United States Air Force Flight Surgeon's Guide. Chapter Nine. Aviation Neuropsychiatry

INTRODUCTION

Aeromedical texts have always emphasized the importance of what we now term mental health, neurosciences, and human factors in achieving safe and effective flying operations. Only sixteen years after the Wright brothers' pioneer flights in 1903, a British military physician published the first English language textbook of aviation medicine, based on his World War One experiences (Anderson, 1919). Three of its nine chapters concerned mental factors and psychological hardiness of fliers, and the positive and negative influences of such factors upon cockpit performance.

Our chapter continues this long tradition of mental health factors in aviation. It presents the extensive experience of flight surgeons in attending to such matters. Thus, its goals and objectives vary considerably from those of conventional psychiatric texts.

- Major goal—to augment flight surgeons' prior psychiatric training with specific aeromedical applications of mental health principles and practices.
- Explicit objectives—to help flight surgeons to:

1. Recognize fliers' usual motivations to fly, along with some pathological variations.
2. Identify desirable and less desirable personality (temperament) characteristics in aviators.
3. Use the Adaptability Rating for Military Aviation (ARMA) to evaluate motivation and personality.
4. Detect common stress coping behaviors that are adaptive and non-adaptive in aviators.
5. Perceive trouble brewing in an aviator's life, and know what to do about it.
6. Realize the effects of normal and disturbed interpersonal relationships (especially marital and familial) upon safe and effective flying.
7. Understand general human factors.
8. Recognize and treat the multifaceted manifestations of acquired fear of flying.
9. Participate in Critical Incident Stress Management (CISM).
10. Provide mental health support to fliers during deployments and in combat.
11. Help train fliers for survival situations and captivity.
12. Determine fitness for flying duties when mental illnesses are diagnosed.
13. Deal with aviators' use and abuse of alcohol.
14. Treat psychiatric emergencies in aviation-related situations.
15. Understand the role of psychopharmacology in aviation.
16. Deal with psychological factors in airsickness.
17. Supervise aeromedical evacuation of psychiatric patients.

We will say little about classic psychiatry—the diagnosis and treatment of mental illnesses. For example, major psychotic disorders are of enormous concern in clinical psychiatry, but aerospace psychiatry gives them little emphasis because they are disqualifying for flying duties, and thus psychotic fliers quickly leave the aerospace

medicine domain. However, brief psychotic episodes that can be demonstrated to have little chance of recurrence (toxic phenomena, extreme acute stress reactions) are of great aeromedical interest to us because they may not be permanently disqualifying.

We will say a great deal about the qualities and standards of normality necessary to select and retain fliers. We will detail the criteria used to determine when to ground fliers and when to return them to flying whenever mental health-related symptoms occur.

We will emphasize what used to be called mental hygiene programs—the support of fliers under conditions of extreme physical, mental and emotional stress, both acute (as in combat or after a mishap) and chronic (as in repeated trans-meridian deployments). These principles are now incorporated into Put Prevention Into Practice (PPIP), a major USAF/SG initiative that includes a significant mental health component.

How necessary is such information to flight surgeons (FS)? A survey of military FS of varying experiences demonstrated clearly that the more experience (and seniority!) those FS had, the greater value they placed upon such knowledge of mental health and human factors (Ursano & Jackson, 1986). All well-trained physicians, regardless of their specialties, should be able to recognize a fully developed psychiatric illness, even if they could not give its exact name. FS will seldom see such marked mental health problems in aviators. However, FS must detect and deal with such problems at a much lower level of symptomatic presentation than is called for in usual medical practice, because of the high demands and ever-present dangers of the flying environment. If 100% effectiveness is suddenly called for during a flight, 92% will not do, and may prove lethal.

We assume that you have a standard medical school acquaintance with psychiatry, psychology, neuropsychology, and the other neurosciences, and that you have had only an incidental exposure to these fields since your graduation. We will present the information as we teach it in the Aerospace Medicine Primary (AMPs) course, with enough detail to be useful as an Air Force-wide instructional guide and reference resource to operational FS. We will give standard references as an entry into follow-up of specific topics, knowing that new data continue to be published and should be sought when you encounter specific circumstances.

The material presented here is not intended to supplant the authority of established aircrew standards, AFIs, MAJCOM guidance or the Aeromedical Consultation Service. When you are dealing with a specific psychiatric disorder, consult the USAFSAM ACS Waiver Guidance on the Internet for detailed instructions about case management and aeromedical disposition. Go to <<http://www.brooks.af.mil/>>. In succession, click on 1) Air Force School of Aerospace Medicine, 2) Aerospace Medicine, 3) ACS, and 4) Waiver Guide.

Information from this chapter should be used in association with current standard textbooks of aerospace medicine (e.g., DeHart, 1996), psychiatry (e.g., Kaplan & Sadock, 1995), the latest version of the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association (1994, currently in its fourth edition, hence "DSM-IV"), your handouts from the various AMPs lectures, and applicable AFIs.

When faced with troublesome situations that are not covered sufficiently by these or other sources, contact us in the most practical way: call DSN 240-3537, fax 240-3349, or email us directly. Email addresses change frequently, but at present ours is:

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REFERENCES

1. Anderson HG. 1919. The medical and surgical aspects of aviation. London: Oxford University Press.
2. Diagnostic and Statistical Manual of Mental Disorders, [Fourth Edition], 1994. American Psychiatric Association, 1400 R Street, NW, Washington, DC, 20005. In addition to the full volume, there is a less expensive (about $30) spiral-bound version referred to as the "Desk Reference of the Diagnostic and Statistical Manual of Mental Disorders, (Fourth Edition)," which may be sufficient for the non-psychiatrist aeromedical practitioner. [These books are available outside the United States from: The Press Syndicate of the University of Cambridge, The Pitt Building, Trumpington Street, Cambridge CB2 1RP, United Kingdom.]
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BASIC MENTAL HEALTH FACTORS IN FLIERS

A good flier must have positive mental attributes: healthy *motivation*, innate neurophysiological and neuropsychological *abilities* that can be trained, adaptive *coping skills*, and, to some extent, certain *personality* characteristics that include sensitivity to self and others. These factors have been parsimoniously summarized as "motivation, ability and stability," and are described in detail by Santy (1994, Chap. 6) in the context of astronaut selection. This section will emphasize *motivation* and *coping skills*, with some comments about *personality factors*. Assessment of innate *abilities* is the domain of personnel specialists and flight instructors, and so will be only briefly mentioned here.

MOTIVATION TO FLY

Any assessment of a person's motivation to fly must deal with primal emotional issues. The attractions of flying involve feelings that seem to be present in all humans from birth, regardless of culture. Flying is a fascinating, dangerous activity that is both loved and feared (Bond, 1952): loved because of its grace and beauty, feared because of the chance of catastrophe. Thus, the issues involved may be summarized as "flying and dying."

Flying is more than a means of transportation. Aeromedical authors have acknowledged the importance of emotional factors in motivation to fly since aviation began. In addition to Anderson's (1919) textbook already cited, Armstrong 's *Principles and Practice of Aviation Medicine* (1943, pp 2, 460ff.) compared the emotional aspects of aviation to a spiritual experience, noting that all religions portray flight as a divine gift

(e.g., "going up" to heaven, angels with wings). John Gillespie Magee, Jr.'s sonnet *High Flight* (1941) ends with the words "...Put out my hand, and touched the face of God." Military aviators, a notoriously reserved group, give each other plaques inscribed with this poem as awards.

"For a pilot, flying is never dangerous, for a man must be a little bit insane or under the press of duty to willingly remain in a position that he truly considers dangerous. Airplanes occasionally crash, pilots are occasionally killed, but flying is not dangerous, it is interesting." Richard Bach, *Stranger to the Ground*

Healthy motivation to fly differs from motivation for careers such as banking or manufacturing. In some ways, it resembles motivation for an artistic career, or even a career in medicine. It is made up of both emotional (limbic, irrational, "All my life, I wanted to fly…") and cognitive (cortical, rational, "When I was 20 I decided…") components. For most fliers, it is a combination of the two—but one will be dominant. A specific flier's proportion of emotional and cognitive elements may change with age, experience, and other life factors such as marriage, children, and other events of a normal life. Motivation to fly should be regarded as a dynamic process. For an individual flier, the answers to the question "What do you tell yourself about the dangers of flying?" change from one decade of his or her life to another, as well as after life events (a mishap; after the birth of a son or daughter). FS need to know how to reassess motivation if it becomes aeromedically necessary.

Such motivation may be considered a dynamic balance between such positive factors *as joy, emotional meaning* and *coping skills*, and such negative factors as *fear, anxiety*, and *anticipated* or *experienced danger*. Other, more mundane factors may also apply—financial rewards, social status, opportunities for travel—but these are rarely the basis for psychological difficulties in the military. The pure emotional joy of flying is balanced by a healthy fear of its true dangers. The "meaning" of flying (it represents power, freedom, independence, control, and other basic urges) may also give rise to anxiety if these elements are threatened. Finally, the flier's coping skills—involved in basic resilience, hardiness, and stress tolerance—may be overcome by the actual dangers of flight as encountered in near-misses, mishaps involving self or respected friends, or in combat situations where control is impossible. (For details on this subject, see Jones, 1986, and Leimann Patt, 1988).

Some fliers choose to fly not so much because they love it, but on a more rational, less emotional basis: it's a good job, with many benefits. Such "rational choice" fliers are not as emotional about flying. They may quit more easily, without much internal struggle (symptoms), when they are overwhelmed by the real dangers of flight.

A survey reported by McGlohn et al. (1996) contrasted the mix of emotional and rational motivational elements in male and female USAF aviators. The reasons most endorsed by the men (45%) emphasized the emotional elements that attracted them to aviation, and by the women (34%) emphasized the rational elements.

The lesson here is that fliers, who value their air of rationality and coolness, may speak to their FS in rational terms about aviation matters that in fact have very deep emotional underpinnings. Because fliers, by inclination and culture, tend to downplay (suppress) emotional matters, or to compartmentalize (deny or even repress) them

entirely, they may not recognize the strength of these issues in their own lives. FS must have a continuing awareness in this regard, and consider the role of emotional factors whenever a flier's response to a situation doesn't make sense (is irrational), or involves an inappropriate emotion, or seems disproportionate to the stressor involved. These three factors—*irrationality*, *inappropriateness*, and *disproportionality*—are true clinical indicators of psychological stressors.

Some fliers have flawed or pathological motivation to fly, which may include living out a parent's fantasy, becoming more powerful than a parent (usually the father), proving they're not afraid even though no one said they were, or risk-taking in search of thrills (high stimulus threshold).

Such pathological motivations contrast with the healthy motivational factors, and may underlie significant symptoms that lead to ineffective or downright dangerous flying behaviors, causes for administrative disqualification if no diagnosable psychopathology is present. Weak or flawed motivation, or poor defenses against the real dangers of flying, may be recognized during flight training, where they are termed "manifestations of apprehension" or in operational flying, where they may present as an emergent or acquired fear of flying.

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PERSONALITY (TEMPERAMENT) OF THE FLIER

Background

Many investigators have tried to correlate aviator personality qualities with successful flying, using endpoints such as graduation from flying training, low accident rates, and military promotions. Early, limited studies centered on individual jet pilots (e.g., Reinhardt, 1970, Christy 1975)), who represent small subsets of military aviation, itself a subset of aviation in general. These pilots tended to be: Independent (narcissistic), Controlling (stubborn, obsessive), Active (high stimulus threshold), and Goal-directed (competitive). Some were also a bit Counterphobic; that is, they deliberately sought exposure to situations that they feared consciously or unconsciously, rather than avoiding them (defined in Edgerton & Campbell, 1994). Such studies have been generally unsatisfactory when applied prospectively as selection criteria.

A study of successful USAF astronaut candidates at USAFSAM listed some common aviator vulnerabilities. These men tended to avoid and deny internal emotional life; preferred concreteness to ambiguity; were cautious in close or intimate personal relationships (even familial); had difficulty with uncertainty or failure; and sometimes were intensely uncomfortable when aware of strong personal emotions. They were active, bright, educated, constructive, achievement-oriented people who were unaware of or suppressed information about their own emotional status (Fine & Hartman, 1968).

Other vulnerabilities of pilots include poor communication about interpersonal stress, including preference for communicating ideas and facts rather than emotions. When experiencing situational reactions, ("adult adjustment reactions"), they prefer to change the situations, rather than changing their reactions to them. Fliers tend to be emotionally avoidant, and many prefer to deal with their own problems, rather than asking for help. They may believe that being good fliers automatically means that they are good at other roles: spouse, parent, officer, business, etc. (the "halo effect"). This is no more true for aviators than it is for physicians. Such attitudes may lead to unrecognized interpersonal emotional conflicts that, if not resolved, may progress to painful symptoms. In addition, fliers' wives tend to be expressive, verbal daughters of achievers who are attracted to men like their own fathers

Clearly, any of these tendencies or traits in excess (not necessarily to a clinical level) can cause trouble. These are generalities, and we do not have comparable information or impressions about the marital families of women who fly.

