

these unique cases. **DISCUSSION:** Several cases involving difficult diagnoses and complex treatments are discussed. In addition to reviewing the clinical aspects of each case, the administrative variables are also reviewed and sequential outcomes revealed.

Learning Objectives:

- 1 Review several rare, complex medical conditions.
- 2 Better understand the need for a stepwise, organized approach to evaluating multiple conditions.

Thursday, May 17

1:30 PM

Ballroom A

PANEL: FPA PANEL ON CLINICAL MEDICINE UPDATES RELEVANT TO AVIATORS PART II

[464] ATRIAL FIBRILLATION:TREATMENT MODALITIES AND IMPLICATIONS FOR AIRMEN

W.K. AUSTIN

Piedmont Heart Institute, Jasper, GA

INTRODUCTION: Atrial fibrillation is a very common cardiac rhythm disturbance. There are several ways to treat this dysrhythmia including medical treatment, surgical methods, and radio frequency ablation. These will all be discussed especially as they relate to airmen.

Learning Objectives:

- 1 The impact of Atrial Fibrillation especially as it relates to aviation will be discussed.
- 2 The factors which contribute to Atrial Fibrillation will be discussed.
- 3 The audience will learn the medical, surgical, and ablative treatments for Atrial Fibrillation.

[465] 2012 UPDATE: DIAGNOSIS AND MANAGEMENT OF GASTROESOPHAGEAL REFLUX DISEASE

B.A. HECKMAN

George Washington University, Silver Spring, MD

INTRODUCTION: Medical and surgical management of gastroesophageal reflux disease and its complications has improved over the past three years due to improvement in diagnostic techniques, endoscopic therapeutic techniques, and release of medications. **DISCUSSION:** A discussion of medical and surgical therapy to include proper administration of drugs, appropriate endoscopic surveillance intervals for Barretts epithelium and adenocarcinoma, avoidance of use of unproven therapeutic maneuvers, and implications regarding symptomatic GERD and aeromedical concerns.

Learning Objectives:

- 1 To learn what symptoms can be ascribed to gastroesophageal reflux disease.

[466] BLOOD PRESSURE ISSUES FOR AVIATORS

D.R. MAURITSON

Grammer & Mauritson LLC, Tuscaloosa, AL

INTRODUCTION: The panelist will discuss hypertension and its therapy, and the effects of both with regard to functioning as an aviator and FAA flight status.

Learning Objectives:

- 1 The participant will be able to list the potential adverse consequences of hypertension, in particular with regard to functioning as an aviator.
- 2 The participant will be able to describe the drug classes, and individual drugs within those classes, available for treatment of hypertension.

- 3 The participant will be able to list the medications that are allowed by the FAA for treatment of hypertension in aviators, and also those medications that are disqualifying for flight status.

Thursday, May 17

Ballroom B

1:30 PM

SLIDE: STUDIES IN AVIATION SAFETY

1:30 pm

[467] STUDYING THE RELATIONSHIP BETWEEN SAFETY CULTURE AND FATIGUE IN REGIONAL AIR CARRIER FLIGHT OPERATIONS PERSONNEL

T.L. VON THADEN

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INTRODUCTION: U.S. regional air carrier flight operational employees (N = 2553) who had recently developed fatigue risk management policies participated in safety culture assessments using the Safety Culture Indicator Scale Measurement System (SCISMS). Using a 7-point Likert scale, fatigue and risk are reverse-scored (higher scores indicate less fatigue/risk). Across organizations, fatigue items had relatively low means. "Pilots who call in fatigued or not fit for duty are scrutinized by chief pilots or management" received a negative score, below the scale midpoint of four (M = 3.15, sd = 1.76). The scores were again negative when asked if they had "Reported for duty when fatigued, ill, or under unusual stress" (M = 3.32, sd = 1.59) and in response to "My airline's leadership schedules pilots as much as legally possible; with little regard for pilots' sleep schedule or fatigue" (M = 3.42, sd = 1.71). While it was hypothesized that recent attention to fatigue management principles at each carrier would prompt positive responses, improvements in practice and employee perceptions, the original supposition did not prove accurate. Fatigue items correlated moderately strongly with frontline supervisors' (r = .42, .16, and .33, p's < .01) and organizations' commitment to safety (r = .40, .19, and .54, p's < .01). Additionally, the first and third items correlated moderately strongly with organizational risk (r's = .34 and .27, p's < .01) and safety behaviors (r's = .24 and .28, p's < .01). Organizational and supervisory commitments to safety were good predictors of fatigue (R = .585), with organizational commitment the stronger of the two (standardized betas = .40 and .23, respectively, p's < .01). Results suggest misaligned perceptions between air carrier leadership and pilots, increased operational pressures, and the vulnerability on part of the pilots to assure they are supported to consistently achieve fitness for duty.

