

JOURNAL

U.S. ARMY MEDICAL DEPARTMENT

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Madigan Research Day '99 2nd Annual Meeting Proceedings

Making the Leap to 91W: A Transition Guide for Leaders

Combat Stress in Chechnya: "The Equal Opportunity Disorder"

JOURNAL

U.S. ARMY MEDICAL DEPARTMENT

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LTG Ronald R. Blanck
Commander, U.S. Army Medical Command
The Army Surgeon General

MG James B. Peake
Commander, U.S. Army Medical Department
Center and School

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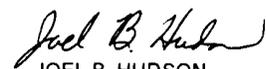
SGM Abu Nasar
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in Physical Therapy, Dept of Med Science, AHS

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Perspective

The AMEDD Journal in the New Millennium

The new millennium opens with a renewed commitment by the Army Medical Department (AMEDD) Journal to serve the men and women of the AMEDD. Published by the AMEDD Center and School since February 1994, the Journal has proudly fulfilled its mission "To expand knowledge of domestic and international military medical issues and technological advances; promote collaborative partnerships among Services, corps, and specialties; convey clinical and health service support information; and provide a peer-reviewed high-quality print medium to encourage dialogues concerning healthcare initiatives." Beginning this year, the AMEDD Journal launches several initiatives designed to improve the publication.

Peer review, the cornerstone of professional publishing, will be strengthened at the Journal. A new editorial board has been convened. Composed of a select group of military medical academicians with proven credentials in peer review and publishing, this editorial board will screen incoming manuscripts and refer them to Journal consultants for subject matter expert review. Journal consultants or peer reviewers are selected from across the AMEDD to reflect the enormous talent and professional expertise of the organization.

In keeping with the professional diversity of the AMEDD, the Journal will also strive to increase the number and type of articles published. Research and similar scholarly works will be emphasized, but there will always be room for other types of articles. The goal is to make the AMEDD Journal the preferred forum for AMEDD scholars, researchers, students, instructors and clinicians to present their work.

It is hoped these changes to the AMEDD Journal will elevate this respected and important professional publication to new heights and greater readership. In this issue of the Journal are several articles of interest:

- *Proceedings of the 1999 Madigan Research*

Day. Identifies the award-winning research abstracts of this annual Madigan Army Medical Center event.



Major General James B. Peake

- *Personality Traits and Types of Army Nurse Corps Officers*. Explores the results of standardized personality inventory administered to company grade Army Nurse Corps Officers.
- *Making the Leap to 91W: A Transition Guide for Leaders*. Focuses on the strategies and procedures necessary for soldiers, their leaders, and commanders to make a successful transition from the current 91B/91C MOSs to the newly-approved 91W Healthcare Specialist.
- *A Case Review of Cerebral Edema: High Altitude Illness*. Presents a case of high altitude illness complicated by brain injury.
- *Combat Stress in Chechnya: "The Equal Opportunity Disorder."* Uses the 1994-96 Russian conflict in Chechnya as a springboard for a discussion on the devastating effects combat stress can have on unit effectiveness.
- *The Evolution of Managed Care Within the Military Health System*. Reviews the history of managed care in the military and the steps being taken to lead Tricare into the new century.

I am asking each of you to look at the Journal as *your* Journal and to use it to share your outstanding professional work with the Army Medical Department at large and the rest of our readers at home and abroad. Good ideas and scientific endeavors will stimulate others, build collaboration, and make us a better AMEDD.

The AMEDD Journal Editorial Board

Beginning with the Apr-May-Jun issue, the AMEDD Journal Editorial Board will become an important part of the publication production effort. The Board will act in an advisory capacity concerning Journal content focus, balance, and direction; identify individuals from the AMEDD corps subspecialties to act as members of the Peer Review Panel; and participate in the content planning for future issues.



**COL James M. Lamiell, MC,
Chairman**

Colonel Lamiell is the Chief, Army Medical Department Clinical Investigation Regulatory Office, Fort Sam Houston, TX.



COL George J. Dydek, MS

Colonel Dydek is currently serving as an Army Research Fellow, RAND Corporation, Santa Monica, CA.



COL Dale E. Carroll, MC

Colonel Carroll is the Chief, Clinical Services Division, U.S. Army Medical Command and Chief Consultant, Medical Corps, Office of The Surgeon General, Fort Sam Houston, TX.



SGM Abu Nasar, Enl Corps

Sergeant Major Nasar is the Senior Enlisted Advisor and Program Manager, Department of Health Education and Training, Academy of Health Sciences, U.S. Army Medical Department Center and School, Fort Sam Houston, TX.



COL Thomas R. Cole, DC

Colonel Cole is the Chief, Consultant Division, U.S. Army Dental Command, Fort Sam Houston, TX.



MAJ Thomas G. Sutlive, SP

Major Sutlive is an Assistant Professor, U.S. Army-Baylor University Graduate Program in Physical Therapy, Department of Medical Science, Academy of Health Sciences, U.S. Army Medical Department Center and School, Fort Sam Houston, TX.



COL Lynne M. Connelly, AN

Colonel Connelly is the Chief, Department of Nursing Science, Academy of Health Sciences, U.S. Army Medical Department Center and School, Fort Sam Houston, TX.



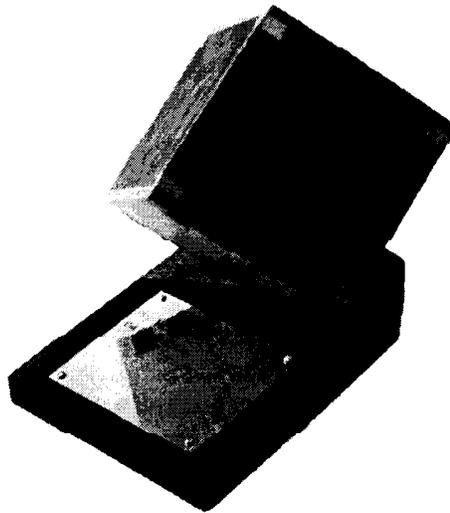
**COL Gary A. Vroegindewey,
VC**

Colonel Vroegindewey is the Assistant Chief, Veterinary Corps and Corps-Specific Branch Proponency Officer, Fort Sam Houston, TX.

Madigan Research Day '99 2nd Annual Meeting Proceedings

1 April 1999 Letterman Auditorium Madigan Army Medical Center

The goals for this program were threefold: Celebrate Exceptional Scope of Scholarly Activities at Madigan Army Medical Center (MAMC), Incite Enthusiasm (for Further Studies, Grants, and Publications at MAMC), and Attract Grant Support for MAMC.



BG George J. Brown Mentor's Cube

INTRODUCTION

I truly believe that no forum offers better proof of what is RIGHT about MAMC than Madigan Research Day (MRD). MRD '99 fulfills and exemplifies your clarification of our MISSION, PRIORITIES, and CORE FUNCTIONS published 8 January 1999. How do we FOCUS on our People? Patients, Soldiers, Leaders, Students, Residents, Fellows, and Young Faculty are all the focus of the 23 oral and 10 poster presentations by teams of Clinical Investigators in MRD '99. The novice presents the team's work with guidance from the mentors. We develop the future healthcare delivery readiness while we perform our tasks today. The driving force behind the courage to be curious and open to peer review, manifests the Army motto: BE ALL YOU CAN BE, with the MAMC twist - prove that your process is the best it can be, now and into the future. The scientific approach to scholarship, improved clinical care, and better readiness remains critical to our continued growth as a center of excellence.

We celebrate the excellence of the scientific approach to today's problems and future solutions awarding best presentations in the following categories: Innovation, Discovery, Change of Practice, and Most Interdisciplinary. And we recognize the central role of the mentor in this process uniquely with the MENTOR'S CUBE. Thanks for joining us today.

Mack C. Hill
Brigadier General, MC
Commanding

Military Unique Clinical Investigation

Moderator: Carroll Ray Dotson, LTC, MS

The care and welfare of our soldiers, airmen, and sailors is the central concern of our military research efforts. The essential process required to preserve and maintain the fighting strength (...salvage our manpower for the unique military missions...) is to anticipate the threat, solve the problems, and work through the medical challenges that the deployed soldier may encounter. At the Joint Services Graduate Medical Education Selection Board, Secretary Martin coined the term "Military Unique Clinical Investigation." Subsequently, The Surgeon General from each of the Department of Defense Services stated that more military unique curriculum development and more military unique research were needed. This message was clear and anticipated at Fort Lewis by both Madigan Army Medical Center (MAMC) and I Corps leadership. There is already an existing tradition of collaborative militarily relevant clinical investigation efforts between MAMC and I Corps and this remains a fundamental element of future plans at this installation.

Sports Medicine in U.S. Army Rangers: A Look at Injuries, Physical Training, and Performance

Presented by Military-Unique Clinical Investigation Section
Department of Physical Medicine and Rehabilitation

The U.S. Army Rangers are a quick strike force capable of deploying within 18 hours to any location in the world. The Rangers most often deploy by parachuting near or onto a hostile airfield at night under intense physical and psychological demands. These demands rival, if not exceed, those of professional athletes. The purpose of this study is to analyze the rates, causes, and types of injuries that occur both in garrison and during deployments in Rangers. In addition, we describe an alternative method of handling these injuries by introducing a sports medicine program similar to a professional athlete setting. Injury data was collected prospectively over a 7-month period in the 2/75 Ranger Battalion, Fort Lewis, Washington. Deployment injury rates were found to be significantly higher than garrison injury rates (28.8/100 Rangers/month, RR = 4.36, 95% CI 2.87, 5.85 and 6.6/100 Rangers/month, respectively). The majority of deployment injuries were traumatic (73%) while garrison injuries were as a result of overuse (71%). The leading causes of injury during deployments were field training (22%), road marching (19%), and fast roping (17%). The leading causes of garrison injuries were related to physical training (PT); running (46%) followed by marching (29%). With the introduction of a sports medicine program, Ranger injuries are treated immediately both in garrison and during deployments and rehab takes place in their own fitness center during PT time or in the intermediate staging base during a deployment. In addition, a "Total Ranger" PT Program is being implemented consisting of six performance measures that closely resemble the physical demands of the battlefield. New PT exercises have been designed to reduce the amount of running and marching while improving skills like speed, agility, quickness, and overall strength; attributes necessary to be successful in combat. This program, modeled very similarly to a professional or college sports medicine program, is being evaluated to determine if it produces more ready and better performing Rangers.

Presenter: Daniel C. Norvell, CPT, SP
Mentor: Joseph R. Dettori, COL, SP

External Fixation of Significantly Displaced Clavicle Fractures

Presented by Medical Intensive Care Unit
Orthopedic Surgery Service, Department of Surgery

We propose the use of external fixation of mid-third clavicle fractures with significant displacement in order to reduce the likelihood of deformity that would interfere with the wearing of shoulder harnesses (rucksacks, parachutes, load bearing equipment, etc) and decrease shoulder stiffness from prolonged immobilization. Currently, the standard treatment for significantly displaced clavicle fractures involves wearing a sling or figure-eight for 8 weeks. Mid-third clavicle fractures with over 100% displacement have been reported to have a 16% nonunion rate and over 32% unsatisfactory results in the general population. Many military personnel require shoulder harnesses in their occupations and cannot tolerate clavicular deformity, malunion, or nonunion.

Thirteen individuals with acutely fractured clavicles that were displaced greater than 100% have been treated with external fixation. Within 2 days postoperatively, all were able to perform shoulder abduction to 90 degrees and engage in moderate shoulder activity without pain. There were no complications from surgery or postoperation infections. The average time for external fixation was 56 days. Two individuals had to have the fixator adjusted to realign the clavicle but healed uneventfully. All were able to resume their normal activities after removal of the external fixator. Based on these results, external fixation of significantly displaced mid-third clavicle fractures is a viable option for individuals whose occupations require the use of shoulder straps and would be adversely affected by clavicular deformity.

Presenter: Greer E. Noonburg, MAJ, MC
Mentor: Patrick St Pierre, LTC, MC

Assessing the Stages of Change for Contraceptive Use in the Prevention of Pregnancy and Sexually Transmitted Disease

Presented by Medical Intensive Care Unit
Department of Family Practice

Background and Methods: This study is a prospective controlled study to assess the stages of change of 300 AD soldiers regarding contraceptive use in the prevention of unintended pregnancy and sexually transmitted disease. The stages of change is a construct of the Trans-theoretical model of health behavior change. The concept of stages of change suggests that as individuals modify health behaviors, they progress through five stages: pre-contemplation, contemplation, preparation, action, and maintenance phases. The Unintended Pregnancy Prevention Program (UPPP) is an ongoing program designed to determine if reproductive education and facilitated access to contraceptive services will decrease the rate of unintended pregnancy. Objectives of this study are to report: (1) participants' stage of change before the unintended pregnancy prevention program intervention; (2) stages of change with respect to demographics of class; and (3) change in participants' stage of change before and after class as a function of class demographics.

This study is being performed via a questionnaire given to the study group before and after the UPPP intervention. The dependent variables for this study consist of the study group and the age/rank/gender of group participants. The method of analysis will be to use a chi-square to compare the incidence of change within the study group before and after the intervention. The five different stages of change will also be converted to numerical rank to compare the mean ranks by group and by age/rank of participants using 2-factor Analysis of Variance.

Results: Currently are in data collecting stage of study. Results of the pre-class and post-class surveys and the demographic data will be completed by 1 Feb 99.

Conclusions: The value of assessing the stage of change in UPPP participants is that it can provide a framework for forming interventions tailored to where individuals are in the process of change. It will also assess if the UPPP is making an effective difference in participant's stage of change. Awaiting results of data collection at this time.

Presenter: Jennifer H. Potter, CPT, MC
Mentor: Diane M. Flynn, LTC, MC

Targeting Hearing Loss Prevention at the High Risk Populations

Presented by Medical Intensive Care Unit
Department of Preventive Medicine

Objective: To estimate rates of hearing loss among soldiers serving in various occupations.

Method: A retrospective cohort design involving soldiers on active duty in the U.S. Army between 1986 to present. A priority, soldiers were assigned to “exposed” and “unexposed” groups based on their military occupational specialty. Audiograms were routinely performed and recorded in a central database during the study period. Rates of significant hearing loss were estimated in the various occupational groups. Crude and occupation-specific rates in the “exposed” group were compared with the “unexposed” using the rate ratio. Internal dose-response relationships of time in “high-risk” occupations with hearing loss were estimated. Dose (time in occupation) was related to response (hearing loss) to support a possible causal relationship.

Results: Overall, there was a substantial reduction in the prevalence of significant hearing loss among soldiers assigned to combat occupational specialties. Other results are pending at this time.

Conclusion: This study will identify specific occupations at high risk for hearing loss. It will also determine if selected military occupations “cause” hearing loss, or whether observed trends could be due to other factors. Changes in hearing loss incidence rates over time will identify periods when hearing loss prevention may be most effective.

Presenter: Samuel S. Jang, CPT, MC
Mentor: Jerffrey D. Gunzenhauser, LTC, MC

Scientific Approach to Managed Care

Moderator: Nancy Newth Greenfield, RN

Managed care is a concept and a framework for healthcare delivery. Maturation of managed care systems is occurring across the country and at Madigan. This framework, when actualized at Madigan, is a dynamic and evolving system. Our managed care system is incredibly complex, with overlapping and matrixed components. Some macro components of a managed care system are the benefits package and the “rules of engagement,” such as how one enrolls, how care is accessed, and how an appointment is made. In addition, more cryptic components include customer service, satisfaction of the beneficiary and the providers, information availability and exchange, internal measurement of processes, priority setting for resource allocation and internal interfaces or handoffs. These cryptic components are governed and influenced by the “culture” of the organization.

Organizational culture includes the openness of the system, communication style and expectation, self-exploration and self-analysis of the system itself, and the education and mentoring of the participants within the system. Why do some managed care systems thrive and others fail? That is where the “science” comes in.

Madigan has enjoyed an evolving culture carefully mentored to be inclusive of concepts of total quality management and continuous quality improvement, embraced by Madigan as we continue our journey into the development of our managed care system. The growth of managed care and science is intimately linked. How do we know what the “right thing, at the right time” is? How do cost factors influence the delivery of healthcare? Does decreased variability in healthcare delivery make a difference? How? Do clinical pathways improve outcomes?

The study of macro and micro components of our managed care system is a part of our culture, reflected in the proceedings of today. Mentoring of our staff to study our systems, resources to support that system, reward for the efforts and outcomes, information available to proceed, are all part of the Madigan culture, culminating in this session, the scientific approach to managed care.

Individual Cost Per Patient and Lengths of Stay as a Function of Patient Category and Clinic Service in a Military Medical Treatment Facility: A Supporting Objective of a Graduate Management Project

Presented by Medical Clinic
Command Group, Madigan Army Medical Center

It is uncertain, under Medicare Subvention (Tricare Senior Prime Demonstration), and in the future enrollment-based capitation, if military medical treatment facilities have a disincentive to treat Medicare-eligible patients, or if there is a methodology

to adequately evaluate the financial effects of treating those same patients. While other studies have examined the impact of other variables on individual patient costs and lengths of stay, none have specifically focused on the impact of treating Medicare beneficiaries in military medical treatment facilities. The purpose of this retrospective study was to determine if any statistically significant relationship exists between the dependent variables of individual patient cost and lengths of stay and the independent variables of patient category and clinic service in one military medical treatment facility. Defense medical information for in-patient dispositions (n=1,743) from a surgery department of a military medical treatment facility was obtained for the first 6 months of fiscal year 1997. Trends for individual patient cost associated with independent variables revealed a moderate and statistically significant linear pattern across individual patient cost and lengths of stay with multiple $r=.247$ and $.288$, respectively. Hierarchical multiple linear regression analysis supports the linear individual patient cost and lengths of stay hypotheses, with $F(10, 1733) = 11.258$ and 15.663 , (with $P < .05$), respectively. Additional analysis revealed significant differences between individual cost per patient and lengths of stay to patient category by clinic service. Final results indicate that increased costs and lengths of stay are related to specific patient categories. This information may assist healthcare administrators and providers in understanding the significance of patient category on cost and lengths of stay, and thereby provide them a decision-making tool to manage the costs of providing healthcare to Medicare and military beneficiaries.

Presenter: William H. Millar, MAJ, MS
Mentor: Van R. Booth, COL, MS

Minocycline Hyperpigmentation

Presented by Medical Clinic
Internal Medicine Service, Department of Medicine

Objective: Minocycline (minocin) has been shown to be a safe and effective therapy for mild rheumatoid arthritis (RA) in several recent studies. Although cutaneous hyperpigmentation is a rarely (1%) reported adverse effect, the Rheumatology service at MAMC has observed this in 33% of RA patients taking this drug. This observation, made possible in part through adverse drug reaction reporting on CHCS, led us to investigate this further to identify possible predisposing risk factors or etiologies.

Patients and Methods: All patients taking minocin for the treatment of RA at the MAMC Rheumatology clinic were examined for adverse cutaneous reactions. Patient characteristics were evaluated to include: age, gender, cumulative minocin dose, steroid use, cumulative steroid dose, daily steroid dose, and use of hydroxychloroquine (also known to cause hyperpigmentation). The various clinical subtypes of minocin hyperpigmentation are reviewed along with histopathology, clinical distinctions, and therapeutic options.

Statistical Analysis: ANOVA and chi-square

Results: The RA patients taking minocin with hyperpigmentation (WHP) (n=23) were compared to those RA patients taking minocin without hyperpigmentation (WOHP) (n=46):

Gender:	28% of females (13/44) WHP vs 40% of males (10/25) ($P=.366$)
Age:	mean age 63.4 years WHP vs 55.1 WOHP ($P=.024$)*
Cumulative minocin dose:	64.7 grams WHP vs 37.5 grams WOHP ($P=.043$)*
Daily steroid dose:	6.04 mg WHP vs 4.46 mg WOHP ($P=.16$)
Cumulative steroid use:	3.7 years WHP vs 2.0 years WOHP ($P=.03$)*
Hydroxychloroquine use:	13% (3/23) WHP vs 25% (24/46) WOHP ($P=.002$)*
Steroid use:	87% (20/23) WHP vs 63% (29/46) WOHP ($P=.04$)*

*statistically significant ($P < .05$)

Conclusions: Advanced patient age, greater cumulative minocin dose, steroid use and duration of steroid use were statistically significant risk factors for the development of skin hyperpigmentation. Although unconfirmed at this point, the brand of minocin may also be a risk factor. Other Army Medical Centers contacted are using the Wyeth-Ayerst brand, and per telephonic conversations with their Rheumatology clinics, they have not observed this drug reaction. Our findings led to the removal of the current minocin brand (Teva), and the replacement product (Wyeth-Ayerst) will save MAMC over \$10,000 per year. The proper reporting of adverse drug reactions by physicians may lead to an increased recognition of toxicities and possibly to financial savings.

Presenter: Eric J. Messner, CPT, MC
Mentor: David R. Finger, MAJ, MC

Risk Factors for Nosocomial Pneumonia in the Intensive Care Unit

Presented by Medical Clinic
Tripler Army Medical Center, Department of Post-Anesthesia Care Unit

Background: Nosocomial pneumonia (NP) has the highest mortality rate (30% to 50%) of all nosocomial infections, but little is known about the risk factors and outcomes when NP occurs in the intensive care units (ICU).

Purpose: This retrospective chart review compared patients who did and did not develop NP in terms of risk factors, length of stay (LOS), and mortality.

Methods: This case control study review of medical records was conducted at Madigan Army Medical Center in three intensive care units (SICU, MICU, and CCU). The ICU subjects with NP (n = 60) were matched to ICU subjects without NP (n = 60) for age, admitting service, and LOS for onset of NP diagnosis. Medical records were reviewed for physiologic and treatment risk factors. Data were analyzed with Chi square, McNemar, and Paired *t* Test tests.

