BACK TO BASICS TO BACK TO BASICS

These are times of great change for the U.S. Air Force and the USAF medical service. “Right-sizing,” TriCare, Objective Wings (and medical treatment facilities), and national health care all contribute to a sense of uncertainty about our future. Uncertainty can be demoralizing to some, but to others times of change are seen as periods of great possibilities. I am personally heartened by these changes as they bode well for the future of aerospace medicine, if only we can capitalize on the opportunities as they arise. Each of us plays a critical role in determining the outcome.

There are some certainties in these tumultuous times. There will be fewer new weapon systems and production levels will be lower for those systems which do reach the field. We will continue to extend the lives of current systems and tolerate smaller inventories as units become unrepairable. As the force shrinks, each person becomes proportionately more important. With the changes in national war-fighting strategy imposed by the new world order we are increasingly forced to use our systems in ways unforeseen during the design phase; these new tactics impose even greater demands on the operators of these systems. What better times could exist for aerospace medicine?

As new systems arrive in the field, flight surgeons must be alert to detect new human factors difficulties. The incredible expense of these new aircraft and the relative scarcity of these systems dramatically increases their intrinsic worth. The consequences of human factors losses are thus magnified and the opportunity for flight surgeons to contribute to accident prevention is greater than ever before.
Fewer personnel present other opportunities for us. Each aviator now carries a disproportionate national defense burden. We must maximize their duty availability through sensible reduction of medical grounding time. We must also ensure appropriate research is done to enhance each operator’s capability and rapidly transmit research results to those who can benefit. This process begins in the field with flight surgeons identifying operational requirements, MAJCOM SGPA’s translating these into Human Systems needs and Armstrong Laboratory responding with research. The USAF School of Aerospace Medicine plays a prime role in transitioning new research knowledge to the field. The importance of this role increases in our new environment, but each of us must ensure that we stay abreast of the latest advances and information.

The new objective hospital/clinic structure finally gives Aeromedical Services official responsibility for medical readiness and health promotion. We must not treat these missions in a cavalier fashion as they are highly visible and of great interest to “Wing Kings.” All of us need to learn more about these new responsibilities. We must innovate and improve both programs. Success will enhance our worth; failure will ensure our demise.

I am well aware that what I have outlined is not new. The old heads recognize that I am simply reiterating the time proven core values and principles of aerospace medicine. I discuss these things because I am convinced that the best way to cope with and capitalize on changes is to go back to basics. Redouble your efforts to understand your units’ missions, fly with interest and involvement, learn all aspects of your job, and communicate both upward and downward. If each and every one of us truly performs the basics to the best of our abilities we will contribute maximally to the present and future Air Force.

These are certainly wild and crazy times, but it is also a marvelous period to be an Air Force flight surgeon. Some day we will all look back to these as the “good old days.”

**KEEP ‘EM FLYING-43 FEL Y!**

Richard F. Jones, Col, USAF, MC, CFS
President, Society of USAF Flight Surgeons

---

**AND FROM WASHINGTON...**

There has been a marked influx of new people here at the Surgeon General’s Office and with it comes exciting new ways of looking at ourselves. Within SGPA, we have been looking at our role in prevention of disease and injury and we’ve found it is not all that dissimilar from the way our patients, the operators, see their mission. The concepts of recce, interdiction, close air support, and air defense all have analogs in our business.

Let’s take a preventive medicine challenge as an example. Say...malaria. In order to prevent loss of people (resources) and to maintain our ability to operate freely, we must institute anti-malarial programs at many deployment sites (engage the enemy). We must first determine whether malaria and its vector are present and whether they represent a threat to our forces (tactical and strategic reconnaissance). We should spray larval colonies (‘strategic bombing’), drain breeding sites (‘interdiction’), protect individuals with antimalarials and permethrin-impregnated clothing (‘close air support’), and place a barrier between the mosquito and the individual by using mosquito netting (air defense).

My intent is not to be cute or to take this analogy to the point of nausea. It is rather to offer this comparison as a vehicle to demonstrate the principles of prevention. It also serves as an example of one way to explain to a line or deployment commander why you must implement a particular public health or preventive program, and just how you intend to do it.