Women aviators in the military share some common tendencies. They tend to marry later than their non-flying peers do, and have children later. They report fewer stressors associated with family or career conflicts than male fliers. Women fliers tend to marry military men, and thus as a group they experience more joint spouse stressors, such as joint deployments, than their male counterparts (McGlohn & King, 1996).

Crew Resource Management

Probably the most promising approach to the analysis of aviators' temperaments is that of Helmreich and his colleagues, who have used psychological data derived from their research into CRM. This abbreviation stands for *Crew* [or *Cockpit*] *Resource Management*. The acronym CRM is now even being used for some other processes in industrial management applications. Helmreich et al. have identified two personality dimensions, *instrumentality* (work orientation, mastery of tasks, and desire to achieve) and *expressivity* (interpersonal communications and sensitivity) as important in cockpit transactions. Either can be manifested positively or negatively.

CRM training has become a standard practice in many aviation settings. As described by Stokes & Kite (1994), three groupings of military pilots have been identified in such programs. The first group has positive elements in both dimensions: strong work orientation, achievement and mastery; and high levels of positive expressivity, low competitiveness and low verbal aggression. This combination seems the best for multicrew cockpits. During CRM training, this group has the highest scores on coordination and communication skills, shows the best ability to absorb the desirable attitude that responsibility rests with the crew as a whole rather than with one authoritative individual, and develops the most insight about recognition of their own reactions to stressors.

The second group of pilots has high instrumentality, but is competitive and verbally aggressive, is less skilled in communication and coordination, learns little about command responsibility, and shows only modest recognition of stressor effects. This combination of characteristics resembles the "fighter pilot personality" stereotype, but no data support these attributes as specifically desirable for any one type of flying assignment.

A third group has both low instrumentality and low expressivity. This group does poorest in communication and coordination during training, actually regresses in appreciation of collective responsibility, and shows little recognition of personal stressor effects.

Coping with stressors of aviation

Fliers commonly cope with their concerns about the dangers of flight by:

- Humor: especially understatement, hyperbole, and word play.
- Anticipation: sharing experiences, planning, practicing, or avoiding *unknown* risks.
- Suppression of emotional responses to crises: ("When in trouble, the best thing to do is nothing. Think before you act.") This element is sometimes called "compartmentalization" in lay flying safety literature, but the lay description seems to include elements of denial and repression. The distinction lies in the amount of conscious decision and unconscious defense used in the process.
- Denial of intrinsic dangers.
- Rationalization that the dangers are not significant.
- Omnipotent Fantasy that the flier overcomes any adversity. (Each one is the World's Greatest, "A Legend In His Own Mind." Here, humor and fantasy merge.)

Collectively, these are usually healthy and effective defenses.

Flight surgeons are fliers, too! Remember that when we speak of fliers, we're not just talking about "them;" once you start to fly it's also about "us." FS will have to develop their own defenses against the dangers of flight, especially when responding to an aircraft mishap involving a friend. You should be careful of projecting your own defenses upon other fliers, assuming that they feel as you do. Your family will also be affected at such times. Be aware that your spouse may not have the same attitude toward flying as you, and that your children may be schoolmates of the children of a flier who is involved in a mishap. For an example of such a situation producing a mild but enduring phobia in a flight surgeon's daughter, see Jones (1982).

One physician's comments on the dangers of flight, written after a mishap witnessed by his own young son while flying on a demonstration ride at an air show…
"No pilot ever forgets that his calling carries with it the risk of profound loss. Calculations of risk are a fundamental part of flying…with every act that moves an aircraft into the fragile world of flight. ...This calculation is not a dominant thought process. If it were to become so, the flier would have to stop flying." —Paul N. Uhlig. Choices. Air & Space 1997; 12(2):16-7.

Fliers can learn to fly in a few weeks. They spend the rest of their lives learning new ways the airplane can kill them, and what to do to avoid these perils. The best aviators try never to take risks that they do not understand.

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ADAPTABILITY RATING for MILITARY AVIATION ARMA)

How do we evaluate Motivation to Fly and Personality in prospective or operational aviators? The standard process is an interview called the Adaptability Rating for Military Aviation (ARMA) (See Mills & Jones, 1984, for a review of its evolution and difficulties.) This has some parallel to the US Navy concept of Aeronautical Adaptability (See Merchant & Baggett, 1994, and Christen & Moore, 1998, for useful reviews of this concept and its application). The ARMA assesses the examinee's suitability before training for special military duties. FS may also perform an ARMA upon already-trained personnel if deemed necessary. The ARMA is not a formal psychiatric interview, but takes the form of an interested conversation between FS and examinee. Conscientiously done, it is useful in assessing the temperamental fitness of a person for a particular occupation or special duty.

The term "ARMA" is reserved for aviation contexts. Similar Adaptability Ratings may be used to determine fitness for Missile Duty, Air Traffic Control Duty, Altitude Chamber Duty, and Pararescue Duty. Although these screenings are done by flight surgeons, we will limit our discussion only to aviation. In general, though, the more you know about whatever type of duty you are assessing, the better your screening effectiveness will be.

The ARMA has no formal structure**.** In a conversational way, explore the person's level of realistic knowledge of an aviation career. Ask about how this career choice fits with long-term goals, family goals, and the person's personality style. Typical ARMA questions might begin with "Now I'd like to spend a little time talking about your interest in flying." Go on to questions such as:

- "How did you get interested in flying?" "How old were you when you first flew?" "What have you flown in?" "Did you get to work the controls?"

- "What do you think of the dangers of flying?" "What do your family and closest friends think?"
- "How do you feel about combat flying?"
- "What would you do as a career if you couldn't have a flying career?"
- Discuss past non-flying endeavors of the examinee. Were they successful? Were successes part of team efforts, or achieved in solo enterprises? Has the examinee shown team skills and social skills?
- "What's the most stressful situation you've ever been in?" "Have you ever been in real physical danger?" "How did you react?"
- Inquire about athletic activities and bold or risk-taking activities. Any history of auto or motorcycle accidents? What sort of behavior was involved?
- What have been this person's general relationships with authority figures? Disciplinary infractions? Arrests?
- Evaluate overall poise, demeanor, body language. Can you "see" this person in a flight suit in the Ops building? If not, why not?

Use only the terms "ARMA-SAT (satisfactory) or "ARMA-UNSAT" (unsatisfactory) to report an ARMA. ARMA-UNSAT disqualifies an aviation candidate from entering a training program such as UPT, UNT or AMP. It may also disqualify a trained aviator for FC II or III duties. Because these are serious consequences, any score of ARMA-UNSAT given by a FS should be reviewed with a mental health consultant before being reported. When a psychiatric diagnosis is established, that should form the basis for disqualification, rather than the ARMA-UNSAT.

The FS who determines that a would-be flier is poorly motivated and will probably not make it through flight training, or will be intrinsically unsafe or ineffective, may save the AF more money than the FS's own annual salary, and may save the flier's life.

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TROUBLE BREWING

Flight, occupational and preventive medicine are practiced in individual and organizational settings. A FS should be aware of the importance of looking for and acting upon early signs of trouble brewing in the flying organization and its fliers. Talk with any flier, or consider mental health consultation, whenever you become aware that

the flier has symptoms of over-stress, anxiety or depression. Here are some indications of trouble:

- Repeated mistakes
- Distraction by worries when flying
- Emotional distress
- Inappropriate anger
- Repeated arguments without closure
- Feeling hopeless
- Can't feel happy (anhedonia)
- Disturbed sleep
- Weight loss
- No interest in sex
- Excess concern about somatic symptoms
- Substance abuse

Indications of such problems may be found in the workplace (flying or ground duty), during social contacts, during medical encounters with the flier or his/her family, in conversations with fellow fliers, or elsewhere. The FS should be alert for problems before they become clinically apparent. As problems or conflicts grow in a person's life, they require increasing psychic energy and attention. These manifest themselves as worry, distraction, or preoccupation before they reach the dimensions of true symptoms that would send an ordinary person to a physician's office.

Proactively detecting such situations is an aspect of military aerospace medicine that sets it apart from usual medical practice. Such problems may arise in interpersonal relationships (life partner, children, parents), in life situations (illness in family, finances, lawsuits), with alcohol, or elsewhere. Significant life changes may trigger problems: a recent marital engagement or divorce, financial difficulty, recent major career decisions, legal or administrative distractions, and others. A much cited, if somewhat dated, listing of such stressors may be found in Holmes & Rahe (1967).

Frequent organizational problems include job dissatisfaction, overwork, or excessive time away from home. Such situations may result from heavy flight scheduling, OPS TEMPO, or frequent or prolonged TDYs. More subtle difficulties may lie within leadership issues and squadron attitudes or unspoken expectations. Fliers may make fun of matters of serious concern as a way of calling attention to the situation without actually "reporting" it, thus validating their personal assessments by seeking concensus and approval by way of their peers' laughter—a use of humor as a stress-reducing mechanism. For example, the FS might notice new jokes about "death before embarrassment" or "Better to die than to look bad!" Such statements mock a squadron's extreme "can do," press-press-press approach to any situation. Be aware that the quality and subject of fliers' jokes, sustained and bitter gripes, or diminished flight (or other) discipline may indicate changes in unit morale. The FS, who is not in the chain of command, may notice such things before squadron commanders become aware of them—or the CO may even be part of the problem.

Such situations may interact with some fliers' personal (internal) attitudes, styles or temperaments in a way that degrades flight safety and effectiveness. Be alert for complacency, an exaggerated "can do" attitude, pushing external and/or internal limits, inaccurate assessment of personal skill, diminished judgment, or changing patterns of illness.

External situational manifestations may fall into the general "Human Factors" areas, which will be discussed below. As you fly with your unit, be alert for evidence of channelized attention (e.g., missing radio calls, not picking up bogies), distraction in the

cockpit (extensive chatter about personal problems), not staying "ahead of the aircraft," and so on. One reason that you fly is to have the chance to talk shop with fliers in their own world, and to make necessary observations.

Recognition of such problems varies, management is frequently arduous, and yet the consequences, though rare, may be profound. Or, as Hippocrates put it in his First Axiom, "Life is short and the Art long, experience deceptive, judgment difficult and decision dangerous." Your purpose is not to meddle in a flier's life, but to try to detect and interrupt any possible chain of attitude, preoccupation, worry, or maladaptive stress coping that may contribute to a possible mishap.

Though difficult to master (as are all clinical proficiencies), this is Flight Surgeoning at its best. Most fliers will take your medical skills for granted, and will not question them unless you give cause. Your other contributions to flying safety and operational effectiveness result from familiarity with and participation in the flying mission, and from your roles as trusted physician, a student of human nature, a fellow officer and flier, and a consultant to the commander.

What might the flight surgeon do in such circumstances?

PREVENTION:

- Help keep stressors as low as possible through your role as unit medical consultant.
- Educate fliers about similarities and differences in dealing with aviation stressors and with life stressors. The two situations may call for different approaches, and an "aviation" approach to a "life" stressor may actually worsen the situation.
- Consider providing instruction in stress management principles, given either by a FS or by an aviation-oriented mental health professional.

EARLY DETECTION:

- Be alert to unit and situational stressors, and advise the commander when they become troublesome.
- Learn to identify the stressed aviator through sub-clinical or early indicators of <u>trouble brewing</u>.

RAPID INTERVENTION:

- Break problems into manageable pieces
- Make appropriate therapeutic recommendations when needed.
- Ground the aviator when necessary, until stressors are past, or until the aviator masters better ways of coping

OPTIMAL RETURN TO FLIGHT STATUS:

- Make it clear that you regard your job, not as grounding fliers, but as getting them back to duty as soon as safely possible.

Remember that *flying is not a recognized form of psychotherapy*. Any flier who says "Flying is the only thing that I enjoy any more!" should probably be grounded until the situation gets better, or until the flier gets better. Consultation should be obtained

with an aviation-oriented mental health professional, or possibly with clergy who is certified in counseling.

In making such aeromedical decisions:

- Sometimes decisions must be based on incomplete or emerging data.
- Sometimes decisions must be made without a definitive diagnosis.
- Therefore, such decisions may depend upon principles, especially when the information is inconclusive.
- In some cases, flight surgeons make their aeromedical decisions before making their diagnosis.

Classic basic principles of aeromedical decision-making: include:

- Safety of flight and operational effectiveness.
- Health and safety of the flier.
- Dependable availability for flight (for professional fliers).
- Recently, health of any possible fetus has become a consideration.

When fliers develop mental health diagnoses disqualifying for flight duties, they must be grounded and treated. When they have recovered satisfactorily, waiver action may be taken IAW AFI 48-123, 7.5.1 Conditions must meet these criteria in order to be considered for waiver:

1. Present no risk of sudden incapacitation.
2. Have minimal potential for subtle performance decrement.
3. Be resolved or stable, and remain so under aviation stressors.
4. Have low possibility of progression or recurrence, with early signs or symptoms being easily detectable without posing a risk to individual or group safety.
5. Require no exotic tests, regular invasive procedures, or frequent absences to monitor stability or progression.
6. Be compatible with sustained flying operations in austere environments.