Learning Objectives:

- 1 The audience will learn that safety culture and organizational commitment provide indications of fatigue relationships in regional air carrier operations.
- 2 The audience will learn that to promote fatigue awareness, air carriers should consistently monitor and measure the usefulness of fatigue programs among their employees.

1:45 pm

[468] ACCIDENTS IN FIXED-WING AIRCRAFT DURING INSTRUCTIONAL FLIGHTS

M.B. O'CONNOR¹, N.A. MODE^{2,1} AND J.M. LINCOLN¹

¹APRO, CDC/NIOSH, Anchorage, AK; ²Nicolle Mode & Associates, Pleasanton, CA

INTRODUCTION: Flight training is generally considered one of the safest categories of general aviation; however no type of flying is without risk. The purpose of this study was to identify risk factors for accidents involving flight instruction in fixed-wing aircraft. **METHODS:** National Transportation Safety Board accident data were used to identify accidents that occurred

during instructional flights in fixed-wing aircraft during 1999-2010. Instructional flights were a part of flight training, those that required instructor supervision or presence onboard. Narrative reports were reviewed to determine primary or secondary student status and whether a flight instructor was present. Data were then analyzed to determine phase of flight, location, circumstances and causes. **RESULTS:** During 1999-2010, 2488 instructional flights were involved in 2474 accidents during civilian flight training operations, resulting in 491 fatalities and 290 serious injuries. The majority of these instructional flights involved primary students (67%, 1673) and over half (55%, 1370) occurred with a certificated flight instructor in the airplane. The most frequent occurrences were loss of control on ground or water (24%), loss of control in flight (15%), hard landing (15%) and loss of engine power (13%). One hundred accidents resulted from fuel starvation or exhaustion; 65 of these accidents had instructors in the aircraft. Instructor's inaction or improper action was identified by the NTSB as a primary factor in almost half (48%, 659) of the accident flights with an instructor onboard. A majority of the accidents occurred on an airstrip (68%); the most common phases of flight in which accidents took place were landing (34%, 857) and takeoff (12%, 297). **DISCUSSION:** These data indicate a need for increased attentiveness and improved supervision of students by flight instructors. Instructor proficiency in emergency procedures and maneuvers and setting conservative criteria for safe flight operations, including fuel reserves, winds and altitudes may prevent future accidents. Capable instructors may prevent accidents during dual flight and by imparting the skills, knowledge and judgment for safe solo flight by students.

Learning Objectives:

- 1 To describe accidents that occur during instructional flights in fixed-wing aircraft.
- 2 To describe the most frequent causes of accidents that occur during solo and dual instructional flights.
- 3 To understand possible strategies to prevent instructional accidents in fixed-wing aircraft.

2:00 pm

[469] FLIGHT HOURS AND ACCIDENT RISK IN THE U.S. CIVIL AIRMAN POPULATION

A. NORRIS, V. SKAGGS AND R. JOHNSON

Civil Aerospace Medical Institute, FAA, Oklahoma City, OK

INTRODUCTION: The objective of this study is to identify and describe pilot variables in a group of airmen who had an accident or incident. On average, more than 80% of general aviation accidents are due to pilot error. The prevailing view is that lack of flight experience is one of the major factors contributing to the risk of an accident. However, there is a limited amount of literature about this topic published from data gathered later than 2004. This study aims to contribute more recent and relevant knowledge. **METHODS:** Data for all U.S. civil airmen in 2005 were collected from the Scientific Information System database developed at the Civil Aerospace Medical Institute. Study variables of interest included age, gender, current medical class, last six months and total flight hours recorded, body mass index (BMI), and documentation of an NTSB event. Descriptive statistics were created for all airmen in 2005 and then repeated for only those with an NTSB-documented event within that calendar year. P-values were generated from the Wilcoxon rank-sum test to assess if the distribution of hours flown was the same in both groups. **RESULTS:** In 2005, 687,715 U.S. civil airmen were medically certified, and 17.6%, 20.1%, and 62.3% held first, second, and third effective medical class certificates, respectively. Females comprised 6.2% of the population. The overall mean age was 44.4 years, and mean BMI was 27.4. Mean total flight time was 2,974 hours while the median flight time was only 450. Mean flight time within the last 6 months was 83 hours, with the median only at 15. For the 1,862 airmen with an NTSB event, mean total flight time was 3,908 hours and median time was 1,310. Mean flight time recorded within the last 6 months was 122 hours, with the median at 50

