The first case of AIDS-associated infection occurred in 1981 when the CDC reported on an unusual cluster of Pneumocystis pneumonia cases. This year marks the 25th anniversary of the first test for human immunodeficiency virus (HIV) antibody. HIV is a communicable infection that leads to a progressive disease with a long asymptomatic period. CDC estimates that ~1.1 million adults and adolescents were living with HIV infection in the United States at the end of 2006 and that ~56,000 persons are newly infected each year. Without treatment, most persons develop acquired immunodeficiency syndrome (AIDS) within 10 years of HIV infection. Antiretroviral therapy delays this progression and increases the length of survival, but is most effective when initiated during the asymptomatic phase. It is estimated that on average, an HIV-positive person aged 25 years who receives high-quality care will survive an additional 39 years. Identifying persons early in the course of infection reduces morbidity and mortality, prevents new infections, and can reduce health-care expenditures.

CDC recommends routine HIV screening between the ages of 13 and 64 years in all health-care settings. Persons at high risk for HIV infection should be screened at least annually. The burden of HIV is greatest among gay, bisexual, and other men who have sex with men (MSM). The disproportionately high rates of diagnoses among African Americans and Latinos, suggest that adults from these subpopulations might also benefit from more frequent testing. Other groups identified as potentially high risk include teenagers and senior citizens. CDC estimates that people over 60 account for 19% of all newly diagnosed AIDS cases.

HIV can be transmitted during pregnancy, labor & delivery, or breastfeeding. CDC has recommended that all pregnant women be counseled and encouraged to be tested for HIV infection. HIV testing should be included in routine prenatal testing. Substantial progress has been made in reducing perinatal HIV transmission rates from 25-30% in 1991 to <2% currently. This reduction is attributed to HIV screening of pregnant women, use of antiretroviral drugs, and elective cesarean deliveries.

Human immunodeficiency virus exists as two distinct viral species, designated HIV-1 and HIV-2. Each species is further subdivided into subgroups, including M, N, & O for HIV-1, and subgroups A-G for HIV-2. The vast majority (99.6%) of HIV infections worldwide are caused by HIV-1, group M. Less prevalent viral types are largely confined to West Africa.

Detection of antibody to the HIV-1 virus is the best method of screening for HIV infection. Following CDC guidelines, HIV antibody testing in the United States has traditionally followed a two-step process that begins with a screening enzyme-linked immunosorbent assay (EIA), followed by a confirmatory test, either a Western Blot or an indirect fluorescent antibody test (IFA). Final HIV antibody test results should be discussed with the patient only after all testing has been completed.

HIV-1 antibody appears at about 11 days and peaks between 70 and 189 days. Most individuals produce detectable levels of antibody within 3 months of infection. The interval between infection and detection of HIV antibody is called the window period. Improvements in HIV-1 antibody tests have steadily reduced the window period as seen in the following table.

<table>
<thead>
<tr>
<th>ELISA Generation</th>
<th>Window Period (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>42</td>
</tr>
<tr>
<td>Second</td>
<td>36</td>
</tr>
<tr>
<td>Third</td>
<td>22</td>
</tr>
<tr>
<td>Fourth</td>
<td>16</td>
</tr>
</tbody>
</table>

HIV-1 antibody tests have been replaced by newer combination tests for HIV-1 and HIV-2. Results are reported as HIV-1/2 antibody. The assay does not distinguish between HIV-1 and HIV-2. Specimens that test reactive to HIV-1/2 antibody are
automatically forwarded for confirmatory testing that initially includes a Western blot for antibodies to specific HIV-1 viral proteins. Any specimen that is reactive for HIV-1/2 antibody, but negative or indeterminate by HIV-1 Western blot is subsequently tested specifically for HIV-2.

Specimens that are reactive in the initial screening test, but are indeterminate or nonreactive by Western blot may represent the seroconversion phase of disease, or may be due to cross-reacting antibody from a variety of conditions. Causes of false positive EIA results include multiparity, previous blood transfusion, chronic liver disease, renal transplantation and chronic renal failure, autoimmune disorders, influenza vaccination, and receipt of hepatitis B immunoglobulin.

The use of Western blot as a confirmatory test is becoming problematic because it is less sensitive than 3rd generation EIA. Patients who are truly infected may have a positive EIA result and a negative or indeterminate Western blot result if testing is done early after onset of infection. In the future, RNA viral load testing may replace Western blot as the recommended supplemental test, because it can detect circulating virus within 11 days after infection. Unfortunately, viral load testing is not currently approved by FDA for this purpose.

Positive HIV antibody results in children younger than 18 months does not establish a diagnosis of HIV infection because children of HIV infected mothers may have detectable levels of maternal antibody up to 18 months after birth. These children should be tested with an HIV DNA PCR at birth, 2 weeks, 4-6 weeks, 6-12 weeks and 4-6 months of age.

Saint Luke’s Regional Laboratories performs approximately 6000 HIV 1/2 Antibody tests per year with a confirmed positive rate of 0.3-0.4% (20-25 patients/year). Testing is performed Monday through Friday. Reference value is nonreactive. Specimen requirement is one SST tube of blood.

### Hemoglobin A1C testing frequency

The Office of Inspector General (OIG) has released its Fiscal Year 2011 Work Plan, which describes the investigative, enforcement and compliance activities that it will undertake in the coming year. OIG will review Medicare contractors for screening the frequency of clinical laboratory claims for HbA1c and determine the appropriateness of Medicare payments. The following testing intervals are considered medically necessary:

- Every 3 months to monitor a diabetic patient’s metabolic control
- Every 1-2 months when treatment regimen is altered to improve control
- Every month for diabetic pregnant women
- Patients with uncontrolled type I or II diabetes may be tested more frequently if the medical record contains supportive documentation

An Advance Beneficiary Notice (ABN) should be submitted for Medicare patients whenever a HbA1c is ordered at more frequent intervals than those listed above.

#### Transfusion of Group A2 Platelets to Group O Recipients

All of the Saint Luke’s Hospital transfusion services try to provide ABO identical platelets for every patient. However, if ABO identical platelets are not available, it may be necessary to issue ABO nonidentical platelets in an emergent situation. Transfusion of group A or B platelets to group O recipient results in post-transfusion platelet increments that are 20% less than those obtained with ABO identical platelet transfusions. Decreased platelet survival is due to the binding of recipient anti-A and/or anti-B to the transfused donor platelets.

Blood group A is subdivided into A1 and A2 subgroups, accounting for 80% and 20% of group A individuals, respectively. More recent studies have demonstrated that A2 platelets serologically behave more like group O than group A1 platelets. Transfusion of group A2 platelets to group O recipients achieves the same post-transfusion rise in platelet count as transfusion of ABO identical platelets and is not associated with any adverse reactions. Accordingly, Saint Luke’s Hospital transfusion services will begin issuing A2 platelets for group O recipients as needed to meet clinical demand.

#### Therapeutic Drug Monitoring of Sirolimus

Saint Luke’s Hospital laboratory has validated an immunoassay for measurement of Sirolimus (Rapamune). Beginning December 16, specimens will be tested in house. Specimen requirement is one 5 mL EDTA (lavender top) tube of blood. Therapeutic range is 4.5 – 28.0 ng/mL. Testing will be performed three times per week.