# Table of Contents

**Message from Steven G. Gabbe, MD** ..... 5  
**Message from Denis O’Day, MBBS** ........ 5  
**Biomedical Informatics**.......................... 6  
**Community Health Initiatives and Health Outreach** ...................... 9  
**Education**........................................... 18  

## Biomedical Informatics Abstracts .......... 6-9  
**Designing Decision Support Delivery For CPOE Systems** .................... 6  
**The Epidemiology of Medication Prescribing Errors in the Emergency Department**.......... 7  
**Real-Time Monitoring of Provider Order Entry Data for Research and Quality Improvement**......................... 8  

## Community Health Initiatives and Health Outreach Abstracts.......10-18  
**Community Health Initiatives Abstracts** ..........10-18  
**The Implementation of a New SPECs Model: A Community-Based Trial** ..........10  
**Perinatal Care: A Woman’s Perspective** ..........11  
**Prescribing Practices and Continuity of Care for the Mentally Ill in the Davidson County Correctional Development Center** ..........12  
**Vacunas Pediatricas: Identifying Barriers to Pediatric Vaccinations in a Recently Established Hispanic Population** ..........13  
**The Establishment of a Free Clinic in a Medically Underserved Community** ..........14  
**Intervening on Behavioral Predictors of Substance Abuse in At-Risk Children** ..........14  
**Strategies to Improve Recruitment of Male Volunteers in Non-Profit Agencies** ..........16  
**Survey Evaluation of High School Sexual Health Education Content** ..........16  
**Community Voices: A Faith-Based Initiative to Reduce African American Infant Mortality** ..........17  

## Education Abstracts .................. 18-21  
**Gross Anatomy: How Much is Enough?** ..........18  

## Message from Steven G. Gabbe, MD  

**Saving A Life in 90 Seconds: A Video to Increase AED Use in Emergencies** ..........19  
**Sleepiness in Medical Students** ..........20  

## Healthcare Research and Management  

**Healthcare Research and Management Abstracts** ..........22-33  
**Revascularization After Segmental Resection of Lower Extremity Soft Tissue Sarcomas** ..........22  
**Evaluation of Adherence to Clinical Practice Guidelines in Age-Related Macular Degeneration** ..........22  
**NSAIDS in the Treatment of Acute Ankle Pain: A Systematic Review** ..........23  
**Impact of Ambulance Staffing Configuration on ACLS in the Pre-Hospital Setting** ..........24  
**Recombinant Factor VIIA Decreases Refractory Bleeding After Cardiac Surgery in Pediatric Patients** ..........24  
**Delirium In The ICU: A Prospective, Randomized Trial Of Placebo Vs. Haloperidol Vs. Ziprasidone** ..........25  
**Corticosteroid Injections In The Treatment Of Trigger Finger: A Level I And II Systematic Review** ..........26  
**Physician Ownership of Freestanding Ambulatory Surgery Centers: A Review of Literature to Determine Causality, Correlation and Impact on Clinical Decision-Making by Surgeons** ..........26  
**Staging Rectal Cancer: Tracked Endorectal Ultrasound Versus 2D Endorectal Ultrasound** ..........27  
**School-Based Obesity Prevention Programs: An Evidence-Based Review** ..........28
| Race And Sex Differences in AIDS-Related Cause of Death in HIV-Infected Persons | 28 |
| Factors Affecting Stress in Emergency Medicine Residents | 29 |
| The Adequacy of Pain Management in Vanderbilt Children’s Hospital | 30 |
| Measuring Performance of Antibiotic Treatment in Preterm Premature Rupture of Membranes | 30 |
| Does Shoe Insole Modification Prevent Stress Fractures? | 31 |
| HIPAA From the Patient’s Perspective | 31 |
| The Efficacy of A Computer-Based Prompt for Deep Venous Thrombosis Prophylaxis | 32 |
| Long-Term Complications in PEG and PEGJ Feeding Tubes | 33 |
| Medical Humanities | 33 |
| Medical Humanities Abstracts | 34-38 |
| An Investigation of the Problem of Access: Exploring Universal Healthcare | 34 |
| A Window | 34 |
| Missed Opportunities: A Descriptive Assessment of Teaching and Attitudes Regarding Communication Skills in a Surgical Residency | 35 |
| Critical Theory of Interational Relief Documentary | 36 |
| Novella | 36 |
| Content Analysis and Student Perceptions of Narrative Reflection in Medical Education | 36 |
| The History of My Cadaver (Chapter 1) | 37 |
| How to Deal: An Undergraduate Medical Education in Palliative Care | 38 |
| International Health | 38 |
| International Health Abstracts | 39-42 |
| Mali: Research And Health Care Delivery in The Third World | 39 |
| Dispatch From India: Final Hurdles in The Polio Eradication Program | 40 |
| The Challenges in Establishing A Clinic in a Rural Village Clinic in The Developing World: The Case of Lwala Community Clinic in Western Kenya | 41 |
| Melioidosis and Statin Use in Far North Queensland | 41 |
| Laboratory-Based Biomedical Research | 42 |
| Laboratory-Based Biomedical Research Abstracts | 42-60 |
| Mechanisms Underlying The Differentiation And Expansion of Regulatory T Cells | 42 |
| Targeting The Akt/mTOR Pathway For Radiosensitization of Breast Cancer | 43 |
| Analysis of Met as an Autism Vulnerability Gene | 43 |
| Defining A Role For Cell-Surface Sialic Acid in Reovirus Neurovirulence | 44 |
| Microarray Analysis of TβRII Signaling in MMTV-PyVmT Induced Tumor Cell Lines | 45 |
| Determining The Biological Importance of Novel p53 Regulated Target Genes | 46 |
| Direct Effects Of Novel Anti-Cancer Fendiline® Analogues on Contractility of Rat Coronary And Mesenteric Arteries | 46 |
| Health-Related Quality of Life 4-Weeks Following Roux-En-Y Gastric Bypass in Patients With Morbid Obesity | 47 |
Mitochondrial Stabilization by Cyclosporine a (CSA) Enhances Skin Cell Survival After Irradiation ..........47
Gene Expression Profiles in Human Diabetes Mellitus ........................................48
Genome-Scale Functional Screen to Identify Novel Kinase Regulators of The Non-Canonical WNT Pathway ......49
Phosphorylation of Myeloid Translocation Gene Protein, MTG16, Regulates Transcriptional Repression ......49
Computation Modeling of Human Neuronal Sodium Channel SCN1A ........50
Proteomic Patterns of Chemosensitivity in NSCLC Cell Lines ................................51
Investigation of The Downstream Targets of _- Arrestin 1 Overexpression in A Colorectal Cancer Cell Line ..........51
Mesenchymal Stem Cells in Fracture Repair: Tropism Without Effect on Biomechanical Properties ..................52
Comparative Effects of Mineralocorticoid Antagonism and Aldosterone Synthase Inhibition on Angiotensin II Induced Cardiorenal Injury ........................................53
Noninvasive Assessment of A VEGF Supplemented in VIVO Bioreactor ........54
Melanocytic Changes in NEVI During Pregnancy ........................................55
Changes in Pancreatic Islet Vascularization in Diabetic and Non-Diabetic OB/OB Leptin-Deficient Mice ..........55
Dopamernergic Transmission and Synaptic Plasticity in the Dorsolateral Bed Nucleus of the Stria Terminalis ....56
VEGF Accelerates Angiogenesis and Bone Growth in a Tissue Engineered Model of Skeletogenesis ..........57

Sequencing of Four Prototype Human Metapneumovirus Strains to Compare Genetic Variability ................58
Endoscopic-Approach Development for Minimally Invasive Orbital Surgery ..........59
Secondary Bile Acids Activate the EGF Receptor (EGFR) Through SRC Kinase-Mediated Mechanism ..................59

Law and Policy ........................................ 60
Law and Policy Abstracts ....................... 61-68
Methamphetamine (Meth) Exposed Child Emergency Department Protocols ..........61
Domestic Violence: The Law, the Reality and Steps Toward Improvement ....61
Understanding the Personal Experience of Adverse Events and Negligence in The Medical Community ..........62
The Planned Parenthood Client’s Awareness, Knowledge and Usage of Emergency Contraception: A New Perspective ........................................63
Human Cloning in Tennessee: Brave New World or the Future of Medicine? ..............64
Domestic Violence: Universal Screening in the Adult Emergency Department, VUMC ........................................65
Increasing Rates of Organ Donation: From Policy to Evincing Change in Academic Centers ...............................................66
Medical Students’ Perspective on The Disclosure of Iatrogenic Events ..................66
Impact of Partial Care on Health: Studying the TennCare Medically Needy Population ........................................67
Health Policy Education: Health Policy and the Medical School Curriculum .............68

Patient-Oriented Research .................. 68
Patient-Oriented Research Abstracts ...... 69-85
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does Hyperglycemia and Morbid Obesity Still Impact Mortality in Trauma?</td>
<td>69</td>
</tr>
<tr>
<td>Clinical Outcomes of Wedge Resection for Non-Small Cell Lung Cancer (Nsclc)</td>
<td>69</td>
</tr>
<tr>
<td>A Randomized, Double-Blinded, Placebo-Controlled Phase I/II, Dose-Ranging Study of the Safety, Reactogenicity and Immunogenicity of Intramuscular Influenza A/H5N1 Vaccine in Healthy Elderly Adults</td>
<td>70</td>
</tr>
<tr>
<td>BMI and Family History Predicts Development of Adolescent Obesity in Premature Pubarche</td>
<td>71</td>
</tr>
<tr>
<td>Allelic Imbalance as a Factor In Phenotypic Variability of SCN1A-Associated Seizure Disorders</td>
<td>72</td>
</tr>
<tr>
<td>Treatment-Refractory Multisystemic Langerhans Cell Histiocytosis With Risk Organ Involvement: A Review of the Pediatric Literature</td>
<td>73</td>
</tr>
<tr>
<td>An Evaluation of Factors Associated With Oxidant Stress in HIVInfected Persons</td>
<td>74</td>
</tr>
<tr>
<td>Surgical Outcomes in Patients Undergoing Preoperative Carotid Body Paraganglioma Embolization</td>
<td>75</td>
</tr>
<tr>
<td>Appropriate Peak Bone Mass in Adolescents With Diabetes: Role of Calcium Intake, Metabolic Control and the IGF System</td>
<td>76</td>
</tr>
<tr>
<td>Clinical Utility of CW Doppler Ultrasound For Measuring Cardiac Output Neurocognitive Sequelae of Pediatric Cancer</td>
<td>77</td>
</tr>
<tr>
<td>Protein Expression in Atrial Tissue From Patients With and Without Post-Operative Atrial Fibrillation</td>
<td>78</td>
</tr>
<tr>
<td>Database Correlation of Cardiac CTA to Cardiac Catheterization</td>
<td>79</td>
</tr>
<tr>
<td>Diet and Drugs Reduce Ventricular Tachycardia in Mouse Model of Pediatric Cardiomyopathy</td>
<td>79</td>
</tr>
<tr>
<td>Hypercapnia- Induced Changes of Cortical Blood Flow During Stimulation Using Near-Infrared Spectroscopy</td>
<td>80</td>
</tr>
<tr>
<td>The Role of Computed Tomographic Angiography in Evaluation of Penetrating Arterial Trauma of The Extremities</td>
<td>81</td>
</tr>
<tr>
<td>Reduced Fasting Protocol For Critically Ill Trauma Patients Undergoing Procedures</td>
<td>81</td>
</tr>
<tr>
<td>Alterations In Brain Metabolites In Recreational 3,4-Methylene-dioxymethamphetamine (MDMA, “Ecstasy”) Users: A 1H-MRS Study</td>
<td>82</td>
</tr>
<tr>
<td>Open Label Pilot Study of Combination Therapy With Osiglitazone and Bexarotene in The Treatment of Cutaneous T-Cell Lymphoma</td>
<td>83</td>
</tr>
<tr>
<td>Autism: Early Report Of Social Behavior Predicts Language Development In Younger Siblings</td>
<td>84</td>
</tr>
<tr>
<td>Digital Recording And Analysis of Chest Sounds: Pilot Study</td>
<td>85</td>
</tr>
</tbody>
</table>
Message from Steven G. Gabbe, MD
Dean, Vanderbilt University School of Medicine

The Vanderbilt University School of Medicine is firmly committed to training future leaders and scholars in medicine. This includes the ability to recognize and understand the various challenges facing medicine as well as the vision and skill to address these challenges. That’s why we’ve created the Emphasis Program - an opportunity for our students to acquire specialized knowledge and experience in a focused area of their choosing.

The Emphasis Program is a unique mode of self-directed study which takes place during the first two years of medical school. We match the students’ areas of interest with those of committed faculty mentors, providing them the opportunity to draw from seasoned professionals. Students cultivate knowledge and skill through these mentorship experiences, as well as hands-on research and study in desired areas of focus.

There are nine Emphasis areas in which students can choose projects: Biomedical Informatics, Patient-Oriented Research, Laboratory-Based Biomedical Research, Health Research and Management, Law, Community Health Initiatives and Health Outreach, International Health, Medical Humanities, and Education. Students choose their areas, mentors and projects during the fall semester of first year, then use the spring semester to acquire general knowledge and skills within their Emphasis area. During this semester, they also work with mentors to design their studies. All students devote eight weeks to their projects during the summer between first and second year, supported by an Emphasis stipend. Projects are completed during the second year and, in the spring students present their work either as posters or oral presentations at our Annual Emphasis Forum.

In this publication, you will find abstracts of all of the projects carried out by the Class of 2008, the first class to complete the Emphasis Program. The broad range of projects reflects the broad range of interests our students bring with them to medical school. We are tremendously proud of their accomplishments, and hope that this experience has been a rewarding first step on the path to leadership and scholarship.

Each student has been able to work closely with a mentor for the duration of the program, spanning the first two years of medical school and including eight weeks during the intervening summer. As Director of the Emphasis Program, I want to express my thanks to those who so willingly accepted the responsibility of mentoring these students. The quality of the work reported in this volume is evidence of the effectiveness of this collaboration.

These 104 abstracts represent 13 oral presentations and 91 posters that were presented at the Emphasis Forum at Vanderbilt University from April 19th to 21st, 2006. Eighty-three of these abstracts represent the work of the first group of students who entered the Emphasis Program in the fall of 2004. Nine abstracts describe research performed by students in Vanderbilt’s Medical Scientist Training Program.

Consistent with the aims of the Emphasis Program, the topics covered in these abstracts are wide ranging. Students explored ethical issues and healthcare policy. They carried out complex, cutting-edge laboratory investigations and undertook innovative projects on healthcare delivery in developing countries and among the urban poor.

Many of these projects will be reported at scientific meetings and in peer-reviewed publications. Some students plan to continue work on their projects as they move into the next phase of their medical education. Others may hang their projects off to the next class entering the program. Regardless of the future direction these projects take, it is clear that the collaboration between students and mentors has provided significant benefit to students, faculty and the advancement of knowledge.

The Emphasis Program is the result of many years of discussion and planning. Once initiated, refinement has continued as we have learned from the experience of students and their mentors. However, if we are to judge from the work presented herein, the overarching goal of nurturing scholarship and leadership in our students has already been successful.

Message from Denis O’Day, MBBS
Director of the Emphasis Program

In devising the Emphasis Program, Vanderbilt University School of Medicine sought to channel the diverse skills and passions of our students into the pursuit of scholarship and leadership. Believing that this aim is best achieved in the context of a relationship with a mentor, we sought the assistance of faculty in many different disciplines across the medical school, the university, the community, the country and the globe. The response has been extraordinarily generous, both in terms of time and commitment. Each student has been able to work closely with a mentor for the duration of the program, spanning the first two years of medical school and including eight weeks during the intervening summer. As Director of the Emphasis Program, I want to express my thanks to those who so willingly accepted the responsibility of mentoring these students. The quality of the work reported in this volume is evidence of the effectiveness of this collaboration.

These 104 abstracts represent 13 oral presentations and 91 posters that were presented at the Emphasis Forum at Vanderbilt University from April 19th to 21st, 2006. Eighty-three of these abstracts represent the work of the first group of students who entered the Emphasis Program in the fall of 2004. Nine abstracts describe research performed by students in Vanderbilt’s Medical Scientist Training Program.

Consistent with the aims of the Emphasis Program, the topics covered in these abstracts are wide ranging. Students explored ethical issues and healthcare policy. They carried out complex, cutting-edge laboratory investigations and undertook innovative projects on healthcare delivery in developing countries and among the urban poor.

Many of these projects will be reported at scientific meetings and in peer-reviewed publications. Some students plan to continue work on their projects as they move into the next phase of their medical education. Others may hang their projects off to the next class entering the program. Regardless of the future direction these projects take, it is clear that the collaboration between students and mentors has provided significant benefit to students, faculty and the advancement of knowledge.

The Emphasis Program is the result of many years of discussion and planning. Once initiated, refinement has continued as we have learned from the experience of students and their mentors. However, if we are to judge from the work presented herein, the overarching goal of nurturing scholarship and leadership in our students has already been successful.

Kevin Johnson is Associate Professor and Vice Chair of Biomedical Informatics with a joint appointment in the Department of Pediatrics. He has been an active participant in the informatics efforts of many national organizations including the Institute of Medicine, the American Medical Informatics Association, the American Board of Pediatrics; the Medical Informatics Special Interest Group of the Ambulatory Pediatrics Association (chair); and the American Academy of Pediatrics’ Steering Committee on Clinical Information Technologies. His research areas are electronic prescription-writing systems development, computerized provider order entry (CPOE) processes and decision support during theEntry (CPOE) ordering process offers a powerful means of both improving patient safety and reducing health care costs. However, decision support is effective only if it successfully improves healthcare provider behavior. Consistently high rates of decision support overrides at the point of care indicate a need to determine why physicians ignore these messages.

Objectives: To assess decision support design and efficacy in CPOE systems in order to address the following issues:

1. What methods are used to prevent decision support? Are presentation approaches related to the message’s content?
2. How do physician response rates vary with decision support message types?

Vanderbilt University School of Medicine

Kevin Johnson
Associate Professor and Vice Chair of Biomedical Informatics

Background: The ability to present decision support during the Computerized Provider Order Entry (CPOE) ordering process offers a powerful means of both improving patient safety and reducing health care costs. However, decision support is effective only if it successfully improves healthcare provider behavior. Consistently high rates of decision support overrides at the point of care indicate a need to determine why physicians ignore these messages.

Objectives: To assess decision support design and efficacy in CPOE systems in order to address the following issues:

1. What methods are used to prevent decision support? Are presentation approaches related to the message’s content?
2. How do physician response rates vary with decision support message types?
Message from Steven G. Gabbe, MD
Dean, Vanderbilt University School of Medicine

The Vanderbilt University School of Medicine is firmly committed to training future leaders and scholars in medicine. This includes the ability to recognize and understand the various challenges facing medicine as well as the vision and skill to address these challenges. That’s why we’ve created the Emphasis Program—an opportunity for our students to acquire specialized knowledge and experience in a focused area of their choosing.

The Emphasis Program is a unique mode of self-directed study which takes place during the first two years of medical school. We match the students’ areas of interest with those of committed faculty mentors, providing them the opportunity to draw from seasoned professionals. Students cultivate knowledge and skill through these mentorship experiences, as well as hands-on research and study in desired areas of focus.

There are nine Emphasis areas in which students can choose projects: Biomedical Informatics, Patient-Oriented Research, Laboratory-Based Biomedical Research, Health Research and Management, Law, Community Health Initiatives and Health Outreach, International Health, Medical Humanities, and Education. Students choose their areas, mentors and projects during the fall semester of first year, then use the spring semester to acquire general knowledge and skills within their Emphasis area. During this semester, they also work with mentors to design their studies. All students devote eight weeks to their projects during the summer between first and second year, supported by an Emphasis stipend. Projects are completed during the second year and, in the spring students present their work either as posters or oral presentations at our Annual Emphasis Forum.

In this publication, you will find abstracts of all of the projects carried out by the Class of 2008, the first class to complete the Emphasis Program. The broad range of projects reflects the broad range of interests our students bring with them to medical school. We are tremendously proud of their accomplishments, and hope that this experience has been a rewarding first step on the path to leadership and scholarship.

Some students plan to continue their work on their projects as they move into the next phase of their medical education. Others may hand their projects off to the next class entering the program. Regardless of the future direction these projects take, it is clear that the collaboration between students and mentors has provided significant benefit to students, faculty and the advancement of knowledge.

The Emphasis Program is the result of many years of discussion and planning. Once initiated, refinement continues as we have learned from the experience of students and their mentors. However, if we are to judge from the work presented herein, the overarching goal of nurturing scholarship and leadership in our students has already been successful.

Biomedical Informatics

Biomedical Informatics is the scientific field that deals with the storage, retrieval and optimal use of biomedical information for problem solving and decision-making. Vanderbilt Biomedical Informatics features a state-of-the-art computer system in use by physicians throughout the Medical Center. Research is focused on all areas of healthcare ranging from computer programs that alert physicians about patient problems to tools that process radiologic images or assist basic scientists with bench research. Many of these projects will be reported at scientific meetings and in peer-reviewed publications. Some students plan to continue work on their projects as they move into the next phase of their medical education. Others may hand their projects off to the next class entering the program. Regardless of the future direction these projects take, it is clear that the collaboration between students and mentors has provided significant benefit to students, faculty and the advancement of knowledge.

Kevin Johnson
Associate Professor and Vice Chair of Biomedical Informatics with a joint appointment in the Department of Pediatrics. He has been an active participant in the informatics efforts of many national organizations including the Institute of Medicine, the American Medical Informatics Association, the American Board of Pediatrics; the Medical Informatics Special Interest Group of the Ambulatory Pediatrics Association (chair); and the American Academy of Pediatrics’ Steering Committee on Clinical Information Technologies. His research areas are electronic prescription-writing systems development; the use of advanced computer technologies in medicine; including the Worldwide Web, personal digital assistants, and pen-based computers; and the development of computer-based documentation systems for the point of care.

“it has been very exciting to observe students as they learn about the field of biomedical informatics. one student, who was concerned about the impact of technology on learning, is in the midst of writing up some very intriguing results. we have also had students with significant technical backgrounds who have made landmark contributions to the field. the emphasis program is allowing students to exchange knowledge among themselves, our faculty, and our graduate students, in a way that will sharpen the skills of all three groups.”

Designing Decision Support Delivery For CPOE Systems

Sutin Chen
Background: The ability to present decision support during the Computerized Provider Order Entry (CPOE) ordering process offers a powerful means of both improving patient safety and reducing health care costs. However, decision support is effective only if it successfully improves healthcare provider behavior. Consistently high rates of decision support overrides at the point of care indicate a need to determine why physicians ignore these messages.

Objectives: To assess decision support design and efficacy in CPOE systems in order to address the following issues:

1. What methods are used to present decision support? Are presentation approaches related to the message’s content?
2. How do physician response rates vary with decision support message type?
Vanderbilt University Medical Center suggests that healthcare provider response rates may be related to the clinical nature of the decision support presented. Further research is needed to qualify and quantify the factors affecting response rates in decision support CPOE systems.

The Epidemiology of Medication Prescribing Errors in the Emergency Department

Gerard Jenkins

Medication errors are a major concern in the Emergency Department (ED). We examined the epidemiology of medication prescribing errors among consecutive adult ED patients during two 10-day periods (period 1: June 2, 2003 to June 30, 2003; period 2: January 26, 2004 to February 4, 2004). Chart retrieval rate was 97.2% after 3 attempts. Following established error classification methodology\(^1\) a clinical pharmacist categorized medication errors into potential adverse drug events (pADE), medication prescribing errors (MPE), and rule violations (RV). Multiple MPEs and RVs within an order were counted separately allowing for more than one MPE or RV per order.

Results: We found that 479 patients had no medication orders and 1,303 had 3,393 orders. Per 100 orders there were 3.7 potential adverse drug errors, 337.1 medication prescribing errors, and 24.2 rule violations.

Introduction: The Institute of Medicine report “To Err is Human: Building a Safer Health System” stated that the Emergency Department (ED) setting accounts for a large number of medical errors. The ED is vulnerable to shortage, and scarcity of hospital beds further intensify the high volume of information exchange in a dynamic, high stress setting that is characterized by frequent handovers, multi-tasking, and frequent interruptions.

The implementation of computerized physician order entry (CPOE) has shown potential to reduce medication errors. In the ED, however, there is limited information about the epidemiology of medication errors prior to implementing CPOE. The goal of the study was to examine the epidemiology of medication prescribing errors in the adult ED prior to implementing CPOE.

Materials and Methods: The medication orders for all consecutive adult ED patients were obtained from the medical chart during two 10-day periods (period 1: June 2, 2003 to June 30, 2003; period 2: January 26, 2004 to February 4, 2004). Chart retrieval rate was 97.2% after 3 attempts. Following established error classification methodology\(^1\) a clinical pharmacist categorized medication errors into potential adverse drug events (pADE), medication prescribing errors (MPE), and rule violations (RV). Multiple MPEs and RVs within an order were counted separately allowing for more than one MPE or RV per order.

Results: We found that 479 patients had no medication orders. The 3,393 orders (range: 1–12 orders) from 1,380 patients resulted in a total of 125 pADEs (3.7/100 orders), 11,439 MPEs (337.1/100 orders), and 820 RVs (24.1/100 orders). The table below displays medication prescribing errors for the two study periods. Allergies to medications had the highest rate of pADEs (3.0/100 orders), missing information (e.g., date/time or indication), was the most frequent MPE (210.8/100 orders), and incorrect abbreviations were the most frequent RV (23.8/100 orders).

Discussion: Compared to a study in the pediatric intensive care unit of the same institution, the ED had 1.5 times more pADEs, 10 times more MPEs, and 3.5 times more RVs. The number of medication prescribing errors in the adult ED during two different study periods was high.

<p>| Table: Overall Medication Analysis in the adult ED |
|-------------------|-------------------|-------------------|-------------------|</p>
<table>
<thead>
<tr>
<th>Period 1 (n=1,678)</th>
<th>Period 2 (n=1,715)</th>
<th>Period 1 (n=1,678)</th>
<th>Period 2 (n=1,715)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number</td>
<td>Total Number</td>
<td>Number per 100 orders</td>
<td>Number per 100 orders</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>pADE</td>
<td>57</td>
<td>3.40</td>
<td>68</td>
</tr>
<tr>
<td>Duplicate therapy</td>
<td>3</td>
<td>0.18</td>
<td>5</td>
</tr>
<tr>
<td>Inappropriate dose</td>
<td>7</td>
<td>0.42</td>
<td>1</td>
</tr>
<tr>
<td>Inappropriate interval</td>
<td>1</td>
<td>0.06</td>
<td>0</td>
</tr>
<tr>
<td>Inappropriate route</td>
<td>1</td>
<td>0.06</td>
<td>3</td>
</tr>
<tr>
<td>Wrong drug</td>
<td>1</td>
<td>0.06</td>
<td>0</td>
</tr>
<tr>
<td>Wrong unit</td>
<td>1</td>
<td>0.06</td>
<td>0</td>
</tr>
<tr>
<td>Drug interaction</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>Allergy to medicine</td>
<td>43</td>
<td>2.56</td>
<td>59</td>
</tr>
</tbody>
</table>

MPE

<table>
<thead>
<tr>
<th>Total Number</th>
<th>Total Number</th>
<th>Number per 100 orders</th>
<th>Number per 100 orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing information</td>
<td>3670</td>
<td>218.70</td>
<td>3483</td>
</tr>
<tr>
<td>No weight</td>
<td>1671</td>
<td>99.60</td>
<td>1640</td>
</tr>
<tr>
<td>Illegible</td>
<td>491</td>
<td>29.30</td>
<td>484</td>
</tr>
<tr>
<td>RV</td>
<td>430</td>
<td>25.10</td>
<td>387</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>421</td>
<td>25.10</td>
<td>387</td>
</tr>
<tr>
<td>Trailing zero</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>No leading zero</td>
<td>9</td>
<td>0.50</td>
<td>3</td>
</tr>
</tbody>
</table>

References:

Acknowledgments:
Co-authors: Philip E. Johnston, PharmD, Neal R. Parel, MD, MPH, Ian Jones, MD, Dominik Avrosky, MD, PhD, all of Vanderbilt University Medical Center. The author was supported by a NLM Training Grant (T15 LM 007450-03).

Real-Time Monitoring of Provider Order Entry Data for Research and Quality Improvement

Benjamin P. Rosenbaum

Background: Care Provider Order Entry (CPOE) systems traditionally store patient data in a relational database for subsequent analysis. However, more immediate analysis of these data can support clinical research and quality improvement (e.g., determining eligibility for research protocols, and monitoring “isolation” orders to assist with infection control). Several years ago, Vanderbilt Biomedical Informatics faculty created a tool that could analyze inpatient orders in real time (within minutes of order generation). A Web-based interface allowed end-users to review reports of orders matching pre-specified criteria. Though used, the tool was inflexible. Users could not create their own queries, only information within a single order could be analyzed, and only orders generated during the past five days could be reviewed.

Objectives: The authors created a “second generation” CPOE tool to assist end-users with building, storing, and viewing queries that could involve multiple orders and arbitrarily long time intervals. Constraints involved providing querying capa-
3. How does the choice of delivery method compare to the clinical significance message in effecting physician response rates to decision support messages?

Materials and Methods: We conducted a two-part study. The first portion consisted of a literature review to characterize different forms of decision support according to a schema detailing:
1. the types of knowledge displayed and
2. decision support presentation methods. We then examined CPOE log files recording past user sessions. From these logs, we assessed user response rates to a selected set of decision support message types.

Results: A literature review examining decision support methods in CPOE systems indicated the following trends:
1. highly intrusive methods, such as intervention windows and pop-up windows, are widely used in delivering decision support,
2. decision support methods are designed to minimize user work: these messages are not only informational, but also allow the user to continue, change or cancel their action from that point in the CPOE application program.

The effectiveness of formulary information decision support messages was high regardless of whether the messages were presented at high or low intrusiveness levels. In contrast, drug-allergy interaction messages had high override rates.

Conclusions: Analysis of the WizOrder CPOE system at Vanderbilt University Medical Center suggests that healthcare provider response rates may be related to the clinical nature of the decision support presented. Further research is needed to quantify and quantify the factors affecting response rates in decision support CPOE systems.

The Epidemiology of Medication Prescribing Errors in the Emergency Department

Gerard Jenkins

Medication errors are a major concern in the Emergency Department (ED). We examined the epidemiology of medication prescribing errors among consecutive adult ED patients during two 10-day periods (period 1: June 2, 2003 to June 30, 2003; period 2: January 26, 2004 to February 4, 2004). Chart retrieval rate was 97.2% after 3 attempts. Following established error classification methodology, a clinical pharmacist categorized medication errors into potential adverse drug events (pADE), medication prescribing errors (MPE), and rule violations (RV). Multiple MPEs and RVs within an order were counted separately allowing for more than one MPE or RV per order.

Results: We found that 479 patients had no medication orders and 1,303 had 3,393 orders. Per 100 orders there were 3.7 potential adverse drug errors, 337.1 medication prescribing errors, and 24.2 rule violations.

Introduction: The Institute of Medicine report “To Err is Human: Building a Safer Health System” stated that the Emergency Department (ED) setting accounts for a large number of medical errors. The ED is vulnerable to medication errors due to clinicians providing episodic care to patients in emergent or urgent situations. Overcrowding episodes, nurse shortage, and scarcity of hospital beds further intensify the high volume of information exchange in a dynamic, high stress setting that is characterized by frequent handovers, multi-tasking, and frequent interruptions.

The implementation of computerized physician order entry (CPOE) has shown potential to reduce medication errors. In the ED, however, there is limited information about the epidemiology of medication errors prior to implementing CPOE. The goal of the study was to examine the epidemiology of medication prescribing errors in the adult ED prior to implementing CPOE.

Materials and Methods: The medication orders for all consecutive adult ED patients were obtained from the medical chart during two 10-day periods (period 1: June 2, 2003 to June 30, 2003; period 2: January 26, 2004 to February 4, 2004). Chart retrieval rate was 97.2% after 3 attempts. Following established error classification methodology, a clinical pharmacist categorized medication errors into potential adverse drug events (pADE), medication prescribing errors (MPE), and rule violations (RV). Multiple MPEs and RVs within an order were counted separately allowing for more than one MPE or RV per order.

Results: We found that 479 patients had no medication orders. The 3,393 orders (range: 1-12 orders) from 1,380 patients resulted in a total of 125 pADEs (3.7/100 orders), 11,439 MPEs (337.1/100 orders), and 820 RVs (24.1/100 orders). The table below displays medication prescribing errors for the two study periods. Allergies to medications had the highest rate of pADEs (3.0/100 orders), missing information (e.g., date/time or interval) was the most frequent MPE (210.8/100 orders), and incorrect abbreviations were the most frequent RV (23.8/100 orders).

Discussion: Compared to a study in the pediatric intensive care unit of the same institution,2 the ED had 1.5 times more pADEs, 10 times more MPEs, and 3.5 times more RVs. The number of medication prescribing errors in the adult ED during two different study periods was high.

Table: Overall Medication Analysis in the adult ED

<table>
<thead>
<tr>
<th></th>
<th>Period 1 (n=1,678)</th>
<th>Period 2 (n=1,715)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pADE</td>
<td>3.40</td>
<td>68.00</td>
</tr>
<tr>
<td>Duplicate therapy</td>
<td>0.18</td>
<td>0.29</td>
</tr>
<tr>
<td>Inappropriate dose</td>
<td>0.42</td>
<td>0.06</td>
</tr>
<tr>
<td>Inappropriate interval</td>
<td>0.06</td>
<td>0.00</td>
</tr>
<tr>
<td>Inappropriate route</td>
<td>0.06</td>
<td>0.17</td>
</tr>
<tr>
<td>Wrong drug</td>
<td>0.06</td>
<td>0.00</td>
</tr>
<tr>
<td>Wrong unit</td>
<td>0.06</td>
<td>0.00</td>
</tr>
<tr>
<td>Drug interaction</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Allergy to medication</td>
<td>43.00</td>
<td>3.44</td>
</tr>
<tr>
<td>RV</td>
<td>25.60</td>
<td>32.20</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>25.10</td>
<td>22.60</td>
</tr>
<tr>
<td>Trailing zero</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>No leading zero</td>
<td>0.50</td>
<td>0.20</td>
</tr>
</tbody>
</table>

References:

Acknowledgments: Co-authors: Philip E. Johnston, PharmD, Neal R. Parel, MD, MPH, Ian Jones, MD, Dominik Aronsky, MD, PhD, all of Vanderbilt University Medical Center. The author was supported by a NLM Training Grant (T15 LM 007450-03).

Background: Care Provider Order Entry (CPOE) systems traditionally store patient data in a relational database for subsequent analysis. However, more immediate analysis of these data can support clinical research and quality improvement (e.g. determining eligibility for research protocols, and monitoring “isolation” orders to assist with infection control). Several years ago, Vanderbilt Biomedical Informatics faculty created a tool that could analyze inpatient orders in real time (within minutes of order generation). A Web-based interface allowed end-users to review reports of orders matching pre-specified criteria. Though used, the tool was inflexible. Users could not create their own queries, only information within a single order could be ana- lyzed, and only orders generated during the past five days could be reviewed.

Objectives: The authors created a “second generation” CPOE tool to assist end-users with building, storing, and viewing queries that could involve multiple orders and arbitrarily long time intervals. Constraints involved providing querying capa-
bilities to computer-naive end-users in a manner that does not impair the CPOE system performance.

Materials and Methods: Development included a Web-based interface created using the PHP programming language, and a MySQL relational database caching scheme. User-friendly explanations of fields within orders enhance users’ ability to construct queries.

Results: The second-generation tool has been beta-tested and is ready for full-scale implementation. It can search up to forty-four fields of the average 15,000 orders generated at Vanderbilt daily. It can provide reports with up to fifty fields. A web-based criterion specification facilitates quick entry of search and report specifications. The tool provides for “draft” query storage and checks user entries for completeness and accuracy. An authentication module ensures that no unauthorized users query inappropriate and inaccurate results.

Conclusion: The Vanderbilt WizOrder CPOE team recommends the tool is expected to be used by both the medical schools and nursing schools at Vanderbilt and has worked as a counselor, a community organizer, and a therapist with children. Ms. Clinton helped develop a system of alternative health services for seniors for the state of Georgia and has served as an advisor to former President Al Gore, the Tennessee Commission on Aging, the National Center for Children in Poverty at Columbia University, the Appalachian Rural Research Initiative of the National Science Foundation, and several private foundations.

Acknowledgements: Co-author: Randolph A. Miller, MD Department of Biomedical Informatics, Vanderbilt University. Part of Mr. Risenhoover’s work was supported by NLM grant 5T15LM007450-04 and by the Vanderbilt University School of Medicine Emphasis Program. Valuable assistance was provided by members of the Vanderbilt WizOrder CPOE team.

Community Health Initiatives and Health Outreach

Community Health Initiatives and Health Outreach embraces health issues that disproportionately affect specific populations, especially but not exclusively underserved populations of all ages. Projects and study in this area link academic medical education with community needs.

Student projects address one of the following six targeted areas of study:

1. Health risks/diseases - entities that disproportionately affect underserved populations.
2. Obstacles to health and healthcare for the underserved.
3. Socio-cultural, historical, and medical aspects of caring for an underserved population.
4. The principles, approaches and skills needed by successful medical provider in an underserved community.
5. Skills and strategies that motivate patients to practice positive health behaviors.
6. Diagnosis of healthcare needs of a community and development of plans to meet those needs.

Barbara Clinton is Director of the Center for Health Services at Vanderbilt University. Ms. Clinton is an Assistant Professor in both the medical schools and nursing schools at Vanderbilt and has worked as a counselor, a community organizer, and a therapist with children. Ms. Clinton helped develop a system of alternative health services for seniors for the state of Georgia and has served as an advisor to former Vice President Al Gore, the Tennessee Commission on Aging, the National Center for Children in Poverty at Columbia University, the Appalachian Rural Research Initiative of the National Science Foundation, and several private foundations.

“The students who selected Community Health were, not surprisingly, advocates by nature. They demanded the support of the school in full measure, so that community people should not be left behind in the excitement over bench research or more glamorous emphasis areas! This first group of students in the Community Health Emphasis area was also brilliant, energetic, and helpful to each other every step of the way. It was pure pleasure to work with them and to share in their pride as their objectives were met, their papers were accepted for publication, they achieved funding for their community projects, and in some cases, became awarded winners for service to the community.”

Perinatal Care: A Woman’s Perspective

Elizabeth Blecker

Background/Problem: In Nashville, Tennessee the infant mortality rates among African-Americans are more than 2.5 times higher than White rates. This disparity has been linked to racial differences in the use and timing of perinatal care.

Objectives: Survey women in the community to gather information about the experiences, feelings, and challenges faced by women affected by the disparity in infant mortality. Using the surveys and follow-up focus groups, identify the reasons that women at high risk for poor birth outcomes do not fully utilize perinatal services at the Public Health Department or elsewhere in the community.

Materials and Methods: A 7-page multiple choice survey was created using information from previous studies and recommendations of experts in the field. It was administered at the Vanderbilt Obstetrics Clinic and the Public Health WIC offices to women over 18 years old that had children under 5 years. The survey asked questions about the experiences of the women in their most recent pregnancy. Questions addressing stress, health, knowledge of available health services, and social support during the pregnancy were included in the survey. After completing the survey, the participants had the opportunity to volunteer to be participants in the upcoming focus groups. The focus groups are planned for the near future.

Results: Surveys from 71 African-American women and 54 Caucasian women were complete and considered for analysis. The average age was 25.92 (Range: 18-41 yrs). 75% of the women had started their prenatal care in the first trimester during their most recent pregnancy. 9% of African-American women did not start their prenatal care until their third trimester, compared to 2% of Caucasian women. 19% of the African-American women had babies that were LBW or VLBW, and 2% of Caucasian women had LBW or VLBW babies. Fewer African-American women than Caucasian women indicated that family members or friends were sources of support. Fewer (10%) African-American women smoked during their pregnancy than Caucasian women (34%).

The two groups of women were similar in the percentage that took multi-vitamins during their pregnancy. Of African-American women, 33% responded “Not Sure”, “Probably Not”, or “Definitely Not” when asked whether the women in their social group use prenatal care. In contrast, 12% of White women answered in these categories (All “Not Sure”). When asked about the

women in their family, 18% of African-American and 8% of White women responded in these categories.

Conclusions: A more in-depth analysis of the data is ongoing. Those factors which show a significant difference between the races will be analyzed in a focused analysis. Furthermore, those factors which pertain to specific subsets of the WIC population will be identified. The significant differences in the prenatal health actions of black and white women will be correlated with the responses to questions concerning knowledge, support, and attitudes towards preconception and prenatal health.

After the analysis is completed, further studies will be needed to explore the significant factors identified in this study. A long-term study as well as programs targeting these factors will be the preliminary steps towards decreasing the disparity in prenatal care and infant mortality.


Acknowledgements: Co-authors: Kimberle Wyder-Ebrige, MD, Theresa Staut, MS, Patricia Temple, MD, MPH, Kelley Bonner, MD, MPH and Connie Gravois, MD, all of Vanderbilt University Medical Center.
The Implementation of a New SPECs Model: A Community-Based Trial

Sara M. Horvitz

Background: The vast majority of money spent on health and human services is spent on reactive and individually based programming, when prevention and community based change methods can be very effective. The “New SPECs” model conceived by Prilleltensky offers an innovative approach for organizations to transform their work to focus on strengths-based, empowering, preventive, and community centered approaches.

Objectives: To implement and evaluate a community outreach program under the principles of the New SPECs model.

Materials and Methods: This community outreach program was conceived, planned, and implemented by staff from The United Neighborhood Health Services (UNHS) and action-researchers from the New SPECs team. Based at UNHS’s Southside Clinic in Nashville, the programmers targeted the issues of teen pregnancy and infant-mortality and chose to work with a population of children ages 11 to 14 at a local recreation center over the summer. The goals of the program were to provide positive activities for teens and change their perceptions and norms through education. The summer program was to combine art activities aspects of sex education and community awareness lessons. The program ran for ten weeks every Tuesday and Wednesday morning at the Napier Community Center and had participants ranging in age from 9 to 16 years. Attendance to the program varied from 0 to 30 participants. At the end of the summer, in depth interviews with seven program facilitators and planners were conducted to obtain a general sense the perceptions and feelings about the program.

Results: Although there were many barriers to implementation of the project as planned, staff felt that they formed some connection with the children and helped initiate changes in the children’s lives. However, they reported that the links to the SPEC philosophy and the objectives of the project were unclear.

Conclusions: To plan and execute a project guided by the principles of the New SPECs model, health and human services organizations must complete transform from a reactive and individual focused approach. The process of education of staff members in a new paradigm for their work may be difficult and requires time and patience. There are many barriers to implementing a community based project and working more on an organizational level must precede this step. Defining clear objectives and devising appropriate methods are crucial to creating an outreach program that has the potential to impact health and well-being on a community level.

Acknowledgements: I would like to thank Isaac Prilleltensky and Barbara Clinton for their guidance and support, as well as the UNHS team for being open to new possibilities.
Conclusions: The second-generation tool has been beta-tested and is ready for full-scale implementation. It can search up to forty-four fields of the average 15,000 orders generated at Vanderbilt daily. It can provide reports with up to fifty fields. Web-based criterion specification facilitates quick entry of search and query inappropriate module ensures that no unauthorized users query inappropriate information. The system also blocks inefficient queries that consume excessive CPU cycles.

Acknowledgements: Co-author: Randolph A. Miller, MD Department of Biomedical Informatics, Vanderbilt University. Part of Mr. Rosenbush’s work was supported by NLM grant 5 TL1 LM007450-04 and by the Vanderbilt University School of Medicine Emphasis Program. Valuable assistance was provided by members of the Vanderbilt WinOrder CPOE team.

Barbara Clinton

Perinatal Care: A Woman’s Perspective

Elizabeth Blecker

Background/Problem: In Nashville, Tennessee the infant mortality rates among African-Americans are more than 2.5 times higher than White rates. This disparity has been linked to racial differences in the use and timing of perinatal care.

Objectives: Survey women in the community to gather information about the experiences, feelings, and challenges faced by women affected by the disparity in infant mortality. Using the surveys and follow-up focus groups, identify the reasons that women at high risk for poor birth outcomes do not fully utilize perinatal services at the Public Health Department or elsewhere in the community.

Materials and Methods: A 7-page multiple choice survey was created using information from previous studies and recommendations of experts in the field. It was administered at the Vanderbilt Obstetrics Clinic and the Public Health WIC offices to women over 18 years old that had children under 5 years. The survey asked questions about the experiences of the women in their most recent pregnancy. Questions addressing stress, health, knowledge of available health services, and social support during the pregnancy were included in the survey. A total of 130 women were consented and completed the survey. After completing the survey, the participants had the opportunity to volunteer to be participants in the upcoming focus groups. The focus groups are planned for the near future.

Results: Surveys from 71 African-American women and 54 Caucasian women were complete and considered for analysis. The average age was 25.92 (Range: 18-41 y). 75% of the women had started their perinatal care in the first trimester during their most recent pregnancy. 9% of African-American women did not start their prenatal care until their third trimester, compared to 2% of Caucasian women. 19% of the African-American women had babies that were LBW or VLBW, and 2% of Caucasian women had LBW or VLBW babies. Fewer African-American women than Caucasian women indicated that family members or friends were sources of support. Fewer (10%) African-American women smoked during their pregnancy than Caucasian women (34%).

The two groups of women were similar in the percentage that took multi-vitamins during their pregnancy. Of African-American women, 33% responded “Not Sure”, “Probably Not”, or “Definitely Not” when asked whether the women in their social group use prenatal care. In contrast, 12% of White women answered in these categories (All “Not Sure”). When asked about the women in their family, 18% of African-American and 8% of White women responded in these categories.

Conclusions: A more in-depth analysis of the data is ongoing. Those factors which show a significant difference between the races will undergo a focused analysis. Furthermore, those factors which pertain to specific subsets of the WIC population will be identified. The significant differences in the prenatal health actions of black and white women will be correlated with the responses to questions concerning knowledge, support, and attitudes towards preconception and prenatal health.

After the analysis is completed, further studies will be needed to explore the significant factors identified in this study. A long-term study as well as programs targeting these factors will be the preliminary steps towards decreasing the disparity in prenatal care and infant mortality.


Acknowledgements: Co-authors: Kimberly Wyder-Elbridge, MD, Theresa Satt, MS, Patricia Temple, MD, MPH, Kelley Bonner, MD, MPH and Connie Graves, MD, all of Vanderbilt University Medical Center.

Community Health Initiatives and Health Outreach

Community Health Initiatives and Health Outreach embraces health issues that disproportionately affect specific populations, especially but not exclusively underserved populations of all ages. Projects and study in this area link academic medical education with community needs.

Student projects address one of the following six targeted areas of study: 1. Health risks/diseases - entities that disproportionately affect underserved populations. 2. Obstacles to health and healthcare for the underserved. 3. Socio-cultural, historical and medical aspects of caring for an underserved population. 4. The principles, approaches and skills needed by successful medical provider in an underserved community. 5. Skills and strategies that motivate patients to practice positive health behaviors. 6. Diagnosis of healthcare needs of a community and development of plans to meet those needs.
Prescribing Practices and Continuity of Care for the Mentally Ill in the Davidson County Correctional Development Center

Heather Burks

Background: Nationwide, jails and prisons have become the primary providers of mental health care. The prevalence of mental illness in jails and prisons is two to four times that of the general population, and three times as many mentally ill persons are housed in jails and prisons as in the country’s mental hospitals. Many of these correctional facilities are not appropriately financed or staffed to adequately care for the high volume of mentally ill inmates, and so many are left without treatment in conditions that can sometimes exacerbate their symptoms. Constitutionally adequate mental health services have been defined by several important federal decisions. The Guidelines exist for the appropriate provision of mental health services in jails and prisons. In many instances, however, these guidelines are not met for a variety of reasons.

The Davidson County Correctional Development Center houses on any given day more mentally ill patients than Middle Tennessee Mental Health Institute, the largest inmate mental hospital in Davidson County. During the month of July 2005, approximately 45% of the female inmates were identified as having a mental illness of some kind, and many of these were taking psychiatric medication.

Jail inmates who are also mental health patients often move rapidly between correctional, institutional, and community mental health facilities. This underserved population experiences drastic discontinuities in care as a result of their situation, and jail prescribing practices may be contributing to the problem. The formulary used by the private health care provider, Prison Health Services, includes primarily inexpensive, older, typical antipsychotic medications. The community mental health care providers in the area tend to prescribe a wider range of medication, and are more likely to use an atypical antipsychotic, which may be associated with fewer unwanted side effects such as tardive dyskinesia.

Objectives
1. Among inmates who were previously diagnosed with schizophrenia or schizoaffective disorder, describe the incidence of those who are prescribed a different medication in jail than they were previously using through another mental health provider.
2. Use the Global Assessment of Functioning (GAF) to determine how many of those whose medication is different are functioning less well on their jail medication.

Materials and Methods: Potential study subjects were identified among inmates in with the Correctional Development Center, Female (CDCF) with the assistance of the Davidson County Sheriff’s Office. Criteria for inclusion in the study were subjects who were: 1) previously diagnosed with schizophrenia or schizoaffective disorder; 2) prescribed a psychotropic medication in CDCF at least two weeks prior; and 3) cognitively capable of consenting to participate. Potential subjects were excluded who: 1) had not yet seen the jail physician; 2) were not cognitively capable of understanding the purpose of the study and their role in it; and 3) had not been prescribed any psychiatric medications before their current incarceration.

Subjects were consented by the medical student interviewer. In-depth interviews were conducted with study participants, and additional information was obtained from their jail medical records and, when available, medical records from outside mental health care providers.

For each subject, her cognitive, social, and medical functioning was determined for two different time periods. The first time period was her time in jail while on jail medication, and the second was a previous period when, according to her report, she was regularly taking a medication—through a different mental health provider—which she felt worked well for her. For each of these periods, a GAF number was assigned. The difference between these two numbers was determined for each subject, and used to determine whether her functioning improved or declined in jail compared to before.

Results: Of ten subjects interviewed, all were placed on a different medication in jail than what they claimed worked the best for them in the past. Seven experienced a decrease in functioning on their jail medication as compared to their previous medication, one experienced an increase in functioning, and two experienced no change. The average change in function in jail was a drop of 7.1 points on the GAF scale. There is some evidence that this is a nonzero difference (P = 0.068, Wilcoxon signed-rank test).

Conclusions: The results suggest that in general, the practice of using cheaper, older, typical antipsychotics on the formulary has the effect of interrupting the continuity of care for inmates who are already established mental health patients, since all interviewed inmates experienced a change in medication upon incarceration. The average drop in GAF suggests that for most patients, this change in medication hinders their ability to adequately manage their mental illness while in jail. This is especially important to note considering the prevalence of incarceration among the nation’s mentally ill population, and the ever increasing role that correctional facilities are being required to play in the care of this population.