hours. **DISCUSSION:** Airmen who had an NTSB event had more measurable pilot proficiency ($p < 0.001$). Further analyses will be conducted to determine if other variables confound or interact with these variables to determine risk of an event. Descriptive data from this study will provide the basis for a case-control study examining the exposure variables associated with risk of an accident. These results will be presented along with the descriptive statistics.

Learning Objectives:

- 1 The relationship between pilot exposure variables and accident rates for U.S. civil airmen in 2005.

2:15 pm

[470] BRITISH ARMY HELICOPTER ACCIDENTS: A REVIEW OF TWO CONTRASTING DECADES

M.S. ADAMS¹, M. HARRIGAN² AND A. BUSHBY²

¹Royal Air Force, Centre of Aviation Medicine, RAF Henlow, United Kingdom; ²HQ, Army Air Corps, Army Aviation Medicine, Middle Wallop, United Kingdom

INTRODUCTION: The decades 1991-2000 and 2001-10 have seen contrasting theatres of operations, with the challenges of severe brownout landing conditions in the latter period, compared with a more European focus in the earlier period. A review was undertaken of aircraft accidents in these contrasting decades to determine trends in causation; an essential task for the development of strategies and technologies to reduce accident rates. **METHODS:** All British Army helicopter accidents reports for the period Jan 2001 - Dec 2010 were reviewed, and compared with those in the previous decade. Accidents caused by hostile fire were excluded. **RESULTS:** 31 Category 4 and 5 accidents occurred in 7 aircraft types. The proportion of fatal accidents increased from 26.3% to 33.3% in the most recent decade. The percentage of accidents caused by Human Factors (aircrew) increased from 78.9% to 83.3%, whilst the percentage due to Technical Failure fell from 21.1% to 8.3%. However, the percentage of Human Factors (aircrew) accidents involving fatalities increased from 13.3% to 30.0%, whilst the percentage of these accidents in which spatial disorientation (SD) was a major or contributory factor, reduced slightly from 66.7% to 60.0%. On operations, SD was a major contributory factor in 83.3% of Human Factors (aircrew) accidents in the first decade and 80% in the second. **DISCUSSION:** Since 2005, efforts have been made to extend in-flight SD refresher training to include type specific training for Apache and fixed wing aircrew. The overall accident rate has reduced since 2005 as has the percentage of SD accidents when compared with the periods 1991-2000 and 2001-4. Conclusions: The percentage of accidents due to Human Factors (aircrew) has increased in the most recent decade, with 80% of those on operations due to SD. Improvements to SD refresher training in the British Army have been introduced to enhance awareness amongst all aircrew. Overall accident rates have reduced markedly since 2005 and may in part be due to these enhanced SD training initiatives.

Learning Objectives:

- 1 To understand the changing causes of British Army helicopter accidents over a 20 year period.
- 2 To understand the potential benefits of in-flight SD training.

2:30 pm

[471] SPATIAL DISORIENTATION-RELATED MISHAPS: A TEN YEAR AUDIT OF U.S. ARMY ROTARY-WING OPERATIONS

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¹Headquarters Army Air Corps, Army Aviation Centre, Middle Wallop, United Kingdom; ²U.S. Army Aeromedical Research Laboratory, Fort Rucker, AL

INTRODUCTION: Spatial disorientation (SD) and its untoward effects have contributed to numerous lost lives, destroyed or damaged aircraft and a reduction in operational mission effectiveness since the early days of aviation. Military rotary-wing (RW) operations are not immune. The U.S. Army has retired many "legacy aircraft" represented



2012 ABSTRACTS OF THE AsMA SCIENTIFIC SESSIONS

83RD Annual Scientific Meeting
May 13-17, 2012

Atlanta Hilton
Atlanta, GA

The following are the abstracts accepted for presentation after blind peer-review—in slide, poster, or panel sessions—at the 2012 Annual Scientific Meeting of the Aerospace Medical Association. The numbered abstracts are keyed to both the daily schedule and the author index. The order and numbering of some abstracts may have been changed.

