

# ASCLS 2003 Annual Meeting: Official Abstracts of Submitted Papers and Posters

## PHILADELPHIA, PENNSYLVANIA

The following abstracts have been accepted for presentation at the 2003 American Society for Clinical Laboratory Science (ASCLS) Annual Meeting and Clinical Laboratory Exposition to be held July 22 through July 26, 2003 in Philadelphia PA. The preliminary meeting program was published in the Spring 2003 issue of *Clinical Laboratory Science*. Abstracts are reviewed by appropriate representatives of the ASCLS Scientific Assembly Sections. They are the final authority in selecting or rejecting an abstract.

Papers and posters will be presented during the following times at the annual meeting. Room assignments will be listed in the final program.

### POSTER PRESENTATIONS

Pennsylvania Convention Center.

Tuesday and Wednesday, July 22 and 23, 2003. 10:00 A.M. - 4:30 P.M. Thursday, July 24, 2003. 10:00 A.M. - 3:30 P.M.

*Authors will be present Thursday, July 24, 2003 from 10:00 A.M. to 11:00 A.M. to discuss their poster.*

### CASE STUDY PRESENTATIONS

Wyndham Franklin Plaza Hotel

Friday, July 25, 2003, 9:00 A.M. to 10:30 A.M.

### RESEARCH PAPER PRESENTATIONS

Wyndham Franklin Plaza Hotel

Friday, July 25, 2003, 2:15 P.M. to 5:30 P.M.

### POSTER PRESENTATIONS

#### Adaptation of a Urine-Based Drug Screening Assay to Use Serum

*Mary Ann McLane PhD CLS(NCA), Kenneth Wannemacher, University of Delaware, Newark DE; Samuel Miller C(ASCP), Hospital of the University of Pennsylvania, Philadelphia PA.*

Routine analysis of drugs of abuse commonly includes qualitative screening analysis of random urine specimens using enzyme-mediated immunoassay techniques (EMIT). Such screening is difficult for patients on renal dialysis since their urine output is negligible to absent. An investigation was

conducted to determine whether the same qualitative method could be used with serum, rather than urine, as the specimen. Seven different purified drugs were added to pooled drug-free serum at concentrations two- to ten-fold higher than the established urine-based drug cutoff used for establishing 'positives' from 'negatives'. Dilutions of these serum drug stocks were processed by a column chromatography extraction, and eluates analyzed by EMIT. Results at each drug concentration were graphed and compared with the established urine cutoff to determine the comparable cutoff that could be used for serum samples. For two drug classes (amphetamine and phencyclidine), the analytical sensitivity was unacceptable. Calculation of summary predictive values for the other five drugs studied indicated 94.0% sensitivity, 98.7% specificity, 98.7% positive predictive value, and 93.8% negative predictive value, which were all comparable to the values found when urine testing is performed. This suggests that serum is an acceptable sample for qualitative drug screening for five of the seven drugs tested.

#### Alleviating Shortages with Rural Interdisciplinary Healthcare Teams

*Lorraine Doucette MS MT(ASCP), Eileen M Patton MS MT(ASCP) RM(AAM), University of Maryland School of Medicine, Baltimore MD.*

Shortages of healthcare providers in rural areas, including clinical laboratory scientists, continue to negatively impact the health care available to citizens of those communities. In response, rural interdisciplinary healthcare teams have been formed to provide this care. Interdisciplinary teams are an integrated approach in which team providers actively coordinate care and services across disciplines to their patient population. In recognition that laboratory professionals are an integral part of the healthcare team, the Department of Medical and Research Technology (DMRT) at the University of Maryland School of Medicine in 2000 joined a pre-established interdisciplinary healthcare team coordinated through the Western Maryland Area Health Education Center (AHEC). Team members developed Web-based modules and learning activities for students to raise awareness of interdisciplinary teaming and to recruit possible new providers of rural healthcare ([www.allconet.org/ahec/rihp](http://www.allconet.org/ahec/rihp)). Healthcare disciplines represented on the team included:

clinical laboratory science (CLS), nursing, occupational therapy, physical therapy, public health, respiratory therapy, and social work. Examples as to how CLS educators can integrate these modules within their own curriculum are provided to broaden CLS students' knowledge concerning rural interdisciplinary healthcare teams.

### **Collaborative Development of a Medical Technology Certification Computer-Adaptive Examination**

*Betty Ciesla MS MT(ASCP)SH, Diane Wilson PhD MT(ASCP)*, Morgan State University, Baltimore MD.