You will see this analogy again in Aerospace Medicine 2005, our strategic plan, which is scheduled for final drafting in the next few weeks and for coordination with MAJCOMS shortly thereafter. I believe we can make some money with this approach and it applies to most of our programs in aircrew health, disease and injury prevention, occupational health, and environmental quality. Let us know what you think.

That’s it for now. You all be careful out there.

R. Landry
The Association of USAFR Flight Surgeons will meet during the AMSUS meeting on Monday, November 14th. The membership is excited about the scientific program which is planned for that afternoon from 1:00 until 5:00 p.m., consisting of presentations on various topics of interest and germane to the Air Force Reserve flight surgeon. The business meeting will be held in the morning at 10:30 a.m. followed by a lecture by Col Tom McNish, retired, Command Surgeon. We invite all Air Force Reserve flight surgeons who are not members to attend the entire program that day and strongly encourage society membership.

Samuel P. Reed, M.D.
Baton Rouge, LA

Editor’s Note: We are pleased to announce the addition of another major group of flight surgeons to our newsletter’s contributing partners. The Association of U.S. Air Force Reserve Flight Surgeons has established a nucleus and is rapidly approaching critical mass. They plan to use our newsletter to contact their members and to interact with the two other major groups of U.S. Air Force flight surgeons, the ANG and the active duty USAF members. We hope this interchange of policy and operational issues will allow us to work together in a seamless fashion. As DESERT SHIELD/STORM showed, we need all three of our groups in order to successfully complete our assigned role, to support the flying mission.

K. J. Cox, Editor

Guard docs, are you adequately trained to perform your new state mission? Do you know what it is? Have you read it? What specific medical-surgical skills do you need that your civilian specialty training doesn’t provide? Do you want to continue earning while you learn them?

I’ll be sending you a survey to determine your interest in military CME and will follow-up with further discussion during AMSUS in Orlando, 15 November 1994. We have a great ANG CME course on deployment medicine! See you there.

Breck Lebegue, Lt Col, ANG, CFS
ANGRC/SGP
3 500 Fetchet
Andrews AFB, MD 20331-5157

<table>
<thead>
<tr>
<th>Highest</th>
<th>Lowest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nevada, 478.1</td>
<td>Utah, 218</td>
</tr>
<tr>
<td>2. D.C., 444.7</td>
<td>Hawaii, 257.2</td>
</tr>
<tr>
<td>3. Tennessee, 442.1</td>
<td>New Mexico, 287.7</td>
</tr>
<tr>
<td>4. W. Virginia, 433.6</td>
<td>Idaho, 293.2</td>
</tr>
<tr>
<td>5. Kentucky, 428.7</td>
<td>Minnesota, 295.2</td>
</tr>
</tbody>
</table>

Smoking remains the #1 preventable cause of premature death in the USA. Use epidemiological facts such as these to help focus your local preventive medical efforts.

K. J. Cox

**Epidemiological Short Takes**

**Smoking Related Deaths, rates per 100,000**

<table>
<thead>
<tr>
<th>Highest</th>
<th>Lowest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nevada, 478.1</td>
<td>Utah, 218</td>
</tr>
<tr>
<td>D.C., 444.7</td>
<td>Hawaii, 257.2</td>
</tr>
<tr>
<td>Tennessee, 442.1</td>
<td>New Mexico, 287.7</td>
</tr>
<tr>
<td>W. Virginia, 433.6</td>
<td>Idaho, 293.2</td>
</tr>
<tr>
<td>Kentucky, 428.7</td>
<td>Minnesota, 295.2</td>
</tr>
</tbody>
</table>

**Epidemiological Short Takes**

**Smoking Related Deaths, rates per 100,000**

<table>
<thead>
<tr>
<th>Highest</th>
<th>Lowest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nevada, 478.1</td>
<td>Utah, 218</td>
</tr>
<tr>
<td>D.C., 444.7</td>
<td>Hawaii, 257.2</td>
</tr>
<tr>
<td>Tennessee, 442.1</td>
<td>New Mexico, 287.7</td>
</tr>
<tr>
<td>W. Virginia, 433.6</td>
<td>Idaho, 293.2</td>
</tr>
<tr>
<td>Kentucky, 428.7</td>
<td>Minnesota, 295.2</td>
</tr>
</tbody>
</table>

Smoking remains the #1 preventable cause of premature death in the USA. Use epidemiological facts such as these to help focus your local preventive medical efforts.