The major limitation of this study is the lack of a comparison group whose medication was kept the same upon incarceration. This would help differentiate the effect of being in jail from the effect of the medication change on the GAF score.

Acknowledgements: Arnold P. Gold Foundation for their generous financial support, Jeff Blum, MD, MS, Davidson County Sheriff’s Office Mental Health Coordinator, Peggy Frick, PhD, Annice Livingston-Garrett, LCSW and mentor, William Breun, MD.

Vacunas Pediatricas: Identifying Barriers to Pediatric Vaccinations in a Recently Established Hispanic Population

Sarah Greene

Background: The face of the Nashville Metro Area minority population is changing rapidly. The Hispanic population is estimated to grow 45% by 2010 based on numbers from the US Census Bureau. Due to the recent, rapid influx of Hispanics into this area, statistics regarding their health are few and often statistically insignificant. Therefore, current research efforts must be based on the needs expressed from within the community. Last spring, Metro Public Health voiced concern about the vaccination rates among Hispanic children. They had noticed a large number of Hispanic students showing up to school unimmunized. Public Health asked me to perform an assessment of the barriers preventing the Hispanic community from obtaining pediatric vaccinations.

Methods: Anonymous questionnaires were administered to 62 Hispanic mothers at the Woodbine Public Health Clinic and other sites within the Hispanic Community.

Results: The questionnaire contained 39 questions addressing the mothers’ knowledge and beliefs about pediatric vaccinations, certain demographic information and issues regarding healthcare in general (e.g., Do you feel safe going to the doctor? These responses are still being analyzed. Preliminary data is available on the final, open ended question, “What has been the biggest problem that you have had getting vaccinations for your children?” Of the 26 mothers who responded to this question, 6 mothers mentioned insurance in their response. Two mothers mentioned racist public health workers. Language barriers were cited by two mothers. For two mothers, transportation was a barrier, while two mentioned the difficulty in scheduling appointments. Others either stated they had not had a problem or mentioned logistical issues (paperwork, keeping track of vaccination schedules, finding clinics, etc.).

A preliminary meeting was held with the public health department to share the early analyses. Public Health Department staff was surprised by the findings. The Public Health Department, especially responses pertaining to insurance and racism. Since insurance plays no role in obtaining vaccinations, there is clearly a misconception in this community regarding the availability of vaccinations regardless of insured status. In addition, public health officials were
Prescribing Practices and Continuity of Care for the Mentally Ill in the Davidson County Correctional Development Center

Heather Burks

Background: Nationwide, jails and prisons have become the primary providers of mental health care. The prevalence of mental illness in jails and prisons is two to four times that of the general population, and three times as many mentally ill persons are housed in jails and prisons as in the country’s mental hospitals. Many of these correctional facilities are not appropriately financed or staffed to adequately care for the high volume of mentally ill inmates, and so many are left without treatment in conditions that can sometimes exacerbate their symptoms.

The Davidson County Correctional Development Center houses on any given day more mentally ill patients than Middle Tennessee Mental Health Institute, the largest inmate mental hospital in Davidson County. During the month of July 2005, approximately 45% of the female inmates were identified as having a mental illness of some kind, and many of these were taking psychiatric medication.

Jail inmates who are also mental health patients often move rapidly between correctional, institutional, and community mental health facilities. Thisunderserved population experiences drastic discontinuities in care as a result of their situation, and jail prescribing practices may be contributing to the problem. The formulary used by the private health care provider, Prison Health Services, includes primarily inexpensive, older, typical antipsychotic medications. The community mental health care providers in the area tend to prescribe a wider range of medication, and are more likely to use an atypical antipsychotic, which may be associated with fewer unwanted side effects such as tardive dyskinesia.

Objectives
1. Among inmates who were previously diagnosed with schizophrenia or schizoaffective disorder, describe the incidence of those who were prescribed a different medication in jail than they were previously using through another mental health provider.
2. Use the Global Assessment of Functioning (GAF) to determine how many of those whose medication is different are functioning worse on their jail medication.

Materials and Methods: Potential study subjects were identified among inmates in with the Correctional Development Center, Female (CDCF) with the assistance of the Davidson County Sheriff’s Office. Criteria for inclusion in the study were subjects who were: 1) previously diagnosed with schizophrenia or schizoaffective disorder; 2) prescribed a psychotropic medication in CDCF at least two weeks prior; and 3) cognitively capable of consenting to participate. Potential subjects were excluded who: 1) had not yet seen the jail psychiatrist; 2) were not cognitively capable of understanding the purpose of the study and their role in it; and 3) had not been prescribed any psychiatric medications before their current incarceration.

Subjects were consented by the medical student interviewer. In-depth interviews were conducted with study participants, and additional information was obtained from their jail medical records and, when available, medical records from outside mental health care providers.

For each subject, her cognitive, social, and medical functioning was determined for two different time periods. The first time period was her time in jail while on jail medication, and the second was a previous period when, according to her report, she was regularly taking a medication—through a different mental health provider—which she felt worked well for her. For each of these periods, a GAF number was assigned. The difference between these two numbers was determined for each subject, and used to determine whether her functioning improved or declined in jail compared to before.

Results:
10 of ten subjects interviewed, all were placed on a different medication in jail than what they claim worked the best for them in the past. Seven experienced a decrease in functioning on their jail medication as compared to their previous medication, one experienced an increase in functioning, and two experienced no change. The average change in function in jail was a drop of 7.1 points on the GAF scale. There is some evidence this is a new phenomenon (P = 0.068, Wilcoxon signed-rank test).

Conclusions: The results suggest that in general, the practice of using cheaper, older, typical antipsychotics on the formulary has the effect of interrupting the continuity of care for inmates who are already established mental health patients, since all interviewed inmates experienced a change in medication upon incarceration. The average drop in GAF suggests that for most inmates, this change in medication hinders their ability to adequately manage their mental illness while in jail. This is especially important to note considering the prevalence of incarceration among the nation’s mentally ill population, and the ever increasing role that correctional facilities are being required to play in the care of this population.

The major limitation of this study is the lack of a comparison group, whose medication was kept the same upon incarceration. This would help differentiate the effect of being in jail from the effect of the medication change on the GAF score.

Acknowledgements: Arnold P. Gold Foundation for their generous financial support, Jeff Blum, MD, DM, Davidson County Sheriff’s Office Mental Health Coordinator, Peggy Fred, PhD, Annie Livingston-Garrett, LCSW and mentor, William Bonsert, MD

Vacunas Pediátricas: Identifying Barriers to Pediatric Vaccinations in a Recently Established Hispanic Population

Sarah Greene

Background: The face of the Nashville Metro Area minority population is changing rapidly. The Hispanic population is estimated to grow 45% by 2010 based on numbers from the US Census Bureau. Due to the recent, rapid influx of Hispanics into this area, statistics regarding their health are few and often statistically insignificant. Therefore, current research efforts must be based on the needs expressed from within the community. Last spring, Metro Public Health voiced concern about the vaccination rates among Hispanic children. They had noticed a large number of Hispanic students showing up to schools unimmunized. Public Health asked me to perform an assessment of the barriers preventing the Hispanic community from obtaining pediatric vaccinations.

Methods: Anonymous questionnaires were administered to 62 Hispanic mothers at the Woodbine Public Health Clinic and other sites within the Hispanic Community.

Results: The questionnaire contained 39 questions addressing the mothers’ knowledge and beliefs about pediatric vaccinations, certain demographic information and questions regarding healthcare in general. (Do you feel safe going to the doctor?) These responses are still being analyzed. Preliminary data is available on the final, open ended question, “What has been the biggest problem that you have had getting vaccinations for your children?” Of the 26 mothers who responded to this question, 6 mothers mentioned insurance in their response. Two mothers mentioned racist public health workers. Language barriers were cited by two mothers. For two mothers transportation was a barrier, while two mentioned the difficulty in scheduling appointments. Others either stated they had not had a problem or mentioned logistical issues (paperwork, keeping track of vaccination schedules, finding clinics, etc.).

A preliminary meeting was held with the public health department to share the early analyses. Public Health Department staff was surprised by the responses to this question, especially responses pertaining to insurance and racism. Since insurance plays no role in obtaining vaccinations, there is clearly a misconception in this community regarding the availability of vaccinations regardless of insured status. In addition, public health officials were...
shocked that two mothers used the term “racist” to describe workers at their clinic, where most of the patient population is minority and a large percentage is Spanish-speaking. The Health Department is already dealing with this issue by increasing the number of Spanish-speaking employees at the clinic. With the final data, Public Health will be able to continue making changes to improve the access of Nashville’s Hispanic Children to vaccinations.

The Establishment of a Free Clinic in a Medically Underserved Community

Dana L. Guyer

Background: The medical needs of the residents of the East Nashville community have frequently been overlooked, despite the wealth of health care resources in Nashville. There are very few community clinics and no hospitals within the borders of the neighborhood. Many of the residents in this community live below the poverty line, and often medical care cannot be the primary concern. Moreover, the recent dis-enrollment from TennCare has intensified the burden of accessing affordable health care. A significant need for health education and prevention also exists, as the community has high rates of diabetes, heart disease, and low birth weight and infant mortality.

Objectives:
1. To establish a medical student-run clinic to serve the health care needs of the targeted community
2. To determine most effective methods of disseminating health information to an inner-city street population
3. To identify the health topics that patients need and demand

Materials and Methods: This summer, I worked to meet the stated objectives by conducting focus groups and in-depth interviews in the community where the clinic is located. I also completed a literature review and met with community groups, attended neighborhood meetings and met with many people in the community health and health education sector to learn from them about successful methods of health education that they have tried.

Results: The Shade Tree Family Clinic opened on October 1, 2005. The clinic has been well-received by the community and has become part of the health care safety net in the East Nashville community. The clinic has treated more than 330 patients since it began operations. Patients range in age from infancy to adulthood. The majority of the patients are African American (65%), there are also Caucasian patients (20%), and immigrants from Mexico, Somalia, and Ethiopia (15%).

The surveys and interviews revealed that the three most topics of greatest concern to residents were diabetes, heart disease including hypertension and hypercholesterolemia, and mother and child wellbeing. Interviewees expressed interest in receiving health information through four sources: written material, educational videos in the waiting room, direct instruction from providers, and targeted workshops. The clinic held its first specialty clinic on February 4, which screened more than 40 women for cervical and breast cancer.

Conclusions: The Shade Tree Family Clinic is steadily becoming an important resource for the East Nashville community. Many residents are growing comfortable with the clinic staff, and are eager to use its health care services. The clinic provides educational materials to its patients, and is recruiting participants for workshops.

Intervening on Behavioral Predictors of Substance Abuse in At-Risk Children

Kathryn L. Jongeward and Kirsten I. Gibbs

Background: Substance abusers often form insecure attachments with their children, placing them at high risk for subsequent development of substance abuse. Additional environmental stressors such as poverty, parental criminal activity and mental illness, and residence in a single-parent household confound the underlying biological risks in children of substance abusers (COSAs)
1. Furthermore, children exhibiting conduct disorder foundations experience underdeveloped social skills, attention deficits, aggressive behavior, and poor academic performance, amplifying their risk for future substance abuse
2. Consequently, current prevention programs focus on developing positive social skills in addition to influencing drug and alcohol knowledge and attitudes. To end the vicious cycle of intergenerational substance abuse, focus must be placed on helping COSAs develop the skills to become productive members of society as well as teaching their parents techniques for reinforcing their development.

Objectives: To identify modifiable risk behaviors and corresponding interventions for future drug abuse, to develop and implement a sustainable prevention program specific to the needs of COSAS, and to document results on a pilot basis.

Project Design: An 8-week multidimensional prevention program with 4 components - children’s lessons, mothers’ discussions, community outings, and a family literacy program - was piloted at a residential recovery center for addicted women and their children aged 0-10. For children ages 5-10, weekly 1-hour lessons taught life skills: self-esteem, decision-making, smoking, advertising, dealing with stress, social skills, communication, and assertiveness (Borlin’s Life Skills Training). Thirty-minute follow up discussions with the mothers supported maternal mastery of parenting techniques to foster development of healthy child behaviors and attitudes at home. Weekly community trips facilitated practice of parenting and life skills and aided in the repair of mother-child relationships. In the summer reading program, families read aloud their favorite books during Sunday book clubs. Mothers of infants and toddlers attended interactive lectures on managing aggression, maternal engagement, and infant development.

Results: To date, 12 of 13 participating mothers completed a final interview/program evaluation. Selected responses are highlighted below:

Curriculum Topics (12 families)
- All 8 social skills addressed were “very important” 9/12
- Children’s Lessons (4 families) Behavioral changes observed in child’s overall behavior, interactions with mom, & assertiveness 3/4
- Mother’s Discussions (12 families) All topics were “very helpful” 5/12
- Infant Lectures (9 families) All lectures were helpful 9/9
- Mothers able to apply the techniques discussed 9/9
- Community Trips (11 families) Most trips “very enjoyable” & “educational” 11/11
- Summer Reading (12 families) Families read “more books” than previously 12/12
- Mothers comfortable teaching child to read 10/12

Conclusions: This prevention program targeted risk behaviors in children of addicted mothers using a family-centered model to enhance social-mother-child relationships. In development, and literacy. COSAS were found to be a challenging population for targeting prevention programs, due to observed attention and cognitive deficits. Therefore, multidimensional programs such as this, which appropriately address the needs of this population, promise to provide greater benefit in halting intergenerational addiction. For sustained social and behavioral changes, this program should be expanded into a 12-month curriculum to be used by residential recovery centers for addicts and their children. Peer/interim/post-intervention ratings of social skills should be utilized to better quantify improvements in the social skills of COSAS.

References:

Acknowledgements:
Co-author: Barbara W Engelhardt, MD, Monroe Carell, Jr. Children’s Hospital at Vanderbilt University. We would like to thank Barbara Clinton and Barbie Chadwick from the Vanderbilt Center for Child Development for their leadership and support, Dr. Robin McWilliam at the Vanderbilt Center for Child Development for his expertise, and Dr. Joseph Webb for providing social skills assessment tools.
shocked that two mothers used the term “racist” to describe workers at their clinic, where most of the patient population is minority and a large percentage is Spanish-speak-

ing. The Public Health Department is already dealing with this issue by increasing the number of Spanish-
speaking employees at the clinic. With the influx of Pub-
lic Health will be able to continue making changes to improve the access of Nashville’s Hispanic Children to vaccinations.

The Establishment of a Free Clinic in a Medically Underserved Community

Dana L. Guyer

Background: The medical needs of the residents of the East Nashville community have frequently been overlooked, despite the wealth of health care resources in Nashville. There are very few community clinics and no hospitals within the bor-
ders of the neighborhood. Many of the residents in this community live below the poverty line, and often medical care cannot be the primary concern. Moreover, the recent dis-
engagement from TennCare has intensified the burden of accessing affordable health care. A significant need for health education and pre-
vention also exists, as the community has high rates of diabetes, heart disease, and low birth weight and infant mortality.

Objectives:
1. To establish a medical student-run clinic to serve the health care needs of the targeted community
2. To determine the most effective methods of disseminating health information to the inner-city street population
3. To identify the health topics that patients need and demand

Materials and Methods: This summer, I worked to meet the start-
ed objectives by conducting focus groups and in-depth interviews in the community where the clinic is located. I also completed a literature review and met with community groups, attended neighborhood meetings and met with many people in the community health and health education sector to learn from them about successful methods of health education that they have tried.

Results: The Shade Tree Family Clinic opened on October 1, 2005. The clinic has been well-received by the community and has become part of the health care safety net in the East Nashville community. The clinic is located in a building that has more than 330 patients since it began operations. Patients range in age from infancy to adult-
hood. The majority of the patients are African American (65%), there are also Caucasian patients (20%), and immigrants from Mexico, Somalia, and Ethiopia (15%).

The surveys and interviews revealed that the three most topics of greatest concern to residents were diabetes, heart disease including hyper-
tension and hypercholesterolemia, and mother and child wellbeing. Interviewees expressed interest in receiving health information through four sources: written mate-
rial, educational videos in the wait-
ing room, direct instruction from providers, and targeted workshops. The clinic held its first specialty clinic on February 4, which screened more than 40 women for cervical and breast cancer.

Conclusions: The Shade Tree Family Clinic is steadily becoming an important resource for the East Nashville community. Many resi-
dents are growing comfortable with the clinic staff, and are eager to use its health care services. The clinic provides educational materials to its patients, and is recruiting partici-
pants for workshops.

Intervening on Behavioral Predictors of Substance Abuse in At-Risk Children

Kathryn L. Jongeward and Kirsten L. Gibbs

Background: Substance abusers often form insecure attachments with their children, placing them at high risk for subsequent develop-
ment of substance abuse. Additional environmental stressors such as poverty, parental criminal activity and mental illness, and residence in a single-parent household confound the underlying biological risks in children of substance abusers (COSAs).

1. Furthermore, children exhibiting conduct disorders underdeveloped social skills, attention deficits, aggressive behavior, and poor academic per-
formance, amplifying their risk for future substance abuse
2. Consequently, current prevention programs focus on developing positive social skills in addition to influencing drug and alcohol knowledge and attitudes. To end the vicious cycle of intergenera-
tional substance abuse, focus must be placed on helping COSAs develop the skills to become productive members of society as well as teaching their parents techniques for reinforc-
ing their development.

Objectives: To identify modifiable risk behaviors and corresponding interventions for future drug abuse, to develop and implement a sustain-
able prevention program specific to the needs of COSAs, and to document results on a pilot basis.

Project Design: An 8-week multidimen-
sional prevention program with 4 components - children’s les-
sions, mother’s discussions, commu-

nity outings, and a family literacy program - was piloted at a residen-
tial recovery center for addicted women and their children 0-
10. For children ages 5–10, weekly 1-hour lessons taught life skills: self-
esteem, decision-making, smoking, advertising, dealing with stress, social skills, communication, and assertiveness (Botvin’s Life Skills Training). Thirty-minute follow up discussions with the mothers sup-
ported maternal mastery of parent-
ing techniques to foster development of healthy child behaviors and atti-
tudes at home. Weekly community trips facilitated practice of parenting and life skills and aided in the repair of mother-child relationships. In

the summer reading program, fami-
lies read aloud their favorite books during Sunday book clubs. Mothers of infants and toddlers attended interactive lectures on managing aggression, maternal engagement, and infant development.

Results: To date, 12 of 13 partici-
pating mothers completed a final interview/program evaluation. Selected responses are highlighted below:

Objectives: To identify modifiable risk behaviors and corresponding interventions for future drug abuse, to develop and implement a sustain-
able prevention program specific to the needs of COSAs, and to document results on a pilot basis.

Project Design: An 8-week multi-
dimensional prevention program with 4 components - children’s les-
sions, mother’s discussions, commu-

nity outings, and a family literacy program - was piloted at a residen-
tial recovery center for addicted women and their children 0-
10. For children ages 5–10, weekly 1-hour lessons taught life skills: self-
esteem, decision-making, smoking, advertising, dealing with stress, social skills, communication, and assertiveness (Botvin’s Life Skills Training). Thirty-minute follow up discussions with the mothers sup-
ported maternal mastery of parent-
ing techniques to foster development of healthy child behaviors and atti-
tudes at home. Weekly community trips facilitated practice of parenting and life skills and aided in the repair of mother-child relationships. In

the summer reading program, fami-
lies read aloud their favorite books during Sunday book clubs. Mothers of infants and toddlers attended interactive lectures on managing aggression, maternal engagement, and infant development.

Results: To date, 12 of 13 partici-
pating mothers completed a final interview/program evaluation. Selected responses are highlighted below:


Acknowledgements: Co-author: Barbara W Engelhardt, MD, Monse Carroll, Jr. Children’s Hospital at Vanderbilt University. We would like to thank Barbara Clinton and Barbara Chadwick from the Vanderbilt Center for Community Health for their leadership and sup-
port, Dr. Robin McWilliam at the Vanderbilt Center for Child Development for his expertise, and Dr. Joseph Hobley for providing social skills assessment tools.
Strategies to Improve Recruitment of Male Volunteers in Non-Profit Agencies

Leanne Kolnick

**Background:** An increase in requests for volunteer services compounded by waning volunteer numbers is a challenge to non-profit organizations. This study explores alternate volunteer sources and suggests methods for recruiting male volunteers.

**Objective:** To survey the perspectives and attitudes of people within the Austin community through small focus groups to develop effective volunteer recruitment programs.

To engage men into the program, as this non-profit organization was waning volunteer numbers in the gay community, in which they maintained a flexible schedule. They believed volunteerism was an opportunity to act as a role model as well as extend one’s personal boundaries. Religious men focused on the social aspect of volunteering. Business men desired to apply their skills, and along with the gay men placed emphasis on competent organizational leadership and existence of a tangible goal. Online corporate and religious organization endorsement was deemed important.

**Results:** The men preferred short-term projects based within the community, in which they maintained a flexible schedule. They believed volunteerism was an opportunity to act as a role model as well as extend one’s personal boundaries. Religious men focused on the social aspect of volunteering. Business men desired to apply their skills, and along with the gay men placed emphasis on competent organizational leadership and existence of a tangible goal. Online corporate and religious organization endorsement was deemed important.

**Conclusions:** Non-profit organizations can improve volunteer recruitment efforts by focusing on the following:

1. Clear messaging highlighting local service involvement.
2. Displaying competent leadership.
3. One hour information sessions for prospective volunteers.
4. Targeting corporations, college/high school students, and sports teams, and continuing to recruit from the religious community.
5. Online endorsement through corporate and religious organization websites.
6. Identifying a champion to serve as a spokesperson.
7. Short-term projects.
8. Emphasizing flexibility and friendship in volunteering.
9. Highlighting the benefits of volunteering on a team.

**Acknowledgements:**
Co-author: John Mulder, MD, Vanderbilt University Medical Center.

---

**Survey Evaluation of High School Sexual Health Education Content**

Yaa Kumah

**Background:** Currently almost 50% of high school teens have had sexual intercourse. The average age of first intercourse is about 16 years for males and 17 years for females. School systems are ideal forums to teach teens about sexual health since most students are enrolled at the time they initiate sexual activity. However, not much focus has been directed on learning what teens want to learn in order to make informed decisions about sex.

**Objectives:**

1. Determine past student satisfaction with their high school sexual health education curriculum;
2. Learn what sexual health topics young adults would like to learn about that are not currently being emphasized in high school curriculums;
3. Learn what contraception methods are most commonly taught in sexual health curricula.

**Materials and Methods:**

- A 22 question anonymous survey was administered to students in the Nashville State Community College psychology course. The survey contained:
  - Ten demographic questions
  - One question about the different contraception methods covered in class
  - Eleven questions about different sexual health topics that may have been covered in class: STDs testing/teen sex health laws/tactics to turn down sex/sexual rejection/risk of vaginal sex/risk of oral sex/risk of anal sex/talking to parents about sex/masturbation/homosexuality/ access to birth control

For each of the 11 sexual health topics students were asked:

- Were the topics covered in class? [YES/NO]
- How useful was the information presented in class? [5 point Likert]
- Did you want to learn about the topic? [YES/NO]

Data were extrapolated from 61 completed surveys.

**Results/Conclusions:** The highest ranking sexual health topic the past students indicated they wanted to learn about while they were teenagers was “how to get tested for sexually transmitted diseases” (STDs) and “laws about teenage sexual health” (examples: age of consent, access to birth control, access to abortion, etc.—both at 74% interest in the subject matter). Between those two topics, 69% of students were most interested in learning about how to get tested for sexually transmitted diseases in their sexual education class, while only 33% of students were presented with information about the laws of teenage sexual health. It is clear that there is a large gap in the desire to learn information about sexual health laws, and the information that is actually provided about this topic in schools.

Information given in sexual education about homosexuality ranked the least useful from 67% of students who were presented with information about it. While this can be a difficult topic to explore, educators should make efforts to find out what information about homosexuality teens want to know so they will be able to provide more useful information to them.

Finally, students receive the most exposure to condoms as a contraception method (90%). Emergency contraception, however, ranked very low with only 26% of students being presented with information. While it is very commendable that many students are being taught about condom use, it is also important that emergency contraception be included as adjunct to any discussion about condom use—it begs to be asked, “What do you do when the condom breaks?”

**References:**


**Acknowledgements:**

Co-author: S. Todd Callahan MD, MPH, Vanderbilt University Medical Center.

---

**Community Voices: A Faith-Based Initiative to Reduce African American Infant Mortality**

Connie A. Ritchey

**Background:** Currently in Nashville an African American infant is over 2 times more likely to die before its first birthday.

Studies of this problem have determined that the majority of infants die because of maternal health issues that are firmly in place before a woman becomes pregnant. To have a healthy pregnancy outcome, a woman’s health must be addressed prior to her pregnancy.

**Objectives:** To raise awareness and increase knowledge of infant mortality in the African American community of Nashville in order to decrease infant mortality.

**Materials and Methods:** The Community Voices program was focused on training Lay Health Advisors (LHAs) in partnership with Faith Based Institutions (FBIs). FBI and LHA recruitment were attempted through a variety of methods, including cold calls and literature distribution to churches, presentations at ministerial meetings and health fairs, and a Community Voices Summit. Two LHA trainings were held. Evaluation was by pre and post-testing and monthly LHA follow-up.

**Results:** 130 individuals were educated about African American infant mortality. 98.7% of 79 surveyed individuals indicated increased knowledge of infant mortality. Pre and post-testing during the most recent LHA training indicated an average increase in knowledge of 27.1% (p<.05).

**Conclusions:** Community Voices will be a critical component of the...
Strategies to Improve Recruitment of Male Volunteers in Non-Profit Agencies

Leanne Kolnick

Background: An increase in requests for volunteer services compounded by waning volunteer numbers is a challenge to non-profit organizations. This study explores alternate volunteer sources and suggests methods for recruiting male volunteers.

Objective: To survey the perspectives and attitudes of people within the Austin community through small focus groups to develop effective volunteer recruitment programs. To engage men into the program, as the lack of male volunteers in hospice work in general, and this non-profit organization specifically was strikingly apparent. The research questions addressed whether recruitment strategy assumptions were preventing ICA from tapping into other volunteer sources, and suggested differences that should be taken into account when recruiting males in different settings.

Materials and Methods: Focus groups were held with current volunteers to garner what they had gained from the volunteer experience. Four focus groups were held targeting men within the business community, religious organizations and the gay community.

Results: The men preferred short-term projects based within the community, in which they maintained a flexible schedule. They believed volunteerism was an opportunity to act as a role model as well as extend one's personal boundaries. Religious men focused on the social aspect of volunteering. Business men desired to apply their skills, and along with the gay men placed emphasis on competent organizational leadership and existence of a tangible goal. The research profit organization specifically was deemed important.

Conclusions: Non-profit organizations can improve volunteer recruitment efforts by focusing on the following:

1. Clear messaging highlighting local service involvement.
2. Displaying competent leadership.
3. One-hour information sessions for prospective volunteers.
4. Targeting corporations, college/high school students, and sports teams, and continuing to recruit from the religious community.
5. Online endorsement through corporate and religious organization websites.
6. Identifying a champion to serve as a spokesperson.
7. Short-term projects.
8. Emphasizing flexibility and friendship in volunteering.
9. Highlighting the benefits of volunteering on a team.

Acknowledgements:
Co-author: John Mulder, MD, Vanderbilt University Medical Center.

Survey Evaluation of High School Sexual Health Education Content
Yaa Kumah

Background: Currently almost 50% of high school teens have had sexual intercourse. The average age of first intercourse is about 16 years for males and 17 years for females. School systems are ideal forums to teach teens about sexual health since most students are enrolled at the time they initiate sexual activity. However, not much focus has been directed on learning what teens want to learn in order to make informed decisions about sex:

Objectives
The purposes of this project were to:
1. Determine past student satisfaction with their high school sexual health education curriculum;
2. Learn what sexual health topics young adults would like to learn about that are not currently being emphasized in high school curriculums; and
3. Learn what contraception methods are most commonly taught in sexual health curriculums.

Materials and Methods: A 22 question anonymous survey was administered to students in the Nashville State Community College psychology course. The survey contained:

- Ten demographic questions
- One question about the different contraception methods covered in class
- Eleven questions about different sexual health topics that may have been covered in class: STDs testing/teen sex health laws/tactics to turn down sex/sexual rejection/risk of vaginal sex/risk of oral sex/ risk of anal sex/talking to parents about sex/masturbation/homosexuality access to birth control

For each of the 11 sexual health topics students were asked:
- Was the topic covered in class? [YES/NO]
- How useful was the information presented in class? [5 point likert scale]
- Did you want to learn about the topic? [YES/NO]

Data were extrapolated from 61 completed surveys.

Results/Conclusions: The highest ranking sexual health topic the past students indicated they wanted to learn about while they were teenagers was "how to get tested for sexually transmitted diseases" (STDs) and "laws about teenage sexual health" (examples: age of consent, access to birth control, abortion, etc.)—both at 74% interest in the subject matter. Between those two topics, 69% of students were interested in learning about contraceptive methods, including emergency contraception. Finally, students receive the most information on contraception methods, who want to learn about the topic and how useful the information presented was.

References:

Acknowledgements:
Co-author: S. Todd Callahan MD, MPH, Vanderbilt University Medical Center.

Community Voices: A Faith-Based Initiative to Reduce African American Infant Mortality
Connie A. Ritchey

Background: Currently in Nashville an African American infant is over two times more likely to die before its first birthday. Studies of this problem have determined that the majority of infants die because of maternal health issues that are firmly in place before a woman becomes pregnant. To have a healthy pregnancy outcome, a woman’s health must be addressed prior to her pregnancy.

Objectives: To raise awareness and increase knowledge of infant mortality in the African American community of Nashville in order to decrease infant mortality.

Materials and Methods: The Community Voices program was focused on training Lay Health Advisors (LHAs) in partnership with Faith Based Institutions (FBIs). FBI and LHA recruitment were attempted through a variety of methods, including cold calls and literature distribution to churches, presentations at ministerial meetings and health fairs, and a Community Voices Summit. Two LHA trainings were held. Evaluation was by pre and post-testing and monthly LHA follow-up.

Results: 130 individuals were educated about African American infant mortality. 98.7% of 79 surveyed individuals indicated increased knowledge of infant mortality. Pre and post-testing during the most recent LHA training indicated an average increase in knowledge of 27.1% (t=7). Data collection from LHA follow-up is in progress.

Conclusions: Community Voices will be a critical component of the
overall effort to reduce infant morta-
ity in Nashville. The primary ob-
course, consistent with the litera-
ture, has been enlisting the support of FBIs. Plans for overcoming this challenge include city-wide cam-
paigns to raise awareness, a new youth-focused Community Voices and hiring a Community Voices specialist to engage FBIs more aggressively through funding secured via a March of Dimes grant.

Acknowledgements:
Co-author: Kimberly Wyche-
Etheridge, MD, Vanderbilt University
Medical Center. Thank you as well to Tina Leister, Carol Hopkins, and the Metro Public Health Department. Thank you to Barbara Clinton and Barbie Chadwick for all of their care and support.

Education

Emphasis experiences in the Education area are designed to introduce students to the theory and practice of learning and teaching in medicine. Students are provided an overview of current research describing how medical students, residents, practicing physicians and patients learn as well as information about effective teaching strategies. In addition, each student has the opportunity to develop a project in an area of interest. Projects can include research or curriculum development.

Educational experiences focus upon, but are not be limited to, addressing the following questions:
1. How can students develop skills to reflect on their own performance as part of a personal approach to lifelong learning and continuing professional development that can be used throughout their medical careers?
2. What teaching strategies help medical students, residents, practicing physicians, and patients learn?
3. How are research studies in medical education conducted and research findings interpreted?
4. How is curriculum developed and evaluated in medical school and residency settings?

Don Moore is Director, Division of Continuing Medical Education at Vanderbilt University School of Medicine. He has devoted a considerable amount of professional career examining, writing and speaking about continu-
ing medical education and a number of other related areas such as: prac-
tice-based CME, computerized order entry, electronic medical records, and evidence-based medi-
cine. His research interests also include the role of CME in physi-
cian change, office systems for CME, and the impact of CME on health care outcomes.

“Working with students in the Emphasis Program was one of the highlights of the past two years for me. It was an honor and privilege for me to watch and share in their excitement and satisfaction as they worked through and accomplished their projects. I am looking forward to working with the students who choose the Education area during this coming year.”

Gross Anatomy: How Much is Enough?

Rachel H. Akers

Background: During the last several
al-decades, there have been signifi-
cant changes in the teaching of Gross Anatomy in medical schools. Examples include adjustments in content delivery, exposure to lab dissection, and allocation of hours to the course. Vanderbilt Medical School (VMS) is engaged in a major curriculum reform process of all its courses. Understanding the preparedness of Vanderbilt medical students and graduates in the use of anatomy in clinical practice may assist educators at Vanderbilt and other universities to optimize anatomo-
y instruction in the curriculum.

Objectives: To assess the personal value of a traditional Gross Anatomy Course according to alumni of the course.

Materials and Methods: A cross-
sectional design was used to survey all alumni and current students of the Vanderbilt School of Medicine since 1994 who participated in the first year Gross Anatomy Course. Questions addressed (1) the amount and kind of anatomy taught to them; (2) the appropriateness of the amount of anatomy taught to them; (3) the effects of stress during the course; and (4) the personal value of a refresher anatomy course during medical school after the first year.

All 1239 current students and gradu-
ates of Vanderbilt Medical School from 1994-2004 were contacted by email to participate in the anony-
mous survey. We excluded 228 par-
ticipants due to: an invalid email address, the respondent did not take anatomy, or responses not obtained due to a programming error. All responses were posted electronically on an SQL database and analyzed with descriptive and hypothesis-
based statistics using SPSS.

Results: There were 620 responses (374 physicians, 246 students) for an overall response rate of 61%. Of the physicians, 64% were non-surgeons, 30% were surgeons, and 6% were radiologists. Most physicians (65%) reported the “right amount” of anatomy taught, a sizeable proportion (29%) wanted less, and few (6%) wanted more anatomy. Compared to surgeons and radiolo-
gist, non-surgeons wanted less anatomy (p < 0.005). Half to three quarters of all physicians desired more radiology in Gross Anatomy. One fourth of all physicians indicated that stress during Gross Anatomy affected them negatively. Non-surgeons and radiologists reported more stress during the course than did surgeons (p=0.029). Over half of respondents (56%) desired an anatomy refresher course sometime after the first year of school. Comments indicated that a refresher course after clinical expo-
sure would allow patient context for better learning.

Of the students, 74 were first years, 60 second years, 65 third years, and 47 fourth years. A larger proportion of students (46%) wanted less anatomy than did physicians (24%). While 52% of all physicians desired more radiological anatomy, only one quarter of students did so. Even more students (36%) than physi-
cians (26%) reported that stress affected them negatively during anatomy. Akin to physicians, more than half of students (62%) wanted a refresher anatomy course.

Conclusions: A sizeable proportion of physicians and current students desired less information during anatomy, experienced stress during the course, and would be agreeable to a refresher course. Differences existed among physician specialist groups, such as the call for less detail about internal anatomy by non-surgeons compared to other specialties.

In light of these results, curricular designers may take into considera-
tion a learner’s anticipated specialty in making decisions about the amount, content, and timing of anatomy instruction that addresses the needs of the whole class and individuals. For example, everyone may need more anatomical radiolo-
gy, but only those pursuing a surgical specialty may request more internal anatomy detail or a refres-
h er course toward the end of their training.

References:
2. Cattan WW. Adequacy of medical school gross anatomy education as per-
cived by certain postgraduate residu-
cy programs and anatomy course direc-
3. Drake RL, et al. Survey of gross anatomy, microscopic anatomy, neuro-
5. Pahk R and Rathsater H-J. Retrospective evaluation of under-
graduate medical education by doctors at the end of their residency time in hospitals: consequences for the anatom-
6. Fason NS and Holland BK. Increased clinical correlation in anatomo-
y teaching enhances students per-

Acknowledgements:
Faculty mentor: Anderson Spickard IV, MD, MS.

Saving A Life in 90 Seconds: A Video to Increase AED Use in Emergencies

Abigail L. Gilbert

Background: Over 250,000 Americans die from sudden cardiac arrest every year. Fewer than 5% will survive with CPR alone. Survival can be increased up to 50% if an automatic external defibrillator (AED) is utilized. The general public remains hesitant to use an AED despite that little or no train-
ing is required to safely and correct-
ly use the device. Numerous studies have shown that untrained lay res-

Vanderbilt Medical Center

Journal of Emphasis

18
overall effort to reduce infant mor- 
tality in Nashville. The primary ob- 
stacle, consistent with the litera-
ture, has been enlisting the support 
of FBIs. Plans for overcoming this 
challenge include city-wide cam-
paigns to raise awareness, a new 
Youth-Focused Community Voices 
and hiring a Community Voices 
Specialist to engage FBIs more 
aggressively through funding 
secured via a March of Dimes grant.

Acknowledgements:
Co-author: Kimberly Wyche-
Etheridge, MD, Vanderbilt University 
Medical Center. Thank you as well to 
Tina Leister, Garet Hoplins, and the 
Metro Public Health Department. 
Thank you to Barbara Clinton and 
Barbi Chadbuck for all of their care 
and support.

Don Moore is 
Director, Division of 
Continuing Medical 
Education at 
Vanderbilt University 
School of Medicine. He 
has devoted a considerable amount 
of his professional career examining, 
writing and speaking about continu-
ing medical education and a number 
of other related areas such as: prac-
tice-based CME, computerized 
order entry, electronic medical 
records, and evidence-based medi-
cine. His research interests also 
include the role of CME in physi-
cian change, office systems for 
CME, and the impact of CME on 
health care outcomes.

“Working with students in the 
Emphasis Program was one of the 
highlights of the past two years for me. 
It was an honor and privilege for me to 
watch and share in their excitement 
and satisfaction as they worked through 
and accomplished their projects. I am 
looking forward to working with the 
students who choose the Education area 
during this coming year.”

Gross Anatomy: How Much is 
Enough?

Rachel H. Akers

Background: During the last several 
decades, there have been significant 
changes in the teaching of Gross 
Anatomy in medical schools. 
Examples include adjustments in 
content delivered, exposure to lab 
dissection, and allocation of hours 
to the course. Vanderbilt Medical 
School (VMS) is engaged in a 
major curriculum reform process of 
all its courses. Understanding the 
preparedness of Vanderbilt medical 
students and graduates in the use of 
anatomy in clinical practice may 
assist educators at Vanderbilt and 
other universities to optimize anato-
my instruction in the curriculum.

Objectives: To assess the personal 
value of a traditional Gross Anatomy 
Course according to alumni of the course.

Materials and Methods: A cross-
sectional design was used to survey 
all alumni and current students of 
the Vanderbilt School of Medicine 
since 1994 who participated in the 
first year Gross Anatomy Course. 
Questions addressed (1) the amount 
and kind of anatomy purchased 
currently used; (2) the appropriateness 
of the amount of anatomy taught to 
them; (3) the effectiveness of stress 
during the course; and (4) the personal 
value of a refresher anatomy course 
during medical school after the first year.

All 1239 current students and 
graduates of Vanderbilt Medical School 
from 1994-2004 were contacted 
by email to participate in the anony-
mous survey. We excluded 228 par-
ticipants due to: an invalid email 
address, the respondent did not take 
anatomy, or responses not obtained 
due to a programming error. All 
responses were posted electronically 
on an SQL database and analyzed 
with descriptive and hypothesis-
based statistics using SPSS.

Results: There were 620 responses 
(374 physicians, 246 students) for 
an overall response rate of 61%. Of 
the physicians, 64% were non-
surgeons, 30% were surgeons, and 6% 
were radiologists. Most physicians 
(63%) reported the “right amount” 
of anatomy taught, a sizeable pro-
portion (29%) wanted less, and few 
(6%) wanted more anatomy. 
Compared to surgeons and radiolo-
gists, non-surgeons wanted less 
anatomy (p < 0.005). Half to three 
quarters of all physicians desired 
more radiology in Gross Anatomy. 
One fourth of all physicians indicated 
that stress during Gross Anatomy 
affect them negatively. Non-surgeons 
and radiologists reported more stress 
during the course than did surgeons (p=0.029). 
Over half of respondents (56%) 
desired an anatomy refresher course 
sometime after the first year of 
school. Comments indicated that a 
refresher course after clinical expo-
sure would allow patient context for 
better learning.

Of the students, 74 were first years, 
60 second years, 65 third years, and 
47 fourth years. A larger proportion 
of students (46%) wanted less 
anatomy than did physicians (24%). 
While 52% of all physicians desired 
more radiological anatomy, only one 
quarter of students did so. Even 
more students (36%) than physi-
cians (26%) reported that stress 
affect them negatively during anatomy. 
Akin to physicians, more than 
half of students (62%) wanted a 
refresher anatomy course.

Conclusions: A sizeable proportion 
of physicians and current students 
desired less information during 
anatomy, experienced stress during 
the course, and would be agreeable 
to a refresher course. Differences 
existing among physician specialist 
groups, such as the call for less 
detail about internal anatomy by 
non-surgeons compared to other 
specialties.

In light of these results, curricular 
designers may take into considera-
tion a learner’s anticipated specialty 
in making decisions about the 
amount, content, and timing of 
anatomy instruction that addresses 
the needs of the whole class and 
individuals. For example, everyone 
might need more anatomical radiolo-
y but only those pursuing a surgical 
specialty may request more internal 
anatomy detail or a refresher 
course toward the end of their 
training.

References:
1 Collins TJ, et al. Status of gross 
anatomy in the U.S. and Canada. 
Dilemma for the 21st Century. 
2 Cottam WW. Adequacy of medical 
school gross anatomy education as 
perceived by certain postgraduate residen-
cy programs and anatomy course direc-
3 Drake RL, et al. Survey of gross 
anatomy, microscopic anatomy, neuro-
science, and embryology courses in 
medical school curricula in the United 
4 Fitzharris TP. Survey of gross 
anatomy courses in the United States 
and Canada. Anat Rec (New Anat) 
5 Pahle R and Rafter R H J. 
Retrospective evaluation of under-
graduate medical education by doctors 
at the end of their residency time in 
hospitals: consequences for the anatom-
6 Fossan NS and Holland BK. 
Increased clinical correlation in anat-
yteaching enhances students per-
formance in the course and national 
board subject examination. Med Sci 

Acknowledgements:
Faculty mentor: Anderson Spickard 
III, MD, MS.

Saving A Life in 
90 Seconds: A 
Video to Increase 
AED Use in 
Emergencies

Abigail L. Gilbert

Background: Over 250,000 
Americans die from sudden 
cardiac arrest every year. Fewer 
than 5% will survive with CPR alone. 
Survival can be increased up to 50% 
if an automatic external defibrillator 
(AED) is utilized. The general 
public remains hesitant to use an 
AED despite that little or no train-
ing is required to safely and correct-
ly use the device. Numerous studies 
have shown that untrained lay res-

curs with no previous training can safely and effectively use an AED. In one study, untrained six graders were able to correctly position the electrode pads and stay clear of the mannequin during shock delivery. Although there are many excellent classes and videos that teach how to use an AED, they are all fairly lengthy and are rarely used.

Objectives: Can a brief 90-second video provide enough information so that an otherwise untrained bystander will be likely to use an AED safely and effectively in an emergency?

Method and Materials: First and second year medical students completed a survey indicating the likelihood of using an AED and performing CPR in an emergency. The students then watched a 90-second video that we produced which demonstrates how to use an AED and perform compression-only CPR. Students again completed the survey 2 to 11 weeks after viewing the video. Survey questions included 5-point Likert scales to assess how likely a student was to call 9-1-1, perform CPR, and use an AED in two situations. The survey also asked students about prior CPR and AED training, and about their fears and concerns which might prevent AED use.

Results: A total of 122 students completed the survey before and after viewing the video. After viewing the video, more students knew that the AED would not permit delivery of a shock unless it was needed. Students initially reported that they were concerned about legal liability, hurting the patient, using the machine incorrectly, and felt that they lacked adequate training. After viewing the video, fewer students responded that fear of hurting the patient, using the machine incorrectly, or felt like they lacked training after watching the video. Students remained concerned about legal liability.

Conclusions: Our 90-second video significantly increased the likelihood that students will use an AED in an emergency, especially in a remote location.

Acknowledgements: Co-authors: Richard Lovallo, Keith Wrenn, MD, and Corey M. Slivis, MD, Vanderbilt University Medical Center.

Sleepiness in Medical Students

David Young

Background: Sleepiness is an important wellness issue. Short sleep duration is associated with increased appetite3 and obesity2 in young adults. Young adults and adolescents tend to be excessively sleepy which affects mood and academic performance4. A recent study at the Eastern Virginia Medical School found a strong negative correlation between sleepiness and academic performance5. AED use decreased with increasing sleepiness as measured by the Epworth Sleepiness Scale (ESS)6. A study by Rodrigues et al found that medical student academic performance was negatively related to ESS scores2. However, bias may have been present because students who happened to be absent during a random morning class were excluded from the study.

Objectives: This study explored the relationship between sleep and performance in the classroom, and assess the sleepiness level of this group of medical students. However, students may be spending their time, a high level of sleepiness would suggest that overall, they are not sleeping enough. Although it was beyond the scope of this study to recommend which courses of action should be taken in the event that students are indeed excessively sleepy, such information may be useful in the planning of future curricula, whether at Vanderbilt or other institutions. This study did not intend to establish a recommended daily amount of sleep.

Procedures: All medical students enrolled in the fall 2005 Neuroscience course at Vanderbilt University School of Medicine were informed of this project in advance, including the procedures involved, complete anonymity and the optional nature of participation. On the day of the final exam, a copy of the ESS was distributed to each student along with the final exam, and each exam-survey pair was numbered uniquely. Students electing to participate filled out the survey and turned it in separately from the exam. Informed consent was obtained from all participants.

Results: Ninety-nine students participated in this study. The average composite score on the ESS was 8.6 ± 4.1 (mean ± SD) with 38 scores (38.4%) consistent with at least a high level of sleepiness. Seven of these 38 (7.1% of all students) had ESS scores indicating a dangerous level of daytime sleepiness, consistent with scores of patients with idiopathic hypersomnia, obstructive sleep apnea or narcolepsy5. This is a significant portion, and further research is needed. Correlational analysis revealed no notable relationship between sleepiness and performance on the exam. Performance was excellent: average of the practical and written components combined was 92.3 ± 6.7%. References:


4. Millman RP and Working Group on Sleepiness in Adolescents/Young Adults, and AAP Committee on Adolescence. Excessive Sleepiness in Adolescents and Young Adults: Causes, Consequences, and Treatment Strategies. Pediatrics 2005; 115; 1774-1786.


Acknowledgements:

Co-authors: Allison Piegas PhD, Vanderbilt University and Don Moore PMD, Vanderbilt University School of Medicine.
cues with no previous training can safely and effectively use an AED. In one study, untrained six graders were able to correctly position the electrode pads and stay clear of the mannequin during shock delivery. Although there are many excellent classes and videos that teach how to use an AED, they are all fairly lengthy and are rarely used.

Objectives: Can a brief 90-second video provide enough information so that a bystander will be likely to use an AED safely and effectively in an emergency?

Method and Materials: First and second year medical students completed a survey indicating the likelihood of using an AED and performing CPR in an emergency. The students then watched a 90-second video that we produced which demonstrates how to use an AED and perform compression-only CPR. Students again completed the survey 2 to 11 weeks after viewing the video. Survey questions included 5-point Likert scales to assess how likely a student was to call 9-1-1, perform CPR, and use an AED in two situations. The survey also asked students about prior CPR and AED training, and about their fears and concerns which might prevent AED use.

Results: A total of 122 students completed the survey before and after viewing the video. After viewing the video, more students knew that the AED would not permit delivery of a shock unless it was needed. Students initially reported that they were concerned about legal liability, hurting the patient, using the machine incorrectly, and felt that they lacked adequate training. After viewing the video, fewer students responded that fear of hurting the patient, using the machine incorrectly, or felt like they lacked training after watching the video. Students remained concerned about legal liability.

Conclusions: Our 90-second video significantly increased the likelihood that students will use an AED in an emergency, especially in a remote location.

Acknowledgements: Co-authors: Richard Lussierette, Keith Wrenn, MD, and Corey M. Slivis, MD, Vanderbilt University Medical Center.

Sleepiness in Medical Students

David Young

Background: Sleepiness is an important wellness issue. Short sleep duration is associated with increased appetite3 and obesity2 in young adults. Young adults and adolescents tend to be excessively sleepy which affects mood and academic performance4. A recent study at the Eastern Virginia Medical School found a strong negative correlation between sleepiness as measured by the Epworth Sleepiness Scale (ESS) and USMLE Step 1 scores, suggesting an effect of sleepiness on something very real to medical students—board scores, which represent a more “urgent”, short-run goal as opposed to, for example, cardiovascular health which is a long-run goal. A negative correlation between sleepiness and exam performance would suggest that sleepiness adversely affects another short-term goal of medical students, exam performance. Analysis by Wolfson and Carskadon has determined that poor sleep habits are negatively associated with academic performance in students from middle school through college, but medical students were not studied. A study by Rodrigues et al found that medical student academic performance was negatively related to ESS scores5; however, bias may have been present because students who happened to be sleepy during a random morning class were excluded from the study.

Objectives: This study explored the relationship between sleep and performance in the classroom, and assess the sleepiness level of this group of medical students. However, students may be spending their time, their high level of sleepiness would suggest that overall, they are not sleeping enough. Although it was beyond the scope of this study to recommend which courses of action should be taken in the event that students are indeed excessively sleepy, such information may be useful in the planning of future curricula, whether at Vanderbilt or other institutions. This study did not intend to establish a recommended daily amount of sleep.

Procedures: All medical students enrolled in the fall 2005 Neuroscience course at Vanderbilt University School of Medicine were informed of this project in advance, including the procedures involved, complete anonymity and the optional nature of participation. On the day of the final exam, a copy of the ESS was distributed to each student along with the final exam, and each exam–survey pair was numbered uniquely. Students electing to participate filled out the survey and turned it in separately from the exam. Informed consent was obtained from all participants.

Results: Ninety-nine students participated in this study. The average composite score on the ESS was 8.6 + 4.1 (mean + SD) with 38 scores (38.4%) consistent with at least a high level of sleepiness. Seven of these 38 (7.1% of all students) had ESS scores indicating a dangerous level of daytime sleepiness, consistent with scores of patients with idiopathic hypersomnia, obstructive sleep apnea or narcolepsy6. This is a significant portion, and further research is needed. Correlational analysis revealed no notable relationship between sleepiness and performance on the exam. Performance was excellent: average age

References


4. Millman RP and Working Group on Sleepiness in Adolescents/Young Adults, and AAP Committee on Adolescence. Excessive Sleepiness in Adolescents and Young Adults: Causes, Consequences, and Treatment Strategies. Pediatrics 2005; 115; 1774-1786.