Morgan State University's Medical Technology (MT) Program has experienced extensive curriculum changes in the past five years. One of the goals was to provide a 'simulated certification' examination for senior students. Although software is available for such a project, the faculty enlisted the services of senior students in the university's computer science department. A team of six students enrolled in the senior software engineering course-COSC 458, was assigned to develop the computer-adaptive examination (CAE). The MT Program became the 'client' for the student-created software company. Four hundred questions, at three taxonomic levels, were submitted by MT faculty for the major disciplines. The software was programmed to select questions according to the student's ability. Additional features of the CAE include password protected entry, question recall, and pre-set test time. The benefits of this collaboration included the development of the CAE, a viable alternative for a budget-strained program and a promotional opportunity.

### **Correlation Between MTHFR677 (C→T), Hyperhomocysteinemia, and BMI**

*Jean M Chappell MS MT(ASCP), Sara Hesson, Jarrett Roth, Porrani Sekar, Elizabeth Murray, Gary Wright, Todd Green, Bowie Kahle*, Marshall University, Huntington WV; *Brenda Hill*, West Virginia State College, Institute WV; *Mark Flood*, Fairmont State College, Fairmont WV.

Two major risk factors for CVD are obesity and hyperhomocysteinemia. One goal of this study was to evaluate the relationships between a common CVD risk factor allele, MTHFR 677 (C→T), hyperhomocysteinemia, and obesity status. Genomic DNA was extracted and a 198bp fragment correlating to the MTHFR677 region was genotyped. *Hinf* I digested samples revealed three distinct banding patterns: Normal, A/A, having one band at 198bp; heterozygous, A/V, having three bands at 198bp, 175bp, and 23bp; and homozygous variant, V/V, having two bands at

175 bp, and 23 bp. Homocysteine was measured using the Abbott IMX Immunoanalyzer. Of the samples processed, 143 samples were genotyped for MTHFR677(C→T) and analyzed for homocysteine; ten samples were analyzed for homocysteine only (genotyping in process); and 114 samples were genotyped only. The data are as follows: 67 wild-type homozygotes, 15 homozygous variants, and 61 heterozygotes. In this preliminary study the obese population had significantly higher homocysteine levels ( $p = .03$ ) than the non-obese population. Homocysteine levels were strongly correlated with age but no significant difference between males and females was found. As compelling as these data are, a more detailed evaluation needs to be conducted with a larger patient population to determine valid correlations between obesity and hyperhomocysteinemia.

### **Effects of Brown Recluse Spider (*Loxocles reclusa*) Venom on the Coagulation Mechanism in Rabbits (*Oryctolagus cuniculus*)**

*DL McGlasson MS CLS(NCA), HH Harroff DVM, E Dick DVM, J Sutton*. 59th Clinical Research Squadron, Wilford Hall Medical Center, Lackland AFB TX.

The brown recluse spider (BRS) bite causes a necrotizing skin cellulitis in both animals and humans. It has also been reported to cause DIC-like symptoms in humans. In a study group of 36 rabbits we report here a dramatic effect on the coagulation mechanism following BRS envenomation. One group received a saline injection, and the other two groups received a 4.0 µg/mL or 10.0 µg/mL dose of the BRS venom. Samples were collected at baseline, 24-, 48-, and 72-hours for CBC/platelets and coagulation testing. The WBC counts and platelets decreased dramatically at 24-hours in rabbits receiving the venom. The APTT and fibrinogen (both clottable and antigenic), FV, FVII, FVIII, FIX, FX, anti-thrombin, and alpha-2 antiplasmin levels were greatly increased in test subjects receiving the venom doses. The Protein C decreased at 24-hours through the 72-hour sampling. However, mixing studies corrected the APTT to normal ranges. FII, FXI, and FXII levels showed no significant changes at any time. In the rabbit we had an elevated APTT that corrected in mixing studies despite the presence of several elevated coagulation factors present or normal results following the BRS envenomation. This suggests a coagulation factor not yet identified by our testing. There is no evidence of DIC in the rabbit. This is the second study in which we have been able to induce increased coagulation factors in this animal model following BRS envenomation.

### Evaluation of CB-18 for the Detection of *Mycobacterium bovis*

**Douty H Bamba**, Janine D Cook PhD, Lorraine Doucette MS, University of Maryland Baltimore; **Charles Thornton PhD**, Chris Caroter, Integrated Research Technology.

