. CCR staff for the case to be considered a complete and viable case for inclusion in the registry. Furthermore, some patient records listed multiple tumors or there was duplicate information from multiple visits that had to be visually edited and consolidated to ensure the correct number of unique primary cancers were reported. Importing the data directly from eMarc to CRSPlus without this level of review could potentially interject erroneous data into the data set and would not follow the high-quality standards followed by the registry.

While the N.C. CCR utilizes WebPlus and eMarc, which have abstracting, coding and case completion capabilities, these applications limit the user to only be able to view and modify one case at a time which requires cumbersome processing steps to move from one case to the next. And, evaluation and manipulation of the data set, in aggregate form, is not possible. The N.C. CCR sought to develop a process that would provide the bridge between eMarc and CRSPlus and, in addition, allow for the quality of the data to be reviewed and validated without extensive manual manipulation.

SOLUTION: The N.C. CCR MU team developed the following workflow to migrate HL7 CDA records from eMarc into the CRSPlus. This workflow stemmed from a project that was successfully implemented for converting electronic pathology reports into complete cases in NAACCR record layout for direct import into PrepPlus.

Background decisions:

1. Use Excel to finalize case data. Being able to view data in a table format allows users to analyze and evaluate groups of data. While any table format would work, Excel was chosen for its easy access and usability by N.C. CCR CTR staff.
2. Identify viable data items from the eMarc file to export into Excel. This is limited to data items and text that would eventually become part of the NAACCR record layout data set.
3. Identify data items to be reviewed and/or coded by N.C. CCR CTR staff.
4. Identify data items (mostly system data items) to be auto-defaulted in SAS to complete the abstract and allow each case to pass all required edits.

For each exported file:

5. Link the eMarc file with the latest CRSPlus extract file using SAS to filter for matches and non-matches.
6. Manually review non-matches to:
   a. Remove non-reportable conditions.
   b. Combine visits for the same facility which results in one case for each patient and primary tumor.
7. Follow back to the reporting facility on missing demographics or questions regarding difficult cases, such as cases with current metastases and information regarding the original diagnosis is needed.
8. Manually code data items required to be completed by N.C. CCR CTR staff.
9. Perform quality audits on completed cases. For example: Review site, laterality, and histology for accuracy. Compare and resolve possible conflicts between dependent data items such as Breslow Depth and AJCC T Category; Surgery and Pathological Stage; etc.
10. Use SAS to convert the Excel file to the NAACCR Record Layout and to populate auto-defaulted data items.
11. Import file into PrepPlus to correct any unforeseen edits.
12. Import file into CRSPlus.

RESULTS: For the first time, the N.C. CCR has valid cancer cases from MU reporting in their registry database. While Go Live status was not initially awarded until 2017, many practices were able to send records dating back to 2014. The following summary is based on records with 2014-2016 diagnoses.

A total of 1385 unique cancer cases were determined to be reportable for the participating dermatology practices. The majority were melanoma cases; therefore, a detailed manual review of the text was required by N.C. CCR CTR staff to verify invasive versus in situ and to appropriately code stage, site specific factors and surgery/treatment data items.

These cases were then imported directly into PrepPlus and had very few edits errors. Most were related to address conflicts. Common issues were added to the quality review process to prevent edit errors in future files.

The cases were then successfully imported into CRSPlus. Multiple quality review checks were performed to validate the quality of the data prior to import into the final registry database. This allows for confidence in the accuracy of the data in the registry database.

MU files received for 2014-2016 diagnoses	**3452**
Non-matches after linkage to registry database (case was not reported by this practice)	4649
Cases with a non-reportable condition	3
Multiple records combined into a single record for the patient and tumor	3261
Cases loaded into the final registry database	1385

SUSTAINING SUCCESS: The N.C. CCR has demonstrated MU reporting can be an effective method of receiving electronic cases from dermatology practices. The N.C. CCR is currently working with other EHR vendors to establish Go Live status. The N.C. CCR plans to continue building on these successes and add more physician practices in other specialties who can electronically report their data through their EHR.

Regardless of the future of MU reporting, the ability to convert electronic data into complete, accurate cancer cases with minimal manual manipulation will continue to be an invaluable tool as the registry explores linkages with other electronic data sets. The N.C. CCR plans to continue developing and further automating this process.