Results: The two groups differed in comparing physiologic risk factors of aspiration ($X^2 = 21.8, P < 0.003$), bacteremia ($X^2 = 4.4, P < 0.03$; RR 2.6), and self-care inability ($X^2 = 11.1, P < 0.01$; RR 21.3). Treatment differences were seen in endotracheal intubation ($X^2 = 20.7, P < 0.00001$), performance of pulmonary exercises ($X^2 = 21, P < 0.002$), respiratory treatments ($X^2 = 22.4, P < 0.0001$), and number of consults ($t = 6.3, P < 0.001$). The outcomes differed. LOS ($t = 3.7, P < 0.001$) was 10.7 days longer and the mortality rate ($X^2 = 6.5, P < 0.01$) was twice that in the NP group.

Conclusion and Nursing Implications: The ICU patients with NP have multiple risk factors associated with higher LOS and mortality rates. The number of consults were higher, the length of hospital stay increased by 60%, and the mortality rate was doubled in the NP group. These risk factors can be monitored and modified by critical care nurses to reduce the incidence and consequences of NP in critically ill patients.

Presenter: Laura L. Feider, CPT, AN
Mentor: Mary McCarthy, RN

Utility of Echocardiography in Asymptomatic Active Duty Service Members with Heart Murmur

Presented by Medical Clinic
Internal Medicine Service, Department of Medicine

Background: Due to frequent screening, the military has a large number of healthy service members found to have heart murmurs. Frequently, they are referred for cardiology consultation and echocardiography. The 1997 American College of Cardiology/American Heart Association (ACC/AHA) echocardiography guidelines have defined murmur characteristics that are thought to predict innocent murmurs and normal echocardiography.

Methods: Our hypothesis was that the ACC/AHA criteria for murmur screening would be validated, that innocent murmurs are predictive of normal echocardiography. Sixty-six consecutive active duty service members referred to cardiology for evaluation of a heart murmur underwent a cardiovascular history, physical exam, electrocardiogram, and echocardiogram. Auscultation was performed by staff cardiologists or third-year cardiology fellows.

Results: The 40 subjects had either a benign flow murmur or a fleeting murmur (was heard by referring provider but not appreciated at the time of cardiology consultation). All of these subjects had normal echocardiograms. Twenty-six subjects had noninnocent murmur by examination. Of these, 7 had abnormalities requiring SBE prophylaxis on echocardiography. There was a strong association between a noninnocent murmur and an abnormal echocardiogram, $P < .002$ (Fisher's exact test). History, general physical exam (other than murmur auscultation), and electrocardiography did not predict abnormal findings on echocardiogram.

Conclusion: If a cardiology staff (or senior fellow) physician determines that a heart murmur in an asymptomatic service member represents a benign flow murmur, the incidence of echocardiographic abnormalities is very low. Confirmation of this data may make echocardiography unnecessary for the majority of the healthy active duty service members with heart murmurs.

Presenter: Eric Shry, CPT, MC
Mentor: Maureen Arendt, MAJ, MC

Keynote Lecture

Bonnie M. Jennings, COL, AN

Colonel Jennings, PhD, now assigned to the Office of The Surgeon General, served at MAMC from 1994-1999, most recently as our Chief Nurse. Colonel Jennings was a Department of Defense representative to the National Advisory Council for Nursing Research from 1991-1995. She is an extraordinary critical thinker, an exceptional research collaborator, and a wonderful teacher. She remains an active clinical investigator who continually finds the time to support the scholarly activity of others, and there are many of us at MAMC who have had the benefit of her famous purple pen. Doctor Jennings is a leading expert in the rapidly evolving field of Outcomes Research. We are most fortunate to have had her give the Keynote address for Madigan Research Day 1999.

Special Award Presentation

Nancy Whitten

Nancy Whitten presented the first annual award for Outstanding Institutional Review Board Member. The first recipient was COL Ted Carter, MC. He was recently named the Chief, Department of Pediatrics.

BG George J. Brown Mentor's Cube Presentation

BG George J. Brown

Madigan Center Research Day celebrates the breadth and depth of scholarly activity performed at MAMC. The basis for this event is the legacy of innovation, discovery, and interdisciplinary collaboration. We give high quality clinical care, while giving our students the capability to provide excellent care in future assignments. And we learn how to give better care and better teaching through our investigational efforts. We are willing to evaluate our performance and use this feedback to continually improve our process. At the core of this enterprise is the mentor.

A mentor is the master communicator who holds your experience up for your inspection, in all of its facets, so that you can see from many angles. A mentor gives the protégé the cube of the shared experience. It is up to the student to build upon that foundation. The Madigan Mentor's Cube was made by COL Casey Jones, DCCS, and named in honor of BG George J. Brown. The first recipient was COL Patrick Kelly.

1999 BG George J. Brown Mentor's Cube Finalists

Nancy Greenfield
William Cahill
Lester Reed
Bonnie Jennings
Romco Perez
Allen Almquist

1999 BG George J. Brown Mentor's Cube Recipient

William Cahill, COL (Ret), MS

Medical Education Research Session

Moderator: Patrick Kelly, COL, MC

Medical Education Research seeks to determine the best method to teach and to instruct in order to optimize learning. How do we take the lead in learning? Curriculum development is only the beginning. How do you impart enthusiasm for lifelong learning in our students? What is the outcome by which we measure our success? MAMC teaches teachers, cultivates mentors, and empowers the investigator to question our educational process. Medical Education Research is truly force amplification by enhancing our future medical readiness.

INFORM - Information for Optimal Data-Based Decision-Making

Presented by Medical Education Research
Department of Nursing Research Service

Overview: MAMC administrative and patient care managers are continually challenged to make decisions effecting productivity, cost, and quality of care. As our Quality Management Program (QMP) decentralizes data acquisition and data-driven decision making, a broad array of MAMC managers are pressed to providing timely answers to complex business and clinical questions. New approaches for collecting, assessing, and presenting data and useful information for decision-making are needed, as our managers are faced with minimal time to research options, an overabundance of data and the necessity to maximize the use of quality data. To address this need, the Research and Development Coordinating Activity (RDCA) recommends a course entitled, ***INFORM - Information for Optimal Data-Based Decision-Making***.

Purpose: The ***INFORM*** course is designed to assist managers from many disciplines in developing core competencies pertaining to data quality and analytical techniques that will underpin solid decision-making to improve MAMC outcomes.

Target Audience: Managers (midlevel and above) will be invited to participate. The QMP directors and other individuals who are expected to brief the EBOD will be highly encouraged to participate.

Format: This course will consist of four, 2-hour classes (Selecting the Right Metric, Planning and Performing the Information Quest, Reporting Useful Information, and Packaging the Presentation). Participants enrolling for the course will be required to attend all four classes. Class size will be limited to a maximum of 12 people. Participants will be given a class syllabus about 2 weeks before each class. Some outside of class work is required. For example, before the first class (***Selecting the Right Metric***), participants will be asked to read some course material and bring to class a management issue to be used to formulate their business question or metric and later their information presentation. Instructors will be available to provide a limited amount of one-on-one support to participants outside of class. Throughout the four classes, participants will use data related to their service area to learn the course content. The classes will be at least 2 weeks apart to allow participants sufficient time to complete pre-class assignments. After the fourth class, participants will have prepared and presented an EBOD quality brief.

Staffing: The RDCA recommends, and the Madigan Consolidated Education (MCED) Director agrees, that the INFORM course be administered through MCED in the same manner as other courses such as the current Health Care Managers Course. The MAMC Staff Development Coordinator will coordinate INFORM course registration, class resources, and rooms. The RDCA will coordinate instructors and course content.

Presenter: Lori A. Loan, RN

Determining Technical Competency for Family Practice Residents in Flexible Sigmoidoscopy

Presented by Medical Education Research
Department of Family Practice

Question: Flexible sigmoidoscopy is a common procedure taught in family practice residencies. Programs document the number of procedures performed, but this may not correlate with competency. Can easily-determined measures of competency in the technical aspects of flexible sigmoidoscopy be identified? Are there patient characteristics that can predict an incomplete exam?

Methods: Over a 30-month period, 421 patients age 14 to 88 who presented for flexible sigmoidoscopy at the family practice clinic of a community hospital had data collected. These included demographics, depth of insertion (cm), time of procedure (min), indications, complications, reason for termination, performance of a biopsy, and patient disposition. Diseases or procedures related to the abdomen or pelvis was recorded. Supervised family practice residents performed the procedures. Data analysis included simple descriptive, *t*-test, linear, and logistic regression.

Results: The mean time for the procedure was 18 ± 9.3 minutes (17.2-19.6, 95% CI). The mean depth of insertion was 51.4 ± 12.6 cm (50.4-52.6 cm, 95% CI). Women who had pelvic surgery showed a decrease in depth of insertion (47 cm vs 53 cm $P=0.002$, *t*-test). Multiple linear regression showed performance of a biopsy predicts time of procedure, controlling for other variables. Logistic regression for depth of insertion showed patients who had a biopsy had increased odds and patients with a history of pelvic surgery had decreased odds of the exam reaching 55 cm, controlling for other variables.

Conclusion: Family practice residents who, on average, achieve a depth of insertion of 50 cm in less than 20 minutes may be considered technically competent in flexible sigmoidoscopy. Residents who frequently perform biopsies or have patients with a history of pelvic surgery may have different averages. Exclusion of these types of patients from data analysis is necessary for an accurate assessment of competency.

Presenter: John R. Holman, CDR, MC, USN
Mentor: Joseph Yetter, COL, MC

The Effects of Thermocouple Sensor Placement on Neonatal Skin Temperature Measurement

Presented by Medical Education Research
Department of Nursing

Purpose: This study was directed toward investigation of the effects of thermocouple sensor placement on skin temperature readings in full term and preterm neonates. Skin temperature probes are commonly used in neonatal units. However, little is known about the influence of probe placement site on accuracy of temperature measurement. Many neonatal units limit probe placement to the torso and over nonbony prominences or two or more probes are used simultaneously to avoid having the infant lie on the probe when his or her position is changed. This descriptive study included 40 infants (20 from MAMC and 20 from Children's Hospital, Seattle) and was designed to objectively evaluate several common nursing practices and beliefs regarding the care of neonates and the placement of temperature probes. The study sought a physiologic basis to support and validate nursing practice.

Hypotheses: (1) There is no difference in the skin temperature readings between probes placed on the abdomen, back, axilla, or

heel of the infant. (2) There is no difference in infant skin temperature readings when the infant is lying-on vs not lying-on the temperature probe.

Methods: Four body sites were studied simultaneously through the use of a small thermocouple sensor and a two-channel continuous readout device. Data were collected for 1 hour with the infant in each of two common positions: supine and prone. Environmental temperature and basic demographic data were also collected for each subject and study period. Descriptive statistics were used to examine differences in temperature readings. Further analysis examined changes in temperature between the four sites and between periods of lying-on vs not lying-on the temperature sensor using ANOVA-RM.

Findings and Conclusions: Data are currently being analyzed and results and conclusions will be ready for presentation prior to MAMC Research Day.

Presenter: Susan E. Chambers, BSN
Mentor: Lori A. Loan, RN

Parental Assessment of Psychologic Adjustment in Children with Asthma: A Comparison of the Child Behavior Checklist (CBCL) and the Behavior Assessment System for Children (BASC)

Presented by Medical Education Research
Department of Developmental Pediatrics

Hypothesis: Behavior rating scales have been utilized in the assessment of children with potential psychosocial and behavior problems, particularly those affected with chronic medical illness. The BASC and CBCL rating scales have been endorsed as having high correlation in similar behavior scales in a normative population of children. However, there have been no studies evaluating correlation between the two in children with chronic illness. We hypothesize that the BASC and CBCL correlate well in an independent study of children with asthma. Furthermore, we suspect that children with asthma have higher levels of psychosocial maladjustment than healthy peers.

Methods: Subjects include 68 children with asthma, 8 to 16 years of age. Parents of the subjects completed BASC and CBCL questionnaires about the subject. The *t* scores indicated level of clinical significance of behaviors endorsed in the questionnaires. Pearson Correlation Coefficient evaluated correlations between the BASC and CBCL in our population of asthmatic children. Chi-square analysis assessed whether there was an increase in clinically significant psychosocial dysfunction in children with asthma. Fisher Exact Test analyzed the frequency of psychosocial difficulties in children with moderate to severe disease compared to those with mild asthma.

Results: Correlations between the BASC and CBCL in our population were similar to those obtained in the normative population. A significantly higher frequency of psychosocial maladjustment by questionnaire was observed in the school age group of children with asthma.

Conclusion: Since the BASC was shown to have good correlation with the CBCL in our population of children with asthma, then it presents an alternative in measurement of behavioral difficulties. As suggested by our findings, children with chronic illness are at greater risk for psychosocial dysfunction than a population of healthy children.

Presenter: Veronica R. Baechler, CPT(P), MC
Mentors: William O. Walker, COL, MC and Patrick C. Kelly, COL, MC

Evaluation of Clinical Standards Implementation at Madigan

Presented by Medical Education Research
Department of Family Practice

Introduction: Clinical standards are authorized and defined statements of minimum levels of acceptable performance or results. Their implementation has received greater emphasis than other practice guidelines. Attitudes, awareness, access, and use are critical factors to address when implementing a program. This survey assesses these factors among primary care providers at Fort Lewis.

Methods: A 32-question confidential survey was distributed to all 201 primary care specialists at Fort Lewis, including family practice, pediatrics, the adult primary care clinic, the emergency department and all active duty clinics. Reminders were delivered via CHCS. Data were analyzed with SPSS using descriptive statistics, chi-square, linear, and logistic regression.

Results: The response rate was 72% (144/201). Eighty-eight percent were aware of clinical standards. Eighty-nine percent felt clinical standards improved patient care. Sixty-three percent listed CHCS as an access point for clinical standards even though CHCS does not contain them. Ninety-three percent support further development. Over one-third access the standards at least weekly. Access barriers included the inability to access during clinic (66%) and not having a PC in their office (53%). Easier access to standards while seeing patients (81%) is a key to improved use. Regression analysis showed that older providers and female providers were less likely to have viewed or used the standards. Increasing time at Fort Lewis was associated with increased use and better regard for the standards.

Discussion: Primary care providers had an overall positive attitude towards clinical standards. However, they seemed to confuse them with other practice guidelines. Providers are incorporating clinical standards into their practice. Older providers may have established clinical scripts and be reluctant to change. Women reviewed and used the standards less than men. This survey provides information for implementing clinical standards programs. Since attitudes appear favorable, improvement efforts should focus on awareness and access.

Presenter: Brian Harrington, MAJ, MC
Mentor: Joseph Yetter, COL, MC

Experimental Design Session

Moderator: Katherine H. Moore, PhD

The category of "Experimental Design" encompasses basic science projects. This type of research typically will investigate a fundamental principle of cell biology or physiology, and is the easiest in which to appreciate the values of hypothesis, objective, and experimental design. The importance of adherence to these values becomes clear in the ethical imperatives of clinical research. These ethical imperatives involve protection of research subjects, whether animal or human. Above all, rigorous experimental design facilitates the search for truth, aiding investigators in avoiding fatal flaws. These flaws may remain unrecognized and could lead to false conclusions. We have seen in the papers already presented today that the importance of a hypothesis, objective, and good experimental design is consistent throughout any research, including approach to managed care, military unique research, and medical education.

The range of topics and experimental models that was presented last year was impressive. At least two of the studies have been published, one in *Cancer*, the other in *Urologic Oncology*. Many of the others have been presented at national and international meetings.

The papers being presented today are equally impressive. One was truly a collaborative effort involving sample collection in the Antarctic, three were primarily performed in the DCI laboratories and animal care facility, and two were performed in the patient care arena. All project the creativity present within the Madigan staff.

Some may view basic science research projects as less important or necessary in a setting such as Madigan compared to other

types of research. However, another view is that basic science projects and the disciplined approach necessary for their success are a critical step in the training of physicians and nurses who then proceed to complete other projects and become the mentors for the next generation. The principles of study design, execution, and data analysis that are learned in a laboratory or carefully designed project utilizing human or animal subjects are relevant to the success of any research project. As in industry, in medicine, the time lag between an idea being in the realm of basic science and practical application is becoming much shorter. I would not be surprised to find that some of the ideas presented in today's Experimental Design section will soon be applied to patient care. In many ways, researchers at Madigan are at the front of the wave that is leading the pathway of change in medicine.

Changing Thyroid Hormone Status and Cognitive and Mood Alterations During Prolonged Antarctic Residence: Effect of Thyroxine Supplementation in the Polar T3 Syndrome

Presented by Experimental Section
Internal Medicine Service, Department of Medicine

Introduction: Humans who live in Antarctica for greater than 4 months develop changes in their hypothalamic-pituitary-thyroid-tissue axis known as the Polar T3 Syndrome. To further test the functional relevance of the biochemical changes in thyroid hormone economy in this syndrome, we followed cognitive and mood alterations with serum measures of thyroid hormones before, monthly, and at the completion of 11 months Antarctic Residence (AR) of 12 euthyroid subjects using a double blind placebo control study design.

Methods: All subjects took placebo for the initial 5 months (Period 1) then during remaining 6 months (Period 2), subjects were randomized into a Levothyroxine (LT4) treated group (T4G) and a Placebo Group (PG). Computerized matching-to-sample (M-to-T) testing measured working memory and attention while Profile of Mood States testing and Epidemiological Depressive-Scale measured mood.

Results: Serum FT4 declined from baseline by a mean of - 4.72% ($P<0.017$) in the PG and increase by +7.6% ($P<0.02$) in the T4G. FT3 declined in both group by -3.67% ($P<0.02$). Serum TSH in the PG changed over the study in a sine distribution ($P<0.01$) with peaks in November and July. There was a decline of -13% ($P<0.026$) in M-to-T scores at the end of Period 1, and with LT4 during Period 2, the cognitive function of T4G returned to +3.16% of the baseline score while the PG remained -11.1% below baseline ($P<0.01$). The T4G reported less fatigue ($P<0.01$) and confusion ($P<0.05$) compared with the PG. Increased serum TSH preceded high scores for depression, anxiety, anger, lack of vigor, and mood disturbance ($P<0.001$) during the austral winter of Period 2. Decreased FT3 preceded high scores for fatigue and confusion ($P<0.05$) during Period 2.

Conclusion: Prolonged AR is associated with declines in cognitive performance and mood which are improved with supplemental thyroxine compared with placebo treatment.

Presenter: Nhan Van Do, CPT, MC
Mentor: Lester H. Reed, COL, MC

The Effect of Preoperative Administration of Ketorolac on Postoperative Bleeding in Anterior Cruciate Ligament Repair

Presented by Experimental Section
Department of Nursing

The use of ketorolac as a preemptive analgesic has been limited in the preoperative setting due to its potential effects on hemostasis. This study is designed to evaluate the effect of a single dose of preoperative ketorolac on platelet function and measured blood loss in subjects undergoing anterior cruciate ligament reconstruction. The sample will consist of 34 patients between the ages of 18 and 65 who have no contraindications for the administration of nonsteroidal anti-inflammatory agents. Subjects will be randomized to an experimental group that will receive 30 mg of ketorolac preoperatively or a control group that will receive an

equal volume of 0.9% normal saline. Platelet aggregation tests will be drawn prior to the administration of the drug or placebo and then again 45 minutes later after the incision has been made. Total postoperative blood loss will be measured in milliliters by a hemovac drain. The results of this study could further the use of ketorolac in this population as a pre-emptive analgesic.

Presenters: Angela Quintanilla, CPT, AN and Anne M. Silvasy, CPT, AN
Mentor: Howard Burnett, LTC, AN

The Association Between Telomerase, p53, and Clinical Staging in Colorectal Cancer

Presented by Experimental Section
Department of General Surgery Service

Background: The p53 mutations are a proposed etiology of tumor activation while telomerase may serve as a key enzyme for maintenance of tumor cell proliferation.

Methods: Telomerase activity levels were measured in colorectal adenocarcinomas and corresponding normal tissue using a modified telomeric repeat amplification protocol, and identified p53 mutations using immunohistochemical staining. Results were compared with staging data using regression analysis.

Results: Telomerase activity was present in 23/23 (100%) of the tumors and only two (9%) of normal specimens ($P < 0.0001$). The p53 mutations were present in 18/23 (78%) of the tumors. No significant correlation between p53 mutations, telomerase activity levels, and staging was found.

Conclusions: Telomerase activity in 100% of the tumors suggests telomerase activation is a universal event in colorectal tumor progression, however, telomerase activity appears to be independent of p53 mutations and clinical staging.

Presenter: Tommy Brown, CPT, MC
Mentor: Wade Aldous, CPT, MS

The Effects of Mitomycin-C on Airway Wound Healing After Laryngotracheoplasty and Stenting in a Pig Model

Presented by Experimental Section
Orthopedic Surgery Service, Department of Surgery

Objective: To assess the effects of mitomycin-C (MTC), a potent fibroblast inhibitor, on airway wound healing after augmentative reconstructive procedures and stenting.

Design: A prospective, blinded, randomized controlled animal study.

Subjects: Eighteen domestic pigs (*Sus scrofula*), divided into 6 groups of 3 animals each.

Interventions: Each animal underwent single-stage laryngotracheoplasty (SS-LTP) with auricular cartilage grafting and stenting. Group 1 and 2 animals were sacrificed on postoperative day 3 and 7, respectively. Group 3 and 4 animals underwent endoscopy on postoperative day 7 with stent removal and application of MTC or placebo (normal saline) at the grafted site. Group 3 animals were sacrificed on postoperative day 14, and group 4 animals on postoperative day 21. Segments of reconstructed airway were evaluated grossly and histologically for all animals.

Main Outcome Measures: Healing, re-epithelization, graft incorporation, and airway diameter.

Results: Two-thirds of the animals demonstrated some degree of stent collapse on endoscopy. Graft site infection occurred in 50% of animals, with a trend towards resolution at 21 days postoperatively. Granulation tissue formation was seen in all animals, and

resolved with stent removal. The MTC did not affect the acute inflammatory response, nor re-epithelization of the graft site. Airway diameter was smaller overall in the treated animals; however, they demonstrated better incorporation of the graft with fibrocartilage proliferation of the graft. Untreated animals demonstrated liquefactive necrosis of the graft.

Conclusions: The MTC seems to prevent the liquefactive necrosis of SS-LTP grafts, allowing for improved graft incorporation. While the airway diameter was smaller in the treated animals, this may reflect improved structural integrity seen with better graft incorporation. The MTC did not seem to affect the acute inflammatory response to SS-LTP or stenting, nor did it affect the re-epithelization of the graft site. Further studies are needed to assess the effects of MTC on long-term healing and stenosis following SS-LTP.