CONFLICT OF INTEREST: All meeting planners and presenters completed financial disclosure forms for this 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.

Sunday, May 13
Salon C

9:00 AM

Sunday, May 13
Salon D

12:00 PM

WORKSHOP: AIRCREW FATIGUE: CAUSES, CONSEQUENCES, AND COUNTERMEASURES

WORKSHOP: AEROSPACE MEDICINE FACULTY DEVELOPMENT WORKSHOP

[1] AIRCREW FATIGUE: CAUSES, CONSEQUENCES, AND COUNTERMEASURES

J.A. CALDWELL¹ AND J. CALDWELL²

¹Fatigue Science, Honolulu, HI; ²711 HPW, Wright-Patterson
AFB, OH

WORKSHOP OVERVIEW: In modern aviation operations, aircrew fatigue has become a serious but often unrecognized problem. The unpredictable work hours, long duty periods, circadian disruptions, and disturbed or restricted sleep that are commonly experienced by aviation personnel strain the body's adaptive capabilities. The result is that crewmembers often report for duty in a fatigued state, and because of this they make mistakes, respond more slowly, experience cognitive difficulties, and suffer mood disturbances that taken together often lead to performance problems and compromised safety. Aircrew fatigue can be effectively mitigated, but only if scientifically validated strategies are systematically applied. These include 1) the implementation of crew scheduling procedures that are based on up-to-date scientific information about the underpinnings of fatigue; 2) the implementation of scientifically-based in-flight counter-fatigue practices; 3) educating crew and crew schedulers on the importance of sleep and circadian rhythms in effective fatigue management; and 4) the utilization of effective strategies for optimizing off-duty sleep periods. Once comprehensive, scientifically-validated fatigue-risk mitigation processes are fully integrated into the aviation safety system, fatigue can be effectively managed, and safety and performance can be optimized. The proposed fatigue workshop will outline the importance of addressing fatigue as a danger in aviation, the basic physiological mechanisms underlying fatigue, and the most common causes of fatigue in air transport and other settings. In addition, the workshop will present ways to recognize fatigue in operational environments, and it will provide information about the relative efficacy of various fatigue countermeasures. Participants will be provided with hard-copy materials that summarize the topics discussed as well as reference bibliographies that can be used to obtain further information on specific issues. This workshop is aimed at those with a basic understanding of the problem of fatigue in operational environments, and/or those who are anticipating new duty assignments in which they will bear some responsibility for the alertness management of aviators or other personnel. No prior education in fatigue management, sleep, or circadian rhythms is required.

[2] AEROSPACE MEDICINE FACULTY DEVELOPMENT WORKSHOP

D. RHODES

Aerospace Medicine, USAFSAM, Wright-Patterson AFB, OH

WORKSHOP OVERVIEW: The purpose of this workshop is to provide presentations on current topics of interest to faculty of Aerospace Medicine residencies and fellowships. These presentations may also be of interest to faculty of other Preventive Medicine Residencies including General Preventive Medicine and Occupational Medicine. The presenters are all experienced faculty for Aerospace Medicine programs. They will present topics aimed at improving teaching skills and providing proven methods for evaluating residents in aerospace medicine. Any current or future aerospace medicine faculty members may benefit from these presentations and are invited to attend. Continuing Medical Education (CME) and Maintenance of Certification (MOC) credit will be available for completion of this workshop.

[3] EVALUATING RESIDENTS IN AEROSPACE MEDICINE D. RHODES

Aerospace Medicine, USAFSAM, Wright-Patterson AFB, OH

INTRODUCTION: The objective evaluation of residents in Aerospace Medicine can take many forms, from the multiple choice examination to a structured evaluation of their clinical skills in a flight medicine clinic environment. Another evaluation tool is the oral exam, which can be utilized to not only evaluate knowledge fund on a subject, but also to view more subjective areas such as poise, competence, and how they organize their thoughts on the fly to answer an aerospace medicine question. Other forms of evaluation can utilize simulated patient encounters to evaluate a resident's skill in taking a good history and physical examination to arrive at a diagnosis while being observed. All of these methods can allow the aerospace medicine preceptor to gather sufficient information to evaluate a resident's ability to show mastery of the various competencies within Aerospace Medicine and to finally make the judgment of that resident's ability to practice independently. These techniques and tools for evaluation of residents will be discussed.

Learning Objectives:

- 1 The participants will learn various techniques and tools to evaluate aerospace medicine residents clinical skills and fund of knowledge in aerospace medicine