K. J. Cox

**WHAT’S HOT**

- TEAM AEROSPACE
- Objective Hospitals
- Measures of Merit
- Composite Wings
- Electronic Bulletin Boards
- Total Quality Leadership
- Preventive Medicine
- Cradle to Grave
- Primary Care
- Crew Resource Management
- Right Sizing
- Tri-Care Regionalization
- Gender Specific Research
- Vit C, Vit E, and Fibre
- Reform Initiatives

**WHAT’S NOT**

- Aeromedical Parochialism
- Traditional MTF Organization
- Monitoring and Evaluation
- Specialized Wings
- Handwritten Correspondence
- Management by Objectives
- Isolated Treatment of Disease
- Denial of Responsibility
- Medical Ultraspecialization
- Cockpit Resource Management
- Down Sizing
- Service Specific Health Care
- Sexual Harassment (Hog Logs)
- Margarine, Butter, and Lard
- Status Quo

K. J. Cox
With our transition to the new operational medical groups all base aeromedical services (squadrons) will now own Health Promotions. The preventive potential for this program is enormous and it deserves much more support from aerospace medicine than we have historically provided. But, with the unpleasant reality of shrinking budgets it will be a challenge to adequately promote these programs. Just for the sake of argument though, let’s assume we do have the necessary resources (time, personnel, money) to launch an effective Health Promotions program. Then the question is, “What constitutes an effective Health Promotions program?”

To begin, we must take the program to the Air Force population. A passive program that occasionally puts out articles in the base paper (which few read), sets up booths at health fairs (which few attend), or sits in the office waiting for individuals to come in and discuss their own health promotion goals (rarely happens), is just not effective in reaching those who would most benefit from what this program has to offer. Let’s face it; the Air Force has a host of programs like the one described above that are available to those seeking help, and they are all under-utilized. No, if the Air Force is serious about Health Promotions we are going to have to develop a much more active approach.

Health Promotions needs to be run along lines similar to our Occupational Medicine program. We need to periodically visit all units, provide written feedback to the commanders regarding our findings, facilitate written feedback to the commanders regarding our findings, and then facilitate the units’ efforts to improve their overall health. The “unit” approach sends a clear message that the Air Force is truly committed to this program. Inspections and reports need to focus on such things as prevalence of smoking, hypertension, and hypercholesterolemia in the unit. Other issues could include compliance with no-smoking policies, access to nutritional foods during duty hours, trends in alcohol-related incidents, and time provided for fitness training. Solutions to many of these problems can also be instituted on a unit basis. We can help the unit coordinate with mental health specialists, fitness center staff, nutritionists, and other base resources. Briefings on alternative diets, fitness training, and smoking cessation clinics are just a few services which could be provided on-site, minimizing any disruptions to regular duties while making the attendees more comfortable in their home environment.

Obviously, health promotion stretches across the domain of many base agencies, in and out of the hospital. The Health Promotions staff, by identifying potential problem areas in a unit, can then act as coordinator with these other agencies to establish more detailed care and follow-up. Notice I use the word “staff” in the above sentence since, obviously, a program such as the one described will require the efforts of more than one or two people. This of course brings us full circle to the issue of funding.

I know we all have many competing priorities and sometimes it seems like aerospace medicine is all Mach and no vector, but we need to take an honest look inside ourselves. Are we truly committed to preventive medicine (the answer had better be yes!)? If so, we need to stand up and fight to make this program one that will be of value to the Air Force. To do otherwise will only leave us managing preventable disease, which is still a treatment failure.

Mark Mavity, Maj, USAF, MC, FS
Wing Surgeon, 388FW, 4FS
Hill APB
In the middle of a busy sick call you receive a call from your local F-16 squadron. They need you to give verbal authorization so that a visiting ambassador can participate in an orientation flight in the F-16D (the same “tub” you were told was unavailable for any flight surgeon sorties this week).