The efficiency of C<sub>18</sub>-carboxypropylbetaine (CB-18), a zwitterionic detergent used in sample processing to recover *Mycobacterium bovis* in infected subjects was investigated. CB-18 has been reported to improve the recovery of mycobacteria during centrifugation, a critical step in sample processing. PCR-based methodology has the greatest potential as a rapid and effective ante mortem test if quantitative recovery of bacilli during specimen processing using CB-18 can be accomplished. Fourteen cows were experimentally infected with *Mycobacterium bovis* strain 1315. Every month for six months, oral, nasal, and intratonsillar swab specimens were collected and processed with CB-18. At the end of six months, the animals were sacrificed and tissue specimens were collected and processed. All the processed specimens were cultured and PCR-based procedures will be performed and compared with traditional processing method. Preliminary results show that all cultures are negative at this point in time. Hence ante mortem testing by culture does not appear to be a viable means for identifying animals in early stage disease. We are awaiting the amplification results.

### Folate Status in Pregnant Women at the First Prenatal Visit

**Sandra Cabrera MS CLS(NCA)**, Christina Thompson EdD CLS(NCA), Texas A&M University-Corpus Christi, Corpus Christi TX.

Research demonstrates the importance of nutrients, vitamins, and minerals not only on the health of normal adults, but also on the health of the developing fetus. Low folate levels have been associated with neural tube defects and, in 1998, the Food and Drug Administration required the fortification of enriched cereal and grain products with folic acid. The purpose of this study was to evaluate the folate status of pregnant women at their first prenatal visit. Two blood samples were obtained from a total of 133 patients during the months of May, June, and July at two clinics in the Corpus Christi area. One clinic was at private womens' center and the other clinic was associated with the city/county health department. An EDTA sample was used for hematocrit testing and a clot sample was collected for serum folate. The patients ranged in age from 15 to 43 years and gestation ranged from four weeks to 39 weeks. No patients were tested before the fourth week gestation, which is after the neural

tube closure. Fifty-three percent of the patients were in the first trimester and 8% in the last trimester. Fifteen percent of the patients had hematocrits below 35%. Twenty-one percent of the patients at the health department clinic had a hematocrit below 35%. The mean folate at the health department (12.4 ng/mL) was significantly lower ( $p < .01$ ) than the folate at the private clinic (17.6 ng/mL).

### Hands-on Opportunity to Discover Laboratory Professionalism through Structured Coursework

**Deborah L Costa MT(ASCP) CLS(NCA)**, Mary Ann McLane PhD CLS(NCA), University of Delaware, Newark DE.

Clinical laboratory science students, from freshmen to graduates, spend the majority of their intensive training learning the basics of their chosen field. While the theory of professionalism is included in their curriculum, there is limited opportunity to practice the concepts learned. Therefore, a one-credit "Anatomy of Professionalism" course was developed by the Medical Technology Department at the University of Delaware. This course included travel to the 70th Annual Meeting of the American Society for Clinical Laboratory Science (ASCLS) and the International Association of Medical Laboratory Technologists (IAMLT) in Orlando FL July 30–August 3, 2002. Course assignments, objectives, and schedules were placed on WebCT for easy access to students. Pre-meeting assignments assessed the level of 'professionalism' awareness in each student. On-site meetings included an orientation session (review of registration materials and the Meeting program), an assignment that encouraged interaction between the students and the vendors, and participation in the ASCLS Opening Ceremony, Awards, and Keynote Presentation. Students compared and contrasted professional societies with regard to purpose, membership, and governance, and reviewed current legislative issues. Students had an opportunity to meet other students and members of the ASCLS/IAMLT organizations. Student feedback was positive. They rated the program very highly, reported positive experiences, and recommended the program to other clinical laboratory science students.

### Impact of Full-time Professional Practice on Student Perception of Medical Science as a Career

**Ralph E B Green FAIMS**, RMIT University, Melbourne, Australia.

A 40-week full-time Professional Practice course in third year has been part of the undergraduate degree in Medical Laboratory Science at RMIT University since 1994. The learn-

ing outcomes for this course are structured around ten broad competencies that have been defined by the professions for entry level medical scientists. Assessment is based upon a journal, reflective essay, seminar presentation, and a performance appraisal by the laboratory supervisor. Evaluation of student responses to the 2001 course experience questionnaire indicated on occasions they felt as if they were being used as cheap labor, and they questioned the value of maintaining a journal. Frequent comments in reflective essays were made to automation in clinical biochemistry, lack of career paths, high workloads, lack of training opportunities, and the negative attitudes of laboratory staff to their work environments. These responses have been fed back to laboratory supervisors and Professional Practice guidelines amended to include: allocated time to work on journals each week, appointment of a recent graduate as a mentor, and provision of a training schedule at the start of the placement period.