Acknowledgements: Co-authors: Allison Pinneo PhD, Vanderbilt University and Don Moore PhD, Vanderbilt University School of Medicine.
Revascularization After Segmental Resection of Lower Extremity Soft Tissue Sarcomas

Mojibat A. Adelani

Background: Limb salvage surgery combined with vascular reconstructions has replaced amputation as the preferred approach for treatment of patients with soft tissue sarcomas involving major vascular structures of the extremities.

Objective: We describe our experience with patients with soft tissue sarcomas involving major vascular structures and examine outcomes according to the type of vascular graft selected. We also examined the effect of venous reconstruction on post-operative edema.

Patients and Methods: This retrospective review included 14 patients with lower extremity soft-tissue sarcomas that encased major vessels, requiring combined limb-preserving tumor resection and revascularization with a synthetic or autogenous saphenous vein graft. Edema in patients with and without venous reconstruction was compared. The incidence of infection, wound dehiscence, and graft thrombosis were compared according to vascular graft type.

Results: There was no significant difference in edema in patients with venous reconstruction and those without. There was also no significant difference in infection and graft thrombosis in patients with synthetic arterial grafts and those with autogenous saphenous vein grafts. Wound dehiscence occurred more often in patients with synthetic grafts (p=0.029).

Conclusions: Although the patient cohort was small, results from this study suggest that further studies are needed to determine the role that vascular graft selection and venous reconstruction play in clinical outcome.

Acknowledgements
Co-authors: Ginger E. Hult, MD, Robert S. Dittus, MD, Marc Posman, MD, and Herbert S. Sibbitt, MD, Vanderbilt University Medical Center.

Evaluation of Adherence to Clinical Practice Guidelines in Age-Related Macular Degeneration

Rehan Ahmed

Background: Variations in practice patterns and quality concerns have prompted the development of evidence-based practice guidelines. It has been previously reported that patients receive recommended care processes across a variety of quality care indicators only 55% of the time. In the treatment of ophthalmic conditions, the most widely accepted set of guidelines is the American Academy of Ophthalmology’s Preferred Practice Pattern (PPP). However, there has been little evaluation of its recommendations for age-related macular degeneration (AMD).

Objective: To evaluate adherence to practice guidelines, two questions were asked:
1. How often is Amour grid testing performed as part of examination in patients with AMD?
2. How often is antioxidant supplement recommendation for patients at high-risk for development of advanced AMD?

Materials and Methods: 107 patient charts were randomly selected from a retrospective review of all patients seen by three retinal specialists between 1/1/04 and 12/31/04 with a diagnosis of AMD. Visits between 1/1/00 and 10/31/05 were reviewed for the following information: (a) diagnosis and severity of AMD by AREDS classification; (b) documentation of Amour grid testing; (c) documentation of the recommended use of antioxidant and mineral supplementation. The rates of documentation of Amour grid testing and supplement recommendation for these relatively low rates may include failure to document a verbal recommendation, differences in years of training, or unawareness of treatment guidelines, there is considerable room for improvement.

Conclusions: Attempts to promote adherence to some aspects of the PPP guidelines for management of patients with AMD are similar to adherence rates of recommended care processes in other fields, they still are only in the range of 50%. While possible explanations for these relatively low rates may include failure to document a verbal recommendation, differences in years of training, or unawareness of treatment guidelines, there is considerable room for improvement.

NSAIDs in the Treatment of Acute Ankle Pain: A Systematic Review

Cameron T Atkinson

Background: Acute ankle sprain is the most common sports-related injury and can be associated with long term morbidity. The treatment of acute ankle sprain with non-steroidal anti-inflammatory drugs has been assessed in several randomized controlled trials, but there has been no synthesis of the best evidence available to determine the overall efficacy of NSAIDs in the treatment of acute ankle sprain.

Objective: To assess the pain reduction, reduction in time lost to injury and adverse effects in the treatment of acute ankle sprain with NSAIDs.

Materials and Methods: We searched the MEDLINE database, Cochrane Collaboration resources, EMBASE, and CRISP for randomized clinical trials using NSAIDs in the treatment of acute ankle sprain published in the English Language using the search terms ankle sprain, treatment, and NSAID. We also performed a manual search of the reference lists of each relevant retrieved article.

The inclusion criteria were defined as (1) randomized, parallel group study design; (2) exclusion of acute ankle sprains (more than 48 hours between injury and treatment); (3) use of objective or validated patient-oriented outcome measures; (4) a minimum of eighty percent follow-up; and (5) blinding of observers to the treatment each patient received. Each relevant article was independently reviewed by at least 2 authors using a worksheet adapted from evidence-based guides developed at our institution. We reconciled disagreement over study methodology by consensus. After all relevant studies were reviewed, the primary author applied the inclusion criteria. Of fourteen studies reviewed, six were included.

Results: Four studies under review found clinically significant reductions in pain several days after
Revascularization After Segmental Resection of Lower Extremity Soft Tissue Sarcomas

Mohib A. Adelani

Background: Limb salvage surgery combined with vascular reconstruction has replaced amputation as the preferred approach for treatment of patients with soft tissue sarcomas involving major vascular structures of the extremities.

Objective: We describe our experience with patients with soft tissue sarcomas involving major vascular structures and examine outcomes according to the type of vascular graft selected. We also examined the effect of venous reconstruction on post-operative edema.

Patients and Methods: This retrospective review included 14 patients with lower extremity soft-tissue sarcomas that encased major vessels, requiring combined limb-preserving tumor resection and revascularization with a synthetic or autogenous saphenous vein graft. Edema in patients with and without venous reconstruction was compared. The incidence of infection, wound dehiscence, and graft thrombosis were compared according to vascular graft type.

Results: There was no significant difference in edema in patients with venous reconstruction and those without. There was also no significant difference in infection and graft thrombosis in patients with synthetic arterial grafts and those with autogenous saphenous vein grafts. Wound dehiscence occurred more often in patients with synthetic grafts (p=0.029).

Conclusions: Although the patient cohort was small, results from this study suggest that further studies are needed to determine the roles of vascular graft selection and venous reconstruction play in clinical outcome.

Acknowledgements

Co-authors: Ginger E. Holt, MD, Robert S. Dittus, MD, Marc Pausman, MD, and Herbert S. Schwaitz, MD, Vanderbilt University Medical Center.

Evaluation of Adherence to Clinical Practice Guidelines in Age-Related Macular Degeneration

Rehan Ahmed

Background: Variations in practice patterns and quality concerns have prompted the development of evidence-based practice guidelines. It has been previously reported that patients receive recommended care processes across a variety of quality care indicators only 55% of the time. In the treatment of ophthalmic conditions, the most widely accepted set of guidelines is the American Academy of Ophthalmology’s Preferred Practice Pattern (PPP); however, there has been little evaluation of its recommendations for age-related macular degeneration (AMD).

Objectives: To evaluate adherence to practice guidelines, two questions were asked:
1. How often is Amslar grid testing performed as part of examination in patients with AMD?
2. How often is antioxidant supplementation recommended for patients at high-risk for development of advanced AMD?

Materials and Methods: 107 patient charts were randomly selected from a retrospective review of all patients seen by three retinal specialists between 1/1/04 and 12/31/04 with a diagnosis of AMD. Visits between 1/1/00 and 10/31/05 were reviewed for the following information: (a) diagnosis and severity of AMD by AREDS classification; (b) documentation of Amsler grid testing; (c) documentation of the recommended use of antioxidant and mineral supplementation. The rates of documentation of Amsler grid testing and supplementation were compared for each retinal specialist. These rates were then compared by the chi-square test.

Results: A total of 317 visits were reviewed. The overall rate of Amsler grid testing was 48%, and there was no significant difference among specialists. The overall rate of documented recommended use of antioxidant supplements was 47%. However, there was a significant statistical difference between one specialist (20%, N=41) and the other two (77%, N=26 and 54%, N=50, respectively; p < 0.001).

Conclusions: Although the overall rates of adherence to some aspects of the PPP guidelines for management of patients with AMD are similar to adherence rates of recommended care processes in other fields, they still are only in the range of 50%. While possible explanations for these relatively low rates may include failure to document a verbal recommendation, differences in years of training, or unawareness of treatment guidelines, there is considerable room for improvement.

Acknowledgements

Co-authors: Paul H. Kokesh, PhD, Frances M. Roccella, MD, Paul Sterberg, Jr. MD, and Anita Agarwale, MD, Vanderbilt University Medical Center.

NSAIDs in the Treatment of Acute Ankle Pain: A Systematic Review

Cameron T Atkinson

Background: Acute ankle sprain is the most common sports-related injury and can be associated with long term morbidity. The treatment of acute ankle sprain with non-steroidal anti-inflammatory drugs has been assessed in several randomized controlled trials, but there has been no synthesis of the best evidence available to determine the overall efficacy of NSAIDs in the treatment of acute ankle sprain.

Objective: To assess the pain reduction, reduction in time lost to injury and adverse effects in the treatment of acute ankle strain with NSAIDs.

Materials and Methods: We searched the MEDLINE database, Cochrane Collaboration resources, EMBASE, and CRISP for randomized clinical trials using NSAIDs in the treatment of acute ankle pain published in the English Language using the search terms ankle strain, treatment, and NSAID. We also performed a manual search of the reference lists of each relevant retrieved article.

The inclusion criteria were defined as (1) randomized, parallel group study design; (2) exclusion of non-acute ankle sprains (more than 48 hours between injury and treatment); (3) use of objective or validated patient-oriented outcome measures; (4) a minimum of eighty percent follow-up; and (5) blinding of observers to the treatment each patient received. Each relevant article was independently reviewed by at least 2 authors using a worksheet adapted from evidence-based guides developed at our institution. We reconciled disagreement over study methodology by consensus. After all relevant studies were reviewed, the primary author applied the inclusion criteria. Of fourteen studies reviewed, six were included.

Results: Four studies under review found clinically significant reductions in pain several days after...
Impact of Ambulance Staffing Configuration on ACLS in the Pre-Hospital Setting

Ryan Bayley

Introduction: Approximately 40% of advanced life support (ALS) ambulances in the United States are staffed by two paramedics. The remainder are staffed by one paramedic and one less trained Emergency Medical Technician (EMT). Little is known about the potential impact of these two configurations on patient care and outcome for most clinical scenarios.

Objectives: To determine the potential differences in care provided by each of these ambulance configurations in regards to the resuscitation of a cardiac arrest victim in ventricular fibrillation.

Methods: Fifteen paramedic-paramedic and fifteen paramedic-EMT teams were recruited to perform resuscitation on a high fidelity human simulator (Learsdar SimMan). Errors and their nature, time to critical interventions, and compliance with continuous cardiopulmonary resuscitation (CPR) were captured by the simulator and videotape.

Results: Preliminary analysis of 19 scenarios completed to date revealed that paramedic-paramedic teams committed more errors per resuscitation (1.11 vs 0.22, p=0.03). Kruskal-Wallis rank sum). CPR performance was not significantly different between groups (47±18% vs. 51±20% [means+SD]) and exhibited high intra-group variability. Paramedic-paramedic teams achieved intubation more rapidly (118 vs. 168 sec, p<0.01, Kruskal-Wallis rank sum), but there was no difference in the time to complete the resuscitation after controlling for team experience and errors (434±75 vs. 437±122 sec).

Conclusions: Paramedic-paramedic teams intubated more quickly, an intervention shown to independently improve patient outcome. However, these same teams committed more errors, exhibited greater intra-group variability, and did not outperform paramedic-EMT teams in overall speed of resuscitation. These results do not support the hypothesis that having a second paramedic on ALS ambulances markedly improves execution or reduces error during critical resuscitation scenarios.

Acknowledgements: Co-authors: Warren R. Dunn, MD, MPH, Vanderbilt University School of Medicine, and Kurt P. Spindler, MD, Vanderbilt Sports Medicine.

Recombinant Factor VIIa Decreases Refractory Bleeding After Cardiac Surgery in Pediatric Patients

Jo Ellen Bennett

Background: Excessive bleeding in the post-operative cardiac surgery patient is a major cause of significant morbidity and mortality. In recent years, rFVIIa has emerged as a potential agent to decrease refractory bleeding in the pediatric post-operative cardiac surgery patient.

Objectives: The purpose of our study was to evaluate the efficacy and safety of recombinant factor VIIa (rFVIIa) in the treatment of significant post-operative bleeding in pediatric patients after cardiac surgery. We assessed the hypothesis that rFVIIa decreased chest tube (CT) bleeding and blood product use after cardiac surgery in the pediatric population.

Materials and Methods: A retrospective review of the last 5 years of the use of rFVIIa therapy for severe bleeding in the first 24 hours post-cardiac surgery was undertaken. Medialantial bleeding, blood product transfusion and coagulation studies before and six hours after the first dose of rFVIIa therapy were analyzed using paired student's t test. The dose, frequency, and side-effects of rFVIIa therapy were also studied.

Results: Twenty four patients including 12 patients placed on extracorporeal membrane oxygenator (ECMO) received rFVIIa (mean dose 43±21 mg/kg/dose) for severe bleeding. Twenty three patients responded successfully as evidenced by reduction in chest tube drainage (from 51.8±36.2 ml/kg/hr to 18.4±21 ml/kg/hr, p<0.001) along with significant reduction of blood products transfusion including packed red blood cells, fresh frozen plasma, cryoprecipitate, and platelets (p<0.05). One patient that failed to respond to 4 doses of rFVIIa had surgical bleeding. Two patients developed complications including clot in the ECMO circuit and thrombosis at bleeding arterial line site resulting in limb ischemia.

Conclusions: rFVIIa therapy effectively controls severe bleeding in the post-operative pediatric cardiac surgery patients including patients placed on ECMO. Caution use is advocated in patients bleeding from multiple sites or having pre-existent clots in the ECMO circuit to prevent major complications.

Acknowledgements: Co-authors: Hemant S. Agrawal MD and Mary B. Taylor MD, MSC1, Monroe Carroll, Jr. Children's Hospital at Vanderbilt.

Delirium In The ICU: A Prospective, Randomized Trial Of Placebo Vs. Haloperidol Vs. Ziprasidone

Steve Cook

Background: Delirium is a type of brain dysfunction that occurs in 60-80% of mechanically ventilated intensive care unit (ICU) patients. Delirium is a serious problem in ICUs as it has been associated with increased mortality, longer hospital stays, and neuropsychological deficits in ICU survivors. A drug commonly used to treat delirium is the antipsychotic haloperidol. Common side effects of haloperidol are extrapyramidal symptoms and disturbances in heart rhythm. Atypical antipsychotics such as ziprasidone offer promising potential to treat delirium without the side effects seen with haloperidol.

Objectives: The purpose of this study is to determine the effectiveness of haloperidol, ziprasidone, and placebo at preventing delirium in mechanically ventilated ICU patients and to compare their effects on neuropsychological status of patients at hospital discharge.

Materials and Methods: Patients are blindly randomized to one arm of the study (receiving haloperidol, ziprasidone, or placebo) to eliminate potential sources of bias. During the drug administration period, patients receive regular doses of the study drug. To determine mental state, CAM-ICU scores are monitored twice daily and lab values and vital signs are recorded.

Results: We hypothesize that patients receiving early treatment of antipsychotics will experience less delirium relative to the placebo group. In addition, we expect that levels of delirium in patients receiving either antipsychotic therapy (haloperidol or ziprasidone) will be comparable. Finally, we hypothesize that neuropsychological test scores at hospital discharge will be better in patients receiving antipsychotics, but that there will be no difference between different antipsychotic therapies.

Conclusions: This study is the first rigorous investigation of delirium treatment and will provide data to support the most appropriate treatment of delirium in the ICU setting. If hypotheses are correct the results will provide support for antipsychotic use for delirium and provide physicians with a treatment with fewer side effects: atypical antipsychotics.

Acknowledgements: To my Emphasis Program mentor, Wes Ely, MD, Vanderbilt University Medical School.

Title • 2006 21
Impact of Ambulance Staffing Configuration on ACLS in the Pre-Hospital Setting

Ryan Bayly

Introduction: Approximately 40% of advanced life support (ALS) ambulances in the United States are staffed by two paramedics. The remainder are staffed by one paramedic and one lesser trained Emergency Medical Technician (EMT). Little is known about the potential impact of these two configurations on patient care and outcome for most clinical scenarios.

Objectives: To determine the potential differences in care provided by each of these ambulance configurations in regards to the resuscitation of a cardiac arrest victim in ventricular fibrillation.

Methods: Fifteen paramedic-paramedic and fifteen paramedic-EMT teams were recruited to perform resuscitation on a high fidelity human simulator (Laerdal SimMan). Errors and their nature, time to critical interventions, and compliance with continuous cardiopulmonary resuscitation (CPR) were captured by the simulator and videotape.

Results: Preliminary analysis of 19 scenarios completed to date revealed that paramedic-paramedic teams committed more errors per resuscitation (1.13 vs. 0.22, p=0.03, Kruskal-Wallis rank sum). CPR performance was not significantly different between groups (47±18% vs. 53±20% [means±SD]) and exhibited high intra-group variability. Paramedic-paramedic teams achieved intubation more rapidly (118 vs. 168 sec, p=0.01, Kruskal-Wallis rank sum), but there was no difference in the time to complete the resuscitation after controlling for team experience and errors (434±75 vs. 437±122 sec).

Conclusions: Paramedic-paramedic teams intubated more quickly, an intervention shown to independently improve patient outcome. However, these same teams committed more errors, exhibited greater intra-group variability, and did not outperform paramedic-EMT teams in overall speed of resuscitation. These results do not support the hypothesis that a second paramedic on ALS ambulances markedly improves execution or reduces error during critical resuscitation scenarios.

Acknowledgements: Co-authors: Warren R. Dunn, MD, MPH, Vanderbilt University School of Medicine, and Kurt P. Spindler, MD, Vanderbilt Sports Medicine.

Recombinant Factor VIIa Decreases Refractory Bleeding After Cardiac Surgery in Pediatric Patients

Jo Ellen Bennett

Background: Excessive bleeding in the post-operative cardiac surgery patient is a major cause of significant morbidity and mortality. In recent years, rFVIIa has emerged as a potential agent to decrease refractory bleeding in the pediatric post-operative cardiac surgery patient.

Objectives: The purpose of our study was to evaluate the efficacy and safety of recombinant factor VIIa (rFVIIa) in the treatment of significant post-operative bleeding in pediatric patients after cardiac surgery. We assessed the hypothesis that rFVIIa decreased chest tube (CT) bleeding and blood product usage after cardiac surgery in the pediatric population.

Materials and Methods: A retrospective review of the last 5 years of the use of rFVIIa therapy for severe bleeding in the first 24 hours post-cardiac surgery was undertaken. Medial antibleeding, blood product transfusion and coagulation studies before and six hours after the first dose of rFVIIa therapy were analyzed using paired student’s t test. The dose, frequency, and side-effects of rFVIIa therapy were also studied.

Results: Twenty-four patients including 12 patients placed on extracorporeal membrane oxygenator (ECMO) received rFVIIa (mean dose 43±22 μg/kg/dose) for severe bleeding. Twenty-three patients responded successfully as evidenced by reduction in chest tube drainage (from 51.8±36.2 ml/kg/hr to 18.4±21 ml/kg/hr, p<0.001), along with significant reduction of blood products transfusion including packed red blood cells, fresh frozen plasma, cryoprecipitate, and platelets (p<0.05). One patient that failed to respond to 4 doses of rFVIIa had surgical bleeding. Two patients developed complications including clot in the ECMO circuit and thrombosis at bleeding arterial line site resulting in limb ischemia.

Conclusions: rFVIIa therapy effectively controls severe bleeding in the post-operative pediatric cardiac surgery patients including patients placed on ECMO. Cautious use is advocated in patients bleeding from multiple sites or having pre-existent clots in the ECMO circuit to prevent major complications.

Acknowledgements: Co-authors: Heman S. Agarwal MD and Mary B. Taylor MD, MSC, Monroe Carell, Jr. Children’s Hospital at Vanderbilt.

Delirium In The ICU: A Prospective, Randomized Trial Of Placebo Vs. Haloperidol Vs. Ziprasidone

Steve Cook

Background: Delirium is a type of brain dysfunction that occurs in 60-80% of mechanically ventilated intensive care unit (ICU) patients. Delirium is a serious problem in ICUs as it has been associated with increased mortality, longer hospital stays, and neuropsychological deficits in ICU survivors. A drug commonly used to treat delirium is the antipsychotic haloperidol. Atypical antipsychotics offer promising potential therapies.

Objectives: The purpose of this study is to determine the effectiveness of haloperidol, ziprasidone, and placebo at preventing delirium in mechanically ventilated ICU patients and to compare their effects on neuropsychological status of patients at hospital discharge.

Materials and Methods: Patients are blindly randomized to one arm of the study (receiving haloperidol, ziprasidone, or placebo) to eliminate potential sources of bias. During the drug administration period, patients receive regular doses of the study drug. To determine mental state, CAM-ICU scores are monitored twice daily and lab values and vital signs are recorded.

Results: We hypothesize that patients receiving early treatment of antipsychotics will experience less delirium relative to the placebo group. In addition, we expect that levels of delirium in patients receiving either antipsychotic therapy (haloperidol or ziprasidone) will be comparable. Finally, we hypothesize that neuropsychological test scores at hospital discharge will be better in patients receiving antipsychotics, but that there will be no difference between different antipsychotic therapies.

Conclusions: This study is the first rigorous investigation of delirium treatment and will provide data to support the most appropriate treatment of delirium in the ICU setting. If hypotheses are correct, the results will provide support for antipsychotic use for delirium and provide physicians with a treatment with fewer side effects: atypical antipsychotics.

Acknowledgements: To my Emphasis Program mentor, Wes Ely, MD, Vanderbilt University Medical School.
Corticosteroid Injections In The Treatment Of Trigger Finger: A Level I And II Systematic Review

Sheryl B. Fleisch

Purpose: Trigger finger is an important occupational pathology with multiple management approaches. The authors conducted an evidence-based medicine systematic review of level I and II prospective randomized controlled trials to determine the effectiveness of steroid injection in the treatment of trigger finger.

Methods: MEDLINE, Cochrane database, and secondary references were reviewed to locate all English language prospective randomized controlled trials evaluating trigger finger treatment. Four studies using injectable steroids were identified based on the following inclusion criteria: all were prospective randomized controlled trials of adults with greater than 85% follow-up.

Results: Based on this review, the incidence of trigger finger was greatest in women (75%), and the average age range of patients was 52-62 years old. In addition, this systematic review determined that steroid injections were effective in 57% of patients after a combined analysis of all four studies.

Conclusions: While there is a scarcity of prospective randomized controlled trials available on trigger finger, based on this systematic review, we can confidently recommend that steroid injection be the first line treatment for trigger finger. Further randomized controlled trials need to be undertaken using a more uniform ratings scale for diagnosing trigger finger severity, pain (visual analogue pain scale), and mobility such that efficacy of trigger finger treatment can be better evaluated using EBIM principles.

Physician Ownership of Freestanding Ambulatory Surgery Centers: A Review of Literature to Determine Causality, Correlation and Impact on Clinical Decision-Making by Surgeons

Avi Giladi

Background: As the Freestanding Ambulatory Surgery Center (FASC) sector has grown, increased focus has been given to the cost, efficiency, safety, and competitive market for these centers. The exponential increase in numbers of facilities, procedures performed and reimbursed have led to questions about the appropriateness of procedures and the suspicion that overuse is significant. Because many of the 4900 centers are owned by physicians who benefit financially from their use, and because procedures performed in FASCs have a higher profit margin, questions have arisen about the net impact these factors have on runaway health costs resulting from overuse of surgical procedures. However, there is no data to support the current focus on these financial issues, and as yet there is no proven impetus for overuse in FASCs. One major aspect that has become an integral part in other health systems is establishing evidence-based procedural guidelines to curtail misuse and overuse.

Objective: The lack of literature in support of the supposed causative factors led to an analysis of another potential contributing element. The purpose of this investigation is to assess the degree to which these criteria are employed effects overuse and excess costs. It was also found that the FASC industry does not have a system of standards or evaluation to ensure that these measures are employed. Research using established criteria as guidelines shows that within the industry a significant percentage of procedures are unnecessary and inappropriate.

Materials and Methods: This industry analysis required a review of literature establishing evidence-based guidelines for ambulatory procedures, as well as existent literature documenting overuse and inappropriate procedures in FASCs. PubMed searches using the following search terms: ambulatory surgery, FASC, or ASC in combination with appropriateness, evidence-based, overuse, inappropriate, and evaluation. Publications and data from The Center for Evaluation Science at Dartmouth, The Vanderbilt Center for Evidence-based Medicine, MedPAC, CMS, the GAO, Health Affairs, AAASC, and FASA were also included. An analysis of standard operating procedures in the ASC sector that focus on evidence was also completed.

Results: Many procedures performed in ASCs have appropriate- ness criteria based on evidence, and research shows that the degree to which these criteria are employed affects overuse and excess costs. It was also found that the FASC industry does not have a system of standards or evaluation to ensure that these measures are employed. Research using established criteria as guidelines shows that within the industry a significant percentage of procedures are unnecessary and inappropriate.

Conclusions: A major measure to decrease overuse and abuse in the FASC system must involve application of appropriateness criteria and a system to evaluate their usage. This element of safe and effective provider performance must be analyzed, as it holds large treatment, public policy, and financial implications.

Acknowledgements: Co-authors: Kurt P Spindler MD and Donald H. Lee MD, Vanderbilt Orthopaedic Institute.

Staging Rectal Cancer: Tracked Endorectal Ultrasound Versus 2D Endorectal Ultrasound

Clay Kaiser

Background: Rectal cancer presents a meaningful problem in America. This cancer, with an overall 5-year survival rate of 62%, was diagnosed in over 40,000 men and women during 2005. This problem is coupled by a lack of techniques available to detect and stage rectal cancer that are fast, accurate, and inexpensive. MRI is one of the most reliable imaging modalities, but its relatively high cost and long examination time make endorectal ultrasound (ERUS) the imaging modality of choice. Improving the current technology of ERUS would help detect and stage the burdensome problem of rectal cancer.

Objective: To determine if tracked endorectal ultrasound is more accurate for staging rectal cancer than 2D ERUS.

Materials and Methods: The materials used to collect data for this study include an endorectal ultrasound probe, an infrared camera that tracks the position of the probe, and a computer that displays the images from the probe in their correct position as determined by the camera. The computer also creates a 3D volume by reconstructing the images captured from the tracked probe. This study was given IRB approval to enroll twenty patients who have been diagnosed with rectal cancer by standard ERUS or other imaging modalities and are undergoing surgical resection of their cancer. The data are collected on the day of their surgical resection. The 3D volumes generated are then compared to either the imaging used to diagnose the rectal cancer initially and/or the pathologi- cal analysis of the specimen to determine if any additional information regarding stage has been obtained.

Results: A total of 4 patients have been enrolled and evaluated at this time. Data were successfully gathered from each of these patients. 3D volumes have been created from the data. Comparing these volumes with standard ERUS or pathology specimen analysis is planned.

Conclusions: The feasibility of creating 3D volumes using tracked 2D ERUS on patients with rectal cancer has been demonstrated. The sensitivity of using these volumes to detect and stage rectal cancer is to be determined, and further research regarding this modality in improving the management of rectal cancer needs to be performed.

Acknowledgements: Co-authors: John Warnacht, MD, Department of Biomedical Engineering, Vanderbilt University, Robert Galloway Jr., PhD and Alan Herline, MD, Division of General Surgery, Vanderbilt University.
Sheryl B. Fleisch

Purpose: Trigger finger is an important occupational pathology with multiple management approaches. The authors conducted an evidence-based medicine systematic review of level I and II prospective randomized controlled trials to determine the effectiveness of steroid injection in the treatment of trigger finger.

Methods: MEDLINE, Cochrane database, and secondary references were reviewed to locate all English language prospective randomized controlled trials evaluating trigger finger treatment. Four studies using injectable steroids were identified based on the following inclusion criteria: all were prospective randomized controlled trials of adults with greater than 85% follow-up.

Results: Based on this review, the incidence of trigger finger was greatest in women (75%), and the average age range of patients was 52-62 years old. In addition, this systematic review determined that steroid injections were effective in 57% of patients after a combined analysis of all four studies.

Conclusions: While there is a scarcity of prospective randomized controlled trials available on trigger finger, based on this systematic review, we can confidently recommend that steroid injection be the first line treatment strategy for trigger finger. Further randomized controlled trials need to be undertaken using a more uniform ratings scale for diagnosing trigger finger severity, pain (visual analogue pain scale), and mobility such that efficacy of trigger finger treatment can be better evaluated using EBM principles.

Acknowledgements:
Co-authors: Kurt P. Spindler MD and Donald H. Lee MD, Vanderbilt Orthopaedic Institute.

Ayvi Giladi

Background: As the Freestanding Ambulatory Surgery Center (FASC) sector has grown, increased focus has been given to the cost, efficiency, safety, and competitive market for these centers. The exponential increase in numbers of facilities, procedures performed and reimbursed have led to questions about the appropriateness of procedures and the suspicion that overuse is significant. Since many of the 4900 centers are owned by physicians who benefit financially from their use, and because procedures performed in FASCs have a higher profit margin, questions have arisen about the net impact these factors have on runaway health costs resulting from overuse of surgical procedures. However, there is no data to support the current focus on these financial issues, and as yet there is no proven impetus for overuse in FASCs. One major aspect that has become an integral part in other health systems is establishing evidence-based procedural guidelines to curtail misuse and overuse.

Objective: The lack of literature in support of the supposed causative factors led to an analysis of another potential contributing element. The purpose of this investigation is to assess the degree to which these criteria are employed effects overuse and excess costs. It was also found that the FASC industry does not have a system of standards or evaluation to ensure that these measures are employed. Research using established criteria as guidelines shows that within the industry a significant percentage of procedures are unnecessary and inappropriate.

Conclusions: A major measure to decrease overuse and abuse in the FASC system must involve application of appropriateness criteria and a system to evaluate their usage. This element of safe and effective provider performance must be analyzed, as it holds large treatment, public policy, and financial implications.

Acknowledgements:
Co-author: Paul Keckley, PhD, Vanderbilt University, Department of Biomedical Engineering, Vanderbilt University, Robert Gallaway Jr., PhD and Alan Herline, MD, Division of General Surgery, Vanderbilt University.

Clay Kaiser

Background: Rectal cancer presents a meaningful problem in America. This cancer, with an overall 5-year survival rate of 62%, was diagnosed in over 40,000 men and women during 2005. This problem is coupled by a lack of techniques available to detect and stage rectal cancer that are fast, accurate, and inexpensive. MRI is one of the most reliable imaging modalities, but its relatively high cost and long examination time make it cost prohibitive. The feasibility of creating 3D volumes using tracked 2D ultrasound (ERUS) the imaging modality of choice. Improving the current technology of ERUS would help detect and stage the burden-some problem of rectal cancer.

Objective: To determine if tracked endorectal ultrasound is more accurate for staging rectal cancer than 2D ERUS.

Materials and Methods: The materials used to collect data for this study include an endorectal ultrasound probe, an infrared camera that tracks the position of the probe, and a computer that displays the images from the probe in their correct position as determined by the camera. The computer also creates a 3D volume by reconstructing the images captured from the tracked probe. This study was given IRB approval to enroll twenty patients who have been diagnosed with rectal cancer by standard ERUS or other imaging modalities and are undergoing surgical resection of their cancer. The data are collected on the day of their surgical resection. The 3D volumes generated are then compared to either the imaging used to diagnose the rectal cancer initially and/or the pathological analysis of the specimen to determine if any additional information regarding stage has been obtained.

Results: A total of 4 patients have been enrolled and evaluated at this time. Data were successfully gathered from each of these patients. 3D volumes have been created from the data. Comparing these volumes with standard ERUS or pathology specimen analysis is planned.

Conclusions: The feasibility of creating 3D volumes using tracked 2D ERUS on patients with rectal cancer has been demonstrated. The sensitivity of using these volumes to detect and stage rectal cancer is to be determined, and further research regarding this modality in improving the management of rectal cancer needs to be performed.

References:
The American Cancer Society: Statistics (www.cancer.org/docroot/STT/stt_0.asp)
School-Based Obesity Prevention Programs: An Evidence-Based Review

Jonathan A. Kropski

Background: Efforts to combat currently surging obesity trends span from medical / surgical treatments of obese individuals to non-specific television advertising promoting healthy lifestyle to the public. Schools have been suggested to be environments particularly well-suited for delivery of interventions designed to prevent overweight and obesity among children. Adequate assessment of these school programs is essential for the institution of appropriate, evidence-based public health policy at the local, state and federal levels.

Method: A systematic review of the medical literature published since 1990 was conducted to identify school-based curricular or environmental preventive interventions, with evaluation six months or greater after baseline, which reported primary or secondary outcome measures in terms of BMI, percent body fat, or prevalence of overweight and/or obesity.

Results: Fourteen studies were identified, including one comparing a nutrition-only program to control, four other studies reported significant improvements in BMI or at-risk for overweight/obesity prevalence in boys, girls or both. Eight studies reported significant improvement in measures of dietary intake. Favorable changes in physical activity and sedentary behavior achieved significance in eight studies.

Discussion: At present the available evidence is equivocal and not of sufficient quality to enable meaningful evaluation school-based overweight prevention programs. It appears that these interventions may facilitate increased physical activity, reduced sedentary behavior, and increased fruit and vegetable consumption and decreased fat intake over a course of six months to six years. Whether these behavior changes produce improvements in BMI, body fat or overweight prevalence is less certain and may require longer-term follow up than that offered by studies to date. Future funding should be contingent upon adequate evaluation of efficacy and long-term health outcomes.

Conclusion: Schools are one of many avenues of intervention that may offer opportunity to curb obesity trends among children in this country. While offering good face validity as a prospective solution, there are limited outcome data to support these programs. Increased experience in implementation of these interventions and sounder evaluation methodology in future studies should provide stronger guidance as to the ultimate role schools should play in combating obesity in the US.

Acknowledgments: Co-authors: Gordon J. Jensen, MD, PhD and Paul Keckley, PhD, Vanderbilt University Medical Center. Graziazi thanks are owed to Jeff Andrews, MD and Pati Thomas for their expertise and assistance.

Race And Sex Differences in Aids-Related Cause of Death in HIV-Infected Persons

Diana C. Lemly

Background: Cause of death (COD) can be an important indicator of the prevalence, severity, and management of a disease. This is particularly true with regards to HIV/AIDS, given the chronic nature of the disease and the well-documented benefits of antiretroviral therapy. Access to specialized healthcare and effective antiretroviral therapy delays progression of HIV-related disease and prolongs survival. Effective treatment has dramatically decreased the incidence of AIDS-defining illnesses. In HIV-infected populations, the proportion of deaths that are AIDS-related might serve as a marker for effective management.

Objectives: To assess for race and sex differences in AIDS- and non-AIDS-related causes of death among HIV-infected persons in the era of Highly Active Antiretroviral Therapy (HAART).

Methods: All patients who received care at the Comprehensive Care Center in Nashville, TN between August 1, 1997 and May 20, 2005 and subsequently died were included in the study. Cause of death (COD) was determined using a validated instrument.

Results: Of the 541 persons who met the inclusion criteria, COD was available for 432 (96%): 332 (77%) men, 100 (23%) women; 235 (54%) white patients and 193 (46%) non-white patients (data on race not available for 3 individuals). In the unadjusted analysis, women were more likely to have an AIDS-related COD than men (62% vs. 50%, p = 0.05) as were non-white compared to white patients (59% vs. 48%, p = 0.03). In a multivariable logistic regression model (that included sex, ART exposure, days from last visit to death, days in care, days from HIV diagnosis to death, alcohol abuse, depression, drug use and mental illness), AIDS-related cause of death was associated with non-white race (OR=1.67, p=0.03), younger age at death (OR=1.04, p=0.001), absence of HIV infection (OR=0.72, p=0.04) and refusal of ART (OR=3.49, p<0.001).

Conclusion: Non-white race was independently associated with an AIDS-related COD death. Despite widely available healthcare coverage, some subsets of the population may be less likely to benefit from advances in HIV treatment.

Factors Affecting Stress in Emergency Medicine Residents

Brent Lorentzen

Background: The stresses of graduate medical education have been widely recognized and investigated. It has been demonstrated that such occupational stress can lead to psychosocial dysfunction, depression, and impaired patient care. Rotations in emergency medicine are generally perceived as stressful; however there has been almost no study of specific factors that influence stress in emergency medicine residents.

Objectives: To identify specific factors correlated with increased stress in emergency medicine residents.

Materials and Methods: A cohort of emergency medicine residents from our institution volunteered to participate in this study. The data was collected during postgraduate training in the emergency medicine program. All eligible residents were provided with a brief questionnaire to be filled out at the completion of their training year.

Results: Of the 2006 residents, 120 (60%) responded. In a logistic regression model, number of shifts in a row and procedures performed were not correlated with elevated stress levels. Stress appeared to be a trend towards lower stress levels on night shifts. There was wide inter- and intra-individual variation in stress levels throughout the course of the study. Much of the data is still being evaluated at this time.

Conclusions: Specific events occurring during the course of a shift in the emergency medicine program significantly affect stress levels of the residents. As specific factors that have the greatest influence on stress are identified, appropriate interventions to alleviate these events may be designed and implemented with the goal of improving resident quality of life as well as patient care.

Acknowledgements: Co-authors: Ramin Timizar, MD, MPH, David S. Keckley, PhD, Andrew Marks, MD, Patti Thomas for their expertise and assistance. Andrew, MD and Patti Thomas for their expertise and assistance.
School-Based Obesity Prevention Programs: An Evidence-Based Review

Jonathan A. Kropski

Background: Efforts to combat currently surging obesity trends span from medical / surgical treatments of obese individuals to non-specific television advertising promoting healthy lifestyle to the public. Schools have been suggested to be environments particularly well-suited for delivery of interventions designed to prevent overweight and obesity among children. Adequate assessment of these school programs is essential for the institution of appropriate, evidence-based public health policy at the local, state and federal levels.

Method: A systematic review of the medical literature published since 1990 was conducted to identify school-based curricular or environmental preventive interventions, with evaluation six months or greater after baseline, which reported primary or secondary outcome measures in terms of BMI, percent body fat, or prevalence of overweight and/or obesity.

Results: Fourteen studies were identified, including one comparing a nutrition-only program to control, two involving physical activity promotion and recreation compared to controls, and eleven studies combining nutrition and physical activity components compared to controls. One trial offered strong (Grade 4) evidence of program efficacy, while 10 of the 14 studies constitute weak (Grade 2) quality evidence. One good quality three-year study reported a significant reduced odds ratio for overweight in girls only. Four other studies reported significant improvements in BMI or at-risk for overweight/overweight prevalence in boys, girls or both. Eight studies reported significant improvement in measures of dietary intake. Favorable changes in physical activity and sedentary behavior achieved significance in eight studies.

Discussion: At present the available evidence is equivocal and not of sufficient quality to enable meaningful evaluation school-based overweight prevention programs. It appears that these interventions may facilitate increased physical activity, reduced sedentary behavior, and increased fruit and vegetable consumption and decrease fat intake over a course of six months to six years. Whether these behavioral changes produce improvements in BMI, body fat or overweight prevalence is less certain and may require longer-term follow-up than that offered by studies to date. Future funding should be contingent upon adequate evaluation of efficacy and long term health outcomes.

Conclusion: Schools are one of many avenues of intervention that may offer opportunity to curb obesity trends among children in this country. While offering good face validity as a prospective solution, there are limited outcome data to support these programs. Increased experience in implementation of these interventions and sounder evaluation methodology in future studies should provide stronger guidance as to the ultimate role schools should play in combating obesity in the US.

Acknowledgments: Co-authors: Gordon J. Jenicek, MD, PhD and Paul Keckley, PhD, Vanderbilt University Medical Center. Grazioso thanks are owed to Jeff Andrews, MD and Pati Thomas for their expertise and assistance.

Race And Sex Differences In Aids-Related Cause of Death in HIV-Infected Persons

Diana C. Lemly

Background: Cause of death (CAD) can be an important indicator of the prevalence, severity, and management of a disease. This is particularly true with regards to HIV/AIDS, given the chronic nature of the disease and the well-documented benefits of antiretroviral therapy. Access to specialized healthcare and effective antiretroviral therapy delays progression of HIV-related disease and prolongs survival. Effective treatment has dramatically decreased the incidence of AIDS-defining illnesses. In HIV-infected populations, the proportion of deaths that are AIDS-related might serve as a marker for effective management.

Objectives: To assess for race and sex differences in AIDS- and non-AIDS-related causes of death among HIV-infected persons in the era of Highly Active Antiretroviral Therapy (HAART).

Methods: All patients who received care at the Comprehensive Care Center in Nashville, TN between August 1, 1997 and May 20, 2005 and subsequently died were included in the study. Cause of death (CAD) was determined using a validated instrument.

Results: Of the 541 persons who met the inclusion criteria, COD was available for 432 (80%): 332 (77%) men, 100 (23%) women; 235 (54%) white patients and 193 (46%) non-white patients (data on race not available for 3 individuals). In the unadjusted analysis, women were more likely to have an AIDS-related COD than men (62% vs. 50%, p = 0.05) as were non-white compared to white patients (59% vs. 48%, p = 0.03). In a multivariable logistic regression model (that included sex, ART exposure, days from last visit to death, days in care, days from HIV diagnosis to death, alcohol abuse, depression, drug use and mental illness), AIDS-related cause of death was associated with non-white race (OR=1.72, p=0.04), younger age at death (OR=1.04, p<0.001), absence of HCV infection (OR=0.72, p=0.04) and refusal of ART (OR=3.49, p=0.001).

Conclusion: Non-white race was independently associated with an AIDS-related COD death. Despite widely available healthcare coverage, some subsets of the population may be less likely to benefit from advances in HIV treatment.

Factors Affecting Stress in Emergency Medicine Residents

Brent Lorenzen

Background: The stresses of graduate medical education have been widely recognized and investigated. It has been demonstrated that such occupational stress can lead to psychosocial dysfunction, depression, and impaired patient care. Rotations in emergency medicine are generally perceived as stressful; however there has been almost no study of specific factors that influence stress in emergency medicine residents.

Objectives: To identify specific factors correlated with increased stress in emergency medicine residents.

Materials and Methods: Medical residents in the second and third year of postgraduate training in emergency medicine were studied at a major academic medical center. Upon completion of randomly selected shifts, the subjects filled out a brief questionnaire that included a modified version of the Perceived Stress Questionnaire (PSQ), a perceived stress level using a visual analog scale, and reporting of specific events during the shift including procedures performed, process failures, and negative interactions. Additional data including patient acuity, number of patients seen, number of consultations, and waiting room time was obtained from the bioinformatics system. Twelve surveys were collected from each resident with four each from day, evening, and night shifts. An analysis of variance was performed on selected factors to determine their relationship with measured stress levels.

Results: The visual analog stress scale correlated with the stress measurements obtained from the PSQ (r=0.46, p<0.001). Process failures, negative interactions, and bad outcomes were all correlated with increased stress. The number of shifts in a row and procedures performed were not correlated with elevated stress levels. There appears to be a trend towards lower stress levels on night shifts. There was wide intra- and inter- individual variation in stress levels throughout the course of the study. Much of the data is still being evaluated at this time.

Conclusions: Specific events occurring during the course of a shift in the emergency medicine residency significantly affect stress levels of the residents. As specific factors that have the greatest influence on stress are identified, appropriate interventions to either minimize these events or alleviate the associated stress can be designed and implemented with the goal of improving resident quality of life as well as patient care.
The Adequacy of Pain Management in Vanderbilt Children’s Hospital
Carrie C. McCoy

Background/Problem: Across healthcare, there is a continued effort to determine the adequacy of pain management practices and improve these methods of care, especially in pediatrics where pain is often inadequately assessed and treated. For the last several years, Vanderbilt Children’s Hospital has increased its attention on pain management, but no study has evaluated the current practices of pain management, and parental/patient satisfaction with these methods.

Objectives: The objective of the study was to evaluate the adequacy of the current methodology of assessment, intervention, and reassessment of pain in Vanderbilt Children’s Hospital and to identify areas for improvement.

Materials and Methods: This study used a quality improvement method that combined questionnaires and chart review to evaluate patient, parent, and staff perception of pain management, frequency of pain assessment, and reassessment of pain after treatment. The study took place on the 7th and 8th floors of Vanderbilt Children’s Hospital. Participants included patients age 6 and up that were admitted to those floors between the dates of July 3, 2005 and July 30, 2005, parents/guardians of those patients, and attending physicians, residents, and nurses caring for the patients participating in the study. The data was analyzed using descriptive statistics.

Results: The results showed that 97% of patients were happy with how their pain was managed, and that 93.7% of parents were either very satisfied or satisfied with the treatment of their child’s pain. On average, physicians and nurses reported that they believed the patients and patient’s parents were either very satisfied or satisfied with the treatment of pain 92.5% of the time. Parents and nurses also reported similar frequencies of pain assessment per shift.

Conclusions: In conclusion, the study suggests that pain management in Vanderbilt Children’s Hospital is adequate and satisfactory to both patients and their parents. While the data support high satisfaction with the process, important barriers to pain management were identified by the staff and present opportunities for improvement in pain management.

Measuring Performance of Antibiotic Treatment in Preterm Premature Rupture of Membranes
Sofie F. Rahman

Background: Assessing compliance with evidence-based guidelines through performance measures is vital to improving the quality of healthcare. Measures for obstetric care are limited as are descriptions of the important considerations in designing a measure for this area. The current realization of the need to align care with evidence and develop performance measures is reflected by the expansion of pay for performance programs.

Objectives: To devise a performance measure for the use of antibiotics in treating preterm premature rupture of membranes (pPROM) and to describe considerations necessary in its design.

Materials and Methods: A literature search was performed identifying current evidence-based guidelines for antibiotic use in pPROM. A performance measure was formulated. Records of patients with pPROM who presented to a major academic medical center in a one-year period were examined. In particular, demographic data, GBS status, antibiotic use, and outcomes were noted. Based on this data, the performance measure was refined.

Results: Of 70 maternal charts examined, 20 were excluded. There was a 94% compliance rate with antibiotic administration. Two of the patients were given amoxicillin-clavulanate, a divergence from the guideline. Patients received a wide variety of antibiotics and some received up to five different types. Erythromycin was used most often, in 52% of the patients, and ampicillin was second most common, used in 48% of the patients.

Conclusions: Treatment of pPROM with antibiotics generally followed guidelines, nevertheless some deviations existed. From the findings, a specific performance measure was proposed. Medical institutions should employ a performance measure such as the one suggested to monitor their practice. One possible consideration to limit variability and improve cost-effectiveness in using antibiotics is the use of computerized physician order entry prompt.

Acknowledgements
Co-authors: Jeff Andrews, MD and Paul Keckley, PhD, Vanderbilt University Medical Center. In addition, R. Chandler Miniat.

Does Shoe Insole Modification Prevent Stress Fractures?
A SYSTEMATIC REVIEW
Rebecca A. Snyder

Background: Stress fractures are a significant problem for athletes and for certain high-risk populations. Shock-absorbent insoles have been proposed as a preventative method.

Hypothesis: Shock-absorbent insoles prevent stress fractures in high-risk populations.

Study Design: An evidence-based, systematic review was performed to evaluate the effect of shock-absorbent insoles on overall stress fracture incidence in a high-risk population.

Methods: An exhaustive review of the English literature was conducted using MEDLINE, the Cochrane databases, Current Controlled Trials, UK National Research Register, ScienceDirect, CINAH, and EMBASE. Using the search terms ‘stress fracture,’ ‘prevention,’ and ‘clinical trial,’ 27 articles were identified. Studies were systematically analyzed for study design, potential bias, and methodological flaws. Analytic techniques were scrutinized and statistical significance was weighed against clinical significance.

Results: Of the 27 manuscripts identified, five randomized or quasi-randomized controlled trials evaluating the use of shock-absorbent insoles for the prevention of stress fractures were included for review. Only one methodologically flawed study reported a significant reduction in stress fracture incidence in military personnel wearing insoles compared to controls.

Conclusions: Based on the best available evidence, there appears to be no clinical benefit to using shock absorbent insoles for the prevention of stress fractures in active-duty military personnel.

Clinical Relevance: Studies in young, active-duty military personnel show little evidence to support the use of insoles for stress fracture prevention in high-risk populations. Since the only high-risk population studied with any rigor was the military however, one must use caution when extrapolating these results to other high-risk populations such as competitive athletes.

Acknowledgements

HIPAA From the Patient’s Perspective
Samuel Snyder

Background: The Privacy Rule of the Health Information Portability and Accountability Act (HIPAA) went into effect in April, 2003. HIPAA has been a frequent topic of discussion in the medical community, and its impact upon researchers and clinicians has been discussed at great length. However, the patient’s experience of HIPAA has not been nearly as well described.

Methods: This project builds on previous work performed by The Vanderbilt Center for Patient and Professional Advocacy (CPPA) which utilizes the Patient Advocates
The Adequacy of Pain Management in Vanderbilt Children’s Hospital

Carrie C. McCoy

Background/Problem: Across healthcare, there is a continued effort to determine the adequacy of pain management practices and improve these methods of care, especially in pediatrics where pain is often inadequately assessed and treated. For the last several years, Vanderbilt Children’s Hospital has increased its attention on pain management, but no study has evaluated the current practices of pain management in the Children’s Hospital and parental/patient satisfaction with these methods.

Objectives: The objective of the study was to evaluate the adequacy of the methods of assessment, intervention, and reassessment of pain in Vanderbilt Children’s Hospital and to identify areas for improvement.

Materials and Methods: This study used a quality improvement method that combined questionnaires and chart review to evaluate patient, parent, and staff perception of pain management, frequency of pain assessment, and reassessment of pain after treatment. The study took place on the 7th and 8th floors of Vanderbilt Children’s Hospital. Participants included patients age 6 and up that were admitted to those floors between the dates of July 3, 2005 and July 30, 2005, parents/guardians of those patients, and attending physicians, residents, and nurses caring for the patients participating in the study. The data was analyzed using descriptive statistics.

Results: The results showed that 97% of patients were happy with how their pain was managed, and that 93.7% of parents were either very satisfied or satisfied with the treatment of their child’s pain. On average, physicians and nurses reported that they believed the patients and patient’s parents were either very satisfied or satisfied with the treatment of pain 92.5% of the time. Parents and nurses also reported similar frequencies of pain assessment per shift.