Presenter: George Coppit, CPT, MC
Mentors: Jonathan Perkins, MAJ, MC and Andrew B. Silva, MAJ, MC

The Expression of Adrenomedullin and Its Receptor in the Human Placenta

Presented by Experimental Section
Maternal-Fetal Medicine, Department of Obstetrics/Gynecology

Objective: Our purpose was to identify the presence of adrenomedullin protein ribonucleic acid (RNA) and adrenomedullin receptor RNA in the various tissues of the human placenta and to assess semi-quantitatively the degree to which these components are expressed.

Study Design: We obtained tissue samples from five placentas of women with uncomplicated pregnancies and two placentas of women with oligohydramnios. Five grams each of placental amnion, chorion, cotyledon, umbilical vein, and umbilical artery were dissected, isolated, and frozen. Total RNA was extracted and the concentration and quality of RNA assessed using spectrophotometry.

A polymerase chain reaction was developed using a cell line known to be positive for adrenomedullin and its receptor. Total RNA was isolated from this cell line and used as a positive control in all experiments. The b-2 microglobulin, a ubiquitously expressed mRNA served as control for the integrity of RNA isolated from the placental tissues.

Adrenomedullin was detected using primer sets with a predicted product of 291 base pairs. A nested probe was used to detect the specific adrenomedullin product. For adrenomedullin receptor amplification, a rat primer was used yielding a 471 base pair product. An antisense primer was used to make cDNA from the RNA template for both adrenomedullin and its receptor. Polymerase chain reaction products were analyzed using electrophoresis with 2% agarose gels then transferred onto nylon filters. Southern blot analysis was then performed using ³²P-labeled oligonucleotide probes. Immunocytochemistry using an antibody to human adrenomedullin was used to identify the presence of adrenomedullin in tissues where adrenomedullin was found by PCR. Tissue sections were stained with antibody against adrenomedullin, using an avidin-biotin-peroxidase complex technique.

Results: With the use of PCR and Southern blot analysis, adrenomedullin RNA and adrenomedullin receptor RNA were identified in various placental tissues.

Conclusion: The demonstration of adrenomedullin and its receptor in the various tissue components of the placenta suggest that the placenta may function as an autoregulatory organ, producing adrenomedullin locally to affect local paracrine and autocrine vasoactive changes.

Presenter: Christina C. Apodaca, MAJ, MC
Mentor: Byron Calhoun, Lt Col, MC, USAF

Effect of Tricuspid Regurgitation on the Accuracy of Pulse Oximetry

Presented by Experimental Section
Department of Medicine

Introduction: Tricuspid valve regurgitation (TR) has been reported to decrease the accuracy of pulse oximetry in one study comparing patients with severe TR and patients without TR (Stewart and Rowbottom, *Anesthesia* 1991; 46:668-670). The TR may complicate cardiac failure and cor pulmonale in patients in whom monitoring with pulse oximeter oxygen saturation (SpO₂) is desirable. We sought to confirm the effect of severe TR on the accuracy of SpO₂ compared to the oxygen saturation as determined by co-oximetry (SaO₂) of arterial blood and to determine whether intermediate degrees of TR explain significant variability between SaO₂ and the SpO₂.

Methods: Patients were grouped according to echocardiographic degree of TR: none; mild; moderate; moderate to severe; and severe. We obtained arterial blood by radial artery needle puncture while simultaneous measurement and graphing of the percent (%) SpO₂ by pulse oximetry was obtained (Marquette Transscope 12 system).

Results: Mean data:

Degree of TR	%SaO ₂	%SpO ₂	%SaO ₂ - %SpO ₂
None	96.9	97.0	-0.1
Mild	96.8	97.1	-0.3
Moderate	96.0	97.0	-0.98
Moderate-Severe	96.9	98.9	-2.0
Severe	96.5	98.3	-1.83

The maximum difference between means is 1.9%.

Conclusion: These data confirm a small error in SpO₂ associated with TR. Our findings suggest that as TR becomes more severe, pulse oximetry over-estimates the oxygen saturation of arterial blood and refute the findings of Stewart and Rowbottom.

Presenter: Michael W. Quinn, CPT, MC
Mentor: Thomas A. Dillard, COL, MC

Case Report Session

Moderator: Romeo Perez, COL, MC

Science and medicine depend on communication, especially written communication from one scholar to another, to transmit observations, conclusions, interpretations, and speculations. The peer-review system has developed over the last 300 years as the principal form of this communication. The critical importance of the timely observation, thoughtfully researched, and carefully presented for review by one's peers remains the keystone for most of the advances in clinical investigation and clinical practice. It is through these little discoveries that a specific hypothesis can be formulated and tested in well-designed clinical studies. New diagnostic methods and therapies are validated through clinical trials. The series of presentations in this segment of the program will focus on brief descriptions of cases of a particular condition that are both unusual and provide new insight into diagnosis and/or management. A brief review of pertinent literature and appropriate management implications are included.

Incidence of Adrenal Tumors in the Ferret Colony

Presented by Clinical Research
Department of Clinical Investigation

Pediatric advanced life support is an essential training program for Madigan Army Medical Center personnel. An in-vivo

pediatric model for intubation provides medical personnel hands on training to enhance their skills. Adult ferrets offer the ideal model for pediatric intubation. The airway of a neonate is very similar to that of the adult ferret, which provides realistic training. The ferret colony has now been maintained for 5 years, with some of the animals reaching older ages. Over the past year, a reoccurring problem and growing concern is adrenal disease in our geriatric ferrets. Ferrets with adrenal disease may have a suppressed immune system, making them more susceptible to microbial infections, as well as other healthcare problems.

The underlying cause of adrenal tumors in ferrets is unknown. Various etiological factors have been implicated including: premature neutering, diet, the lack of exposure to natural photoperiods, and genetics. Clinical signs vary for each ferret. One of the most significant findings in our colony was symmetrical alopecia.

Diagnosis of adrenal disease can be made based on physical examination findings. Routine blood work in ferrets with diseased adrenal glands are usually unremarkable, occasionally a complete blood count may reveal regenerative or nonregenerative anemia and an elevated alanine aminotransferase. Ultrasonography can be a highly reliable technique for diagnosing adrenal disease in ferrets. It can show the measurements and location of the adrenal gland. Width greater than 3 mm is correlated with adrenal disease, although length does not seem to be a factor. The adrenocorticotropic hormone stimulation test and dexamethasone suppression test are useful in other mammals but not diagnosing adrenal disease in ferrets. Measurements of certain plasma steroids may be a reliable means of diagnosis. Exploratory laparotomy is an extremely useful tool for diagnosing adrenal disease, and provides curative solution with a diseased adrenal gland. Examination of the tissue by a pathologist is the only definitive diagnoses of adrenal disease in ferrets.

Samples from our colony showed that the plasma steroid tests may be specific but not sensitive for early diagnoses. Evaluation of the assays showed that they were valid for measurement of steroids in ferret plasma, but the steroid hormones in our animals (three affected animals vs five young unaffected animals) were below the level of detection of the tests. Tissue samples were taken from the three affected animals and sent to Armed Forces Institute of Veterinary Pathology confirming adrenal disease.

The facilities at the Department of Clinical Investigation's Laboratory Animal Resources Service ensure the highest quality veterinary care for all laboratory animals. The veterinarian and animal technicians play a vital role of maintaining the health and well-being of the ferret colony housed in the Department of Clinical Investigation.

Presenter: Sandra Fogelman 91T, SPC(P)
Mentor: S.F. Felt, CPT,VC (1st Special Forces Group)

Unilateral Congenital Lymphedema Associated with Intestinal Lymphangiectasia, Elevated Liver Transaminases, and Hypopigmentation

Presented by Clinical Research
Department of Pediatrics

We report on a 16-year-old Filipino female with an unusual presentation of congenital lymphedema. The patient was noted at birth to have right facial puffiness that has persisted. She was later noted to have hypopigmented patches and increased circumference of her right extremities. Liver transaminases were persistently elevated at age 15 years. Serum bilirubin, alkaline phosphatase, copper, ceruloplasmin, and iron studies were normal. Evaluation for infectious causes of her hepatitis was negative. Past medical history was significant only for a single, brief generalized seizure at age 10 years. Growth parameters, development, and academic achievement were normal. Family history was significant for a maternal aunt with hypopigmented patches and several relatives with premature graying of the hair. There were no relatives with lymphedema, autoimmune disorders, or liver disease. Physical examination revealed right facial fullness but no dysmorphic features. There was pretibial pitting edema on the right, along with mild pitting and ridging of the nails. Right upper and lower extremity circumferences were increased compared to the left. There was no limb length discrepancy. Multiple ½ to 1 cm areas of hypopigmentation were noted on the extremities, right greater than left. She had scattered coarse, white hairs. Extremity radiographs showed increased reticulation in the subcutaneous fat on the right. Abdominal MRI showed right superficial femoral vein ectasia and focal dilatation of the distal right saphenous vein. MRI of the extremities showed asymmetry of subcutaneous fat laterally and anteriorly on the right. Liver needle biopsy showed

mild, nonspecific portal and focal lobular chronic inflammatory changes. Duodenal biopsy showed marked lamina propria lymphangiectasia, consistent with congenital lymphedema. The constellation of findings in this patient, lymphedema, intestinal lymphangiectasia, elevated liver transaminases, patchy hypopigmentation, and coarse, white hairs, has not been described in the English literature and may represent a new syndrome.

Presenter: William M. Campbell, LTC, MC
Mentor: Laura Martin, MD

Pseudo-Dissection of the Main Pulmonary Artery on Computed Tomography (CT)

Presented by Clinical Research
Department of Radiology

Objective: To evaluate the main pulmonary artery on helical contrast enhanced chest CT for an artifact that could be readily mistaken for a pulmonary artery dissection.

Materials and Methods: Following presentation of two index cases with findings suggestive of pulmonary artery dissection, 102 consecutive, contrast enhanced, helically acquired chest CT exams were evaluated retrospectively for similar artifacts. All studies were performed on a GE helical CT scanner. Indications for these studies were cancer staging or follow up, (n= 45); evaluation of mass or adenopathy, (n=27); infection/inflammatory, (n=9), trauma, (n= 5); and miscellaneous (n=16). The main pulmonary artery was evaluated and abnormalities within the main pulmonary artery were characterized.

Results: Six of 102 (6%) helical chest CT studies exhibited artifacts with potential to represent a pulmonary artery dissection. These six cases were less worrisome than the two index cases, and were not prospectively identified. The most common location of this artifact was the left lateral main pulmonary outflow tract, and was noted on multiple (2 to 4) contiguous CT images. An additional 32 of 102 (32 %) demonstrated abnormalities within the pulmonary artery which were clearly artifactual. These artifacts are characterized.

Conclusion: Artifacts within the main pulmonary artery are more common than previously reported. Pseudo-dissection of the pulmonary artery is a previously unrecognized artifact, and is related to wall motion of the main pulmonary artery. Knowledge of this pseudo-dissection and other common artifacts may avert further invasive and noninvasive diagnostic studies.

Presenter: Adam Benson, CPT, MC
Mentor: Sean P. Murray, MAJ, MC

Pilomatrixoma of the Head and Neck

Presented by Clinical Research
Head and Neck Surgery Service, Department of Otolaryngology

Background: Pilomatrixoma is a benign, usually asymptomatic neoplasm arising from the hair follicle matrix cells and often involves the head and neck area. The purpose of this paper is to describe our experience with patients treated for a pilomatrixoma during the past 5 years, and to compare these findings with previously reported results.

Methods: A 5-year retrospective chart review was conducted to identify those patients treated for a histologically confirmed pilomatrixoma involving the head and neck region. Medical records were examined for presenting signs and symptoms, lesion characteristics, and outcome of treatment rendered to these patients.

Results: The medical record review identified 56 patients with a histologically confirmed pilomatrixoma. Of these, 26 patients (46%) with a mean age of 32.7 years were ultimately included in the study. All patients were treated for solitary tumors by simple surgical excision and closure. There were no reported adverse outcomes and no recurrences of neoplasm at the surgical sites.

Conclusion: Our results support simple surgical excision and primary closure as the treatment of choice for these tumors.

Presenter: Richard W. Thomas, MAJ, MC
Mentor: Jonathan A. Perkins, MAJ, MC

Findings of Fibular Hemimelia Syndrome with Radiographically Normal Fibulae

Presented by Clinical Research
Orthopedic Surgery Service, Department of Surgery

Purpose of Study: Fibular hemimelia is the most common cause of limb deficiency in the lower extremity. The syndrome consists of variable degrees of fibular hypoplasia as well as other associated findings, including limb shortening, absent lateral rays of the foot, ball and socket ankle joint, tarsal coalition, hypoplasia of the lateral femoral condyle with knee valgus, tibial spine hypoplasia and cruciate ligament instability. We have noted a number of patients with features of the fibular hemimelia syndrome, but with radiographically normal fibulae. This study was undertaken to further define this group.

Methods and Materials: A retrospective and prospective review of the hospital records and radiographs of all limb deficiency patients at the Shriner's Hospital for Children, Spokane Unit, over a 72-year period, 1925-1997, was conducted.

Results: We identified 16 limbs in 14 patients with findings of fibular hemimelia syndrome with radiographically normal fibulae, out of 149 limbs in 95 patients with features of fibular hemimelia. Thirteen of 16 had absent lateral rays with either ball and socket ankle joint, tarsal coalition or both. Of these 13, six had limb shortening of at least 4%. Five of the 13 were in patients with bilateral involvement, so shortening could not be assessed. The other two did not have adequate information to determine limb shortening. Five of the 13 had knee valgus (38%), 4 had hypoplastic tibial spines (31%), 3 had cruciate instability (23%), and 3 had clubfeet (23%). Three limbs in 3 patients did not have absent lateral rays, but had at least 2 other features of fibular hemimelia syndrome. All had ball and socket ankles and tarsal coalitions. Two had shortening of 4%, and the other had bilateral involvement. Two also had fusion of the 4th and 5th rays.

Conclusion: We feel that these patients represent a mild subset of fibular hemimelia syndrome, and propose that they be classified as Type 0 fibular hemimelia. These 16 limbs comprised 11% of our total fibular hemimelia population, and constitute a previously undescribed group of mild fibular hemimelia syndrome.

Presenter: Clark P. Searle, CPT, MC
Mentors: Dr Paul Caskey and Craig Ono, LTC, MC

The following presentations were included in the concurrent Poster Session

Refractive Changes Following LASIK Corneal Surgery

Purpose: To observe changes in corneal shape, thickness, and visual acuity that may take place in patients whose corneas are exposed to hypoxia following laser in situ keratomileusis (LASIK) corneal surgery.

Methods and Materials: Twenty LASIK patients and 20 myopic control patients were exposed to ocular surface hypoxia in one eye by filtering humidified, compressed 100% nitrogen (0% oxygen) through an air-tight goggle system at sea level for 2 hours. The other eye was exposed to humidified, compressed air (21% oxygen) simultaneously through the air-tight goggle system. Video keratography, cycloplegic refraction, and pachymetry were evaluated using repeated measures analysis of variance.

Results: There was no significant change in corneal topography or cycloplegic refraction in either the myopic control group or the LASIK group after 2 hours exposure to hypoxia. There was a significant increase in central corneal thickness in both control and LASIK eyes exposed to hypoxia, and no change in eyes exposed to compressed air.

Conclusions: These results suggest that corneal hypoxia does not cause significant refractive changes in LASIK patients, unlike patients who have had radial keratometry corneal surgery. This has important implications for refractive surgery patients who perform activities at high-altitudes.

Presenter: Mark L. Nelson, MAJ, MC
Mentor: Thomas Mader, COL, MC

Atypical Hyperplasia in the Era of Stereotactic Core Needle Biopsy

Presented by Poster Section
Department of General Surgery Service

Objective: To characterize both atypical hyperplasia (AH) and the malignancies typically present at open surgical biopsy in women diagnosed with AH by stereotactic core needle biopsy (SCNB).

Methods: Patients with AH diagnosed by SCNB were advised to undergo surgical biopsy to rule out an associated malignancy. Mammography findings, pathology reports, and follow-up data were analyzed.

Results: The AH was identified by SCNB in 38 of 893 (4.3%) patients. Carcinoma was identified in 12 of 33 (36.4%) patients who went on to surgical biopsy. Ductal carcinoma in situ was present in 11 of the 12 patients with malignancy. There were no characteristic mammographic findings which would identify patients with carcinoma.

Conclusions: When SCNB returns a diagnosis of AH there is a substantial risk of an associated malignancy in the breast. There appear to be no definitive criteria to distinguish which patients harbor a malignancy, and surgical biopsy should always serve as an adjunct diagnostic procedure.

Presenter: Tommy Brown, CPT, MC
Mentor: William Williard, LTC, MC

Prolonged Chest Discomfort Associated with Concomitant Use of Lisinopril and Fluvastatin

Presented by Poster Section
Department of Pharmacy

Adverse reactions associated with lisinopril include chest discomfort, myocardial infarction, angina, joint pain, and shoulder pain. These reactions have been reported to occur in less than 1% of patients being treated with lisinopril. Patients taking fluvastatin have reported back and muscle pain. Documentation comparing the incidence of such adverse reactions attributed to the concomitant use of lisinopril and fluvastatin with either agent alone is not available. However, the authors have identified several cases in which patients being treated with both agents presented with the primary complaint of prolonged chest discomfort, shoulder pain, back pain, and/or angina. In these cases, myocardial infarction was ruled out based on the lack of ECG changes consistent with ischemia or necrosis and the absence of elevated cardiac enzymes. The reported chest discomfort, pain, or angina resolved upon discontinuation of lisinopril, fluvastatin, or both agents. A retrospective evaluation is proposed to identify the relationship between the concomitant use of these agents and the occurrence of prolonged chest pain, shoulder pain, and/or angina.

Presenter: Ricardo Nannini, CPT, MS
Mentor: Dennis R. Beaudoin, LTC(P), MS

Diffuse Fungal Myositis: Diagnosis, Treatment, and the Clinical Utility of Tagged White Blood Cell Scans

Presented by Poster Section
Internal Medicine Service, Department of Medicine

Learning Objectives: (1) Diagnose diffuse fungal myositis. (2) Assess treatment success using clinical and radiographic data.

(3) Recognize the clinical utility and limitations of tagged white blood cell scans.

Case: An otherwise healthy 36-year-old man was diagnosed with acute myelogenous leukemia and underwent induction chemotherapy. As anticipated, he became neutropenic and subsequently developed fevers. He was initially treated with broad spectrum antibiotics and clinically improved. Vancomycin and later amphotericin B were added when he became febrile again. Blood cultures revealed a yeast and *S. hemolyticus*. The patient developed a diffuse, papular, nonblanching rash and complained of muscle pain and weakness in his extremities. On exam he was areflexic and had diffusely decreased strength. A few days later, the patient experienced respiratory failure and circulatory collapse requiring transfer to the intensive care unit where he was intubated and treated with vasopressors. He continued to be febrile and demonstrate septic hemodynamic parameters, which prompted an aggressive search for an infectious foci. An abdominal computed tomography was unrevealing. An indium labeled leukocyte study demonstrated diffuse uptake of both upper and lower extremities. This was consistent with either leukemic infiltration of skeletal muscle or a diffuse infectious myositis. Excisional biopsy of the posterior gastrocnemius demonstrated numerous budding yeasts and yeast in chains on special stains. No leukemic infiltrates were identified. Culture of fine needle aspirate of the muscle grew only *S. hemolyticus*. The patient was treated with vancomycin, amphotericin B, and fluconazole for an infectious myositis. A repeat indium labeled leukocyte scan was performed after 14 days of antimicrobial therapy and showed partial resolution. A third scan showed resolution of the fungal myositis.

Discussion: Diffuse fungal myositis has been reported in the literature a few times. However, none of these patients survived and only one was diagnosed ante-mortum. The diagnosis of diffuse fungal myositis should be considered in neutropenic patients who present with the triad of diffuse myalgias, fever, and rash. Either positive blood cultures or characteristic muscle biopsies may confirm the diagnosis. The dilemma of how to determine if the infection has cleared so that chemotherapy may be resumed has not been addressed in the literature. We propose that a tagged white blood cell scan may be a helpful, less invasive method than repeat muscle biopsy of determining clearance of infectious myositis.

Presenter: Jennifer E. Jorgensen, CPT, MC
Mentor: Joseph T. Morris III, LTC, MC

Cost Consequences of Implementation of an Early Obstetrical Discharge Program in a Military Teaching Hospital

Presented by Poster Section
Department of Obstetrics/Gynecology

Objective: To evaluate the cost consequence of a voluntary early obstetrical discharge program in a military teaching hospital.

Methods: The study involved a control group of routine obstetrical discharge patients with uncomplicated vaginal delivery from 1 Mar - 31 Aug 94 and the study group of early obstetrical discharge (24-48 hours) patients with uncomplicated vaginal delivery from 1 Mar - 31 Aug 96.

Results: There were 1,042 total control patients with routine vaginal delivery from 1 Mar - 31 Aug 94 totaling 2,668 hospital days with a mean number of hospital days of 2.56 per patient. The study group of early obstetrical discharge patients from 1 Mar - 31 Aug 96 with uncomplicated vaginal delivery encompassed 1,050 patients with 1,965 hospital days with mean hospital days of 1.87 per patient. The total cost of admissions (cost calculation of \$1,221/hospital day) fell from \$3,257,628 in the routine discharge group to \$2,399,625 in the early discharge cohort showing a total cost savings of \$858,003 over the 6 months study period. The average cost per obstetrical admission for routine vaginal delivery fell from \$3,126/day to \$2,285/day without an increase in the postpartum pediatric or maternal adverse outcomes.

Conclusion: A early obstetrical discharge program at a military teaching hospital showed significant cost savings without concomitant increase in pediatric or maternal adverse outcomes.

