2018 ABSTRACTS OF THE AsMA SCIENTIFIC SESSIONS

89th Annual Scientific Meeting **Hilton Anatole Hotel**
May 6–10, 2018 **Dallas, TX**

The following are the sessions and abstracts with rooms and presentation times for all presentations accepted after blind peer-review—in workshop, panel, slide, or poster sessions—for the 2018 Annual Scientific Meeting of the Aerospace Medical Association. The numbered abstracts are keyed to both the daily schedule and the author index. The Sessions numbers are listed as S-001 through S-092 (including workshops). Session chairs are included in the index to participants. The order of some sessions may have changed (check the Addendum provided at the meeting for the latest information). Abstracts withdrawn are listed as W/D. Presenters are underlined in the text.

SLIDES & PANELS: Each slide presentation is scheduled for 15 minutes. We strive to keep slide presentation on time. Panel presentations have more flexibility and may not keep to a strict 15 minute per presenter format. There will be a discussion period of 15 minutes at the end of each panel.

NEW THIS YEAR!!!! POSTERS: Posters Sessions may be displayed all day on both Wednesday and Thursday! They will be on display in the Chantilly Foyer. Poster authors must be present for the full morning or afternoon session in which their poster is scheduled: **Wednesday 8:30 a.m.–10:30 a.m. or 2:00 p.m.–4:00 p.m.; Thursday 9:30 a.m.–11:30 a.m. or 1:30 p.m.–3:30 p.m.**

EXHIBITS: Exhibits will be open Sunday evening during the Welcome Reception, and 9:30 a.m. to 4:30 p.m. Monday and Tuesday. Please wear your badge and visit every exhibit.

CONFLICT OF INTEREST: All meeting planners and presenters completed financial disclosure forms for this live educational activity. All potential conflicts of interest were resolved before planners and presenters were approved to participate in the educational activity. Any conflicts of interest that could not be resolved resulted in disqualification from any role involved in planning, management, presentation, or evaluation of the educational activity.

PLEASE NOTE: FAA AME Sessions will be held in the Governors Room all week. The schedule appears on p. 157. Please check the addendum for any changes to this schedule.

Sunday, May 06 ***8:00 AM***
Governors

S-001: WORKSHOP: INTRODUCTION TO AEROSPACE EPIDEMIOLOGY - KEY METHODS FOR THE STUDY OF RARE EVENTS

Sponsored by International Association of Military Flight Surgeon Pilots

Chair: Pete Mapes
Bethesda, MD

[001] INTRODUCTION TO AEROSPACE EPIDEMIOLOGY - KEY METHODS FOR THE STUDY OF RARE EVENTS
P. Mapes
Military & Emergency Medicine, Uniformed Services University, Bethesda, MD

(EDUCATION - TUTORIAL)
PROBLEM STATEMENT: Aerospace mishap epidemiology is a unique application of epidemiology to the study of aviation and space mishaps. Since these events are rare, the mathematical evaluation of the data is relatively unique. Sampling is often not an option & many times the entire universe of events must be captured to obtain statistical adequacy. Due to low frequencies, sometimes decades of data are required to show statistical significance. **TOPIC:** This workshop takes the learner through the many methodologies associated with the manipulation of parametric data associated with aerospace mishaps. It also teaches the learner to calculate power to ensure proper sample size. Nonparametric data is discussed at length & the necessity of selecting proper tools to evaluate it is made clear. The workshop addresses modelling & regression. It discusses considerations for building models. Roughly 6 hours of classroom teaching & 2 hours of supervised problem solving are included in the 8 hour program. **APPLICATIONS:** The techniques addressed in this workshop should be considered any time the analyses and/or meta-analyses of aerospace mishaps is undertaken. Learners will understand the need to calculate p-values and become familiar with tools to do these calculations. Learners will practice with U.S. Government freeware made available to the public in a way that allows its use for work with Aerospace Epidemiology. This workshop covers many topics found on the board certification examinations provided by the American Board of Preventive Medicine. **RESOURCES:** Learners will be provided with a printed slide set for the course and a learner's guide. All participants should plan to bring a fully charged PC computer with the appropriate version of EPI INFO (TM) loaded onto it. Of particular interest will be the 'STAT CALC (TM)' subroutines. Practice problems will also be provided for use during the course. A MOC question review will also be provided. The MOC question review must be completed, returned and corrected to 100% before MOC Credit will be awarded.