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EFFECTS OF MARITAL AND FAMILY RELATIONSHIPS UPON THE AVIATOR

Marriage represents an enormous emotional investment for anyone, and is probably the next important life relationship after childhood has ended. It fulfills emotional needs, provides companionship and emotional security, allows for a division of labor, and furnishes parenting when children are born. The ideal marriage is life-long, monogamous, is a joint and wholehearted commitment, and is an evolving and developing relationship. Marital support strengthens any life endeavor, and a poor marriage is a powerful stressor. It follows that a FS will be concerned with a flier's

personal relationships, especially including those with spouse and children, for reasons of flying safety and effectiveness as well as of simple good medical practice.

In order to understand the special factors associated with military aircrew marriage and family, the FS must recognize military aircrew marriage and family vulnerabilities, and develop some enhancement, prevention, surveillance and intervention strategies. The special marital and relational stressors in this career include OPS TEMPO and PERS TEMPO, flying at night, in bad weather, recurrent inflight emergencies, demanding schedules (including deployments), (re)organization of units, maintenance problems, and the possibility of combat. The mission is to FLY, FIGHT and WIN.

We have already considered the "Aviator Personality:" its elements of motivation, ability and stability may facilitate safe and effective flight, but they may not be the best way to approach marital relationships. Sometimes they lead to increasing denial, agitation and ineffectiveness, a condition that has been called "The Failing Aviator" (Voge, 1989). Denial may also lead to reverse malingering (Markovits, 1993), wherein the flier stoutly rejects any suggestion that anything is wrong even as the commander or the FS are trying to find out what is causing the dangerous situation.

American society has changed its view of marital roles, and these changes have extended even into the world of male and female military aviators. Success has been redefined as being happy, not as simply enduring the inevitable stressors of service life. As a result, spouses see no obvious reasons for making a long-term commitment to "work it out" when they are unhappy for more than a few weeks or months. Today's society offers few models or methods for conflict resolution, and far-away extended families may offer little day-to-day support.

Such factors might affect any marriage, but the specific demands of aviation may add potentially lethal overtones. Distraction, increased physiological arousal, pilot error, degraded sleep, poor eating—all can influence flight safety and effectiveness. Stressors are many: long hours, recurrent PCS moves, TDYs, spouses' roles in formal and informal settings, conflicting demands of career maneuvering and general commitment to the AF, need for PME and advanced degree study, few easily available marital supports, and such mundane concerns as Sex and Money.

Interpersonal Relationship Problems may include the patterns of interaction between spouses or partners. Communication may become distorted, negative, or even non-existent. Such influences, by no means unique to military aviators, may lead to aeromedically or even clinically significant impairment in functioning, or development of frank clinical symptoms.

If the response to marital stressors is accommodation or resolution, the stress will diminish. If the stressors are not resolved, the response will increase until "something gives." The FS must assure that "something" is not an aircraft mishap. Stokes and Kite (1994) defined *stress* as a mismatch between the individual's perception of current demands and perception of personal resources to cope with those demands. The perceived mismatch may involve an overestimate or an underestimate of the demands or the coping resources. Such misinterpretation may lead to an error in flight decision-making.

Raschmann and Patterson (1990) analyzed 21 instances of aeronautically significant marital discord in USAF fliers. The average occurred in a 35-year-old flier, a captain with 1700 hours flying time. The discord extended over 2.5 years, and in 90%

led the wife to initiate divorce. Reasons cited included poor communication with an authoritarian, over-controlled husband/flier, conflicts between marital goals and career goals, and recurrent TDYs.

In a study of British aircrew, Aitken (1969) reported that 20% of all pilots worried about flying, 60% of pilots in a squadron with a high accident rate worried about flying, and that the worries concerned topics of flying, bereavement, wife and love-life.

In terms of prevention and early identification of such problems, the FS and the aerospace psychologist may wish to offer information about skillful parenting, communication, and stress management. Be aware of "talk" in the squadron or in your office about difficulty sleeping or "children getting on my nerves."

Trollip & Jensen (1991) published an "I'm Safe" acronym checklist with the following items:

- Illness? Do I have any symptoms?
- Medication? Have I been taking prescription or over the counter drugs?
- Stress? Am I under psychological pressure from the job? Do I have money, health, or family problems?
- Alcohol? Have I had anything to drink in last 24 h? Do I have a hangover?
- Fatigue? How much time since my last flight? Did I sleep well last night and am I adequately rested?
- Eating? Have I eaten enough of the proper foods to keep me adequately nourished during the entire flight?

If the flier and the FS maintain awareness of such factors, stress-related symptoms should be rapidly detected and can be properly dealt with.

Evaluation of such factors equates with a careful mental status assessment. Look for non-verbal cues. Review personal habits: Sleep, Eat, Sex, Alcohol, Interests, Affect. Talk about the marriage: Communication, Problem solving, Parenting, Achievement, Health, Financial, Future plans. Estimate the: Level of disturbance, Level of stress, Frequency, Duration, Severity, Ability to cope.

If necessary, consult locally with senior FS, mental health resources, SGPA, the squadron CO, or the Chaplain. Consult outside with MAJCOM authorities or the ACS. Your decision will generally be one of three: 1) No treatment necessary, 2) Fly and treat, or 3) Ground and treat. In this last instance, make it clear that your aim is to restore the flier to safe flying as soon as possible.

Treatment issues will include individual vs. couple therapy, and choosing the provider (yourself, mental health, chaplain, or family advocacy). Know your resources in time of Crisis and Non-Crisis (prevention). Prognostic factors include Duration of the problem, Frequency, Severity, Physical Abuse, Commitment, and general Marriage Stability.

Since most of the stressors, and perhaps some of the stress responses discussed here may be intimately familiar to the FS and his/her family, be sure that personal factors (transference issues) do not intrude upon good aeromedical practice. Keep your own house in order.

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GENERAL HUMAN FACTORS

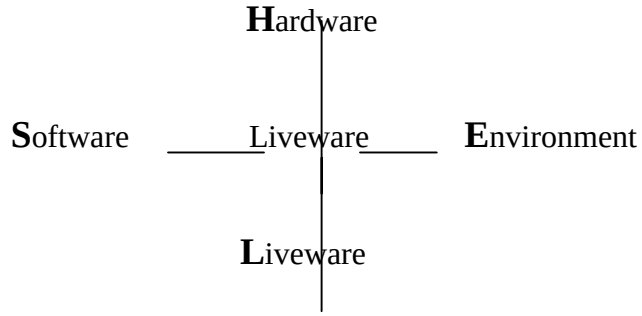
Cockpit design, airsickness, crew interactions, maintenance procedures, a unit's emotional climate…these are all facets in the field of "Human Factors." This field is *huge*. It is difficult to imagine anything related to aviation that cannot be considered a part of human factors. What ties them together is that they are all part of the "system" of aviation. The dynamic field of Human Factors is concerned with the interaction between the numerous "subsystems" related to flight. This sets it apart from other sciences. While engineers may concentrate on designing instrumentation, psychologists can delimit perceptual skills and physicians discuss medical conditions that can interfere with perception, human factors specialists examine how these three interact. Formally, human factors has been defined as "…the technology concerned with optimizing the relationships between people and their activities by the systematic application of the human sciences, integrated within the framework of system engineering"… (Edwards, 1988). Flight surgeons need not become experts in human factors but should have conversational knowledge of this field. This section of the Flight Surgeon's Guide will provide a general review.

Noteworthy milestones mark the history of human factors. The first were the Hawthorne studies performed between 1924 and 1930. These demonstrated that factory production rates could be influenced by psychological factors unrelated to the physical interface between people and machines (the "Hawthorne Effect"). Another milestone occurred during World War II at Cambridge University in England. Using a cockpit simulator (the "Cambridge Cockpit"), researchers concluded that performance was enhanced when machines were made to fit human characteristics rather than expecting humans to conform to the sometimes awkward design of machines.

The formalized recognition of human factors as a scientific discipline came in 1949 with the founding of the Ergonomics Research Society in England. Commercial airlines began offering short courses in human factors beginning in the 1970s. Finally, in 1977, 583 individuals lost their lives when two airplanes collided on a runway at Tenerife. This accident was due to a number of human factors deficiencies and accentuated the need for increased study of human factors and the implementation of

resultant recommendations. Formal study in this field has developed at a rapid rate. As of 1990 there were 33 graduate degree programs in human factors in the United States.

Human factors are often conceptualized with the SHEL model (Edwards, 1972), which illustrates the interaction of different factors on human performance:



The SHEL model demonstrates the relationship between the individual (Liveware) and other factors. These include interactions between the individual and rules, procedures, or regulations (Liveware-**S**oftware), equipment (Liveware-**H**ardware), the elements and physical limitations (Liveware-**E**nvironment), as well as communications and relationships with other individuals (Liveware-**L**iveware). This simple model illustrates the great variety of influences on human functioning and, importantly, that all are related. Flight surgeons are generally not involved in all of these influences to the same extent. For example, few FS undertake the development of weapons systems, and most do not create policies or regulations.

On the other hand, the typical FS works daily with aviators who experience influences such as g-forces, altitude, and changes in circadian rhythm. Additionally, aviators (including FS) need to be aware of issues related to perception (including visual illusions), situational awareness, effects of automation on crew performance, motivation, crew resource management, and cockpit design. These are common topics in human factors texts and journals. We recommend that flight surgeons become aware of the general findings and conclusions related to these topics. This information may be obtained by reading selected journals and books and by consulting with aviation psychologists and physiologists.

The following books contain considerable information regarding human factors and aviation:

- Aerospace Clinical Psychology by Raymond E. King. 1999. Hants, England; Ashgate Publishing Ltd.
- Aviation Psychology in Practice by Neil Johnston, Nick McDonald, and Ray Fuller (Eds.). 1994. Hants, England; Ashgate Publishing Ltd.
- Flight Stress: Stress, Fatigue, and Performance in Aviation by Alan Stokes and Kirsten Kite. 1994. Brookfield, VT; Ashgate Publishing Ltd.
- Human Factors for Pilots by Roger G. Green, Helen Muir, Melanie James, David Gradwell and Roger L. Green. 1991. Hants, England; Ashgate Publishing Group.
- Stress and Human Performance by James E. Driskell and Eduardo Salas. 1996. Mahwah, NJ. Lawrence Erlbaum Associates, Inc.

- The Naked Pilot: The Human Factor in Aircraft Accidents by David Beatty. 1995. Shrewsbury, England; Airlife Publishing Ltd.

The following journals frequently include articles related to human factors and aviation:

- Aviation, Space, and Environmental Medicine
- Human Factors
- International Journal of Aviation Psychology
- Military Psychology

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ALCOHOL AND THE MILITARY AVIATOR

Alcohol causes difficulties in many ways through its direct CNS and metabolic effects, its acute and chronic toxic biological effects, and its many behavioral, familial, social, financial, legal and spiritual effects. It is associated with about 20,000 driver error fatalities per year in the US. Alcohol is involved in many general aviation mishaps; its use, misuse, and in particular, "hangover" effects are significant threats to aviation safety.

Some other data: 90% of American adults consume alcohol, and 10% of Americans develop alcoholism. About 80% of the alcohol marketed in America is consumed by 20% of the US population. Half of all suicide victims have alcohol in their bodies. More US military members exceed 5 drinks per week (32%) than does the general US civilian population (14%).

Alcohol has many appealing qualities. It quickly creates a festive atmosphere. It is cheap, readily available, and is generally legally sanctioned, even in the world of aviation, as witnessed by various "Bottle to Throttle" (B to T) rules. As an icebreaker, alcohol also gives the impression of managing stress and solving problems. Among fliers, an ability to "handle" alcohol once was considered a salient attribute, and was portrayed in many novels and films (e.g., Pat Conroy's "The Great Santini," Tom Wolfe's depiction of Edwards Flight Test Center in "The Right Stuff."). The cultural role of alcohol was firmly established in long-standing USAF traditions concerning O-Clubs (e.g., having to "buy the bar" as a penalty for ringing the bar bell, placing one's flight cap on the bar, or being paged by one's spouse), various party traditions (e.g., chugalug contests, "Dead Bug"), and squadron functions (e.g., unit keg parties, semi-mandatory Friday evening

commanders' calls at the bar). For a clear description of those days, see Pursch (1974). However, official and cultural tolerance for much of the behavior he describes has diminished somewhat in recent years.

As a historical note, although the Royal Navy recommended the end of the traditional rum ration in 1834, this was finally accomplished in 1968!

Over a recent 7-year period, 214 US military aviators underwent alcohol-related hospitalization; 57% were due to alcohol-related problems (Flynn, et al. 1996). As in Pursch's day, alcohol was the most common reason for psychiatric admission of military aviators. All this suggests that alcohol is a continuing significant threat to the health and safety of the flying community.

The metabolism of ethyl alcohol (Etoh) is well known. It involves zero order kinetics—the same amount of ethanol is metabolized per unit of time regardless of the ambient blood level. The average clearance of Etoh reduces the BAC by about 0.01% per hour. This allows predictable blood alcohol concentrations (BAC) following ingestion of a given amount. Individual tolerance to the effects of ethanol develops within the CNS, rather than by accelerating the rate of clearance. Extreme tolerance to alcohol has been associated with established alcoholism. This condition is rare in military flyers, but it does occur.