Presenter: Christine Kovac, CPT, MC
Mentor: Byron C. Calhoun, Lt Col, MC, USAF

Factors Associated with Hospitalization in Kidney Transplant Patients

Presented by Poster Section
Department of Nursing, Nursing Research Service

Rehospitalization following kidney transplant (TX) surgery is a recurrent and costly event that detracts from the ultimate aims of the intervention. The purposes of this study were to: (1) estimate the rate of rehospitalization during the 90 days following surgery; (2) identify reasons for readmission; (3) identify patient factors associated with the likelihood of rehospitalization. Using a retrospective cohort design, data were abstracted from a consecutive series of 300 patients (mean age = 46.9 yrs \pm SD = 12.59) who received kidney TXs between Mar 95 and Feb 97. Twenty-two demographic and clinical factors were examined for their relationship to rehospitalization. The median length of initial hospital stay (ILOS) was 9 days (IQR = 7-15). Among the 300 patients, 161 patients (53.7%) were readmitted. The cohort experienced a total of 267 readmissions during the study period. Readmissions were primarily for infection (28.8%); acute rejection (27.3%); perinephric/ureteral problems (13%); and fluid and electrolyte imbalances (8%). The ILOS was longer for recipients of kidneys, 60 years vs kidneys < 60 years old: median = 14 vs 9 days, respectively, ($P < .001$). Patients with delayed graft function (DGF) also had significantly longer ILOS vs those without: median = 17 vs 8 days, respectively ($P < .0001$). Eleven of 22 patient-specific factors, significant in univariate logistic regression, were analyzed in a multivariate logistic regression model. Donor Age (OR 1.2, $P = .025$) and DGF (OR 2.53, $P = .008$) were significantly associated with the likelihood of rehospitalization. Charlson comorbidity score, donor/recipient cytomegalovirus status, HLA-mismatch, donor source, immuno-suppression, technical complications, ILOS, discharge disposition, and location of residence were not sufficiently associated with readmission to enter the model in the presence of donor age and DGF. Further research is needed to identify patient and treatment factors associated with readmission during the early post-transplant period, though findings suggest that the relation of donor age and DGF to readmission continue to be investigated.

Presenter: Laura R. Brosch, LTC, AN
Mentor: Bonnie Jennings, COL, AN

Metastatic Crohn's Disease: Case Report and Literature Review

Presented by Poster Section
Otolaryngology Service, Department of Surgery

Objective: Crohn's disease is a granulomatous inflammatory bowel disease with pathological findings of noncontiguous chronic inflammation along with noncaseating granulomas. Even though any segment of the gastrointestinal tract can be involved, it is uncommon to find it elsewhere. In this article, we present a case of extraintestinal Crohn's disease with quiescent involvement of the lower gastrointestinal tract but flood involvement of the nasal cavity, supraglottic structures, and skin.

Methods: A 45-year-old black male with known Crohn's disease, presented for evaluation of nasal obstruction. Physical examination revealed bilateral anterior nasal stenosis. Between 1985 and 1997, in conjunction with aggressive medical management, the patient underwent laser procedures to correct this stenosis. None of these procedures were curative, but in combination with intensive medical therapy, the frequency of surgical therapy was decreased. Follow-up visits demonstrated progressive hoarseness and physical examination revealed erythema and granulation tissue involving his supraglottic structures along with nonhealing ulcerations of the scalp.

Results: A carbon dioxide laser was utilized to open the nasal passages by removing scar tissue. Direct laryngoscopy revealed edematous tissue with areas of granulation involving the false vocal folds and epiglottis. Histologically, this was Crohn's disease; postoperatively, his 6-mercaptopurine was increased twofold. The patient is still with disease but has noted improvement in his nasal airway over the past 11 months and only recently is experiencing nasal symptoms. The skin lesions are quiescent with pigmental changes remaining. Laryngeal examination reveals no change in the extent of supraglottic edema and erythema.

Conclusion: This case is unusual in that the disease process failed the standard medical management of systemic and topical steroids along with 6-mercaptopurine. With surgical intervention this process was slowed, but it remains a difficult management problem. This aggressive manifestation of Crohn's disease, which can be classified as metastatic Crohn's disease due to its intestinal and extraintestinal involvement, demonstrates the need to be aware of the existence of the disease and the requirement to be proactive in the management of these patients.

Presenter: Keith M. Ulnick, LCDR, MC, USN

Prevention of Unintended Pregnancy in Female Soldiers

Presented by Poster Section
Department of Family Practice

Objective: A comprehensive program to decrease unintended pregnancy was implemented at a large military installation.

Case: Fifty percent of pregnancies in female soldiers presenting for prenatal care are unintended. To decrease unintended pregnancies, we instituted a program incorporating an educational intervention and enhanced access to reproductive healthcare. Participants are encouraged to explore their attitudes on contraception and to assume responsibility for their reproductive lives. The intervention will reach approximately 1,000 women annually. Life table analysis will be used to measure program efficacy.

Discussion: There are no reports in the literature of interventions to decrease unintended pregnancy in military women. The program presented here addresses the five core goals of the Institute of Medicine Committee on Unintended Pregnancy: (1) reproductive health education; (2) increased access to contraception; (3) consideration of the role that feelings and attitudes play in contraception; (4) systematic program evaluation; and (5) stimulation of research.

Conclusion: This program represents the most comprehensive initiative to date with the objective of decreasing unintended pregnancy in female soldiers. If effective, it will have far-reaching implications for enhancing the quality of life of military families and for the prevention of unintended pregnancy in other populations.

Presenter: Diane M. Flynn, LTC, MC
Mentors: Roderick F. Hume, COL, MC and Michael McCaffery, COL, MC

Genetic Paradigm as Best Business Practice Model for Inherited Breast Cancer Susceptibility Testing: The Region 11 Demonstration Project Experience

Presented by Poster Section
Department of Obstetrics/Gynecology

Summary Description: The Region 11 Demonstration Project has provided the platform to experience and understand the complexities of implementing a genetic paradigm for testing individuals for inherited breast cancer susceptibility genes and offer the basis of our proposed best business practice model.

Purpose: Develop best business practice for offering pedigree analysis, genetic counseling, and genetic testing to a population of men and women at risk for inherited breast and ovarian cancer. Evaluate the molecular genetic laboratory services.

Setting: A Military Medical Center, with referrals from regional MTF's in Region 11.

Methodology: Due to the complexity of genetics testing, many of our efforts have necessarily been under protocol (No. 97047). Clinical Pathway and the Counseling Program were presented last year. Since then, we have adopted a process action committee team under the leadership of the Northwest Lead Agent. The Director, Medical Genetics at MAMC, remains the Genetic Consultant, while the Chief, Department of Clinical Investigation, provides additional oversight for this project. We have been successful in the completion of our program's objectives. We have organized our findings in a fashion to allow interpretive analysis of best business practice (benchmark) by providing the quantitative and qualitative data, graphical analysis of our experience, review of relevant recent advances, identification of challenges, and selective alternative solutions

Outcome Measures: Patient survey for level of risk and intensity of interest; compare laboratory turnaround times, final reports, responsiveness, and discrepant results.

Results: From 311/526 patients who completed the survey: 56/311 had significant cancer pedigree, 40/56 wanted genetic counseling, 16 declined; of the 255 without significant cancer pedigree, 55/255 wanted genetic counseling. Study IRB (No. 97047):

206 patients contacted. One hundred six declined to participate. One hundred seen for genetic counseling, 30 eligible for genetic testing, 25 accepted, 20 completed results, three positive, three variants, 14 negative. 10/20 completed tests split samples; O 110 day average, >90% final reports, <24 hour responsive; K 130 day average, 1/10 final reports, 5/10 discrepant findings, >2 d response. Qualitative assessments of educational, outreach, recruitment, and pathway completed.

Conclusion: Primacy of pedigree analysis, genetics counseling, and informed consent before laboratory testing allows for best business practice. Delay or discrepant results are the major source of frustration and anxiety for patients. Laboratory service with most turnaround time, 100% final reports, and most responsive staff should be Benchmark.

Recommendation: Genetic model should be used as the basis for best business practice for the integrated care approach to inherited breast cancer susceptibility testing.

Presenter: Jamilyn M. Daniels, MS, CGC

Mentors: Charlene Holt, MD and Shelby R. Brammer, COL, MC

Telomerase Activity in Cytologically Positive Bronchoscopy, Thoracentesis and Fine Needle Specimens

Presented by Poster Section
Pulmonary Service, Department of Medicine

Purpose: The ribonucleoprotein enzyme telomerase occurs in immortal lines of mammalian cells including germ cells and most malignancies. The activity of telomerase has potential to emerge as a clinical tumor marker in prognosis or therapeutic options for lung cancer. Telomerase activity has been described in surgical and autopsy specimens of carcinomas but seldom in diagnostic specimens. We prospectively evaluated the feasibility of assessing telomerase activity in diagnostic specimens of thoracic neoplasma.

Methods: We assessed telomerase activity in 25 bronchoscopic, thoracentesis and fine needle specimens by gel electrophoresis and a PCR ELISA assay using a single blinded study design. The clinical specimens had cytologically confirmed malignancy consisting of 9 small cell carcinomas and 16 nonsmall cell lung carcinomas including 2 carcinomas metastatic to the thorax. In addition, we noted an absence of significant telomerase activity by the gel electrophoresis technique in four patients with pneumonia, trapped lung, or eosinophilic pleuritis.

Results: We found telomerase activity by gel electrophoresis in 17 of 25 specimens (68%) including 10 of 13 bronchoscopy specimens (77%), 3 of 8 thoracentesis specimens (38%) and 4 of 4 fine needle aspirates (100%). When we examined the results by tissue type of carcinoma, we found 6 of 9 small cell (68%) and 11 of 16 nonsmall cell specimens (69%) had gel activity. Six specimens (24%) had relatively high telomerase activities (>0.312 A 450-690) by PCR ELISA assay. These consisted of 2 of 9 small cell (22%) and 4 of 16 nonsmall cell specimens (25%). Brushings, transbronchial needle aspirates, and fine needle aspirates appeared to have greater combined sensitivity (92%) than pleural fluid and lavage specimens (42%).

Conclusions: Detection of telomerase activity in thoracic malignancies appears feasible from clinical diagnostic specimens such as bronchoscopy, thoracentesis, and fine needle aspirates. The prevalence of telomerase activity by gel electrophoresis was similar in the small cell and nonsmall cell specimens in this study. Telomerase activity has moderate sensitivity as an indicator of cytologically confirmed malignancy.

Clinical Implications: Telomerase activity can be detected in clinical diagnostic specimens from patients with cytologically confirmed lung cancer. Should telomerase prove to be a valuable tumor marker, positivity in diagnostic specimens may obviate the need for more invasive procedures. Future studies using diagnostic specimens may aid in assessing the value of telomerase activity as a tumor marker.

Presenter: Ravi Ramakrishna, MD

Mentor: Thomas A. Dillard, COL, MS

Personality Traits and Types of Army Nurse Corps Officers

MAJ Petra Goodman, AN†
MAJ Robert L. Goodman, MSC††
Norma Barr, PhD†††
COL Lynne Connelly, AN††††
LTC Allison Mirakian, AN†††††

Introduction

Military healthcare delivery has changed significantly during the past decade. With this change into a managed care organization has occurred a proliferation of new roles for Army Nurse Corps (AN) officers. In accordance with the Army Surgeon General's Vision Statement, people are the greatest and most valued asset in the Army Medical Department (AMEDD).¹ Using this as a starting point, what information is available to the AN leadership to assist with the best possible management of personnel? Many health professions have used psychological testing in a variety of contexts such as management development, team building, consulting, or career planning. One of the most widely used instruments is the Myers-Briggs Type Indicator (MBTI). Although the MBTI has been administered to many healthcare executives and physicians, there is a paucity of research of this nature in nursing.

Theoretical Framework

The MBTI

The MBTI is designed to test Jung's theory of psychological type which claims that variation in human behavior is not due to chance but is, in fact, the result of basic preferences in the way individuals prefer to use their perception and judgment.² "Perception involves all the ways of becoming aware of things, people, happenings, or ideas. Judgment involves all the ways of coming to conclusions."^{2(p1)} It measures an individual's dominant psychological process in four separate dimensions which compose four bipolar scales. These dimensions are: (1) Energizing - *extroversion/introversion (E/I)*; (2)

Perceiving - sensing/intuition (S/N); (3) Deciding - *thinking/feeling (T/F)*; and (4) Living - *judging/perceiving (J/P)*. Two of these, *S/N* and *T/F* reflect basic preferences for use of perception and judgment; whereas, the other two, *E/I* and *J/P*, reflect "attitudes or styles of orientation to the inner and outer world."^{2(p19)} These processes will influence how people perceive a situation and decide on a course of action.

The first scale, *Extravert (E)* and *Introvert (I)*, refers to how individuals are energized. An *extravert* draws energy from the outside world of people, activities, and things; whereas, the *introvert* draws energy from within one's internal world of ideas, emotions, and impressions. The second scale is *Sensing (S)* and *Intuition (N)* which refers to how one gathers data. *Sensing* individuals prefer to gather information by using the five senses and noticing what is actual; whereas, *intuitive* individuals gather information by way of insight and establish possibilities, meanings, and relationships. *Sensing* persons are aware of what is occurring in the present and thus focus on the immediate experience. *Intuitive* persons are more oriented to the future, focusing on the possibilities. *Sensing* individuals are good in gathering detailed information; whereas, *intuitive* persons are good in showing relationships and patterns.^{2,3}

How individuals make decisions is the third scale. *Thinking (T)* persons make decisions in a logical, analytical, and objective manner. *Feeling (F)* persons make decisions in a personal, values-oriented way. *Thinking* individuals use their heads; whereas, feeling individuals use their hearts to decide what to do. The fourth scale is composed of *Judging (J)* and *Perceiving (P)* and refers to one's lifestyle or orientation to the

outside world. *Judging* individuals prefer a planned and organized style; whereas, *perceiving* individuals are more spontaneous and flexible.^{2,3}

The preferences are not rigid. Depending on the situation, individuals may use either preference of the bipolar scale. Through awareness of personal traits and type and an understanding of traits and types of others, an individual can learn to access the whole repertoire of traits to use those which would most benefit them in certain situations. Nonetheless, they will display a dominant trait in each of the four dimensions at any given time. These four dimensions, each with two possible traits, combine to create 16 different possible personality types.^{2,3}

Review of Literature

The MBTI and Management Role.

The MBTI has been used widely in the study of personality types for numerous occupations and roles. Numerous studies support the notion that the majority of organizational decision-makers have one of the *thinking/judging (TJ)* types found in the MBTI type distribution table (*ISTJ, ESTJ, INTJ, and ENTJ*) in a variety of occupations, including bankers, computer technicians, social service managers, executive educators, sales and work directors, and industrial and business managers.⁴⁻¹¹

Prior MBTI research into the type preferences of managers suggests that lower and midlevel managers generally favor *S, T, and J* in a variety of occupations in education, industry, and business.¹⁰⁻¹³ Furthermore, these studies suggest that *ISTJs* and *ESTJs* are very common types among lower and midlevel managers. The Center for Applications of Psychological Type (CAPT) indicates that, for managers and administrators, the personality type *ISTJ* is 15% and *ESTJ* is 17% of the total managerial population.²

However, there is some evidence that the majority of top level managers prefer intuition over sensing.^{7,10,11,14} In a study examining the psychological types of the founders of the 500 fastest growing privately held firms in the U.S., the sample was predominantly *N* (60%), very strongly *T* (87%), and slightly more *J* (54%). The most frequent types were *INTP, ISTJ, ENTJ, INTJ, and ENTP*.¹⁴

The MBTI and Healthcare Professionals.

The preponderance of *TJ* types in management roles also has been documented in samples of healthcare managers. Shewchuk, O'Connor, and Raab analyzed the psychological type among a nationwide sample of 522 healthcare executives. Sixty-three percent of the sample fell into one of the four *TJ* cells (*ESTJ, ISTJ, ENTJ, INTJ*). Additionally, significantly more *Ts* than expected were observed among the healthcare executives when compared to general business managers.¹⁵

Additional studies support the preponderance of *TJs* among managers in healthcare: speech pathology and audiology supervisors, respiratory therapists, and social service managers.^{16,17,6} Therefore, the over-representation of *TJs* among decision-makers is likely to occur regardless of whether the setting is business or healthcare. However, in the above studies that also investigated the psychological types among the clinicians in the three arenas, the clinicians were more likely to be *Fs*. In fact, the managers in these areas were more similar to other managers and administrators than to the clinicians in their respective areas.

Occupational research using the MBTI has not only been directed at the managers in the healthcare settings, but also at various other types of healthcare providers. The *EST/FJ* types predominated in dental students.¹⁸ The *ISTJ* was the most common personality type among family practice residents; whereas, *ENFJ* was the prevalent type in another group of medical/family practice residents.^{19,20} A predominance of *intuitive, feeling, and judging* types was found among speech-language pathologists and a predominance of *sensing, thinking, and judging* types was found among audiologists.²¹ In a study of emergency physicians, two-thirds preferred *introversion, intuition, thinking, and judging*; and the most frequent single type was *ISTJ*.²² In a study of residents in a Physical Medicine and Rehabilitation Program and graduates of the same program, *intuition* was the most common dominant process for both groups. The residents were strongly *extroverted* and the graduates were strongly *introverted*. Finally, the graduates preferred *judging*; whereas, the residents were evenly split between *judging* and *perceiving*.²³

Two studies described a consistent set of personality types common to medical technologists – ISFJ, ESFJ, ISTJ, and ESTJ.²⁴ In two separate studies of pharmacy students, the general preferences of the students were ISTJ with about two-thirds having *S* and *J* preferences.^{25,26}

The MBTI and the Nursing Profession

Although numerous studies have examined the personality types of nurses, few have used the MBTI.²⁷⁻³⁵ Two studies used the Hogan Champagne Preference Survey which is an adaptation of the MBTI to identify personality types for a sample of emergency nurses and oncology nurses.^{36,37} The most frequent personality type was *ISFJ* for both groups. The second most frequently occurring type for the emergency nurses was *ISTJ*. Gabram et al examined the personality types of flight crew members in a hospital-based helicopter program which included nurses. Using the MBTI, the nurses were more *extroverted, intuitive, feeling, and perceiving*.³⁸

Demographic Characteristics and the MBTI

Multiple studies have described the personality types of people in relationship to gender. One study compared the MBTI responses of women chessplayers with those of average and master-level male players. The total male chessplayers group was significantly more *introverted, intuitive, thinking, and judging* than the total female chessplayers group. However, female chessmasters significantly favored thinking more than the male chessmasters.³⁹

This is similar to the findings by Ginn and Sexton who found that the females in the sample of the founders or co-founders of the 500 fastest growing firms in the U.S. also preferred *thinking* (88%). The female founders were remarkably similar to the male founders in their type distribution, particularly in their preference for thinking. The male and female founders in the above study were almost indistinguishable.¹⁴ These findings parallel those in another study of the personality types of managers (school principals) in which no gender-related differences on any of the four dichotomous scales of the MBTI were found.¹²

In reference to studies addressing healthcare

professionals, Descouzis also found no statistically significant differences between male and female speech-language pathologists and audiologists.²¹ However, Lowenthal found a significant difference between gender in pharmacy students on the *T/F* preference. Seventy-one percent (70.5%) of the male students were *T*, whereas 59% of the female students were *T*.²⁵ In another study, female dental students were more *N* and *F* than male students.⁴⁰

In a national U.S. stratified sample, Hammer and Mitchell identified the following gender differences. Slightly more women (71%) preferred *S* than did men (64%). About 69% of men preferred *T*, whereas 61% of the women preferred *F*. Slightly more women (61%) preferred *J* compared to men (55%). For both men and women, *introverted sensing* was the most frequent dominant function.⁴¹

Purpose and Hypotheses

With the scarcity of research using MBTI investigating the personality types of nurses, the purpose was to explore the personality traits and types of AN officers.

The study investigated the following:

- To describe the MBTI traits and types of the AN officers.
- To explore the relationship between MBTI traits and types and various specialty areas of the AN officers.
- To explore the relationship between MBTI traits and types and various demographic characteristics of the AN officers.

Methodology

A correlational, descriptive study was conducted through data analysis of the MBTI, routinely completed by the participants of the Head Nurse Leadership Development Course sponsored by the Department of Nursing Science, Army Medical Department Center and School, Fort Sam Houston, Texas. During each iteration of the course, from Jan 91 to Apr 96, participants were asked to complete the MBTI along with a demographic survey.

Widely used in the study of personality types, reliability, and validity of the MBTI have been reported.² The internal consistency estimated by Spearman-Brown coefficient alpha ranges from 0.80 to 0.90 with adult samples. In addition, the test-retest reliabilities show consistency over time with the majority of the correlations in the 0.7 to 0.8 range. Validity also has been established. Studies have been conducted to assess both construct and predictive or criterion-related validity. The MBTI scores were compared to scores from other tests measuring similar or related traits to determine whether the match between comparison test scores was in the direction predicted by the MBTI type.

A convenience sample of 1,516 active duty and Reserve AN officers and 44 civilian nurses completed the MBTI. All responses were anonymous.

The data from the 1,560 participants were analyzed using the Statistical Package for the Social Sciences. To describe the MBTI traits and types of AN officers, descriptive statistics were used. To explore the relationship between MBTI traits and types and various specialty areas of the AN officers, and to explore the relationship between MBTI traits and types and various demographic characteristics of the AN officers, Pearson's correlation and Pearson's chi-square test for significance were used.

Results

Of the 1,140 complete records, 705 of the officers were active duty and 435 were reserve. The overall average age of the group was 39 years old. However, the average age of the active duty officers was 36 and the average age of the Reserve officers was 43. The moderate Pearson's r correlation ($r = -0.460$) between age and military status was significant ($P < .001$) which indicates that active duty officers were younger than the Reserve officers. In addition, age was also significantly ($P < .001$) related to the *perceiving* characteristic ($\chi^2 = 65.104$, $n = 1526$). This indicates that younger nurses appear much more likely to prefer *perceiving* than older nurses.

Another finding was that the active duty officers were more evenly distributed among the area of concentration (AOCs) than the Reserve officers. However, a significantly ($P < .001$) higher proportion of Reserve

officers represented the AOC - 66H (medical/surgical [med/surg]) nurses than the active duty officers. Seventy-one percent of the Reserve officers were 66Hs.