Conclusions: In conclusion, the study suggests that pain management in Vanderbilt Children’s Hospital is adequate and satisfactory to both patients and their parents. While the data support high satisfaction with the process, important barriers to pain management were identified by the staff and present opportunities for improvement in pain management.

Acknowledgements: The authors would like to acknowledge Dr. Jay Deshpande for his guidance and contribution, as well as the nursing staff.

Measuring Performance of Antibiotic Treatment in Preterm Premature Rupture of Membranes

Sofie F. Rahman

Background: Assessing compliance with evidence-based guidelines through performance measures is vital to improving the quality of healthcare. Measures for obstetric care are limited as are descriptions of the important considerations in designing a measure for this area. The current realization of the need to align care with evidence and develop performance measures is reflected by the expansion of pay for performance programs.

Objectives: To devise a performance measure for the use of antibiotics in preterm premature rupture of membranes (pPROM) and to describe the considerations necessary in its design.

Materials and Methods: A literature search was performed identifying current evidence-based guidelines for antibiotic use in pPROM. A performance measure was formulated. Records of patients with pPROM who presented to a major academic medical center in a one-year period were examined. In particular, demographic data, GBS status, antibiotic use, and outcomes were noted. Based on this data, the performance measure was refined.

Results: Of 70 maternal charts examined, 20 were excluded. There was a 94% compliance rate with antibiotic administration. Two of the patients were given amoxicillin-clavulanate, a divergence from the guideline. Patients received a wide variety of antibiotics and some received up to five different types. Erythromycin was used most often, in 52% of the patients, and ampicillin was second most common, used in 48% of the patients.

Conclusions: Treatment of pPROM with antibiotics generally followed guidelines, nevertheless some deviations existed. From the findings, a specific performance measure was proposed. Medical institutions should employ a performance measure such as the one suggested to monitor their practice. One possible consideration to limit variability and improve cost-effectiveness in using antibiotics is the use of computerized physician order entry prompt.


Does Shoe Insole Modification Prevent Stress Fractures?

A SYSTEMATIC REVIEW

Rebecca A. Snyder

Background: Stress fractures are a significant problem for athletes and for certain high-risk populations. Shock-absorbent insoles have been proposed as a preventative method.

Hypothesis: Shock-absorbent insoles prevent stress fractures in high-risk populations.

Methods: An exhaustive review of the English literature was conducted using MEDLINE, the Cochrane databases, Current Controlled Trials, UK National Research Register, ScienceDirect, CINAHL, and EMBASE. Using the search terms ‘stress fracture,’ ‘prevention,’ and ‘clinical trial,’ 27 articles were identified. Studies were systematically analyzed for study design, potential bias, and methodological flaws. Analytic techniques were scrutinized and statistical significance was weighed against clinical significance.

Results: Of the 27 manuscripts identified, five randomized or quasi-randomized controlled trials evaluating the use of shock-absorbent insoles for the prevention of stress fractures were included for review. Only one methodologically flawed study reported a significant reduction in stress fracture incidence in military personnel wearing insoles compared to controls.

Conclusions: Based on the best available evidence, there appears to be no clinical benefit to using shock absorbent insoles for the prevention of stress fractures in active-duty military personnel.

Clinical Relevance: Studies in young, active-duty military personnel show little evidence to support the use of insoles for stress fracture prevention in high-risk populations. Since the only high-risk population studied with any rigor was the military, however, one must use caution when extrapolating these results to other high-risk populations such as competitive athletes.


HITPA From the Patient’s Perspective

Samuel Snyder

Background: The Privacy Rule of the Health Information Portability and Accountability Act (HIPAA) went into effect in April, 2003. HIPAA has been a frequent topic of discussion in the medical community and its impact upon researchers and clinicians has been discussed at great length. However, the patient’s experience of HIPAA has not been nearly as well described.

Methods: This project builds on previous work performed by The Vanderbilt Center for Patient and Professional Advocacy (CPPA) which utilizes the Patient Advocates...
Reporting System (PARSom), a computer program developed to aggregate and classify unsolicited complaints from offices of Patient Affairs at medical centers throughout the country.

We developed a coding scheme for confidentiality/privacy/HIPAA-related complaints (hereinafter, “HIPAA-related complaints”) that was modeled on the PARS coding scheme. Complaint reports from these medical centers were retrieved from the PARS database if they met the following criteria: previous classification under PARS as a confidentiality violation, and/or the presence of a confidentiality-related keyword in the complaint narrative report (e.g., “hipaa”, “hippa”, “privacy”, “overheard”) and dated between April 2001 and April 2005 (thus facilitating comparison of results for 2 years pre- and post-HIPAA imple-mentation). Each complaint was then classified by one of two raters.

Results: The proportion of all HIPAA-related complaints for the four years examined was low—between 1% and 2% for all 3 medical centers. Nevertheless, at every location the proportion of HIPAA-related complaints increased post-HIPAA implementation—by 49%, 1056%, and 49%.

Conclusions: The increase in the proportion of HIPAA-related complaints since the implementation of HIPAA may be related to a HIPAA-inspired increased awareness of confidentiality and privacy issues. We postulate that this may be the result of increased confidentiality and privacy-type complaints by patients, or greater vigilance by Patient Affairs officials in recording such complaints. The high proportion of complaints about increased burdensome privacy policies at every institution suggests that in the post-HIPAA era, greater attention to information security has increased patient inconvenience.

The Efficacy of A Computer-Based Prompt for Deep Venous Thrombosis Prophylaxis
Paul Stromberg

Introduction: Approximately 2 million Americans develop deep venous thrombosis (DVT) per year. Pulmonary Embolism (PE) is a serious complication that occurs in 10-26% of patients with DVT, 25% present with sudden death.1,2 PE causes 200,000 deaths per year and is the leading cause of preventable death in hospitals.3 In the absence of prophylaxis, adult medical and surgical inpatients develop DVT in 10–40% of hospital admissions.4 Vanderbilt University Hospital policy dictates that all patients 18 and over receive DVT prophylaxis, either using pharmaceutical anti-coagulation or mechanical sequential pneumatic compression. To increase prophylaxis usage at Vanderbilt University Hospital a DVT advisor was added to the WinOrder Care Provider Order Entry (CPOE) system in 2002.

Methods: An anonymous retro- spective analysis was performed on all adult patients admitted to Vanderbilt University Hospital from July 1, 2000 to June 30, 2005. Prophylaxis given within the first 24 hours of admission was arbitrarily defined as “upon admission.” Resource utilization, the length of stay, discharge diagnosis and hospi- tal mortality rates were compared between patients given prophylaxis and patients not given prophylaxis.

Results: During the five-year interval, 78,992 adult patients over the age of 18 experienced 124,865 hospital admissions. Addition of the DVT advisor in June of 2002 significantly increased the rate of prophylaxis usage from 37% to 58%. Usage of anticoagulation therapy, most notably unfractionated Heparin significantly increased from 25% to 40% following the installation of the DVT advisor to WinOrder. Other differences between prophylaxis and non-prophylaxis groups remain to be analyzed.

Conclusions: A computer-based prompt can be successfully employed to increase rates of DVT prophylaxis usage at a large academic medical center.

Long-Term Complications in PEG and PEGJ Feeding Tubes
Jan P. Vobecky

Background: Gastrointestinal feeding is vital to the care of critically ill and chronically ill patients. Despite the importance of nutritional sup- port, the best method of adminis- tration is still highly debated.

Objectives: This study focuses on long-term complications of two feeding methods: PEG (percutaneous endoscopic gastrostomy) and PEGJ (percutaneous endoscopic transgastric jejunostomy). Based on an understanding of the long term complications, health care providers will be able to better assess the most appropriate feeding method to use in specific populations to achieve the maximum benefit with the fewest complications.

Materials and Methods: All patients who underwent PEG or PEGJ placement at Vanderbilt University Medical Center by Drs. Willie Melvin and Michael Holzman were accessed from the surgeons’ records. Starpanel was accessed to acquire information per-taining to patient demographics and diagnoses, feeding tube placement, and complications. Complications assessed included patency, accidental removal, technical issues, erosion, fistula formation, and perforation. Outcomes variables were evaluated considering patients’ demographics: sex, age, race, and indications (neurological, ENT, gastrointestinal, malnutrition, pulmonary, or other).

Results: A total of 255 patients underwent surgical placement of PEG (142) or PEGJ (123) tubes. A total of 37 complications were recorded: PEG (19) or PEGJ (18). The complication hazard ratio was 1.4 times as likely with PEGJ and a P>|z| of 0.277. Multivariate logistic regression models for indi- cations: procedure, age, gender, race (Caucasian, African American, other, and unknown) had the fol- lowing P>|z| values: 0.283, 0.305, 0.382, 0.694, 0.825, 0.975.

Conclusions: Long term complica- tions were 1.4 times as likely to occur in patients undergoing the more technical PEGJ procedure. However upon statistical analysis this proved not to be a significant difference. All outcomes variables evaluated considering patients’ demographics: sex, age, race, and indications proved to play no role in the overall morbidity or mortality with regard to the feeding tube complications.

Acknowledgements:
Co-authors: Michael D. Holzman, MD, MPH and Benjamin K. Paulus, MD, Vanderbilt University Medical Center.

Medical Humanities

Medical Humanities encompasses a wide array of disciplines, each with its own literature, methods and issues. These disciplines have in common is the focus on human experience and an examination of human values. The core activity of the medical humanities is critical reading and interpretation of texts that speak to central human issues in medicine and healthcare. Among the areas available to students are bioethics, philosophy of medicine, history of medicine and science, literature and medicine, religion/spirituality and medicine.

Mark Bilton is an Associate Professor in the Department of Philosophy, and the Department of Philosophy at Vanderbilt University. He serves as the Chief of Vanderbilt University Medical Center’s Clinical
The Efficacy of A Computer-Based Prompt for Deep Venous Thrombosis Ph prophylaxis

Paul Stromberg

Introduction: Approximately 2 million Americans develop deep venous thrombosis (DVT) per year. Pulmonary Embolism (PE) is a serious complication that occurs in 10-26% of patients with DVT; 25% present with sudden death.1,2 PE causes 200,000 deaths per year and is the leading cause of preventable death in hospitals.1 In the absence of prophylaxis, adult medical and surgical inpatients develop DVT in 10-40% of hospital admissions.1 Vanderbilt University Hospital policy dictates that all patients 18 and over receive DVT prophylaxis, either using pharmacological anti-coagulation or mechanical sequential pneumatic compression. To increase prophylaxis usage at Vanderbilt University Hospital a DVT advisor was added to the WinOrder Care Provider Order Entry (CPOE) system in 2002.

Methods: An anonymous retrospective analysis was performed on all adult patients admitted to Vanderbilt University Hospital in the 2 years pre- and post-HIPAA implementation—by 21%, 1056%, and 49%.

Results: During the five-year interval, 78,992 adult patients over the age of 18 experienced 124,865 hospital admissions. Addition of the DVT advisor in June of 2002 significantly increased the rate of prophylaxis usage from 37% to 59%. Usage of anticoagulation therapy, most notably unfractionated Heparin significantly increased from 25% to 40% following the installation of the DVT advisor to WinOrder. Other differences between prophylaxis and non-prophylaxis groups remain to be analyzed.

Conclusions: A computer-based prompt can be successfully employed to increase rates of DVT prophylaxis usage at a large academic medical center.

References:

Acknowledgements:
Co-investigators: Lomuel R. Waterman, PhD, Ali Ozdas, PhD, MS, Randolph A. Miller, MD, and Art Wheeler, MD, Vanderbilt University Medical Center.

Long-Term Complications in PEG and PEGJ Feeding Tubes

Jan P. Voblec

Background: Gastrointestinal feeding is vital to the care of critically ill and chronically ill patients. Despite the importance of nutritional support, the best method of administration is still highly debated.

Objectives: This study focuses on long-term complications of two feeding methods: PEG (percutaneous endoscopic gastrostomy) and PEGJ (percutaneous endoscopic transgastric jejunostomy). Based on an understanding of the long term complications, health care providers will be able to better assess the most appropriate feeding method to use in specific populations to achieve the maximum benefit with the fewest complications.

Materials and Methods: All patients who underwent PEG or PEGJ placement at Vanderbilt University Medical Center by Drs. Willie Melvin and Michael Holmman were accessed from the surgeons’ records. Starpanel was accessed to acquire information pertaining to patient demographics and diagnoses, feeding tube placement, and complications. Complications assessed included patency, accidental removal, technical issues, erosion, fistula formation, and perforation. Outcomes variables were evaluated considering patients’ demographics: sex, age, race, and indications (neurological, ENT, gastrointestinal, malnutrition, pulmonary, or other).

Results: A total of 255 patients underwent surgical placement of PEG (142) or PEGJ (123) feeding tubes. A total of 37 complications were recorded: PEG (19) or PEGJ (18). The complication hazard ratio was 1.4 times as likely with PEGJ and a P>|z| of 0.277. Multivariate logistic regression models for indications: procedure, age, gender, race (Caucasian, African American, other, and unknown) had the following P>|z| values: 0.283, 0.305, 0.382, 0.694, 0.825, 0.975.

Conclusions: Long term complications were 1.4 times as likely to occur in patients undergoing the more technical PEGJ procedure. However, upon statistical analysis this proved not to be a significant difference. All outcomes variables evaluated considering patients’ demographics: sex, age, race, and indications proved to play no role in the overall morbidity or mortality with regard to the feeding tube complications.

Acknowledgements:
Co-authors: Michael D. Holman, MD, MPH and Benjamin R. Paulse, MD, Vanderbilt University Medical Center.

Medical Humanities

Medical Humanities encompasses a wide array of disciplines, each with its own literature, methods and issues. What these disciplines have in common is the focus on human experience and an examination of human values. The core activity of the medical humanities is critical reading and interpretation of texts that speak to central human issues in medicine and healthcare. Among the areas available to students are bioethics, philosophy of medicine, history of medicine and science, literature and medicine, religion/spirituality and medicine.

Mark Bliton is an Associate Professor in the Department of Medicine, with secondary appointments in the Department of Obstetrics and Gynecology and the Department of Philosophy at Vanderbilt University. He serves as the Chief of Vanderbilt University Medical Center’s Clinical

Vanderbilt EndoJournal • 2006

28 Vanderbilt University Medical Center Journal of Emphasis

33
An Investigation of the Problem of Access: Exploring Universal Healthcare

Laura K. Altom

Background/Problem: More than 45 million Americans suffer the consequences of being uninsured. These people are less likely to receive preventive care, are more likely to be hospitalized for avoidable health problems, and are more likely to be diagnosed in the late stages of disease.

Objectives: To explore the problem of the increasing uninsured population on both an individual and national level, and to investigate solutions to the problem.

Materials and Methods: By researching articles, texts, news sources, and through direct interviews with interested and involved persons, I sought to become knowledgeable as possible on the issues of healthcare in the U.S., political proposals for healthcare reform, and how healthcare systems function in other countries. I also formed my own opinions on the issue of the uninsured, access to healthcare, and universal healthcare, and I became involved with organizations and activities that advocate for reform in the U.S. healthcare system. I have worked and will continue to work on submitting opinion articles on the subject.

Results: I gained a working knowledge of the current state of access to healthcare in the US, and I am currently applying that knowledge to articles. I will submit an opinion article to the Tennessean discussing the merits and pitfalls of the President’s suggestions for healthcare reform as mentioned in his recent State of the Union Address. I am working with Dr. Larry Churchill on an article for submission to MedGenMed, an online medical journal, by April 1.

Conclusions: This project has expanded my knowledge of the state of access to healthcare in the U.S., and has given me a foundation from which I will continue to work in the push for universal healthcare in the immediate and distant future.


Acceptance: I am working with Dr. Larry Churchill, Vanderbilt University Medical Center. Plus Patricia Temple, John Sergent, Frank Bohm, George Hill, Clifton Meader, Josh Perry, Page Kranbuhl, Mark Ernst and Marion Daniels.

A Window

Robert Connor

This project, a series of personal essays, attempts to document the integration of medicine into my own life. Considering the ideas of medicine and medical education as they approach, and often consume, my personal life will, I hope, give the reader a deeper sense of their implications and a flavor for what I believe to be the deep intimacy and humanity of every idea.

Among others, I considered the following questions:

“When a person becomes a professional, what part of their profession is personal?”

“Why is it good to be a medical student?”

“Could any information at all possibly be worth all the bother involved in churning out answers to such irritatingly ambiguous questions?”

Excerpts

Whatever the nature of healing may be, we must believe blindly in our ability to actualize it.

“In asking, the patient has demanded that the physician examine the extent of their capability...knowledge, I think, is the easiest ignorance to admit.”

“It’s remarkable, but what’s educated and prudent in the lecture hall in duplicitous and mendacious in the clinic...real life is a parallel universe.”

“A curious symmetry – love and medicine. Both so far beyond my grasp, and both chosen with that dewy-eyed abandon...”

Missed Opportunities: A Descriptive Assessment of Teaching and Attitudes Regarding Communication Skills in a Surgical Residency

Olivia A. Hurlt

Background: The ACGME requires that "residents must be able to demonstrate interpersonal and communication skills". We sought to assess current methods of teaching and attitudes regarding communication skills in our surgical residency.

Methods: After obtaining IRB exemption, voluntary anonymous surveys were completed by a sample of convenience at our institution: surgical residents at Grand Rounds and attending surgeons in a faculty meeting. Data were evaluated from 49 respondents (33 of 75 total surgical residents, 16 representative attending surgeons).

Results: 100% of all respondents rated the importance of communication to the successful care of patients as “4” or “5” out of 5. Direct attending observation of residents communicating with patients/families was confirmed by residents and faculty.

Residents reported varying levels of comfort with different types of conversations. Residents were “comfortable” or “very comfortable” as follows: obtaining informed consent (91%); reporting operative findings (64%); delivering bad news (61%); conducting a family conference (48%); discussing DNR orders (36%); discussing transition to comfort care (24%).

Resident receptiveness to communication skills education varied with proposed venues: 84% favored teaching in the course of routine clinical care; 52% via online resources; 46% in workshops.

Residents were asked how frequently they received feedback specific to their communication skills during the past 6 months: the majority of residents reported zero (39%) or one (21%) feedback episode. Only 30% of resident respondents reported receiving feedback that they perceived helpful.

Attending surgeons reported they did provide resident feedback specific to their communication skills. When asked to estimate the number of feedback episodes in the last 6 months, 16 faculty members reported a total of 67 feedback episodes, while 33 residents reported a total of only 24 episodes.

The majority of faculty members rated their comfort with providing feedback specific to communication skills as “very comfortable” (56%) or “comfortable” (19%). “Time constraints” was the most frequently cited barrier to teaching communication skills.

Conclusions: Communication skills are valued as integral to patient care by both residents and faculty in this study. Residents are most receptive to teaching of communication skills in the clinical setting. Faculty members report they are providing feedback to residents. Although residents report direct observation by faculty, currently only a minority (30%) are receiving feedback regarding communication that they consider helpful. There is a need to facilitate the feedback process to resolve this discrepancy. We propose that a standardized instrument to evaluate communication skills may strengthen the feedback process.

Acknowledgments: Co-authors: R.O. Carpenter, MD, J. Tarpley, MD, and K.D. Lamis, MD, Vanderbilt University Medical Center.
An Investigation of the Problem of Access: Exploring Universal Healthcare

Laura K. Alton

Background/Problem: More than 45 million Americans suffer the consequences of being uninsured. These people are less likely to receive preventive care, are more likely to be hospitalized for avoidable health problems, and are more likely to be diagnosed in the later stages of disease.

Objectives: To explore the problem of the increasing uninsured population on both an individual and national level, and to investigate solutions to the problem.

Materials and Methods: By researching articles, texts, news sources, and through direct interviews with interested and involved persons, I sought to become as knowledgeable as possible on the issues of healthcare in the U.S., political proposals for healthcare reform, and how healthcare systems function in other countries. I also formed my own opinions on the issue of the uninsured, access to healthcare, and universal healthcare, and I became involved with organizations and activities that advocate for reform in the U.S. healthcare system. I have worked and will continue to work on submitting opinion articles on the subject.

Results: I gained a working knowledge of the current state of access to healthcare in the U.S., and I am currently applying that knowledge to articles. I will submit an opinion article to the Tennessean discussing the merits and pitfalls of the President’s suggestions for healthcare reform as mentioned in his recent State of the Union Address. I am working with Dr. Larry Churchill on an article for submission to MedGenMed, an online medical journal, by April 1.

Conclusions: This project has expanded my knowledge of the state of access to healthcare in the U.S., and has given me a foundation from which I will continue to work in the push for universal healthcare in the immediate and distant future.


Acknowledgements:

Co-author: Larry Churchill, Vanderbilt University Medical Center.

Plus Patricia Temple, John Sergent, Frank Boehm, George Hill, Clifton Meader, Josh Perry, Page Kranabal, Mark Ernst and Marion Daniel.

A Window

Robert Conners

This project, a series of personal essays, attempts to document the integration of medicine into my own life. Considering the ideas of medicine and medical education as I approach, and often consume, my personal life will, I hope, give the reader a deeper sense of their implications and a flavor for what I believe to be the deep intimacy and humanity of every idea.

Among others, I considered the following questions:

“When a person becomes a professional, what part of their profession is personal?”

“Why is it good to be a medical student?”

“Could any information at all possibly be worth all the bother involved in churning out answers to such irritatingly ambiguous questions?”

“Whatever the nature of healing may be, we must believe blindly in our ability to actualize it.”

“In asking, the patient has demanded that the physician examine the extent of their capability...knowledge, I think, is the easiest ignorance to admit.”

“It’s remarkable, but what’s educated and prudent in the lecture hall in duplicitous and mendacious in the clinic…real life is a parallel universe.”

“A curious symmetry—love and medicine. Both so far beyond my grasp, and both chosen with that dewy-eyed abandon…”

Missed Opportunities: A Descriptive Assessment of Teaching and Attitudes Regarding Communication Skills in a Surgical Residency

Olivia A. Hartl

Background: The ACGME requires that “residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients families, and professional associates.” We sought to assess current methods of teaching and attitudes regarding communication skills in our surgical residency.

Methods: After obtaining IRB exemption, voluntary anonymous surveys were completed by a sample of convenience at our institution: surgical residents at Grand Rounds and attending surgeons in a faculty meeting. Data were evaluated from 49 respondents (33 of 75 total surgical residents, 16 representative attending surgeons).

Results: 100% of all respondents rated the importance of communication to the successful care of patients at “4” or “5” out of 5. Direct attending observation of residents communicating with patients/families was confirmed by residents and faculty.

Residents reported varying levels of comfort with different types of conversations. Residents were “comfortable” or “very comfortable” as follows: obtaining informed consent 91%; reporting operative findings 64%; delivering bad news 61%; conducting a family conference 40%; discussing DNR orders 36%; discussing transition to comfort care 24%.

Resident receptiveness to communication skills education varied with proposed venues: 84% favored teaching in the course of routine clinical care; 52% via online resources; 46% in workshops.

Residents were asked how frequently they received feedback specific to their communication skills during the past 6 months: the majority of residents reported zero (39%) or one (21%) feedback episode. Only 30% of resident respondents reported receiving feedback that they perceived helpful.

Attending surgeons reported they did provide residents feedback specific to their communication skills. When asked to estimate the number of feedback episodes in the last 6 months, 16 faculty members reported a total of 67 feedback episodes, while 33 residents reported a total of only 24 episodes.

The majority of faculty members rated their comfort with providing feedback specific to communication skills as “very comfortable” (56%) or “comfortable” (19%). “Time constraints” was the most frequently cited barrier to teaching communication skills.

Conclusions: Communication skills are valued as integral to patient care by both residents and faculty in this study. Residents are the most receptive to teaching of communication skills in the clinical setting. Faculty members report they are providing feedback to residents. Although residents report direct observation by faculty, currently only a minority (30%) are receiving feedback regarding communication that they consider helpful. There is a need to facilitate the feedback process to resolve this discrepancy. We propose that a standardized instrument to evaluate communication skills may strengthen the feedback process.

Acknowledgements:

Co-authors: B.O. Carpento, MD, J. Tarpily, MD, and K.D. Lamis, MD, Vanderbilt University Medical Center.

The hallmark of my experience with the students in the Humanities area was the diversity of the interests they embraced. Combined with the energy and focus they applied to their projects, that range of interests presents the initial strength of the Emphasis Program as these students grow to meet the dual challenges of a dynamic and increasingly stratified health care system.
Critical Theory of International Relief Documentary

Andrew Keyes

This project explored the ways that relief documentaries are made and how documentaries affect people who view them. International relief documentary seeks to persuade its viewers both that a particular problem exists, for example world hunger, and that there is a course of action which can help ameliorate the problem, political action. By working with an experienced filmmaker who produces documentaries in the area of medical relief I gained insight in the way global health problems are perceived around the world and how documentaries are used to gain support for health programs.

The actual work had several dimensions. The first was the exploration of documentary theory. Consisting of viewing many classic documentaries and reading books which analyze filmmakers’ techniques such as surrealism and reflexivity I was able to view documentaries in a more sophisticated light.

Using my knowledge of documentary theory, I then visited Cambodia to film and implement an international medical relief program. The project was to educate doctors in developing countries on the use of a network of US physicians who agreed to take consults from physicians in developing countries. Through participating in the process work and filmmaking I was able to help portray the complexity of the project and the way it presented solutions to the problem of lack of specialists in developing countries.

Through script writing, interviewing and filming I was able to see the value and limitations of film. The editing for the film will likely be done by late April or May (2006), but the process of making the documentary has been in itself a way of attracting attention to our project and has helped gain support for the ideas presented in it. In the future the documentary will be used at Vanderbilt and the US to recruit physicians and solicit donations for money and equipment.

Novella

Kevin Liaw

Abstract: For my Emphasis project, I was interested in creatively writing a story that dealt with the future of medicine. Essentially, what are the problems that doctors may face in the future, and how will new medical technology affect our society as a whole. Is new technology always better? These main questions helped guide my ideas through these last few months of writing. I spent my time researching recent breakthroughs in gene therapy to add a scientific component to my story. Other than reading scientific journals, my other materials simply included my word processor and brain. I also read many fiction novels (including Andromeda Strain and Travels by Michael Crichton) during this process in order to find some additional guidance in the writing process. I spent time meeting Dr. Daniels, Dr. Bliton and Dr. Churchill for brainstorming sessions for a story. Soon, I had the formulations of a plot that I thought would make an interesting tale.

Over the span of five months I was able to collect all my ideas and draft a rough outline. Eventually, I was able to produce a 24-page (single spaced) novella. It essentially deals with a patient and his unborn child, and the odd ethical problems that will arise from new gene manipulation technology. Because the story takes place in the future, I mainly hypothesize what innovations in medicine will be developed several decades from now. I paint a picture of what I believe could happen in the future, especially with the rise of cutting edge biomedical research facilities with massive funding resources in Asia such as Biopolis, Singapore and Genome Valley, India.

I am happy with the huge diversity of projects that Emphasis allowed. I have enjoyed this experience, and I am satisfied with the results.

Acknowledgments: Dr. K. Daniels and Dr. M. Bliton, Vanderbilt University Medical Center.

Content Analysis and Student Perceptions of Narrative Reflection in Medical Education

Michael P McTigue

Background: It has long been acknowledged that scientific advances and the ability to practice the art of medicine are both essential features of what it means to be a physician. How to instill and expose physicians-in-training to the latter has remained a question of great debate and exploration. An article has asserted “the effective practice of medicine requires narrative competence, that is, the ability to acknowledge, absorb, interpret, and act on the stories and plights of others...narrative medicine is proposed as a model for humane and effective medical practice.”

Objectives: To analyze student written narrative reflections and to assess feasibility and student response in medical education.

Materials and Methods: This study was conducted with third-year surgical clerkship students in an academic center. Students were introduced to the rationale for a narrative write-up. Each narrative was analyzed for content, given a subjective score (0–5) based on significance to the narrative and depth/extent of discussion, and finally reviewed. One year later, a survey was sent to 47 of the participants which used the Likert responses to assess students’ experiences with the exercise and their thoughts on the value of written reflection.

Results: A total of 57 write-ups were collected over a two year period (Table 1). Follow-up surveys were received from 21 of 47 participants who were provided with them. When asked if their medical education benefited from written reflection, 13 students agreed (5 strongly) while only 3 students disagreed (1 strongly).

Discussion: Students tended to emphasize patient issues and dynamics over their own. A broad range of categories received scores of 5, indicating many diverse issues were central to the student reflection. This suggests the need for physicians-in-training to engage patients on different aspects of their lives and the impact of their illnesses, in the end, eliciting the core values of each patient’s story. From the surveys, it was evident a majority of students believed written reflection was valuable and would recommend it to future students.

References:

<table>
<thead>
<tr>
<th>Category Criterion</th>
<th>Mean Score</th>
<th>Inclusion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Illness Exp</td>
<td>3.44</td>
<td>98%</td>
</tr>
<tr>
<td>Student Illness Exp</td>
<td>2.21</td>
<td>98%</td>
</tr>
<tr>
<td>Patient’s Family</td>
<td>2.40</td>
<td>98%</td>
</tr>
<tr>
<td>Patient Faith</td>
<td>2.07</td>
<td>88%</td>
</tr>
<tr>
<td>Patient Spirituality</td>
<td>2.18</td>
<td>86%</td>
</tr>
<tr>
<td>Student Learn Exp</td>
<td>2.47</td>
<td>84%</td>
</tr>
<tr>
<td>Student Spirituality</td>
<td>2.46</td>
<td>84%</td>
</tr>
<tr>
<td>Patient Lack of Control</td>
<td>1.74</td>
<td>83%</td>
</tr>
<tr>
<td>Patient Fear</td>
<td>1.74</td>
<td>81%</td>
</tr>
<tr>
<td>Conflict Exhibited</td>
<td>0.86</td>
<td>44%</td>
</tr>
<tr>
<td>Student Fear</td>
<td>0.61</td>
<td>39%</td>
</tr>
<tr>
<td>Student Faith</td>
<td>0.60</td>
<td>37%</td>
</tr>
<tr>
<td>Student Lack of Control</td>
<td>0.39</td>
<td>21%</td>
</tr>
</tbody>
</table>

Table 1: For each main analytic criterion, a mean score (0–5) and percentage of write-ups that included the criteria is displayed.

The History of My Cadaver (Chapter 1)

Ben Trappey

Abstract: The submitted piece is the opening chapter of an unfinished novel, tentatively entitled The History of My Cadaver. The submission introduces the narrator, a first year medical student, who is journaling about the changes that he is beginning to notice in his personality and in his way of life as he
Critical Theory of International Relief Documentary

Andrew Keyes

This project explored the ways that relief documentaries are made and how documentaries affect people who view them. International relief documentary seeks to persuade its viewer both that a particular problem exists, for example, world hunger, and that there is a course of action which can help ameliorate the problem, political action. By working with an experienced filmmaker who produces documentaries in the area of medical relief I gained insight in the way documentaries in the area of medical relief are made and has helped gain support for the ideas presented in it. In the future the documentary will be used at Vanderbilt and the US to recruit physicians and solicit donations for money and equipment.

Novella

Kevin Liaw

Abstract: For my Emphasis project, I was interested in creatively writing a story that dealt with the future of medicine. Essentially, what are the problems that doctors may face in the future, and how will new medical technology affect our society as a whole? Is new technology always better? These main questions helped guide my ideas through the writing process. I spent time researching recent breakthroughs in gene therapy to add a scientific component to my story. Other than reading scientific journals, my other materials simply included my word processor and brain. I also read many fiction novels (including Andromeda Strain and Travels by Michael Crichton) during this process in order to find some additional guidance in the writing process. I spent time meeting Dr. Daniels, Dr. Bilton and Dr. Churchill for brainstorming sessions for a story. Soon, I had the formulations of a plot that I thought would make an interesting tale.

Over the span of five months I was able to collect all my ideas and draft a rough outline. Eventually, I was able to produce a 24-page (single spaced) novella. It essentially deals with a patient and his unborn child, and the odd ethical problems that will arise from new gene manipulation technology. Because the story takes place in the future, I mainly hypothesize what innovations in medicine will be developed several decades from now. I paint a picture of what I believe could happen in the future, especially with the rise of cutting edge biomedical research facilities with massive funding resources in Asia such as Biopolis, Singapore and Genome Valley, India.

I am happy with the huge diversity of projects that Emphasis allowed. I have enjoyed this experience, and I am satisfied with the results.

Acknowledgments: Dr. K. Daniels and Dr. M. Bilton, Vanderbilt University Medical Center.

Content Analysis and Student Perceptions of Narrative Reflection in Medical Education

Michael P. McTigue

Background: It has long been acknowledged that scientific acumen and the ability to practice the art of medicine are both essential features of what it means to be a physician. How to install and expose physicians-in-training to the latter has remained a question of great debate and exploration. An article has asserted “the effective practice of medicine requires narrative competence, that is, the ability to acknowledge, absorb, interpret, and act on the stories and plights of others…narrative medicine is proposed as a model for humane and effective medical practice.”

Objectives: To analyze student written narrative reflections and to assess feasibility and student response in medical education.

Materials and Methods: This study was conducted with third-year surgical clerkship students in an academic center. Students were introduced to the rationale for a narrative write-up. Each narrative was analyzed for content, given a subjective score (0-5) based on significance to the narrative and depth/extent of discussion, and finally reviewed. One year later, a survey was sent to 47 of the participants which used a five-point Likert responses to assess students’ experiences with the exercise and their thoughts on the value of written reflection.

Results: A total of 57 write-ups were collected over a two year period (Table 1). Follow-up surveys were received from 21 of 47 participants who were provided with them. When asked if their medical education benefited from written reflection, 13 students agreed (5 strongly) while only 3 students disagreed (1 strongly).

Discussion: Students tended to emphasize patient issues and dynamics over their own. A broad range of categories received scores of 5, indicating many diverse issues were central to the student reflection. This suggests the need for physicians-in-training to engage patients on different aspects of their lives and the impact of their illnesses, in the end, eliciting the core values of each patient’s story. From the surveys, it was evident a majority of students believed written reflection was valuable and would recommend it to future students.

References:

The History of My Cadaver

Ben Trappey

Abstract: The submitted piece is the opening chapter of an unfinished novel, tentatively entitled The History of My Cadaver. The submission introduces the narrator, a first year medical student, who is journaling about the changes that he is beginning to notice in his personality and in his way of life as he

Table 1: For each main analytic criterion, a mean score (0-5) and percentage of write-ups that included the criterion is displayed.

<table>
<thead>
<tr>
<th>Category Criterion</th>
<th>Mean Score</th>
<th>Inclusion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Illness Exp</td>
<td>3.44</td>
<td>98%</td>
</tr>
<tr>
<td>Student Illness Exp</td>
<td>2.21</td>
<td>98%</td>
</tr>
<tr>
<td>Patient’s Family</td>
<td>2.40</td>
<td>98%</td>
</tr>
<tr>
<td>Patient Faith</td>
<td>2.07</td>
<td>88%</td>
</tr>
<tr>
<td>Patient Spirituality</td>
<td>2.18</td>
<td>86%</td>
</tr>
<tr>
<td>Student Learn Exp</td>
<td>2.47</td>
<td>84%</td>
</tr>
<tr>
<td>Student Spirituality</td>
<td>2.46</td>
<td>84%</td>
</tr>
<tr>
<td>Patient Lack of Control</td>
<td>1.74</td>
<td>83%</td>
</tr>
<tr>
<td>Patient Fear</td>
<td>1.74</td>
<td>81%</td>
</tr>
<tr>
<td>Conflict Exhibited</td>
<td>0.86</td>
<td>44%</td>
</tr>
<tr>
<td>Student Fear</td>
<td>0.61</td>
<td>39%</td>
</tr>
<tr>
<td>Student Faith</td>
<td>0.60</td>
<td>37%</td>
</tr>
<tr>
<td>Student Lack of Control</td>
<td>0.39</td>
<td>21%</td>
</tr>
</tbody>
</table>
How to Deal: An Undergraduate Medical Education in Palliative Care

Roxanne Wada

Palliative care is an essential part of the continuum of health care. With the challenge of providing care to a multicultural population, palliative care becomes an even more challenging endeavor. It takes place in settings as diverse as hospices, hospitals, nursing homes, and in the home itself. As part of this study, field research was performed in different settings of palliative care in Nashville, New York and San Francisco.

In a mini-internship with the National Hospice and Palliative Care Association, a toolkit on disparities in palliative health care was researched and compiled, as part of a toolkit in providing palliative care for diverse populations. In 2000 the LCME required end of life care to be taught as part of the education of all medical students. However, even with this requirement, the actual instruction in palliative care varies widely among institutions, and often, medical students are not given enough exposure to this critical practice.

Studies of medical students in their clinical years have shown that those who have taken a palliative care or hospice rotation rate themselves as more comfortable with the technical aspects of palliative and end of life care, and report better attitudes and fewer anxieties related to palliative and end of life care compared to other students. Other studies have shown that students who encounter a death on the wards during their clinical years often have strong emotional responses to the incident and do not feel emotionally supported, showing the need for more end of life education. Though the effects of palliative and end-of-life education on students in their clinical years have been examined, no published study has examined the effects on medical students in their pre-clinical years.

This study uses an anonymous online survey to identify how medical students at Vanderbilt University Medical School were affected by taking a palliative care elective in their pre-clinical years. It examines students’ self-reported gains in emotional insight and interpersonal skills in the area of palliative care and how these skills and insights may affect their clinical education. It also seeks to understand what motivated this population of students to take the elective and what they believe they have gained from it. In addition, it seeks to assess how students perceive the attitudes towards palliative and end of life care at Vanderbilt University Medical Center.

International Health

The focus area of International Health provides students an opportunity to learn about issues of global health through participation in projects based in other countries. Potential projects encompass the full range of themes in international health, from medical sciences and clinical investigation, to socio-cultural correlates of health and health care delivery. Participation in an International Health elective and other directed study will provide background for work abroad.

Peter Wright is Co-Principal Investigator for the Vanderbilt HIV Vaccine Program. He initiated HIV vaccine research at Vanderbilt in 1987 and has been directing HIV clinical trials since that time. Dr. Wright has a special interest in mucosal immunity to HIV. He has also worked closely with investigators at Cornell University and GHESKIO in Port-au-Prince, Haiti to bring HIV vaccine research to the Caribbean. Dr. Wright is Professor of Pediatrics and Microbiology and Chief of the Pediatric Infectious Diseases Division at Vanderbilt.

"International Health was a late addition to the initial year of the Emphasis program at the impetus of students with interests in this area. In the first year, four students participated in very diverse projects, all of which involved spending the summer between the first and second years in an international setting. The interest in the International Health Emphasis area has grown such that currently there are 16 first year students who have elected to have training abroad. This parallels a recognized trend and resurgence in interest in medical students in participation in International Health that was recently highlighted in a Perspective the New England Journal of Medicine.

The International Health emphasis area contributed to a broadening of expectations for students completing the Emphasis Program. The initial goal was for the student to produce a ‘very defined product, specifically a paper prepared for a journal.’ In the Emphasis Program in International Health there has to date been a health clinic built in Kenya, a new prospective on women’s rights from Mali, an insight into the global polio eradication program in India and a description of an association of melodisco and the use of statin drugs from aborigines in Australia. For each student the experience has substantially changed their perspective on medicine and their future careers.

Credit for the growth in the International Health area must be fully shared with our new Institute for Global Health headed by Dr. Zein Vermund whose enthusiasm and access to students through an office in Light Hall has greatly facilitated and refined the aspirations and expectations of students to match with the realism of work in the International Health arena.”

Mali: Research And Health Care Delivery In The Third World

Aline M. Bernard

Background: I graduated from Johns Hopkins University with a Bachelors degree in public health. The knowledge I gained sparked my interest to learn more about the provision of health care in the underdeveloped world and pursue an academic career in this field. The emphasis program gave me the opportunity to combine my knowledge of the French language with my interest in health care delivery in the third world. I joined the research team affiliated with the Malara Research Institute in Bamako, Mali. They were begin- ning a trial comparing the effective- ness two malaria drug regimens in children less than five years of age.

Objectives: I traveled to Mali in order to gain a better understanding of how health care is delivered and research is conducted in a third world setting so that I would have a more solid basis to consider research of this type in my future academic career. I was also interested to learn about the social structures, culture, daily activities, and obstacles faced by Malians in everyday life as well as in regard to their health.

Materials and Methods: I joined a team of Malian physicians from the Malara Research Institute at Point G, Mali’s largest public hospital. During the last five weeks of my stay, I worked in the Internal Medicine Department at the hospital in order to gain an appreciation for the challenges of tropical medi- cine. Then, with the research team, I traveled to Faladje, a small rural village 80 kilometers from the capital. There, we set up a malaria drug therapy study at the village’s com- munity health center.
How to Deal: An Undergraduate Medical Education in Palliative Care

Roxanne Wadia

Palliative care is an essential part of the continuum of health care. With the challenge of providing care to a multicultural population, palliative care becomes an even more challenging endeavor. It takes place in settings as diverse as hospices, hospitals, nursing homes, and in the home itself. As part of this study, field research was performed in different settings of palliative care in Nashville, New York and San Francisco.

In a mini-internship with the National Hospice and Palliative Care Association, a toolkit on disparities in palliative health care was researched and compiled, as part of a toolkit in providing palliative care for diverse populations. In 2000 the LCME required end of life care to be taught as part of the education of all medical students. However, even with this requirement, the actual instruction in palliative care varies widely among institutions, and often, medical students are not given enough exposure to this critical practice. Studies of medical students in their clinical years have shown that those who have taken a palliative care or hospice rotation rate themselves as more comfortable with the technical aspects of palliative and end of life care, and report better attitudes and fewer anxieties related to palliative and end of life care compared to other students. Other studies have shown that students who encounter a death on the wards during their clinical years often have strong emotional responses to the incident and do not feel emotionally supported; showing the need for more end of life education. Though the effects of palliative and end-of-life education on students in their clinical years have been examined, no published study has examined the effects on medical students in their pre-clinical years.

This study uses an anonymous online survey to identify how medical students at Vanderbilt University Medical School were affected by taking a palliative care elective in their pre-clinical years. It examines students’ self-reported gains in emotional insight and interpersonal skills in the area of palliative care and how these skills and insights may affect their clinical education. It also seeks to understand what motivated this population of students to take the elective and what they believe they have gained from it. In addition, it seeks to assess how students perceive the attitudes towards palliative and end of life care at Vanderbilt University Medical Center.

International Health

The focus area of International Health provides students an opportunity to learn about issues of global health through participation in projects based in other countries. Potential projects encompass the full range of themes in international health, from medical sciences and clinical investigation, to socio-cultural correlates of health and health care delivery. Participation in an International Health elective and other directed study will provide background for work abroad.

Peter Wright is Co-Principal Investigator for the Vanderbilt HIV Vaccine Program. He initiated HIV vaccine research at Vanderbilt in 1987 and has been directing HIV clinical trials since that time. Dr. Wright has a special interest in mucosal immunity to HIV. He has also worked closely with investigators at Cornell University and GHESKIO in Port-au-Prince, Haiti to bring HIV vaccine research to the Caribbean. Dr. Wright is Professor of Pediatrics and Microbiology and Chief of the Pediatric Infectious Diseases Division at Vanderbilt.

"International Health was a late addition to the initial year of the Emphasis program at the impetus of students with interests in clinical care. In the first year, four students participated in very diverse projects, all of which involved spending the summer between the first and second years in an international setting. The interest in the International Health Emphasis area has grown such that currently there are 16 first year students who have elected to have training abroad. This parallels a recognized trend and resurgence of interest in medical students in participation in International Health that was recently highlighted in a Perspective the New England Journal of Medicine.

The International Health emphasis area contributed to a broadening of expectations for students completing the Emphasis Program. The initial goal was for the student to produce a very defined product, specifically a paper prepared for a journal. In the Emphasis Program in International Health there has to date been a health clinic built in Kenya, a new perspective on women’s rights from Mali, an insight into the global polio eradication program in India and a description of an association of melioidosis and the use of statin drugs from aborigines in Australia. For each student the experience has substantially changed their perspective on medicine and their future careers.

Objectives: I traveled to Mali in order to gain a better understanding of how health care is delivered and research is conducted in a third world setting so that I would have a more solid basis to consider research of this type in my future academic career. I was also interested to learn about the social structure, culture, daily activities, and obstacles faced by Malians in everyday life as well as in regard to their health.

Materials and Methods: I joined a team of Malian physicians from the Malara Research Institute at Point G, Mali’s largest public hospital. During this stay, I worked in the Internal Medicine Department at the hospital in order to gain an appreciation for the challenges of tropical medicine. Then, with the research team, I traveled to Faladje, a small rural village 80 kilometers from the capital. There, we set-up a malaria drug therapy study at the week’s end in the village’s community health center.

Mali: Research And Health Care Delivery in The Third World

Aline M. Bernard

Background: I graduated from Johns Hopkins University with a Bachelor’s degree in public health. The knowledge I gained sparked my interest to learn more about the provision of health care in the underdeveloped world and pursue an academic career in this field. The emphasis program gave me the opportunity to combine my knowledge of the French language with my interest in health care delivery in the third world. I joined the research team affiliated with the Malara Research Institute in Bamako, Mali. They were beginning a trial comparing the effectiveness of two malaria drug regimens in children less than five years of age.

Objectives: I traveled to Mali in order to gain a better understanding of how health care is delivered and research is conducted in a third world setting so that I would have a more solid basis to consider research of this type in my future academic career. I was also interested to learn about the social structure, culture, daily activities, and obstacles faced by Malians in everyday life as well as in regard to their health.

Materials and Methods: I joined a team of Malian physicians from the Malara Research Institute at Point G, Mali’s largest public hospital. During this stay, I worked in the Internal Medicine Department at the hospital in order to gain an appreciation for the challenges of tropical medicine. Then, with the research team, I traveled to Faladje, a small rural village 80 kilometers from the capital. There, we set-up a malaria drug therapy study at the week’s end in the village’s community health center.
Results: I gained an appreciation for the different diseases encountered in Mali and the obstacles, primarily due to a lack of resources, which the doctors had to overcome in order to treat their patients. I also gained an understanding of how the society’s structure and hierarchical nature has an enormous influence on health. Finally, I was able to assist in initiation of a research project in a small, rural health center and observed how the team earned the trust of the community and integrated into the society.

Conclusions: I left Mali with the desire to return in order to augment the general Malian health status. There are many opportunities for improvement of care in Mali. I was surprised to find that simply working as a physician would not be the most effective approach. A lack of personnel is not their primary problem. Purely practicing medicine would not be the best approach to improving access to care. The most effective approach is to bring in resources in order to improve the infrastructure and knowledge base through conducting research projects. By doing so, resources are brought into the country and, furthermore, delivery of care specific to the unique Malian health status. The most effective approach is to bring in resources in order to improve the infrastructure and knowledge base through conducting research projects. By doing so, resources are brought into the country and, furthermore, delivery of care specific to the unique Malian health status. 

Acknowledgements: Kausum Kayentos and colleagues at Point G Hospital, Soukalo Dao, MD and my mentor: Peter Wright, M.D.

Dispatch From India: Final Hurdles in The Polio Eradication Program

India Fox Landigran

Background: The Global Polio Eradication Initiative, spearheaded by the World Health Organization, is currently in its 19th year of operation. The program has a two-pronged approach to eradication: mass vaccination to prevent the spread of infection and surveillance to look for remaining disease. In 2005, endemic polio transmission remained in only five countries.

Objectives: To work as a vaccinator and a monitor to learn about challenges facing the vaccination and surveillance aspects of the polio eradication program in India.

Materials and Methods: I traveled to Uttar Pradesh in northern India, and worked for two weeks as a vaccinator and a monitor during a National Immunization “Day”. I spent time with three Surveillance Medical Officers investigating new onset cases of acute flaccid paralysis in different areas of Uttar Pradesh. In New Delhi, I met with both the project manager for the National Polio Surveillance Project, and officials at Rotary International. I also attended a WHO-run surveillance medical officer training session in Agra.

Results: Because of the hands-on nature of the work I did, I managed to learn more about the global eradication campaign than I could have studying it from afar. I spoke to a variety of individuals, from local vaccinators in rural villages to program leaders in the capital city, and I gained a broad understanding of the successes of the program so far and the challenges that face eradication today. For example, while rumors persist among some Muslims that the polio vaccine is unsafe, targeted efforts to raise awareness of the safety and importance of the vaccine in these communities are slowly breaking down resistance. Also, monovalent vaccine was used in India for the first time in 2005 in an attempt to boost immunity, particularly to type 1 polio virus, which causes almost all the cases there. Early results are encouraging; transmission had significantly decreased in western Uttar Pradesh as of December 2005, with only 10 cases in the peak transmission period from August to October (compared with 43 in 2004).

Conclusions: Strengths and weaknesses aside, what struck me most is that this massive public health leg-end-in-the-making is a living and breathing thing. This inconceivably monumental and wonderfully hysterical task entails eradicating an infection that is usually invisible, and it is being carried out by millions of people who will never receive recognition or true compensation for their dedication. In India and many other countries, being paralyzed can be tantamount to a torture sentence; these individuals’ unending work has a chance to save every child in the world from this devastation forever. This exposure to the polio eradication program was an impelling and one hopes an enduring lesson for an American medical student.

The Challenges in Establishing A Clinic in a Rural Village Clinic in The Developing World: The Case of Lwala Community Clinic in Western Kenya

Milton O. Ochieng’

Background: Milton and Fred Ochieng’ grew up in Lwala, a rural village in Rongo District, Nyamira Province of Kenya. The village has neither running water nor electricity, and is accessed by a 9 km dirt road off the Kisii-Rongo main road. The nearest government hospital, where patients could get to see a doctor are approximately 40km away. People use bicycle taxis, wheelbarrows or beds for emergency transportation of patients. The clinic is expected to serve 4,000 people.

Objectives: To improve access to healthcare, a first line of intervention in medical emergencies, provide maternal child healthcare facilities and anti-retroviral drugs for HIV AIDS and to provide shared learning experiences and capacity building for the local health workers by visiting American physicians, residents and medical students.

Materials and Methods: Collaborative village outreach efforts with the local church elders, politicians, the location chief and his assistants and primary school leaders at public open air meetings facilitated information dissemination and group mobilization. In Lwala, a 21-member village-elected construction committee interviewed local skilled contractors, bought the building materials, mobilized the community members to bring water, sand and stones from source to the site around the clinic site, and kept records of the expenditure and transactions. We engaged American organizations, middle school, high school and college students in fundraising while getting advice from Prof Jeffery Sachs’ UN Millennium Project.

Results: A 30.2m by 6m clinic has been constructed in Lwala village in western Kenya. Challenges encountered include difficulties in fundraising, sustainability issues, transfer of funds to Kenya, communication with the village committee in Kenya due to poor infrastructure and shipping donated medical supplies to Kenya. See website: http://www.wm.vanderbilt.edu/lwala

Conclusions: Through the collaborative effort of the Lwala community, Vanderbilt, Dartmouth, the Kenyan Ministry of Health and Prof Jeffery Sachs’ UN Millennium Project, we have started up a community-centered model village development project that utilizes global resources while maximizing community involvement to improve provision of healthcare to a rural village in Kenya.