BAC is reported in mg/100ml, mg%, or mg/dl (deciliter). Thus, 10mg Etoh per 100ml blood may be recorded as 10mg%, 0.10%, or 100mg/dl. These synonymous values form the legal definition of driving under the influence of alcohol (DUI) or driving while intoxicated (DWI) in most states. One beer (5% Etoh) or one "shot" (1oz) of 80 proof (40% Etoh) distilled spirits will typically raise BAC by 0.02 to 0.03%. Etoh is absorbed best from the small intestine, and so drinking on an empty stomach will accelerate the rate of rise of BAC. "Sugary" drinks will have the same effect. Drinking very large amounts of Etoh delays gastric emptying, and so BAC climbs more slowly on a full stomach. However, because the slower absorption of Etoh under such conditions continues long after ingestion has ceased, the effects of a given amount, though milder, will also last longer than usual after the last drink.

Women get a faster rate of rise of BAC than men from drinking the same amount of alcohol. Women also reach a higher absolute BAC than male peers who consume the same amount. This effect is thought to be due to the higher proportion of body fat in healthy female body. Hepatic size and alcohol dehydrogenase levels also play a role.

Most people feel a "buzz" from a BAC of 0.02 to 0.04%. Flight simulator studies have shown an impairment of flying abilities and judgment at about 0.025%. At the high end of the scale, a BAC of 0.25%, which sometimes occurs from intemperate drinking such as "chugging" at college fraternity functions can kill a non-tolerant individual through respiratory arrest, or by aspiration of vomitus. However, a "tolerant" patient can often remain conscious with BAC of 0.35 to 0.40%.

A great deal of aeromedical research has been done on alcohol in civilian aviation, and the results have led to various B to T rules. Federal Air Regulation 91.11 mandates 8 hours B to T in civil aviation, and the US military calls for 12 hours (e.g., U.S. Navy OPNAVINST 3710.7J) (both cited in Gibbons, 1988). Most US airlines require their pilots to abstain for 24 hours. However, numerous studies have shown significant impairment may remain well after statutory minimum B to T intervals. After BAC returns to zero, the individual can still have slowed reaction time and a diminished

ability to monitor multiple sensory inputs or to switch rapidly from one task to another. Radio communications were also adversely affected up to 8 hr after reaching a BAL of 0.10% (Morrow et al., 1993). Fourteen hours after reaching this same level, Etoh increased the variance of scores on most performance measures *with the pilots unaware of their impairment* (Yesavage & Leirer, 1986). Another simulator study found acute impairment beginning at a BAL of 0.04% that increased as BAL rose to 0.10%. Impairment declined, but was still significant through the next 8 hr, *with these pilots also unaware that they were impaired* (Morrow et al., 1990).

Alcohol impairs reactions to angular acceleration (G forces). Moderate amounts of Etoh reduce +Gz tolerance by 0.1 to 0.4 Gz. Further, Etoh consumption is associated with transient hypoglycemia (reduced gluconeogenesis) for 6 to 36 hours after ingestion. A blood glucose of 50mg% may be associated with another reduction of +Gz tolerance by 0.6 Gz (Brook & Simpson, 1989; Glaister, 1988). In another study, civilian pilots were given Etoh to attain BAC of 0.04%, and their BACs were allowed to return to zero. They were then examined for their ability to detect rates of angular acceleration. Etoh subjects could detect 0.34 degrees per sec per sec, while "sober" controls detected 0.26 deg per sec per sec ($p<0.001$). These effects continued for some pilots for an hour after their BACs returned to zero (Ross & Mughni, 1995).

Another troublesome phenomenon is Positional Alcohol Nystagmus (PAN). This is nystagmus associated with positional change after consumption of alcohol, and is related to changes in endolymphatic specific gravity (Money et al., 1974). Subjects were given either 0.85 or 1.7 ml Etoh per kg body weight. PAN was present 34 hours after ingestion, and could be induced 44 hours after ingestion when exposed to just 2.5 G (Ryback & Dowd, 1970; Oosterveld, 1970). For an extensive review, see Gibbons (1988).

In US Navy studies, ten US Navy aviators received Etoh to achieve BAC of 0.10%. Fourteen hours of abstinence followed. The subjects then "flew" simulator inflight emergency scenarios. Pilot performance was worse on virtually all measures of pilot performance in the "hangover" state. This sort of research has been repeated several times in civilian settings (Yesavage & Leirer, 1986; Billings et al., 1991; Ross et al., 1992; Taylor et al., 1996).

Sleep effects of alcohol are of particular interest. Alcohol reduces sleep latency, yet increases drowsiness. There is a rebound effect during sleep: Etoh causes sympathetic arousal and activation as it leaves the body. The activation disturbs Delta sleep and REM, and the resultant sleep disturbance causes fatigue and drowsiness the next day. Thus, fatigue is cumulative with repeated drinking bouts (Jules, et al., 1967).

Hangover effects are well known. Post-alcohol impairment (PAI) is a common temporary dose-related effect that includes nausea, irritability, anxiety, thirst, diaphoresis, headache, anorexia, and fatigue. Higher cortical functions may be affected for 48-72 hours. In a study of aviators with BACs to 0.10%, after 14 hours 68% committed pre-flight checklist errors, compared to 10% for a control group (Brook & Simpson, 1989).

Check to be sure that fliers understand the practical implications of factual information presented to them in the abstract. In a survey of 477 private aviators given theoretical information about types of beverages and amounts consumed, a large proportion could not determine when their BAC would be likely to fall to 0.02% after drinking, and many felt that they were safe to fly before they would have actually reached

safe levels. Their estimates of when it was safe to fly also became increasingly inaccurate with more alcohol, and with varying beverages (Widders & Harris, 1997). All these findings indicate the complications that arise when fliers drink, and there is no reason to think that military fliers would be much different.

We believe that operational flight under the influence of alcohol is extremely rare in the USAF today. Should it occur, assume that the disease of alcoholism is present. Understand that an aviator who has a problem with drinking will do everything possible to conceal this fact. The FS must have a high index of suspicion when a flier has any of these signs or symptoms:

- Public intoxication
- Etoh-related domestic incident
- Etoh-related altercation
- Driving under the influence of alcohol (DUI, DWI)
- One-vehicle motor accident
- Injuries occurring after midnight, regardless of cause
- Elevated GGT
- Elevated MCV
- Frequent falls with minor injuries, including sports injuries
- Peers, commander, or FS observe aviator irritability, suspiciousness, or withdrawal
- Sick call complaints of depression, anxiety, tension, headaches, palpitations, ill-defined GI complaints
- A flier's spouse is unlikely to contact FS or commander about such matters, but any such contacts should be considered valid. An angry spouse may be telling the truth at last.

CAGE questions may help make a presumptive diagnosis of alcohol abuse.

- "Have you ever thought you should Cut back on your drinking?"
- "Have you been Annoyed by others' comments about your drinking?"
- "Have you ever felt Guilty about drinking?"
- "Do you ever need Eye-openers to get going in the morning?"

Alcohol-related diagnoses may be made with some precision.

- Abuse: Continued drinking despite: failure to meet obligations; Etoh-related hazards (DUI) or legal problems; social or interpersonal consequences of drinking.
- Dependence: Usual features of abuse plus: tolerance; withdrawal; failed attempts to cutback or "control" drinking (these are evidence of addiction to alcohol); undue time spent drinking; important activities given-up; knowledge of Etoh-related medical or psychiatric problems.

What is the USAF policy concerning Alcoholic Aviators?

- A diagnosis of alcohol abuse or dependence is disqualifying for flying duty.
- Alcohol dependence or abuse can be treated.
- Prognosis *with treatment* is quite good in the aviation community, especially among airline pilots.

- Although disqualifying for military flying duties, either diagnosis may be waivered.

Aeromedical practice vs clinical practice

Misuse of alcohol may compromise flying safety even in the absence of the DSM-IV criteria for alcohol dependence or alcohol abuse. A most common mistake made in the care of aviators is the lack of FS familiarity with the distinction between aeromedical concerns and standard clinical diagnosis.

Certainly the FS must be able to recognize the alcoholic aviator, but "problem drinking" short of diagnosable abuse or dependence also is a very serious hazard to the military aviator. Do not kid yourself that it is "OK" for an aviator to drink heavily to cope with stress, yet continue to fly as long as diagnostic criteria for alcohol dependence or alcohol abuse are not met! Such a situation merely adds one more stressor to present significant stressors, and may reasonably be called "an accident waiting to happen."

What should the flight surgeon do?

- Evaluate the aviator (FS relationship with aviator and squadron could really help here).
- Obtain Mental Health consultation if there is any doubt.
- If the FS confirms or even suspects an alcohol problem after evaluation, the situation becomes a matter of official USAF policy. The FS ***must*** inform the aviator's commander.
- The commander ***must*** then request Alcohol and Drug Abuse Prevention and Treatment (ADAPT) evaluation and counsel aviator re situation.
- ADAPT will perform the substance abuse evaluation. The USAF ADAPT Program will receive the commander's referral. The ADAPT/PM is responsible for completing an evaluation within 7 duty days. The treatment team (Commander/1st Sgt, Supervisor, ADAPTPM, Therapist, FS) will convene, and the patient is included in the meeting. The recommendations are based entirely on clinical (ASAM) need criteria.

Medical Profiles and administrative actions follow. The diagnosis of alcohol abuse or alcohol dependence results in immediate DNIF, as well as Medical Disqualification (DQ) for flying duties from the point of the diagnosis until full remission of the presenting problem, but not less than 6 months. Diagnosed patients are also placed on S4T profile (ordinarily a 6-month ineligibility for deployment or mobility).

Consider for waiver when treatment and aftercare have been completed, and the flier has been off Antabuse or naltrexone for 6 months and has been sober for 6 months. Waiver action must be supported by command, FS, and the ADAPT staff. All parties must feel the flier to be at low risk for relapse. The flier then signs an understanding that total abstinence is now required, and any relapse will be cause for permanent DQ.

With this program, 85% of US military personnel treated for alcohol abuse or dependence have remained on active duty at least one year after treatment. Some 65% of 138 US military aviators hospitalized for alcoholism had returned to flying within two years of treatment completion (Flynn, et al., 1996). An early treatment onset was associated with better treatment outcomes. Success in this program parallels similar

successful programs in the air transport industry, programs endorsed and supported by the companies, the pilot unions, and the FAA.

Alcohol and Aeromedical Evacuation

Alcohol is also of concern in aeromedical evacuation (air evac) missions: The air evac system carries many seriously ill alcoholic patients (i.e., 300/yr.just to Andrews AFB). Any patient suspected of an alcoholic disorder must undergo detoxification prior to air evac Failure to do so can lead to in-flight emergencies enroute (seizures; aspiration; unexpected violence in a delirious patient), all of which have been actual occurrences.

FS should take the information in this section seriously. Decades of clinical experience have shown that avoiding the accurate labeling of alcohol abuse in fliers, passively or actively shielding its victims in operational units, and failing to provide for its consequences in air evac patients can do grave, life-threatening harm to those for whose care we are uniquely responsible.

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STRESSOR-RELATED REACTIONS

Acute stress reactions are usually based on combinations of fear and anxiety.

FEAR acts through the emotions to protect a person from danger, in somewhat the same way as pain protects the body from injury. A person normally feels fear when in actual danger. It is a usual reflex emotion that may elicit widely varying reactions when it occurs. People are born with certain innate fears, such as of falling (an infant's Moro reflex), or when exposed to sudden strong sensory inputs such as loud noises or bright flashing lights (a startle reflex).

ANXIETY, in contrast, is also a natural emotion, but arises in response to a symbolic danger out of proportion to the actual physical threat (e.g., reacting to a *picture* of rattlesnake as if it were a *real* rattlesnake). Anxiety feels the same as fear mentally, physically and autonomically. It may involve what the situation "means" symbolically, and it impels us to avoid emotional discomfort (shame, guilt, separation, loss, etc.), rather than simply physical discomfort. Clinically significant ACQUIRED FEAR OF FLYING involves anxiety as well as fear, and their similar symptoms are intertwined. *Treatment therefore should focus upon the irrational anxiety, not the rational fear.*

Anxiety about flying is not instinctive (most kids love to fly), so it must be acquired. It has different emotional and cognitive components than fear, and it may include secondary gain (e.g., drawing attention from others). Manifestations of either fear or anxiety may include motor tension, autonomic hyperactivity, vigilance and scanning, and time dilation (a sense that time is moving slowly when one is in acute danger). Entering flight school exposes student pilots to a new set of risks, even when their motivation to fly is quite healthy. Acknowledging this situation, the FS might ask, "Flying adds real danger to life. Isn't it natural to be afraid of that which is dangerous? If flying is dangerous, why isn't everyone afraid to fly?" The answer is that overcoming fear in pursuit of some personal goal is a widespread and generally admired human achievement. Perhaps the students are afraid deep in their hearts, but they are coping with the fear in healthy ways, so that what they feel is excitement, anticipation, and perhaps some performance anxiety, rather than raw fear. If these means of coping with fear—these defense mechanisms—fail, then a flier may become consciously aware of a new and unpleasant sensation, a fear of flying, for the first time.