The demographic characteristic of gender appears to play a role in the traits exhibited on the MBTI as well as a relationship to other demographic variables for the total surveyed population. Female nurses may prefer *feeling* and *judging* more than their male counterparts. Forty-one percent (41.4%) of the females demonstrated the *feeling* characteristic as compared to 21.4% of the males ($P < .001$, $r = .175$), and 72.4% of the females demonstrated the *judging* characteristic as compared to 66% of the males ($P < .05$, $r = .063$). In comparison to the population in the U.S., about 65% of females prefer *feeling* and 60% of the males prefer *thinking*.² However, in numerous occupational studies, fewer females (36% to 65%) preferred *judging* than the males (38% to 86%).²

The demographic characteristic of education was related to the *thinking* and *judging* traits. Fifty-five percent (55.78%) of the officers with higher levels of education, defined as a Master's Degree or higher, demonstrated the *TJ* characteristic as compared to 47.87% of officers with a BSN or lower levels of education ($n = 1479$, $\chi^2 = 45.817$, $df = 15$, $P < .001$). This indicates that officers with higher levels of education may prefer the *thinking* and *judging* traits more than officers with lower levels of education.

The results of the MBTI correlation with specialty area/AOC will be presented in order from the largest to the smallest subject pool. The AOC - 66H (med/surg) nurses comprised 868 of the 1,375 valid subjects in the study. The 66H (med/surg) nurses were representative of the total surveyed population. The two most common MBTI profiles for 66H (med/surg) nurses were *ISTJ* ($n = 187$, 21.5%) and *ESTJ* ($n = 128$, 14.7%) (Table 2). These were similar to the two most common MBTI profiles for the total surveyed population: *ISTJ* (21.2%) and *ESTJ* (14.7%). In addition, the 66H (med/surg) nurses were representative of the total surveyed population on individual traits. The percentages of the various traits of the 66H (med/surg) nurses in comparison to the total surveyed population are: *introversion* 52.76% as compared to 53.31%, *sensing* 66.71% as compared to 65.6%, *thinking* 63.02% as compared to 63.05%, and *judging* 71.54% as compared to 71.13% (Table 1).

The AOC 66E (operating room [OR]) nurses comprised 185 of the 1,375 valid subjects in the study. The two most common MBTI profiles for 66E (OR) nurses were *ISTJ* (n=45, 24.3%) and *ESTJ* (n=27, 14.6%) (Table 2).

The 66E (OR) nurses were also representative of the larger surveyed population in all traits except for *thinking*. A higher percentage (68.11%) of 66E (OR) nurses preferred *thinking* in comparison to 63.05% of the total surveyed population (Table 1).

	Extrovert	Introvert	Sensing	Intuition	Thinking	Feeling	Judging	Perceiving
Nursing:RN*	46.38%	53.62%	56.91%	43.09%	34.89%	65.11%	62.82%	37.18%
HNC-Total	46.69%	53.31%	65.60%	34.40%	63.05%	36.95%	71.13%	28.87%
66II	47.24%	52.76%	66.71%	33.29%	63.02%	36.98%	71.54%	28.46%
66G	48.28%	51.72%	78.16%	21.84%	48.28%	51.72%	70.11%	29.89%
66F	58.70%	41.30%	73.91%	26.09%	76.09%	23.91%	71.74%	28.26%
66E	44.32%	55.68%	64.86%	35.14%	68.11%	31.89%	69.73%	30.27%
66D	42.67%	57.33%	61.33%	38.67%	56.00%	44.00%	68.00%	32.00%
66C	39.51%	60.49%	48.15%	51.85%	62.96%	37.04%	69.14%	30.86%
66B	51.52%	48.48%	48.48%	51.52%	72.73%	27.27%	81.82%	18.18%

*The norms for nursing as indicated in the CAPT, 1985.

Table 1. Percentages of the MBTI Trait for Nursing, the Total Surveyed Population, and each AOC

MBTI	66B	66C	66D	66E	66F	66G	66H	TOTAL	CAPT-Norm*
ESTJ	6	7	11	27	12	8	128	199	94.3
ESFJ	1	5	4	12	3	13	60	98	149.9
ENTJ	5	6	4	15	2	6	63	101	53.4
ENFJ	2	5	2	5	1	2	24	41	84.2
ESTP	1	0	1	5	2	4	32	45	27.1
ESFP	0	0	6	3	1	4	26	40	52.0
ENTP	0	6	0	9	4	1	34	54	47.6
ENFP	2	3	4	6	2	4	43	64	129.4
ISTJ	5	14	12	45	10	18	187	291	131.6
ISFJ	2	8	6	13	3	13	88	133	216.4
INTJ	4	9	7	7	1	1	43	72	52.0
INFJ	2	2	5	5	1	0	28	43	82.0
ISTP	1	1	2	9	3	2	30	48	33.7
ISFP	0	4	4	6	0	6	28	48	77.6
INTP	2	8	5	9	1	2	30	57	40.3
INFP	0	3	2	9	0	3	24	41	103.8
TOTAL	33	81	75	185	46	87	868	1375	1375.0

* The norms for nursing as indicated in the CAPT, 1985.

Table 2. Number of Nurses within each MBTI Personality Type for Nursing, the Total Surveyed Population, and each AOC

The AOC – 66G (obstetrical/gynecology[OB/GYN]) nurses comprised 87 of the 1,375 valid study subjects. The 66G (OB/GYN) nurses demonstrated significant ($P>.05$) differences from the total surveyed population for three personality types ($\chi^2 = 25.99$, $df = 15$). The three most common MBTI profiles for 66G (OB/GYN) nurses were *ISTJ* ($n=18$, 20.7%), *ESFJ* ($n=13$, 14.9%), and *ISFJ* ($n=13$, 14.9%) (Table 2). In addition, the 66G (OB/GYN) nurses demonstrated significant differences from the total surveyed population for two traits - *sensing* and *feeling*. Seventy-eight percent (78.16%) of the 66G (OB/GYN) nurses preferred *sensing* as compared to 65.6% of the total surveyed population ($\chi^2 = 6.271$, $P<.05$), and 51.72% of the 66Gs preferred *feeling* as compared to 36.95% of the total surveyed population ($\chi^2 = 8.767$, $P<.005$) (Table 1).

The AOC – 66C (psychiatric) nurses comprised 81 of the 1,375 valid subjects in the study. The 66C (psychiatric) nurses demonstrated significant ($P>.05$) differences from the total surveyed population for two personality types ($\chi^2 = 28.36$, $df = 15$). The two most common MBTI profiles for 66C (psychiatric) nurses were *ISTJ* ($n=14$, 17.3%) and *INTJ* ($n=9$, 11.1%) (Table 2). In addition, the 66C (psychiatric) nurses demonstrated significant differences from the total surveyed population for the trait of *intuition*. Fifty-two percent (52%) of the 66C (psychiatric) nurses preferred *intuition* in comparison to 34.4% of the total surveyed population ($\chi^2 = 11.435$, $P<.001$) (Table 1).

The AOC – 66D (pediatric) nurses comprised 75 of the 1,375 valid subjects in the study. The two most common MBTI profiles for 66D (pediatric) nurses were *ISTJ* ($n=12$, 16.0%) and *ESTJ* ($n=11$, 14.7%) (Table 2). Although the 66D (pediatric) nurses were representative of the total surveyed population in the *ISTJ* type, they demonstrated each of these individual traits except for *introversion* at a lower percentage (Table 1).

The AOC – 66F (nurse anesthetists) comprised 46 of the 1,375 valid subjects in the study. The two most common MBTI profiles for 66F (nurse anesthetists) were *ESTJ* ($n=12$, 26.1%) and *ISTJ* ($n=10$, 21.7%) (Table 2). Also, the 66F (nurse anesthetists) were not representative of the total surveyed population except on the *judging* trait (Table 1). A high percentage of these officers preferred

sensing (73.91%), *thinking* (76.09%), and *judging* (71.74%).

The AOC – 66B (community health [CH]) nurses comprised 33 of the 1,375 valid subjects in the study. The three most common MBTI profiles for 66B (CH) nurses were *ESTJ* ($n=6$, 18.2%), *ENTJ* ($n=5$, 15.2%), and *ISTJ* ($n=5$, 15.2%) (Table 2). In contrast, the 66B (CH) nurses were not representative of the total surveyed population except on the *thinking and judging* traits (Table 1).

The comparison of the AOCs to each other identified differences in traits and types between the specialties. All the AOCs except for the 66Fs preferred *introversion* with the 66Cs (60.49%) being the most preferential group for *introversion*. Although the 66Fs (58.7%) preferred *extroversion*, they along with all the other AOCs were close to the 50th percentile for demonstration of the *introversion/extroversion* trait. The 66Bs (51.52%) and the 66Cs (51.85%) preferred *intuition* whereas all other AOCs preferred *sensing*, particularly the 66Gs (78.16%). Although the 66Gs (51.72%) preferred *feeling*, they were close to the 50th percentile for this trait. All other AOCs preferred *thinking* with the 66Fs (76.09%) being the most preferential group for *thinking*. Finally, all the AOCs highly preferred *judging* (Table 1). In reference to the types, *ISTJ* was a predominant type in all the AOCs, and *ESTJ* also was a predominant type in five of the seven AOCs (Table 2).

Discussion

The present study describes the MBTI traits and types of AN officers attending the Head Nurse Leadership Development Course. Furthermore, the study explored the relationship between MBTI traits and types and various specialty areas of the AN officers and the relationship between MBTI traits and types and various demographic characteristics of the AN officers. The findings suggested a number of interesting points of discussion.

The total surveyed population was predominantly *introverted, sensing, thinking, and judging* (Table 1) with the three most common personality types of *ISTJ, ESTJ, and ISFJ* (Table 2). In comparison to the norms for nurses indicated in the CAPT, the total surveyed population is predominantly *introverted* as are nurses in general, they

prefer *sensing* and *judging* more than nurses in general, and they prefer *thinking* as compared to *feeling* for nurses in general. The contrast in *thinking* as compared to *feeling* may be due to the roles and the military service of the nurses in the study population.

The study population consisted of Army Nurse Corps officers attending the Head Nurse Leadership Development Course. These are officers who are currently in the management role of Head Nurse or who will be entering that role soon. The nurses in the study preferred *thinking*, which is similar to previous research indicating a predominance of *thinking* among all levels of management, to include lower and midlevel managers. Additionally, the nurses in the study preferred *sensing* and *judging* which parallels studies of lower and midlevel managers who generally favor *sensing* and *judging*. The personality types of *ISTJ* and *ESTJ* in the study population are also similar to those indicated in the literature as being the most common among lower and midlevel managers. Therefore, the AN officers in this study appear to be more similar to the general managerial population than to the general population of nurses.

In comparison of the personality traits and types to the AOCs for the study population, overall, each specialty area was representative of the total surveyed population in the majority of the traits. The 66H (med/surg) nurse demonstrated the same individual personality traits (Table 1) and combined types (Table 2) as the total surveyed population. In comparison to a study of emergency and oncology nurses in whom *ISFJ* was the predominant personality type and *ISTJ* was the second most frequently occurring personality type in the emergency nurse; *ISTJ*, *ESTJ*, and *ISFJ*, in order, were the most common personality types for the 66H (med/surg) nurse.^{36,37} In comparison to the CAPT norms for personality types of nurses, *ISFJ*, *ESFJ*, and *ISTJ* are the three most common personality types for nurses in general. Therefore, in reference to personality types, the 66H (med/surg) nurses were largely similar to the civilian nurses. The variance in the *feeling/thinking* characteristic may be due to the managerial roles of the 66H (med/surg) nurses as compared to the clinical roles of the civilian nurses.

The 66F (nurse anesthetist) was similar to the total surveyed population in individual personality traits (Table

1) and types (Table 2), except that the 66F (nurse anesthetist) was predominantly *extroverted* (58.7%) as compared to *introverted* for the total surveyed population. The 66D (pediatric) nurse and the 66E (OR) nurse were also similar to the total surveyed population in individual personality traits (Table 1) and types (Table 2). The 66B (CH) nurse was similar to the total surveyed population in individual personality traits (Table 1) and types (Table 2) except the 66B was almost equally divided between *introversion* and *extroversion* and between *sensing* and *intuition*. The 66G (OB/GYN) nurse significantly differed from the total surveyed population on one individual trait. Although, the 66G (OB/GYN) nurse was predominantly *introverted*, *sensing*, and *judging* as the total population, the 66G (OB/GYN) nurse predominantly preferred *feeling* (51.72%) as compared to *thinking* for the total population (Table 1). In addition, a significantly higher proportion of 66G (OB/GYN) nurses preferred *sensing* (78.16%) than the total population. The three most common personality types of the 66G (OB/GYN) nurses were, first, *ISTJ* with *ESFJ* and *ISFJ* following in equal numbers (Table 2). These findings are similar to previous research which identified nursing as typically characterized by *sensing* and *feeling* individuals (Table 1) with the two most common personality types of *ISFJ* and *ESFJ* (Table 2). Therefore, this specialty group of AN officers is more similar to civilian nurses than the other specialty groups.

The 66C (psychiatric) nurse also differed from the total surveyed population on one individual trait. Although, the 66C (psychiatric) nurse predominantly preferred *introversion*, *thinking*, and *judging* as did the total population, the 66C predominantly preferred *intuition* (51.85%) as compared to *sensing* in the total population (Table 1). The most common personality types were *ISTJ* and *INTJ* (Table 2). The predominance of *intuition* in this specialty group may be related to their role. In caring for psychiatric patients, few concrete or physical parameters are available for assessment. The psychiatric nurses collect observations, verbal responses, and historical facts as data during their assessment. Thereafter, they interpret the data to establish diagnoses and a plan of care. The interpretation entails identification of relationships, possibilities, and meanings within the data, which is the definition of *intuition*.² Psychiatric nurses must perceive beyond what is visible to the senses in order to identify accurately what is occurring with the patient and what

needs to be done. Because of the prevalence of adverse reactions among this group of patients, these nurses are consistently aware of the possibility of a negative outcome. Thus, their *intuition* is always in the consciousness.

Of the demographic variables explored in this study, it was noted that age related to the *perception/judging* trait. Younger nurses preferred *perceiving* more than older nurses. This may be related to the roles of the nurses. Younger nurses entering the profession initially assume clinical roles and as they progress in the profession and naturally, in age as well, they attain managerial roles. As indicated earlier, the literature shows that *judging* is a predominant trait among managers. Therefore, the implication may be that this personality trait within nurses changes as they transition from clinical to managerial roles. Maximizing the use of the opposite trait may be essential for adaptability in certain situations or roles. The older nurses may prefer *judging* as compared to *perceiving* in management roles due to the requirements of those roles. The possibility of a change within personality traits may further imply the development of alternative types. Nurses may demonstrate different traits and types as they progress throughout the profession.

The study also found relationship between the personality trait of *judging* and gender and between *feeling* and gender. Similar to previous research, which identified *feeling* as a predominant female trait, the females in this study preferred *feeling* more than the males. In addition, similar to the review of literature, which indicates a predominance of *judging* among females, the females in this study preferred *judging*. However, this finding contrasts a study of dental students which indicated a predominance of *perceiving* among the females.⁴⁰ The variability in this trait may be due to age and roles as discussed previously.

In addition, the study found a relationship between level of education and the *thinking* and *judging* characteristics. The nurses with higher levels of education preferred the *thinking* and *judging* traits. This finding parallels a description of graduate students in business by Myers and McCaulley.² Sixty-two percent (62%) of the graduate students preferred *thinking* and *judging*. Within this study, the preference for this trait may be due to age and roles. One of the programs within the Army Nurse

Corps is the Long Term Health Education and Training Program which funds active duty nurses who have approximately 5 to 17 years military service to attain advanced degrees beyond the Bachelor of Science in Nursing. Naturally, these nurses are older than the age at entry into school or into military service and are usually placed in a managerial position following completion of graduate school. Furthermore, the graduate degrees in nursing administration focus on managerial training and typically the remaining degrees, whether in informatics or advanced clinical practice include, directly or indirectly, management training.

Several limitations were identified. The study was conducted from retrospective analysis of data. Data collection was performed by more than one individual. In addition, the inclusion of 44 civilian nurses may have affected the findings.

Implications

This research described the personality traits and types of AN officers as a whole and within each specialty. Overall, the nurses in each specialty (AOC) were similar to the total surveyed population. The total population was predominantly *introverted, sensing, thinking, and judging*. Of significance was the predominance of *feeling* among the 66G (OB/GYN) nurse and the predominance of *intuition* among the 66C (psychiatric) nurses. Do personality characteristics predispose people to choose a particular specialty or do some specialties involve such influences that they alter personalities to their particular outcomes? The literature has shown that professions will attract those with specific MBTI personality preferences.²⁵ Furthermore, the literature indicates that this applies to specialties within professions as well. Physicians have been studied extensively according to medical specialty. A study of specialty selection of medical students using a personality tool other than the MBTI indicated that the selection of certain specialties (surgery, psychiatry, pediatrics, and OB/GYN) could be predicted.⁴² In another study, 521 medical students were studied using the MBTI and the correlation between specialty choice and personality type was confirmed. The students choosing family medicine were predominantly *SFJ*, those choosing OB/GYN were predominantly *STJ*, and those choosing psychiatry were predominantly *NFP*.⁴³ Similar studies

using the MBTI with nurses have not been conducted.

Demographic characteristics such as age, gender, and education related to individual personality traits. Since age and gender are nonalterable characteristics, the personality traits of *thinking* and *judging* are dependent on age and gender. However, in reference to education, which is an alterable variable, do personality characteristics predispose people to pursue advanced degrees or does higher education involve such influences that they alter personalities to their particular outcomes? Quigley et al using the Vocational Preference Inventory, found that nurses of different educational levels would exhibit different personality profiles.³⁵ This suggests that nurses may develop different personality profiles as they progress through the educational process.

This research stimulated further questions. Longitudinal studies to document the effect of demographics such as age and education would provide information regarding the effect on personality types. Studying different levels of management from lower to senior within the Army Nurse Corps would provide data regarding the similarities and differences within the management levels.

Knowledge of personality traits and types could increase the level of self-understanding healthcare organizations are seeking to engender among their staffs. This understanding is useful for team building, communication, decision-making, and additional management processes. The MBTI is a tool available to organizations to gain an awareness of personality types of their staffs. The MBTI is used by the AN in the Head Nurse Leadership Development Course to increase self-awareness. Nurses are made aware of personal preferences and nonpreferences and thereafter, they can learn to access the nonpreferable traits to achieve a balance among all.

Research has begun to identify how type affects group dynamics. Although people with similar types will communicate more easily and work more comfortably with each other than people with opposite types, mixed-type groups will produce better results because all the preference strengths will be balanced.⁴⁴ Each trait and type has advantages and disadvantages and collectively produce the best results.

As the literature indicates and findings in this study suggest, personality traits and types can change. Although the traits are dichotomous, they are on a continuous scale with bipolar traits; E/I, S/N, F/T, P/J, allowing access and development of the other side. Each trait has a range from 0+ on the scale. At the center of the scale is the 0 and as you move towards the outside, the number increases. The range indicates the amount of preference for that trait. Therefore, if an individual demonstrates a low amount of preference for a trait and is close to the center of the scale which is 0, that individual may easily be able to access the opposite trait. Through awareness of personal traits and type and understanding of traits and types of others, an individual can learn to access the whole repertoire of traits to use those which would most benefit them in certain situations. For example, during an interactive presentation, a person may demonstrate extroversion by drawing on the energy of the audience to stimulate further discussion, yet during a one-to-one discussion with another person, this individual prefers to use his introversion trait to quietly listen and concentrate intently.

Conclusion

Organizational effectiveness, whether in the Army or any other corporation or company, is dependent upon its leadership. Leadership requires knowledge of self and a need to know your strengths and weaknesses in how you manage, filter information, and make decisions. The MBTI is a useful tool for helping leaders to perform self-examination. A clear understanding of your own preferences enables development of the opposite traits. Leadership requires that you maximize the preferences you prefer and to develop the skills for the least preferred traits. Balance is the key to leadership.³

Leading also means sharing, valuing, and cultivating the strengths and diversity of the group and realizing when the diversity and strengths become blocks and weaknesses. Promotion of organizational effectiveness is the extent to which an organization can encourage diversity rather than uniformity. Leadership means valuing different characteristics among staff and accommodating and using trait and type diversity. Work groups characterized by this kind of diversity will be effective in responding to environmental changes particularly those occurring today in the Army and the AMEDD.

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AUTHORS:

†Army Nurse Corps. Major Goodman is assigned to the Department of Nursing Science as the OAC Liaison/Advisor, AMEDD Officer Advanced

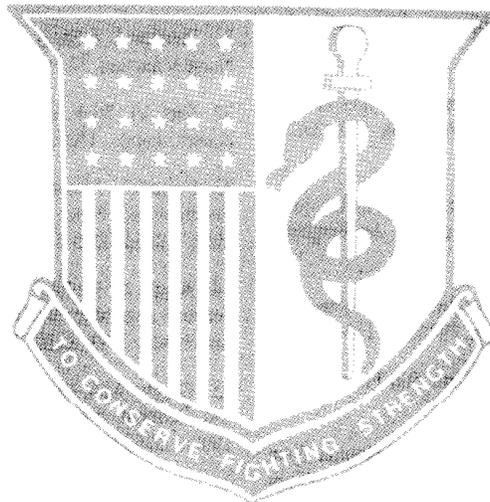
Course, Academy of Health Sciences, U.S. Army Medical Department Center and School, Fort Sam Houston, TX.

††Medical Service Corps. Major Goodman is the Chief of Health Policy Analysis, Directorate of Program Analysis and Evaluation, U.S. Army Medical Command, Fort Sam Houston, TX

†††Doctor Barr is a Consultant with Barr and Barr Communications Consultants, Austin, TX.

††††Army Nurse Corps. Colonel Connelly is the Chief, Department of Nursing Science, Academy of Health Sciences, U.S. Army Medical Department Center and School, Fort Sam Houston, TX

†††††Army Nurse Corps. LTC Mirakian is the Assistant Chief Nurse and Chief, Hospital Services Department, William Keller Army Community Hospital, West Point, NY.