Meliodosis and Statin Use in Far North Queensland

D’Mitrí A. Sofianos

Background: HMG CoA reductase inhibitors (statins) exhibit immunomodulatory effects independent of their lipid lowering actions and a protective effect has been demonstrated in sepsis. Melioidosis, caused by Burkholderia pseudomallei is a serious bacterial infection that is endemic in northern Australia. Conditions such as diabetes, renal failure and alcohol abuse increase susceptibility to infection.

Aim: To (i) determine if the frequency of statin use was significant less in patients with a history of Melioidosis than in a control group and (ii) examine whether statin use reduced the severity and duration of infection with Burkholderia pseudomallei.

Methods: A retrospective case control study of patients with laboratory confirmed Melioidosis. Controls without Melioidosis were matched by age, gender, locality, ethnicity, year of diagnosis and underlying medical conditions. Statin use was recorded. Factors predicted to affect
The Challenges in Establishing A Clinic in a Rural Village Clinic in The Developing World: The Case of Lwala Community Clinic in Western Kenya

Milton O. Ochierg

Background: Milton and Fred Ochierg grew up in Lwala, a rural village in Rongo District, Nyanza Province of Kenya. The village has neither running water nor electricity, and is accessed by a 9 km dirt road off the Kisii-Rongo main road. The nearest government hospital where patients could get to see a doctor are approximately 40km away. People use bicycle taxis, wheelbarrows or beds for emergency transportation of patients. The clinic is expected to serve 4,000 people.

Objectives: To improve access to primary health care, act as a first line of intervention in medical emergencies, provide maternal, child healthcare facilities and anti-retroviral drugs for HIV AIDS and to provide shared learning experience and capacity building for the local health workers by visiting American physicians, residents and medical students.

Materials and Methods: Collaborative village outreach efforts with the local church elders, politicians, the location chief and his assistants and primary school leaders at public open air meetings facilitated information dissemination and group mobilization. In Lwala, a 21-member village-elected construction committee interviewed local skilled contractors, bought the building materials, mobilized the community members to bring water, sand and stones from sources around the clinic site, and kept records of the expenditure and transactions. We engaged American organizations, middle school, high school and college students in fundraising while getting advice from Prof Jeffery Sachs’ UN Millennium Project.

Results: A 30.2m by 6m clinic has been constructed in Lwala village in western Kenya. Challenges encountered include difficulties in fundraising, sustainability issues, transfer of funds to Kenya, communication with the village committee in Kenya due to poor infrastructure and shipping donated medical supplies to Kenya. See website: http://www.nvc.vanderbilt.edu/lwala

Conclusions: Through the collaborative effort of the Lwala community, Vanderbilt, Dartmouth, the Kenyan Ministry of Health and Fred Ochierg’ UN Millennium Project, we have started up a community-centered model village development project that utilizes global resources while maximizing community involvement to improve provision of healthcare to a rural village in Kenya.

Dispatch From India: Final Hurdles in The Polio Eradication Program

India Fox Landrigan

Background: The Global Polio Eradication Initiative, spearheaded by the World Health Organization, is currently in its 19th year of operation. The program has a two-pronged approach to eradication: mass vaccination to prevent the spread of infection and surveillance to look for remaining disease. In 2005, endemic polio transmission remained in only five countries.

Objectives: To work as a vaccinator and a monitor to learn about challenges facing the vaccination and surveillance aspects of the polio eradication program in India.

Materials and Methods: I traveled to Uttar Pradesh in northern India, and worked for two weeks as a vaccinator and monitor during a National Immunization “Day”. I spent time with three Surveillance Medical Officers investigating new onset cases of acute flaccid paralysis in different areas of Uttar Pradesh. In New Delhi, I met with both the project manager for the National Polio Surveillance Project, and officials at Rotary International. I also attended a WHO-run surveillance medical officer training session in Agra.

Results: Because of the hands-on nature of the work I did, I managed to learn more about the global eradication campaign than I could have studying it from afar. I spoke to a variety of individuals, from local vaccinators in rural villages to program leaders in the capital city, and I gained a broad understanding of the successes of the program so far and the challenges that face eradication today. For example, while rumors persist among some Muslims that the polio vaccine is unsafe, targeted efforts to raise awareness of the safety and importance of the vaccine in these communities are slowly breaking down resistance. Also, monovalent vaccine was used in India for the first time in 2005 in an attempt to boost immunity, particularly to type 1 polio virus, which causes almost all the cases there. Early results are encouraging; transmission had significantly decreased in western Uttar Pradesh as of December 2005, with only 10 cases in the peak transmission period from August to October (compared with 43 in 2004).

Conclusions: Strengths and weaknesses aside, what struck me most is that this massive public health endeavor—which work is in dollars, and businesses are dominated by a tragic health task entails eradicating an infection that is usually invisible, and it is being carried out by millions of people who will never receive recognition or true compensation for their dedication. In India and many other countries, being paralyzed can be tantamount to a torture sentence; these individuals’ untiring work has a chance to save every child in the world from this devastation forever. This exposure to the polio eradication program was an impelling and one hopes an enduring lesson for an American medical student.

Results: I gained an appreciation for the different diseases encountered in Mali and the obstacles, primarily due to a lack of resources, which the doctors and nurses had to overcome in order to treat their patients. I also gained an understanding of how the society’s structure and hierarchical nature has an enormous influence on health. Finally, I was able to assist in initiation of a research project in a small, rural health center and observed how the team earned the trust of the community and integrated into the society.

Conclusions: I left Mali with the desire to return in order to augment the general Malian health status. There are many opportunities for improvement of care in Mali. I was surprised to find that simply working as a physician would not be the most effective approach. A lack of personnel is not their primary problem. Purely practicing medicine would only be a fraction of the impact capable of an outside physician. The most effective approach is to bring in resources in order to improve the infrastructure and knowledge base through conducting research projects. By doing so, resources are brought into the country and, furthermore, delivery of care specific to the unique Malian health care system and its most commonly encountered diseases is evaluated and improved.

Acknowledgements: Kassoum Kayentao and colleagues at Point G Hospital, Sounkalo Dao, MD and my mentor: Peter Wright, M.D.

Meliodosis and Statin Use in Far North Queensland

D’Mirri A. Sofanéd

Background: HMG CoA reductase inhibitors (statins) exhibit immunomodulatory effects independent of their lipid lowering actions and a protective effect has been demonstrated in sepsis. Melioidosis, caused by Burkholderia pseudomallei is a serious bacterial infection that is endemic in northern Australia. Conditions such as diabetes, renal failure and alcohol abuse increase susceptibility to infection.

Aim: To: (i) determine if the frequency of statin use was significant-ly less in patients with a history of Melioidosis than in a control group and (ii) examine whether statin use reduces the severity and duration of infection with Burkholderia pseudomallei.

Methods: A retrospective case control study of patients with labora-tory confirmed Melioidosis. Controls without Melioidosis were matched for age, gender, locality, ethnicity, year of diagnosis and underlying medical conditions. Statin use was recorded. Factors predicted to affect
use of statins were recorded, as was patient eligibility using accepted criteria. Measures of severity for Melioidosis were also recorded.

Results: Control patients were well matched with case patients with respect to risk factors for Melioidosis and indications for Statin use. Five of the patients with Melioidosis (7%) were taking statins at the time of their admission compared to 20 (29%) of the control group (odds ratio, 0.12; 95% confidence interval, 0.01-0.50 P < 0.001). There was no statistically significant association between statin use and illness severity.

Conclusions: Use of statins is associated with a significantly lower risk for Melioidosis.

Mechanisms Underlying The Differentiation And Expansion of Regulatory T Cells

Omonogho Asagbonhi

Background: Regulatory T cells (Tregs) are an essential mechanism in preventing autoimmunity and facilitating immune responses against tumors. Tregs are characterized by their expression of Foxp3, a transcription factor expressed by a subset of lymphocytes that down-regulate immune activation. However, the mechanisms underlying Treg differentiation and expansion have yet to be clarified.

Objective: We plan to delineate the mechanisms required for Treg differentiation and expansion.

Materials and Methods: Foxp3 is a transcription factor expressed by Tregs. However, the mechanisms it employs to control Treg differentiation remain to be understood. Therefore, in order to identify the importance of Foxp3 to Treg development, we would down-regulate Foxp3 expression in Tregs by using a lentiviral RNAi system to inhibit Foxp3 protein synthesis. Phenotypic and functional analysis of these Foxp3 down-regulated cells would then be performed to determine if such Tregs maintain their suppressive functions.

Expected results and conclusions: This set of experiments would help determine if the phenotypic and functional features of Tregs require sustained Foxp3 expression and whether the transcriptional program set by Foxp3 is irreversible i.e. whether Foxp3 expression determines lineage commitment into Treg. In conclusion, we hope to shed some light on Treg developmental mechanisms.

References: Oswald-Richter K, Grill SM, Ledevogu M, Unutmaz D. HIV infection of primary human T cells, it suggests that the depletion of Tregs favors viral replication. It is therefore likely that expansion of Tregs would help control HIV infection. However, the mechanisms underlying Treg differentiation and expansion have yet to be clarified.

Acknowledgement Co-author: Dorsa Unutmaz, MD, Vanderbilt University Medical Center.

Targeting The Akt/ mTOR Pathway For Radio-sensitization of Breast Cancer

Jeffrey M. Albert

Background: The PI3K/Akt pathway is known to be activated by radiation. The mammalian target of rapamycin (mTOR), downstream of Akt and, we investigated the effects of radion on Akt/mTOR signaling in breast cancer cell models. We conclude that the combination treatment group have been a contributing factor in the increased radiosensitization seen in this study.

Conclusions: We conclude that RAD001 attenuates radiation-induced pro-survival Akt/mTOR signaling and enhances the cytotoxic effects of radiation in breast cancer cell models, showing promise as a method of radiosensitization of breast cancer.

Analysis of Met as an Autism Vulnerability Gene

Mica Y. Bergman

Background: Autism spectrum disorder (ASD) is characterized by impairment in social interaction and communication, and restricted, repetitive, stereotyped behavior. Its co-morbidities include immune sensitivities, gastrointestinal dysfunction, and epilepsy. Evidence suggests that the MET receptor tyrosine kinase may play a role in autism vulnerability. The gene maps to an ASD susceptibility locus, and in G2/M cell cycle arrest was seen in the combination treatment group when compared to controls, suggesting that cell cycle arrest may have been a contributing factor in the increased radiosensitization seen in this study.
use of statins were recorded, as was patient eligibility using accepted criteria. Measures of severity for Melioidosis were also recorded.

Results: Control patients were well matched with case patients with respect to risk factors for Melioidosis and indications for Statin use. Five of the patients with Melioidosis (7%) were taking statins at the time of their admission compared to 20 (29%) of the control group (odds ratio, 0.12; 95% confidence interval, 0.01-0.50 P < 0.001). There was no statistically significant association between statin use and illness severity.

Conclusions: Use of statins is associated with a significantly lower risk of Melioidosis.

Mechanisms Underlying The Differentiation And Expansion of Regulatory T Cells

Omoniogh Aiagbonhi

Background: Regulatory T cells (Tregs) are a CD4+CD25hi Foxp3 expressing subset of lymphocytes that down-regulate immune activation and thus help prevent autoimmunity and tissue destruction from inflammation. One of the hallmarks of HIV infection is chronic immune activation, and recent evidence suggests that this is due to viral targeting and depletion of Tregs. Since HIV requires activation signals for cell activation. Eur J Immunol. 2004 Jun; 34(6):1705-14.

Objective: We plan to delineate the mechanisms required for Treg differentiation and expansion.

Materials and Methods: Foxp3 is a transcription factor expressed by Tregs. However, the mechanisms it employs to control Treg differentiation remain to be understood. Therefore, in order to identify the importance of Foxp3 to Treg development, we would down-regulate Foxp3 expression in Tregs by using a lentiviral RNAi system to inhibit Foxp3 protein synthesis. Phenotypic and functional analysis of these Foxp3 down-regulated cells would then be performed to determine if such Tregs maintain their suppressive functions.

Expected results and conclusions: This set of experiments would help determine if the phenotypic and functional features of Tregs require sustained Foxp3 expression and whether the transcriptional program set by Foxp3 is irreversible i.e. whether Foxp3 expression determines lineage commitment into Treg. In conclusion, we hope to shed light on Treg developmental mechanisms.


Acknowledgement Co-author: Dorya Unatmaz, MD, Vanderbilt University Medical Center.

Analysis of Met as an Autism Vulnerability Gene

Mica Y. Bergman

Background: Autism spectrum disorder (ASD) is characterized by impairment in social interaction and communication, and restricted, repetitive, stereotyped behavior. Its co-morbidities include immune sensitivities, gastrointestinal dysfunction, and epilepsy. Evidence suggests that the MET receptor tyrosine kinase may play a role in autism vulnerability. The gene maps to an ASD susceptibility locus, and in G2/M cell cycle arrest was seen in the combination treatment group when compared to controls, suggesting that cell cycle arrest may have been a contributing factor in the increased radiosensitization seen in this study.

Conclusions: We conclude that RAD001 attenuates radiation-induced pro-survival Akt/mTOR signaling and enhances the cytotoxic effects of radiation in breast cancer cell models, showing promise as a method of radiosensitization of breast cancer.

Materials and Methods: Western immunoblots, clonogenic assays, and cell cycle analysis were used in this study.

Results: RAD001 decreased clonogenic cell survival in both breast cancer cell lines MDA-MB-231 and MCF-7, though the effect is greater in MDA-MB-231 cells. Irradiation induced Akt and mTOR signaling and enhances the cytotoxic effects of radiation in breast cancer. We conclude that RAD001 increased radiosensitization seen in this study.

Acknowledgements: Co-authors: Kwang Woon Kim, Carolyn Cao and Bo Lu, Vanderbilt University School of Medicine. Supported in part by Vanderbilt Discovery Grant, Vanderbilt Physician Scientist Grant, a grant from the Mouse leukemia applied research foundation, and DOD grants PC031161, DOD BC303542.

Targeting The Akt/ mTOR Pathway For Radiosensitization of Breast Cancer

Jeffrey M. Albert

Background: The PI3K/Akt pathway is known to be activated by radiation. The mammalian target of rapamycin (mTOR) is downstream of Akt, and we investigated the effects of radiation on Akt/mTOR signaling in breast cancer cell models.

Objectives: RAD001 (everolimus), a potent derivative of the mTOR inhibitor rapamycin, was used to study the effects of mTOR inhibition, as the role of mTOR inhibition in enhancing radiation remains unexplored.

Materials and Methods: Western immunoblots, clonogenic assays, and cell cycle analysis were used in this study.

Results: RAD001 decreased clonogenic cell survival in both breast cancer cell lines MDA-MB-231 and MCF-7, though the effect is greater in MDA-MB-231 cells. Irradiation induced Akt and mTOR signaling, and this signaling is attenuated by RAD001. The radiation-induced signaling activation is mediated by PI3K, since inhibition of PI3K with LY294002 inhibited the increase in downstream mTOR signaling. Additionally, caspase-dependent apoptosis is an important mechanism of cell death when RAD001 is combined with 3 Gy radiation, as shown by induction of caspase 3 cleavage. An increase in
mouse, defects in the MET signaling pathway after GABAAergic interneuron development, producing an ASD-related phenotype. And, MET regulates aspects of GI and immune development and functioning.

**Preliminary Data:** Genetic analysis of 743 families revealed overtransmission of the C allele of MET promoter variant, rs1858830 (G-20C), to individuals with autism, p = 0.00003. Functionally, the C allele shows a 2.5-fold decrease in transcript production relative to the G allele. The autism-associated C allele shows a 2.5-fold decrease in transcript production relative to the G allele.

**Methods:** Electromobility Shift Assay (EMSA) and Supershift Assay - 30 bp ds probes containing each allele of the rs1858830 variant were labeled with 32P-ATP and incubated with HeLa cell nuclear extract to allow binding. The reactions were electrophoresed on a polyacrylamide gel and the bands were visualized by autoradiography. For the supershift assays, antibodies were incubated with the nuclear extract prior to addition of the radiolabeled probe.

**Results:** The autism-associated C allele of MET promoter variant rs1858830 significantly reduced transcription factor binding relative to the G allele. In addition, the alleles show qualitative differences in transcript factor complex binding. When incubated with HeLa cell nuclear extract, the G probe binds one complex whereas the C probe binds two complexes. PC4 is a part of both complexes that bind the C probe, but not the complex that binds the G probe. SP1 is a part of the complexes that bind both probes, and SP3 and AP2 bind neither probe.

**Conclusions:** MET promoter variant rs1858830 C and G alleles show qualitative and quantitative differences in transcription factor binding, which may mediate the reduction in transcript production observed with the autism-associated C allele. Binding sites for transcription factors SP1 and PC4 are found within the G-C SNP and may account for part of this difference.

**Acknowledgements**

Co-authors: Daniel B. Campbell, PhD, Vanderbilt University School of Medicine and Pat Levitt, PhD, Vanderbilt University.

**References**


**Future work, which I will focus upon, will be determining the biological importance of one or several of these target genes in p53-mediated signaling.**

**Materials and Methods:** Preliminary research will include additional siRNA validation of the previously mentioned p53 target genes and further characterization of the target gene products’ biochemical function.

**Results:** Using this methodology, a total of 100 DNA fragments were isolated that contain p53 binding sites.

**Conclusions:** Four novel genes including EDN-2 (ET-2), PPM1J, RPS27L, and UBD1D1 identified from this screening assay have been confirmed to be regulated in a p53-dependent manner by quantitative real-time PCR assays.

**References:**


**Acknowledgements:**

Co-authors: Jamie Hearns, PhD, Deborah Mays, PhD and Jennifer Piettenpol, PhD, Vanderbilt University Medical Center.

**Direct Effects Of Novel Anti-Cancer Fendiline® Analogues on Contractility of Rat Coronary And Mesenteric Arteries**

Denis A. Foretia

**Background:** Fendiline is a diphenylalkylamine calcium channel antagonist FDA-approved for management of stable angina. Our colleagues recently separated its enantiomers and synthesized novel analogues based on the contractility of rat coronary and mesenteric arteries.

**Conclusions:** Fendiline and its analogues have similar efficacy and potency on both coronary and mesenteric arteries (P<0.05). Analogues (SRW516Fd & SRW516FM) were equally efficacious in dilating pre-constricted vessels and the differences in effects on coronary and mesenteric arteries were not statistically significant. Analogues had a ≥ 70-fold higher potency compared to fendiline enantiomers (EC50 ~ 0.20µM compared to EC50 ~ 12.0µM). The vasodilatory effects of isomers and analogues on septal vessels were measured using Mulvany-Halpern wire myography. Data were analyzed using Student’s unpaired t-test and ANOVA with Bonferroni’s multiple comparison test. Responses are expressed as maximum relaxation (Emax) or area under curve (AUC).

**Results:** R- and S-fendiline isomers and fendiline analogues all dilated potassium-induced, pre-constricted coronary and mesenteric vessels in a concentration-dependent manner. Fendiline isomers had similar efficacy and potency on both coronary and mesenteric arteries (P<0.05). Analogues (SRW516Fd & SRW516FM) were equally efficacious in dilating pre-constricted vessels and the differences in effects on coronary and mesenteric arteries were not statistically significant. Analogues had a ≥ 70-fold higher potency compared to fendiline enantiomers (EC50 ~ 0.20µM compared to EC50 ~ 12.0µM). The vasodilatory effects of isomers and analogues on septal vessels were measured using Mulvany-Halpern wire myography. Data were analyzed using Student’s unpaired t-test and ANOVA with Bonferroni’s multiple comparison test. Responses are expressed as maximum relaxation (Emax) or area under curve (AUC).

**Conclusions:** Novel fendiline analogues are potent vasodilators at both coronary and resistance mesenteric arteries. These increased pressures may be due to increased transport through lipid membrane and/or increased avidity in the...
Microarray Analysis of TβRII Signaling in MMTV-PyVmT Induced Tumor Cell Lines

Daniel Stover

**Background:** TGF-β signaling has long been assumed to enhance progression and metastasis in cancer. The TGF-β type II receptor (TβRII) is critical in initiating signaling for all three soluble TGF-β ligands. An MMTV-Cre mediated conditional knockout of the TGF-β type II receptor (TβRIIKO) in mammary carcinoma cells with MMTV-polyoma middle T antigen (PyVmT) results in enhanced pulmonary metastases, challenging this dogma. Western analyses demonstrated that no identifiable mature or truncated protein could be detected in TβRII KO PyVmT tumor cell lines, further validating this mouse model and confirming the absence of mature TβRII protein in mouse mammary cells with Cre-mediated excision of exon 2.

**Results:** To understand the difference in metastatic potential at the molecular level, we performed an Affymetrix microarray to determine changes in the transcriptome from control and conditional TβRII knockout PyVmT antigen induced tumor cell lines. Microarray analysis of gene expression in the TβRII<sup>Δex2</sup> and TβRII<sup>−/−</sup> mice demonstrated significant differences in expression levels of multiple classes of gene products, including signal transduction, nucleic acid binding, and cell cycle regulation, among others. Six genes from the array were selected for verification by Real-time PCR and the results indicated that the array accurately identified changes in their expression levels. Several genes were also selected for analysis by western blot and IHC (immunohistochemistry) to determine if the protein levels would parallel the mRNA expression profiles. The protein levels from the genes selected for analysis including c-jun, ets-1 and cyclin D2 accurately recapitulated the microarray data. Further, IHC for c-jun demonstrated that the sub-cellular localization of the upregulated protein altered in TβRII null PyVmT tumors when compared to the controls.

**Conclusion:** Together the microarray results along with our extensive background control experiments suggest that distinct molecular mechanisms may be identified that contribute to the enhanced metastatic potential observed in tumor cells lacking Tgfbr2 expression.

**Acknowledgements:**
Co-authors: Brian Bierie, Agnes Gorska, Elizabeth Forrester and Anna Chytil.
mouse, defects in the MET signaling pathway after GABAergic interneuron development, producing an ASD-related phenotype. And, MET regulates aspects of GI and immune development and functioning.

**Preliminary Data:** Genetic analysis of 743 families revealed overtransmission of the C allele of MET promoter variant, rs1858830 (G-20C), to individuals with autism, p = 0.00003. Functionally, the C allele shows a 2.5-fold decrease in transcript production relative to the G allele.

**Methods:**
- Electromobility Shift Assay (EMSA) and Supershift Assay – 30 bp ds oligos containing each allele of the rs1858830 variant were labeled with 32P-ATP and incubated with HeLa cells’ nuclear extract to allow binding. The reactions were electrophoresed on a polyacrylamide gel and the bands were visualized by autoradiography. For the supershift assays, antibodies were incubated with the nuclear extract prior to addition of the radiolabeled probe.
- **Results:** The autism-associated C allele of MET promoter variant rs1858830 significantly reduced transcription factor binding relative to the G allele. In addition, the alleles show qualitative differences in transcription factor complex binding. When incubated with HeLa cell nuclear extract, the G probe binds one complex whereas the C probe binds two complexes. PC4 is a part of both complexes that bind the C probe, but not the complex that binds the G probe. SP1 is a part of the complexes that bind both probes, and SP3 and AP2 bind neither probe.

**Conclusions:**
- MET promoter variant rs1858830 C and G alleles show qualitative and quantitative differences in transcription factor binding, which may mediate the reduction in transcript production observed with the autism-associated C allele. Binding sites for transcription factors SP1 and PC4 are found within the G-C SNP and may account for part of this difference.
- The growth of T3SA+ and T3SA- viruses will be assessed in primary neuronal cultures derived from JAM-A+/- and JAM-A-/- mice. I will define the involvement of SA in the kinetics and tropism of infection, primarily in CNS tissues.

**Materials and Methods:**
- The growth of T3SA+ and T3SA- viruses will be assessed in primary neuronal cultures derived from JAM-A+/- and JAM-A-/- mice. I will define the involvement of SA in the kinetics and tropism of viral infection in wild-type mice by comparing T3SA+ and T3SA- for growth in the intestine, blood, and CNS at different timepoints following oral inoculation.

**Conclusions:**
- I will also address the relative competitive fitness of T3SA+ and T3SA- by simultaneously inoculating both strains and assessing the growth of each at primary and secondary sites of infection.

**Acknowledgements**
- Co-authors: Daniel B. Campbell, PhD, Vanderbilt University School of Medicine and Pat Lesotti, PhD, Vanderbilt University.

---

**Defining A Role For Cell-Surface Sialic Acid in Reovirus Neurovirulence**

Elizabeth Eby

**Background:** Mammalian reovirus infects a wide host range using functional adhesion molecule A (JAM-A) as a primary receptor. While all reovirus serotypes have been shown to utilize JAM-A, iso-genic strains that differ only in their capacity to bind sialic acid (SA) are altered in their infection kinetics and tropism, particularly in the central nervous system (CNS).

Additionally, there is preliminary evidence that T3SA+, a strain of reovirus capable of binding both JAM-A and SA, can productively infect neurons in JAM-A+/- mice, suggesting that uncharacterized entry pathways exist for reovirus.

**Objective(s):**
- To analyze differences between T3SA+ and T3SA- in the kinetics and tropism of infection, primarily in CNS tissues.

**Materials and Methods:**
- For Cell-Surface Reovirus, several of these target genes in p53-dependent signaling.

**References:**

**Acknowledgements**
- **Co-author:** Teresa S. Demersy, MD, Vanderbilt University Medical Center.
Mitochondrial Stabilization by Cyclosporine a (CSA) Enhances Skin Cell Survival After Irradiation

Jennifer M. Glocenkner

Background: The success of organ transplantation is related to the use of the immunosuppressive drug, CSA. An unfortunate consequence of long-term CSA therapy is a dramatic increase in squamous cell carcinoma (SCC) in organ transplant recipients (OTR). The prevalence of SCC and their aggressive nature in these patients are thought to be a result of impaired immune surveillance, but emerging evidence suggests that CSA may directly alter the growth of hyperproliferating skin cells by a cell autonomous mechanism.

Objectives: To investigate the role of CSA in the pathogenesis of SCC in organ transplant recipients, we are exploring the biology of the keratinocyte by evaluating the ability of CSA to modulate cell death in response to ultraviolet (UV) exposure through its interaction with Cyclinophilin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Materials and Methods: We exposed cultured skin cells to repetitive physiological doses of UVA light over a range of CSA doses and measured cell death using trypan blue exclusion, AnnexinV, and PPI staining. DNA from cell culture experiments was screened for mitochondrial DNA (mtDNA) damage in the form of deletions using a quantitative PCR assay. Additionally, DNA from excised SCC tumors of OTRs was analyzed for accumulated mtDNA damage for comparison with our data set from skin cancer specimens from non-transplant patients.

Results: Our results indicate that there was an effect of the CypD-binding drugs, CSA, and Nim811, to repress cellular death, whereas the immunosuppressive drug FK506 (which binds cytosolic immunophilins but not CypD) had a negligible effect on cell death as compared to control cells treated with vehicle. In addition, we have characterized a panel of mtDNA deletions that occur in the skin of patients with SCC including the 4977bp and 6278bp UVA-associated deletions. We have evaluated the levels of heteroplasmy of these deletions using a PCR assay in repetitively irradiated cultured cells and in SCC tumors excised from OTRs.

Conclusions: These results suggest that CSA’s effect on UV-induced cell death is due to its binding of CypD at the MPTP and is independent of its immunosuppressive effects, as exhibited by the inability of FK506 to repress cell death. The accrual of mtDNA damage in these cells is being investigated for its potential to support keratinocyte hyperproliferation, and thus contribute to a neoplastic phenotype.

Acknowledgements
Co-authors: Naji N. Abouassad, MD, Affonso Torquati, MD and Irene Feurer, PhD, Vanderbilt University Medical Center.

Gene Expression Profiles in Human Diabetes Mellitus
Britney Grayson

Background: We are interested in a set of preliminary microarray data indicating the presence of gene expression signatures unique to human Type I and Type II Diabetes Mellitus. Specifically, there are two separate gene expression signatures in TIDM and a third that characterized TIIIDM. Further complicating this story are the expression profiles of children with TIDDM (sometimes referred to as T1.5 DM), which do not match any identified signatures in TIDM or TIIIDM.

Objectives: Our specific aims are to expand the microarray data and analyze to determine answers to the following questions:

- Are different signatures of Type I DM products of inheritance, disease onset, disease duration, or of severity or complications?
- That portion of the Type II DM signature is a product of inheritance and what portion is a product of disease onset or duration? Does the profile change with duration and/or severity?
- What signature (Type I or Adult Type II) does the childhood non-Type I Diabetes genetic profile most closely match?

Materials and Methods: Oligonucleotide microarray slides will be used to analyze the relative expression of ~50,000 genes in whole blood from patients with TIDDM, TIIIDM and control individuals. These slides are analyzed using the GenePix Pro Program. Various computer programs will be used for data analysis.

Results: These experiments have yet to be completed.

Conclusions: Ultimately, my goal would be to further our understanding of diabetes at this point, I would prefer not to commit to a specific hypothesis but rather focus my efforts where the data lead. Phase II of this project will be to perform molecular analysis based on the gene expression data gathered.

Acknowledgements
Co-author: Thomas June, PhD, Vanderbilt University Medical Center.
Materials and Methods: We exposed cultured skin cells to repetitive physiological doses of UVA light over a range of 10-1000 joules per cm2 to investigate acute or chronic effects, in vivo animal studies to demonstrate potential chemotherapeutic efficacy, and monitored the cellular and mitochondrial response to ultraviolet (UV) exposure through its interaction with Cyclophillin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Results: Objective: To investigate the role of CYP in the pathogenesis of SCC in organ transplant recipients, we are exploring the biology of the keratinocyte by evaluating the ability of CsA to modulate cell death in response to ultraviolet (UV) exposure through its interaction with Cyclophillin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Conclusions: To investigate the role of CYP in the pathogenesis of SCC in organ transplant recipients, we are exploring the biology of the keratinocyte by evaluating the ability of CsA to modulate cell death in response to ultraviolet (UV) exposure through its interaction with Cyclophillin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Acknowledgements

Co-authors: Feurer, PhD, Vanderbilt University Medical Center.

Materials and Methods: This work was supported by a VA Merit Award to James Sligh.

Gene Expression Profiles in Human Diabetes Mellitus

Britney Grayson

Background: We are interested in a set of preliminary microarray data indicating the presence of gene expression signatures unique to human Type I and Type II Diabetes Mellitus. Specifically, there are two separate gene expression signatures in TIDM and a third that characterizes TIIDM. Further complicating this story are the expression profiles of children with TIIDM (sometimes referred to as T1 DM), which do not match any identified signatures in TIDM or TIIDM.

Objectives: To investigate the role of CYP in the pathogenesis of SCC in organ transplant recipients, we are exploring the biology of the keratinocyte by evaluating the ability of CsA to modulate cell death in response to ultraviolet (UV) exposure through its interaction with Cyclophillin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Conclusions: To investigate the role of CYP in the pathogenesis of SCC in organ transplant recipients, we are exploring the biology of the keratinocyte by evaluating the ability of CsA to modulate cell death in response to ultraviolet (UV) exposure through its interaction with Cyclophillin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Acknowledgements

Co-author: Thomas June, PhD, Vanderbilt University Medical Center.

Materials and Methods: Oligonucleotide microarray slides will be used to analyze the relative expression of ~50,000 genes in whole blood from patients with TIDM, TIIDM and control individuals. These slides are analyzed using the GenePix Pro Program. Various computer programs will be used for data analysis.

Results: These experiments have yet to be completed.

Conclusions: Ultimately, my goal would be to further our understanding of diabetes at this point, I would prefer not to commit to a specific hypothesis but rather focus my efforts where the data lead. Phase II of this project will be to perform molecular analysis based on the gene expression data gathered.

Acknowledgements

Co-author: Kimberly Norman, Alex Eshaghian, James E. Sligh, Vanderbilt University and VA Medical Centers. This work was supported by a VA Merit Award to James Sligh.

Gene Expression Profiles in Human Diabetes Mellitus

Britney Grayson

Background: We are interested in a set of preliminary microarray data indicating the presence of gene expression signatures unique to human Type I and Type II Diabetes Mellitus. Specifically, there are two separate gene expression signatures in TIDM and a third that characterizes TIIDM. Further complicating this story are the expression profiles of children with TIIDM (sometimes referred to as T1 DM), which do not match any identified signatures in TIDM or TIIDM.

Objectives: To investigate the role of CYP in the pathogenesis of SCC in organ transplant recipients, we are exploring the biology of the keratinocyte by evaluating the ability of CsA to modulate cell death in response to ultraviolet (UV) exposure through its interaction with Cyclophillin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Conclusions: To investigate the role of CYP in the pathogenesis of SCC in organ transplant recipients, we are exploring the biology of the keratinocyte by evaluating the ability of CsA to modulate cell death in response to ultraviolet (UV) exposure through its interaction with Cyclophillin D (CypD), a regulator of the mitochondrial permeability transition pore (MPTP).

Acknowledgements

Co-author: Kimberly Norman, Alex Eshaghian, James E. Sligh, Vanderbilt University and VA Medical Centers. This work was supported by a VA Merit Award to James Sligh.
Phosphorylation of Myeloid Translocation Gene Protein, MTG16, Regulates Transcriptional Repression

Aubrey Hunt

Background: The myeloid translocation gene family of transcriptional co-effectors includes MTG8, MTG16, and Mryn1. These proteins share sequence homology with the drosophila nervous system transcriptional co-repressor complex in four domains, labeled NHR1 through NHR4. MTG family proteins function in stem cell homeostasis and, consequently, development and tumorigenesis. MTG16 is disrupted by the (t16;21) translocation observed in therapy-related and, rarely, de novo acute myeloid leukemia. MTG proteins recruit the transcriptional co-repressors NCoR and SMRT, and histone deacetylases to DNA, coordinating the assembly of repressor complexes at target promoters to repress gene expression. Several phosphorylation sites have been identified on MTG16, including three serine/threonine residues within NHR4, the region that also binds NCoR. These sites are conserved among all MTG family members.

Materials and Methods: Site-directed mutagenesis was performed on the phosphorylation sites in the NHR4 region of MTG16 to express transcriptional repression impaired in the reporter assays relative to wild-type. The ability of phosphorylated MTG16 to repress transcription was impaired in the reporter assays relative to wild-type. These experiments have yet to be performed.

Results: These experiments have yet to be performed.

Conclusions: We hope to find a novel kinase that is important for non-canonical Wnt signaling. Such a kinase would serve as an excellent target for small molecule inhibitors, which can be used as both biological tools to help us further understand this arm of the Wnt signaling pathway and as potential chemotherapeutic agents.

Acknowledgements

Co-author: Ethan Lee, PhD, Vanderbilt University Medical Center.

Materials and Methods: Site-directed mutagenesis was performed on the phosphorylation sites in the NHR4 region of MTG16 to express transcriptional repression impaired in the reporter assays relative to wild-type. The ability of phosphorylated MTG16 to repress transcription was impaired in the reporter assays relative to wild-type. These experiments have yet to be performed.

Results: MTG16 binding of NCoR was inhibited by phosphorylation relative to wild-type. The ability of phosphorylated MTG16 to repress transcription was impaired in the reporter assays relative to wild-type. The degree of impairment in both assays was comparable to deletion of the entire NHR4 domain, suggesting that the phosphorylation sites play a major role in the action of MTG16 with NCoR and transcriptional repression.

Conclusions: Phosphorylation of the three serine/threonine residues in the NHR4 region of MTG16 decreases MTG16’s ability to interact with NCoR and therefore its ability to repress transcription. This finding provides a clue to how MTG proteins are regulated, both in development and, possibly, in tumorigenesis. It may ultimately allow us to manipulate the function of the pro-leukemic fusion protein.

Acknowledgements

Co-authors: Michael Engel, MD, PhD, Monseer Carel Jr. Children’s Hospital at Vanderbilt and Scott Hieber, PhD, Vanderbilt University School of Medicine.

Materials and Methods: Site-directed mutagenesis was performed on the phosphorylation sites in the NHR4 region of MTG16 to express transcriptional repression impaired in the reporter assays relative to wild-type. The ability of phosphorylated MTG16 to repress transcription was impaired in the reporter assays relative to wild-type. These experiments have yet to be performed.

Results: MTG16 binding of NCoR was inhibited by phosphorylation relative to wild-type. The ability of phosphorylated MTG16 to repress transcription was impaired in the reporter assays relative to wild-type. The degree of impairment in both assays was comparable to deletion of the entire NHR4 domain, suggesting that the phosphorylation sites play a major role in the action of MTG16 with NCoR and transcriptional repression.

Conclusions: Phosphorylation of the three serine/threonine residues in the NHR4 region of MTG16 decreases MTG16’s ability to interact with NCoR and therefore its ability to repress transcription. This finding provides a clue to how MTG proteins are regulated, both in development and, possibly, in tumorigenesis. It may ultimately allow us to manipulate the function of the pro-leukemic fusion protein.

Acknowledgements

Co-authors: Michael Engel, MD, PhD, Monseer Carel Jr. Children’s Hospital at Vanderbilt and Scott Hieber, PhD, Vanderbilt University School of Medicine.

Computation Modeling of Human Neuronal Sodium Channel SCN1A

Dan Kaiser and Sunita Misra

Background: Several inherited epilepsies have been associated with mutations in the human voltage-gated sodium channel SCN1A (Nav1.1). Electrophysiological studies of these mutants in heterologous systems have revealed an array of biophysical defects exhibiting complex relationships to epileptic severity. For instance, the SCN1A mutants R1648H and R1648C display an increased persistent current. However, R1648H is associated with the relatively mild epilepsy syndrome generalized epilepsy with febrile seizures plus (GEFS+) while R1648C causes severe myoclonic epilepsy of infancy (SMEI).

Objectives: Here we use the NEURON computational modeling program to construct empirical-based computer models of SCN1A with the goal of determining the impact of epilepsy-associated SCN1A bio-physical defects (such as persistent current) on neuronal excitability.

Methods: First, we constructed a theoretical model for wild type SCN1A (WT-SCN1A) that would replicate the biophysical properties of the human channel. Beginning with the model design described by Clancy and Kuo, we developed an expanded Markov scheme consist-
Genome-Scale Functional Screen to Identify Novel Kinase Regulators of The Non-Canonical WNT Pathway

Ali Hanson

Background: The Wnt signaling pathway coordinates many fundamental processes during development and plays an important role in maintaining stem cells throughout life. Misregulation of this pathway results in a variety of diseases states, such as cancer. There are two major arms of Wnt signaling: canonical and non-canonical. Little is known about how these two arms interact or how the Wnt signal is propagated from the cell surface in each arm to induce cellular changes.

Objectives:
1. Identify novel kinase regulators of the non-canonical Wnt signaling pathway.
2. Characterize the newly identified non-canonical kinase(s).
3. Develop small molecule inhibitors of the newly identified non-canonical kinase(s).

Materials and Methods:
1. Kinase Screen: A kinase screen will be carried out by injecting Xenopus embryos at the 1-2 cell stage with small interfering RNAs targeting each kinase to silence the kinase activity and observe the effects on cell migration and morphology in cultured cells. The effects on cancer cell lines will be tested by analyzing growth on soft agar and cell proliferation rates. Time permitting, in vivo analysis of tumor growth in mice will also be performed.
2. Small Molecule Inhibitors: Once a kinase has been identified and characterized, it will be analyzed by the Vanderbilt High Throughput Screening Facility to identify small molecules capable of inhibiting its function.

Results:
These experiments have yet to be performed.

Conclusions:
We hope to find a novel kinase that is important for non-canonical Wnt signaling. Such a kinase would serve as an excellent target for small molecule inhibitors, which can be used as both biological tools to help us further understand this arm of the Wnt signaling pathway and as potential chemotherapeutic agents.

Phosphorylation of Myeloid Translocation Gene Protein, MTG16, Regulates Transcriptional Repression

Aubrey Hunt

Background: The myeloid translocation gene family of transcriptional co-repressors includes MTG8, MTG16, and Mxgr1. These proteins share sequence homology with the drosophila nervous system transcriptional co-repressor in four domains, labeled NHR1 through NHR4. MTG family proteins function in stem cell homeostasis and, consequently, development and tumorigenesis.

MTG16 is disrupted by the (t16;21) translocation observed in therapy-related and, rarely, de novo acute myeloid leukemia. MTG proteins recruit the transcriptional co-repressors NCoR, Sin3, SMRT, and histone deacetylases to DNA, coordinating the assembly of repressor complexes at target promoters to regulate gene expression. Several phosphorylation sites have been identified on MTG16, including three serine/threonine residues within NHR4, the region that also binds NCoR. These sites are conserved among all MTG family members.

Materials and Methods:
Site-directed mutagenesis was performed on the phosphorylation sites in the NHR4 NCoR binding region. The serine/threonine residues were mutated to aspartate to mimic phosphorylation. Deletion of the NHR4 domain in its entirety was created for comparison.

Transcriptional reporter assays and co-precipitation assays were then done in transiently transfected mammalian cells comparing the phosphorylation mutants, deletion mutants, and wild-type MTG16.

Results:
MTG16 binding of NCoR was inhibited by phosphorylation relative to wild-type. The ability of phosphorylated MTG16 to repress transcription was impaired in the reporter assays relative to wild-type. The degree of impairment in both assays was comparable to deletion of the entire NHR4 domain, suggesting that the phosphorylation sites play a major role in the action of MTG16 with NCoR and transcriptional repression.

Conclusions:
Phosphorylation of the three serine/threonine residues in the NHR4 region of MTG16 decreases MTG16’s ability to interact with NCoR and thus its ability to repress transcription. This finding provides a clue to how MTG proteins are regulated, both in development and, possibly, in tumorigenesis. It may ultimately allow us to manipulates the function of the pro-leukemic fusion protein.

Acknowledgements:
Co-authors: Michael Engol, MD, PhD, Monroe Carell Jr. Children’s Hospital at Vanderbilt and Scott Hiebert, Vanderbilt University School of Medicine.

Computation Modeling of Human Neuronal Sodium Channel SCN1A

Dan Kaiser and Sunita Misra

Background: Several inherited epilepsies have been associated with mutations in the human voltage-gated sodium channel SCN1A (Nav1.1). Electrophysiological studies of these mutants in heterologous systems have revealed an array of biophysical defects exhibiting complex relationships to epileptogenicity. For instance, the SCN1A mutants R1648H and R1648C display an increased persistent current. However, R1648H is associated with the relatively mild epilepsy syndrome generalized epilepsy with febrile seizures plus (GEFS+) while R1648C causes severe myoclonic epilepsy of infancy (SMEI).

Objectives: We are now developing theoretical models simulating the persistent current observed for R1648H and R1648C. Neuronal simulation studies with WT-SCN1A and SCN1A mutants are expected to help define the role of specific SCN1A biophysical abnormalities on cellular excitability.

References:
Proteomic Patterns of Chemosensitivity in NSCLC Cell Lines

Jacob Kaufman

Background/Problem: Current clinical and histopathological evaluation of non-small cell lung cancer provides little information useful in predicting response to chemotherapy. Proteomic analysis has been used in NSCLC to predict variables such as prognosis not apparent under the microscope. Molecular patterns may also be useful in predicting tumor response to chemotherapy.

Objectives: To develop a model based on proteomic analysis of 33 NSCLC cell lines predictive of chemosensitivity for cisplatin, paclitaxel, gemcitabine, and vinorelbine.

Materials and Methods: IC50 values were determined for these chemotherapeutics for each cell line with an in vitro MTT. Cell lines were divided into sensitive, resistant and intermediate groups for each drug based on these IC50 values. Molecular patterns may also be useful in predicting tumor response to chemotherapy.

Results: The number of ions that met these criteria for the three comparisons of each drug ranged from 3 to 32, with a total of 65 unique ions selected. The classification rates for sensitive versus non-sensitive, resistant versus non-resistant and sensitive versus resistant were for cisplatin 24%, 21%, 11%; for gemcitabine 13%, 18%, 12%; for paclitaxel 18%, 0%, and 6% and for vinorelbine 33%, 6%, and 0% respectively. Additionally, the abundances of several ions were found to correlate with chemosensitivity of more than one agent. The expression levels of these ions showed the same trends with respect to the chemosensitivity of the different drugs, possibly indicating a more general role chemosensitivity or resistance.

Conclusions: Several protein ions were identified that showed statistically significant changes in expression between chemosensitive and chemoresistant cell lines. Class prediction models based on the abundances of several of these proteins are capable of predicting cell line sensitivity to different chemotherapy agents.

References:

Investigation of The Downstream Targets of β-Arrestin 1 Overexpression in A Colorectal Cancer Cell Line

Jared D. Knol

Background: The arrestin proteins are classically known for their role in de-sensitizing GPCR signaling. It has recently been established that β-arrestin also functions as a scaffold protein and thereby plays a role in multiple signaling pathways1, many of which have well-established roles in cancer development. Over-expression of the beta-arrestin 1 isoform in a colorectal cancer cell line (LS-174) resulted in dramatically increased liver metastasis in a mouse spleen injection model.2 However, the downstream targets of beta-arrestin 1 overexpression responsible for this effect have not yet been identified.

Objectives: To investigate the gene expression profile of a colorectal cancer cell line overexpressing beta-arrestin 1, with the goal of identifying genes that may be responsible for the increased metastasis and migration observed in these cells as compared to wild type.

Materials and Methods: Total RNA was prepared from two sources: 1) A human colorectal cancer cell line (LS-174T) and 2) two LS-174T clones which stably overexpress β-arrestin 1 (B-15 and B-18). Expression profiles were obtained using the Affymetrix system. A subset of genes showing the most significant changes was confirmed by qPCR.

Results: Microarray analysis demonstrated 19 significantly upregulated genes and 17 significantly downregulated genes. On qPCR analysis, the most significant upregulation was seen for CystatinS (23x above WT), and the most significantly downregulated gene was Spindle1 (30x below WT).

Conclusions: There are clear differences between the expression profiles of wild-type and beta-arrestin 1 overexpressing LS-174T cells. Future work will focus on the subset of the genes identified in this study, with the goal of investigating their potential roles in promoting metastasis.

References:

Mesenchymal Stem Cells in Fracture Repair: Tropism Without Effect on Biomechanical Properties

Benjamin Lands

Background: Impaired healing complications 10% of bone fractures.1 A promising approach for enhancing fracture repair is the use of pluripotent bone marrow derived mesenchymal stem cells (MSC). Previous studies have demonstrated some utility of MSC in fracture repair therapy, but further in vivo characterization of their behavior remains necessary.

Objectives: First, to assess in vitro whether systemically-delivered MSC are preferentially recruited to the fracture site in a mouse tibia fracture model. Second, to evaluate the effect of these MSC on the biomechanical properties of the healing fracture callus.

Materials and Methods: MSC obtained from BM of syngeneic mice are labeled by adenosyl vector expressing firefly luciferase (lac-MSC). Closed, stabilized left tibia fracture is created in 8 to 12 week old female virgin syngeneic mouse. Immediately after fracture animals receive doses of lac-MSC (5X103, 50X103, 100X103, 200X103, 300X103, 700X103, 1000X103 cells, n=3 for each dose) systemically by tail vein injection. In vivo bioluminescence (BLI) studies are performed daily for 8 days (IVIS 100; Xenogen). Biomechanical analyses (distraction to failure testing) are performed on dissected fractured tibias at 21 days after fracture (Bionix 588; NTIS).

Results: BLI studies demonstrate that lac-MSC are preferentially recruited to the fracture site by day 3 post-fracture. We find that normalized BLI signal at the fracture site (p/sec/m2/s1) correlates with number of MSC transplanted (p=0.01). Analysis of biomechanical testing shows that maximum force at failure (N) as well as energy to failure (J) does not correlate with the number of transplanted lac-MSC or with the BLI signal from fracture site.

Conclusions: Utilizing in vivo BLI imaging studies, we have demonstrated that systemically transplant- ed MSC display a specific tropism toward fractured bone sites.
Proteomic Patterns of Chemosensitivity in NSCLC Cell Lines

Jacob Kaufman

Background/Problem: Current clinical and histopathological evaluation of non-small cell lung cancer provides little information useful in predicting response to chemotherapy. Proteomic analysis has been used in NSCLC to predict variables such as prognosis not apparent under the microscope. Molecular patterns may also be useful in predicting tumor response to chemotherapy.

Objectives: To develop a model based on proteomic analysis of 33 NSCLC cell lines predictive of chemosensitivity for cisplatin, paclitaxel, gemcitabine, and vinorelbine.

Materials and Methods: IC50 values were determined for these chemotherapy agents for each cell line using an in vitro MTT. Cell lines were divided into sensitive, resistant and intermediate groups for each drug based on these IC50 values. Additional information included the number of ions that distinguished between chemosensitive and chemoresistant cells. Several protein ions were selected. The misclassification rates were determined for these IC50 values respectively. Additionally, the abundances of several ions were found to correlate with chemosensitivity of more than one agent. The expression levels of these ions showed the same trends with respect to the chemosensitivity of the different drugs, possibly indicating a more general role chemosensitivity or resistance.

Conclusions: Several protein ions were identified that showed statistically significant changes in expression between chemosensitive and chemoresistant cell lines. Classification prediction models based on the abundances of several of these proteins are capable of predicting cell line sensitivity to different chemotherapy agents.

References:

Results: The number of ions that met these criteria for the three comparisons of each drug ranged from 3 to 32, with a total of 65 unique ions selected. The misclassification rates were determined for the training cohort using leave-one-out cross-validation.

Acknowledgements: Co-authors: Funiko Taguchi, PhD, Takayoshi Kikuchi, PhD, Ya Shyr, PhD, and David Carbone, PhD. Vanderbilt Ingram Cancer Center and Luc Giraud, PhD, and John Minna, PhD, UT Southwestern Medical Center, Hamon Center for Therapeutic Oncology Research. Vanderbilt Medical School Emphasis Program and program coordinator Lillian Nunney, PhD, are acknowledged for their invaluable assistance.

Investigation of The Downstream Targets of β-Arrestin 1 Overexpression in A Colorectal Cancer Cell Line

Jared D. Knol

Background: The arrestin proteins are classically known for their role in de-sensitizing GPCR signaling. It has recently been established that β-arrestin also functions as a scaffold protein and thereby plays a role in multiple signaling pathways1, many of which have well-established roles in cancer development. Over-expression of the β-arrestin 1 isoform in a colorectal cancer cell line (LS-174) resulted in dramatically increased liver metastasis in a mouse spleen injection model.2 However, the downstream targets of β-arrestin 1 overexpression responsible for this effect have not yet been identified.