Learning Objectives:
1. Learners will fully comprehend the nature of aerospace denominators and be able to select appropriate denominators for use in studies of aerospace events.
2. Learners will understand the difference between parametric, nonparametric and Bayesian analyses. They will be able to calculate p-values from parametric data and conduct parametric analyses of rare events.
3. Learners will be comprehend the differences between Taylor Series 2 by 2 table analyses, ANOVA and regression and know when to apply each. Learners will know the nine Bradford-Hill criteria and when to apply them. They will understand the difference between association and causation. They will also understand confounding and bias as well as the differences between internal and external reliability and the import and application of each.

Sunday, May 06 ***9:00 AM***
Sapphire

S-002: WORKSHOP: AIR CREW FATIGUE: CAUSES, CONSEQUENCES, AND COUNTERMEASURES

Chair: J. Lynn Caldwell
Yellow Springs, OH

Chair: John A. Caldwell
Key West, FL

[002] AIR CREW FATIGUE : CAUSES, CONSEQUENCES, AND COUNTERMEASURES

J. L. Caldwell[1] and J.A. Caldwell[2]
[1]Aeromedical Directorate, Naval Medical Research Unit Dayton, Yellow Springs, OH; [2]Military Nutrition, U.S. Army Research Institute of Environmental Medicine, Key West, FL

(EDUCATION - TUTORIAL)

PROBLEM STATEMENT: Human fatigue stemming from lengthy work periods, circadian disruptions, and insufficient sleep poses a serious threat to performance, safety, and general wellbeing. Leaders, healthcare professionals, schedulers, and aircrew members need to understand the causes of fatigue and the scientifically-valid strategies for fatigue mitigation. **TOPIC:** In modern aerospace settings, long work hours, shift work, time-zone transitions, and sleep disturbances are common. These factors often result in personnel reporting for duty in a fatigued state, leading to mistakes, cognitive difficulties, and mood disturbances that can degrade performance and compromise safety. It is possible to effectively mitigate these difficulties if scientifically validated strategies are systematically applied, including the implementation of crew scheduling practices that are based on a scientific understanding about the underpinnings of fatigue. This workshop will provide a fully-updated, science-based overview of fatigue factors and relevant countermeasures and will emphasize the importance of implementing educational, preventative, monitoring, and mitigation strategies within the context of a fully-integrated fatigue risk management system. **APPLICATIONS:** Effective fatigue management is an important key to optimizing operational performance and safety within aerospace contexts. Up-to-date, evidence-based information on this topic is of broad interest to professionals who are in a position to safeguard and augment human performance in today's demanding operational environments.

Learning Objectives:
1. Learn to recognize the dangers of fatigue in various settings.
2. Understand the major causes of fatigue and apply appropriate countermeasures.
3. Understand the basics of a good Fatigue Risk Management System (FRMS).

Sunday, May 06 ***12:00 PM***
Coral

S-003: WORKSHOP: AEROSPACE MEDICINE FACULTY DEVELOPMENT WORKSHOP

Chair: Richard Allnutt
Wright-Patterson AFB, OH

Chair: Mark Coakwell
Wright-Patterson AFB, OH

WORKSHOP OVERVIEW: This workshop will present current information on various topics of interest to Aerospace Medicine faculty members. The Accreditation Council for Graduate Medical Education (ACGME) requires as part of its residency program accreditation process that faculty members participate in regular faculty development. This may include not only CME-type activities directed toward acquisition of clinical knowledge and skills, but also activities directed toward developing teaching abilities, professionalism, and abilities for incorporating Practice-based Learning & Improvement, Systems-based Practice, and Interpersonal and Communication Skills into medical practice and teaching. This can be accomplished via both didactic (conferences, grand rounds, journal clubs, lecture-based CME events) and experiential (workshops, directed QI projects, practice improvement self-study) types of activities. This conference-based workshop is presented toward the fulfillment of this requirement.