Making the Leap to 91W: A Transition Guide for Leaders

MAJ Robert A. De Lorenzo, MC†

Introduction

The Army has approved the new Military Occupational Specialty (MOS) 91W Healthcare Specialist. This new MOS will replace 91B Medical Specialist and 91C Practical Nurse designations beginning in October 2001. All soldiers holding the primary MOS of 91B or 91C, to include all the associated Additional Skill Identifiers (ASIs), will need to make the leap to 91W. Because this effort is so large (91W will be the second-largest MOS in the Army) and involves tens of thousands of soldiers in the Active (AC) and Reserve (RC) Components, the Army has allowed a phase-in period. During this period, current 91B and 91C soldiers must transition to the new 91W MOS. The AC will be fully transitioned by 2007 with the majority of soldiers successfully transitioned by 2004. The RC soldiers will have until 2009 to complete the transition.

This article will focus on the strategies and procedures needed to make a successful transition. The information provided is intended to guide soldiers, their leaders, and commanders with some practical advice on how to best position themselves and their units for the 91W initiative.

Transition Process

On or about 1 October 2001, a number of things can be expected to happen. Most important for soldiers will be the change of their MOS from 91B or 91C to 91W. This will occur through local personnel (SIDPERS) transaction. Leaders and commanders will also note that their manning documents (table of organization and equipment/table of distribution and allowances) will change to reflect the new MOS.

Another important change will occur. All new 91Ws who just transitioned from 91B or 91C will see a new ASI,

“Y2” attached to their personnel records. Y2 indicates a soldier in transition. Thus, a 91B in 2001 will become a 91WY2. This serves as a method for commanders, leaders, and the Army to track and monitor transitioning soldiers. The Y2 designator will be removed once the personnel system has confirmed full and complete transition to 91W.

91C Practical Nurses will also convert to 91W, but by virtue of their training and licensure, will be awarded the M6 ASI. Thus, a 91C in 2001 will become a 91WM6Y2. The M6 stands for Practical Nurse and Y2 designates a soldier in transition. The Y2 will be removed once the personnel system confirms a full and complete transition to 91W and verifies the practical nurse license of the soldier. Holders of ASIs such as Cardiovascular Specialist (91BY6) and Dialysis Specialist (91CM3) will continue to retain their ASIs in 2001. Thus, a 91BY6 will become a 91WY6Y2 and a 91CM3 will become a 91WM6M3Y2. The Y2 transition designator will be removed once the personnel system has confirmed a full and complete transition to 91W and confirmed the additional credentials and licenses required by the ASIs. Table 1 outlines some of the MOS and ASI designations used in the transition process.

MOS/ASI	Notes
91B	Converts to 91W in Oct 2001
91C	Converts 91WM6 in Oct 2001
91W	New MOS effective Oct 2001
Y2	Identifies soldiers in transition
M6	New ASI identifying practical nurse
91WY2	A former 91B who is transitioning to 91W
91WM6Y2	A former 91C who is transitioning to 91WM6

Table 1. Some Examples of MOS and ASI Designations

EMT Training

It is the goal of the Army Medical Department (AMEDD) to rapidly and efficiently transition as many soldiers as possible while ensuring that each soldier receives the training necessary to be successful in the new MOS. To accomplish this, a number of initiatives are under way or in the planning stages to provide 91W training. The following paragraphs will outline a few of these.

The first step towards achieving 91W is to obtain emergency medical technician-basic (EMT-B) certification through the National Registry (NR) of EMTs (NREMT). The NREMT-B is the foundation of 91W and is required to keep the MOS. Therefore, it is recommended that soldiers, leaders, and commanders direct their initial efforts towards obtaining and maintaining NREMT-B certification. The EMT courses are available from a large number of sources and there is probably one in the local community. Many installations and military hospitals (both in the U.S. and overseas) run EMT courses. Civilian fire departments, emergency medical services (EMS), and ambulance companies also are frequent sponsors of courses. A nominal fee is generally charged. Community colleges and universities often offer EMT courses and some college credit. Units wishing to start their own EMT courses are encouraged to do so. Course sponsors will need to demonstrate command support, physician involvement, qualified instructors, adequate equipment, and classroom facilities. Interested leaders should visit the AMEDD Center and School website at www.cs.amedd.army.mil for more information.

Holders of state (as opposed to NR) EMT certifications can apply to the NREMT to take the national examination. Visit the NREMT website at www.nremt.org for more information. In most cases, soldiers can take the NREMT written examination at military (Army, Air Force, Navy, and Marine Corps) education centers around the globe. The NR testing is also offered in most states on a periodic basis. Contact your regional or state EMS office for more details. As part of the effort to ensure a smooth and effective transition, the AMEDD Center and School has already instituted several initiatives to increase EMT training. First and foremost is the immediate offering of EMT training and certification in the current 91B Initial

Entry Training course and the 91B and 91C Basic Noncommissioned Officer Courses (BNCOC). Successful EMT course completion and certification will become a graduation requirement for these courses during fiscal year 2000.

Another important initiative is the introduction of an abbreviated EMT-B course especially designed to train or "bridge" 91Bs and 91Cs to EMT-B. This course will be approximately 50 hours long, which is a 60% savings over the regular 110 hour EMT-B course. All 91Bs and 91Cs will be eligible to take this bridge course. However, candidates will need to possess a cardiopulmonary resuscitation card (for healthcare providers) and can expect a pretest prior to being eligible for the course. Any candidate who is unsuccessful in passing the pretest will need to complete the full 110-hour EMT-B course instead. Units desiring to host the 91B/91C EMT-B bridge course will need to demonstrate all the requirements for a regular EMT-B course, to include command support, physician participation, and qualified instructors. More information is available at the AMEDD Center and School homepage at www.cs.amedd.army.mil.

Transition Training

While EMT-B certification is central to achieving 91W, additional training beyond EMT-B will be required of all soldiers prior to completing the transition process. Until the process is complete, soldiers will continue to carry the Y2 identifier in their personnel records. To ensure a smooth transition, the AMEDD has proposed a number of different methods to accomplish the transition mission. The multi-pronged approach allows soldiers with differing backgrounds and experiences to all enjoy the opportunity to successfully transition to 91W. The following paragraphs will outline these multiple training approaches.

After October 1999, the AC 10-week medical track associated with the BNCOC will play a central role in transitioning 91Bs and 91Cs. This course will be reconfigured to provide NREMT-B certification, Basic Trauma Life Support (BTLS), and also complete the 91W transition process. Each year, hundreds of sergeants and staff sergeants can expect to become 91Ws by this route. It is anticipated that the RC BNCOC will follow this model. A unique facet of the 91W-transition initiative is the plan

to tailor training to the individual. Thus, soldiers with medical skills relating to 91W will get credit. This rewards soldiers with previous training, such as the 10-week technical track at the Fort Sam Houston BNCOC. This will enable sergeants who have completed BNCOC in the past few years to get substantial credit for training performed. Of course, such soldiers will still need to achieve NREMT-B certification and will also be required to complete a BTLS or Pre-Hospital Life Support (PHTLS) course. (PHTLS and BTLS are 3-day courses that focus on acute trauma care. Soldiers should ensure they enroll in courses that teach all the advanced skills in the course, including intravenous access and fluids, intubation, and needle decompression of tension pneumothorax.)

BTLS or PHTLS to make the final leap to 91W. The transition course will focus on critical 91W skills including *Trauma* assessment, *Advanced airway management*, *Intravenous therapy*, *Medication administration and pharmacology*, and *Shock management (Trauma AIMS)*. The transition course will be available to medical treatment facilities and field units that have the proper command support, facilities, and faculty to teach the critical skills required in the course. It is anticipated that most major Army installations will have courses throughout the transition period. The transition course will also be useful for The Army School System RC training battalions and other reserve training sites. Table 2 outlines some of the training opportunities and pathways available to transitioning soldiers.

Training Example	Notes
NREMT-B	Excellent starting point for partial transition
BTLS or PHTLS	Excellent course (either one) to follow NREMT-B
NREMT-I or EMT-P	Possible option for 91Bs for complete transition
LPN + NREMT-B + BTLS/PHTLS	Possible option for 91Cs for complete transition
NREMT-B + BTLS/PHTLS + BNCOC*	Possible option for 91B NCOs for complete transition
NREMT-B + BTLS/PHTLS + Transition (Trauma AIMS) Course	Possible option for junior soldiers
BNCOC** after Oct 99 for AC	Expected to both certify in NREMT-B, BTLS, and complete 91W transition
Transition Course	Unit train-up packages designed especially for AC/RC use, available by 2001
*10-week AC medical track associated with BNCOC courses prior to Oct 99 or RC medical track taken after 1 Oct 96.	
** 10-week AC medical track associated with BNCOC planned for Oct 99 and beyond.	

Table 2. Transition Training Examples

For junior soldiers who have not completed BNCOC (nor expected to soon enroll in BNCOC), a train-up package or "Transition Course" is being developed by the AMEDD Center and School, and may even be available by the time you read this. This transition course will enable 91Bs who have completed NREMT-B certification and

Grandfathering

Grandfathering is the term used to describe the automatic transition of certain soldiers in October 2001. Grandfathering is reserved for selected soldiers possessing certain qualifications at initiation of the MOS

changeover. To grandfather into 91W, soldiers must possess specific medical credentials or be at least SFC promotable on 1 October 2001 (Table 3). Senior ranking soldiers are authorized to grandfather by virtue of their executive status. Soldiers in possession of active, unrestricted medical credentials as outlined in Table 3 are also authorized to grandfather. Commanders, after verifying the soldier's license and certifications, will request the local SIDPERS to remove the Y2 transition designator.

- Rank of E7(P) and above.
- NREMT-I or NREMT-P certification.
- State LPN license plus NREMT-B plus PHTLS/BTLS course.
- Soldiers not meeting the above will need to complete 91W transition training. Ample time to complete the process is provided.

Table 3. 91W Grandfathering Criteria on 1 October 2001

Effective in June 2000, the Army will award promotion points to eligible soldiers who hold valid certification from the NREMT as EMT-I or EMT-P. Thirty points are awarded for NREMT-I and 40 for NREMT-P. This new policy will provide a powerful incentive for medics to achieve these important certifications and will simultaneously provide an effective route to 91W

It is important to realize that the grandfathering process is designed to recognize selected soldiers who have achieved certain rank or qualifications. *The majority of soldiers will not be grandfathered and instead, will be required to take transition training*, as described in the previous sections.

How it All Might Work

A vivid outline of how this might work is best demonstrated by examining several examples. First is the 91WY2 (former 91B) who, on their own initiative, completes an EMT-I course and is certified by the NR in 2003. This soldier can have their credentials verified by

their commander and be credited toward completion of 91W.

A second example might be the 91WM6Y2 (former 91C) who completes NREMT-B certification and BTLS (advanced version) in 2003. This soldier will receive full training credit towards 91W after having their credentials verified.

A third example is a 91WY2 (former 91B) who completed the 10-week AC AMEDD BNCOC medical track in 1998 and NREMT-B certification in 2002. This Noncommissioned Officer (NCO) will be well on the way towards achieving 91W. However, they will need to complete BTLS or PHTLS and then their commander can verify the credentials.

A fourth example is a Specialist (E4) 91B who desires to become a 91W. To accomplish this, the soldier first enrolls in a local EMT-B and BTLS course and successfully completes both. He then takes the transition course offered by the MTF on post. On completion of the train-up course, this Specialist has successfully leaped to the new 91W MOS.

Finally, this example illustrates the Grandfathering process. Two soldiers, a 91C and a 91B, wish to grandfather on 1 October 2001. On that date, the 91C has a valid LPN license, NREMT-B certification, and a current BTLS card. The 91B holds the rank of MSG (E8). Both soldiers can have their credentials verified by their commander and be awarded the 91W MOS by the grandfathering route.

A key component of 91W is clinical competency. This is to ensure all soldiers are properly prepared for the demands of the new 91W MOS. Skills testing, (and in some cases, a written examination, also) is integral to the transition process. The NREMT examinations, practical nurse licensure, and train-up exams are all considered a part of the transition process. In some cases, specific skills testing may be needed for selected options. This will normally be the last step after all transition training is complete. If it needs to be accomplished, skills testing is expected to take place at home station by local teams composed of NCOs, nurses, and physician assistants all under the oversight and supervision of a qualified physician.

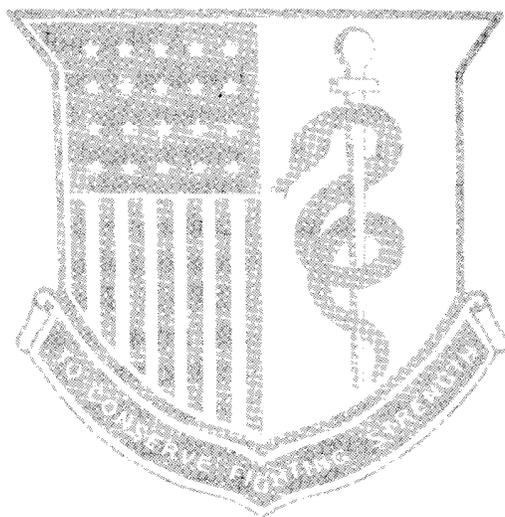
Conclusion

The Army decision to move to the new 91W MOS brings several challenges to AMEDD soldiers, leaders, and commanders alike. However, by focusing on the mission, these challenges can be overcome. First and foremost, there is an ample transition period for soldiers to achieve 91W. Second, it is essential to understand the process and be familiar with the new emphasis on credentials and skills verification. Lastly, soldiers and

leaders should focus initial efforts toward achieving and maintaining NREMT-B certification. The EMT-B certification is the cornerstone of 91W and the first step toward successful transition.

AUTHOR:

†Medical Corps. Major De Lorenzo is the Chief, 91W Program Management Branch, Department of Medical Science, Academy of Health Sciences, U.S. Army Medical Department Center and School, Fort Sam Houston, TX.



A Case Review of Cerebral Edema: High Altitude Illness

COL Dennis LaRavia, MC†
Robert Lahasky, MD††
Lynn Pittman-Cooley†††
Vasanthi Vinayagam, MD††††

High Altitude Cerebral Edema (HACE) is marked by lethargy, stupor, coma, and death, if left untreated. As an acute form of high altitude illness, HACE is the least common, but most severe form of this disease. It results from a rapid ascension to high altitudes in a subgroup of patients. This article discusses symptoms, treatment, and preventive measures.

Introduction

Modern transportation enables large segments of the population to be exposed to altitudes above 8,000 ft. Military personnel, trekkers, skiers, and mountaineers engaging in vigorous exercise are at the greatest risk for developing high altitude illnesses. Physicians may be consulted by patients for advice prior to their ascent to higher elevation. Failure to advise, recognize and appropriately manage those at risk may result in needless suffering or death. Through the presentation of a case history, this article will discuss HACE and its clinical manifestations, treatment, and prevention.

Barometric Changes with Altitude

Many physical and atmospheric changes accompany an increase in elevation. Likewise, humans undergo adaptation, which optimize the delivery of oxygen from the air to their tissues. With increasing elevation, the partial pressure of oxygen (PIO_2) diminishes as oxygen molecules move from air into tissues. The physiologic effects of decreased PIO_2 , including decreased exercise performance and increased ventilation at rest, begin at approximately 5,000 ft; but there is only minor impairment of oxygen saturation ($SAO_2 < 90\%$) until 11,500 ft. Symptoms related to high altitude illness become common with rapid ascent above 8,200 ft, at which most visitors from low altitudes are affected. Hypoxemia ($SAO_2 < 90\%$ and/or $PaO_2 < 60$ mm Hg) is generally mild, but may be severe during exercise,

and altitude illness.¹ Low temperatures are also a frequent problem. For every 1,000 ft in altitude gained, the temperature decreases 3.5°F.²

Case Report

A 39-year-old white male traveled via airplane from Louisiana (approximately 50 ft above sea level) to Breckenridge, CO (approximately 10,000 ft above sea level) to attend a medical seminar. Prior to flight, he took acetazolamide (Diamox) prophylactically to prevent possible altitude illness. On the day following arrival, he spent most of the day skiing at an altitude of approximately 10,000 ft. That evening, within a period of 14-16 hours after arrival, he developed a severe headache with nausea and insomnia. His condition worsened significantly within 3 hours of symptom onset. He began to experience loss of coordination, gait disturbance, loss of fine motor skills, dysrhythmia, blurred vision, slight confusion, persistent nausea, and episodes of vomiting. He was hydrated with Gatorade to compensate for the loss of fluids secondary to vomiting. Upon evaluation, it was decided that either descent to a lower elevation or administration of steroids was an appropriate option for treatment. No oxygen was available for administration. The patient was given dexamethasone 8 mg, intramuscularly at approximately 1100 hours. Within 2-3 hours of receiving the steroid injection, the subject showed significant improvement in his symptoms. He experienced a slow but steady improvement in his coordination and ataxia over the next

several hours. He was started on oral prednisone at 1600 hours. He continued to improve with ability for normal ambulation and concentration within 8 hours after the initial intramuscular dose of dexamethasone. Within 13 hours of initiation of prednisone by mouth, he had a complete recovery with no sequelae.

Signs and Symptoms of HACE

Acute high altitude illness is common, and usually occurs at elevations of 8,000 ft or more. The manifestations of acute high altitude illness may exacerbate other illnesses and be confused with other disorders. The acute forms include acute mountain sickness (AMS), high altitude pulmonary edema, HACE, and high altitude retinal hemorrhage.

The HACE is the least common, but most severe, of the high altitude illnesses (see table). Symptoms may range from mild to severe. Truncal ataxia is usually the

much effort and is unable to evaluate his or her condition accurately. Hallucinations are often very vivid and are occasionally violent.³

The HACE is suspected in any person who can "no longer keep up with the group" or in any person who exhibits any mental status changes. The HACE usually occurs within 72 hours of ascending to an altitude above 8,000 ft. The initially mild symptoms of HACE may progress to lethargy, stupor, coma, and death if left untreated. Thus, HACE is a potentially fatal disease. Coma may develop between 12 hours and 9 days from onset of symptomology. However, this condition usually manifests during the first 1-3 days of increased altitude.⁴ If coma has developed, mortality is over 60%.⁵

Differential Diagnosis

The HACE is a serious condition easily confused with hypothermia, substance abuse, psychosis, and

Altitude Onset	Occurs above 8,000 ft (2440 m) Within 2 to 3 days of arrival at high altitude
Signs and Symptoms	Severe progressive headache, ataxia, loss of coordination, diplopia, emotional lability, mental confusion, hallucination, papilledema, and engorged retinal vessels
Treatment	Immediate evacuation to a lower altitude; oxygen, bed rest, and corticosteroids while awaiting descent
Prevention	Acclimatization: ascend at a rate of no more than 1,000 ft (305 m) per day at elevation of 10,000 ft to 14,000 ft (3,048 m to 4,267 m) and at half that rate above 14,000 ft Acetazolamide: orally, 250 mg every 8 hours beginning 24 hours before ascent, and continued for 48 to 72 hours at the increased altitude

Table. Characteristics of High Altitude Cerebral Edema

earliest sign. Severe progressive headache (the hallmark), mental confusion, hallucinations, and significant ataxia are some of the early signs and symptoms. Severe lassitude is also a warning signal. Focal neurological symptoms may be present, but in general, HACE is global in nature. The victim feels tired and is apparently unwilling to make

atypical migraine. Guillain-Barre's Syndrome should be considered in the differential diagnosis.⁶⁻⁷ The headache of HACE is usually more severe than in AMS. Mental confusion, hallucinations, and ataxia are the most important and often the earliest symptoms of HACE. Of course, this same group of symptoms can be noted in

hypothermia and the treatment markedly differs, so early correct diagnosis is critical. Loss of fine motor movements of the hands, fingers, and eyes are common in HACE, but again may be seen as frequent manifestations of hypothermia.

Pathophysiology

In 1970, Hansen and Evans first reviewed evidence that ascent to high altitudes was associated with a shift of water into the brain, elevated cerebrospinal fluid pressure, elevated cerebral blood flow, and increased blood volume.⁸

The increased intracranial pressure of HACE may be due to a combination of vasogenic and cytotoxic mechanisms. According to the vasogenic theory, hypoxic cerebral vasodilatation predominates over hypocapnic vasoconstriction, resulting in increased blood flow. Exercise, which increases cardiac output, and cold weather, which causes peripheral vasoconstriction and central redistribution of blood, may augment cerebral flow. This increase in cerebral blood flow will overwhelm the integrity of the vascular endothelial junction, leading to extravasation of fluid from the intravascular to the interstitial spaces of the brain. Increased intracranial pressure results in cerebral hemorrhage and edema. The cytotoxic theory of the origin of HACE states that hypoxia induced failure of the cellular adenosine triphosphate dependent Sodium (Na) pump results in Na and water accumulation within cells and subsequent cellular swelling.

Incidence

Nearly 40 million people in the world live at elevations above 8,000 ft and approximately an equal number visit high altitudes each year. The number of active mountain climbers in the USA has risen to approximately 100,000 and many more worldwide.

Each year, an increasing number of people are traveling to high altitudes; most do so quickly without proper acclimatization. This accounts for 25% of the headaches in the Rocky Mountains among individuals who ascend to an altitude of 8,000 ft or above.

Treatment

The most successful therapeutic efforts in altitude related illness are preventive measures and prophylactic therapy. Once such illness develops, the key to successful therapy is rapid recognition.

Mountain climbers should be well educated about altitude illness and should take preventive measures. Gradual ascent is one of the most important rules to remember. A high carbohydrate diet has also been found to be helpful. Mild exercise and avoiding overexertion also seems to aid acclimatization. Sedative and hypnotic drugs should not be used. Smoking decreases oxygen-carrying capacity and should be avoided at any altitude. Maintaining hydration and minimizing alcohol intake is highly recommended. "Graded Ascent" is the best standard guideline for safer acclimatization. Some authors suggest a maximum gain in altitude of 500 to 1,000 ft/day, using the lower number in attaining elevations over 14,000 ft.