Objectives: To investigate the gene expression profile of a colorectal cancer cell line overexpressing β-arrestin 1, with the goal of identifying genes that may be responsible for the increased metastasis and migration observed in these cells as compared to wild type.

Materials and Methods: Total RNA was prepared from two sources: 1) A human colorectal cancer cell line (LS-174T) and 2) two LS-174T clones which stably overexpress FLAG-tagged β-arrestin 1 (B-15 and B-18). Expression profiles were obtained using the Affymetrix system. A subset of genes showing the most significant changes was confirmed by qPCR.

Results: Microarray analysis demonstrated 19 significantly upregulated genes and 17 significantly downregulated genes. On qPCR analysis, the most significant upregulation was seen for CystatinSN (23x above WT), the most significant downregulation was Spodin3 (30x below WT).

Conclusions: There are clear differences between the expression profiles of wild-type and β-arrestin 1 overexpressing LS-174T cells. Future work will focus on the subset of the genes identified in this study, with the goal of investigating their potential roles in promoting metastasis.

References:

Acknowledgements: Co-authors: F. Gregory Buchanan, PhD and Raymond N. Dubois, MD, PhD, Vanderbilt University Medical Center.

Mesenchymal Stem Cells in Fracture Repair: Tropism Without Effect on Biomechanical Properties

Benjamin Landis

Background: Impaired healing complications 10% of bone fractures1. A promising approach for enhancing fracture repair is the use of pluripotent bone marrow derived mesenchymal stem cells (MSC). Previous studies have demonstrated some utility of MSC in fracture repair therapy, but further in vivo characterization of their behavior remains necessary2.

Objectives: First, to assess in vivo whether systemically-delivered MSC are preferentially recruited to the fracture site in a mouse tibia fracture model. Secondly, to evaluate the effect of these MSC on the biomechanical properties of the healing fracture callus.

Materials and Methods: MSC obtained from BM of syngeneic mice are labeled by adenosiral vector expressing firefly luciferase (luc-MSC). Closed, stabilized left tibia fracture is created in 8 to 12 week old female virgin syngeneic mouse. Immediately after fracture animals receive doses of luc-MSC (5X103, 50X103, 100X103, 200X103, 350X103, 700X103, 1000X103 cells, n=3 for each dose) systemically by tail vein injection. In vivo bioluminescence (BLI) studies are performed daily for 8 days (IVIS 100; Xenogen). Biomechanical analyses (distraction to failure testing) are performed on dissected fractured tibias at 21 days after fracture (Bionix 858; MTSS).

Results: BLI studies demonstrate that luc-MSC are preferentially recruited to the fracture site by day 3 post-fracture. We find that luminescent BLI signal at the fracture site (p<sec/m2/s) correlates with number of MSC transplanted (p<0.01). Analysis of biomechanical testing shows that maximum force at failure (N) as well as energy to failure (J) does not correlate with the number of transplanted luc-MSC or with the BLI signal from fracture site.

Conclusions: Utilizing in vivo BLI imaging studies, we have demonstrated that systemically transplant- ed MSC display a specific tropism toward fractured bone sites.
Background: Aldosterone is one end-product of the renin-angiotensin system and traditionally acts upon the mineralocorticoid receptor (MR) in the distal tubules to promote sodium reabsorption and maintain cardiovascular homeostasis. MR antagonists when taken with ACE inhibitors can reduce overall cardiovascular morbidity, however hyperkalemia is a serious clinical complication. Aldosterone has also been shown to promote cardiac fibrosis and vascular remodeling in several animal models; however, the exact mechanism by which aldosterone induces these effects has yet to be elucidated, though there is speculation an MR-independent mechanism may be involved.

Objectives: To compare the effect of spironolactone, an MR antagonist, and FAD286, an aldosterone synthase (CYP11B2) inhibitor on aldosterone's MR-mediated and MR-independent mechanisms.

Materials and Methods: Sprague-Dawley male rats were randomized into 8 treatment groups (n=7) as follows:

1. with BMP-2 and with VEGF;
2. without BMP-2 and with VEGF;
3. with BMP-2 and with VEGF;
4. uninephrectomy and Ang II;
5. uninephrectomy and Ang II + FAD286;
6. uninephrectomy and Ang II + spironolactone;
7. uninephrectomy only;
8. sham.

Experimental groups were characterized by the following variables:

- SBP (mmHg)
- Aldosterone (pg/ml)
- Blood urea nitrogen (BUN) (mg/dL)
- Serum potassium (K+) (mEq/L)
- Albumin/Cr (µg/mg)

Results: Spironolactone or FAD286 prevented the hypertensive response to uninephrectomy alone but did not attenuate the SBP response to Ang II-uninephrectomy. FAD286, but not spironolactone, significantly decreased plasma aldosterone during Ang II infusion. Serum potassium, sodium and urinary potassium and sodium excretion were comparable in spironolactone and FAD286 treatment groups. Ang II induced cardiac hypertrophy and either spironolactone or FAD286 prevented this effect. Unilateral nephrectomy caused hypertrophy of the remaining kidney, which was increased by Ang II. Spironolactone and FAD286 prevented Ang II induced renal hypertension, albuminuria and azotemia.

Conclusions: These data suggest aldosterone causes end-organ damage through both MR-dependent and MR-independent mechanisms.

Acknowledgements: Co-authors: Sae Kwon, Agnes Pigo, MD, and Nancy Brown MD, Vanderbilt University Medical Center.

In addition, exogenous VEGF has been shown to enhance blood vessel formation, ossification, and new bone maturation in mouse femur fractures and to stimulate osteoblast chemotaxis. Objective: The goal of our study is to further evaluate the role of angiogenesis in skeletogenesis by adding vascular endothelial growth factor (VEGF) to the in vivo bioreactor and performing a quantitative analysis of resultant bone growth.

Materials and Methods: In a rat model, the superficial inferior epigastric vessels were isolated, ligated, and then threaded through a prefabricated scaffold cylinder. Experimental groups were characterized by the following variables: (1) with BMP-2 and with VEGF; (2) without BMP-2 and with VEGF; (3) with BMP-2 and with VEGF; (4) with BMP-2 and with Luciferase tag. At 2 weeks, biophotonic imaging was performed to analyze the VEGF expression in the implants. At 2.6 and 12 weeks, bone densitometry analysis was performed to measure the bone mineral density (BMD) change in the implants. At 12 weeks, the implants were retrieved for histologic processing. Angiogenesis and osteogenesis will be quantified through histological and comparative analysis of resultant bone densitometry data.

Results: The scaffolds loaded with BMP-2 and VEGF showed a 20.6% increase in BMD, those with VEGF alone a 11.1% increase in BMD, and those without BMP-2 or VEGF a 8.7% decrease in BMD between 2 and 12 weeks.

Conclusions: We are awaiting histologic analysis and correlation for final conclusions.

Background: Aldosterone is one end-product of the renin-angiotensin system and traditionally acts upon the mineralocorticoid receptor (MR) in the distal tubules to promote sodium reabsorption and maintain cardiovascular homeostasis. MR antagonists when taken with ACE inhibitors can reduce overall cardiovascular morbidity, however hyperkalemia is a serious clinical complication. Aldosterone has also been shown to promote cardiac fibrosis and vascular remodeling in several animal models; however, even the mechanism by which aldosterone induces these effects has yet to be elucidated, though there is speculation an MR-independent mechanism may be involved.

Objectives: To compare the effect of spironolactone, an MR antagonist, and FAD286, an aldosterone synthase (CYP11B2) inhibitor on angiotensin II-induced end-organ damage, thereby better differentiating aldosterone’s MR-mediated and MR-independent effects.

Materials and Methods: Sprague-Dawley male rats were randomized into 8 treatment groups (n=7) receiving (1) sham surgery only, (2) uninephrectomy only, (3) uninephrectomy and spironolactone, (4) uninephrectomy and FAD286, (5) uninephrectomy and angiotensin II, (6) uninephrectomy, spironolactone, and ang II, and (7) uninephrectomy, FAD286, and ang II. Rats were treated for 8 weeks, blood pressure was measured every 2 weeks, urine and blood were collected every 4 weeks, and an echocardiogram was obtained prior to tissue harvest at 8 weeks. FAD286 (4mg/kg/d) and spirono-
lactone (5mg/kg/d) were administered via subcutaneous osmotic mini-pump. Blood pressures were measured via non-invasive tail cuff monitoring throughout the 8 weeks, and simultaneously via direct intra-aortic measurements for the last 4 weeks of the study. Following sacrifice, end-organ damage and fibrosis were quantified in heart, aorta, liver, and kidney samples for each animal.

Results: Spironolactone or FAD286 prevented the hypertensive response to uninephrectomy alone but did not attenuate the SBP response to Ang II-uninephrectomy. FAD286, but not spironolactone, significantly decreased plasma aldosterone during Ang II infusion. Serum sodium, potassium and sodium excretion were comparable in spironolactone and FAD286 treatment groups. Ang II induced cardiac hypertrophy and either spironolactone or FAD286 prevented this effect. Unilateral nephrectomy caused hypertrophy of the remaining kidney, which was increased by Ang II. Spironolactone and FAD286 prevented Ang II induced renal hypertrophy, albuminuria and azotemia.

Conclusions: These data suggest aldosterone causes end-organ damage through both MR-dependent and MR-independent mechanisms.

Acknowledgements: Co-authors: See Kwak, Agnes Pogo, MD, and Nancy Bream MD, Vanderbilt University Medical Center.

Comparative Effects of Mineralocorticoid Antagonism and Aldosterone Synthase Inhibition on Angiotensin II Induced Cardiorenal Injury

William Lea

Noninvasive Assessment of a VEGF Supplemented in VIVO Bioreactor

Willard A. Moore and William B. Payne

Background: Successful skeletal tissue regeneration requires the synergistic interaction of osteoprogenitor cells, growth and differentiation factors, and an extracellular matrix scaffold. In 2005, Holt et al. introduced an in vivo bioreactor model to fulfill each of these requirements. This model recruits pluripotent stem cells from circulating blood to a vascularized scaffold of interconnected porosity supplemented with bone morphogenetic protein-2 (BMP-2).

In addition, exogenous VEGF has been shown to enhance blood vessel formation, ossification, and new bone maturation in mouse femur fractures and to stimulate osteoblast chemotaxis.

Objective: The goal of our study is to further evaluate the role of angiogenesis in skeletal formation by adding vascular endothelial growth factor (VEGF) to the in vivo bioreactor and performing a quantitative analysis of resultant bone growth.

Materials and Methods: In a rat model, the superficial inferior epigastric vessels were isolated, ligated, and then threaded through a prefabricated scaffold cylinder. Experimental groups were characterized by the following variables: (1) with BMP-2 and with VEGF; (2) without BMP-2 and with VEGF; (3) with BMP-2 and with Luciferase tag. At 2 weeks, biophotonic imaging was performed to analyze the VEGF expression in the implants.

Results: The scaffolds loaded with BMP-2 and VEGF showed a 20.6% increase in BMD, those with VEGF alone a 11.3% increase in BMD, and those without BMP-2 or VEGF a 8.7% decrease in BMD between 2 and 12 weeks.

Conclusions: We are awaiting histologic analysis and correlation for final conclusions.

Acknowledgements:
Co-authors: Ginger E. Holt, MD, Vanderbilt University School of Medicine. The authors would like to thank Clint Devon, orthopaedic resident, Amy Navarro, Animal Care Facility, and Dr. Ed Donofy in the Department of Radiology for their generous gift of time and talent.

Melanocytic Changes in NEVI During Pregnancy
Mary Alice Nadig

Background: Evidence suggests that melanocytes are estrogen responsive. Recent studies at Vanderbilt have shown estrogen receptor (ER) and not estrogen receptor, Vanderbilt have shown estrogen increased expression of ER and thus.

Results: Our initial data propose that although vascular density is similar in all three mouse islet sections (p = 0.1590), vessel area is significantly reduced for wild type (71.2 ± 18.68 µm², n = 8) and diabetic islets (64.54 ± 14.99 µm², n = 10), compared to non-diabetic islets (103.0 ± 23.60 µm², n = 11).

Objective: Our study aims to assess the effects of hyperglycemia on islet function via the following parameters: measurement of individual vessel area, average islet size, and vessel density (number of vessels per islet area). By observing changes in these three parameters we can better understand the progression of vascularization in response to the diabetic state.

Materials and Methods: To identify transgenic mice for study, we tailored the mice for DNA extraction and purified the solution with a Promega kit. A restriction enzyme, Ddel, was then added to produce DNA segments that differentiate between heterozygous and homozygous mice with the mutation via PCR. Using tomato lectin injections and fluorescence microscopy, we set out to look at how vascular density and individual vessel area change with hyperglycemia. These data suggest the diabetic state leads to perfusion of the islets, which affects blood supply to the islets is important for preventing the onset of diabetes. We are currently conducting similar studies on younger mice (2 and 4 months of age) to better understand the progression of islet hyperplasia and hyperplasia and the corresponding vascularization. These reports suggest that the diabetic state leads to vascular regression and this might be important in the islet dysfunction of type-2 diabetes.

Acknowledgements: As co-authors, Lillian B. Namesny, PhD, Alan S. Boyd, MD, and Darrel L. Ellis, MD, Vanderbilt University Medical Center.
Changes in Pancreatic Islet Vascularization in Diabetic and Non-Diabetic OB/OB Leptin-Deficient Mice

Mario Nieto

Background/Problem: Leptin regulates feeding behavior, metabolism, and reduces insulin resistance in mice. The ob/ob leptin-deficient mouse has been used as a model for type-2 diabetes as insulin resistance in these mice boosts insulin secretion and ultimately results in islet hyperplasia; pancreatic vascularization, however, has been poorly defined in the literature. Islets receive 8-20 times more blood than the surrounding acinar tissue, leading us to believe that vascularization is essential for adequate islet function, i.e. insulin production.

Objectives: Our study aims to assess the effects of hyperglycemia on islet function via the following parameters: measurement of individual vessel area, average islet size, and vessel density (number of vessels per islet area). By observing changes in these three parameters we can better understand the progression of vascularization in response to the diabetic state.

Materials and Methods: To identify transgenic mice for study, we tailed the mice for DNA extraction and purified the solution with a Promega® kit. A restriction enzyme, DdeI, was then added to produce DNA segments that differentiate between heterozygous and homozygous mice with the mutation via PCR. Using tomato lectin injections and fluorescence microscopy, we set out to look at how vascular density and individual vessel area change with hyperglycemia. Three 8-month old mice, one ob/ob diabetic, one ob/+ diabetic, one ob/+ non-diabetic and one ob/- wild type, were chosen. The mice were infused with lectin via external jugular vein injection and the sectioned pancreata were analyzed with MetaMorph® software.

Results: Our initial data propose that although vascular density is similar in all three mouse islet sections (p=0.1590), vessel area is significantly reduced for wild type (77.2±18.68 µm², n=8) and diabetic islets (64.54±14.99 µm², n=10), compared to non-diabetic islets (103.0±23.60 µm², n=11).

Conclusions: These data suggest that an adequate blood supply to the islets is important for preventing the onset of diabetes. We are currently conducting similar studies on younger mice (2 and 4 months of age) to better understand the progression of islet hyperglycemia and hyperplasia and the corresponding vascularization. These results suggest that the diabetic state leads to vascular regression and this might be important in the islet dysfunction of type-2 diabetes.

Acknowledgements: Co-authors: Chunhua Dai, MD, Vanderbilt University School of Medicine and AI Pauwels, MD, IH Medical Center. The advice and guidance of Drs. Chunhua Dai and AI Pauwels and the rest of the Peers Lab was invaluable for the initiation and continuing progress of this project.

Dopamnergic Transmission and Synaptic Plasticity in the Dorsolateral Bed Nucleus of the Stria Terminalis

William Nobis

Background: The bed nucleus of the stria terminalis (BNST) is a key part of a ring of cells referred to as the extended amygdala. It plays a key role in the CNS stress and reward circuit. Synaptic plasticity in this region could in part underlie the persistent behavioral alterations in generalized anxiety and addiction. Our lab is particularly interested in determining factors that govern modulation of synaptic plasticity, particularly in this region.

Objectives: There is substantial and consistent evidence that dopamine is involved in the experience of drug reward in humans. Dopamine may also be involved in motivational processes such as drug craving. The BNST receives heavy dopaminergic input, including innervation from the ventral tegmental area (VTA), an area shown to be involved in addiction and abuse. Furthermore, it has previously been shown that drugs of abuse cause robust rises in extracellular dopamine in BNST. Therefore, we are interested in understanding the effects of dopamine on the population of glutamatergic and GABAergic neurons and synaptic function in BNST.

Materials and Methods: Brain Slice Preparation: Male C57Bl6/j mice (6–10 weeks old, Jackson Laboratories) were decapitated under anesthesia (Isoturethane). For interface chamber recordings, the brains were quickly removed and placed in ice-cold artificial cerebrospinal fluid (ACSF) (in mM: 124 NaCl, 4.4 KCl, 2 CaCl2, 1.2 MgSO4, 1 NaH2PO4, 10 glucose, and 26 NaHCO3). Slices 300 µm in thickness were prepared using a vibratome (Leica). Rostral slices containing anterior portions of BNST (Bregma 0.26 mm to 0.02 mm) (Franklin and Paxinos, 1997) were identified using the internal capsule, anterior commissure, fornix and stria terminalis as landmarks as previously described (Egli and Winder, 2003; Egli et al., 2005; Wirstad et al., 2004). Slices were then transferred to either an interface recording chamber (field potential recordings, ~28°C), a submerged recording chamber (whole-cell patch clamp recordings, ~25°C) or a submerged holding chamber (25°C) where they were perfused with ACSF (95% O2/5% CO2) ACSF at a rate of 2 mL/minute. Slices were allowed to equilibrate in normal ACSF for one hour before experiments began.

Extracellular Field Recordings
Low extracellular electrodes were pulled with borosilicate glass (2-3 M on a Filament Brown Micropipette Puller (Sutter) and were filled with ACSF. Stimulating electrodes consisted of twisted, insulated nichrome bipolar
VEGF Accelerates Angiogenesis and Bone Growth in a Tissue Engineered Model of Skeletogenesis

William B. Payne and Willard A. Moore

Background: Successful skeletal tissue regeneration requires the synergistic interaction of osteoprogenitor cells, growth and differentiation factors, and an extracellular matrix scaffold. In 2005, Holt et al. introduced an in vivo bioreactor model to fulfill each of these requirements. This model recruits pluripotent stem cells from circulating blood to a vascularized porous coral scaffold supplemented with bone morphogenetic protein-2 (BMP-2). The result is a model of ectopic host bone generation and vascularized tissue that could potentially be used to treat skeletal defects or study primary and metastatic cancers of bone.

Objectives: The hypothesis that precursors to bone and blood vessels arise from mesenchymal stem cells recruited from the circulatory tree incited this investigation into the role of angiogenesis in skeletogenesis.

Methods: A model was designed based on previously published HMPV strains leading to our hypothesis that its addition to an scaffold cylinders. Experimental groups were characterized by the following scaffold variables: (1) BMP-2 and with VEGF; (2) without BMP-2 and with VEGF; (3) without BMP-2 and with Luciferase tag. At two weeks, biochem and AssemblyLIGN were used.

Results: To date, we have successfully implanted and retrieved sixteen cylinders in eight rats. Tissue samples are currently being decellularized, fixed, and stained with H&E, trichrome green, and CD31/PECAM-1 (a marker of endothelial cells). Bone formation will be quantified through histological analysis, and reported as a percentage of area bone/area cross section scaffold. 100. Bone mineral density scans were analyzed and a 20.6% density increase was found in the (1) VEGF + BMP-2 versus an 8.7% decrease in the (3) without BMP-2 + Luciferase control group

Conclusions: Once the histological samples have been analyzed we will be able to conclude whether and to what extent the addition of VEGF to an in vivo bioreactor further promotes angiogenesis and osteogenesis.


Acknowledgements: Co-authors: Clinton J. Devin, MD, Jennifer L. Halpern, MD, and Ginger E. Holt, MD, Vanderbilt University Medical Center. •

Seqencing of Four Prototype Human Metapneumovirus Strains to Compare Genetic Variability

Reborah Pyarana

Background: Human metapneumovirus (HMPV) belongs to the Paramyxoviridae family. It is most commonly found in nasopharyngeal aspirates of young children and causes clinical symptoms similar to the better known human respiratory syncytial virus (HRSV). HMPV causes mild to severe respiratory infections in children and immunosuppressed adults, and may be a frequent but somewhat underevaluated pathogen. The RNA genome of HMPV consists of 8 genes with short intragenic sequences interspersed between them. Prior HMPV sequence analysis has revealed the existence of different subgroups. The cloning and sequencing of prototype HMPV strains from each of the proposed four genetic lineages would be potentially useful in development of successful vaccines against the virus.

Objectives: To obtain fully sequenced and characterized genomes of four putative HMPV strains which are representative of their viral subtypes (A1, A2, B1, B2). 2. Comparison of individual genes within and between subgroups

References: 1. We have fully sequenced the P-M-F-M2-SH-G genes for all four subgroups. I have most of the N sequence and the initial portion of the L gene for the four viruses. Dr. Williams and I are currently in the process of data analysis for the P-M-F-M2-SH-G genes. The completion of the project will involve finishing the sequencing of the L and N genes.

Acknowledgements: Co-author: John Williams, MD, Vanderbilt University Medical Center, as well as Sharon Telford, Gabriella Czek, Dr. Lillian Nanney, The Infectious Disease Society of America, Vanderbilt School of Medicine.
wire. Stimulating electrodes were placed on the dorsal anterolateral BNST (dBNST) border of the internal capsule approximately 200-500 µm dorsal to the anterior commissure. The response was evoked at a frequency of 0.05 Hz using a stimulus range of 5-15 V at a duration of 100-150 µs. Experiments were performed in a heated (~28°C) interface-style recording chamber (Fine Science Tools) as previously reported (Wetzel et al., 2004; Egl et al., in press). M pipetoxin. Data points. All recordings were performed in the presence of 25 µM picrotoxin. Data points. All recordings were performed in the presence of 25 µM picrotoxin.

**Results:** Preliminary data suggest that application of Dopamine increases field potential amplitude in the BNST. This also appears to be true for a selective D1/D5 agonist.

**Conclusions:** Future goals to include:

1. Characterize the effect of dopamine on the glutamatergic and GABAergic neurons in the BNST responsible for the variability in dopamine levels.
2. Investigate the molecular mechanisms of dopamine action on these neurons.
3. Identify the population of neurons in the BNST responsible for the varying effects of dopamine observed using recombinant mouse strains.
4. Investigate the molecular mechanisms governing the role of dopamine in the BNST.

**Acknowledgements**

Co-authors: Bradford Gruter and Danny G. Winder, Vanderbilt University Medical Center.

**VEGF Accelerates Angiogenesis and Bone Growth in a Tissue Engineered Model of Skeletogenesis**

William B. Payne and Willard A. Moore

**Background:** Successful skeletal tissue regeneration requires the synergistic interaction of osteoprogenitor cells, growth and differentiation factors, and an extracellular matrix scaffold. In 2005, Holt et al. introduced an in vivo bioreactor to fulfill each of these requirements. This model recruits pluripotent stem cells from circulating blood to a vascularized porous coral scaffold supplemented with bone morphogenetic protein-2 (BMP-2). The result is a model of ectopic host bone generation and vascularized tissue that could potentially be used to treat skeletal defects or study primary and metastatic cancers of bone.

**Objectives:** The hypothesis that precursors to bone and blood vessels arise from mesenchymal stem cells recruited from the circulatory tree incited this investigation into the role of angiogenesis in skeletogenesis. The goal of our study was to add a viral vector expressing vascular endothelial growth factor (VEGF) to an in vivo bioreactor and measure resultant bone growth. VEGF has been shown to stimulate osteoblast chemotaxis and enhance bone vessel formation, ossification, and new bone maturation in rodent models leading to our hypothesis that its addition to an in vivo bioreactor would further promote skeletogenesis.

**Materials and Methods:** Using a rat model, the superficial inferior epigastric vessels were isolated, ligated, and threaded through prefabricated cadaverine hyalosynapatic scaffold cylinders. Experimental groups were characterized by the following scaffold variables: (1) BMP-2 and with VEGF; (2) without BMP-2 and with VEGF; (3) without BMP-2 and without VEGF and Luciferase tag. At two weeks, bio luminescence imaging was performed to analyze VEGF expression in the implants. At two, six, and twelve weeks, bone densitometry analysis was performed to measure bone mineral density change in the implants. At twelve weeks, the implants were retrieved.

**Results:** To date, we have successfully implanted and retrieved sixteen cylinders in eight rats. Tissue samples are currently being decalcified, fixed, and stained with H&E, trichrome green, and CD31/PECAM-1 (a marker of endothelial cells). Bone formation was quantified through histological analysis, and reported as a percentage of area bone/(area cross section scaffold). 100 bone mineral density scans were analyzed and a 20.6% density increase was found in the (1) VEGF + BMP-2 versus an 8.7% decrease in the (3) without BMP-2 + Luciferase control group.

**Conclusions:** Once the histological samples have been analyzed we will be able to conclude whether and to what extent the addition of VEGF to an in vivo bioreactor further promotes angiogenesis and osteogenesis.

**References:**


**Acknowledgements:**

Co-authors: Clinton J. Devin, MD, Jennifer L. Halpern, MD, and Ginger E. Holt, MD, Vanderbilt University Medical Center.

**Sequencing of Four Prototype Human Metapneumovirus Strains to Compare Genetic Variability**

Rebhik Pyarana

**Background:** Human metapneumovirus (HMPV) belongs to the Paramyxoviridae family. It is most commonly found in nasopharyngeal aspirates of young children and causes clinical symptoms similar to the better known human respiratory syncytial virus (HRSV). HMPV causes mild to severe respiratory infections in children and immunosuppressed adults, and may be a frequent but somewhat undervalued pathogen. The RNA genome of HMPV consists of 8 genes with short intergenic sequences interspersed between them. Prior HMPV sequence analysis has revealed the existence of different subgroups. The cloning and sequencing of prototype HMPV strains from each of the proposed four genetic lineages would be potentially useful in development of successful vaccines against the virus.

**Objectives:**

1. To obtain fully sequenced and characterized genomes of four putative HMPV strains which are representative of their viral subtypes (A1, A2, B1, B2).
2. Comparison of individual genes within and between subgroups.

**Materials and methods:** Viral RNA was isolated from virus infected cell supernatants using a High Pure RNA isolation kit according to instructions from the manufacturer (Qiagen). One step RT-PCR reactions were performed in a single tube. Primers for each gene were designed based on previously published HMPV sequences. The purified DNA was subsequently ligated into a pGEM Easy T vector. DH5α cells were transformed with the plasmid and plated on agar-ampicillin plates which were incubated overnight. Appropriate colonies were picked and grown overnight in LB with ampicillin. Plasmid extraction and purification was performed using a Qagen mini-prep kit. Restriction digests were run on a gel to verify the presence of the desired DNA fragment before sending the purified plasmid for sequencing. To analyze and generate consensus sequences, the programs MacVector and AssemblyLIGN were used.

**Results:** The HMPV genome is shown below. My aim was to obtain full genomic sequences for the HMPV 96-12, 98-42, 99-19 and 94-9 strains, which are the prototypic viruses representing the different genetic subgroups.

I have fully sequenced the P-M-F-M2-SH-G genes for all four subgroups. I have most of the N sequence and the initial portion of the L gene for the four viruses. Dr. Williams and I are currently in the process of data analysis for the P-M-F-M2-SH-G genes. The completion of the project will involve finishing the sequencing of the L and N genes.

**Acknowledgements:**

Co-authors: John G. Williams, MD, Vanderbilt University Medical Center, as well as Sharon Tellfond, Gabriella Cicek, Dr. Lillian Nanney, The Infectious Disease Society of America, Vanderbilt School of Medicine.
Secondary Bile Acids Activate the EGF Receptor (EGFR) Through SRC Kinase-Mediated Mechanism

Igor V. Vokhrunsky

Methods: DCA was added individually to the apical and basolateral surfaces of polarized HCA-7 cells. Cells were then pre-treated with WAY-22, a selective inhibitor of TNF-α converting enzyme (TACE) which is involved in the proteolytic cleavage of the EGFR ligands amphiregulin (AR), transforming growth factor-β (TGF-β), and heparin binding-EGF like growth factor (HB-EGF) to their mature form, or with PP2, a Src kinase inhibitor. Levels of each ligand were measured in the apical and basolateral medium and cell lysates by radioimmunoassay (TGF-β, AR) or ELISA (HB-EGF). RNA was isolated from HCA-7 cells at various time points after DCA treatment and quantitative RT-PCR was performed to determine mRNA expression of AR, TGF-β, HB-EGF, TACE and EGFR. Statistical analysis was performed by Student’s t-test and Mann-Whitney U test. P<0.05 was considered statistically significant.

Results: Basolateral, but not apical administration of DCA preferentially stimulated release of AR and TGF-β in the basolateral, but no apical medium, and HB-EGF into both domains starting at 2-4 hours after DCA delivery. Pre-treatment with WAY-22 or PP2 prior to DCA treatment reduced AR, TGF-β, HB-EGF levels in the basolateral medium to baseline levels (p<0.05). mRNA expression of all ligands was increased 4 hours after DCA treatment and not at earlier time points.

Conclusion: These results highlight the importance of the compartment-selective effects of DCA on release of AR, TGF-β, and HB-EGF in polarizing HCA-7 cells. The mechanism of DCA-induced EGFR activation appears to be controlled through a Src kinase mediated release of AR, TGF-β, and HB-EGF from basolateral cell surface, and not through a transcriptionally mediated mechanism.

Acknowledgments

Co-authors: R.D. Robinson, J.H. Shen, M.R. Fortinot, and K.M. Jones, Vanderbilt Eye Institute. Support was provided by the MFEI Program (DOD# F49550-04-1-0045), Core Grant EY08126, Challenge Grant from Research to Prevent Blindness, NY, Ethylene G. Gill Eye and Ear Foundation.

Law and Policy

Medicine is influenced in every aspect of its practice by law and policy. The goal of the Law and Policy Emphasis area is to help students understand more fully the complexity of these interactions and to give them tools to participate effectively in these arenas. All of the students enrolled in an interdisciplinary course with law and divinity students explored the intersections of law, ethics and medicine and all were instructed in basic methods of legal research. Their actual projects used a variety of methods and ranged across numerous topics. Many engaged in qualitative and survey research to obtain information that could inform policy decisions.

Some of the students went on to propose and even implement policy reforms. One preferred a comprehensive review of existing laws and pending legislation across the country in an area of major interest to Vanderbilt in the Tennessee legislature. One worked for a Congressman who is a leader in health care policy and this student is now playing a major role in redesigning components of the undergraduate medical school curriculum. Another worked for the Institute of Medicine on a project to increase the supply of organs for transplantation, thus gaining an insider’s view on that issue. Another student assisted lawyers who were actively litigating changes in state healthcare policies.

Last fall students reconvened and each gave a presentation in which each discussed what each had learned, then engaged in conversation with the rest of the class. These were sessions were truly extraordinary.

Ellen Clayton holds the Rosalind E. Franklin Chair in Genetics and Health Policy at Vanderbilt University Center and is the Co-Director of the Center for Biomedical Ethics and Society. She joined the Vanderbilt faculty in 1988 and holds appointments in both the Medical School and Law School. Dr. Clayton is one of the preeminent scholars in the field of law and genetics. She has numerous publications in books, medical journals, interdisciplinary journals, and law journals on the intersection of law, medicine, and public health. In addition to teaching in the Law School and Medical School, she is a practicing pediatrician at the Vanderbilt Medical Center.

“The Emphasis Program was a rich experience for me. Josh Perry, our fellow, and I got to know these students quite well and got to watch them grow and develop during this period in a way that I had not previously experienced in many years of teaching. I am confident that they know more now about the setting in which medicine is practiced, and that they will be more effective advocates in the future as a result.”
Endoscopic-Approach Development for Minimally Invasive Orbital Surgery

Rohan J. Shah

Purpose: Orbital tumors and pseudotumor cerebri are sometimes treated with orbital surgical approaches. Our previous studies suggest that endoscopy may potentially be useful for minimally invasive orbital therapy. This study proposed to improve a technique for accessing the posterior orbital space via endoscopy with the application of Free Electron Laser (FEL) energy, biopsy forceps, vessel coagulation, and CO2 insufflation to posterior orbital tissues.

Methods: An inferior transconjunctival approach was used to access the posterior orbital space in 14 eyes of 7 non-survival pigs. A guidance tube and the endoscope monitor were used to guide the surgeon to the posterior orbit. Then FEL energy application (6.1 μm, 2.7 ± 0.5 mJ, 30 Hz, delivered via glass-hollow waveguide), tissue excision with biopsy forceps, and monopolar electrocautery were attempted via endoscopy. The effects of CO2 gas insufflation were then assessed by analyzing arterial blood gases for 3 consecutive 30-minute intervals.

Results: The posterior orbit was accessed via endoscopy in all except the first attempted eye. The optic nerve was additionally encountered and FEL energy was applied in 8 of the 14 trials. Applications of biopsy forceps to the incised optic nerve sheaths and electrocautery to vessels were successful and documented by histology. Although ANOVA statistical tests for arterial blood gas changes were insignificant: pH % change = 0.936% (P = 0.95), pCO2 % change = 13.7% (P = 0.82), HCO3% % change = 7.41% (P = 0.39), visibility was adequate without CO2 insufflation.

Conclusions: The posterior orbit was successfully accessed using endoscopy. The optic nerve was also exposed and successfully treated with FEL energy, which was not an original objective. CO2 insufflation did not alter blood gases, but did not further enhance visibility in this study. Applications of endoscopy for posterior orbital procedures are feasible, but extreme surgical care is required and further study with human cadaveric eyes is needed.

Acknowledgements: Co-authors: R. D. Robinson, J.H. Shen, M.R. Furtado, and K.M. Joes, Vanderbilt Eye Institute. Support was provided by the MFEL Program (DOD F49550-04-1-0045, Core Grant EY08126, Challenge Grant from Research to Prevent Blindness, NY, Ethyene G. Gill Eye and Ear Foundation.)

Secondary Bile Acids Activate the EGF Receptor (EGFR) Through SRC Kinase-Mediated Mechanism

Igor V. Vokrجنsky

Background: Diets high in fats and low in fiber are associated with increases in secondary bile acids, such as desoxycholic acid (DCA), which is a known colon cancer promoter. Tumorigenic effects of DCA are linked to activation of EGFR. Communication between Src kinases and EGFR signaling has been shown to involve cell surface proteolysis of EGFR ligand precursors.

Objectives: To determine the mechanism by which DCA activates EGFR in human polarizing colon cancer cell line HCA-7.

Methods: DCA was added individually to the apical and basolateral surfaces of polarized HCA-7 cells. Cells were then pre-treated with WAY-21 or WAY-52 prior to DCA treatment reduced AR, TGF-β, and HB-EGF levels in the basolateral medium to baseline levels (p<0.05). mRNA expression of all ligands was increased 4 hours after DCA treatment and not at earlier time points.

Conclusion: These results highlight the importance of the compartment-selective effects of DCA on release of AR, TGF-β, and HB-EGF in polarizing HCA-7 cells. The mechanism of DCA-induced EGFR activation appears to be controlled through a Src kinase mediated release of AR, TGF-β, and HB-EGF from basolateral cell surface, and not through a transcriptionally mediated mechanism.

Acknowledgements: Co-authors: Christopher Rogers, Babula Trivedi, MS, Jason Marrero, MD, Robert J. Coffey, MD and Nipun Merchant, MD, Vanderbilt University Medical Center.

Law and Policy

Medicine is influenced in every aspect of its practice by law and policy. The goal of the Law and Policy Emphasis area is to help students understand more fully the complexity of these interactions and to give them tools to participate effectively in these arenas. All of the students enrolled in an interdisciplinary course with law and divinity students explored the intersections of law, ethics and medicine and all were instructed in basic methods of legal research. Their actual projects used a variety of methods and ranged across numerous topics. Many engaged in qualitative and survey research to obtain information that could inform policy decisions.

Some of the students went on to propose and even implement policy reforms. One performed a comprehensive analysis of existing laws and pending legislation across the country in an area of major interest to Vanderbilt in the Tennessee legislature. One worked for a Congressman who is a leader in health care policy and this student is now playing a major role in redesigning components of the undergraduate medical school curriculum. Another worked for the Institute of Medicine on a project to increase the supply of organs for transplantation, thus gaining an insider’s view on that issue. Another student assisted lawyers who were actively litigating changes in state healthcare policies.

Last fall students reconvened and each gave a presentation in which each discussed what each had learned, then engaged in conversation with the rest of the class. These were sessions were truly extraordinary.

Ellen Clayton holds the Rosalind E. Franklin Chair in Genetics and Health Policy at Vanderbilt University Center and is the Co-Director of the Center for Biomedical Ethics and Society. She joined the Vanderbilt faculty in 1988 and holds appointments in both the Medical School and Law School. Dr. Clayton is one of the preeminent scholars in the field of law and genetics. She has numerous publications in books, medical journals, interdisciplinary journals, and law journals on the intersection of law, medicine, and public health. In addition to teaching in the Law School and Medical School, she is a practicing pediatrician at the Vanderbilt Medical Center.

“The Emphasis Program was a rich experience for me. Josh Perry, our fellow, and I got to know these students quite well and got to watch them grow and develop during this period in a way that I had not previously experienced in many years of teaching. I am confident that they know more now about the setting in which medicine is practiced, and that they will be more effective advocates in the future as a result.”

“...”
Methamphetamine (Meth) Exposed Child Emergency Department Protocols

Lara Bratcher

Background: Tennessee Department of Children’s Services estimates that more than 700 children are placed in state custody every year because of meth or meth production (Governor’s Task Force Report 11). Children discovered in clandestine methamphetamine labs are exposed to a variety of chemical and environmental dangers. Most of these children are taken immediately to emergency departments. The question of the proper medical treatment of these children is still largely undefined. At the current time, Tennessee does not have a statewide, standardized protocol for medical personnel treating children exposed to meth.

Objective: To discover health care providers’ current practices regarding meth exposed children and to gauge their interest in standardized protocols.

Methods: A survey of medical practices was mailed to 87 physicians associated with emergency departments and child services was mailed to 12 southeastern Tennessee counties. The survey, consisting of 20 questions, was sent to Vanderbilt Medical Center physicians and residents in the wards to educate medical students about domestic violence and to become familiar with the enforcement of the laws. In addition, medical community might include domestic violence resource centers, housing, and funding. The aims of the survey are to understand the experience of medical students/residents and their families related to an adverse event due to perceived or disclosed negligence; to learn how they become aware of such errors; to appreciate what factors influenced their decision to/not to file a claim; and to ascertain how involvement in these experiences may have shaped their practice behavior and view of medicine.

Materials and Methods: Literature review: A search for English-language empirical data articles and literature reviews was conducted on Google Scholar and PubMed. Keywords included malpractice, negligence, adverse event, error, and doctors as patients. As primary articles were identified, additional articles were located by reviewing reference lists. Articles were selected based on original findings, design quality, and relevance. Survey: The survey, consisting of 20 various open-ended, yes/no, and/or multiple choice questions relating to an experience with a medical error, will be administered to Vanderbilt medical students (I-IV) and residents later this semester.

Results: Literature Review: Key findings suggest that there is no universal definition of an error or adverse event related to an adverse event due to perceived or disclosed negligence; to learn how they become aware of such errors; to appreciate what factors influenced their decision to/not to file a claim; and to ascertain how involvement in these experiences may have shaped their practice behavior and view of medicine.
Methamphetamine (Meth) Exposed Child Emergency Department Protocols

Lara Bratcher

Background: Tennessee Department of Children’s Services estimates that more than 700 children are placed in state custody every year because of meth or meth production (Governor’s Task Force Report 11). Children discovered in clandestine methamphetamine labs are exposed to a variety of chemical and environmental dangers. Most of these children are taken immediately to emergency departments. The question of the proper medical treatment of these children is still largely undefined. At the current time, Tennessee does not have a statewide, standardized protocol for medical personnel treating children exposed to meth.

Objective: To discover health care providers’ current practices regarding meth exposed children and to gauge their interest in standardized protocols.

Methods: A survey of medical practices was mailed to 87 physicians associated with emergency departments and child services was mailed to 12 southeastern Tennessee counties, Bradley, Coffee, Franklin, Grundy, Hamilton, Marion, McMinn, Meigs, Monroe, Sequatchie, Van Buren, and Warren. This survey described three clinical scenarios in which the likelihood of meth exposure is definite, high, or unlikely respectively. The physicians were asked to outline the steps of their examination for each scenario. The second part consisted of general questions about the severity of the meth problem in their area, the utility of a standardized protocol, and the contents of such a protocol. A commonly used protocol, written by the National Alliance for Drug Endangered Children was included, and the physicians were asked if they felt it was appropriate for Tennessee emergency departments.

Results: Over 90% of respondents stated that a state-wide protocol for meth exposed children would be helpful to them. The survey also revealed that current clinical practices are extremely wide ranging and physician dependent.

Conclusions: A standardized protocol would aid physicians in providing evidence based, effective care for meth exposed children.


Acknowledgements: Co-author: Christopher Grooley, MD, Monroe Carroll Children’s Hospital at Vanderbilt.

Domestic Violence: The Law, the Reality and Steps Toward Improvement

Erin M. Carney

Background/Problem: The incidence of domestic abuse in the United States remains high despite the fact that domestic violence was recognized as a public issue over 30 years ago. In the state of Tennessee in 2001, 41.7% of all crimes against persons were domestic violence crimes.

Objectives: • To gain an understanding of the Tennessee code applicable to domestic violence and to become familiar with the enforcement of the laws. • To find areas that are under-served in the system of screening and advocacy for domestic violence, and to devise a program to fill those gaps.

Materials and Methods: A review of the 2005 Tennessee code applicable to domestic violence was completed, and legislative updates were obtained to ascertain the status of recent bills in the state legislature. Following the legislative study, an internship with a Davidson County domestic violence resource center was fulfilled to observe the impact of the laws on victims.

Results: The laws were found not to be uniformly applied. Services for victims were found to be lacking in the community, in regards to support systems, housing, and funding.

Conclusions: After observing hearings for orders of protection and talking with victims, it is clear that at times a divide exists between the written code and the enforcement of the code. In addition, many victims are unaware of the resources that exist in the community to assist them in securing their safety. To address this gap, an elective course has been established at Vanderbilt University School of Medicine to educate medical students about domestic violence. This will enable students working on the wards to know how to screen patients for domestic abuse and how to help them reach the resources available in the local community.

Future work on education for the medical community might include a module in required coursework for medical students and online resources for reference. In addition, evaluation measures will be implemented to follow these endeavors.

Acknowledgements: Many thanks to Ellen W. Clayton, MD, JD, Joshua E. Perry, MTS, JD, Laura Litz and Erinn E. Perry, MTS, JD, Laura Litz and Ted L. Anderson, MD, PhD. ■

Understanding the Personal Experience of Adverse Events and Negligence in The Medical Community

Nadja Colon

Background: Previous studies have revealed several reasons why medical mistakes occur, such as miscommunication, dosing errors, and misinterpretation of diagnostics. Once a mistake is made, disclosure, or lack thereof, can play a pivotal role in a patient’s decision to pursue litigation for medical negligence.

An interesting patient population subset includes medical students, residents, and physicians who can be, at various times, both patients and physicians/physicians-in-training. As no one is exempt from possibly experiencing an adverse event, they may find themselves in situations in which a medical error occurred. In instances when they or their loved ones experience an adverse event, it may be that their medical knowledge or position affects their overall experience. It may even influence their decisions to pursue a claim.

Objective: The primary goals of the literature review are to appreciate the variance in defining errors and adverse events and what role perceived negligence plays in these situations; to what extent disclosure should occur; and what factors influence a patient’s decision to/not to file a lawsuit. It was also important to acquire a better understanding of what it means to be a physician-patient.

The aims of the survey are to understand the experience of medical students/residents and their families related to an adverse event due to perceived or disclosed negligence; to learn how they become aware of such errors; to appreciate what factors influenced their decision to/not to file a claim; and to ascertain how involvement in these experiences may have shaped their practice behavior and view of medicine.

Materials and Methods: Literature review: A search for English-language empirical data articles and literature reviews was conducted on Google Scholar and PubMed. Keywords included malpractice, negligence, adverse event, error, and doctors as patients. As primary articles were identified, additional articles were located by reviewing reference lists. Articles were selected based on original findings, design quality, and relevance.

Survey: The survey, consisting of 20 various open-ended, yes/no, and evaluative questions relating to an experience with a medical error, will be administered to Vanderbilt medical students (II-IV) and residents later this semester.

Results: Literature Review: Key findings suggest that there is no universal definition of an error or adverse
event, as patients define these terms broadly, whereas physicians define them more narrowly. When mistakes occur, disclosure rarely occurs, even though it does not imply liability. One study showed that 76% of housestaff failed to inform patients of a serious error. Of the 30% of patients that said they have been informed of an error, only 33% received an apology.

One of the single-most important factors in the decision to file a lawsuit is the physician-patient relationship, at 71% of depositions identified physician-patient relationship issues as the reason for the suit. Moreover, less than 20% of malpractice cases actually involve negligence, although almost all involved a breakdown in physician-patient relationship.

Another study determined that of patients who sued: 20% were looking for answers; 24% perceived a cover-up; 32% said that their physician would not answer their questions. However, of the 18% of patients with meritious claims due to inappropriate care, only 1% actually filed.

When it comes to physicians as patients, it must be realized that they are not typical patients. There are implications of melding one’s personal and professional lives in the context of being an ill physician. With studies supporting the idea that physicians do not seek out care unless necessary, consultation rates are actually quite low. Physicians rely on informal consults and self-prescribing, which allows them to go to work and carry on as usual. However, such practices should not be encouraged.

**Survey:** The results of the survey are pending.

**Conclusion**

**Literature Review:** There is a disconnect between what patients and physicians call an error and adverse event. However, disclosure coupled with a genuine apology, especially in the context of a positive physician-patient relationship, significantly decreases malpractice claims on a case-by-case basis.

When it comes to physicians as patients, it must be realized that they are not typical patients. There are implications of melding one’s personal and professional lives in the context of being an ill physician. With studies supporting the idea that physicians do not seek out care unless necessary, consultation rates are actually quite low. Physicians rely on informal consults and self-prescribing, which allows them to go to work and carry on as usual. However, such practices should not be encouraged.

**Survey:** Conclusions are pending.

**References:** Available upon request

**Acknowledgements:** Special thanks to Gerald Hickson, MD, Ellen Wright Clayton, MD, JD, and Joshua Perry, JD, MTS for their guidance.

---

### The Planned Parenthood Client’s Awareness, Knowledge and Usage of Emergency Contraception: A New Perspective

**Jillian Copeland and Erin Horn**

**Background**

Emergency contraception (EC) is an important but underutilized contraceptive method. Studies have been conducted to ascertain EC competency in the general population. However, current literature concerning EC focuses on large metropolitan populations, not necessarily representative of a mid-sized southern city. Therefore, the Nashville population should be examined to determine how well national studies approximate local opinions.

**Objectives:** Compare awareness, knowledge, willingness to use, and past usage of Emergency Contraception (hereafter termed EC competency) among the clientele at Planned Parenthood of Middle and East Tennessee (PPMET), to published data.

**Materials and Methods:** A self-administered survey offered to women presenting at the PPMET clinic for gynecologic or contraceptive services during a ten-week period. The volunteer sample of 134 women, aged 18 – 44 (mean 23.7), answered a 23-question survey focused on EC competency. Results were compared to 14 studies published between 1995 and 2005. Eligible studies measured the chosen competencies and included a domestic population demographically similar to the PPMET clientele.

**Results:** Within the PPMET population, 93% (125) had heard of EC or the morning after pill, 63% (80) correctly identified EC’s time restrictions, 72% (97) stated a willingness to use EC, and 26% (35) had taken it. This compares with an average awareness level in previously published populations of 53% (13% - 95%); knowledge level of 24% (4% - 74%); willingness level of 66% (47% - 95%); and past usage level of 7% (.7% - 24%).

In the literature, the most common factors correlated with competency levels were: higher education, contact with a health care provider, socioeconomic status, and age.

Among PPMET clients, knowledge and usage were not related to the aforementioned variables; however, willingness to use EC was correlated with past EC use or familiarity with EC through a friend’s usage.

**Conclusions:** A greater level of awareness, knowledge, willingness and utilization was observed among women seeking care at the PPMET clinic as compared to populations in the literature. Furthermore, increase EC competency was unrelated to race, socioeconomic status, or education. Limitations include selection bias and a comparison to data spanning 10 years compiled using differing methods of data acquisition. Despite these shortcomings, the data reveals that the PPMET clientele is better informed about EC as compared to populations presented in the published literature.

There is a need for comprehensive analysis of Nashville women to provide better comparison with the national and PPMET populations.

**References:** Available upon request.

**Acknowledgements:** Dr. Esther Eisenberg and Dr. Lynn Webb, Vanderbilt University Medical Center, for their mentorship. Keri Adams, Barbara Chadwick, Dr. Ellen Clayton, Barbara Clinton, Mark Huffman, and the staff of Planned Parenthood of Middle and East Tennessee. The Arthur P. Gold Foundation for their generous support.

---

### Human Cloning in Tennessee: Brave New World or the Future of Medicine?

**Rebecca Lawmizak**

**Background:** The federal moratorium on human embryonic stem cell research has expired and the federal government has failed to enact legislation regarding human cloning and embryonic stem cell research. Due to the lack of standards set by the federal government and fear that undesirable ones may be set, many states have taken the initiative to pass their own legislation regarding this important area of science and medicine. Tennessee’s legislature has addressed this topic as well. Bills have been and will be introduced that seek to ban all forms of human cloning, including somatic cell nuclear transfer (SCNT), an important form of embryonic stem cell research.

**Objectives:** The objective is to provide accurate information regarding human cloning in Tennessee.
The Planned Parenthood Client’s Awareness, Knowledge and Usage of Emergency Contraception: A New Perspective

Jillian Copeland and Erin Horn

Background

Emergency contraception (EC) is an important but underutilized contraceptive method. Studies have been conducted to ascertain EC competency in the general population. However, current literature concerning EC focuses on large metropolitan populations, not necessarily representative of a mid-sized southern city. Therefore, the Nashville population should be examined to determine how well national studies approximate local opinions.

Objectives: Compare awareness, knowledge, willingness to use, and past usage of Emergency Contraception (henceforth termed EC competency) among the clientele at Planned Parenthood of Middle and East Tennessee (PPMET), to published data.

Materials and Methods: A self-administered survey offered to women presenting at the PPMET clinic for gynecologic or contraceptive services during a ten-week period.