[003] SEXUAL HARASSMENT AS AN ACT OF AGGRESSION : UNDERSTANDING WHAT IT IS AND WHY IT MATTERS

M. Carminati
Carminati Law PLLC, Denver, CO

(EDUCATION - TUTORIAL)

While sexual harassment is generally disapproved in all professional settings, the approach to the issue of sexual harassment is usually flawed from the outset. Sexual harassment is framed as something to avoid because of "political correctness" or as "inappropriate." While these are accurate they also miss the mark. Sexual harassment is about power, women's experiences with gender victimization, and normative behaviors that undermine women's legitimacy in the workplace. In public discourse, questions arise about what consists sexual harassment and sometimes some wonder what the "big deal" is. Understanding sexual harassment as an act of aggression, whether to a person's financial, mental, or physical well-being, shifts the paradigm and allows for more clear development of sexual harassment guidelines and a clearer understanding of why it matters and what to do, both personally and institutionally.

Learning Objectives:
1. Understanding what constitutes "sexual harassment."
2. Understanding why sexual harassment has the effect that it does and why that matters.
3. Developing ways to counteract sexual harassment and sexual harassment mentality personally and institutionally.

[004] EMOTIONAL INTELLIGENCE IN GRADUATE MEDICAL EDUCATION

M.R. Coakwell
Residency in Aerospace Medicine, USAFSAM, Wright-Patterson AFB, OH

(EDUCATION - TUTORIAL)

PROBLEM STATEMENT: Emotional Intelligence includes the ability to engage in sophisticated information processing about one's own and others' emotions, and the ability to use this information as a guide to thinking and behavior. The ability to pay attention to, use, understand, and mange emotions can be highly beneficial to medical residency program faculty as well as to residents and practicing physicians. **TOPIC:** This presentation will address concepts and principles associated with Emotional Intelligence and will suggest ways to improve one's self-management in these areas. **APPLICATIONS:** These concepts and principles

are based upon traits identified and described by Salovey and Mayer in 1990, and can be applied in all interpersonal interactions.
Learning Objectives:
1. Upon completion of the presentation, participants will be able to characterize the four defined areas of Emotional Intelligence, analyze their own traits and understand how to improve them, and then use that understanding to enhance outcomes in interpersonal interactions with others.

[005] ALTERNATE EVALUATION TECHNIQUES OF AEROSPACE MEDICINE RESIDENTS

R.A. Allnutt
Residency in Aerospace Medicine, USAFSAM, Wright-Patterson AFB, OH

(EDUCATION - PROCESS)

PROBLEM STATEMENT: Evaluating physicians in a non-competitive environment opens the door to using evaluation techniques for both mundane and also innovative, non-traditional purposes. **TOPIC:** Evaluation of residents by faculty is an integral part of graduate medical education. Purposes of this evaluation range from demonstrating resident mastery of an area of instruction to reinforcing the techniques or academic knowledge of a portion of the residency. Sometimes there is blurring between evaluation and training. **APPLICATIONS:** Evaluation of residents is most often aimed at determining competence rather than class rank. Examples of such evaluation include multiple choice tests, oral examinations, faculty feedback, and completion of research, presentations or publications. An additional benefit of evaluation can be furthering of the resident's competence through correction, stimulation of discussion, or contemplation regarding the evaluation session. Well-designed evaluation can result in deeper mastery of the clinical and academic material.
Learning Objectives:
1. Understand the limitations of various methods of evaluation.
2. Expand the horizon for new methods of evaluation.
3. Make plans to include alternate methods of evaluation.