ACQUIRED FEAR OF FLYING in aviators differs from the fear that non-aviators usually describe. Some 25 % of the general public are uneasy about flying, and about 10% are truly phobic about flying (Agras et al., 1969). As a rule, these phobias are

true and long-standing disorders, and do not represent a change in attitude from a previous attraction to flying. In contrast, overt and disabling fear of flying in aviators is a rather rare symptom (not a disorder *per se*), and is *an acquired serial change in attitude*.

Aviators may manifest an ACQUIRED FEAR OF FLYING in five general ways. See Jones et al. (1994) for a full discussion of these various manifestations.[1]

1. *Phobic fear* of flying in a previously unafraid aviator, without an obvious antecedent event ("I don't know what's wrong with me, Doc, but…").
2. *Somatoform symptoms* arising from or accentuated by interpersonal stressors and manifested in the aviation milieu as reasons for the aviator not to fly ("I'd like to fly, but…").
3. *Acute psychophysiological symptoms* (hyperventilation, psychogenic syncope).
4. Symptoms arising from a *neurotic motivation to fly* (anxiety, depression).
5. *Acute adjustment or posttraumatic stress reaction* to a flight-related event or mishap, which may at first be denied or suppressed (Initial "No sweat, Doc!" becomes "I don't ever want to fly again!").

1. PHOBIC FEAR OF FLYING characteristically occurs in aviators who have previously enjoyed flying. It may "start small," without association with any known cause or event, and then worsen with time. Such a phobia is ego-dystonic; that is, the flier is upset and disheartened by the feelings. In the experience of experienced aeromedical practitioners, such a phobia is always due to life factors outside of aviation, usually from stressors of interpersonal relations or job situations. If a flier becomes phobic, the FS should be alert for causes arising from the human factors discussed above concerning relationships, marital tensions, or from the job, career, finances, or other such situations.

The phobia may begin as exaggerated fear of a specific aviation setting, already known to be somewhat difficult; e.g., bad weather, night flying, or flying at low altitude. Remember—such situations involve some real danger, but the new symptoms are out of proportion to that danger. The aviator becomes obsessed with the feared situation, experiencing anxiety superimposed on whatever rational fear was already there. **Careful history concerning life situations just before the onset of symptoms is crucial to diagnostic formulation, and to treatment.**

- Treatment of flight phobia may consist of two non-pharmacologic approaches:

a. <u>Behavior modification therapy</u>.

- Learn a relaxation technique.
- Learn to use it fast, while doing something else.
- Practice mental imagery of the feared situation.
- Relieve anxiety by using the relaxation technique.
- Arrange a successive approximation to the real feared situation.
- Use the relaxation technique for real-time anxiety.

Behavioral modification treatment is difficult to carry out in an operational flying setting. It requires command approval and cooperation, and will probably use expensive

[1] The topics are arranged and titled a bit differently in this reference, but are essentially the same.

flying time. It also must be safe, and not expose others to increased risk or liability. Still, this technique has been successfully applied in the past, and with careful presentation and preparation may be successful in some future instances.

b. "Talk therapy" (cognitive, insight-oriented) to deal with underlying anxiety-provoking situation. This may take longer than behavioral modification, but it is not intrinsically DQ for flying, and may continue after aviator is flying again. Once they get the hang of it, most professional aviators make excellent patients, especially since their motivation includes the ego-dystonicity of the symptoms, and the economic pressure to get back to work.

Treatment of phobic disorders may not include the use of medications in operational settings, except for the initial stage of therapy and with the presence of a qualified alternate crewmember, because psychotropic medications are incompatible with aviation duties.

2. SOMATOFORM SYMPTOMS ("psychosomatic") involve chronic physical or physiological symptoms, generally mediated through the autonomic nervous system and presented by a professional aviator as incompatible with continuing to fly ("I'd like to fly, but…"). No conscious anxiety is expressed about flying, and any questions the FS asks about fear of flying may be angrily rejected (the protection the symptoms offer against subconscious anxiety is being challenged). The flier describes symptoms in terms of their effect on flying, and expresses little anxiety about having an underlying disease. The flier may also see *grounding* as the answer to the problem, and will show no particular interest in being cured and returning to the cockpit. These symptoms may be ego-syntonic; that is, the aviator does not particularly wish to be rid of them. Thus, the entire presentation differs from the usual sick aviator who doesn't want to be grounded at all, or grounded any longer than necessary. The resulting situation quickly becomes frustrating for both physician and patient, and this feeling of frustration on the part of the FS may itself be a symptom of the problem.

Three questions may be helpful in such instances:

1. *"What do you think about these symptoms?"* The flier with good motivation will say, in effect, "I'm worried…am I really sick?" The one with poor motivation will say "I'm not worried about an illness…just ground me and I'll be OK."
2. *"Why can't you fly with these symptoms?"* Good motivation: "I'm really sick…how long will it take me to get well?" Poor motivation: "I'm not safe…just ground me and I'll be OK."
3. *"Will you fly when we cure you?"* Good motivation: "That's a dumb question!" or words to that effect. Poor motivation: (Sigh) "I guess so."

Most aviators avoid physicians, and don't want to be grounded. Ask yourself, *"Is this aviator more concerned about being sick, or about having to fly?"*

3. ACUTE PSYCHOPHYSIOLOGICAL REACTIONS may result from such stressors as a loss of sense of control (e.g., spatial disorientation), threats to bodily integrity (venipuncture), or degraded social status ("loss of face," embarrassment). Such reactions present problems not seen in usual medical practice. They are not defined in DSM-IV, and thus do not constitute psychopathology in the ordinary sense. They may

occur in response to physical stressors in the absence of physical disease, and characteristically occur with situational or social stressors. The two most common are *hyperventilation* and *syncope*. This discussion will presume that neither manifestation is due to cardiac or neurologic pathology, both of which have been appropriately considered and ruled out.

- Hyperventilation. If fliers experience an alteration of consciousness in flight, they must differentiate between hypoxia, hyperventilation, and toxic fumes while in control of a high-performance aircraft. The "school" response while thus stressed is to gangload the regulator to 100% oxygen under positive pressure, take three deep breaths, and "control" one's breathing. Unfortunately, the flier may do this by decreasing the *rate* of respiration while increasing the *depth*, so that the minute volume stays the same, or even increases.

  Two simple rules may help the flier to control breathing effectively:
  - Breathe through nostrils…they act as flow-limiting valves.
  - Exhale twice as long as inhale…this further slows respiratory rate to compensate for any increased respiratory depth.
- Psychogenic syncope. This has never been a problem in the cockpit, where the flier is IN CONTROL. Syncope may occur when the flier must remain passive in the face of a perceived threat, as with venipuncture, or the sight of blood. A particular stressor for a male flier is seeing his own child being sutured. The perceived threat may be symbolic, such as a graphic first aid talk or movie, or it may involve a loss of face in front of peers or superiors. Such situations may be intensified when added to chronic dissatisfaction with working conditions or situation (Boydstun & Sledge, 1979).

  Prevention of psychogenic syncope involves teaching fliers to heed the early warning symptoms such as lightheadedness, altered awareness of surroundings, constricted or dim vision, weakness or tingling, or any other personal awareness of orthostasis they have experienced. It may be useful to compare the sensations to G-LOC or to hypoxia. Corrective action is simple: get head lower than heart. LIE DOWN NOW! Tell them to "Forget your dignity. Pride goeth before a fall!"

4. ANXIETY ARISING FROM A NEUROTIC MOTIVATION TO FLY. Such cases are rare, mostly occurring during or shortly after flying training. In theory, a properly performed ARMA will detect such flawed motivation, serving as the basis for disqualification before any flying is done.

When seen in the aviation environment, such cases usually involve student fliers who are children of abusive fathers. As the students near graduation from training, the threat of symbolically surpassing their fathers causes intense anxiety and self-defeating behavior. (The movie "An Officer and a Gentleman" addressed this theme.) Such individuals should be grounded and offered treatment. They will probably not be allowed to re-enter military flying training programs.

When such cases involve female fliers, previous sexual abuse may underlie the situation. This may be exacerbated in UPT situations where peer support from male classmates involves covert or overt sexual overtones, the woman is exposed to heavy individual pressure from male instructors, and little recourse is perceived or sought. Such situations do not necessarily constitute sexual harassment (if present, this must be taken

into account through proper channels), but are perceived as unbearably threatening because of the woman's past experiences (Jones, 1983).

Whether occurring in male or female fliers, and regardless of the sympathy the predisposing factors may deserve, neurotic motivations to succeed in a flying career are intrinsically unsafe, and aviation is an unforgiving and lethal arena. Flying must not be regarded as a necessary psychotherapeutic experience. The individual should be grounded, and proper therapy undertaken. Usually the nature of the DSM-IV diagnosis is permanently disqualifying.

5. <u>POST-TRAUMATIC ADJUSTMENT OR STRESS DISORDER (PTSD)</u> in aviation begins with a clear precipitating event, generally involving some aspect of flight. The symptoms may be delayed, and then denied, but finally they become intolerable. They meet some or all DSM-IV criteria for an *acute* stress disorder, and may progress to *chronic* PTSD. The aviator may not accept return to flying as a therapeutic goal.

In this instance, the event (a mishap or a close call) has overcome the flier's coping defenses against real dangers of flying. Recent exploratory prospective research indicates that the proportion of acutely traumatized individuals experiencing acute stress disorders was similar to the proportion experiencing PTSD six months later. Note that the experience of individual posttraumatic symptoms (dissociation, intrusive thoughts) is common after a traumatic event, and is not necessarily pathological (Brewin, et al., 1999). Treatment of acute stress disorders is possible, but treatment of PTSD is difficult or impossible, and so it is important to *prevent* the occurrence of PTSD if it is deemed likely to occur (e.g., post-mishap or close call). The classic aviation medicine literature proposes what amounts to crisis intervention techniques for prevention.

<u>Preventing a Post-traumatic stress disorder following a mishap or a close call:</u>

- **During the privacy of the post-event physical exam, inquire how aviator is feeling. ("How are you doing?")**
- **Be prepared for denial of emotional response. ("I'm OK, Doc.")**
- **Go over the reality of what happened, and what the flier experienced (facts) and felt (emotions).**
- **Encourage the flier to express feelings. ("I don't know about you, but I'd be thinking real hard about whether I wanted to keep on flying…")**
- **Reassure about normality of such feelings.**
- **Discuss nature of original motivation to fly. Is it still valid?**
- **Discuss original and current defenses about the dangers of flying.**
- **Give some information about possible reactions yet to come—intrusive thoughts, dreams, flashbacks, and also emotional numbing.**
- **Reassure that such feelings are normal and predictable (you just predicted them!), and will pass with time. They do not represent "going crazy."**
- **Leave the matter open for future discussion if necessary.**

Treating an established post-traumatic stress disorder is difficult and controversial, and successful treatments of chronic conditions have been poor, even

among specialists. Thus, prevention seems to be the best approach for the FS. The office approach outlined above has been distilled from decades of clinical experience passed on among FS, and has never been given a specific name, nor generated much formal literature. In its general philosophy, it resembles a well-documented approach called "CRITICAL INCIDENT STRESS MANAGEMENT." Although as of 1999 no strong outcome studies support its efficacy (Applewhite & Dickens, 1997; Martin et al., 1996; Ireland & Bostwick, 1997; also Geller S, personal communication, 1997), it is widely used in military and civilian emergency and disaster situations, and is an official USAF response as well (see AFI 44-153, *Critical Incident Stress Management* [1 Jul 97], which implements AFPD 44-1, *Medical Operations*).

CRITICAL INCIDENT STRESS MANAGEMENT (CISM)

CISM is a comprehensive, organized approach for the reduction and control of harmful symptoms due to stressful critical events. This technique was developed by Jeffrey Mitchell, Ph.D. to prevent Post Traumatic Stress reactions (and PTSD) especially among high-risk occupational persons such as firefighters, law enforcers, and emergency medical practitioners (Mitchell, 1983). It aims to maintain health and productivity, prevent, delay or reduce traumatic stress effects, rapidly restore afflicted personnel to normal function, and enhance the overall environment in which such people live and work. CISM is carried out in the Air Force by Critical Incident Stress Teams (CISTs) appointed at each installation by the wing commander. Its team members represent Medical, Mental Health, Chaplain, and Personnel disciplines. Thus, FS should be familiar with its principles, and should expect to work with CISM teams in times of crisis. You should be prepared to advise your unit commander about its principles on the spot should acute situations occur.

Key CISM elements involve *Critical Incident Stress Debriefings, Defusing, Demobilization, Follow-up services after critical incident interventions, Pre-incident traumatic stress education, On-going stress education, and Family Support Services*. We will outline the first three elements; the latter four are fairly self-evident.