### Novel Educational Strategy for Clinical Electrophoresis Workshop

*Jean M Chappell MS MT(ASCP), Dorothy Fike MS MT(ASCP) SBB, Marshall University, Huntington WV.*

The objective of this project was to develop an enhanced electrophoresis workshop for senior-level clinical laboratory science (CLS) students thereby providing an additional level of clinical skill. This involved a combination of computer-based simulations, didactic education, and hands-on experience. Senior CLS students were introduced to various electrophoresis topics using traditional classroom didactic methods. Using the Beckman-Coulter "Electrophoresis Tutorial" CD-ROM, topics were emphasized using visual and graphic representations of theories presented. Using hands-on laboratory experiments designed for the Beckman-Coulter Paragon System™, specific diseases were chosen to further emphasize critical points. Students demonstrated their mastery of the topics by passing a comprehensive examination on the topics discussed with an average of 98%. This is a significant increase over the previous years in which this format was not used. In addition, the students reported feeling more in control of their learning goals and that the immediate feedback provided by the tutorial allowed them to correct their deficiencies before inaccurate information was committed to memory. Evaluation of this learning format will continue for several semesters to determine a more precise outcome.

### Teaching Hematology Using Live Digital Microscopy

*Robin G Krefetz MEd CLS(NCA), Glenn Flodstrom MS MT(ASCP), Community College of Philadelphia, Philadelphia PA.*

One of the core competencies for clinical laboratory science students in hematology is the identification of cells in the WBC differential. The use of 35mm slides and individual practice with blood films are well-established techniques in the development of these skills. Our experience includes the use of live digital microscopy as an additional teaching resource in the student laboratory. Among the advantages of this technique are: its low cost, the high resolution images produced, ease of instructor use, the ability to develop permanent images for later use, and the student centered nature of the 'group' differential. Both students and faculty found this method of teaching microscopy and learning WBC morphology better than the traditional methods. Interviews of faculty and students, including those from other colleges indicate that they prefer this teaching method. The use of live digital microscopy was found to be an improvement over traditional teaching methods for both microscopic urinalysis and WBC differentials, a technique that can also be applied to teaching gram stain examination and other microscopic procedures.

### The Use of Audio Visuals in the Teaching of Urinalysis

*Dyan Monte Verde MS CLS(NCA), Monte Verde Productions Inc, Rochester NY.*

This study was an attempt to apply the use of audiovisuals and learning theory to a situation which approaches the laboratory setting. This was achieved by the manipulation of taped instructions and visual aids to different groups of students. Group I was the Preparatory Group; they did not have any prior classes or laboratories in urinalysis. Group II was the Advance Group; they did have prior classes and laboratories in urinalysis. Group III was medical students. All subjects were given a pretest before the slide tape was shown to see how much knowledge they had in the area of urinary sediment. Immediately following their exposure to the instructional material, all the subjects completed a post test. This was done to assess ability to recall in order to measure the influence of the tape on the learning process. That is, what did the subjects learn from this instructional medium? Subjects without any classes or laboratories in urinalysis demonstrated almost as good recall of urinary sediments as their counterparts who had had classes and laboratories in urinalysis. The slide tape program and script will be available to view and purchase.

## Using Theory-Driven Evaluations to Determine Strengths and Weaknesses of a CLS Program

*Sandra M Weiss EdD CLS(NCA)*, Neumann College, Aston PA.

Theory provides a lens to look at the meaning and function of events. However, many programs fail to incorporate theory in program evaluation. According to the literature, many programs are evaluated by a set of predetermined questions that provide information that is uniformly applied. This approach may supply information about the success or failure of the program, but does not identify any underlying cause. The clinical laboratory science (CLS) department conducted an evaluation of the CLS program to identify the causal processes underlying the program's value. The CLS program had been restructured from a traditional program into a non-traditional night/weekend format located within the Division of Nursing and Health Sciences. Normative theory was used to guide the goals and outcomes that should be pursued, designed, and implemented for the program. Consistency between goals and activities used to attain goals were examined using various normative evaluations. Consistency between goals and activities was established for all evaluations except for the normative context evaluation and the normative implementing evaluation. In order to correct for these inconsistencies, the CLS program was restructured back into a traditional program as a concentration within the biological science program rather than a separate major.

## CASE STUDY PRESENTATIONS

### The Arts of Urine Analysis...Crystals and Calculi

*Dyan Monte Verde MS CLS(NCA)*, Monte Verde Productions Inc, Rochester NY.

