

TrueQC Protocols for Hematology, Chemistry and Blood Gas Analyzers

Introduction

Quality control (QC) monitoring of hematology, clinical chemistry, and blood gas instrumentation has been established in clinical and commercial laboratories from their inception. In principle, QC monitoring applies to in-hospital laboratory instrumentation also; however, regular QC programs have been slowly and ineffectively integrated in the daily routine of the veterinary facility. Without regular QC, critical factors such as reagent reactivity, automated sample pipetting, reaction temperature, and the instrument itself are left unchecked.

Manufacturers enable this casual approach to QC by stating, or implying, their respective systems do not require QC. This statement is misleading and contrary to the American Society of Veterinary Clinical Pathology (ASVCP) guidelines. This document is intended to review the need for, and the benefits of, regular QC analysis, and to introduce Heska's TrueQC™ Protocols—a simple, effective QC program for in-hospital hematology, chemistry and blood gas analyzers.

Confidence in Generated Results

QC recommendations from the ASVCP include a program that assays external controls (similar to patient samples, *i.e.*, blood or serum) with known ranges of acceptable values for each test performed. The performance of an analyzer and the reliability of the results can only be guaranteed by the use of external controls. In addition, only cumulative QC data can provide evidence of a system's reproducibility performance (over time). The rationale for a prescribed quality control program is:

- Clinicians are frequently faced with patient test results that do not correspond with expectations. A regular QC program provides an additional day-to-day confidence level that the diagnostic system is performing to specifications and that patient results are reliable.
- QC information is an essential first step in troubleshooting if a problem does occur.

Failure to institute an appropriate QC program ignores recognized procedures used by professional laboratories and exposes both clinicians and patients to questionable and potentially erroneous test results. From the clinical perspective, a QC program provides day-to-day assurance of instrument accuracy and reliability of patient results, and allows the clinician to interpret laboratory data with greater confidence. Simply stated, numbers generated by an analyzer are only as good as the instrument's controlled performance, regardless of the technological sophistication.

TrueQC Protocols for Hematology, Chemistry and Blood Gases

Heska introduces TrueQC Protocols, which are patterned after established laboratory practice standards. These recommendations include a process for implementing a simple and reliable QC program that validates a number of critical factors inherent to in-hospital hematology, chemistry and blood gas testing.

Hematology Protocol

Analyzer-related factors having deleterious effects on hematology results include, but are not limited to: deteriorated O-rings (around pistons), protein build-up, old or contaminated reagents and obstruction by micro-clots. QC material should be run at the beginning of each work day, prior to any patient samples being run. When running in-hospital hematology, daily QC should always be used to:

1. Minimize or eliminate the effect of these variables on results.
2. Provide the greatest degree of certainty and validation of accurate laboratory results.

Blood Film Review

Use of automated differential data alone can lead to serious interpretive mistakes. Automated hematology systems reduce, but do not eliminate the need for microscopy. Even the most sophisticated systems are unable to detect morphologic abnormalities in WBCs and RBCs. Bands, toxic granulocytes, atypical cells, spherocytes, Heinz bodies, blood-cell parasites and polychromasia are just a few of the changes which can go undetected if a blood film is not reviewed. When blood results are considerably abnormal, a blood film should always be used to clarify the abnormalities and pathology present.

Chemistry Protocol

Heska's TrueQC Protocols for chemistry are recommendations based on a hospital's testing volume. Daily QC is most aligned with standard laboratory practices and provides the greatest degree of certainty and validation of accurate laboratory results. Daily QC Testing should be implemented wherever possible, particularly in hospitals testing 3 or more profiles per day.

Some situations warrant a more periodic approach. In these cases, QC material should be run at the beginning of each week, prior to any patient samples being run. This weekly QC plan should be supplemented by spot checks when results do not meet preconceived clinical expectations. This approach may be more suited for low testing volumes of less than 3 profiles per day and is recommended for chemistry analysis only.

In either case, if the QC results match the reference values of the QC material, the QC check is valid and patient samples can be considered accurate and reliable. Regardless of the QC plan being implemented (daily or weekly), quality control material should always be kept on hand in the event you need to spot check your analyzer to assess questionable patient sample results or to troubleshoot an instrument issue with Heska's Technical Support Services.

Blood Gas Protocol

Heska's QC program for blood gas analyzers is in direct alignment with our hematology and chemistry TrueQC Protocols. To ensure analyzer performance, Heska recommends running one control a day. The control substance should be external to the analyzer with known, acceptable value ranges. Control values should be documented, reviewed and used to identify analyzer trends or inconsistencies prior to patient sample analysis.

Summary

The current trend in veterinary diagnostic instrumentation systems includes reduced complexity, improved information management capability, and increased reliability through self-monitoring. Heska's TrueQC Protocols align with this philosophy and offer a program designed to eliminate errors (and their resulting consequences), ensure accurate results and eliminate wasted resources.

References

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For further assistance, please call Heska's Technical Support Services at 800.464.3752, option 3.