Debriefings (CISDs) involve 1.5- to 3-hour group meetings. These are jointly guided by mental health professionals and by peers of those exposed to the trauma, and are intended to reduce the immediate effects of such an event and to accelerate recovery. Debriefings include 7 distinct phases: *Introduction, Facts, Thoughts, Reactions, Symptoms, Teaching, and Re-entry*. During the *introduction* phase, the intervention team members are introduced and the overall process is explained to participants. The objective of the *fact* phase is to have each participant describe the traumatic event from his or her own perspective. In the *thought* phase, each participant is asked to describe their cognitive reactions to the critical incident; transition into the emotional level is begun. Each participant, during the next phase, the *reaction* phase, is asked to identify the most traumatic aspect of the event and to identify his or her emotional responses. Next is the *symptom* phase, in which participants identify their personal symptoms of distress; transition is now begun back to the cognitive level. A good question to ask during the *symptom* phase is "How did you know this (event) was having an effect upon you?" Continuing at the cognitive level, in the *teaching* phase, team members educate as

to normal reactions to traumatic stress and adaptive coping mechanisms (i.e., stress management techniques). The last phase is *re-entry*; in this phase, opportunities are provided to clarify ambiguities and to prepare for termination ("Is there anything else that we haven't talked about?").

CISD was carried out (and publicized) after Hurricanes Hugo (1990) and Andrew (1992), Operation Desert Storm (1992), the Oklahoma City bombing (1995), and at Nellis AFB (1998). You may expect to encounter CISMs after future natural disasters (hurricanes, floods, fires, earthquakes), mass casualty accidents, combat situations, large-scale environmental pollution, terrorist acts, child-related traumatic events, or multiple homicides. It will likely be a routine factor in Military Operations Other Than War (MOOTW) in the future.

According to Mitchell, the CISD team combines the skills of *mental health professionals* with those of emergency or high-risk *peer participants* trained in preventing or mitigating the negative effects of traumatic stress on themselves and their fellows. The *mental health professionals* should have at least a Masters degree in psychology, social work, psychiatric nursing or mental health counseling. They must also have specialty training in crisis intervention, stress, PTSD, and the CISD process.

Peer participants are previously selected and trained volunteers from agencies that may encounter such situations: emergency service organizations, police, fire departments, emergency medical services, and nurses. Thus, an incident that predominantly involves a fire will have firefighter peers available. Clearly, CISD teams must be organized and maintained in advance of traumatic events, and (like all team efforts) require ongoing training, call rosters, documentation and other such provisions.

A CISD opens by introducing the team members, and proceeds to discuss the purpose and process of the meeting. The facts of the event are reviewed, and factual material ("What did you see?") elicited from participants who wish to speak. Emotional reactions in a "What did you feel?" vein are accepted, but are not actively pursued. The range of normal emotions that people have experienced after such an event is presented in an educational spirit, and, after any appropriate further discussion, the meeting is closed with the assurance that participants may be seen individually upon their request, and that further meetings are planned. For further details, see AFI 44-153.

Defusings are shortened versions of Debriefings, lasting 20-60 minutes. They must be provided within 8 hours of incident; and are used for smaller groups. Their three phases are *Introduction, Exploration of facts,* and *Informal teaching.*

Demobilizations are for groups of 100 personnel or more. These rare situations occur in response to large-scale events, and may substitute for a defusing. Each involves a 10-minute information section from a CISD team member, followed by 20 minutes for food and rest for the participants.

CISD/CISM resembles an abbreviated treatment for combat fatigue, based on findings during both World Wars that distraught soldiers returned to combat more quickly when given immediate psychological support in the field than when managed later in rear hospital settings. Israeli studies during and after the 1982 war in Lebanon have shown that such an approach reduced the incidence of long-term psychiatric casualties up to 60%. Extensive investigation by others has demonstrated the effectiveness of approaches incorporating the principles embodied in the acronym BICEPS: Brief treatment, given in the Immediate situation in Central (non-hospital) field

situations, Expecting the individual to return to duty, close (Proximate) to healthy peers, and Simply involving psychological first aid and support. This will be discussed in greater detail in the Combat section.

It is worth repeating that the principles involved in such Critical Incident team efforts to support multiple victims of traumatic situations will also aid the FS in dealing with an individual flier who has been involved in a mishap or a close call.

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AIRSICKNESS MANAGEMENT

Motion sickness is a well-known phenomenon in humans in "unusual" environments. Motion and acceleration effects in aviation are for the most part highly respected, if not feared, among aviators. Motion sickness is defined as a response to real or apparent motion to which a person is not adapted; it is not a disorder, and the symptoms are normal responses to an "abnormal" stimulus (Dobie & May, 1994). Seasickness, airsickness, space motion sickness, simulator sickness and now virtual reality sickness have been the subject of intensive study for many years. Motion of the individual is not always a factor; the complete syndrome may be generated in a susceptible person sitting quite motionless inside a cylindrical chamber within which rotating stripes are projected—the optokinetic stimulus (Hu et al., 1999).

Airsickness can be a significant issue in flight training and crew adaptation to military flying. Pioneers in operational medicine studied various aspects of this phenomenon: etiology, prevention, amelioration, and even issues of selection and performance decrement resulting from these overwhelming physiological responses to motion. The voluminous literature in this area continues to grow. The most success has been from studies of techniques of amelioration; least successful have been the studies of etiology. Numerous models have been developed in attempting to understand the connection between movement and the malady experienced by some but not all individuals in a variety of ground, water, air and virtual vehicles. The most complete models include interactions or mismatches between perception, cognition, affect, and physiology as etiologically involved in motion sickness (Benson, 1984; Dobie & May, 1994; Money, 1970; Reason, 1978).

Recent literature has emphasized the electrogastrogram (EGG) as a research tool. The acceleration of normal gastric motility (about 3 waves/min) to tachygastria (4-9 waves/min) appears to accompany the subjective signs (pallor, apathy) and symptoms (salivation, sweating, nausea, vomiting) of motion sickness (e.g., Hu et al., 1999). Some subtle changes or imbalances in the interactions between or within visual and vestibular motion detection systems may predict a tendency toward motion sickness, but this has not yet been refined to the point of operational usefulness (e.g., Cauquil et al., 1997.). The most practical clinical predictor of airsickness is a history of previous motion sickness, but this is neither particularly sensitive nor specific. Thus, at present, there is no sure way to identify individuals who will become airsick except for them to fly. For a full description of selection of persons resistant to motion sickness, see Dobie & May (1994, pp. C5-6).

Flight surgeons usually become involved when a flier becomes airsick during flight training. Several medication, behavioral and combination treatment programs have been reported (Jones, Levy, Gardner, Marsh, Patterson, 1985; Giles & Lockridge, 1985; Dobie et al., 1989; Dobie & May, 1994; Stern, Hu, Vasey, Koch, 1989; Banks, Salisbury, Ceresia, 1992). All generally rely on various aspects of physiological habituation and accommodation, whether these occur through 1) drug-induced physiological dampening to allow the body to experience the motion without the reaction, 2) cognitive-behavioral symptom management in the context of motion, or 3) both modalities. Medications have the virtues of simplicity and nearly 100% symptom management, but have either *known* side effects incompatible with flying or *unknown* and therefore unacceptable side-effect profiles. Scopolamine-dextroamphetamine and ephedrine combinations are examples. Phenytoin has also been effective, but is obviously contraindicated in fliers (Chelen, et al, 1990). Psychological methods have the virtues of no negative side effects and of "self" management and mastery, but can be time-consuming and expensive (if flight time is required), and success is likely to be related to motivational, personality and other moderating variables.

Various approaches have been developed to treat motion sickness associated with flying training. These approaches use a primary and secondary prevention model beginning with education and training for all students before flying training begins. It is estimated that one hour of simple classroom awareness training on the basics of motion sickness (normalization and identification of symptoms, basic vestibular physiology), along with rudimentary methods of prevention (foods, dietary schedule, stress management, etc.) can reduce airsickness incidence by as much as 30%. For those trainees who go on to become symptomatic, careful aeromedical and psychological assessment is essential to differentiate between primary or secondary motion sickness. Primary motion sickness results from a maladaptive physiological reaction, whereas secondary motion sickness is, at least in part, the result of problems with ability, emotional stability and/or motivation for flying. In secondary cases, administrative action is undertaken to eliminate the individual for unsuitability.

The diagnosis of primary motion sickness leads to a staged, individualized treatment plan and can include pharmacotherapy (up to about 4 flights), stress management and/or cognitive-behavioral training, usually given for about one week, 1-2 sessions per day, followed by *in vivo* training). Psychological techniques used include relaxation training, biofeedback, desensitization, and cognitive restructuring with or without motion stimulation (e.g., Bárány chair).

Several military motion sickness research programs have replicated excellent outcomes with various treatment regimens and various subjects. Programs such as the USAF biofeedback treatment protocol have shown at least an 84% return to fly rate for the most refractory cases (Jones, et al., 1987), while early intervention programs in flight training have produced successful outcome for up to 96% of cases (Giles & Lockridge, 1985)).

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COPING WITH THE STRESSES OF DEPLOYMENT, PEACEKEEPING, AND COMBAT: A MENTAL HEALTH PERSPECTIVE ON DEPLOYMENT LEADERSHIP

Deployment and peacekeeping missions are common in today's military environment. Military leadership requires military and political skills. Medical leadership adds another dimension.
Become familiar with sources of medical intelligence, including :

1. **Defense Intelligence Agency, Armed Forces Medical Intelligence Center**, Ft Detrick, Frederick, MD **Operations Division (24 hour service): DSN: 343-7574** Also produces a **CD-ROM** entitled **Medical Environmental Disease and Intelligence Countermeasures (MEDIC)** [Available by mail: AFMIC, Ft Detrick, 1607 Porter St., Frederick, MD 21702-5004]

2. **Travel warnings of the US State Department** @ http://travel.state.gov/travel_warnings.html
3. **Publications and warnings of the CIA (including maps)** @ www.odci.gov/cia/publications/pubs.html
4. **Geographic health recommendations of the CDC** @ www.cdc.gov/travel/index.htm#Geographic
5. **Medical Intelligence & Medical Estimate of the Situation Workstation** (prepared by a retired/career military public health senior NCO) @ www.txdirect.net/users/jeturner/
6. **US Army FM 8-55 Planning for Health Services Support** @ www.adtdl.army.mil/cgi-bin/atdl.dll/fm/8-55/toc.htm
7. **DoD Joint Publication Menu** (contains Tri-Service documents on deployment and medical support) @ www.dtic.mil/doctrine/jel/c_pubs.htm

Stay up-to-date on the latest news, and read between the lines of what is presented to search out clues to matters of medical importance.

Deployment stressors begin with the first hint of possible deployment:

- **Question #1: When are we coming home?**
- **Disrupted civilian occupation, financial burdens**
- **Uncertain deployment length**
- **Changing plans**
- **Waiting, boredom**
- **Jet lag, fatigue**
- **Poor mail or telephone service**
- **Lack of privacy**
- **Physical discomfort**
- **Unpleasant climate**
- **Unpleasant food**
- **Lack of equipment, supplies**
- **Abstract or unclear goals**
- **General confusion**
- **Possible or actual terrorism**
- **Exposure to atrocities or dead bodies**
- **Risk of capture**
- **Inability to defend self or others**
- **Fear for personal safety in ambiguous situations**
- **Situations outside the rules of engagement**
- **Question #1: When are we going home?**

Pay attention to basic physical amenities: water, food, sleep and comfort. Note that these represent basic human needs (as in Maslow's famous hierarchy), and if they are not met, nothing else will go well.

- Actively support chaplain programs and religious observances, since religious faith is a strong support in stressful times. Be sure that all faiths are represented.
- Flexible leadership is crucial in any commander, including medical commanders.
- Emphasize clear chain of command and sense of mission.
- Update plans and training as necessary.
- Be careful of "us versus them" situations with distant headquarters.
- Become a reliable source of information.
- Don't make promises you can't keep about when troops will go home.
- Commanders must be alert for stress-related misbehavior.

- LEAD BY EXAMPLE.

Understand how people may react to chronic stress; watch for indications of poor morale. These include sloppy performance, a rising non-effectiveness rate (something that medics will notice first), substance abuse, and minor disciplinary infractions (disobedience, fights, insubordination, failure to repair). Regard such indicators seriously and investigate them rapidly—especially the quality of mid-level leadership (junior officers, senior NCOs). Understand that members assigned from Reserve or ANG sources may be making greater sacrifices than RegAF troops. Know your disciplinary options by heart and in order of severity before you deploy—circumstances may not allow you to consult with JAG or other officials before committing to a course of action.

The unusual circumstances that require deployments will frequently involve civilian authorities at a level that you have never experienced. The Constitution specifies civilian oversight of the military, and for good reason, but it may be a surprise when you encounter such oversight personally. Professional familiarity with the chain of command and with the Public Affairs office will serve you well here. Be careful of intemperate statements, especially around patients or subordinates.

In the same spirit, be aware of the large role that the media play in undertakings that require deployment of troops. A free press is a cherished national asset. Regardless of how you or other military members feel, media representatives are a fact of life, and the general public and civilian authorities pay a great deal of attention to media interpretations of what goes on in the military. The worst times and events attract media, by definition. It's their job. Do not let emotions degrade your dealings with them, especially during crises such as disasters, mishaps or combat losses. Keep your communications with them brief and professional, and think before you speak.