Using a case study, this presentation will provide an updated view of the "true arts" of urine analysis...crystaluria and renal calculi. Many common crystals are readily recognized in urine sediment under light microscopy, but further differentiation may require more detailed examination using polarization techniques. If they are morphologically similar, their refractive properties can be of particular importance in their identification. Some crystals demonstrate a unique ability to assume various forms in the same patient. Also, crystals normal to one patient may be pathological to another if certain conditions exist. Crystalline forms of many drugs, medications, and radiocontrast dyes appear in the urine and will be discussed. The participants will enjoy learning about other non-crystal "art forms" in urinalysis and understand their clinical significance.

## Finding the Cause of Hypercoagulability: A Critical Role for the Laboratory

*Shirlyn B McKenzie PhD CLS(NCA)*, University of Texas Health Science Center at San Antonio, San Antonio TX.

Repeated thrombotic events, hypercoagulability, may be due to congenital or acquired factors. Proper treatment or prevention of thrombosis requires not only clinical assessment but also extensive diagnostic testing. This case concerns a 34-year-old male with a ten-year history of thrombotic episodes. Although he was on coumadin therapy, he experienced chronic venous occlusion in the left leg. He was admitted to the hospital for venous reconstruction in the affected leg. At time of admission his INR was 1.55, while his platelet count and CBC were normal. At admission he was switched from coumadin to heparin and monitored by the APTT. The day after surgery he developed chest pain and hypotension and despite medical intervention, expired. Cause of death, identified by autopsy, was cardiac tamponade. The patient was never tested for congenital coagulation defects until after his death. Blood drawn before death was sent to a reference laboratory for molecular analysis. Results revealed heterozygosity for Factor V Leiden. Since this single defect is unlikely to have caused this extensive history of thrombosis, it is probable that other factors were present that acted synergistically with Factor V Leiden. Whether this patient's life could have been spared by a complete coagulation testing profile for congenital abnormalities is unknown.

### Mini Cases in Microscopic Urinalysis

*Dyan Monte Verde MS CLS(NCA)*, Monte Verde Productions Inc, Rochester NY.

Microscopic examination of the urinary sediment has been described as a "mini biopsy" of the kidney. It provides a vital diagnostic tool for physicians and their patients to diagnose an asymptomatic patient and enables one to follow the progression of illness and recommend further treatment. Using case studies, this presentation will focus on the over all importance of microscopic urinalysis. Atypical epithelia, cells, crystals, and casts found in the urinary sediment will be shown utilizing various stains and polarization techniques.

### Treatment of Severe *Plasmodium falciparum* Infection with Exchange Transfusion

*Linda A Smith PhD CLS(NCA)*, *Stephen Alaniz*, University of Texas Health Science Center, San Antonio TX.

Malaria affects more than 2.5 million persons worldwide. Although most cases are diagnosed in individuals living in

endemic areas such as Africa, South America, and Southeast Asia, travelers to these areas are also at risk of acquiring infection, especially if malarial prophylaxis is not taken. *Plasmodium falciparum* is recognized as the most severe of the malarial infections and is associated with significant morbidity and mortality. It may present with high levels of parasitemia and multiple complications. Although treatment for non-resistant strains is usually successful using only anti-malarial drugs, some cases require additional forms of treatment. This case is that of an African-American male who presented with symptoms of malaria after a trip to Africa. His peripheral blood smear showed high-grade parasitemia with intraerythrocytic rings identified as *P. falciparum*. Both anti-malarial medication and multiple red blood cell exchanges were required to successfully treat this patient.

### Unusual Sequential Development of Alloantibodies in a Multitransfused Patient with Idiopathic Hemolytic Anemia

*Linda Hawthorne MHS, Deepti Shukla MD, Diana Veillon MD, Xin Gu MD, James D Cotellingam MD*, Louisiana State University Health Sciences Center, Shreveport LA.

A 31-year-old female was hospitalized for symptomatic anemia with initial hemoglobin of 5.7 g/dL. Her last transfusion occurred one year ago. Within twenty-four hours her hemoglobin dropped to 4.7. Compatibility testing detected a strong cold autoantibody. Five units of warmed blood were transfused. By day nine her hemoglobin was 4.4 g/dL despite no obvious bleeding. Compatibility testing identified anti-s and anti-Jka and six units were transfused. On day fourteen, her hemoglobin was 4.0 g/dL and anti-C was detected. She was treated with prednisone, transfused with one unit of blood, and plasmapheresis was initiated. On day fifteen, her hemoglobin was 3.6 and transfusions were suspended in favor of treatment with erythropoietin. On day eighteen, anti-Fya was eluted from her cells. By day twenty-one, her hemoglobin was 2.8 g/dL and four units were transfused. Her hemoglobin stabilized around 6.0 g/dL and she complained of abdominal pain. CT scan confirmed a massive splenic infarct and a splenectomy was performed. Pathological examination revealed splenomegaly with a wedge shaped infarct and extramedullary hematopoiesis was evident microscopically. A diagnosis of idiopathic cold autoimmune hemolytic anemia with superimposed alloantibody related hemolysis was made. Following splenectomy, the patient is doing well and hemoglobin levels have normalized.

