Hematology, Chemistry, Coagulation

Helpful Hints

Hematology

- A good check to see if your Complete Blood Counts on your patient results are valid is the

"RULE OF THREE"

Hematology

Rules of Three for normal Hematology

Rule #1

   $Hgb \times 3 = Hct +/-2$

Rule #2

   $RBC \times 3.3 = Hgb +/- 1.5$

Rule #3

   $RBC \times 9 = Hct +/3$

Hematology

- The laboratory must verify calibration on the instrument every 6 months or on an "as needed" basis to ensure accuracy of the system.

Hematology

- And why else would calibration be necessary?

1. Critical parts are replaced such as manometers, apertures, or detector circuit boards

2. Controls show an unusual trend or are outside of acceptable limits and cannot be corrected by maintenance or troubleshooting.

Hematology

- Low platelet counts on an individual that has no bleeding symptoms, try checking the blood smear for platelet clumping or platelets satelliting around the neutrophils

Hematology

- To help correct this problem, use sodium citrate as an alternative anticoagulant (because EDTA induced platelet clumping) and multiply the citrate platelet count and WBC by 1.11 to correct for anticoagulant dilution

Hematology

- What should you be doing if you have two different hematology instruments?

- Or if you have two instruments that are the same

Hematology

- Comparison check

Hematology

Do not use non Clorox bleach or any scented Clorox bleach for cleaning the instruments.

If you can not get Clorox, then

Chemistry

- The laboratory must very calibration every six months or on an "as needed" basis to ensure accuracy of the system.

Chemistry

- And why else would calibration be necessary?

1. Critical parts are replaced
2. Controls show an unusual trend or are outside of acceptable limits and cannot be corrected by maintenance or troubleshooting.

Coagulation

- If you are using a manual or semi-automated method for your APTTs, the timing of the incubation of your "patient plasma + reagent" is critical. The Timing of your duplicate testing needs to be precise. Any deviations in timing will usually result in the duplicate test results not matching.

- The tests needs to be run with the same timing limits as the controls.

- So what does that mean you should be checking?

Coagulation

- Your timer!

- Controls (normal and abnormal) are typically valid for one year.
- Ranges are not established so you must establish your own ranges.
- Run the controls a minimum of 30 times to establish the mean and SDs.

Quality Control

- Internal Quality Control
- Reagent Check (Parallel Testing)
- External Quality Control (proficiency programs)
- Blind Samples
- Competency Checks

- Quality control material
- Quality control ranges
- Plotting results (Levey-Jennings Graphs)
- Reviewing Results
- Corrective Action Logs
- Reagent Checks (parallel testing)
- Review & Signature

- Do you have appropriate controls for each procedure?

Quantitative: low (normal) & high

normal & abnormal

- Do you treat your control material like the patient samples?

- Are the control results verified *BEFORE* patient results are released?

- How often do you run your controls?

  *per manufacturers instructions

  *per laboratory guidelines

  *can always run more than recommendation

  *balance time, cost and efficacy

"General Guidelines"

CBC: per 8 hour shift

Manual Differentials/BPS: per day
  (stain check)

Chemistry: per 8 hour shift

- Document results on run sheet or QC log
- Include lot #'s & expiration dates
- Include tech initials & run date
- For QT assays,

    Manufacturers Mean & Range (~$\pm$2.5 SD)

    Internal Mean $\pm$ 2 & 3 SD

    Levey-Jennings Control Charts

- Why use Levey-Jennings control charts?

- Patterns
  1:2s, 1:3s
  Dispersion (loss of precision)
  Trend
  Shift

- Lab supervisor review if exceeded (*before patient results are released)
- Corrective action if needed (document)
- Retest if required

- QC 'failures' must be reviewed and signed off by lab supervisor or higher
- All unexpected or failed QC results must be documented – Corrective Action Log
- Final action must demonstrate problem was resolved
- Lab Sup/Mgr must review/sign CA Logs at least monthly
- Must have CA log for every test/equipment/system

- Why do parallel testing?

  Consistency of patient results
  Transition of control

- Chemistry: New control lot in parallel→mean/SD
- CBC/FBC: New control lot in parallel 3-5 days

- At the October Meeting:
  - Westgard Rules
  - Normal Values
  - QC and corrective action
  - QA
  - Instrument Validation
  - Carryover Studies