[006] RECOGNIZING EARLY TRAITS OF MALIGNANT LEADERSHIP AMONG RESIDENTS AND HOW TO PREVENT ITS PROGRESSION

E. Rodriguez
Aerospace Medicine Residency, USAFSAM, Wright-Patterson AFB, OH

(EDUCATION - TUTORIAL)

MOTIVATION: Professionalism is one of the Accreditation Council for Graduate Medical Education focus areas in the resident's clinical learning environment. Leadership is an important component of the resident education in professionalism, an essential skill needed for the resident to effectively guide the health care team. While must research and education efforts concentrates on the positive traits observed among great leaders, awareness by the residency faculty members of traits associated with undesired leadership qualities are equally necessary. **SIGNIFICANCE:** Program directors and core residency faculty members are entrusted with the education and early development of the future Aerospace Medicine leaders. Identifying best strategies to correct observed gaps in the resident physician skills in leadership and professionalism areas can be daunting challenge for the faculty staff.
Learning Objectives:
1. Create awareness among Aerospace Medicine Residency programs faculty members of the need to address negative leadership traits among as part of the professionalism education curriculum.

[007] ORAL CASE PRESENTATIONS: RECOVERING A LOST ART

M.D. Jacobson[1,2]
[1]Aerospace Education, 711 HPW/USAFSAM, Wright- Patterson AFB, OH; [2]Family Medicine, Wright State University, Dayton, OH

(EDUCATION - TUTORIAL)

The Oral Case Presentation (OCP) represents a distinctive time-honored tradition of the medical profession. Yet, a uniform curriculum and standard are lacking. This session will provide a review of the current literature, present the rationale for OCPs, an overview of the five essential components of an effective OCP, as well as details as to each component, and a mnemonic for recall and evaluating effective OCPs. On a busy family medicine inpatient service, implementing this training resulted in a dramatic improvement in OCP quality, even while cutting average presentation time by more than 50%. Furthermore, differing venues require significant variations in format, so that learning, maintaining and/or recovering OCP skill can help practicing physicians to communicate complex histories and concepts clearly, concisely, logically and persuasively. Effective OCPs involve a skill that extends well beyond residency's morning report.
Learning Objectives:
1. Learners will be familiar with the current literature to ascertain the presence (or absence) of a uniform standard for Oral Case Presentations (OCPs).
2. Learners will be able to identify the five basic components -- and their rationale -- for effective OCPs.
3. Learners will be provided with an easy-to-recall mnemonic that will assist them in articulating and/or evaluating OCPs.

[008] FOR WHOM THE POLL TOLLS: REVIEW OF BASIC SURVEY RESEARCH

J. LaVan
Naval Aerospace Medical Institute, Pensacola, FL

(EDUCATION - TUTORIAL)

PROBLEM STATEMENT: When done correctly, surveys offer a powerful tool for gathering factual information about or opinions of the survey takers. However, there are a variety of pitfalls which can interfere with the quality application of the survey tool. **TOPIC:** A discussion of basic survey research methodology, including a review of pitfalls and errors in survey research and an exploration of techniques for creating effective survey instruments. **APPLICATIONS:** Surveys offer a valuable tool for conveniently gathering objective or subjective data from a variety of subjects with little expense, little chance of observer bias and precise results. However, surveys have drawbacks as well, including lack of flexibility, difficulty addressing controversial topics and inability to individualize queries and responses to obtain nuanced answers to complex questions. This session will review basic principles of survey design and discuss common errors which can hurt results or invalidate outcomes in an effort to refine application of tool which can prove very useful in public health and aerospace medicine research and teaching.
Learning Objectives:
1. Discuss basic methods of survey research.
2. Review common errors in survey creation.
3. Discuss techniques for analyzing survey data.