## ORAL PRESENTATIONS:

### An Evaluation of the Platelet Function Effect of Aspirin and Plavix in Subjects with Stable Coronary Disease

*DL McGlasson MS CLS(NCA); JD Geoghagan CPT MD; CPT MK Murphy BSN RN*, Wilford Hall Medical Center, Lackland AFB TX.

The purpose of this study was to evaluate the anti-platelet effects of Plavix, when combined with aspirin therapy in patients with CAD. Thirty-two specimens from subjects with stable CAD taking aspirin (ASA) daily were evaluated. The subjects were administered a loading dose of 300mg Plavix and then a daily dose of 75 mg for four weeks. Testing at baseline, four weeks and eight weeks was performed. Platelet studies were performed by platelet aggregometry (PA) using ADP and collagen agonists and the PFA-100 Platelet Function Analyzer using ADP/COLL and EPI/COLL cartridges on 3.8% sodium citrated blood. Results on subjects (n=16) on ASA only had two decreased (PA) patterns at baseline; four with abnormal PFA results (EPI/COLL only); seven with both abnormal PA and PFA results. In three specimens no effects were measured. Specimens in which the subjects (n = 16) were taking both ASA and Plavix had two with abnormal PA, two with ADP/COLL and EPI/COLL PFA prolongations, and 12 specimens with abnormal PA and prolonged PFA results (two ADP/COLL and 12 EPI/COLL). Specimens obtained when the subjects were on both ASA and Plavix had a higher incidence of decreased platelet function in both the PA patterns and PFA results. There were no significant differences in the effect of ASA strength in the platelet studies.

### Applications of Evidence Based Practice in Clinical Laboratory Science

*Elizabeth Kenimer Leibach EdD CLS(NCA) SBB(ASCP), Lynn Black MT SC, Barbara Russell MHE MT SH*, Medical College of Georgia, Augusta GA.

Evidence based practice (EBP) has been defined as "conscientious, explicit, and judicious use of current best evidence in making decisions about patients". EBP in clinical laboratory science (CLS) is defined as benchmarking the medical effectiveness of laboratory testing practices with the standardization of testing guidelines based on these benchmarks. Studies are reported that demonstrate applications of measurements of cost-efficiency and criteria of medical effec-

tiveness that define a process for benchmarking best practices to support decision making in CLS. This process was applied to evaluations of blood gas and hemoglobin A<sub>1C</sub> methodologies. In each case, the “quality ratio” derived from the analysis was used to support and justify decision making. A study was also undertaken in which this EBP process was used to determine medically meaningful critical values in point-of-care glucose testing and suggest changes in laboratory confirmation practices.

### Asking Different Questions about the Laboratory Profession

*Moiria M Grant MEd ART*, Ontario Institute for Studies in Education of the University of Toronto, Toronto Canada.

Medical laboratory science is experiencing challenges related to workforce shortages and to the lack of recognition and respect for the profession. Researchers have queried the potential for credential upgrading and curriculum change to resolve these issues. Past efforts to implement such change have had limited success. This presentation outlines a sociological inquiry into issues of gender, race, and class in medical laboratory science in Canada. The methodological approach to this doctoral thesis work included detailed document analysis and a practitioner survey that incorporated both qualitative and quantitative elements. The findings suggest that credentialing or curriculum change alone may not offer solutions to issues of professional recognition and shortages. They reveal the potential for sociological analysis of the profession to highlight historical and structural issues that may lead to greater understanding of the challenges facing medical laboratory science. This understanding facilitates an informed approach to professional change that addresses systemic and implicit assumptions about the role of laboratory science in healthcare. Further avenues for inquiry and change are proposed with these assumptions in mind.

### Co-morbidity of Type II Diabetes and Alzheimer's Dementia: Frequency and Treatment Strategies

*BreAnn Davis, Dianne M Cearlock PhD CLS(NCA)*, Northern Illinois University, DeKalb IL.