The Himalayan Rescue Association recommends definite guidelines to decrease the incidence of high altitude illness^{9,10} There guidelines are highlighted by the following recommendations:

- At 2500 to 3000 m (8200-9843 ft), stay 1 to 3 nights before going higher.
- At altitudes above 3000 m (>9843 ft), stay 1 day and 2 nights, sleeping during the day and returning lower to sleep, enhances acclimatization.
- Acetazolamide (Diamox) may be used in prophylaxis dosed 250 mg orally every 8 hours.
- Patients with clinical conditions such as uncompensated heart failure, pulmonary hypertension, sickle cell anemia, chronic obstructive pulmonary disease, arrhythmias, and seizures should be cautioned when going to high altitudes.

The headaches of acute altitude sickness occur in about 25% of visitors to the Rocky Mountains at an altitude of 8,000 ft or above. Headaches usually occur within the first 48 hours upon arrival and may interfere with an early diagnosis of HACE. Drinking more fluids

(not alcohol), getting more rest, and avoidance of excessive exertion, particularly within the first 2-3 days after arrival at high altitudes, may ameliorate symptoms.³

Discussion

The HACE is the least common but most severe form of high altitude illness, which has been estimated to occur in 1% of travelers.¹¹ It almost always occurs at elevations above 12,000 ft and, unlike other altitude illness, it can result in permanent injury or death.

Conclusion

The key to a successful encounter with high altitude, whether it is in the mountains or on an airplane, is early recognition of altitude-related signs and symptoms resulting in a quick decision to promptly descend. Supplementary oxygen is indicated as a temporizing measure, which will enable certain individuals to travel on airplanes. Acetazolamide is a good prophylactic measure, but does not work on all individuals. High altitude illness can be prevented by slow ascent. However, dexamethasone remains an excellent medication to keep available for the treatment of HACE in an acute situation.

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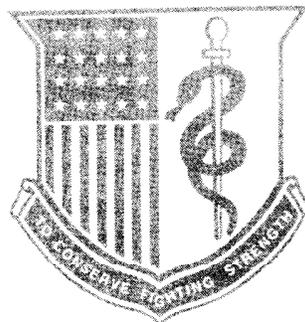
AUTHORS:

†Medical Corps (ARNG). Colonel LaRavia is currently the 256th Infantry Brigade (Med) Surgeon. He is a Clinical Professor and Director of Rural and Community Medicine, Louisiana State University Health Sciences Center, Shreveport, LA.

††Doctor Lahasky is currently in private practice in New Iberia, LA. He is the Past President of the Louisiana Academy of Family Physicians.

†††Ms Pittman-Cooley is a Clinical Associate with Rural and Community Medicine, Louisiana State University Health Sciences Center, Shreveport, LA.

††††Doctor Vinayagam is currently in the Family Practice Residency Program, Baton Rouge General Hospital, Baton Rouge, LA.



Combat Stress in Chechnya: “The Equal Opportunity Disorder”

Timothy L. Thomas†
MAJ Charles P. O’Hara, MSC††

Introduction

Russia’s conflict with Chechnya, a republic in the southwestern part of the Russian Federation, lasted from Dec 94 to Aug 96. Like the war in Afghanistan in the 1980s, the Chechen conflict produced severe cases of combat stress and psychological trauma. Unlike the war in Afghanistan, where most of the fighting was conducted in valleys or in the mountains, the fighting in Chechnya was conducted in cities or at close range in the countryside. As one Russian officer noted about the latter conflict:

The majority of analysts have arrived at the opinion that the course and outcome of modern war in large part will depend on the psychological condition of servicemen, their ability to endure an ever-increasing (psychological) load, overcome fear in battle, and preserve their will to win.¹

These recent wars reinvigorated Russia’s military medical service to look for new ways to prevent or limit psychological trauma in servicemen, and to find new methods to rehabilitate those affected. For the U.S. Armed Forces, which hasn’t suffered combat stress casualties on such a scale since the war in Vietnam, the lessons learned by Russia’s medical services offer a smorgasbord of options and treatments that should be examined closely for their relevance and potential applicability.

In addition, as was the U.S. experience in Vietnam, Russian society to some extent has become a victim of the fighting. The proper means to rehabilitate combat stress victims are currently under study, but most treatments are coming too late. Unable to acclimate to social conditions and feeling unappreciated for their sacrifices, some Chechen veterans are even turning to violent or organized crime to make a living, a consequence of the fighting that will plague Russian society for years to come.

Russian Forces in Chechnya: The Psychological Environment

One of the key lessons of the war in Chechnya for the study of military operations other than war (MOOTW) is that the psychological climate of small-scale operations may be more complicated and stressful than large scale operations such as Desert Storm. Correspondingly, there may be a much larger role for mental health professionals to play, at or near the front. War always invokes fear in man. But the psychological climate for Russian forces in Chechnya was exacerbated by specific conditions. For example, the Russian armed forces, over the preceding 3 years leading up to the conflict, had been poorly trained. Worse, the intervention into Chechnya was poorly planned and initiated under horrible weather conditions. The fighting pitted poorly trained Russian forces fighting primarily in cities where combat stress is significantly higher than in the countryside against guerillas who knew the city layouts like the back of their hands. Many of the local noncombatants resented the Russians presence as well. The situation was ideal for producing combat stress related disorders.

Only 3 years earlier, many of the Chechen guerillas had been part of the Soviet armed forces. Therefore, most of them spoke Russian fluently and had an excellent knowledge of Russian tactics and military culture (staffing procedures, logistics, etc). Russian combatants realized that the guerillas could predict their every move, listen in on their communications, and easily deceive them. This impacted negatively on the psychological condition of the Russian leaders and conscripts. Acts of subversion and terrorism also kept Russian forces on their guard and in a high state of readiness and anxiety. These factors made Russian forces extremely tentative in their activities since Chechen forces appeared able to predict their every move. This, in turn, allowed rumors to “become facts” much

more easily. While the Chechen force had a specific perspective and goal - the survival of its race - the Russian force was less certain in December of 1994 just why it was fighting.

This environment persuaded the Russian force to look at every male (old or young) and even females as potential enemies. Was it the old man (need to check his arms for powder burns), the young child (look under his coat for a grenade), or the nongovernmental organization worker (is he a Chechen posing as a Red Cross worker simply to get inside Russian defenses)? Or was it the good-looking female with an accent (a Lithuanian sniper), or the Russian officer (a Ukrainian mercenary working for the Chechens and dressed in a Russian officer's uniform)? Such continuous uncertainty allowed the Chechens to exert intense psychological pressure on the Russian force. The Chechens manipulated this fact to their benefit whenever possible. In addition, much of the fighting in Chechnya was hand to hand or at close range in "rebel" territory. Mutilations or torture were commonplace against Russian prisoners, further increasing stress and battle fatigue.

The Chechens also used several psychological operation campaigns that not only intimidated Russian servicemen but provoked certain anti-Russian responses from the population. One of these campaigns was run against the Russian Air Force. For example, the Chechens tried to **intimidate** pilots. They exploited the Russian Air Forces' inefficient bombing practices (due to poor weather and a lack of training, the air force often hit civilian targets) by issuing demands from the populace for reprisals and revenge (which could also be a potential problem if North Atlantic Treaty Organization (NATO) forces enter Kosovo under other than peacekeeping/peace enforcement reasons). One Moscow report noted that pilots who had ejected were executed by Dudayev's forces on the spot when captured. Reports also noted that in a Chechen raid on a hospital in the Russian town of Buddenovsk in the summer of 1995, hospitalized Russian pilots (none of whom had fought in Chechnya) were shot on the spot by the rebel group led by Shamil Basayev.

In another instance, Basayev, interviewed nearly 7 months into the war, indicated that he or his compatriots possessed bacteriological weapons, 5-liter bottles of red

mercury, and Stingers, the latter passed on to him "by a fellow Chechen." Whether Basayev possessed these weapons or not has not been verified, but there was enough circumstantial evidence (pictures in a newspaper of them lying on a blanket, and a photo of two Stingers being held by a masked man) to make the claim worthy of concern to Russian pilots (Americans can clearly recall the psychological terror posed by the "potential use" of chemical weapons by Sadaam Hussein during the Gulf War). Stingers had inflicted severe psychological and physical damage to Russian pilots in Afghanistan (see discussion below), and now pilots were led to believe they had to confront them again. In addition, a string of Russian ground attack fighters (three, in all) blew up in mid-air when pulling a certain number of Gs, and the rumor circulated that these fighters had been sabotaged by Chechens. As a result, for a long time there was great reluctance among pilots to perform certain air maneuvers.

Chechens also intimidated Russian pilots by warning that they knew which pilots were bombing them, their addresses, and the names of their family members, and warned the pilots that they could not protect themselves or their families all the time. Officers' families, whether ground troops or pilots, received threatening phone calls warning the family to tell the father not to fight or bomb Chechens, or face the consequences. Obviously, these actions were all designed to intimidate pilots to stop flying or shoot poorly. Interestingly, the NATO pilots currently flying missions in Kosovo, even those shot down have not been named.

Another type of psychological operation was **provocation**. A classic use of this technique involved the Chechen exploitation of Russian aircraft hovering or flying over villages. When this happened, Chechen rebels in the village would open fire on the plane if they had air defense assets, hoping not only to hit the plane but to draw return fire. Since return fire from the aircraft would usually miss the weapon system (a point target), no harm was done to the guerilla force but it was not uncommon for a house or road to be destroyed. This incurred the wrath of the local villagers, and the militants used this anger to recruit additional local fighters. Provocation became a recruiting technique and caused stress for the Russian soldier on the ground because everyone hated him even more. As a result, soldiers were constantly looking behind them.

Deception was also used heavily in Chechnya. The Chechens took control of some radio nets associated with the direction of artillery or air force firepower on several occasions, and directed Russian air strikes on friendly forces. According to one British analyst:

To further compound communication problems, it was found that virtually all radio frequencies and nets were being monitored by the Chechens...because requests for close air support (CAS) missions included details of troop concentrations, weapons, and enemy positions, it was often the case that the targets would disappear before the mission was on task, or the Chechens would engage the Russian positions with artillery or mortar fire...there were even reports of Chechens taking control of CAS missions and redirecting aircraft onto Russian positions. As the conflict wore on, many unit commanders were unwilling to indicate the position of friendly forces or even to accept CAS missions in their areas of operation.²

Persuasion, the old game of loud speakers and leaflets, was also used. Dudayev's special services carried out propaganda activities to urge home guards to engage in sabotage, and to persuade inhabitants that Russia's military actions, and the conflict in general, had a religious bias aimed against Muslims and Islam. If Allah was on their side, what did they have to fear? For the Russian soldier, this implied that people were driven by some religious fervor or extremism and increased the psychological pressure on them due to their exaggerated image of the enemy as driven religious fanatics.

Sergei Stepashin, currently the Prime Minister of Russia, but the head of Russian counterintelligence at the time of the fighting, believed that a difficult task for Russian mass media in the future would be to change the psychological stereotype that Dudayev's ultra nationalist propaganda drummed into the consciousness of ordinary Chechens, particularly rural inhabitants. Russian activities, however, did just as much to reinforce this tendency. Chechen difficulties were highlighted against the backdrop of Russia's air power brutality. It was not until much later that the word circulated about Chechen brutalities. As a result, morale among Russian pilots and servicemen plummeted as they fought a war no one, in their opinion,

appreciated or understood. And with that depression came more combat stress injuries.

What is Combat Stress?

Combat stress is the result of internal and external stressors. It most often relates to stress that a soldier experiences while actually performing a combat or combat related mission. Combat stressors do not come from enemy actions alone. Many stressors are generated from the soldiers own unit, leaders, and mission demands. In MOOTW environments, stress may result from rules of engagement that are different than in a traditional combat zone, the proximity of the combatants to one another, or the severity of the fighting, among other issues. If the stressors continue for an extended period, an individual's adaptive resources become overwhelmed.

One of the primary (and obvious) factors leading to combat stress is a soldier's fear of dying. This can be curbed somewhat by proper preparatory training, good unit morale, proper leadership, and high state of an Army's equipment quality and readiness. It is also dependent on the proximity of medical assets and personnel to properly diagnose and treat battle stress. The absence of these factors allows tension to increase without any precautionary pressure releases. Soldiers can simply be overwhelmed by feelings of helplessness and rage. As casualties mount, and if performance does not meet expectations, a unit will experience more combat stress casualties. In Chechnya, soldiers used in the initial assaults were poorly trained, lacked unit cohesion (some soldiers did not know the last name of others in the same tank), and confronted guerrillas fighting for the survival of their nation (while many Russian conscripts had no idea why they were fighting!).³

Combat produces two types of behavior, one positive or adaptive, the other dysfunctional. Both may cause a soldier to become a combat stress casualty either in the short-term (during or immediately after a battle) or long-term, after the fighting has stopped and the soldier is either out of the combat zone or even out of the armed forces. Some elements that help form adaptive behavior are unit cohesion, a sense of mission, vigilance, loyalty, and acts of heroism. However, overexposure to extreme combat conditions can stress even a good soldier, and the

individual may end up committing criminal or other acts of misconduct. Elements leading to dysfunctional behavior are criminal acts, which include mutilation of enemy soldiers, looting, alcohol abuse, riding sick call, desertion, and killing noncombatants; and battle fatigue, the latter characterized by hyperalertness, fear, impaired performance of duty, apathy, and others. All of these behaviors, either adaptive or dysfunctional, can lead to Post-Traumatic Stress Disorder (PTSD), which produces intrusive flashbacks, guilt, sleep disorders, social isolation, exaggerated startle responses, substance abuse, or various forms of misconduct. A formal definition of PTSD is:

The development of characteristic symptoms following exposure to an extreme traumatic stressor involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate. The person's response to the event must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from the exposure to the extreme trauma include persistent re-experiencing of the traumatic event, persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness, and persistent symptoms of increased arousal. The full symptom picture must be present for more than 1 month and the disturbance must cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.⁴

The PTSD is an equal opportunity affliction, capable of affecting the newest private or the commanding general. Treated immediately and in close proximity to the front, the expectancy is that soldiers experiencing PTSD could return to their units in 3 days. The severity of combat stress seems to depend on whether the soldier endured an intense combat period (resulting in a high incidence of significant psychiatric disorders); a moderate stress environment (somatic complaints or fatigue cases); or intermittent stress (behavioral disorders).

An Initial Evaluation of Stress-Related Injuries in Chechnya

The first visible indicator of the traumatic nature of the attack on the psyche of Russian servicemen as a result of combat activity in Chechnya was an article in *Military Medical Journal*, a mere 4 months after the start of serious fighting. In his article, "Psycho-Physiological Support of Combat Activities of Military Personnel," V.S. Novikov, professor and Major General in the medical service, gave a scathing account of the neurological disorders he was observing in Chechnya.⁵

To Novikov, psycho-physiological support includes an assessment and then prognosis of the combat readiness of troops based on their physiological condition; and includes psycho-physiological selection and psycho-physiological monitoring. Selection is based on screening troops and selecting those still capable of performing combat activities. Monitoring includes researching psycho-physiological conditions; discovering functional and pathological disorders; assessing a unit's combat readiness; correcting and rehabilitating combatants; and forecasting possible consequences of combat stress to combatants.⁶

Novikov screened 1,312 troops in his survey. He found that 28% were healthy and the other 72% had some type of psychological disorder (46% exhibited asthenic depression, a weak, apathetic or retarded motor state) symptoms, such as insomnia, lack of motivation, high anxiety, neuro-emotional stress, tiredness, and hypochondriacal fixation (when a soldier is primarily concerned about cardiovascular functioning. Frequently, this is expressed as concerns about heart attacks, difficulty in breathing, and may be diagnosed as a panic attack); and the other 26% exhibited psychotic reactions such as high anxiety or aggressiveness, a deterioration of moral values or interpersonal relations, excitement or depression (psychotic disorders are those with marked stressors diagnosed by DSM-IV typically when there is evidence of delusions, hallucinations, disorganized speech, grossly disorganized behavior, or catatonic behavior). About 40% of those screened demonstrated a lack of neuro-psychological stability that included depletion of cardiorespirator system reserves and a deterioration in psychological self-regulation and communications capability. The longer a soldier was stationed in the war

zone, as expected, the more radical the change in his neuro-psychological condition. Novikov termed this condition Post-Traumatic Stress Syndrome (PTSD, that is, Novikov used the English abbreviation (!) in the Russian original). The percentage of troops with combat stress disorders was higher than in Afghanistan, he added, which implied that combat in cities produces more combat stress symptoms than some other types of conflict, and consequently, is a category of combat that should be closely monitored.⁷

The research also revealed that some 32% experienced extreme stress while preparing for combat. These soldiers were taught active and passive muscular relaxation, and others received psychological therapy or even pharmacological treatment (to treat insomnia or stress). As expected, the peak of psycho-physiological stress occurred during times of real danger, as first emotions, then exhaustion, and finally, personality disorders emerged. After their removal from combat, troops asthenic (that is depressed, retarded motor skills, or loss of interest to the extent of self-preservation or actions in response to orders) symptoms decreased while their psychotic disorders increased. This offered a trend toward the formation of sociopathic/psychopathic inclinations, including increased impulsiveness and unreasonable focusing on minor problems.⁸ Individuals focused intently on self-interests and lacked the capacity to care about others in the physical, moral, or emotional sense, with a marked disregard for standard social values.

In conclusion, Novikov noted that the psycho-physiological support of combat activity should include a determination of the psychological characteristics of individuals, and a determination as to which group of combat activity (support troops or fighting troops) an individual should belong. It should also include assessments prior to, during, and after combat by a specialized psycho-physiological group. To correct psycho-physiological problems, collective suggestive influences and pharmacological treatments are the most effective. There should be five specialists at Army level - two psycho-physiologists, and one each psychopharmacologist, psychiatrist, and medical psychologist. This group can assess and provide help to 200-250 people per day, in Novikov's opinion. Finally, a recommendation was made to provide psycho-physiological support to units

in support of combat activities. These specialists could be trained at the Military Medical Academy by establishing a special psycho-physiological department. This latter recommendation offers evidence of the seriousness of the psychological injuries that were sustained in Chechnya, and the medical staff's inability to cope with them at the time.⁹

Post-War PTSD and Care

The analysis indicates, and the *Military Medical Journal* substantiates, that the primary lessons learned by the medical service in Chechnya were to pay special attention to psycho-preventative measures to reduce combat stress, preclude or reduce psychological injuries, and thereby preserve or raise the combat capability of the force.¹⁰ The Military Medical Academy may be at the forefront of these efforts. Another area of concern, highlighted by the military press, was the rehabilitation of soldiers released from service and still suffering psychological trauma after their return to society.

An entire series of articles was devoted to the condition and fate of these young men who were attempting to return to civilian life. The articles indicated that the young Russian soldiers who fought in Chechnya, similar to America's youth after Vietnam, suffered from PTSD and found it difficult to adapt. The measures adopted by the Russian military to treat PTSD are offered here for consideration.

Apparently, this problem did not receive much attention for a number of years, perhaps because the Soviet military did not fight a prolonged war until Afghanistan. For example, one article noted that not until the 1980s did the Soviet Union's medical personnel begin to look at the psychological consequences of combat stress. At first, the focus was on manic depression, epilepsy, mental debilitation, and schizophrenia. Later, other lesser reactions were examined. In general, Soviet psychologists believed that psychological afflictions appeared to be temporary due to their adaptive nature, that is, they appeared to be afflictions that responded to treatment. Soviet psychologists also believed in the power of "internal energy" to help heal a victim. But if too much "negative energy" slipped past a person's defensive barriers, the energy could manifest itself later in unmotivated

aggression, sleep disruption, the use of alcohol or narcotics, or the degradation of a person's vital signs. Without timely attention, this could result in psychological derangement and require more than a psychologist to help the victim, the author noted.¹¹

The author also underscored the importance of having a victim of combat stress recall both what he remembers and, with a psychologist's help, what lies in his subconscious. If this process is repeated a sufficient number of times, then a person's internal energy will help neutralize the trauma and bring the body back to some state of equilibrium. To make the psychological help effective, six principles were recommended: the victim must realize he needs help and must work with and trust the psychologist completely to achieve some satisfactory result; assistance must be offered immediately, even during pauses in combat; the assistance must be offered near the field of battle; the structure of daily military activity of the individual and the composition of the unit must be preserved; information-educational work must be oriented toward the recognition of the high value of the missions completed; and the amount of time spent on psychological help to an individual must be limited. Some psychological ailments or afflictions can be handled in hours, but others must be sent on to evacuation points, and their care may take several days. If this does not work, then the patient is sent on to division medical points for up to 2 weeks.¹²

These afflictions affected both ground soldiers and pilots. Experience in Afghanistan demonstrated that within 5-12 hours after a combat mission, some pilots suffered several types of psychological disorientation. They could experience one or a combination of the following symptoms: a rise in body temperature, serious headaches, weakness and indisposition, shivering, back, neck and extremity pain, or dry mouths. Vision decreased temporarily in some and others went into a stupor. Psychological assistance helped alleviate these symptoms within 36-48 hours, and allowed afflicted pilots to return to their military duties in 3-5 days.¹³

For others, however, it was only when war ended that their psychological afflictions became known. From March 97 to 98, which was 7 to 19 months after the end of fighting in Chechnya, estimates were that 10,000 Russian soldiers needed psychological help. Rehabilitation points,

centers for psychological consultation, and rooms for psychological relief were established on three levels: in military units; in military sanitariums or rest homes; and in government and nongovernment regional rehabilitation establishments. These centers already helped return over 20,000 former soldiers to work.¹⁴

A second article of interest for the discussion of PTSD in Chechnya, "Life after Military Service," was devoted to the psychological adaptation of participants of wars to modern living conditions. Written by military psychologist Aleksander Kucher, the article noted that nearly 35,000 soldiers and their families (the latter often forgotten by many military specialists) had received psychological counseling since 1996. Many suffered from PTSD, characterized by increased aggressiveness and emotional instability. This affliction resulted from recollections of comrades who died, and manifested itself in nightmares and insomnia. Similar symptoms were even found in the parents of soldiers if the latter did not return from the war.¹⁵

Kucher also attacked some of the other works published in Russia about psychological problems caused by combat in Chechnya, noting that they were neither objective nor correct. He was particularly upset that some authors labeled soldiers as murderers, rapists, marauders, sex perverts, and abnormal people who should not be hired until they became "normal." Kucher felt these authors divided people into two groups: those who enjoy taking risks and killing, having overcome their fears; and those who, when killing, find comfort in drugs, alcohol, and perverted sex. One such article he attacked asked "is it possible to restore the humanity of such a person?"¹⁶

Kucher objected strongly to this classification, noting that such authors have completely ignored the group of soldiers who returned in near normal psychological shape. These latter soldiers fulfilled their duty to the Motherland while risking their lives, yet still maintained a degree of emotional stability. Some found after returning home that they had no money, no place to live, were forgotten by their friends and the government, and simply asked "why"? Sometimes, the criminal world is successful in recruiting these unappreciated kids, Kucher added. This happens most often if they are given no attention, no respect, or no recognition by society. Kucher believes that

a government law is needed not only to offer these people respect, but to rehabilitate them. He is most worried that an attitude is forming toward Chechen war veterans that is void of understanding and far from friendly.¹⁷

Some Russian Recommendations/Conclusions

There are many indicators that the Russian military is trying to cope with this problem. New methods beyond the old fashioned "100 grams of vodka" given in World War II to increase a soldier's bravery (or reduce his rational understanding of fear) are in various stages of progress. One new development is a medical "psychological first aid tent." Here, medical personnel experimented with the creation of a "club" that mixes a video salon and a classical music center. The purpose is to offer a musical and soft scene treatment to sooth the injured psyche of the soldiers. Psychologists recommended showing on video screens burning logs in a fireplace, a view of the ocean, or a mountain scene. In an adjoining tent they developed a mini-hall featuring the music of Vivaldi, Schubert, and Chopin. In a corner, personnel positioned a white screen on which they showed landscapes, flowers, and waterfalls - yet other methods of "psychological correction."¹⁸

Psychologist Viktor Razduev noted that in future wars Russia would expect, at a minimum, that 20% of the participants would return home with some type of post-war psychological syndrome. A specialist from the Ministry of Internal Affairs (a Russian ministry responsible for civil order and quelling ethnic conflict in the country, and a direct participant in the Chechen conflict) noted that after 1 month, up to 60% of its soldiers serving in "hot spots" had a change in their psyche in one form or another. He recommended forming "collectives" of specialists (psychologists, psychiatrists, psycho-pharmacologists, etc) in mobile teams for future wars to treat those suffering such afflictions. He, and others, recognized that if you can get to a person in hours, or no later than 2-3 days after suffering psychological trauma, you could weaken or even prevent PTSD's onset. Another important finding was that even in peacetime or in pre-combat conditions, psychological help (training, conditioning, etc) should be rendered as well.¹⁹

In conclusion, Chechnya was clearly a war infested

with a special psychological flavor for Russian combatants because of the special circumstances of the conflict (fighting their own citizens under the toughest of circumstances, that is, combat in cities using a poorly trained and informed force vulnerable to intimidation, persuasion, deception, and provocation). The emotional environment was high risk. The combat stress casualties sustained by the Russians were predictable, based on the experiences of armies fighting in World War II, Korea, Vietnam, Israel, the Falklands, and Somalia.

