Physician eLink: User-Friendly Remote Laboratory Access

Physician eLink is an Internet-based application provided by Saint Luke's Health System for physicians and members of the physician’s staff. It allows the user to:

- Access inpatient census from home or office via the web
- View laboratory, radiology and transcribed reports from each of the System’s metro hospitals. Results can be sorted by test name, type or date.
- View results from more than one System facility together, eliminating the need to pull up results one facility at a time.
- Verify patient insurance and information status
- Receive triggered messages regarding patient admissions
- Use secure messaging to communicate with other Physician eLink users without the risks of standard e-mail.
- Build patient lists by physician group

Since its implementation in 2002, Physician eLink has provided a means of access for regional referring physicians. Over 100 physicians and their staff have been trained on the system. However, most physicians practicing at Saint Luke’s Health System hospitals are not aware of Physician eLink. The Clinical Pathologists believe that Physician eLink is a much more robust, faster and user-friendly system for retrieving laboratory results than Clinical Browser. Laboratory results are listed by laboratory section and trended chronologically across the page, similar to printed laboratory summaries. Point of care glucose results have their own result line and do not interfere with result review. Serial test results are easily displayed as a graph. Result review is not limited to 25 tests per page. Fewer clicks are required to access interpretive reports. We believe that Physician eLink will greatly enhance your laboratory experience and decrease the likelihood of missing or misinterpreting an important laboratory result. Physicians can arrange for a personal demonstration or receive a login for Physician eLink by calling Jason Sifuentes at 816-932-5167.

Poor Performance of the Band Count

Enumeration of band neutrophils has long been a mainstay in the laboratory diagnosis of bacterial infection. Recently the clinical utility of the band count has been challenged, as summarized in a recent review (Clinics in Laboratory Medicine, 22: 101-136, 2002). Modern automated hematology instruments provide an accurate and precise 5-part differential count, which includes the absolute neutrophil count. A band count always requires a manual differential count, a procedure which is not only labor-intensive, but also inaccurate and imprecise, and for which there is little evidence-based justification.

Elevation of the band count is not specific for infection, but may be secondary to inflammatory processes, tissue damage or necrosis, neoplasia, intoxication, metabolic abnormalities, hemorrhage, hemolysis or drugs. A band count thus has limited utility in the diagnosis of infection in sick, hospitalized patients who are likely to have bandemia associated with an underlying illnesses or medication.

There are moreover several major technical limitations of the manual band count. The method is inherently inaccurate and imprecise, because of sampling error, statistical imprecision, and subjective problems with band identification. Firstly, leukocytes on a peripheral blood smear are not randomly distributed, with maldistribution problems exacerbated if a blood smear is too thick, leading to considerable sampling error in a band count. Secondly, even with a technically perfect blood smear and faultless cell identification, band
percentages obtained from a differential count are extremely imprecise due to obligate statistical variability. The 95% confidence limits for a standard 100-cell differential count are unacceptably wide – for 5% bands the 95% confidence limits are 1% to 12%, for 10% bands the limits are 4% to 18%, and for 15% bands the limits are 8% to 24%. It would be necessary to count 500 cells in each case (a practical impossibility) to decrease these limits by half. This large imprecision of the band count significantly undermines the clinical reliability of the test, and this weakness is compounded by imperfect non-random smears, and cell misidentification.

Perhaps the greatest problem with the band count is the inability to reproducibly identify band neutrophils. The literature contains at least three different definitions of a band neutrophil, leading to widely varying reference ranges. A College of American Pathologists Hematology Resource Committee found that band identification remained a highly variable and subjective process even when laboratories used a uniform illustrated definition. They demonstrated convincingly that bands cannot be reliably and consistently distinguished from segmented neutrophils by human observers.

Numerous studies have investigated the clinical utility of the band count in the discrimination between patients with and without bacterial infection. Most studies of suspected bacterial infection in adults have demonstrated poor performance of the band count as a diagnostic test, with unacceptably low sensitivity and/or specificity. In a study of adults with bacterial infection and normal total white cell counts (WBC), the band count had minimal value for identifying infected patients. In a study of elderly patients with acute sepsis, the band count was not a useful independent predictor of infection. In several studies of patients with suspected acute appendicitis, the band count often showed much lower sensitivity than the total WBC or neutrophil percentage. Only one adult study showed satisfactory sensitivity and specificity for the band count in detecting bacterial infection in patients with diabetic ketoacidosis. The band count is used widely in various established diagnostic algorithms to diagnose bacterial infection in newborns and infants less than three months of age. Some studies have shown high sensitivity for these algorithms in identifying bacterial infection, however other conflicting results have been reported, and the independent contribution of the band count to the performance of these algorithms has not been evaluated.

In conclusion, the band count is a time-consuming, non-specific, inaccurate, and imprecise laboratory test. A review of the literature lends little support for the clinical utility of the band count in patients greater than three months of age. The total WBC and absolute neutrophil count have been repeatedly shown to be much better predictors of bacterial infection, to which the band count adds no additional useful information. In the future, rapid analysis of inflammatory factors, cytokines, neutrophil surface antigens or bacterial DNA are likely to be superior tests for the early diagnosis of sepsis. Many clinical laboratories have ceased to report band counts, including Stanford University Medical Center, Cleveland Clinic, Vanderbilt University Medical Center, and M.D. Anderson Cancer Center. For all these reasons, Saint Luke’s Regional Laboratories is planning to discontinue routine band counts in the near future (other than in neonates and infants less than three months of age). We would welcome input from the medical staff regarding this change.

**Arterial Blood Gas Changes**

Arterial Blood Gas instruments were upgraded to new models in June. The reference range for carboxyhemoglobin (CoHb) has changed from 0 – 1.5% to 0 – 2%. Smokers can have CoHb values as high as 10%. All other reference ranges remain the same. Blood gases are no longer corrected for patient temperature in accordance with national guidelines.

**Autologous and Directed Blood Donations**

Effective May 10, Community Blood Center began leukocyte reduction of all RBC units prepared from autologous and directed donors. If a physician wishes to have FFP prepared from one of these special donations in addition to red blood cells this information must be specified at the time of the initial order.