As the deployment is ending, plan for some sort of formal closure, farewell party, or ceremony *before* the unit returns to its home and disbands. It may not be possible once you return, and it is psychologically very important to have an ending to the experience.

Read about the world you may have to enter—not only medical sources, but also histories and biographies. Talk about combat and deployment experiences with veterans of such endeavors. Forewarned is forearmed.

READING LIST

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FLIGHT SURGEON SUPPORT TO AVIATORS IN COMBAT

"IF THEY AIN'T HURT, DON'T SHIP 'EM OUT."

Care of aviators and other USAF personnel in combat situations involves dealing with all of the stressors of deployment, and adds to them the uncertainly, violence, powerlessness, multisensory stimulation, fog and friction of war.

The military mission in war is to break the enemy's will to resist, an intent that might be expressed in psychiatric terms as causing stress-related symptoms among enemy troops. The foe will be trying to do the same to our troops. In such situations, it takes little medical effort to decide to evacuate troops who are becoming symptomatic—but to do so helps the enemy. On the contrary, the essence of leadership and of military medicine is to return such troops to duties, at least for a while.

Fliers in the Air Force are a numerical minority, but a powerful minority with a collective short-term (about 25-year) reservoir of experience in combat. Fliers have role models and mentors, and (unlike most USAF members, who are not aviators) have a strong and widely publicized tradition of how they are expected to behave in combat.

Combat flying recapitulates and magnifies the general dangers of flying, and thus enlarges the factors involved in coping with those dangers. Fear is to the mind as pain is to the body—both fear and pain have an evolutionary value. They protect us from that which can injure or kill us. We may or may not respond by confronting the danger; fear may also urge us to freeze to avoid detection, or to run away to safety ("fight, fright or flight"). When confronted by danger, the instinctive reaction must be tempered by cognitive will, especially to overcome freezing up or running away. Thus, willpower urges troops to stay and confront the danger, to "do their duty." This may lead to an internal conflict that produces symptoms: psychological, physical (autonomic), or both. To repeat, **combat fatigue symptoms arise from internal conflicts between instinct (emotion) and willpower.**

Willpower can't last forever. When will weakens, as it almost always does eventually, the resulting symptoms are called Combat Fatigue by some. This is a normal and predictable course of events. It varies between individuals, and also within a single person at different times. Previous stressors can hasten symptoms.

Initial symptoms may need care:

Irritability Tremors, jumpiness

Lost sense of humor	Sleep disturbance
Change of habits	Social withdrawal
Alcohol abuse	Poor performance
Nicotine abuse	Personality change
Caffeine abuse	
Abuse of other substances	

Such symptoms may receive "first aid" care within the unit ("First Echelon Care"). This may consist of extra rest, ventilation and support: "Three hots and a cot." Within a flying squadron, combat losses may recall peacetime losses. Here, we may use the lessons learned through experience with Fear of Flying.

There is no ethical way to simulate fear in combat exercises, and so fliers may be shocked by the magnitude of their fears in their first few combat sorties. Most fliers will settle down fairly quickly, using defenses they have used before.

Similar personalities tend to use similar defenses. All fliers undergo standard selection, training, checkout and socialization, experiences that tend to produce aviators who reinforce each other's similar defenses. Thus (in order of each coping skill's relative maturity and contribution to the general hardiness of each flier) we find that most fliers use humor, anticipation (planning), suppression, denial, rationalization, intellectualization, and repression to cope. Collectively, they all feed into the visible and traditional mixture of understatement, bravado and fatalism that is frequently portrayed in books and movies about fliers at war.

Commanders & flight surgeons have two basic instruments to oppose Combat Fatigue (*medications may not be used, except on rare occasions*):

- REST—both short- and long-term. Note that quality of sleep is essential. Pay attention to sleep conditions & facilities.
- PERSONAL INFLUENCE—the transference relationship with the flier.

REST

Pertinent factors include length of flying missions, time of day they are flown, the intensity of combat (and losses), number of missions per day, time spent on alert (cockpit alert is especially fatiguing), how long the air war has gone on, and how long it is expected to continue. In this context, the judicious use of stimulant and sedative medications ("go / no-go pills") under appropriate conditions of command authorization may be an effective military aeromedical decision.

The interval between missions determines the short-term recovery time. Examples from the recent past are instructive:

- Short: Israeli pilots flew up to 10/day during the Sinai Peninsula War
- Long: B-52 crews flew 19-hr missions (26-hr crew day) during Linebacker II in December 1972, and similar missions during the Gulf War.
- Longest: British Vulcan crews flew 26-hr missions (40-hr crew day) from Ascension Island during the Falklands War.

If combat missions extend beyond a week or so, recommend scheduled one- or two-day breaks as soon as possible. Also, advise longer rest periods such as "R & R," if

the combat or deployment tour goes beyond six months. Be aware that the type of combat tour can affect fliers' reactions:

- Number of missions (e.g., 100-mission tour): fliers will want to get them done, and not take rest breaks.
- Specified tour length (e.g., six-month tour): fliers are more willing to take time off.

Whatever rule the authorities establish, they should TRY NOT TO EXTEND IT INVOLUNTARILY. If it must be extended, recommend that they "grandfather" those already there under the old rule in order to support unit morale.

PERSONAL INFLUENCE WITH THE FLIER

The flight surgeon must be:

- A good physician. Nothing can make up for professional incompetence.
- A good officer. The military will assume you are a good doctor until you prove you are not; they will not assume you are a good officer until you prove that you are. Develop the skills.
- A powerful member of the squadron. This role will increase in combat.

The FS mission is to help the fliers to do the job at hand, support their sense of duty, help them control their fear by buttressing their coping skills and defenses, and help them control their fatigue by all means possible. The FS message to the fliers should be: "Our duty is to help you fly, not to rescue you." FS should do some combat observer flying themselves in order to establish their credibility, to obtain realistic information, and to make suggestions helping safety and operational effectiveness: the reasons they fly any sort of unit missions.

Flight surgeons help provide good medical care, healthy coping skills against stressors, reinforcement of trust in fliers' own skill and training, the best possible living conditions (flight surgeons should be billeted with fliers), high motivation, group cohesion and a desire to succeed, trust in comrades ("Others feel the same as you. If they can keep on, so can you."), and trust in equipment. Accurate information is essential; the FS may serve as an informal link in the chain of command; an alternate pathway for getting things done. FS may advise on useful activities during slack periods (health and first aid education, safe sports programs; also useful are civic action programs, local tours, local history and language courses, etc.) They provide information to commander about adequate leave and rest programs, and also about the morale of the fliers.

In all these situations, beware of secondary gain from symptoms if motivation begins to slack off. Suspect secondary gain when fliers seek you out to get grounded, or when grounded fliers seem in no hurry to get back to flying by missing appointments, asking to stay grounded longer, or asking to be assigned to limited or non-flying duties.

To summarize, in combat the flight surgeon must be to the fliers as the chief of maintenance is to the aircraft.

Trust the wisdom of line officers about what the squadron can do, and of the fliers themselves about when one of them has "paid his/her dues." This may help you decide when to be tough or to be sympathetic about symptoms of fear.

Combat stress decisions are "zero-balance." Grounding a flier from a mission sends another flier on that mission. The flier who goes may be almost as worn out as the

one grounded. Confer with the commander or operations officer about such decisions. When combat fatigue is a concern, see the squadron members every day in the flight line environment. Talk to fliers before and after missions. Ask about sleeping patterns. Watch for social withdrawal, temper outbursts and tremors, and for abuse of caffeine, nicotine, and alcohol.

Beware of alcohol abuse. A functional definition of alcohol abuse in the aviation context is when fliers notice, over a several-day period, that drinking affects their sleeping pattern or their sharpness in the cockpit. Drinking to help induce sleep is another warning sign. See the section on Alcohol and the Flier for further information.

If a flier must be grounded for combat fatigue symptoms, use as little medication as possible for as short a period as possible. Manage according to the BICEPS principles.

BICEPS

- B - Brevity. Keep the intervention to three days or less.
- I - Immediacy. Treat as soon as the symptoms become disabling.
- C - Centrality. Keep those under treatment together in a rest camp environment, and out of hospitals.
- E - Expectancy. They are expected to get well, defined as returning to duty.
- P - Proximity. Treat close enough to the unit that the commander and fellow fliers can visit them. Encourage this.
- S - Simplicity. Focus treatment on return to duty. Use minimum medications. Help re-establish adequate coping skills. Appeal to the flier's sense of duty.

Combat situations, by their nature, involve new ethical considerations. Is it "right" to send a stressed-out flier back to duty when he or she is under such stress? Is it safe?

Medics are in the "getting-well" business, and here, as anywhere in the service, getting well means going back to duty. The enemy has been trying to get rid of our fliers, and grounding a flier helps that goal. If this flier doesn't return to duty, either someone else will have to do the job, or no one will do the job. This leads to explicit consequences:

- Either someone else does the job—
  - A new flier is much more at risk, both physically and psychologically.
  - Another "old" flier is almost equally worn out, and the unit is spread even thinner.
- Or no one does the job, and the ground troops may pay the price.

Finally, if a flight surgeon "helps" a flier by evacuation or reassignment for combat fatigue, it may have life-long repercussions for the flier. The kinds of decisions that flight surgeons must make under these conditions are very much like those made by commanders.

Remember the words of General Robert E. Lee as he viewed the carnage after his victory at the battle of Fredericksburg. *"It is well that war is so terrible, else we should become too fond of it."*

The section on combat is based upon Jones DR. Chap 8, pp. 177-210. U.S. Air Force Combat Psychiatry. IN: Jones FD, et al. (Eds.) War Psychiatry. This book is a volume in the series: Zajtchuk R, (Ed.) Textbook of Military Medicine, Part I: Warfare, Weaponry and the Casualty. 1995. Office of the Surgeon General at TMM Publications, Borden Institute, Walter Reed Army Medical Center, Washington, DC 20307-5001. This source includes an extensive list of references.

One of the few first-hand references to such flight surgeon experience is Rayman RB. 1993. "The Cambodian airlift: a study of fatigue." Aviat Space Environ Med. 64: 319-23.

Some good non-medical books, available in paperback at many bookstores, may also help acquaint the FS with combat situations: Ethell J, Price A, "Air War South Atlantic" (a particularly useful overview of both strategic and tactical considerations); Trotti J, "Phantom over Vietnam;" Basel, GI, "Pak Six;" Cunningham, R, "Fox Two;" Downs, F, "Aftermath;" Mowat, F, "And No Bird Sang."

THE WILL TO SURVIVE UNDER EXTREME STRESS

This section will address the mental health aspects of surviving in extreme danger, both acute and chronic. The technical details of actions to be taken are taught in specialized courses, and we will not consider them here (an excellent source on this topic is AF PAM 36-2246, *Aircrew Survival).*

Survival is one of the basic instincts at every level of life: homeostasis for the cell, self-preservation for the individual, herd behavior for the group, reproduction for the species. If a behavior helps us survive, we learn from it and repeat it whenever a similar danger threatens again. People frightened by acute danger respond instinctively toward survival by resisting, hiding or fleeing (fight, fright or flight). Within a random population, about 12-25% will react adaptively, combating the danger or helping themselves and others. About 50-75% will do nothing much; they are tractable, but lack initiative. The remaining 10-25% will manifest paralyzing anxiety, will panic or will do illogical, obstructive things, requiring the efforts of others to rescue them, and adding to the problem (Tyhurst, 1951). Panicky behavior involves thoughtless and possibly counterproductive behavior that may actually increase the danger. For example, a person under gunfire may panic, jump up and run, actually increasing the chances of being shot. In contrast, adaptive survival behavior helps us to re-establish a sense of control over the situation. The proportions of the less adaptive tendencies cited for random populations may be lessened by planning, training and exercising skills and behaviors useful for survival.

In addition to successful instinctive reactions, people learn to survive by rehearsing adaptive behavior. Animals "train" through play: much of the instinctive play activity of young animals serves this purpose. However, animals learn only from reality; unlike humans, they cannot plan for novel contingencies. Humans can use their unique cognitive powers to plan for survival, rehearsing mentally (imagining—fliers do a lot of this with their "hanger flying"), listening to the experiences of others (training), or physically performing (practicing) what actions to take.

Both mental rehearsal and physical practice are a part of the vital coping skill of Anticipation discussed previously, and make fliers more likely to do the proper thing in a crisis—they can "remember" things that they have never actually done because they have thought them through ahead of time. Thus prepared to deal with novel situations, they do not have to decide upon the best response under conditions of unforeseen stress. Although one can never predict exactly how any individual will behave in an emergency,

practices based on mental rehearsal, learning from others and hands-on training have proven generally useful in many past situations. Clearly, the more realistic the process, the better, which has led to the slogan, "Train like you fight."

