The Cooperative Human Tissue Network's Western Division (CHTN-WD) at Vanderbilt University Medical Center (VUMC) is a federally funded service oriented grant that provides high-quality biospecimens and services to the research community. CHTN-WD has integrated an error-reporting dashboard module in its Biorepository Information Management System, VUMC Donor Quest, to report and track errors made in each operational area. These errors can be broken down or “binned” into transactions within an area, representing a task or a general area. The error-reporting functionality can be accessed across the Biorepository infrastructure to report negative impact, SOP development or enhancements, ability to report true error rates within a Biorepository setting, which can be used to streamline operations through resource load quantification and leveling and assist in developing strategies to train staff. This concept of error-reporting embedded into our Biorepository IT application substantiates our Total Quality Management (TQM) system by solidifying the product we produce and enhancing our ability to serve customers.

The CHTN-WD consistently provides high-quality biospecimens and services to the research community. This consistency relies on current departmental SOPs, high-level staff training, and identifying and correcting problems as they arise. Our operation is unique in that each operational area subsequently reviews, or secondary checks the previous area’s work. Prior to the error-reporting dashboard, the secondary checker would identify an error and attempt to correct it. Often the error was corrected without communicating to the study coordinator or logging the error, which made the process of determining a “true error” Biorepository operations rate impossible. An initial requirements gathering phase was conducted to determine the data elements that would be meaningful to the continued development of our Key Performance Indicators (KPIs), as well as maintaining the integrity of our TQM.

While the process of recording errors has been established with the excel document, analyzing and distributing the errors to staff for corrective actions were not easily implemented. Frequently, mistakes were not being recorded because staff were unable to pause their current work and enter information into the excel document. Developing a dashboard module that automatically distributes and alerts the operational areas of reported errors is essential for sustaining TQM through the development of KPIs.

### Implementation

A comprehensive error-reporting dashboard module has been created to record, distribute, and analyze all errors made during daily operations. The error-reporting functionality has been added as a page within the current VUMC Donor Quest system. The VUMC Donor Quest system is a modern Java, Spring, and Hibernate based web application which utilizes an Oracle database to persist data. This web application is hosted at the Vanderbilt University Medical Center and is only available to internal staff.

When an error is identified, the user will utilize the “Report Error” function to display the dashboard module and fully describe the error and the necessary corrective action or SOP revision. The pop-up interface functionality does not interfere with current workflow, allowing the user to return to previous work without delays. After the error details have been rendered to the system, an email is generated to all staff members associated within that operational area. The email includes the error number and the description of the issue, permitting the responsible individuals to access and correct the error. One of the individuals clicks the displaying the error-reporting dashboard module with only certain fields available for entry to prevent data from being altered. Only key personnel within CHTN-WD have administrative privileges to edit content of a previously submitted error.

### Results

By utilizing the error-reporting dashboard, process and workflow improvements can be updated and donor systems enhanced simultaneously. Upon analysis of reported user errors, patterns were identified in certain operational areas that raised concern and prompted process improvement by utilizing IT support. Specifically, request ID entries for biospecimens at a segment level were being incorrectly entered. Prior to the error-reporting dashboard, request ID’s were entered manually by users into an open text field, resulting in issues that had to be fixed before shipments could occur. Each request ID is unique to an investigator’s request for a biospecimen and given a computer generated ID (i.e. REQ13456) and this information is housed in our CHTN Investigators’ IT system. Request ID’s were then entered into VUMC Donor Quest manually, resulting in various human errors including transposing numbers and choosing the incorrect request ID altogether. This created issues and confusion with reporting downstream. IT staff were asked to enhance VUMC Donor Quest to prevent these errors from occurring, therefore streamlining the process. IT staff developed a link from CHTN Investigators’ IT system to VUMC Donor Quest and created dropdown fields at the segment level for “Investigator” and subsequently the request ID’s for that investigator populate in the rest field. The improvement eliminated manual entry of request ID’s by tying two heavily utilized donor applications together, resulting in fewer errors at the segment level and within CHTN-WD operations.

### Results Continued

By utilizing the reporting functions of the error-reporting dashboard, data was exported from an excel file to generate the line graph below. The graph outlines the current data from each operational area; however, the data is skewed in the Pathology report operational area due to additional data elements extracted from ancillary tests required by CHTN-WD for a complete pathology report. The high error percentage in this area stems from reporting to include these additional data elements, not from critical errors involving confidential donor information. Overall, the goal of this data is to analyze the operational areas “true error rate”, develop innovative SOP revisions, and maintain and enhance KPIs.

### Conclusion

The role of TQM in our operations is to consistently provide feedback to staff and managers regarding efficiency, effectiveness, and quality in all operational areas. Allowing staff to view their “true error” Biorepository operations rate and be accountable for the work that is produced, allows our Biorepository to operate efficiently with a high customer satisfaction rating is paramount to our success.

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