This situations comes as a surprise to you. No medical records were forwarded for your review and you are not personally acquainted with the dignitary. You politely request that the ambassador stop by the FSO for a quick medical evaluation and pre-flight orientation briefing prior to granting any clearance. The aide replies that the ambassador has several other scheduled visits and will subsequently proceed directly to the squadron. Furthermore, the ambassador has participated in orientation flights at other bases and has never previously been “bothered” by the flight surgeon. You are irritated by this response and state that “no one gets an orientation flight without obtaining medical clearance from the flight surgeon.” The aide will “get” back to you.

A few minutes later, you get a call from the wing commander’s executive officer. He has a message for you, from the wing commander, “Clear the ambassador — Now!”

After assessing your difficult position, you wisely decide to attempt a compromise, and offer to see the ambassador at the flying squadron. You are escorted into a briefing room, where you find the ambassador obscured by a dense cloud of smoke, which has apparently been generated by cigarettes that she has smoked as evidenced by a number of cigarette butts in and around a smoking tobacco container lid masquerading as an ashtray. A final clue is the cigarette currently hanging from her mouth. She appears to be in her late fifties, not obese but not athletic either. Rather than addressing the fact that the squadron is a nonsmoking facility, you proceed with a brief history as she blows smoke rings at you. You are unable to elicit any history of cardiac symptoms and the other areas you routinely cover for an incentive flight medical review are also negative. She claims that she is healthy despite a forty year, three pack a day smoking history, frequent alcohol consumption due to her required ambassadorial social functions, and lack of an exercise program. The ambassador is vague and seemingly evasive when questioned about recent medical evaluations and has recently changed doctors because of personal differences. She does not have any medical records available for your review. What do you do?

a. Clear her for the planned SAT mission orientation ride.
b. Clear her for a modified, G-limited orientation ride.
c. Refuse to clear her for any orientation ride, anywhere, anytime.
d. Ask the squadron to reschedule the orientation ride for another time and request the phone number of the ambassador’s physician, in order to further evaluate the case and review her medical records.
e. The solution is above your pay grade, you punt to the MTF commander.

I’m sure there are similar situations where each of these solutions has been attempted. Given this scenario, as written, I would opt for suggestion (d). It is important that as a flight surgeon one is not pressured into jeopardizing the personal safety of the incentive ride candidates as well as the safety of the aircraft commander. However, the ideal solution would be to prevent this type of situation from occurring in the first place. This can be accomplished if coordination between the local flying squadrons, the protocol office, the flight surgeons’ office, and the DO’s office (the DO usually controls access to local incentive flights) takes place prior to scheduling orientation flights. These organizations need to know that flight clearances will not be granted without an adequate pre-flight medical evaluation. This will encourage them to schedule such events in a reasonable manner, including consultation with a flight surgeon. Such coordination is rarely easy, be sure and keep your SGP and/or DBMS in the communication loop, they will be able to provide good advice as well as more direct support.

K.L. Cox, Editor
The overall prevalence of occupational asthma in the United States is estimated to be between 2% and 15%. Currently, well over 200 agents found in the workplace are known to be capable of inducing occupational asthma. However, this list can be expected to increase as industrial technology becomes more sophisticated and new agents and industrial processes are introduced into the workplace.

Occupational asthma is a "disease characterized by variable air flow limitation and/or airway hyperresponsiveness due to causes and conditions which are attributable to a particular occupational environment and not to stimuli encountered outside the workplace." The diagnosis is primarily based on history although objective clinical, physiologic, and laboratory findings are used to confirm the diagnosis. Therefore, a detailed occupational history is essential in any worker in whom the diagnosis of asthma is suspected, especially if the individual has no past history of asthma or other allergic conditions. The occupational history should include a complete list of all industrial processes, substances, and chemicals to which a worker can potentially be exposed to during the performance of his/her work. A history of recurrent pulmonary symptoms (i.e., cough, dyspnea, chest tightness, and wheezing) which become progressively worse throughout the workday and improve over the weekend or during vacations is characteristic of occupational asthma and should warrant further evaluation.

It is important to differentiate between occupational asthma and nonoccupational asthma because the pathogenesis, treatment, and prognosis is different for each condition.