One element almost impossible to simulate, train for or imagine is the emotional reaction to danger, *fear*. Fear changes the ways we think, feel and act, partly though its mental effects, but mostly by its effects on the autonomic nervous system (ANS). Danger may be acutely threatening. Good pilots are said to have "the right stuff," the ability to think clearly and act correctly during severe situations even if unforeseen. Experience in dealing successfully with extreme situations leads to confidence and clear thinking in subsequent crises. Possibly these pilots have learned how to *think* under stress while controlling the ANS in situations where most people would stop thinking clearly and either freeze or panic.

Danger may also last longer and require a more enduring response—a chronic stressor. For example, a pilot may have to deal with a severe inflight event that results in ejection and leads directly to a survival situation, going on to require escape and evasion tactics. After dealing with the multiple initial acute threats, the pilot may be physically exhausted, injured, and utterly alone in a hostile environment. This situation is so far removed from the usual flying scene that the pilot feels overwhelmed, helpless, or even guilty about being in the situation. Instinct and immediate responses have worked so far, but now a new set of skills involving innovation and flexibility is required. As soon as possible after the event occurs, the flier should stop and rest, eat and drink, clean and dress any wounds, and assess the situation as clearly as possible. What is the next move?

Situations perceived as uncontrollable evoke such feelings as fear, helplessness, desperation, exhaustion, and submission: the will to survive diminishes or may disappear altogether. Helplessness and hopelessness sap the motivation to respond, the perception of possible success, and the emotional control. Fear, anxiety or depression may lead to a strong temptation just to give up, to wait passively for whatever comes next. Indeed, in such a situation, "lying low" may be the best course of action, but hiding is not the same as submitting. While resting the pilot must maintain emotional control, continue to "think ahead" of the situation, remain alert to pertinent stimuli, and plan "what if…" moves as in a chess game.

Fliers generally have a strong sense of control, and bring that expectation of control to crisis situations. Predictability implies controllability, and so they believe, with good reason, that what they do will make a difference. Fliers' past experiences of successful adaptation to stressful situations increase their chances of dealing successfully with new challenges. Their extensive training in procedures for behaviors in predicaments involving emergencies, survival, escape and evasion, and even captivity lead them to a cognitive understanding of what is happening, which increases their ability to think clearly about the best course of action. They tend, individually and in groups, to perceive, expect, learn and adapt well to such situations.

In survival, escape or captivity situations, certain phases commonly occur. First comes derealization and denial: "it's like a dream," "this can't be happening to me," "it's like watching someone else," " it's as if everything is in slow motion." (Part of such perceptions may be the "time dilation" that some experience during extreme stress, a phenomenon in which the rapidity of cognitive assessment of the situation speeds up, allowing for evaluation of multiple possible responses, during which time everything else

seems to slow down.) To overcome this reaction, and to avoid illogical, automatic behavior, fliers undergo repeated rehearsal, both mental and physical. They receive realistic simulation and hands-on training. (Cyclical tension exists between the need for realism in such training and the "tone-it-down" official reaction to the inevitable abuses and accidental injuries that result from such realism.) Training includes learning simple checklists, slogans, jingles, and acronyms, which amount to pre-made decisions about what to do in specific situations.

Captivity situations include a real loss of control over self, a loss of group support, possibly a loss of sense of purpose, and a loss of self-esteem (shame, guilt). Corrective actions include:

- Re-establishing a sense of control by winning small, safe personal victories (providing disinformation, committing small thefts, playing covert jokes on captors such as writing "confessions" illegibly or in stilted, artificial terms).
- Establishing communication with other captives (by means of the tap code, a message drop system or similar means).
- Setting up an internal military organization (during the Vietnam conflict, the prisoners in the Hanoi Hilton had a formal Wing structure).
- Deciding upon a personal standard of behavior (the Wing motto was "Return With Honor").

Anyone can be forced to give information of some kind under torture. Doing so may represent an appalling "defeat" to a professional military aviator, resulting in guilt and self-reproach. The Code of Conduct provides a standard for behavior. The group of other prisoners can offer specific guidance and support. The flier is responsible to resist for as long as possible, and then give out as little and as trivial information as possible. Once returned to communication with the group, the flier should let them know what was revealed (so damage control can begin and the stories of others kept straight). Then the group should reassure the flier of his or her value in their eyes ("you did okay, we all break at some point"), and the flier should do whatever is possible to "pull up your socks and be ready to go again." The whole process is a kind of confession and absolution. For a detailed analysis of this process and the supporting literature, see Jones, 1980.

Both the group and the flier benefit from this supportive relationship—helping others, sharing whatever has been learned, and thinking of others rather than just of self. Thoughtful reading of the writings of fliers captured in other conflicts reveals that the adaptive coping skills (Vaillant, 1971) were mentioned earlier in this Guide—

- Humor: maintain self-esteem and identity by keeping a balanced view of the larger situation and the true proportions of one's own role in it
- Anticipation: plan ahead, as discussed above
- Altruism: be loyal to other prisoners, serve your country
- Sublimation: look for small satisfactions
- Suppression: don't dwell on problems
- –as well as imagination and fantasy

These have served well in even the most stressful and protracted captivities. Knowing that others have lived through such trials, have grown stronger as a result of

them (Jones, 1980), and have gone on to later successful lives gives confidence that this flier can do it now.

Flight surgeons may be called upon to give some instruction in these matters. Referral to the principles outlined here and some familiarity with a few of the references given below should furnish a good basis for discussion. As always, stay current on official doctrine and current events.

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FLIGHT SURGEON MANAGEMENT OF CLINICAL PSYCHIATRIC CONTINGENCIES

Deployed flight surgeons are responsible for the management of all medical emergencies unless more expert consultants are present at the deployment location. In addition, FS are attending physicians for all patients throughout the aeromedical evacuation (air evac) system, and many air evac patients have psychiatric diagnoses, both in peacetime and in war. Finally, long experience has shown that line commanders usually turn to their flight surgeons in any unusual medical situation, and psychiatric events definitely qualify as such: the wife threatening suicide in base housing, the airman who has climbed the water tower and is not sure what he wants to do next, the family that must be told that a son has been killed in a motorcycle accident, the agitated NCO who is convinced that someone wants to kill him.

EMERGENCY MANAGEMENT OF AGITATED OR PSYCHOTIC PATIENTS.

First, do no harm. Remember, *agitation alone is not necessarily a psychotic symptom*. Do not over-react to people who are acutely upset by dreadful situations. Sometimes simple sympathy, ventilation and reassurance are all that is necessary. Aeromedical risks of neuroleptics use include respiratory depression, aspiration during airsickness or vomiting from other causes, and increased vulnerability in emergency egress Haloperidol (Haldol®) 5 mg IM is tried and true for relief of psychotic agitation in a physically healthy patient. Co-administer benztropine (Cogentin®) 2mg IM to prevent dystonic reaction, particularly in muscular males.

When medications are indicated for management of non-psychotic anxiety states, benzodiazepines are much preferred. Lorazepam (Ativan®) 2mg PO or IM is an excellent choice. A medically stable but psychotically agitated patient may be given haloperidol 5mg, lorazepam 2mg, and benztropine 2mg together.

Combat Stress Syndrome. The BICEPS principles favor forward, non-medication treatment of stress reactions, rather than evacuation for medicated psychiatric convalescence. The FS task here is to differentiate between psychiatric casualties requiring medication (psychosis, catatonia, melancholia, conversion reaction) and combat stress syndrome. Confusion here guarantees bad results. In combat situations, acutely psychotic personnel may be managed as noted above. ***Remember that patients with actual psychiatric disorders such as schizophrenia, paranoia or bipolar affective disorder will not be helped by the BICEPS approach, and should be controlled and evacuated as soon as possible. They have no place in the combat arena!***

Suicide. This is the third leading cause of death on active duty. Accidents are the leading cause of death, but some of these may represent covert suicides. The suicide rate has historically dropped in wartime. Without a doubt, any psychiatric patient who presents in a crisis situation (or at any time!) should be asked about self-destructive thoughts or intentions. Observation, protection, and cathartic ventilation are the basic emergency interventions. If available, good nursing care is vital in such situations.

Casualty Notification. In the event of an aircraft mishap, customarily the commander, flight surgeon, and chaplain visit the home of the deceased or injured. The presence of a trusted flight surgeon in this setting can be of substantial importance. It may be helpful to bring along anxiolytic and hypnotic medications.

AEROMEDICAL EVACUATION OF PSYCHIATRIC PATIENTS.

Prepare patients. They will handle expected situations far better than surprises. As with all patients, treat them with courtesy and dignity (this sounds and is really easy, but is often over-looked). Always talk to a patient about what will be happening during the air evac process. Even acutely psychotic patients may understand such information, even if they do not respond, and knowing what is happening to oneself is always appropriate.

Acute psychiatric casualties do not belong in forward battle areas. Decisions about triage, patient care, and air evacuation require sharp judgment in an evolving operational situation. You must balance the need to move the patients quickly with the fact that out-of-control agitation aboard an air evacuation mission is much better prevented than treated. Recall that thousands of properly prepared psychotic patients have been air evacuated without an in-flight fatality.

Pay attention to the timing of air evac in the course of managing an upset patient. A patient who is hard to manage on the ground will be much more of a problem in the air, where space, personnel and resources are limited. . Highly agitated patients should be stabilized and under control before flight—sedated and restrained on a litter, or merely sedated When transport cannot wait for clinical clearing of psychosis, restraint on a litter is clearly better than uncontrolled in-flight behavior. An attendant is usually added to crew when such patients are on the manifest, because they complicate emergency egress procedures. When in doubt, do the safer thing.

Remember that long transoceanic airevac is miserable for restrained patients, and provide adequate sedating medication for them. When considering these decisions, think in terms of the "worst" possibilities: a flight that is not routine, that encounters bad weather, that has long ramp delays, that has to divert from its planned destination, that must RON at an unforeseen airport with no medical support, and so on. Air evac medical crews generally prefer that a patient is over- rather than under-classified in this respect.

Patients who have been abusing alcohol pose specific problems. Detoxification is best done on the ground before the flight. Dehydration will be exacerbated by long flight duration, and seizure or onset of delirium may occur (this was an unanticipated problem during the Gulf War).

Any air evac flight has psychological implications for its patients—it takes them from somewhere, and is going somewhere else. Both locations are important in any patient's life, and knowing what they mean may make for an easier trip. Ask patients a few questions. How do they feel about leaving? What do they expect to happen? Who will be there to greet them? How will family members react to an illness or injury?

A little preparation and reassurance may save a lot of anxiety. For a somewhat dated reference that discusses such topics in detail, see Jones DR. 1980. "Aeromedical transportation of psychiatric patients: historical review and present management." Aviat Space Environ Med 51:709-16.

USING PSYCHOTROPIC MEDICATIONS FOR AIRCREW.

With a few exceptions, the use of psychotropic medications in aircrew requires grounding—this is often due both to the diagnosis that required the medication, and to the effects of the medication itself. Both temazepam (Restoril®) and zolpidem (Ambien®) are approved for use as sedative "no-go" medications for sleep induction in aircrew in specific situations within fairly strict guidelines. These medications require single dose "ground testing" before they may be used in active aircrew, and their operational use requires prior MAJCOM/SG approval. Fliers must not fly within 12 hours of taking the medication, and regulations specify a maximum use of 7 consecutive days or 20 days in a 60-day period of time.

Temazepam (Restoril®) 15mg @ hs is the standard hypnotic dose. This drug has an 8-9 hour half-life; with no active metabolites. No reported enzyme induction has been reported during short-term use. It is a possible teratogen. Temazepam is a benzodiazepine (BZDP) with all the usual side effects and adverse reaction possibilities (disturbed delta sleep, amnesia, disinhibition, "rebound").

Zolpidem (Ambien®) 10mg @ hs is the standard hypnotic dose. This drug is a non-BZDP (imidazopyridine) with a 2.5 hour half-life. It interacts with the GABA-BZDP receptors, but is more selective in this regard than BZDP. This may explain why the drug spares Stage III and IV deep sleep in humans (which BZDP disrupt).

It is worth repeating that psychotropic medications other than temazepam and zolpidem require that aircrew be grounded. In addition, most disorders requiring such medications require grounding as well. Even "prophylactic" antidepressant regimens for patients with depression in remission require grounding action.

DISQUALIFYING PSYCHIATRIC DIAGNOSES

Essentially all psychiatric disorders are disqualifying and require waiver for return to flying, except for adjustment disorders lasting less than 60 days. The Neuropsychiatry Branch of USAFSAM can help with questions prior to formal waiver requests (DSN 240-3537).

WAIVERS FOR PSYCHIATRIC DISORDERS.

Generally, such waivers require full remission of active signs of illness, and typically require a long period (3-6 months) of medication free remission of illness. Some conditions are virtually "unwaiverable" (schizophrenia, mania). The prognosis concerning recurrence is pivotal to waiver decisions. "Reverse malingering" of aircrew often leads then to delay psychiatric treatment until crisis occurs. Aircrew perception of the Life Skills Clinic as a "Roach Motel" (fliers go in, but they never come out) further contributes to their apathy toward this option. Experience has shown that with psychiatric disorders, as with most disorders, early treatment leads to better treatment results. Although aircrew may not believe it, many psychiatric disorders are compatible with return to flying and may be waived. Refer to "Waiver Guidance" on the ACS website in specific instances.