[009] 2018 ABPM UPDATE FOR AEROSPACE MEDICINE RESIDENCY PROGRAM DIRECTORS

H.J. Ortega[1], C. Lowry[2] and W.B. Klein[3]
[1]Flight Docs Unlimited, LLC, San Antonio, TX; [2]USAF, Office of the Surgeon General, Washington, DC; [3]USAF, Robins AFB, GA

(EDUCATION - PROCESS)

MOTIVATION: The American Board of Preventive Medicine (ABPM) is responsible for awarding certificates of special knowledge in the medical specialty of Aerospace Medicine. Thus the ABPM has a critical interest in maintaining open communication and cooperative relations with residency training program directors in the specialty. Update topics for the faculty development workshop will include ABPM website upgrades, online application process and issues surrounding Maintenance of Certification (MOC). **OVERVIEW:** The ABPM has recently undertaken a significant information technology upgrade to its website and gone to a completely paperless certification examination application process. ABPM relies on program directors to guide and advise their residents through this process, as well as to verify residency eligibility, training program participation and completion status for those physicians seeking board certification. In response to the requirements of the American Board of Medical Specialties (ABMS), ABPM is actively developing the MOC requirements for Aerospace Medicine specialists. This presentation will describe the use of the APBM's new online

application process, the various ABPM pathways for certification, and the expected role of program directors within the certification application process. In addition to answering questions on certification, ABPM directors would like to engender discussion and feedback about certification issues and seek input regarding future directions for ABPM to consider, particularly in regards to website communication with diplomates and MOC. **SIGNIFICANCE:** The ABPM Directors for Aerospace Medicine will present updates of interest to residency program directors/ faculty and answer questions regarding certification examination status as well as discuss maintenance of certification issues that affect program directors and specialists in Aerospace Medicine.

Learning Objectives:

1. Familiarity with the new on-line application system.
2. Understand the important role that Program Directors play in verifying eligibility for Board Certification.
3. Basic understanding of the issues with Maintenance of Certification.

[010] PROGRAM EVALUATION AND IMPROVEMENT INITIATIVES: EXAMPLES FROM THE U.S. ARMY AND U.S. NAVY AEROSPACE MEDICINE RESIDENCIES

J. Venezia[2], J.J. Pavelites[2] and N. Almond[1]
[1]Aerospace Medicine Residency, NAMI, Pensacola, FL; [2]Graduate Medical Education, School of Army Aviation Medicine, Fort Rucker, AL

(EDUCATION - PROCESS)

Alignment of key elements of Accreditation Council for Graduate Medical Education (ACGME) programmatic requirements such as milestones, competencies and Clinical Learning Environment Review (CLER) objectives are important for effective and efficient residency training. ACGME describes many tools that include resident forums, Program Evaluation Committees and Residency Advisory Committees—all designed to assist in the Program Evaluation and Improvement (PEI) process. The uniqueness of the military residency construct including organizational structure, lines of funding, and mission requirements provide challenges that may require innovative solutions to satisfy this alignment. This panel presents PEI examples from the U.S. Army and the U.S. Navy Aerospace Medicine (ASM) residencies. The goals of these initiatives are to implement integrated, continuous PEI in order to better facilitate, improve, or enhance the educational experience. The first three presentations are from the U.S. Army Aerospace Medicine Residency and begin with an overview of the ASM Program. The second presentation will address the implementation of a unique flight training program designed to address ACGME requirements while facilitating capstone flight periods that demonstrate conditions of aeromedical consequence for experiential learning. The third presentation will describe the Operational Aerospace Medicine (OAM) world-wide teleconference, a resident conceived and run forum for timely information dissemination regarding health policy, research, safety, and medical evacuation while simultaneously providing a "reach back" forum for problems encountered within the operational environment. The final presentation will highlight the U.S. Navy Aerospace Residency's engagement within the Global Public Health Navy enterprise. This program is aimed at resident attainment of the Navy's Global Health qualification designation and the degree in Global Public Health from the University of West Florida. Following these presentations, an open panel discussion will be facilitated to elaborate on the presented PEI projects while soliciting unique approaches and best-practices from the audience for consideration by GME faculty.

