Decreasing False Critical Value Alerts for Platelets, WBC, and Hgb by Using a Rules Based Approach in Cerner and Saving Technologist Time

Samuel I McCash[2,3,4], Mark Gendron[4], David Fagan[3], Scott Shulman[1,2], Shivani Dobhal[1,2], Roselvy Salamea[1,2], Eurwin Lopez[1,2], Lily Zhuo[1,2], Lakshmi Ramanathan[2], Ellinor Peerschke[1,4]

Department of Laboratory Medicine, Memorial Sloan Kettering Cancer Center, New York, NY, United States.

Divisions of [1]Hematology, [2]Clinical Chemistry, [3]Laboratory Information Systems, and [4]Quality.

Introduction

Hematology results of platelets ≤20 K/mcL, WBC ≤0.5 K/mcL, or Hemoglobin ≤6.0 g/dL are considered by many clinical labs to be critical values that must be reported quickly to a patient's licensed medical provider.[1,2] At our institution, we have a significant proportion of inpatients, particularly from the stem cell transplant service, who go through prolonged periods where these parameters drop below the threshold of "critical". Such cases per the clinical team are not actually critical, and do not need to be acted upon emergently. Our current process is that the LIS sends all results that meet these criteria to the critical callback queue. To facilitate the exceptions technologists review critical cases flagged by the LIS for the following: 1) determine the case to be truly critical and notify the patient's physician (see True Critical if: column in table), or 2) determine that the value is not truly critical and document that in the LIS with no notification initiated. For instance, if a platelet count is ≤20 K/mcL, the technologists checks for the most previous platelet counts in the last 7 days. If the previous platelet count was ≥30 K/mcL there may have been an acute drop in platelet count and the patient care team is notified to take appropriate action. If the previous platelet count is < 30 K/mcL, then the result is not treated as a critical value as it does not require immediate attention. That determination is then documented in the laboratory information system. The review and documenting of these cases take up technologist time which could be allocated elsewhere. Automating this decision tree could save technologist time and effort.

Analyte	Callback Queue Rule	True Critical if:
Platelets	≤20 K/mcL	Inpatient AND within the last 7 days a previous platelet count was ≥30 K/mcL or no platelet count available.
WBC	≤0.5 K/mcL	New patients only.
Hgb	≤6.0 g/dL	Notification of critical values once in 24 hours

Objective

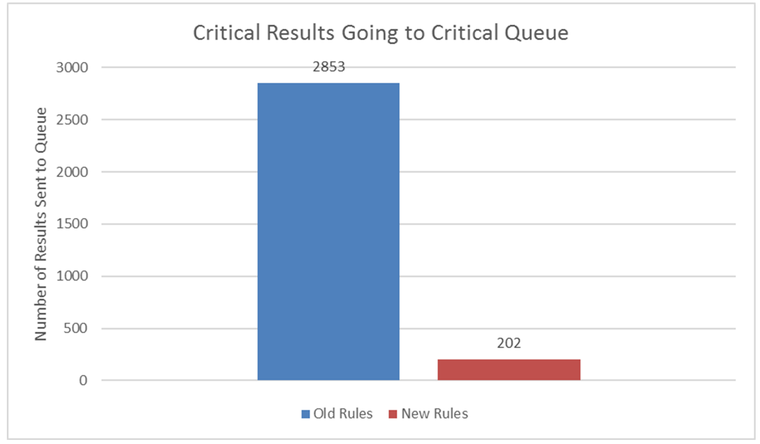
To reduce the number of false critical values that go to the critical callback queue using a rules-based approach within Cerner. A false critical value to the queue is defined as a critical value that goes to the queue but is documented as not critical due to not meeting all specified criteria for a critical value (see table). This must be done without missing any true critical values. Time saved will be calculated based on the number of cases not requiring a manual technologist look-back.

Materials and Method

This study met criteria for a quality assurance/improvement initiative and did not require IRB review. For 28 consecutive days the number of cases that met the criteria for being a critical value by any of the three original hematology rules was tallied. The number of results flagged by the new rules was also recorded. Percent reduction was calculated as 1 - (Number cases sent to queue using new rules/number of cases sent to the queue with original rules) x 100. Technologist time saved was calculated in FTEs as (Average cases using old rules per 8-hour-shift – Average number case using new rules per 8-hour-shift) x 5 minutes. Five minutes was the estimated time to evaluate each result and make the appropriate non-critical value documentation in the LIS.

Results

The total number of critical values due to the three hematology rules over the study period was reduced from 2853 to 202, a 93% reduction. The algorithm eliminates the need for technologist review of 2,651 critical values from the queue over four weeks and translates into a time savings of about 0.33 full time equivalents. The algorithm did not miss any actual critical results.



Conclusion

A rules-based approach in the Cerner LIS is an effective way to streamline identification of hematology critical values in a cancer patient population and increases laboratory efficiency. To our knowledge this is the first time rules have been built in a Cerner system that uses a patient's encounter history, inpatient status, and previous values to direct a sample to the critical value queue.

References

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