The volunteer sample of 134 women, aged 18 – 44 (mean 23.7), answered a 23-question survey focused on EC competency. Results were compared to 14 studies published between 1995 and 2005. Eligible studies measured the chosen competencies and included a democratic population demographically similar to the PPMET clientele.

Results: Within the PPMET population, 93% (125) had heard of EC or the morning after pill, 63% (80) correctly identified EC’s time restrictions, 72% (97) stated a willingness to use EC, and 26% (35) had taken it. This compares with an average awareness level in previously published populations of 53% (13% - 95%); knowledge level of 24% (4% - 74%); willingness level of 66% (47% - 95%); and past usage level of 7% (7% - 24%).

In the literature, the most common factors correlated with competency levels were: higher education, contact with a health care provider, socioeconomic status, and age. Among PPMET clients, knowledge and usage were not related to the aforementioned variables; however, willingness to use EC was correlated with past EC use or familiarity with EC through a friend’s usage.

Conclusions: A greater level of awareness, knowledge, willingness and utilization was observed among women seeking care at the PPMET clinic as compared to populations in the literature. Furthermore, increase EC competency was unrelated to race, socioeconomic status, or education. Limitations include selection bias and a comparison to data spanning 10 years compiled using different methods of data acquisition. Despite these shortcomings, the data reveals that the PPMET clientele is better informed about EC as compared to populations presented in the published literature.

There is a need for comprehensive analysis of Nashville women to provide better comparison with the national and PPMET populations.
the prospects that laws will be enacted regulating stem cell research, the ethical arguments in favor of this research, the popular opinion, and the financial consequences in conducting this in Tennessee.

Materials and Methods: Legislation presented/enacted in other states and on a federal level was examined for patterns or language that would be useful to understand and control the bills presented in Tennessee. Public opinion polls were analyzed to determine current opinion on embryonic stem cell research and to observe trends in these opinions throughout the public debate. Informational handouts, meetings, and presentations were arranged for legislators, lobbyists, and the public.

Results: Factors observed to be important in human cloning and embryonic stem cell research bills were the definitions used in the bill and the various clauses added to the bill (e.g. establishing a research advisory panel and disallowing compensation for donation of eggs). Public opinion polls showed that the majority of the population, particularly across religious and political groups, was against this research, the ethical arguments in favor of this research, the popular opinion, and public perceptions concerning organ donation, and educational obstacles. The role in the committee concerns background research in these areas, involvement in meetings, particularly in the investigation of educational options, the use of financial incentives to encourage organ donation, and weighing a presumed consent policy.

Acknowledgements: The language of the electronic system; and to assess staff perceptions and attitudes toward domestic violence. This system was developed for persons who responded affirmatively to having been hurt and wishing to speak with someone about that event. This system was then anonymously observed for compliance and quality. In addition, an anonymous paper questionnaire was distributed to ED nurses to ascertain procedural and/or personal barriers to compliance with the electronic system.

Results: The project is ongoing and results for prevalence of domestic violence among subpopulations throughout the public debate. Informational handouts, meetings, and presentations were arranged for legislators, lobbyists, and the public.

Domestic Violence:
Increasing Rates of Organ Donation: From Policy to Evincing Change in Academic Centers

Laura Meints

Background: Private and public aspects of domestic violence intersect in the emergency department (ED). Yet the prevalence and presenting complaints of adult populations in emergency rooms remain poorly understood.

Objectives: To advocate for, design, and implement an electronic system to screen universally for domestic violence in the adult emergency room. To then screen for domestic violence in an adult ED setting. Future data will add to existing knowledge about domestic violence and opportunities for intervention.

Future Directions
1. Adult ED: To move screening for DV to the secondary nursing encounter.
2. OB/Gyn: To implement the DV consultation form to assist in proper documentation of DV and resources for patients.
3. Pediatric ED: To adapt and implement the electronic system of screening DV for use among 14- to 17-year-olds.

Methods and Materials: This project initiated, designed, and implemented for the adult emergency department at VUMC. A new electronic system was created to screen all patients at Triage for whether they were the victims of domestic violence. The necessary consultation network (intra-hospital, extrahospital), and procedures were concurrently developed for persons who responded affirmatively to having been hurt and wishing to speak with someone about that event. This system was then anonymously observed for compliance and quality. In addition, an anonymous paper questionnaire was distributed to ED nurses to ascertain procedural and/or personal barriers to compliance with the electronic system.

Results: The project is ongoing, and results for prevalence of domestic violence among subpopulations, presenting medical issues, medical treatment, and long-term follow-up have yet to be determined.

Conclusions: This electronic system is the first to permit universal screening for domestic violence in an adult ED setting. Future data will add to existing knowledge about domestic violence and opportunities for intervention.

Increasing Rates of Organ Donation: From Policy to Evincing Change in Academic Centers

Anamika B. Mukherjee

Background/Problem: Transplantation has become the therapy of choice for many for end-stage organ failure. However, despite efforts to improve organ utilization and even use living and non-heart-beating donors, the demand for organs far outstrips their supply. It is clear that to increase the number of patients helped by transplantation, it is necessary to increase the number of available donor organs. The Institute of Medicine (1995) was charged by Congress to present solutions to this problem.

Objective: To identify means of improving rates of organ donation.

Methods and Materials: A committee was assembled to investigate current roadblocks to organ donation, including state and federal statutes, religious/cultural issues, public perceptions concerning organ donation, and educational obstacles. My role in the committee concerned background research in these areas, involvement in meetings, particularly in the investigation of educational options, the use of financial incentives to encourage organ donation, and weighing a presumed consent policy.

Results and Conclusions: A committee report was generated evaluating various options, including financial incentives for the families of organ donors, a presumed consent policy, the creation of national donor registries and making recommendations. The report is currently under review.

Medical Students’ Perspective on The Disclosure of Iatrogenic Events

Paul Q. Reynolds

Background: In 1999, the Institute of Medicine published a report entitled “To Err is Human: Building a Safer Health System,” that revealed from 44,000 to 98,000 deaths occur per year in hospitals throughout the country due to preventable errors. In response to the report some medical schools have instituted the topic of iatrogenic error disclosure in their curricula. It remains unknown, though, how medical students’ education outside of the classroom (via clinical exposure) affects their views on error disclosure.

Objectives: To determine if medical students’ propensity to disclose iatrogenic errors changes during the course of their medical education.

Materials and Methods: An online, anonymous survey was distributed to 1st and 4th year students at six medical schools in the region, specifically through improved education of students, resident physicians, and faculty. I further hope that this will improve the patient care we can offer every transplant recipient.

Acknowledgements: Dr. Ellen Clayton, Cathy Liverman, MD, Vanderbilt University School of Medicine, I would like to thank Vanderbilt University School of Medicine for sponsorship of my project, Dr. Ellen Clayton, Cathy Liverman, and the Institute of Medicine for providing this unique research experience.
the prospects that laws will be enacted regulating stem cell research, the ethical arguments in favor of this research, the popular opinion, and the financial consequences in conducting this in Tennessee.

Materials and Methods: Legislation presented/enacted in other states and on a federal level was examined for patterns or language that would be useful to understand and contrast the bills presented in Tennessee. Public opinion polls were analyzed to determine current opinion on embryonic stem cell research and to observe trends in these opinions throughout the public debate. Informational handouts, meetings, and presentations were arranged for legislators, lobbyists, and the public.

Results: Factors observed to be important in human cloning and embryonic stem cell research bills were the definitions used in the bill and the various clauses added to the bill (e.g. establishing a research advisory panel and disallowing compensation for donation of eggs). Public opinion polls showed that the majority of the population, across religious and political groups, favors embryonic stem cell research.

Conclusions: The language of the human cloning and embryonic stem cell research bills seemed to play a role in whether or not the bills were enacted and accepted publicly. The support of the majority of the US population for embryonic stem cell research influences legislators as well. In light of these factors, we conclude that the legislators in Tennessee will choose not to implement a law that bans SCNT and may even consider legislation promoting this research.

Acknowledgements: Betty Nixon, Dr. Ellen Clayton, and Josh Perry provided guidance throughout the project.

Domestic Violence: Universal Screening in the Adult Emergency Department, VUMC

Laura Meints

Background: Private and public aspects of domestic violence intersect in the emergency department (ED). Yet the prevalence and presenting complaints of adult populations in emergency rooms remain poorly understood.

Objectives: To advocate for, design, and implement an electronic system to screen universally for domestic violence in the adult emergency room at Vanderbilt University Medical Center (VUMC); to educate staff about screening for domestic violence through the electronic system; and to assess staff perceptions and attitudes toward this type of screening.

Materials and Methods: This project was initiated, designed, and implemented for the adult emergency department at VUMC. A new electronic system was created to screen all patients at triage for whether they were the victims of domestic violence. The necessary consultation network (intra-hospital), resources (extra-hospital), and procedures were concurrently developed for persons who responded affirmatively to having been hurt and wishing to speak with someone about that event. This system was then anonymously observed for compliance and quality. In addition, an anonymous paper questionnaire was distributed to ED nurses to ascertain procedural and/or personal barriers to compliance with the electronic system.

Results: The project is ongoing; and results for prevalence of domestic violence among subpopulations, presenting medical issues, medical treatment, and long-term follow-up have yet to be determined.

Conclusions: This electronic system is the first to permit universal screening for domestic violence in an adult ED setting. Future data will add to existing knowledge about domestic violence and opportunities for intervention.

Future Directions
1. Adult ED: To move screening for DV to the secondary nursing encounter.
2. OB/Gyn: To implement the DV consultation form to assist in proper documentation of DV and resources for patients.
3. Pediatric ED: To adapt and implement the electronic system of screening DV for use among 14- to 17-year-olds.


Increasing Rates of Organ Donation: From Policy to Evincing Change in Academic Centers

Anamika B. Mukherjee

Background/Problem: Transplantation has become the therapy of choice for many forms of end-stage organ failure. However, despite efforts to improve organ utilization and even use living and non-heart-beating donors, the demand for organs far outstrips their supply. It is clear that, to increase the number of patients helped by transplantation, it is necessary to increase the number of available donor organs. The Institute of Medicine (IOM) was charged by Congress to present solutions to this problem.

Objective: To identify means of improving rates of organ donation.

Materials and Methods: This project was initiated, designed, and implemented for the adult emergency department at VUMC. A new electronic system was created to screen all patients at triage for whether they were the victims of domestic violence. The necessary consultation network (intra-hospital), resources (extra-hospital), and procedures were concurrently developed for persons who responded affirmatively to having been hurt and wishing to speak with someone about that event. This system was then anonymously observed for compliance and quality. In addition, an anonymous paper questionnaire was distributed to ED nurses to ascertain procedural and/or personal barriers to compliance with the electronic system.

Results: The project is ongoing; and results for prevalence of domestic violence among subpopulations, presenting medical issues, medical treatment, and long-term follow-up have yet to be determined.

Conclusions: This electronic system is the first to permit universal screening for domestic violence in an adult ED setting. Future data will add to existing knowledge about domestic violence and opportunities for intervention.

Future Directions
1. Adult ED: To move screening for DV to the secondary nursing encounter.
2. OB/Gyn: To implement the DV consultation form to assist in proper documentation of DV and resources for patients.
3. Pediatric ED: To adapt and implement the electronic system of screening DV for use among 14- to 17-year-olds.

References: Anglin D and Sachs C. Preventative care in the emergency department: Screening for domestic
ial schools. The survey contained 4 hypothetical case studies in which an error was made. Respondents estimated the extent of their disclosure for each situation based on a five-point Likert scale. A score of 1 indicates no disclosure and a score of 5 denotes full disclosure.

**Results:** 151 of 217 surveys were completed (70%) at Vanderbilt Medical School. Data collection is still ongoing at four other schools. Overall, 1st year students reported a 3.87 out of 5 likelihood of error disclosure compared to 4th year students’ 4.04 value. The difference is statistically significant (two-tail P value=0.004). The greatest variation in error disclosure was elicited in situations where the students were asked if they would give a clear statement to the patient’s family that an error had occurred, as opposed to disclosing the error directly to the patient. 4th year students disclosed errors at a higher rate than 1st year students on every case study except for two situations in which responsibility for the error was assigned or the patient’s privacy was at stake.

**Conclusions:** Graduating medical students are more likely to let a patient’s family know when an iatrogenic error occurs than they would have been prior to their medical experience and education. 4th year students were less prone than 1st year medical students to make the medically needy group of TennCare recipients.

**Health Policy Education: Health Policy and the Medical School Curriculum**

**Cary W. Stimson, Jr.**

**Background:** Current medical education fails to address the broader health policy issues that are an integral piece of daily medical practice. This new course is part of a curriculum that addresses health policy in a formalized setting that respects the historical context of the current debate and explores pertinent issues from multiple angles.

**Objective:** To develop a formal health policy curriculum for first and second year medical students.

**Materials and Methods:** As an assistant to the Plaintiffs-Intervenors, I acted as a “medical expert.” My job was to perform background investigations on the scientific experts used by the Tennessee Justice Center and provide analysis of their published work pertinent to their testimony. At the conclusion of the trial, my focus shifted to collection of data regarding the health of the medically needy group. Data was collected through a review of records at the TennCare Bureau, personal interviews and e-mail correspondence with the attorneys that represented Plaintiffs-Intervenors. Additionally, I reviewed the secondary literature concerning the lack of health care access and its influence on people’s health.

**Results:**

- In eight months since the reduction in TennCare’s population, there have been no definitive studies addressing the long-term effects of these changes on the health care of this population. However, the general trend indicates that the medically needy have less hospital utilization, lower prescription drug usage, and increased patient compliance and satisfaction compared to when they had full coverage. The trend also suggests that emergency room visits have not changed for the group.

**Conclusions:**

- The working hypothesis for this project suggests that the medically needy population receiving partial insurance will have greater emergency room visits, less satisfaction and hospital visits, and decrease medication compliance in comparison to when they had full coverage, which contradicts the recent trend. More data will be forthcoming in the upcoming months which can be used to properly evaluate the hypothesis.

**Patient-Oriented Research**

The area of Patient-Oriented Research addresses:

1. the mechanisms of human disease,
2. therapeutic interventions,
3. clinical trials,
4. the use of new technologies for the diagnosis, treatment, or prevention of disease, and
5. the emotional, social, developmental, and behavioral mechanisms of health and disease.

In addition to standard randomized clinical trials, patient-oriented methodologies also include self-perception measures (e.g., patients completing questionnaires), interviews, and focus groups. The core of this focus area is the scientific study of human participants to understand the causes of disease, health, and function. This understanding contributes to therapy and prevention. Clinically derived scientific knowledge, laboratory science, and patient-oriented science are core disciplines of the medical profession.

**Tom Davis** is Associate Director of Neurology and Director, Division of Movement Disorders, Director of the General Clinical Research Center Core Laboratory, a staff neurologist at the Nashville Veterans Administration Hospital, and neurological consultant at Vanderbilt.
Impact of Partial Care on Health: Studying the TennCare Medically Needy Population

Yaw Sarpong

Background: TennCare is a program started by the state of Tennessee in 1994 to provide health insurance to its Medicaid-eligible population and those without insurance or deemed uninsurable through the use of manage care organizations. Due to uncontrolled rising costs, Tennessee proposed an elimination of much of TennCare's coverage. Under this proposal, the state would remove a certain number of people from the TennCare population and limit the coverage of the remaining members of the program. This proposal was challenged by two groups: the Tennessee Justice Center, who represented the at large population of the TennCare program, and the Plaintiffs-Intervenors, who represented the medically needy group of TennCare recipients.

Objectives: To assist the Plaintiffs-Intervenors and to follow the medically needy group for a period of twelve months in order to compare the effectiveness of partial insurance to hospital utilization, emergency room visits, prescription drug usage, and patient compliance and satisfaction through patient interview (K-study) with those who have full health care insurance coverage.

Materials and Methods: As an assistant to the Plaintiffs-Intervenors, I acted as a "medical expert." My job was to perform background investigations on the scientific experts used by the Tennessee Justice Center and provide analysis of their published work pertinent to their testimony. At the conclusion of the trial, my focus shifted to collection of data regarding the health of the medically needy group. Data was collected through a review of records at the TennCare Bureau, personal interviews and e-mail correspondence with the attorneys who represented Plaintiffs-Intervenors. Additionally, I reviewed the secondary literature concerning the lack of health care access and its influence on people's health.

Results: In eight months since the reduction in TennCare's population, there have been no definitive studies addressing the long-term effects of these changes on the health care of this population. However, the general trend indicates that the medically needy have less hospital utilization, lower prescription drug usage, and increase patient compliance and satisfaction as compared to when they had full coverage. The trend also suggests that emergency room visits have not changed for the group.

Conclusions: The working hypothesis for this project suggests that the medically needy population receiving partial insurance will have increased emergency room visits, less satisfaction and hospital visits, and decreased medication compliance in comparison to when they had full coverage, which contradicts the recent trend. More data will be forthcoming in the upcoming months which can be used to properly evaluate the hypothesis.

Health Policy Education: Health Policy and the Medical School Curriculum

Cary W. Stimson, Jr.

Background: Current medical education fails to address the broader health policy issues that are an integral piece of daily medical practice. These shortcomings leave physicians to form opinions and judgments based on incomplete and inaccurate foundations.

To remedy this gap, Vanderbilt University Medical School (VMS) is developing a formal course for first and second year medical students that will address health policy. This new course is part of a curriculum review that includes a variety of neglected but critical topics for 21st century physicians. VMS will provide students the opportunity to discover health care policy in a formalized setting that respects the historical context of the current debate and explores pertinent issues from multiple angles.

Objective: To develop a formal health policy curriculum for first and second year medical students.

Materials and Methods: Critical issues were identified during an eight week Congressional health policy fellowship combined with reviews of the literature and of health policy courses at the Owen Graduate School of Management. A proposed curriculum was created, based on a two year course schedule with the exact hours of class time undefined as of this writing.

Results: The specific learning objectives were designed to provide practical tools for assessing and debating health policy.

1. To understand what and how health care is delivered, who receives this health care, and who pays;
2. To understand the US health care system's historical context;
3. To develop paradigms for engaging the health policy debate; and
4. To gain fluency in health care policy language.

Conclusions: Health policy is a complex topic with subtle elements. Although it is difficult to present a complete picture of the issues in the context of a demanding medical curriculum, this course will serve an important role by providing future physicians with the knowledge base to be advocates and leaders in this important discussion.

Acknowledgments: A tremendous debt is owed to the following individuals: Dr. Ellen Clayton, Congressman Jim Cooper (TN-5), Mr. Josh Perry, Dr. Larry Churchill and Dr. Lynn Webb.

Patient-Oriented Research

The area of Patient-Oriented Research addresses:
1. the mechanisms of human disease;
2. therapeutic interventions;
3. clinical trials;
4. the use of new technologies for the diagnosis, treatment, or prevention of disease; and
5. the emotional, social, developmental, and behavioral mechanisms of health and disease.

In addition to standard randomized clinical trials, patient-oriented methodologies also include self-perception measures (e.g., patients completing questionnaires), interviews, and focus groups. The core of this focus area is the scientific study of human participants to understand the causes of disease, health, and function. This understanding contributes to therapy and prevention. Clinically derived scientific knowledge, laboratory science, and patient-oriented science are core disciplines of the medical profession.

Tom Davis is Associate Director of Neurology and Director, Division of Movement Disorders, Director of the General Clinical Research Center Core Laboratory, a staff neurologist at the Nashville Veterans Administration Hospital, and neurological consultant at Vanderbilt-
Does Hyperglycemia and Morbid Obesity Still Impact Mortality in Trauma? Marshall Berkes

Objectives: In the era of improved patient management, we hypothesize that morbidity obese (MO) trauma patients do not have worse outcomes compared to non-obese (NO) patients.

Methods: A TRACS database retrospective review was performed at our level 1 trauma center from 1/2000 to 10/2004. Inclusion criteria were age >15 years and BMI > 3 days post hospital stay. Data collected included age, gender, and ISS. The total patient population was divided into NO & MO (BMI ≥ 35 kg/m2) as well as hyperglycemic (HGL, mean glucose >150 mg/dl) or on initial hospital day) and normoglycemic (NGL). Primary outcome was 30 day mortality. Univariate logistic regression (ULR) was utilized to assess the relationship of input variables to mortality. In each model, relationships were assessed using odds ratios (OR) and area under the receiver operator characteristic curve (AUC).

Results: 1334 patients met study criteria and 70.5% were male. The mean age was 40.3, ISS 25.7, LOS 13.4 and BMI 27.5. The most common mechanism of injury was MVC 55.1%. Overall mortality was 4.7%. Mortality was higher in HGL vs. non-HGL (8.76% v. 3.5%; p<0.001). Mortality was higher in MO vs. NO, but not significantly (5.5 v. 4.6%; NS p=0.645). ULR relationships of Death to Age: OR-1.031, p<0.001, AUC = SE.669 ± .042; ISS OR-1.044, p<0.001, AUC = SE.649 ± .039; HGL OR-2.765, p<0.001, AUC = SE.614 ± .067; MO: OR-1.196, p=0.645, AUC = SE.509 ± 0.049.

Conclusion: Morbid obesity is not an independent risk factor for mortality in the trauma patient. Hyperglycemia ≥150mg/dl on the day of admission is associated with a nearly three-fold increase in mortality, and should be outcome measures to be followed.

Acknowledgements:

Co-authors: Jose J. Díaz, MD, Patrick R. Norris, PhD, Bryce R. Collier, DO, Arif Ozdas, PhD,

Advisors: K. May, MD, Richard S. Miller, MD, and John A. Morris, Jr., MD, Vanderbilt University Medical Center.

Clinical Outcomes of Wedge Resection for Non-Small Cell Lung Cancer (Nsclc)

Robert Lee Browning

Background: Lung cancer is the number one cause of cancer related deaths among men and women in the United States. Surgical resection is the treatment of choice for early stage (stage I and II) non-small cell lung cancer (NSCLC). The prognosis is the best when complete resection of the tumor is possible. Typical procedures include: lobectomy, bilobectomy and pneumonectomy, with lobectomy being the standard. However, in certain cases a more limited resection such as segmentectomy or wedge excision must be used.

Objective: The current study examines 61 cases of patients that underwent a wedge excision at Vanderbilt Medical Center from March 1995 through December 2002. Age, Sex, lung and lobe involvement, nodal status, surgical and pleural margins, tumor size and stage, date of death or last follow-up were all recorded. Statistical analyses of the recorded data were performed to determine OS and relapse-free survival. The possible risk factors were compared for survival with Kaplan-Meier estimates and log-rank tests. All tests of significance were two-sided, and differences were considered statistically significant when p-value < 0.05.

Results: We found the median overall survival time to be 30.18 months with at least 43.92% of the patients surviving three years. The median time to recurrence was 21.73 months with at least 35.42% of the patients being disease free at three years. The incidence of local recurrence was 8 out of 20 total recurrences (40%). Analysis of sex, which lung the tumor was in, nodal involvement, lobe of involvement, surgical and pleural margins, and tumor size had no correlation to overall survival or recurrence (P > .05). However, the T-stage of cancer was significant in determining recurrence free survival with T2 resulting in an increased chance of recurrence over T1 (P < 0.009).

Conclusion: We concluded that wedge resection for NSCLC should only be performed on patients that cannot tolerate the more extensive procedures, especially in patients with T2 tumors.

Acknowledgements: Basha Shabtaiow, Yu Shye, Dennis Hallahan and Bo Lu, Vanderbilt University School of Medicine.

A Randomized, Double-Blinded, Placebo-Controlled Phase I/II, Dose-Ranging Study of the Safety, Reactogenicity and Immunogenicity of Intramuscular Influenza A/H5N1 Vaccine in Healthy Elderly Adults

Daryyl Calvo

Background: This vaccine trial was designed to study both the safety and the immunogenicity of an inactivated influenza A vaccine in healthy elderly adults age 65 and older of which 260 were enrolled. Study subject are divided into a placebo group and two dosage groups who receive 3 vaccinations (either 45ug or 90ug dosage levels), the first two separated by one month and the third 6 months following the first.

Objective: Although the immunogenicity data is still pending, an interim safety report was created to determine the ongoing safety of vaccine trials and to determine dosage levels and the trial was determined to be safe to continue.


Vanderbilt Medical Center

Journal of Emphasis

Stallworth Rehabilitation Hospital and Nashville General Hospital. His research is patient oriented and involves primarily various aspects of Parkinson’s disease including markers of disease progression, pathophysiology of motor fluctuations, and autonomic failure in Parkinson’s disease.

"After spending several years in medical education, the Emphasis program was the first time I had the opportunity (and was trusted) to work closely with the first and second year medical students. Seeing them outside of the clinic in this broad environment reminded me how gifted intellectually they really are. The Emphasis program gives the students an opportunity to begin to hone their problem solving skills and will hopefully encourage them to become life-long students."

Clinical Outcomes of Wedge Resection for Non-Small Cell Lung Cancer (NSCLC)

Robert Lee Browning

Background: Lung cancer is the number one cause of cancer related deaths among men and women in the United States. Surgical resection is the treatment of choice for early stage (stage I and II) non-small cell lung cancer (NSCLC). The prognosis is the best when complete resection of the tumor is possible. Typical procedures include: lobectomy, bilobectomy and pneumonectomy, with lobectomy being the standard. However, in certain cases a more limited resection such as segmentectomy or wedge excision must be used.

Objective: The current study examines 61 cases of patients that underwent a wedge excision at Vanderbilt Medical Center from March 1995 through December 2002. Age, Sex, lung and lobe involvement, nodal status, surgical and pleural margins, tumor size and stage, date of death or last follow-up were all recorded. Statistical analyses of the recorded data were performed to determine OS and relapse-free survival. The possible risk factors were compared for survival with Kaplan-Meier estimates and log-rank tests. All tests of significance were two-sided, and differences were considered statistically significant when p-value < 0.05.

Results: We found the median overall survival time to be 30.18 months with at least 43.92% of the patients surviving three years. The median time to recurrence was 21.73 months with at least 35.42% of the patients being disease free at three years. The incidence of local recurrence was 8 out of 20 total recurrences (40%). Analysis of sex, which lung the tumor was in, nodal involvement, lobe of involvement, surgical and pleural margins, and tumor size had no correlation to overall survival or recurrence (P > .05). However, the T-stage of cancer was significant in determining recurrence free survival with T2 resulting in an increased chance of recurrence over T1 (P < 0.009).

Conclusion: We concluded that wedge resection for NSCLC should only be performed on patients that cannot tolerate the more extensive procedures, especially in patients with T2 tumors.

Acknowledgements: Basha Shabtaiow, Yu Shye, Dennis Hallahan and Bo Lu, Vanderbilt University School of Medicine.

A Randomized, Double-Blinded, Placebo-Controlled Phase I/II, Dose-Ranging Study of the Safety, Reactogenicity and Immunogenicity of Intramuscular Influenza A/H5N1 Vaccine in Healthy Elderly Adults

Daryyl Calvo

Background: This vaccine trial was designed to study both the safety and the immunogenicity of an inactivated influenza A vaccine in healthy elderly adults age 65 and older of which 260 were enrolled. Study subject are divided into a placebo group and two dosage groups who receive 3 vaccinations (either 45ug or 90ug dosage levels), the first two separated by one month and the third 6 months following the first.

Objective: Although the immunogenicity data is still pending, an interim safety report was created to determine the ongoing safety of vaccine trials and to determine dosage levels and the trial was determined to be safe to continue.

Stallworth Rehabilitation Hospital and Nashville General Hospital. His research is patient oriented and involves various primary aspects of Parkinson’s disease including markers of disease progression, pathophysiology of motor fluctuations, and autonomic failure in Parkinson’s disease.

"After spending several years in medical education, the Emphasis program was the first time I had the opportunity (and was trusted) to work closely with the first and second year medical students. Seeing them outside of the clinic in this broad environment reminded me how gifted intellectually they really are. The Emphasis program gives the students an opportunity to begin to hone their problem solving skills and will hopefully encourage them to become life-long-students."

**Clinical Outcomes of Wedge Resection for Non-Small Cell Lung Cancer (Nsclc)**

Robert Lee Browning

**Background:** Lung cancer is the number one cause of cancer related deaths among men and women in the United States. Surgical resection is the treatment of choice for early stage (stage I and II) non-small cell lung cancer (NSCLC). The prognosis is the best when complete resection of the tumor is possible. Typical procedures include: lobectomy, bilobectomy and pneumonectomy, with lobectomy being the standard. However, in certain cases a more limited resection such as segmentectomy or wedge excision must be used.

**Conclusion:** Morbid obesity is not an independent risk factor for mortality in the trauma patient. Hyperglycemia (200mg/dl) on the day of admission is associated with a nearly three-fold increase in mortality, and should be an outcome measure to be followed.

**Material and Methods:** A chart review was performed on the 61 patients that underwent a wedge excision at Vanderbilt Medical Center from March 1995 through December 2002. Age, Sex, lung and lobe involvement, nodal status, surgical and pleural margins, tumor size and stage, date of death or last follow-up were all recorded. Statistical analyses of the recorded data were performed to determine OS and relapse-free survival. The possible risk factors were compared for survival with Kaplan-Meier estimates and log-rank tests. All tests of significance were two-sided, and differences were considered statistically significant when p-value < 0.05.

**Results:** We found the median overall survival time to be 30.18 months with at least 43.92% of the patients surviving three years. The median time to recurrence was 21.73 months with at least 35.42% of the patients being disease free at three years. The incidence of local recurrence was 8 out of 20 total recurrences (40%). Analysis of sex, which lung the tumor was in, nodal involvement, lobe of involvement, surgical and pleural margins, and tumor size had no correlation to overall survival or recurrence (P>0.05). However, the T-stage of cancer was significant in determining recurrence free survival with T2 resulting in an increased chance of recurrence over T1 (P=0.0094).

**Conclusion:** We concluded that wedge resection for NSCLC should only be performed on patients that cannot tolerate the more extensive procedures, especially in patients with T2 tumors.

**Material and Methods:** A randomized, double-blinded, placebo-controlled phase I/II, dose-ranging study of the safety, reactogenicity and immunogenicity of intramuscular influenza A/H5N1 vaccine in healthy elderly adults.

Darryl Calvo

**Background:** This vaccine trial was designed to study both the safety and the immunogenicity of an inactivated influenza A vaccine in healthy adults age 65 and older of which 260 were enrolled. Study subject are divided into a placebo group and two dosage groups who receive 3 vaccinations (either 45ug or 90ug dosage levels), the first two separated by one month and the third 6 months following the first.

**Objective:** Although the immunogenicity data is still pending, an interim safety report was created to assess the safety of the vaccine following two of three scheduled vaccine injections.

**Materials and Methods:** All adverse events (AE) and serious adverse events (SAE) during this period are measured 30 minutes after each vaccination by study staff and recorded for 7 days following each vaccination on memory aids provided to the subjects. These memory aids were reviewed with patients 7 days following each vaccination. Events were divided into categories local/systemic and solicited/non-solicited and rated subjectively by patients as mild, moderate, or severe. Solicited events were specific symptoms that the study coordinators asked participants to comment.

**Results:** From the 259 individuals receiving the first vaccination and before the second vaccination 168 adverse events were recorded. Of these 116 and 7 moderate were determined to be associated with the vaccine. 4 were undetermined. 228 individuals received the second dose of the vaccine at the time of data reporting and 79 adverse events were noted. Of these 13 mild and 6 moderate were deemed temporally associated with the vaccine. 11 were undetermined.

In addition two serious adverse events were reported; one episode of esophageal spasm and one episode of severe hypertension. Both were deemed temporally unrelated to the vaccine.

**Conclusions:** Interim reviews of safety data during clinical trials for vaccines are conducted to monitor the ongoing safety of vaccine trials and to determine dosage levels and proper dosing for future related trials. The interim safety data from this trial were evaluated by the NIH data safety and monitoring board and the trial was determined to be safe to continue.

**References:** DMID Protocol 04-076 Safety Summary Report.
BMI and Family History Predicts Development of Adolescent Obesity in Premature Pubarche

Emily Hon

Background: Premature pubarche (PP) is defined in females as growth of pubic hair before age 8 due to a rise in adrenal androgens, especially dehydroepiandrosterone. Insulin Resistance Syndrome (IRS) is a polygenic condition associated with obesity, dyslipidemia, atherosclerosis, hypertension, type 2 diabetes, hyperandrogenism, and polycystic ovary syndrome (PCOS). PP is linked to higher risk of PCOS and hyperinsulinemia in post-pubertal girls, implying girls with PP may be at risk of other IRS morbidities.

Objective: Determine whether PP predicts greater risk of cardiovascular disease, insulin resistance and hyperandrogenism.

Methods: We assessed a population of 16 girls ages 11–14 with PP for risk factors for IRS morbidities. Rates of change in BMI and weight gain in girls who were overweight (BMI >85th percentile) and normal weight at diagnosis were compared with an unpaired t-test. Relative risk of relevant family history was obtained in overweight and normal adolescents.

Results: Girls overweight at diagnosis increased BMI at a 3.6 times ($p = 0.047$) and weight at a 2.0 times ($p = 0.044$) greater rate than girls with normal childhood BMI. Incidence of hypertension, obesity, hirsutism and menstrual dysfunction in first degree relatives was higher in overweight adolescents.

Conclusion: Development of PP in combination with BMI >85th percentile predicts obesity and higher incidence of obesity, hypertension, hirsutism and menstrual dysfunction in first degree relatives.

References:

Acknowledgements: Vanderbilt Medical Student Summer Research Training Program in Diabetes, Endocrinology, and Metabolism.
Allelic Imbalance as a Factor In Phenotypic Variability of SCN1A-Associated Seizure Disorders

Erin J. McArdle

Background: SCN1A encodes a sodium channel subunit expressed by neurons, contributing to their electrophysiological properties. Numerous single-allele missense SCN1A mutations are associated with epilepsy syndromes including generalized epilepsy with febrile seizures plus (GEFS+) and severe myoclonic epilepsy of infancy (SMEI), which are thought to represent milder and more severe extremes (respectively) of a single disease spectrum. Functional studies of missense mutations in SMEI and GEFS+ have not demonstrated a consistent relationship between mutant channel properties and the severity of the associated epilepsy phenotype.

Among potential factors accounting for phenotypic variance among these patients is allelic imbalance. Specifically, it is hypothesized that patients with functionally equivalent heterozygous missense SCN1A mutations may develop mild or severe disease, depending on the expression level of their wild-type allele.

Objectives: To study the sequence and expression profiles of SCN1A in an SMEI patient and assess whether allelic imbalance can account for the high phenotypic severity if a heterozygous missense mutation is present.

Materials and Methods: Using post-mortem cerebellum from an SMEI patient, RNA was isolated and used to synthesize cDNA, from which the SCN1A coding sequence was determined. SCN1A protein expressed in the tissue was analyzed by Western blot.

Results: The patient was found to have a previously uncharacterized SCN1A mutation: c.3608delA, resulting in a premature stop codon, truncating the protein from 2010 amino acids to 1206. Western blot for SCN1A does not demonstrate the truncated mutant isoform in protein isolated from the SMEI patient. Additionally, the expression of full-length SCN1A in the SMEI tissue appears to be significantly less than that in normal controls.

Conclusions: The mutation identified causes truncation of the protein, which likely results in its degradation upon translation, as evidenced by the failure of the truncated isoform to appear on Western blot. Since this patient did not have a heterozygous mutation functionally equivalent to those in GEFS+, the original hypothesis could not be investigated. However, these data are useful in considering a related, alternative model for the high phenotypic severity of this patient’s disease: a loss-of-function mutation on one allele leaves the patient with reduced SCN1A protein expression, attributable to a single wild-type copy.

References:

Acknowledgements:
Co-authors: T. Leomar Ballester, Reshma Desai, Kris Kahlig, and Lauren Manderfield. I wish to acknowledge the Harvard Brain Tissue Resource Center for providing the tissue samples used in this work. Student training is supported by the Vanderbilt Medical Scientist Training Program.
Background: Langerhans cell histiocytosis (LCH) is a rare, heterogeneous disorder of childhood and beyond characterized by prolifera- ting histiocytes that resemble Langerhans cells of the epidermis. LCH may be localized or diffuse, monosystemic or multisystemic, and may remit spontaneously or progress rapidly, ending in organ failure and death despite aggressive therapy. Prior to 1987, the disorder was known by a number of names, including histiocytosis X, eosinophilic granuloma, Hand-Schuller-Christian disease, Letterer-Siwe disease, and type II histiocytosis, among others. In 1975, Lahey proposed diagnostic and risk-stratifi- cation criteria, which greatly facilitated interstudy comparison. But it was not until 1987 that the Histocyte Society coined the all-encompassing term “Langerhans cell histiocytosis” and established official diagnostic and risk-stratifi- cation criteria. These new criteria enabled investigators to assign patients presumptive or definitive LCH diagnoses and to assign them to low-risk or high-risk groups. This latter group, especially children with multisystemic LCH with risk organ involvement (hemopoietic, pulmonary, hepatic, or splenic involvement), should be of special interest to clinicians. Children with multisystemic LCH with risk organ involvement are often treatment- refractory, and many succumb to disease. The evidence for how to best manage these high-risk children consists largely of small patient series without control groups. Many of the treatment recommenda- tions made in the literature are purely anecdotal. Nevertheless, there is value in gathering what evi- dence does exist, so that preliminary observations may be made to direct future therapeutic trials.

Aim: The pediatric LCH literature was reviewed to gain a better under- standing of (1) the types of children being described, (2) the front-line and salvage therapies being used to treat high-risk children, and (3) the outcomes of high-risk treatment-refractory children.

Materials and Methods: All arti- cles used in this review were English language articles obtained from PubMed using the search terms “Langerhans cell histiocy- tosis”, “infant(s)”, “neonate(s)”, “chil- dren/child”, “adolescent(s)”, “young adult(s)”, “twins(s)”, and “treatment” in various combinations. Articles published prior to 1988 were included only if a definitive diagnos- is of LCH was made. Articles published after 1987 were included if any diagnosis of LCH, presumptive or definitive, was made.

Children were included in this review if they had multisystemic LCH with risk organ involvement at the time of diagnosis, prior to salvage therapy, or at any point in between. Children were included only if they failed at least one course of systemic treatment prior to sal- vage therapy. Children were excluded if they were 18 years of age or older at the time of salvage therapy; if they underwent liver or lung transplantation at any time, if they had any type of malignancy prior to or subsequent to LCH, if they suffered from a specific co- morbid disorder, such as a second histiocytic disorder, if they had special- site LCH involvement, includ- ing CNS disease (with the excep- tion of isolated pituitary involu- tion), or if their disease or treatment trajectories could not be fol- lowed. The resulting group of chil- dren was divided according to dis- ease profile, the intensity of treat- ment prior to salvage therapy, and whether remission was achieved prior to salvage therapy. This gave twelve subgroups:

- Children with low-risk disease at the time of LCH diagnosis and high-risk disease at the time of salvage treatment with non-intensive or intensive prior treat- ment with or without remission (subgroups 1-4).
- Children with high-risk disease at the time of LCH diagnosis and low-risk disease at the time of salvage treatment with non-intensive or intensive prior treat- ment with or without remission (subgroups 5-8).
- Children with high-risk disease at the time of LCH diagnosis and high-risk disease at the time of salvage treatment with non-intensive or intensive prior treat- ment with or without remission (subgroups 9-12).

Results: Seven children met our inclusion criteria and were divided according to disease profile, the intensity of treatment prior to sal- vage therapy, and whether remission was achieved prior to salvage thera- py.

High-risk disease was defined as multisystemic LCH with risk organ involvement. Low-risk dis- ease was defined as multisystemic LCH with or without risk organ involvement or multisystemic LCH without risk organ involvement.

Non-intensive prior treatment was defined as any localized treatment such as radiation therapy, single-agent chemotherapy with or without steroids, or monotherapy with a non-steroidal immunosuppressive agent such as etanercept. Intensive prior treatment was defined as multi- agent chemotherapy, either single regimen or sequential agents, or any sort of bone marrow or stem cell transplantation. Finally, remis- sion was defined as any period fol- lowing the diagnosis of LCH dur- ing which the child was disease free.

Each child’s salvage therapy and lat- est follow-up information were recorded for interstudy comparison. The largest group (n=45) consisted of patients with high-risk LCH at the time of diagnosis and salvage treatment who received intensive prior treatment and never achieved remission prior to salvage treatment.

Conclusions

1. Children with high-risk LCH at the time of diagnosis and salvage treatment who receive intensive prior treatment and never achieve remission prior to salvage treat- ment comprise the largest subset of patients in the English pedi- atric LCH literature.

2. The most common salvage treat- ments utilized within this popula- tion are cytotoxic chemotherapy, bone marrow or stem cell trans- plantation, and non-steroidal immunosuppressive agents.

3. Prospective, randomized trials are needed in this patient population.

References: Available upon request.

Acknowledgements: Co-author: James A. Whitlock, MD, Monroe Carell, Jr. Children’s Hospital at Vanderbilt.

An Evaluation of Factors Associated With Oxidant Stress in HIV-Infected Persons

Leigh Anne Dageforde

Background: The term oxidant stress describes non-specific cellular damage. Plasma F2-isoprostanes (F2-Isop) are markers of oxidant stress in humans. Toxicities of HIV therapy may be associated with increased oxidant stress. Several studies have explored the effect of antiox- idant supplementation in reducing oxidant stress in HIV-infected per- sons, but relationships between HIV infection, antiretroviral (ART) toxici- city, and oxidant stress are not yet clearly known.

Objectives

1. To determine which factors influence oxidant stress (as deter- mined by F2-Isop levels) in a large cross-sectional sample of HIV-infected subjects, and
2. To assess longitudinal changes in clinical parameters and oxidant stress in a subgroup of these subjects.

Materials and Methods: Clinical and laboratory data from a select group of treated and untreated HIV-infected subjects were collect- ed prospectively. Plasma F2-Isop levels were quantified by gas chromatog- raphy/mass spectroscopy. Kruskal- Wallis and Chi-squared tests com- pared variables between F2-Isop tertiles. As a part of an ongoing longitudinal cohort study, several previous study subjects have been reevaluated at a later time point.

Results: Of 307 subjects enrolled in the cross-sectional study, 25% were female, 57% were white non-Hispanic, and 207 (67%) were on ART. The median age of participants was 42 years (range 22-67). Plasma F2-Isop values were obtained for 285 subjects. In univariate analyses, female sex (p=0.006) and higher BMI (p=0.03) were associated with having higher plasma F2-Isop. Conversely, self reported antioxidant use (p=0.04) and use of the ART nevirapine (p=0.04), were associated with lower F2-Isop. Use of other ART, CD4+ T cell count, HIV-1 RNA level, and total cholesterol were not associated with F2-Isop. To date, 10 subjects from the previous study, all currently receiving ART, have been enrolled in a prospective longitudinal study with a median of 66 weeks (range 53-96) between
Background: Langerhans cell histiocytosis (LCH) is a rare, heterogeneous disorder of childhood and beyond characterized by proliferating histiocytes that resemble Langerhans cells of the epidermis. LCH may be localized or diffuse, monosystemic or multisystemic, and may remit spontaneously or progress rapidly, ending in organ failure and death despite aggressive therapy. Prior to 1987, the disorder was known by a number of names, including histiocytosis X, eosinophilic granuloma, Hand-Schuller-Christian disease, Letterer-Siwe disease, and type II histiocytosis, among others. In 1975, Lacey proposed diagnostic and risk-stratification criteria, which greatly facilitated interstudy comparison. But it was not until 1987 that the Histiocyte Society coined the all-encompassing term “Langerhans cell histiocytosis” and established official diagnostic and risk-stratification criteria. These new criteria enabled investigators to assign patients presumptive or definitive LCH diagnoses and to assign them to low-risk or high-risk groups. This latter group, especially children with monosystemic LCH with risk organ involvement (hemopoietic, pulmonary, hepatic, or splenic involvement), should be of special interest to clinicians. Children with monosystemic LCH with risk organ involvement are often treatment-refractory, and many succumb to disease. The evidence for how to best manage these high-risk children consists largely of small patient series without control groups. Many of the treatment recommendations made in the literature are purely anecdotal. Nevertheless, there is value in gathering what evidence does exist, so that preliminary evidence does exist, so that preliminary evidence does exist, so that preliminary evidence does exist, so that preliminary evidence does exist, so that preliminary observations may be made to direct future therapeutic trials.

Aim: The pediatric LCH literature was reviewed to gain a better understanding of (1) the types of children being described, (2) the front-line and salvage therapies being used to treat high-risk children, and (3) the outcomes of high-risk treatment-refractory children.

Materials and Methods: All articles used in this review were English language articles obtained from PubMed using the search terms “Langerhans cell histiocyto-

sis”, “infant(s)”, “neonate(s)”, “child-
ren/child”, “adolescent(s)”, “young adult(s)”, “twin(s)”, and “treatment” in various combinations. Articles published prior to 1988 were included only if a definitive diagnosis of LCH was made. Articles published after 1987 were included if any diagnosis of LCH, presumptive or definitive, was made.

Children were included in this review if they had a histologic LCH with risk organ involvement at the time of diagnosis, prior to salvage therapy, or at any point in between. Children were included only if they failed at least one course of systemic treatment prior to salvage therapy. Children were excluded if they were 18 years of age or older at the time of salvage therapy; if they underwent liver or lung transplantation at any time, if they had any type of malignancy prior to or subsequent to LCH, if they suffered from a specific co-morbid disorder, such as a second histiocytic disorder, if they had special-site LCH involvement, including CNS disease (with the exception of isolated pituitary involvement), or if their disease or treatment trajectories could not be followed. The resulting group of children was divided according to disease profile, the intensity of treatment prior to salvage therapy, and whether remission was achieved prior to salvage therapy. This gave twelve subgroups:

- Children with low-risk disease at the time of LCH diagnosis and high-risk disease at the time of salvage treatment with non-intensive or intensive prior treatment with or without remission (subgroups 1-4).
- Children with high-risk disease at the time of LCH diagnosis and low-risk disease at the time of salvage treatment with non-intensive or intensive prior treatment with or without remission (subgroups 5-8).
- Children with high-risk disease at the time of LCH diagnosis and high-risk disease at the time of salvage treatment with non-intensive or intensive prior treatment with or without remission (subgroups 9-12).

Results: Seventy children met our inclusion criteria and were divided according to disease profile, the intensity of treatment prior to salvage therapy, and whether remission was achieved prior to salvage therapy. High-risk disease was defined as monosystemic LCH with risk organ involvement. Low-risk disease was defined as monosystemic LCH with or without risk organ involvement or multisystemic LCH without risk organ involvement. Non-intensive prior treatment was defined as any localized treatment such as radiation therapy, single-agent chemotherapy with or without steroids, or monotherapy with a non-steroidal immunosuppressive agent such as etanercept. Intensive prior treatment was defined as multiagent chemotherapy, either single regimens or sequential agents, or any sort of bone marrow or stem cell transplantation. Finally, remission was defined as any period following the diagnosis of LCH during which the child was disease free. Each child’s salvage therapy and latest follow-up information were recorded for interstudy comparison. The largest group (n=45) consisted of patients with high-risk LCH at the time of diagnosis and salvage treatment who received intensive prior treatment and never achieved remission prior to salvage treatment.

Conclusions:

1. Children with high-risk LCH at the time of diagnosis and salvage treatment who receive intensive prior treatment and never achieve remission prior to salvage treatment comprise the largest subset of patients in the English pediatric LCH literature.

2. The most common salvage treatments utilized within this population are cytotoxic chemotherapy, bone marrow or stem cell transplantation, and non-steroidal immunosuppressive agents.

3. Prospective, randomized trials are needed in this patient population.

References: Available upon request.

Acknowledgements: Co-author: James W. Whitlock, MD, Monroe Carroll, Jr. Children’s Hospital at Vanderbilt.

An Evaluation of Factors Associated With Oxidant Stress in HIV-Infected Persons

Leigh Anne Dageforde

Background: The term oxidant stress describes non-specific cellular damage. Plasma F2-isoprostanes (F2-Isop) are markers of oxidant stress in humans. Toxicities of HIV therapy may be associated with increased oxidant stress. Plasma F2-Isop values were obtained for 285 subjects. In univariate analyses, BMI (p=0.03) were associated with F2-Isop values. To determine which clinical parameters and oxidant stress in a subgroup of these subjects.

Materials and Methods: Clinical and laboratory data from a select group of treated and untreated HIV-infected subjects were collected prospectively. Plasma F2-Isop values were quantified by gas chromatography/mass spectrometry. Kruskal-Wallis and Chi-squared tests compared variables between F2-Isop tertiles. As a part of an ongoing longitudinal cohort study, several previous study subjects have been reevaluated at a later time point.

Results: Of 307 subjects enrolled in the cross-sectional study, 25% were female, 57% were white, non-Hispanic, and 207 (67%) were on ART. The median age of participants was 42 years (range 22-67). Plasma F2-Isop values were obtained for 285 subjects. In univariate analyses, female sex (p=0.006) and higher BMI (p=0.03) were associated with having higher plasma F2-Isop values. Conversely, self-reported antioxidant use (p=0.04) and use of the ART nevirapine (p=0.04), were associated with lower F2-Isop levels. Use of other ART, CD4+ T cell count, HIV-1 RNA level, and total cholesterol were not associated with F2-Isop levels. To date, 10 subjects from the previous study, all currently receiving ART, have been enrolled in a prospective longitudinal study with a median of 66 weeks (range 53-96) between
Surgical Outcomes in Patients Undergoing Preoperative Carotid Body Paraganglioma Embolization

L. Taylor Davis

Background: Carotid body paragangliomas (CBP) are vascular tumors located at the bifurcation of the common carotid artery. Resection of these tumors carries a significant risk of morbidity including significant blood loss, protracted operation time, and cranial nerve resections. Preoperative embolization of these tumors has been employed to decrease the morbidity associated with CBP removal.

Objectives: To determine the extent that preoperative embolization facilitates surgical removal of CBPs and reduces patient morbidity.

Materials and Methods: We reviewed patients undergoing embolization prior to CBP resection during the past 13 years at Vanderbilt University Medical Center. The analysis was limited to patients undergoing greater than 50% embolization followed by resection of a CBP. Twenty-four CBPs (E-EMB) in 22 patients were included in this study. No complications occurred during the embolization procedures in the E-EMB group, and surgical removal was performed within 48 hours following embolization. Surgical outcomes were compared to controls from the literature that included patients undergoing CBP removal with preoperative embolization (L-EMB) or without preoperative embolization (Non-EMB).