Learning Objectives:

1. Describe the ACGME tools to include resident meetings, Program Evaluation Committees and Residency Advisory Committees that are used to assist in the Program Evaluation and Improvement process for medical residencies.
2. Discuss the integrated/ continuous model of Program Evaluation and Improvement as applied to the U.S. Army Aerospace Medicine Residency.
3. Explain the role of the Navy's Global Health qualification designation and the University of West Florida's Masters of Global Public Health in the U.S. Navy Aerospace Medicine Residency's contribution to the U.S. Navy's Global Public Health Enterprise.

MONDAY, MAY 7, 2018

Monday, May 07 ***8:00 AM***
Chantilly East

64th ANNUAL LOUIS H. BAUER LECTURE

Morgan Sandercock
"High Altitude Physiology Without an Engine"

Monday, May 07 ***10:30 AM***
Ballroom D

S-004: PANEL: AIRCREW NECK PAIN PREVENTION AND MANAGEMENT - INSIGHTS FROM NATO HFM RTG-252 PART I: CLINICAL

Sponsored by Life Sciences and Biomedical Engineering Branch

Chair: Christopher Goff
Patuxent River, MD

Chair: Barry Shender
Patuxent River, MD

PANEL OVERVIEW: Several surveys published by North Atlantic Treaty Organization (NATO) and other national air forces have chronicled the prevalence of neck pain in pilots and aircrew of most aircraft types. The incidents are greatest in high performance jet aircraft and helicopter aircrews. This is often associated with equipment (e.g., head supported devices), non-ergonomic seating, long duration missions, and environmental stresses (e.g., G-loading). Pain can impact performance, reduce situational awareness, affect behavior (i.e., limit aggressive maneuvering), and has led to aircrew grounding. The NATO Human Factors and Medicine (HFM) Research Task Group (RTG) Panel 252 on Aircrew Neck Pain has a mandate to contextualize and understand aircrew neck pain, conduct the necessary research to evaluate a variety of mitigating solutions, and generate recommendations for reducing the risk of aircrew neck pain. Thus, the overall objective of this NATO RTG is to seek and ultimately recommend evidence-based administrative, procedural, ergonomic, engineering, preventative, and treatment solutions to aircrew neck pain. HFM RTG-252 has developed two panels to communicate its interim findings. Part I focuses on clinical issues. It opens with a summary from an extensive literature review on military relevant neck pain epidemiology. While surveys agree on the prevalence of the issue, the variability in survey design makes it impossible to collate results meaningfully. To address this, the second talk describes a series of core questions recommended for all future questionnaires. Next, we describe two comprehensive aircrew conditioning programs sanctioned by air force leadership and incorporated into aircrew daily workplace schedules. The fourth talk is focused on a core tenant in reducing neck pain risk - a comprehensive education program, based on best practices, that focuses on anatomy, physiology, behavior, and a healthy lifestyle. The session concludes with a discussion of acute and chronic treatment options.

[011] AIRCREW NECK PAIN PREVENTION AND MANAGEMENT – INSIGHTS FROM NATO HFM RTG-252 PART I: A REVIEW OF THE LITERATURE

J. Crowley
U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL

(EDUCATION - TUTORIAL)

PROBLEM STATEMENT: Neck pain and injury have long been known as risks for pilots of high performance fixed-wing aircraft, but in the past 20 years, an increase in neck problems has been documented in helicopter crews as well. This increase is thought to be mainly due to the proliferation of head-mounted displays related to the tactical advantages of night flying in military helicopter aviation. To set the stage for the panel discussion of neck pain problems and solutions in aviation, this