The fighting in Chechnya possessed many of elements that should give pause to any military planner: a civilian population that did not welcome foreigners, an unpopular and poorly supported war with an open-ended mission, a lack of predictability, and a mobile enemy force that seemed to know everything about your armed force. These circumstances reinforced the need to have a clear military agenda, proper training, effective command relationships, and the national will to pursue the fight when forces are deployed.

The rehabilitation of troops suffering psychological injuries after this conflict will take a sustained effort by the Russian medical service, especially since a recent lack of experience caused many mistakes to be made. Soldiers who were treated inadequately at the front are at increased risk to be chronic patients in the medical system. Attempts at using drugs or rest tents with classical music and peaceful scenes is only a partial answer for many soldiers. The basic principles of keeping the soldier near his unit, and keeping the unit in contact with the soldier with the expectation he will return to the unit is crucial during the early stages of treatment. Many of these principles were violated in the early fighting, when the duration and intensity of the conflict was unknown, and it will be more difficult to rehabilitate these soldiers.

Another crucial area for the Russian medical service today is the identification and treatment of those soldiers who are classified as PTSD. The PTSD does not always appear immediately after a conflict, taking as long as appear immediately after a conflict, taking as long as months, or even years to appear. This will certainly add additional stress to the lives of many veterans.

The experiences of the Russians in Afghanistan and

Chechnya (and the U.S. experiences in Vietnam and Desert Storm) offer analysts an excellent chance to study the impact of modern warfare on the psyche of the soldier. A joint conference between the Russians and the U.S. would prove beneficial and interesting to discuss the effects of combat stress in varying environments, from desert and jungle to cities. Both nations have extensive experience and expertise in the way warfare is conducted, and casualties counted and treated. Studying the symptoms and treatments of soldiers involved in fighting on different types of terrain is an important peacetime function of the medical corps. The growth of the science and art of mental health evaluations for soldiers participating in MOOTW environments is a specialty worthy of closer study.

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AUTHORS:

†Mr Thomas is an Analyst assigned to the Foreign Military Studies Office, U.S. Army Combined Arms Center, Fort Leavenworth, KS.

††Medical Service Corps. At the time this article was written, Major O'Hara was a psychologist assigned to the U.S. Disciplinary Barracks, Fort Leavenworth, KS.



The Evolution of Managed Care Within the Military Health System

MAJ Robert L. Goodman, MS†

This article is a review of the history of military managed care and major changes in the proposed new regional Managed Care Support Contracts (MCSC). Regional Lead Agent Offices, Military Treatment Facilities (MTF), and the MCS Contractors have been working with different financial incentives during the implementation of these large MCSC and Enrollment Based Capitation (EBC). The introduction of the newer MCSC is built upon the many lessons learned during the recent growth phase of managed care within the Military Health System (MHS). With the ever-increasing scrutiny of military medicine's peacetime value to the Department of Defense (DOD), the MHS must rectify the mistakes of the past and demonstrate the ability to provide managed, fiscally responsible healthcare to eligible beneficiaries. Multiple initiatives were undertaken during the 1980s to control the growth in the Civilian Health and Medical Program for the Uniformed Services (CHAMPUS) which provided lessons learned for capitation financing, enrollment, and the more competitive TRICARE Regional MCSC of the future. TRICARE 3.0 should allow the MHS to regain a competitive advantage and become the managed care provider of choice for DOD beneficiaries.

Introduction

Military healthcare delivery has changed significantly during the past decade. The MHS was sustained with relatively high levels of funding and staffing during the 1980s. The early 1990s saw the advent of capitation funding. The former Health Services Command (HSC) changed the funding methodology for 11 U.S. Army MTFs on 1 Oct 91. The HSC passed out funding based on the local population. Many believed this "capitation thing" to be a passing trend that would go away like so many other ideas for controlling medical cost growth.

Historical Framework for Managed Care in the MHS

The large-scale mobilization of the American military in 1943 quickly created a void between the available healthcare the military system could provide and the massive growth of dependents resulting from the new, largely drafted military. Congress passed the Emergency Maternity and Infant Care Program (EMIC) in 1943, solely to provide medical coverage for the wives and infants of the four lowest grades in the armed forces. During the rapid demobilization upon the conclusion of World War II, the number of active duty dependents subsided to a level

that could be handled by the military healthcare system. In 1949, the EMIC program was terminated.¹

The Korean conflict began in 1950 and again caused the military healthcare system to be stretched beyond its capability. The Korean conflict, combined with the strong 1940s and 1950s labor movement requests for improved benefit packages, of which medical care for family members was a major element, led to the 1956 congressional legislation that enacted the CHAMPUS.

The original CHAMPUS was a private insurance plan administered by the Blue Cross Association, Blue Shield plans. The benefit package was (and still is) roughly equivalent to the Blue Cross/Blue Shield "high" option.² This unique administration arrangement was the precedent for the even more complex Federal Employees' Health Benefits Program (FEHBP) which was enacted in 1959.³

Initially, the CHAMPUS costs were low, both in terms of real dollars and as a percentage of the military healthcare expenditures. However, by the mid- to late-1970s, CHAMPUS costs began to grow rapidly. Compounding this growing CHAMPUS bill was the increasing referral of CHAMPUS and Medicare eligible

care out of the MTFs with no financial penalty at the local unit. This practice became known as cost shifting.

The CHAMPUS bill was fully paid by the DOD until 1987. At each year-end close, the Secretary of Defense would regularly return to Congress with a request for additional funds for unpaid, outstanding CHAMPUS bills. Two important changes occurred during 1988. First, Congress directed that the individual services would be held accountable for their own CHAMPUS expenditures. Second, CHAMPUS payments made to hospitals was changed from billed charges to diagnostic related groups (DRG).⁴ These two changes helped set the stage for service and MTF accountability.

The 1980s: Important Lessons Learned

Several demonstration projects were put into action during the late 1980s. One involved a DOD (Health Affairs [HA]) directive to combine facilities in close geographic settings. Three sites were selected. The project in San Antonio, Texas, involved placing control of staffing and resources of Brooke Army Medical Center under the direct control of the Air Force's Wilford Hall Medical Center. In 3 years, no cost savings or slowed cost growth occurred.⁵

Another initiative was the Catchment Area Management (CAM) demonstration projects. The CAM demonstrations were an attempt to give a local MTF commander the responsibility and authority to manage the delivery of healthcare within a 40-mile radius of the hospital. The MTF commander could build networks and preferred provider arrangements to lower CHAMPUS costs and begin better healthcare management.

Because of the severe shortage of primary care, the services developed contractor owned-contractor operated clinics situated near large CHAMPUS eligible population centers. These clinics, called PRIMUS by the Air Force and Army, provided essentially walk-in care. Because these clinics were often funded on a workload basis, this did little to improve the management of primary care for enrolled beneficiaries.⁶

Clearly, the most ambitious demonstration undertaken by the DOD (HA) was the CHAMPUS

Reform Initiative (CRI). Initially, it was designed to augment readiness in the event of another major mobilization. The plan would allow a seamless transition of care for dependents from the MTF to a designated network of civilian providers. The partnership would be with major healthcare delivery organizations and use a fixed-price, shared-risk contract. The original concept was enormous but the pilot project was scaled back to just two states, California and Hawaii.

When Foundation Health Corporation finally accepted the contract for the CRI, they proceeded to develop provider networks and established a product called CHAMPUS Prime. In CHAMPUS Prime, enrollees were promised increased access and would have their deductibles waived if they agreed to use only the network providers. They were also provided with free preventive care visits. By most accounts, beneficiaries were pleased with the increased ease of access.^{7,8}

Other initiatives provided valuable information for building the foundation of the regional MCSC. One initiative involved the revision of the contract with a Fiscal Intermediary (FI). Rather than simply paying CHAMPUS claims, the FI was to implement managed care concepts. Wisconsin Physicians Service (WPS) was awarded the contract for the Southeast Region Preferred Provider Organization (PPO) demonstration project and began providing services in Jul 90. Many MTFs viewed the FI as the support contract for developing local PPO networks. The WPS provided many management reports on PPO usage, services consumed, and savings resulting from Utilization Review activities undertaken by the FI.⁹

The lessons learned from these initiatives were extensive. The most important lesson learned was about our own perverse system of financing the MTFs. The Medical Care Composite Unit (MCCU) was the standard system of reimbursing the costs of delivering healthcare within the MIIS. It heavily favored the delivery of inpatient care. This created a reward system that was contrary to managed care concepts. Inappropriate admissions and extra long stays in the MTF actually resulted in increased funding.

Work had begun in the late 1980s to transition the DOD healthcare system from MCCU-based funding to

DRG-based funding. However, under either funding program, a visionary commander who initiated strict utilization would only be cutting his or her own funding. This would only be alleviated through the introduction of a capitated form of resource allocation for each MTF. Capitation financing would not reward unnecessary admissions or additional occupied bed days.¹⁰

Capitation financing empowered the MTF commander with a stable source of funding and the freedom to be innovative. Savings from appropriate utilization could be reinvested into prevention and other programs designed to manage the health of the beneficiaries instead of continuing the unmanaged treatment of acute, episodic care. The goal clearly was to manage wellness by emphasizing education and prevention. Research provides strong evidence of the effect behaviors such as smoking, drinking, and poor diet have on overall health. Tobacco usage, diet and exercise patterns, and high rates of alcohol consumption directly resulted in 38% of the disease processes that caused death in 1990.¹¹

The second major lesson learned was the lack of healthcare delivery coordination. Little work had been done to coordinate care in the right quantity at the right place and at the right time. Because cost shifting the excess workload to CHAMPUS or to Medicare was “free” to MTF commanders, they were unmotivated to worry about providing adequate primary care managers, or “gatekeepers,” to ensure access and management of care for the beneficiary population. This ability to shift care to another source served to provide another method for MTF commanders to abdicate financial accountability under this perverse reward system.

A concept called resource sharing was tested under the CRI. This involved the contractor providing healthcare assets (usually personnel) to a local MTF in exchange for workload credit. Resource sharing, “enhanced the capability of the MTFs by selectively increasing staff and material resources, ...enabling facilities to operate more productively and therefore proved to be a valuable component of the CRI demonstration (p 782).”¹²

However, this may have led to further CHAMPUS cost increases under the CRI contract because of the “cost-

plus” provisions in the CRI shared-risk contract for workload shifting. The lessons learned from writing the CRI contract, though expensive, enabled the MHS to write the MCSC and implement TRICARE.

The Conflict with Capitation Funding: MCSC

The capitation model proposed by COL Douglas Braendel in 1990 for re-engineering the MHS was a clear departure from the status quo. A major element of the model required a new method for financing MTFs. He proposed using capitation financing, based on the number, age, and sex of enrollees in each catchment area. Because cost shifting CHAMPUS patients could not be allowed to continue, the model included the CHAMPUS dollars within the overall funding level of each MTF. By doing this, an MTF commander could no longer avoid the financial accountability for cost shifting eligible beneficiaries.¹³

As a result, HSC proposed and implemented an early form of capitated funding in FY 92. The military payroll was added to the operations and maintenance dollars. In addition, a new precedent was set by the passing of the local CHAMPUS costs down from the service (Army) level to each MTF. Provisions were made to allow the local commander to recapture workload from CHAMPUS and reap the savings. This change in the financial incentives provided a foundation from which managed care and innovation could take place.

Following the capitated financing methodology incorporated by HSC during FY 92, the DOD (HA) introduced a modified capitation methodology to allocate funds during FY 94. The MHS leaders could afford to promote lower utilization and begin reducing inpatient infrastructure after the perverse financial system was removed. The reduction of inpatient infrastructure allows resources to shift towards new forms of outpatient care (such as advice nurses) or administrative functions (such as healthcare finders and the coordinated care staff).

However, just a year after HSC had implemented capitation across all Army MTFs, the first of the TRICARE MCSC was initiated in Regions 9-12 during late 1993. The implications were enormous for the MHS. The gravity of the situation was created by the differing

incentives concerning workload. With the MTFs freed from the concern with workload, Utilization Management (UM) actions began taking place. The UM actions began occurring during FY 93, coinciding with the data collection period for the Region 9-12 MCSC.

The initial TRICARE MCSC were based on the contract language from the 1991 New Orleans Managed Care Demonstration project. The demonstration was structured to offer a triple option (HMO, PPO, and standard CHAMPUS) through a risk-based contract, with a provider network, UM, and quality assurance programs.¹⁴

The TRICARE MCSC are essentially workload-based, shared-risk contracts with the following main components. The contractor bid on the healthcare claims portion of historical regional data. A guarantee for a profit was added after the bid. Additionally, a new set of expenditures was allowed in the form of regional contract administration and administrative profit. Further adjustments, through risk sharing and bid price adjustments (BPAs), can be made based on MTF workload shifts and population changes. Risk-sharing and BPAs were intended to protect the government and the contractor from the enormous risk associated with these large and complex contracts.¹⁵ The Lead Agent activities could also make requests from the MCSC such as contractor-provided UM and other management reports.

An important modification occurred prior to the Region 6, 3-4 contracts. Data collection for inpatient care was modified to remove raw dispositions for both the MTF and CHAMPUS workload and replace the MTF portion with Non-Availability Statements (NASs). This important distinction was in line with the change in the financial incentives created by the implementation of capitation methodology for resource allocation in the MHS. If capitation allowed MTF commanders to initiate good UM, this was offset by the BPA language in the Region 9-12 MCSC. The MCSC Region 6, 3-4 changes reduced some of the artificial penalties created when inappropriate admissions and excess bed days simply disappeared. The MCSC Region 9-12 language allowed the assumption that MTF workload reductions represented new workload for the contractor.¹⁶

TRICARE 3.0, The New MCSC

With all MTFs now receiving a capitated form of funding, DOD recognized that further restructuring of the MCSC was necessary. First, the idea of a workload-based (visit, NASs) contract needed revision. The concepts of Resource Sharing and Resource Support suffered from several problems. Finally, there was a need to take potential win-win arrangements between MTFs and Regional contractors out of the BPA arena.

Briefings in Nov 97 and Feb 98 detailed many of the improvements offered by TRICARE 3.0. There would be no government provided estimates of workload to the contractor. In line with EBC, MTF Prime enrollees will receive their care in the MTF, other direct care MTF, or in a civilian hospital. This care will be funded by the enrollee's catchment area MTF. To eliminate the negative impacts of the workload BPA and create a win-win situation, MTFs will be able to purchase care from the MCSC civilian network and the bill will be reconciled at the end of each month. Another win-win situation was created by offering the MCSC the opportunity to purchase care from the MTFs for items the military produces at a lower cost than the civilian market.^{17,18} Another change included the likely elimination of resource sharing arrangements. Montgomery provides two fine examples of both an effective and a disastrous resource sharing arrangement. A major problem with resource sharing was a general lack of understanding of the process at the MTF-level.¹⁹

The risk-sharing corridor has been simplified to offer more profit to the contractor (30%) in the event of cost savings. However, in the event of increases in the CHAMPUS medical costs, the contractor will be accountable for a greater (30%) portion of the loss.

Another improvement is the requirement for the contractor to itemize pricing for available support services. This will allow Lead Agent offices the opportunity to perform some fact-oriented cost analysis before asking for the contractor to perform a support or administrative service.^{20,21}

The research on MHS managed care continues to grow. LaMar, Jacoby, Meyer, and Potter provide a

valuable managed care physician staffing tool. It has applicability for both MTF and Regional uses. Their model is based upon civilian norms for age and sex distributions and that military primary care providers will be able to see nearly 400 visits per month and does provide a useful benchmark to strive toward. LeMar et al determined that 141 physicians and 15 additional provider extenders (physician assistant or nurse practitioner) can care for 100,000 eligible TRICARE beneficiaries. This was further defined by prescribing the numbers of each type of physician specialty required and can be modified for each catchment area. Based on the local available military providers in the MTF, remaining requirements may need to be filled by the TRICARE MCSC.²²

Alain Enthoven wrote an article on the failure of managed care to contain costs. He concludes that while managed care plans have clearly reduced costs, overall healthcare cost growth had remained above 11% annually. His analysis led him to believe that purchasers are insensitive to costs. Because the consumers are insensitive to coverage costs, little effort has been made to cut costs.²³ Price insensitivity may be the greatest threat to the MHS. The Services' Line component or Congress may conclude that MHS managed care has failed to control healthcare costs and choose the FEHBP instead. The additional costs of this fee-for-service plan with multiple options, would be offset with significant reductions to the active duty force structure of the medical departments.²⁴

The 21 Feb 97 Government Accounting Office (GAO) report on the Defense Health Program (DHP) indicates that \$15 billion spent by the DHP accounts for 6% of the total DOD budget. The bottom line is that the DOD (HA) program objective memorandum overestimated UM savings and did not factor in increased operating costs for new technology and medical intensity.

The GAO estimate for medical reprogramming is \$8.4 billion from FY 98 to FY 03. Even more disturbing is the MHS' past history for underestimation of true costs. From FY 86 to FY 90, reprogramming was always necessary. However, centralization of the DHP at the DOD (HA) level since FY 91 has improved the situation. Reprogramming to cover TRICARE Regional Contract cost over-runs has only occurred during four of the last 7 years.²⁵

The 14 Jul 97 GAO report provides little solace. Since 1994, 357 change orders have been made, with settlements on 134 of them for \$336,000. The DOD estimates for the remaining 223 orders are expected to cost nearly \$38 million. While approximately one-third of the change orders are the result of congressional legislation, many of them involve DOD-directed changes to MCSC reporting requirements.²⁶ The GAO reports that the DOD (HA) did not properly manage the change order process. They have paid for the changes by using funds budgeted for other Direct Health Program activities. The GAO predicts that the change orders may require future supplemental funding for the DHP.²⁷

Conclusion

This summarizes the major changes in the proposed new regional MCSC, known as TRICARE 3.0. These changes represent a major improvement and are expected to remove many of the perverse relationships created by the original MCS contract language. The removal of a workload-based MCSC along with Resource Sharing and thresholds for Resource Support will only strengthen the relationship between Regional Lead Agent offices, MTFs, and the MCS Contractor during the refinement of TRICARE implementation for regional beneficiaries. The new MCSC is built upon the many lessons learned during the initiatives undertaken during the 1980s and the capitation financing accomplished by HSC during the early 1990s. TRICARE 3.0 should allow the MHS to regain an equilibrium and become the managed care provider of choice for the DOD.

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AUTHOR:

†Medical Service Corps. Major Goodman is the Chief of Health Policy Analysis, Directorate of Program Analysis and Evaluation, U.S. Army Medical Command, Fort Sam Houston, TX.



Combat Medic Prayer

Oh Lord, I ask for the divine strength to meet the demands of my profession. Help me to be the finest medic, both technically and tactically. If I am called to the battlefield, give me the courage to conserve our fighting forces by providing medical care to all who are in need. If I am called to a mission of peace, give me the strength to lead by caring for those who need my assistance. Finally, Lord, help me to take care of my own spiritual, physical, and emotional needs. Teach me to trust in your presence and never-failing love.

Amen



WRITING AND SUBMITTING ARTICLES FOR THE AMEDD JOURNAL

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