The purpose of this study is to investigate the frequency of co-morbidity with Type II diabetes and Alzheimer's dementia in elderly patients and document treatment strategies. Although Alzheimer's dementia and Type II diabetes are two prevalent health problems in the older adult, few studies have

investigated co-morbidity with both. In a study of 476 patients, the authors conclude that there is no significant association between dementia and diabetes. However, several investigators suggest that the risk of Alzheimer's dementia among patients treated with insulin is higher than that among patients treated with oral hypoglycemic agents. In this retrospective pilot study, 74 medical records of patients residing in a long-term care facility are reviewed. Of those, nine (12%) patients have diabetes, 10 (13.5%) have Alzheimer's, and five (6.7%) are diagnosed with both. Age does not appear to be a factor in co-morbidity as the mean age for all 74 patients is 86, as is the mean age for patients presenting with co-morbidity. Polypharmacy is noted from the medical records of all five patients with co-morbidity. Results from this and similar studies may provide a stimulus for enhancing prevention, treatment, and monitoring of diabetes in Alzheimer's patients.

### Development of a Computer Program to Grade Students' Evaluation of Peripheral Blood Smears

*Donald C Lehman EdD MT(ASCP) SM(NRM)*, *Raelene E Maser PhD MT(ASCP)*, University of Delaware, Newark DE.

Information in the clinical laboratory science (CLS) field is increasing with instructors expected to teach more content in the same amount of time with similar resources. We examined whether computer-assisted assessment could evaluate student performance of differentials accurately while reducing the instructors' grading time. Authorware® (Macromedia) and educational computer software design theories were used to create a computer application to assess CLS students' ability to evaluate peripheral blood smears in a senior hematology course. The students were evaluated in three areas: white blood cell differential, platelet estimate, and red blood cell morphology and white blood cell abnormalities. If the students did not get satisfactory results on their first attempt, the computer program informed the students immediately which areas were unsatisfactory. The students were then given the opportunity to repeat their evaluation of the blood smear. Overall, the program correctly assessed the students' results. Even though the program was not written as a tutorial, the immediate response given to the students was perceived to help improve their ability to accurately perform a differential (Spearman rho = 0.604,  $p = 0.013$ ). While the program was initially designed as a grading tool, by incorporating meaningful feedback and a tutorial, the program could also become a teaching tool.

### Estimated Incidence of Sickle Cell Anemia and HIV Infection in Northeastern Haiti

*Tim R Randolph MS CLS(NCA)*, Saint Louis University, St Louis MO.

The purpose of this study was to estimate the incidence of sickle cell anemia and HIV infection among subjects likely to utilize Bethesda Medical Clinic in Vaudreuil, Haiti. Haiti is one of the poorest countries in the Western Hemisphere with minimal access to healthcare. HIV and sickle cell disease are two of many serious health issues. Knowledge of disease prevalence will improve laboratory test ordering practices and diagnostic decisions. Sickle cell and HIV screening was offered to clinic patients, staff, and local residents on a regular clinic day. Capillary punctures were performed on 61 patients. All 61 had sickle cell testing and 59 also had HIV testing performed. The hemoglobin solubility technique was used for sickle cell testing and an immunochromatographic method was performed to detect HIV antibodies. Of the 61 subjects, 31 (50.8%) were clinic patients being seen for pregnancy follow-up, 10 (16.4%) were clinic staff and the remaining 20 (32.8%) were local residents. The incidence of sickle cell was 14.8% and HIV was 3.4%. According to other reports, the estimated incidence of sickle cell and HIV in Haiti is approximately 25% and 5%, respectively. The incidences determined in this study are considered estimates because no confirmatory testing was available.

### Incorporation of Management Skills in an Undergraduate Medical Laboratory Science Degree

*Ralph E B Green FAIMS*, RMIT University, Melbourne Australia.

Management skills are incorporated at two points in the Medical Laboratory Science degree conducted at RMIT University. The third year full-time 40-week Professional Practice program provides an opportunity for students to enroll in a concurrent Diploma in Frontline Management that is conducted according to a national curriculum. This program is seen by many employers as an entry-level management program and is based on workplace assessment of competency. Approximately two thirds of the competencies that students are required to demonstrate in Professional Practice align with the competencies required for the Diploma in Frontline Management. In fourth year, students are required to take a course in medical informatics and laboratory management. The medical informatics component includes principles of digitizing information, digital imag-

ing and analysis, expert/knowledge-based systems, laboratory information systems, and telepathology. The laboratory management component includes topics on leadership, change management, automation, point of care testing, healthcare economics, quality systems, and laboratory accreditation. Medical scientists who have specialized in many of these fields provide a number of the lectures and illustrate alternative future career paths following graduation for final year students.