Results: For the E-EMB group, the mean tumor size was 4.4 ± 1.7 cm, mean blood loss was 146.3 ± 112.8 mL, and mean operation time was 3.3 ± 1.2 h. One patient in the E-EMB group sustained a cranial nerve (CN) resection, and no blood transfusions were required. There was no significant difference in tumor size between E-EMB and L-EMB (4.0 ± 1.5 cm) or Non-EMB (4.0 ± 1.7 cm). Mean blood loss was significantly less in E-EMB than in L-EMB (818 ± 1096 mL, p = 0.0045) and Non-EMB (1116 ± 999 mL, p = 0.0001). Mean operation time in E-EMB was not significantly less than in L-EMB (4.2 ± 1.9 h, p = 0.063) but was significantly less than in Non-EMB (4.4 ± 1.8 h, p = 0.015). More CN resections occurred in the E-EMB (5) and Non-EMB (4) groups than in the L-EMB group. Three blood transfusions in L-EMB and 6 in N-EMB were reported.

Conclusion: Preoperative embolization of CBPs facilitates their surgical removal and limits intraoperative and postoperative complications without increased risk to the patient.

Acknowledgements Co-author: Theodore C. Larson, III, MD, Vanderbilt University Medical Center.

Appropriate Peak Bone Mass in Adolescents With Diabetes: Role of Calcium Intake, Metabolic Control and the IGF System

Randon Hall

Background: Pediatric diabetes is the most common chronic disease of childhood, and the incidence is increasingly increasing. People with diabetes have greater risk of health consequences such as heart disease, stroke, kidney disease and osteoporosis. Specifically, diabetic osteoporosis is recognized as a long-term complication in adults, however, the pathogenesis of diabetic osteopathy remains unclear. It is unknown as to whether the low bone mineral density (BMD) is a result of reduced acquisition of bone mass or from an increased bone loss. Since 70% of bone density is acquired between 13 and 18 years of age, it is necessary to study a pediatric population in order to investigate the process by which this lowered BMD occurs.

Objectives 1. To evaluate the role of calcium intake and metabolic control in the acquisition of peak bone mass in adolescents with type 1 and type 2 diabetes. 2. To determine if the insulin-like growth factor system in adolescents with diabetes determines failure to attain peak bone mass.

Materials and Methods: Patients in this study were selected from the pediatric diabetes clinic in an academic medical center. There are two primary groups of subjects: adolescent subjects with type 1 diabetes and young adults ages 23-28 with type 1 diabetes. Subjects are placed in subcategories of metabolic control of their diabetes based on consistent HbA1c levels being above or below 9%, correlating to good or poor control respectively. There will be 40 adults and 40 children enrolled in the study with 20 of each being in the good and poor category. All diabetic patients had diabetes for at least 3 years with at least 3 consistent HbA1c levels for the year and a half prior to enrollment. BMD was measured at the proximal femur, and lumbar spine with dual-energy X-ray absorptiometry (DEXA). Fasting serum and 24-hour urine collection were obtained. Physical activity was measured by accelerometer in a 3-day record. Three-day food diary was collected. Subjects were evaluated at the Clinical Research Center (CRC) at Vanderbilt Medical Center.

Results: At the present time we have 21 adolescent patients enrolled in the study with 15 in the good metabolic control category and 6 in the bad metabolic control category. It has proved difficult to recruit patients for a number of reasons, including inconsistent HbA1c values, apprehension to participate, as well as DEXA scan must be performed on Friday mornings requiring subjects to miss school. Therefore we have widened our criteria to current specifications to hopefully allow an increase in enrollment. We have also offered to the enrolled subjects the possibility to have studies done on Saturday morning.

Conclusions: The results will provide information about the role of calcium intake and metabolic control in the attainment of bone mass in adolescents with diabetes as well as determine the role of IGF system in the process of bone mass acquisition in these patients.

Acknowledgements Co-authors: Kate Dixon, MD and Anna Spagnoli, MD, Vanderbilt University Medical Center. Also, Vanderbilt University Medical School, Emphasis Program, Department of Pediatric Endocrinology, Vanderbilt University Clinical Nutrition Research Unit, and the Clinical Research Center.
assessments. This group includes 2 females and 6 non-Hispanic whites. At the time of the first evaluation, the median F2-IsoP level in the group was 39 pg/mL (range 18-81 pg/mL). Additionally, since the original study, 5 of the 10 subjects report new use of antioxidants.

Conclusions: Several factors were found to be associated with oxidative stress in HIV-infected participants in a previous cross-sectional study. Multivariate analyses are ongoing. The current longitudinal cohort study has an anticipated enrollment of 135 participants on ART. This study will examine changes over a two-year period in ART toxicities, possible clinical manifestations of oxidative stress, as well as changes in other characteristics including antioxidant intake. Results will inform future studies of interventions for increased oxidative stress and ART toxicities.


Surgical Outcomes in Patients Undergoing Preoperative Carotid Body Paraganglioma Embolization

L. Taylor Davis

Background: Carotid body paragangliomas (CBP) are vascular tumors located at the bifurcation of the common carotid artery. Resection of these tumors carries a significant risk of morbidity including significant blood loss, protracted operation time, and cranial nerve resections. Preoperative embolization of these tumors has been employed to decrease the morbidity associated with CBP removal.

Objectives: To determine the extent that preoperative embolization facilitates surgical removal of CBPs and reduces patient morbidity.

Materials and Methods: We reviewed patients undergoing embolization prior to CBP resection during the past 13 years at Vanderbilt University Medical Center. The analysis was limited to patients undergoing greater than 50% embolization followed by resection of a CBP. Twenty-four CBPs (E-EMB) in 22 patients were included in this study. No complications occurred during the embolization procedures in the E-EMB group, and surgical removal was performed within 48 hours following embolization. Surgical outcomes were compared to controls from the literature that included patients undergoing CBP removal with preoperative embolization (L-EMB) or without preoperative embolization (Non-EMB).

Results: For the E-EMB group, the mean tumor size was 4.4 ± 1.7 cm, mean blood loss was 146.3 ± 112.8 mL, and mean operation time was 3.3 ± 1.2 h. One patient in the E-EMB group sustained a cranial nerve (CN) resection, and no blood transfusions were required. There was no significant difference in tumor size between E-EMB and L-EMB (4.0 ± 1.5 cm) or Non-EMB (4.0 ± 1.7 cm). Mean blood loss was significantly less in E-EMB than in L-EMB (818 ± 1096 mL, p = 0.0045) and Non-EMB (1116 ± 999 mL, p = 0.0001). Mean operation time in E-EMB was not significantly less than in L-EMB (4.2 ± 1.9 h, p = 0.063) but was significantly less than in Non-EMB (4.4 ± 1.8 h, p = 0.015). More CN resections occurred in the L-EMB (5) and Non-EMB (4) groups than in the E-EMB group. Three blood transfusions in L-EMB and 6 in N-EMB were reported.

Conclusions: Preoperative embolization of CBPs facilitates their surgical removal and limits intraoperative and postoperative complications without increased risk to the patient.

Acknowledgements
Co-author: Theodore C. Larson, III, MD, Vanderbilt University Medical Center.

Appropriate Peak Bone Mass in Adolescents With Diabetes: Role of Calcium Intake, Metabolic Control and the IGF System

Randon Hall

Background: Pediatric diabetes is the most common chronic disease of childhood, and the incidence is inceasingly increasing. People with diabetes have greater risk of health consequences such as heart disease, stroke, kidney disease and osteoporosis. Specifically, diabetic osteoporosis is recognized as a long-term complication in adults, however, the pathogenesis of diabetic osteopathy remains unclear. It is unknown as to whether the low bone mineral density (BMD) is a result of reduced bone density acquired between 13 and 18 years of age, it is necessary to study a pediatric population in order to investigate the process by which this lowered BMD occurs.

Objectives
1. To evaluate the role of calcium intake and metabolic control in the acquisition of peak bone mass in adolescents with type 1 and type 2 diabetes.
2. To determine if the insulin-like growth factor system in adolescents with diabetes determines failure to attain peak bone mass.

Materials and Methods: Patients in this study were selected from the pediatric diabetes clinic in an academic medical center. There are two primary groups of subjects: adolescent subjects with type 1 diabetes and young adults ages 23-28 with type 1 diabetes. Subjects are placed in subcategories of metabolic control of their diabetes based on consistent HbA1c levels being above or below 9%, correlating to good or poor control respectively. There will be 40 adults and 40 children enrolled in the study with 20 of each being in the good or poor category. All diabetic patients had diabetes for at least 3 years with at least 3 consistent HbA1c levels for the year and a half prior to enrollment. BMD was measured at the proximal femur, and lumbar spine with dual-energy X-ray absorptiometry (DEXA). Fasting serum and 24-hour urine collection were obtained. Physical activity was measured by accelerometer in a 3-day record. Three-day food diary was collected. Subjects were evaluated at the Clinical Research Center (CRC) at Vanderbilt Medical Center.

Results: At the present time we have 21 adolescent patients enrolled in the study with 15 in the good metabolic control category and 6 in the bad metabolic control category. It has proved difficult to recruit patients for a number of reasons, including inconsistent HbA1c values, apprehension to participate, as well as DEXA scan must be performed on Friday mornings requiring subjects to miss school. Therefore we have widened our criteria to the current specifications to hopefully allow an increase in enrollment. We have also offered to the enrolled subjects the possibility to have studies done on Saturday morning.

Conclusions: The results will provide information about the role of calcium intake and metabolic control in the attainment of bone mass in adolescents with diabetes as well as determine the role of IGF system in the process of bone mass acquisition in these patients.

Acknowledgements
Co-authors: Kate Dixon, MD and Anna Spagnoli, MD, Vanderbilt University Medical Center. Also, Vanderbilt University Medical School, Emphasis Program, Department of Pediatric Endocrinology, Vanderbilt University Clinical Nutrition Research Unit, and the Clinical Research Center.

Title • 2006

Vanderbilt Medical Center

Journal of Emphasis
Clinical Utility of CW Doppler Ultrasound For Measuring Cardiac Output

William J. Heerman

Problem: Measuring cardiac output at the bedside in pediatrics in unreliable and poses a significant risk to patients.

Objectives: To investigate the clinical usefulness of Continuous Wave (CW) Doppler ultrasound for monitoring cardiac function in a pediatric critical care setting by evaluating intra-user variability and the time necessary to obtain measurements.

Methods: USCOM, Ltd. has developed a transcutaneous CW Doppler ultrasound device that measures blood flow across the semilunar valves. An ultrasound probe (3.3 MHz) is placed on the patient’s skin in the suprasternal notch or the 4th intercostal space. The device plots the velocity of trans-valvular blood flow against time. The velocity time integral (VTI) is measured manually using the “touch point” feature on the device. The device’s algorithm calculates cardiac output: VTI x cross-sectional area x heart rate.

We evaluated cardiac output in seven pediatric patients (< five years old) for twenty-four hours following corrective heart surgery. At each of ten time points we used the USCOM device to record two sequential measurements using either the suprasternal approach (aortic valve) or the intercostal approach (pulmonary valve). Each measurement represents the average of four heartbeats. Thus, at each time point we recorded two equivalent representations of each patient’s cardiac output. All measurements were taken by a single investigator who was previously untrained in CW ultrasound.

Results: The average time to obtain the initial data measurement was 6.0 min. +/- 3.17 min. The average time to obtain each subsequent measurement was 1.75 min. +/- 0.23 min. The means and 95% confidence intervals are presented. The Bland-Altman figure 1 method evaluates the intra-user variability between the two sequential cardiac output measurements, which are taken at the same time point.

With low intra-user variability and an average measurement time of less than 2 minutes, the USCOM device proves to be a practical method of assessing cardiac status in a pediatric critical care setting.

Acknowledgements

Co-authors: Kevin B. Churchwell, MD and Mary B. Taylor, MD. Monroe Carell Jr. Children’s Hospital at Vanderbilt University.

Neurocognitive Sequelae of Pediatric Cancer

Alaina Kiefer

Background: Acute Lymphocytic leukemia (ALL) is the most common form of childhood cancer, accounting for nearly one-third of diagnoses. Impaired neurocognitive functioning is an increasingly recognized long-term consequence of ALL treatment. Management of the long-term sequelae of treatment and preserving quality of life for childhood ALL survivors has become a major focus of research and clinical practice.

Objectives: The purpose of this project is to develop neurocognitive tests for use in functional magnetic resonance imaging (fMRI) and to obtain pilot data from pediatric ALL survivors who have a major focus of research and clinical practice.

Conclusions: The use of Continuous Wave Doppler ultrasound is promising new technique for measuring cardiac output non-invasively. The Bland-Altman plot demonstrates low variability, especially at low cardiac output values. The greater variation at higher cardiac output values is explained partially by inter-patient variation but requires further investigation.

Protein Expression in Atrial Tissue From Patients With and Without Post-Operative Atrial Fibrillation

Vincent Mishra

Background: Inflammation and fibrosis are implicated in the pathogenesis of atrial fibrillation (AF), a major cause of morbidity and mortality in the US. Angiotensin II causes inflammation and fibrosis in animal models in part through aldosterone-receptor mediated mechanisms. Interruption of the renin-angiotensin-aldosterone system (RAAS) by ACE inhibition or AT1 receptor antagonism decreases the risk of AF in several different patient populations. Since Ang II and aldosterone each induce inflammation in humans through an aldosterone receptor-dependent mechanism, we hypothesize that ACE inhibition or aldosterone receptor antagonism will reduce post-operative inflammation and AF.

Objectives: To test the hypothesis that differences in protein expression exist in atrial tissues from patients with post-operative atrial fibrillation versus those without.

Material and Methods: At the time of cannula placement for coronary artery bypass or valve replacement, a 0.5 to 1.5 g fragment of right atrium distal to ligature placement is excised by the cardiothoracic surgeon. The sample is snap-frozen in liquid nitrogen and sectioned at around 12 um. The sample is placed on a gold-coated MALDI plate. A matrix, 20 mg/ml solution of sinapinic acid in 50:50 acetonitrile:0.2% TFA is used in water for tissue analysis. The sample is then analyzed by mass spectrometry.

Results: The following spectra shows normalized intensity peaks from the patient samples with (n=5) and without atrial fibrillation (n=5).
Clinical Utility of CW Doppler Ultrasound For Measuring Cardiac Output

William J. Heerman

Problem: Measuring cardiac output at the bedside in pediatrics is unreliable and poses a significant risk to patients.

Objectives: To investigate the clinical usefulness of Continuous Wave (CW) Doppler ultrasound for monitoring cardiac function in a pediatric critical care setting by evaluating intra-user variability and the time necessary to obtain measurements.

Methods: USCOM, Ltd. has developed a trans-cutaneous CW Doppler ultrasound device that measures blood flow across the semilunar valves. An ultrasound probe (3.3 MHz) is placed on the patient’s skin in the suprasternal notch or over the 4th intercostal space. The device plots the velocity of trans-valvular blood flow against time. The velocity time integral (VTI) is measured manually using the "touch point" feature on the device. The device’s algorithm calculates cardiac output: VTI x cross-sectional area x heart rate.

We evaluated cardiac output in seven pediatric patients (< five years old) for twenty-four hours following corrective heart surgery. At each of ten time points we used the USCOM device to record two sequential measurements using either the suprasternal approach (aortic valve) or the intercostal approach (pulmonic valve). Each measurement represents the average of four heartbeats. Thus, at each time point we recorded two equivalent representations of each patient’s cardiac output. All measurements were taken by a single investigator who was previously trained in CW ultrasound.

Results: The average time to obtain the initial data measurement was 6.0 min. +/- 3.17 min. The average time to obtain each subsequent measurement was 1.75 min. +/- 0.23 min. The means and 95% confidence intervals are presented. The Bland-Altman (figure 1) method evaluates the intra-user variation between the two sequential cardiac output measurements, which are taken at the same time point.

With low intra-user variability and an average measurement time of less than 2 minutes, the USCOM device proves to be a practical method of assessing cardiac status in a pediatric critical care setting.

Acknowledgements

Co-authors: Kevin B. Cheethwood, MD and Mary B. Tyale, MD. Monroe Carell Jr. Children’s Hospital at Vanderbilt University.

Neurocognitive Sequelae of Pediatric Cancer

Alaina Kiefer

Background: Acute lymphocytic leukemia (ALL) is the most common form of childhood cancer, accounting for nearly one-third of diagnoses. Impaired neurocognitive functioning is an increasingly recognized long-term consequence of ALL treatment. Management of the long-term sequelae of treatment and preserving quality of life of childhood ALL survivors has become a major focus of research and clinical practice.

Objectives: The purpose of this project is to develop neurocognitive tests for use in functional magnetic resonance imaging (fMRI) and to obtain pilot data from pediatric ALL survivors to determine the neurocognitive profile of childhood ALL survivors who have been treated with modern chemotherapy.

Results: As of April 10, 21 ALL survivors and 13 controls have completed the imaging protocol. Differences in mean scores on WISC Working Memory, Digit Span, and Working Memory subscales are statistically significant (p<0.001). Further, score change within BA9-R between 3-back and 1-back is also significant (p<0.001). Lower WISC Working Memory scores corresponded to higher percent signal changes within BA46-R on the N-back task, whereas higher WISC Working Memory scores correlated to a more diffuse pattern of negative activation.

Conclusions: Preliminary evaluation suggests that these findings provide a basis for further recruitment of subjects, neurocognitive testing, and data analysis.

References


Neurocognitive Sequelae of Pediatric Cancer

Alaina Kiefer

Background: Acute lymphocytic leukemia (ALL) is the most common form of childhood cancer, accounting for nearly one-third of diagnoses. Impaired neurocognitive functioning is an increasingly recognized long-term consequence of ALL treatment. Management of the long-term sequelae of treatment and preserving quality of life of childhood ALL survivors has become a major focus of research and clinical practice.

Objectives: The purpose of this project is to develop neurocognitive tests for use in functional magnetic resonance imaging (fMRI) and to obtain pilot data from pediatric ALL survivors to determine the neurocognitive profile of childhood ALL survivors who have been treated with modern chemotherapy.

Results: As of April 10, 21 ALL survivors and 13 controls have completed the imaging protocol. Differences in mean scores on WISC Working Memory, Digit Span, and Working Memory subscales are statistically significant (p<0.001). Further, score change within BA9-R between 3-back and 1-back is also significant (p<0.001). Lower WISC Working Memory scores corresponded to higher percent signal changes within BA46-R on the N-back task, whereas higher WISC Working Memory scores correlated to a more diffuse pattern of negative activation.

Conclusions: Preliminary evaluation suggests that these findings provide a basis for further recruitment of subjects, neurocognitive testing, and data analysis.

References


Protein Expression in Atrial Tissue From Patients With and Without Post-Operative Atrial Fibrillation

Vineet Mishra

Background: Inflammation and fibrosis are implicated in the pathogenesis of atrial fibrillation (AF), a major cause of morbidity and mortality in the US. Angiotensin II causes inflammation and fibrosis in animal models in part through aldosterone-receptor mediated mechanisms. Interruption of the renin-angiotensin-aldosterone system (RAAS) by ACE inhibition or AT1 receptor antagonism decreases the risk of AF in several different patient populations. Since Ang II and aldosterone each induce inflammation in humans through an aldosterone-receptor-dependent mechanism, we hypothesize that ACE inhibition or aldosterone receptor antagonism will reduce post-operative inflammation and AF.

Objectives: To test the hypothesis that differences in protein expression exist in atrial tissues from patients with post-operative atrial fibrillation versus those without.

Material and Methods: At the time of cannula placement for coronary artery bypass or valve replacement, a 0.5 to 1.5 g fragment of right atrium distal to ligature placement is excised by the cardiothoracic surgeon. The sample is snap frozen in liquid nitrogen and sectioned at 12 µm. The sample is placed on a gold-coated MALDI plate. A matrix, 20 mg/ml solution of sinapinic acid in 50:50 acetonitrile:0.2% TFA is used in water for tissue analysis. The sample is then analyzed by mass spectrometry.

Results: The following spectra shows normalized intensity peaks from the patient samples with (n=5) and without atrial fibrillation (n=5).
Database Correlation of Cardiac CTA to Cardiac Catheterization

Joshua A. Nepute

Background: In the past, noninvasive imaging of the coronary arteries was limited due to cardiac motion and the tortuous course of the arteries through the image plane. After the introduction of 16-, 40-, and 64-slice detector CT scanners, imaging of the coronary arteries, heart, and great vessels became feasible. Currently, we can achieve spatial and temporal resolutions of 0.4 mm and 165 ms, respectively, for retrospectively EKG-gated coronary multi-detector-row CT angiography (CTA). These acquisition parameters are extremely close to cardiac catheterization. However, there has been very few studies to compare the findings of cardiac CTA to the gold-standard, cardiac catheterization.

Objectives: To correlate findings from both cardiac CTA to cardiac catheterization using a Microsoft Access database.

Materials and Methods: This study was conducted in an academic medical center. After the patients in the study underwent an EKG-gated cardiac CTA, they were entered into a Microsoft Access database. Only those patients undergoing both a CTA and a cardiac catheterization were included in the data analysis.

The database contains a vast amount of patient information including demographics, patient history, patient symptoms, patient exam, risk factors for coronary artery disease, laboratory findings, medications, CTA findings, catheterization findings, echocardiogram findings, and stress test data.

In order to compare the accuracy of cardiac CTA to catheterization with respect to coronary stenosis, the location of the lesion, severity of the lesion, and characteristic of the lesion were entered in the database. Therefore, this information could be used to compare the findings of each modality.

Results: Pending.

Conclusions: Preliminary data suggests that there is a high concordance in the findings of the cardiac CTA and cardiac catheterization. Although the results are still pending, the data is encouraging not only due to the reproducibility of the findings from the CTA, but also because the CTA is able to show extra-cardiac details that the catheterization cannot.

Acknowledgements

Co-authors: Frank Scholl, MD, and Nancy J. Brezen, MD, Vanderbilt University Medical Center.

Diet and Drugs Reduce Ventricular Tachycardia in Mouse Model of Pediatric Cardiomyopathy

Albert T. Nguyen

Background: Very Long-Chain Acyl-Coenzyme A Dehydrogenase (VLCAD) deficiency, an inborn error of fatty acid metabolism, causes cardiomyopathy, ventricular arrhythmias, and sudden death in children. Patients are fed a diet low in long chain fatty acids (LCFA), but the effects of this diet on ventricular arrhythmias, as well as the efficacy of antiarrhythmic drugs, is not known. The VLCAD knockout mouse mirrors the clinical phenotype, with cardiac hypertrophy, and inducible ventricular tachycardia (VT).

Objectives: To study the effects of antiarrhythmic drugs and a diet low in LCFA on the inducibility of VT in VLCAD deficiency.

Methods: Thirteen VLCAD knockout mice underwent electrophysiology study (EPS) at baseline and with isoproterenol (100 mcg) 2 months after randomization to a diet low in LCFA, or a standard diet. In addition, 44 VLCAD knockout mice on standard diets were studied with EPS at baseline and after intraperfusion injection of amiodarone (0.2 mg/g), verapamil (0.15 mcg/g), sotalol (2 mcg/g), procainamide (0.3 mcg/g), or flecainide (4 mcg/g).

Results: Mice on the diet low in LCFA had significantly less VT on isoproterenol compared to those on standard diet (3 ± 2 episodes vs. 15 ± 8 episodes, P<.006). Ventricular effective refractory period was prolonged by procainamide (48 ± 13 ms to 70 ± 18 ms, P<.001) and flecainide (37 ± 11 ms to 54 ± 12 ms, P<.006), but not by amiodarone, sotalol, or verapamil. Amiodarone, verapamil, and sotalol increased the number of induced VT episodes, while procainamide and flecainide decreased VT (Figure 1).

Conclusions: A diet low in LCFA reduces VT in VLCAD deficiency. Procainamide and flecainide also reduce VT, and the mechanism appears to be related to prolongation of refractoriness. These interventions may be beneficial in children with cardiomyopathy due to VLCAD deficiency, as well as other fatty acid oxidation defects.

Acknowledgements: Co-authors: Prince J. Kannankeril, MD, Bartlett Bartold, MD, PhD, Philip D. Smith, BS, Zaza Khuchua, PhD, Arnold W. Strauss, MD and Vernat J. Exil, MD, Vanderbilt University Medical Center.

Figure 1: Number of induced VT episodes before and after intraperfusion drug injection. 44 VLCAD knockout mice were studied with EPS at baseline, and after intraperfusion injection of amiodarone (0.2 mg/g), verapamil (0.15 mg/g), sotalol (2 mcg/g), procainamide (0.3 mcg/g), or flecainide (4 mcg/g). Mice showed increased number of induced VT episodes after injection with amiodarone, verapamil, or sotalol, whereas mice had fewer episodes of VT after injection with procainamide or flecainide.

Hypercapnia-Induced Changes of Cortical Blood Flow During Stimulation Using Near-Infrared Spectroscopy

Blake Niederhauser

Background: Near-infrared optical spectroscopy (NIRS) measures the differential attenuation of light of different wavelengths to assess tissue oxygenation and blood content and is a potentially useful tool for transcranial studies of brain cortical function. However, the use of this technology in neurological applications requires further studies that quantify effects due to experimental variables and physiological conditions.

Objectives: In recent studies we have shown that measures of local functional activation responses of the brain can be made accurately and reproducibly using NIRS. In this study, we investigated the effects of hypercapnia and changes in basal cerebral blood flow on the functional response of the visual cortex to a flashing alternating checkerboard stimulus. We predicted that hypercapnia would induce vasodilation in cortical blood vessels and that, relative to baseline conditions, the subsequent activation-induced increase in oxygen-hemoglobin and corresponding decrease in deoxy-hemoglobin would be measurably diminished, as the vessels are maximally or near-maximally dilated. We also investigated whether a brief period of hypercapnia changed the response to subsequent exposures.

Materials and Methods: Experiments were performed on five healthy subjects between the ages of 22 and 26 using a novel multi-optode system for NIRS optical topography. Subjects sat upright in a comfortable chair approximately one meter from a computer screen. An alternating black and white checkerboard pattern was presented at a frequency of 8 Hz for periods of 15 seconds followed by random intervals of no stimulation corresponding to a black screen. Data were collected as subjects breathed either room air or a mixture of 5% carbon dioxide and 95% oxygen.
Background: In the past, noninvasive imaging of the coronary arteries was limited due to cardiac motion and the tortuous course of the arteries through the image plane. After the introduction of 16-, 40-, and 64-slice detector CT scanners, imaging of the coronary arteries, heart, and great vessels became feasible. Currently, we can achieve spatial and temporal resolutions of 0.4 mm and 165 ms, respectively, for retrospectively EKG-gated coronary multi-detector-row CT angiography (CTA). These acquisition parameters are extremely close to cardiac catheterization. However, there has been very few studies to compare the findings of cardiac CTA to the gold-standard, cardiac catheterization.

Objectives: To correlate findings from both cardiac CTA to cardiac catheterization using a Microsoft Access database.

Materials and Methods: This study was conducted in an academic medical center. After the patients in the study underwent an EKG-gated cardiac CTA, they were entered into a Microsoft Access database. Only those patients undergoing both a CTA and a cardiac catheterization were included in the data analysis.

The database contains a vast amount of patient information including demographics, patient history, patient symptoms, patient exam, risk factors for coronary artery disease, laboratory findings, medications, CTA findings, catheterization findings, echocardiogram findings, and stress test data.

In order to compare the accuracy of cardiac CTA to catheterization with respect to coronary stenosis, the location of the lesion, severity of the lesion, and characteristic of the lesion were entered in the database. Therefore, this information could be used to compare the findings of each modality.

Results: Pending.

Conclusions: Preliminary data suggests that there is a high concordance in the findings of the cardiac CTA and cardiac catheterization. Although the results are still pending, the data is encouraging not only due to the reproducibility of the findings from the CTA, but also because the CTA is able to show extra-cardiac details that the catheterization cannot.

Acknowledgements

Co-authors: Murray Mazer, MD, Vanderbilt University Medical Center.

Diet and Drugs Reduce Ventricular Tachycardia in Mouse Model of Pediatric Cardiomyopathy

Albert T. Nguyen

Background: Very Long-Chain Acyl-Coenzyme A Dehydrogenase (VLCAD) deficiency, an inborn error of fatty acid metabolism, causes cardiomyopathy, ventricular arrhythmias, and sudden death in children. Patients are fed a diet low in long chain fatty acids (LCFA), but the effects of this diet on ventricular arrhythmias, as well as the efficacy of antiarrhythmic drugs, is not known. The VLCAD knockout mouse model mirrors the clinical phenotype, with cardiac fatty acid oxidation defects.

Objectives: To study the effects of antiarrhythmic drugs and a diet low in LCFA on the inducibility of VT in VLCAD deficiency.

Methods: Thirteen VLCAD knockout mice underwent electrophysiology study (EPS) at baseline and with isoproterenol (100 mcg) 2 months after randomization to a diet low in LCFA, or a standard diet. In addition, 44 VLCAD knockout mice on standard diets were studied with EPS at baseline and after intraperitoneal injection of amiodarone (0.2 mg/g), verapamil (0.15 mcg/g), sotalol (2 mcg/g), or flecainide (4 mcg/g).

Results: Mice on the diet low in LCFA had significantly less VT on isoproterenol compared to those on standard diet (3 ± 2 episodes vs. 15 ± 8 episodes, P<.006). Ventricular effective refractory period was prolonged by procainamide (48 ± 13 ms to 70 ± 18 ms, P<.001) and flecainide (37 ± 11 ms to 54 ± 12 ms, P=.006), but not by amiodarone, sotalol, or verapamil. Amiodarone, verapamil, and sotalol increased the number of induced VT episodes, while procainamide and flecainide decreased VT (Figure 1).

Conclusions: A diet low in LCFA reduces VT in VLCAD deficiency. Procainamide and flecainide also reduce VT, but the mechanism appears to be related to prolongation of refractoriness. These inter-ventions may be beneficial in children with cardiomyopathy due to VLCAD deficiency, as well as other fatty acid oxidation defects.

Acknowledgements: Co-authors: Prince J. Kannankeril, MD, Bajtiris Bartoldi, MD, PhD, Phillip D. Smith, BS, Zaza Khuchua, PhD, Arnold W. Strauss, MD and Vernet J. Exil, MD, Vanderbilt University Medical Center.

Hypercapnia-Induced Changes of Cortical Blood Flow During Stimulation Using Near-Infrared Spectroscopy

Blake Niederhauser

Background: Near-infrared optical spectroscopy (NIRS) measures the differential attenuation of light of different wavelengths to assess tissue oxygenation and blood content and is a potentially useful tool for transcranial studies of brain cortical function. However, the use of this technology in neurological applications requires further studies that quantify effects due to experimental variables and physiological conditions.

Objectives: In recent studies we have shown that measurements of local functional activation responses of the brain can be made accurately and reproducibly using NIRS. In this study, we investigated the effects of hypercapnia and changes in basal cerebral blood flow on the functional response of the visual cortex to a flashing alternating checkerboard stimulus. We predicted that hypercapnia would induce vasodilation in cortical blood vessels and that, relative to baseline conditions, the subsequent activation-induced increase in oxygen-hemoglobin and corresponding decrease in deoxy-hemoglobin would be measurably diminished, as the vessels are maximally or near-maximally dilated. We also investigated whether a brief period of hypercapnia changed the response to subsequent exposures.

Materials and Methods: Experiments were performed on five healthy subjects between the ages of 22 and 26 using a novel multi-optode system for NIRS optical tomography. Subjects sat upright in a comfortable chair approximately one meter from a computer screen. An alternating black and white checkerboard stimulus was presented at a frequency of 8 Hz for periods of 15 seconds followed by random intervals of no stimulation corresponding to a black screen. Data were collected as subjects breathed either room air or a mixture of 5% carbon dioxide and 95% oxygen.
The Role of Computed Tomographic Angiography in Evaluation of Penetrating Arterial Trauma of The Extremities

Sanjay G. Patel

Reduced Fasting Protocol For Critically Ill Trauma Patients Undergoing Procedures

Colleen Pepper

Background: Protocols that require fasting for procedures often disrupt adequate nutrition delivery in critically ill trauma patients.

Objectives

1. To study the effect of a new total enteral nutritional protocol as compared to standard care on time of attainment of target caloric goals.
2. To study the effect of a new total enteral nutritional protocol as compared to standard care on incidence of ventilator associated pneumonia (VAP).

Methods: Methods: IRB approval was obtained to enroll patients in the Trauma ICU who had a protected airway (cuffed endotracheal tube or tracheostomy) and were anticipated to need nutrition support. Patients were studied in two 3-month phases. The pre-implementation phase (group 1) followed the standard nutritional protocol and the post-implementation phase (group 2) followed a reduced fasting protocol.

Results: The reduced fasting protocol stated that for a patient receiving gastric feedings, TEN would be discontinued 45 minutes prior to a procedure and the nasogastric/gastric tube would be aspirated to remove residual gastric contents. Patients being tube fed into the small bowel received TEN up until the time of procedure. The patients underwent a variety of surgical and non-surgical procedures including orthopedic, ENT and ophthalmologic surgeries; tracheostomy, percutaneous feeding tube placements and bronchoscopy. Patients without gastric feedings were allowed a reduced fasting protocol. Reduced time to reach goal TEN. No increase in VAP or other infectious complications was detected.

Conclusion: A reduced fasting protocol for selected procedures may improve delivery of TEN for critically ill trauma patients without additional complications, but a larger randomized study of this approach is warranted before adoption of this practice can be advocated.

Acknowledgements

Co-authors: Art Pouman, DO, Beth Mills, MS, RD, CNSD, Pratik Pandhirapande, MD, Jose Diaz, MD, Brian Cellion, DO, Robert Miller, MD, and Gordon Jensen, MD, PhD, Vanderbilt University Medical Center.

Alterations In Brain Metabolites In Recreational 3,4-Methylene-dioxymethamphetamine (MDMA), “Ecstasy”) Users: A 1H-MRS Study

Deanne Roberts

Background: Synthesized by Merck in 1914, 3,4-methylenedioxymethamphetamine (MDMA), has gained wide popularity as the club drug Ecstasy. A potent blocker of serotonin reuptake, MDMA has also been shown to be toxic to serotonergic axons in culture and in animal models, however this toxicity has yet to be proven in humans. A recent study however showed reduced gray matter concentrations in Brodmann areas (BA) 18 (bilateral), 21 and 45 (left), postulating that this could be due to direct drug toxicity and/or loss of serotonergically mediated mechanisms of growth, blood flow and maintenance.

Objective: Using 1H-MRS voxels selected in BA 18 and left 45 of MDMA users, determine if there are alterations in N-acetyl aspartate (NAA), a neuronal marker, and myoinositol (mI), a glial marker concentrations compared to controls.

Materials and Methods:

Spectroscopic Measurements were made at 3T (GE Medical Systems) using short echo times (TE=30ms) for mI and long echoes (TE=144ms) for NAA for each voxel. Spectra were fit with a Marquart-Levenberg algorithm and peak areas of creatine (Cr), NAA and mI were measured from the resulting fit. Ratios of NAA/Cr and mI/Cr were calculated for each of the two areas.

Results: From 11 subjects in area Cr, the mean NAA/Cr ratio was 1.87 mmol/kg with a standard deviation of .20 mmol/kg. The mI/Cr ratio was .56 mmol/kg with a standard deviation of .20 mmol/kg. Values for Area 18 were NAA/Cr and mI/Cr ratios were 2.02mmol/kg, standard deviation .09mmol/kg and
Results: We confirmed our primary hypothesis and found that, while breathing the carbon dioxide mixture, there was a 45% decrease in the change in oxy-hemoglobin concentration caused by visual activation. However, a corresponding 11% increase in the deoxy-hemoglobin change and a 7% decrease in the change of total hemoglobin concentration. The effects of brief periods of hypercapnia did change the response to subsequent exposures in some subjects, but those results were inconsistent.

Conclusions: The results of this study are significant as they show that NIRS can be used to quantify accurately and reproducibly the effects of physiological manipulation on cortical oxygenation and measurements of activation. Such studies could, for example, be useful for assessing cerebrovascular reserve, and are necessary for interpreting NIRS measurements in studies of brain function.

Acknowledgments:
Co-author: John C. Gore, PhD, Vanderbilt University Institute of Imaging Science

Sanjay G. Patel

The Role of Computed Tomographic Angiography in Evaluation of Penetrating Arterial Trauma of The Extremities

Objective: To evaluate the role of Computed Tomographic Angiography (CTA) in the management of penetrating trauma to the extremities at our institution.

Methods: Retrospective review of adult patients (>18y) who presented to the Vanderbilt University Medical Center with penetrating extremity injuries from May 2003 to May 2005.

Results: There were a total of 203 patients with penetrating extremity injuries (166 gunshot, 37 stab). Fifty-one patients had signs/symptoms of vascular injury, of which 21 (41%) had CTA performed. Seventeen of 21 had confirmed vascular injuries and went on to a vascular intervention. Three patients had missed vascular injuries. Twenty-two of the remaining 30 patients with signs/symptoms went directly to the operating room for repair of vascular injuries.

Of the remaining 152 patients with no signs/symptoms of vascular injury, 20 (13%) had CTA performed. Only one minor vascular injury was found, which did not require surgical intervention. None of the 152 patients without signs/symptoms of vascular injury required surgical intervention. There were no vascular injuries found in the 6 patients with isolated neurologic signs/symptoms. Overall sensitivity and specificity was 76% and 100% respectively.

Conclusions: The general acceptance of selective angiography for penetrating extremity injury has taken several decades to evolve. With the most benefit coming to patients presenting with signs/symptoms of vascular insufficiency. With the advent of CTA, which has been found to be equally as sensitive and specific and much less invasive, the use of diagnostic imaging for these injuries may be unnecessarily increasing. This is suggested by the observation that a number of negative CTAIs are being performed in asymptomatic patients who do not otherwise require a vascular intervention. Also, despite its relatively accurate arterial diagnostic ability, CTA does not seem to provide any relevant nonvascular information. Finally, isolated neurologic exam findings do not seem to pose any added risk of vascular injury.

Acknowledgments:
Co-authors: Paul Flier, MD, Jeffry B. Dattilo, MD, and Marc A. Pusnak, MD, Vanderbilt University Medical Center

Reduced Fasting Protocol For Critically Ill Trauma Patients Undergoing Procedures

Colleen Pepper

Background: Protocols that require fasting for procedures often disrupt adequate nutrition delivery in critically ill trauma patients.

Objectives: 1. To study the effect of a new total enteral nutritional protocol as compared to standard care on time of attainment of target caloric goals. 2. To study the effect of a new total enteral nutritional protocol as compared to standard care on incidence of ventilator associated pneumonia (VAP).

Methods: IRB approval was obtained to enroll patients in the Trauma ICU who had a protected airway (suffled endotracheal tube or tracheostomy) and were anticipated to need nutrition support. Patients were studied in two 3-month phases. The pre-implementation phase (group 1) followed the standard nutritional protocol and the post-implementation phase (group 2) followed a reduced fasting protocol. The reduced fasting protocol stated that for a patient receiving gastric feedings, TEN would be discontinued 45 minutes prior to a procedure and the naso-gastric/gastric tube would be aspirated to remove residual gastric contents. Patients being fed into the small bowel received TEN up until the time of procedure. The patients underwent a variety of surgical and non-surgical procedures including orthopedic, ENT and ophthalmologic surgeries; tracheostomy, percutaneous feeding tube placements and bronchoscopy. Patients were followed for 10 days, or until PO intake began or until death. VAP was defined on the basis of chest x-ray infiltrate, positive bronchoalveolar lavage, and physician documentation.

Results: The study included 65 pre and 75 post-implementation patients including 37 and 36 patients who underwent procedures, respectively. There were no significant baseline differences between the two groups with regard to age, gender, BMI, APACHE II, mechanism of injury, prealbumin, and CRP values. There were significant improvements in delivery of TEN during the post-implementation phase including reduced days to achieve goal TEN, reduced time without TEN, and greater days at goal TEN. No increase in VAP or other infectious complications was detected.

Conclusion: A reduced fasting protocol for selected procedures may improve delivery of TEN for critically ill trauma patients without additional complications, but a larger randomized study of this approach is warranted before adoption of this practice can be advocated.

Acknowledgments:
Co-authors: Art Pusnak, DO, Beth Mills, MS, RD, CNSD, Prazik Palabhopantong, MD, Jose Diaz, MD, Brian Collier, DO, Robert Miller, MD, and Gordon Jensen, MD, PhD, Vanderbilt University Medical Center

Alterations In Brain Metabolites In Recreational 3,4-Methylenedioxy- 
Dioxymethamphetamine (MDMA, “Ecstasy”) Users: A 1H-MRS Study

Deanne Roberts

Background: Synthesized by Merck in 1914, 3,4-methylenedioxy- 
dioxymethamphetamine (MDMA), has gained wide popularity as the club drug Ecstasy. A potent blocker of serotonin uptake, MDMA has also been shown to be toxic to serotonergic axons in culture and in animal models, however this toxicity has yet to be proven in humans. A recent study however showed reduced gray matter concentrations in Brodmann areas (BA) 18 (bilateral), 21 and 45 (left), postulating that this could be due to direct drug toxicity and/or loss of serotonergically mediated mechanisms of growth, blood flow and maintenance.

Objectives: Using 1H-MRS voxels selected in BA 18 and left 45 of MDMA users, determine if there are alterations in N-acetyl aspartate (NAA), a neuronal marker, and myoinositol (mI), a glial marker concentrations compared to controls.

Materials and Methods: Spectroscopic Measurements were made at 3T (GE Medical Systems) using short echo times (TE=30ms) for ml and long echoes (TE=144ms) for NAA for each voxel. Spectra were fit with a Marquart-Levenberg algorithm and peak areas of creatine (Cr), NAA and ml were measured from the resulting fit. Ratios of NAA/Cr and ml/Cr were calculated for each of the two areas.

Results: From 11 subjects in area 45, the mean NAA/Cr ratio was 1.87 mmol/kg with a standard deviation of .39 mmol/kg. The ml/Cr ratio was .56 mmol/kg with a standard deviation of .20 mmol/kg. Values for Area 18 for NAA/Cr and ml/Cr ratios were 2.02mmol/kg, standard deviation .09mmol/kg and
Open Label Pilot Study of Combination Therapy With Osiglitazone and Bexarotene in the Treatment of Cutaneous T-Cell Lymphoma

Open Label Pilot Study of Combination Therapy With Osiglitazone and Bexarotene in the Treatment of Cutaneous T-Cell Lymphoma

Background: In vitro studies indicate that RXR agonists (retinoid X receptor) and PPARα agonists (peroxisome proliferator-activated receptor gamma) may act synergistically to induce apoptosis in cutaneous T-cell lymphoma (CTCL) cell lines. Bexarotene is an RXR agonist approved by the FDA for the treatment of CTCL. Rosiglitazone is a PPARγ agonist approved by the FDA for the treatment of type 2 diabetes. Rosiglitazone has been documented to increase apoptosis both alone and in combination with RXR agonists in CTCL cell lines.

Objective: The primary objective of this trial is to determine if combination therapy with rosiglitazone and bexarotene has a synergistic effect in the treatment of patients with CTCL.

Design, Setting, and Patients: This 16-week open-label, single-arm clinical trial enrolled patients at VUMC with CTCL who had received at least four months of bexarotene. The study patients maintained their dose of bexarotene throughout the study and added rosiglitazone. Patients were examined monthly to assess tumor burden.

Main Outcome Measure: Skin score was assessed by percentage involvement of total body surface area, weighted for patch, plaque, and tumor. Secondary outcome measures included pruritus and quality of life assessments.

Results: To date, four patients (stages IB, IIA, IVA, IVA) have completed the 16-week protocol. Skin score decreased for 2 patients (-11.9% and -5.5%), remained unchanged for 1 (0%), and increased slightly for 1 (6.2%). Total response was assessed by combining change in skin score, peripheral lymph node measurements and total CD4 counts (if applicable). One patient achieved a partial response, designated as an improvement of greater than 50%. The other 3 patients showed stable disease for the 16-week period. Pruritus, assessed with a 10 cm visual analog scale, improved for 3 out of 4 patients.

Conclusions: Further larger studies are indicated to assess the efficacy of combination therapy with rosiglitazone and bexarotene in the treatment of CTCL. Combination therapy appears to be safe with no grade 4 AEs and may positively impact pruritus.

Acknowledgements

Co-authors: John P. Greer, MD, Vanderbilt University Medical Center; John A. Zic, MD, Vanderbilt University Medical Center.

Autism: Early Report Of Social Behavior Predicts Language Development In Younger Siblings

Adam E. Stenger

Background/Problem: Autism is steadily increasing in prevalence. The current accepted rate of occurrence is 17 in 10,000. It is important to recognize risk for this disorder at a younger age before other interventional therapies have been shown to improve outcomes. It is important to study siblings of children diagnosed with autism because these children are at a higher risk for developing the disorder. The accepted value for rate of occurrence in siblings of children with autism is 50 times higher than prevalence in typical populations. There is a correlation between early social behavior and language development in typically developing children. This study is important for several reasons. First, it will clarify the relationship between social and language development in typically developing children; as well as those with Autism Spectrum Disorders.

Second, it will help identify children for early language intervention studies. Finally, this study could have implications for further research involving intervention and prevention therapies.

Materials and Methods: The data set used is provided by the TRIAD center at Vanderbilt University. Two groups of children were studied before the age of 18 months. Out of 110 total children, 58 were high-risk siblings of children with Autism Spectrum Disorders (ASD). The other 53 were siblings of typically developing children (TD). There are no differences in age or gender. 25 children returned for the follow-up visit one year later: 18 siblings of ASD children and 7 siblings of TD children. Three measures of social behavior were given at the child’s first visit with the TRIAD center: the Screening Tool for Autism in Two Year Olds (STAT), the Social Behavior Checklist (SBC), and the Detection of Autism by Infant Sociability Interview (DAISI). There is a correlation between early social behavior and language development. The follow-up has not yet been completed, and the two groups were too small to analyze their data separately. The combined data revealed that time 1 scores on the interactive measure of social behavior (STAT) were correlated significantly with follow-up expressive language, as measured by the Mullen (an interactive measure) and the MCDI (parent report).

Conclusions: Significant differences exist in many areas of social and language development for siblings of children with Autism Spectrum Disorders, as compared with siblings of typically developing children.

References:

Autism: Early Report Of Social Behavior Predicts Language Development In Younger Siblings

Adam E. Stenger

Background/Problem: Autism is steadily increasing in prevalence. The current accepted rate of occurrence is 17 in 10,000. It is important to recognize risk for this disorder at a younger age because earlier interventional therapy has been shown to improve outcomes. It is important to study siblings of children diagnosed with autism because these children are at a higher risk for developing the disorder. The accepted value for rate of occurrence in siblings of children with autism is 50 times higher than prevalence in typical populations. Three to eight percent of these siblings will receive a diagnosis of autism.

Objectives: The purpose of this study is to determine whether or not measures of early social behavior in the high-risk/autistic siblings of children with autism will be a predicting factor for their language development one year later. The development of these children will be compared with the control sample of siblings of typically developing children. This study is important for several reasons. First, it will clarify the relationships between social and language development in typically developing children, as well as those with Autism Spectrum Disorders. Second, it will help identify children for early language intervention studies. Finally, this study could have implications for further research involving intervention and prevention therapies.

Materials and Methods: The data set used is provided by the TRIAD center at Vanderbilt University. Two groups of children were studied before the age of 18 months. Out of 111 total children, 58 were high-risk siblings of children with Autism Spectrum Disorders (ASD). The other 53 were siblings of typically developing children (TD). There are no differences in age or gender. Twenty-five children returned for the follow-up visit one year later: 18 siblings of ASD children and 7 siblings of TD children. Three measures of social behavior were given at the child's first visit with the TRIAD center: the Screening Tool for Autism in Two Year Olds (STAT), the Social Behavior Checklist (SBC), and the Detection of Autism by Infant Sociability Interview (DAISI). Two measures of language development were given at the one-year follow-up: the Mullen Scales of Early Learning, and the MCDI, or MacArthur Communicative Development Inventory. The STAT and Mullen are observational measures, while the MCDI, SBC, and DAISI are parental interviews.

Results: There is a correlation between early social behavior and later language development. This result was found for both the siblings of children with Autism Spectrum Disorders and siblings of typically developing children. Moreover, the correlation was found for parent report as well as observational measure. The two groups were significantly different in social, language, and cognitive development at initial assessment, with the children in the ASD sibling group demonstrating weaker performance in these areas. The same differences were found when children with an eventual diagnosis of Autism Spectrum Disorder were removed from the sample. These results were not found for either group separately, because the follow-up has not yet been completed, and the two groups were too small to analyze their data separately. The combined data revealed that time 1 scores on the interactive measure of social behavior (STAT) were correlated significantly with follow-up expressive language, as measured by the Mullen (an interactive measure) and the MCDI (parent report).

Conclusions: Significant differences exist in many areas of social and language development for siblings of children with Autism Spectrum Disorders, as compared with siblings of typically developing children.

References:

Acknowledgements:
Co-authors: Caitlin R. McMahon, BA, Vanderbilt University and Wendy L. Stone, PhD, Vanderbilt University Medical Center.

Digital Recording And Analysis of Chest Sounds: Pilot Study

Ryan C. Tomlinson

Background/Problem: Recent advances in computational sound wave analysis have made it possible to digitally record large amounts of sound data in a straightforward and in real-time. This sound data can be converted into frequency and time domains for several modes of analysis. Small microphones can be coupled to computers to become mobile sound recording stations. This simple, non-invasive technology may then be utilized at the bedside for chest sound recording and analysis, and potentially for clinical monitoring and decision-making.

Objectives: In this study, we explored the potential diagnostic value of non-invasive, continuous, digital recording and analysis of chest sounds in an attempt to earlier diagnose and treat acute pulmonary and pleural conditions.

Materials and Methods: Recording was performed at the chest wall using a Nova Sonics Lifesound heart/breath sound monitoring system (Model LS 1040). Input signals were sent through a Behringer Eurorack UB802 soundboard for signal amplification. Input signals were then sent to a PC operating with a Creative Sound Blaster audio card and Audacity 1.2.3 software. Recordings were made of healthy subjects at the right mid-axillary line in the 5th intercostal space.

Results: We were able to develop a non-invasive method of digitally recording and analyzing chest sounds. We have collected preliminary chest sound data from healthy individuals to establish normalcy, focusing on a frequency range between 200-1500 MHz.

Conclusions: We plan to move ahead and compare these baseline data with data recorded from critical care patients with pulmonary conditions, and from healthy surgical subjects undergoing elective procedures. Evaluation of significant, gross differences between data sets will be used to determine feasibility and clinical value of real-time chest sound recording for diagnosis of disordered pleuro-pulmonary function.

Future questions include:
1. Can continuous, digital chest sound recording be performed?
2. Is it possible to detect “pathological” critical care chest sounds patterns represent a deviation form a normal or baseline state? If so, how are they sounds different?

Acknowledgements:
Co-authors: John Barwise, MD, ChB, Michael S. Curatolo, and Adrian A. Jarquin-Valdivia, MD, RDMS, Vanderbilt University Medical Center.