



Configuring and Implementing an Error Reporting Feature in a Donor Repository Procurement Application

RM16

Erik Brooks, Kiley Wease, Matt Clement, Ying Jin, Kerry Wiles, Dr. Kay Washington
Department of Pathology, Microbiology and Immunology – Vanderbilt University Medical Center

Introduction

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 used 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 qualification 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.

Background

The CHTN-WD consistently provides high-quality biospecimens and services to the research community. This consistency relies on current departmental SOP's, 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.

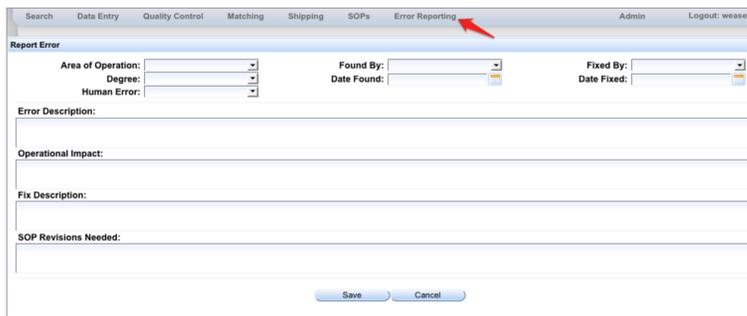
An initial requirements gathering phase was conducted to determine the data elements that would be meaningful to the continued development of our Key Performance Indicators (KPIs), as well as maintaining the integrity of our TQM. The beta test yielded an excel document that all staff used to report errors and each week the results were compiled and reviewed.

Date Found	Found by	Area of Operation	Human Error	Type of Error	Degree	Fixed	Fixed by	Explanation of how fixed	How it affects our operations
9/20/12	Sarah	Core Histology Service	Unknown	Slide printed with wrong barcode	Minor	Yes	Sarah	Matched slides to blocks, wrote correct barcode on slide	If the number is incorrect it takes longer for the slides to be sent through QAQC, which means a longer wait for the investigator.
9/20/12	Kerry	Pathology Report	Yes	Surg Path # in PR	Critical	Yes	Sarah	Opened path report, found # and removed it from report	If the # is left in the PR, it is a HIPAA violation.
9/20/12	Ellen	Pathology Report	Yes	PR not scrubbed	Critical	Yes	Ellen	Dr. XXX and date	HIPAA violation and IRB audit

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 [Fix](#) 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.

9	wilesk	feyasj	09/13/2012	09/13/2012	Pathology Report	Critical	Yes	Fix Edit
Description: Dr. Name in path report								
Fix Description: Opened pathology report, found name and edited it out of the report.								
Operational Impact: If a name is released on a pathology report it is a violation of HIPAA and we would get into huge legal trouble.								
SOP Revisions Needed:								

A tutorial was presented to all staff of CHTN-WD introducing the functionality of the error-reporting dashboard module from start to finish. The importance of standardizing the process initially teaches staff to aim for "true error rates" calculated from the data entered into the module. The data is essential to maintaining existing and developing new KPIs that will uphold the integrity of our TQM.

Results

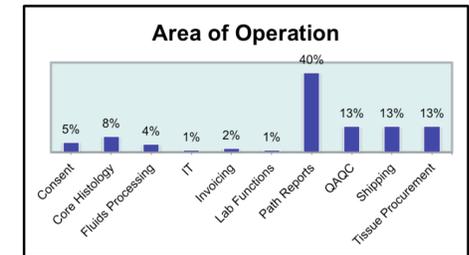
Compiling and generating data reports measures the consistency of our KPI's. By utilizing this data, we can develop indicators to test our current processes, SOP's and output within CHTN-WD. Currently the error-reporting dashboard reporting options include exporting an excel file, CSV file or PDF. Displayed below is an example of a recorded error from each operational area that have been submitted into the dashboard module and exported as an excel file.

Area of Operation	Degree	Human Error	Description	Fix Description	SOP Revisions Needed	Operational Impact
Consent	Minor	Yes	Consent not entered	Entered Consent into database		Procurement unable to select consent and it took additional time to select consent for each tissue sample
Core Histology Service	Minor	Unknown	slide printed with wrong barcode (same barcode as another slide)	Matched slide to block, corrected barcode by writing correct barcode on slide		If the number is incorrect it takes longer to send the slides through QAQC, which takes longer for the investigator to receive the tissue
Fluids Processing	Major	Yes	Fluids left on dry ice overnight without a bag of ice covering the specimens.			The integrity of the sample is diminished when encountering changes in temperature. Tissue segments unable to be entered and fresh shipments halted until fix occurred.
Information Technology	Critical	Suspected IT	Donor system down without notification, unable to enter data, etc.	Server was restarted.		This could cause delay of payment or no payment at all
Invoicing	Minor	Yes	incorrect PO#	Updated PO# in Zoho and resent invoice to billing contact with explanation		
Lab Functions	Minor	Yes	Frozen Pen/Step was removed for fresh shipments, but one of the vials was empty.	Obtained another Pen/Step.	Please be sure to check that vials are filled when aliquoting additives to prevent future occurrences.	More time was wasted waiting on extra Pen/Step to show, delaying shipments.
Pathology Report	Critical	Yes	Dates/times in path report	Deleted times, deleted months		HIPAA violation and IRB audit
QAQC	Major	Yes	wrong specimen type listed	Confirmed with another pathologist what the specimen is and fixed on the report		We want to make sure we are exact in our QA because we do not want to provide the wrong information to investigators and affect their research negatively.
Shipping	Major	Unknown	Storage location incorrect	edit storage location for segment		Adds time to locating/pulling segments. Possibly leading to not being able to supply all needed samples to an investigator.
Tissue Procurement	Minor	Yes	weight missing on FFPE	Entered weight into the database		Stove work flow because procurement staff has to go back and add the weight

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 next 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 neglecting 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.



Degree	%
Minor	56%
Major	21%
Critical	23%

Another issue arose when reviewing errors of similar types. Individuals were entering different degree classifications for the same error description and type. As mentioned previously, standardizing user entry of errors is key when calculating the "true error" Biorepository operations rate, therefore, the definition of each degree classification appears when the cursor is over the drop-down field. Moving forward, CHTN-WD IT staff plans to work with the report functions of the error-reporting dashboard to create more advanced functionality. Jasper Reporting will eventually be utilized to display the error-reporting data in visually meaningful ways. The current reporting functions give us the ability to initially observe the error-report dashboard module in a simplistic manner, so we can continue to evaluate the fields necessary to report an error.

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.

Acknowledgements

We thank the CHTN-WD staff for their efforts and support: Anne Campbell, Aunshka Collins, Brittney Fain, Sarah Feyas, Cari Jennings, and Jessica Rix. This project is supported by NCI/NIH 2U01CA091664-08.