### Nutritional Status in Pregnant Women at the First Prenatal Visit

*Christina Thompson EdD CLS(NCA)*, *Sandra Cabrera MS CLS(NCA)*, Texas A&M University-Corpus Christi, Corpus Christi TX.

Research demonstrates the importance of nutrients, vitamins, and minerals not only on the health of normal adults, but also on the health of the developing fetus. The purpose of this study was to evaluate the nutritional status of pregnant women at their first pre-natal visit. Two blood samples were obtained from a total of 133 patients during the months of May, June, and July at two clinics in the Corpus Christi area. One clinic was a private women's center and the other clinic was associated with the city/county health department. An EDTA sample was used for hematocrit testing and a clot sample was collected for serum iron, ferritin, and transthyretin (prealbumin) testing. The patients ranged in age from 15 to 43 years and gestation ranged from 4 to 39 weeks. Fifty-three percent of the patients were in the first trimester and 8% in the last trimester. Fifteen percent of the patients had hematocrits below 35%. Twenty-one percent of the patients at the health department clinic had a hematocrit below 35%. The mean pre-albumin was significantly lower ( $p < .05$ ) at the private clinic (15.5 mg/dL) than at the health department (17.8 mg/dL). Fifteen percent of the patients at the private clinic had a pre-albumin below the normal 10 mg/dL.

### Universal Leukocyte Reduced Transfusions: Cost and Benefits

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The purpose of this study was to determine the benefits and cost of universal leukocyte reduced transfusions (URLT) in our institution. The use of URLT is controversial and its financial impact cannot be readily assessed. The definite ben-

efits of leukocyte reduced products are prevention of febrile nonhemolytic transfusion reactions (FNHTR), HLA alloimmunization, e.g., prevention of platelet refractoriness, and cytomegalovirus (CMV transfusion related transmission). In our study we evaluated the benefits of ULRT transfusions as measured by the total FNHTR. In the six-month period prior to the implementation of ULRT, there were 6 FNHTR/5450 units (0.11%), compared with 0 FNHTR/5639 units (0%) with ULRT. Each filtered RBC unit costs

an additional \$16, with a total additional cost/six-months of \$90,224. There were 1150/5639 (20.4%) of total units transfused in trauma patients in whom prevention of alloimmunization, CMV transmission, and FNHTR may not be significant in the larger clinical trauma picture. The additional cost was approximately \$18,400. We conclude that while ULRT eliminated FNHTR, it also represents an unnecessary financial burden on our institution, especially when used indiscriminately.

### STUDENT RESEARCH ABSTRACT

This student research paper is the winner of the ASCLS Education Scientific Assembly (ESA) 2003 competition for CLS/CLT student research papers and case studies. Student **Research Papers** were to address scientific as well as applicable educational, technical, administrative, consulting, and management studies. The student must be a current ASCLS member and have been enrolled in a NAACLS accredited CLS/CLT program at the time the research was conducted. The student winner of the research paper award receives an all-expense paid trip to the ASCLS annual meeting in Philadelphia, Pennsylvania on July 22-26, 2003, to present their paper and will be honored at the awards ceremony during the ASCLS annual meeting. In addition the paper will be submitted for publication in a future issue of the journal *Clinical Laboratory Science*.

#### **Rapid Detection of West Nile Virus in Birds Using the VecTest™ WNV Antigen Assay**

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**OBJECTIVE:** To determine if the VecTest™ WNV Antigen Assay (for testing mosquitoes) could be adapted to detect West Nile virus rapidly and accurately in birds for screening purposes.

**DESIGN:** Cloacal swabs and tissue (kidney and spleen) were harvested from forty fresh dead birds. The VecTest™ was used for each swab specimen for detection of West Nile virus and PCR was used for each tissue specimen for confirmation of West Nile virus.

**SETTING:** Mississippi Veterinary Diagnostic Laboratory (MVDL) in Jackson, Mississippi and College of Veterinary Medicine-Mississippi State University (CVM-MSU) in Starkville, Mississippi.

**SPECIMENS/SUBJECTS:** Forty birds of the Corvid family (31 Bluejays and 9 American Crows) were included in the study. Fresh dead birds that died from no obvious cause were submitted for testing.

**RESULTS:** VecTest™ results were 35 positives and 5 negatives. PCR results were 35 positives and 5 negatives.

**CONCLUSION:** VecTest™ showed 100% accuracy.