Occupational asthma usually presents clinically after a variable latency period of several months to years following repeated workplace exposures to one or more causative agents. The length of the latency period is influenced by the reactivity, toxicity, and exposure concentration of the agent as well as individual host factors. Occupational asthma can be divided into two categories: allergic and nonallergic. In allergic occupational asthma an immune hypersensitivity response can be demonstrated whereas no mechanism of hypersensitivity can be elicited in the majority of nonallergic cases. Known agents which cause occupational asthma have been classically divided into two groups: (1) high molecular weight (HMW) compounds (>1,000 daltons) which tend to be antigenic animal- or plant-derived proteins that typically induce an IgE mediated response and; (2) low molecular weight (LMW) compounds (4,000 daltons) which may or may not induce a specific immunologic response. Although no single host factor has been consistently shown to predispose individuals to occupational asthma, a correlation between atopy and sensitization to HMW compounds has been observed. This correlation, however, does not appear to exist for LMW compounds.

Objective tests which have been used to aid in the diagnosis of occupational asthma include pre- and postshift spirometry, methacholine inhalation challenge tests, serial peak expiratory flow rate (PEFR) determinations, specific bronchial inhalation tests, and serologic/skin testing. Despite the lack of specificity, a decrement of 15% in FEV1 between pre- and post-shift spirometry tests is considered supportive of the diagnosis of occupational asthma. Serial PEFR offers an easier and more practical method to diagnose occupational asthma. In order to obtain accurate results, it is recommended that PEFR determinations be recorded every 2-3 hours while awake for 2 full work weeks followed by an additional 2 weeks away from the work environment. A diurnal variability of 10% or more during workdays followed by resolution of the diurnal variability during the off work period is consistent with the diagnosis of occupational asthma. Under these conditions, serial PEFR has been shown to have a specificity as high as 89%.

A methacholine inhalation challenge test is a nonspecific test of bronchial hyperresponsiveness. Since bronchial hyperresponsiveness is so characteristic of occupational asthma, a negative methacholine inhalation test is believed to essentially exclude the diagnosis of occupational asthma. In order to maximize the sensitivity of the test, it is recommended...
that the test be conducted at the end of the workday following a 1-2 week work period. However, the sensitivity of the test can be adversely affected by various inflammatory and immunogenic stimulants/irritants such as air pollutants (i.e. ozone, sulfur dioxide, nitrogen dioxide), antigens, and upper respiratory tract infections; all of which can temporarily increase bronchial hyperresponsiveness. Cigarette smoking immediately prior to methacholine challenge testing has been shown to result in significant individual variability. Therefore, it is recommended that smokers refrain from smoking at least 2 hours prior to testing in order to obtain reproducible and unbiased results. A methacholine provocative concentration (PC20) of less than 10 mg/ml which results in a 20% reduction in FEV1 is indicative of increased airway hyperresponsiveness.

Specific bronchial inhalation challenge testing, although useful in the diagnosis of occupational asthma, can be very difficult to perform, especially when the exposures are unknown or when a large number of agents are present in the workplace. Specific bronchial inhalation challenge testing should be conducted in the following situations: (1) to establish a causal role of a substance which has been previously unrecognized as a cause of occupational asthma; (2) to establish a specific etiologic diagnosis when there is doubt of the diagnosis and further exposure could endanger workers’ health; (3) to determine the precise etiologic agent in a complex work environment; and (4) for medicolegal purposes. The testing should be administered and performed by experienced physicians and in a hospital setting.

Once the diagnosis of occupational asthma has been established, the preferred treatment is to remove the worker from the work environment in order to prevent further exposure to the causative agent(s). In general, the use of masks and respirators have been shown to provide inadequate protection in preventing the progression of occupational asthma once the condition has developed. An individual with occupational asthma is at risk of having severe asthmatic reactions (status asthmaticus) if exposed to high concentrations of the agent(s) (i.e. during accidental spills). In addition, chronic low-level exposures to the agent(s) may result in the development of irreversible obstructive airway disease and airway hyperresponsiveness even though the exposure has been terminated. Although the principles of drug therapy in the acute management of occupational asthma are the same as for nonoccupational asthma, there is no evidence that prophylactic use of anti-asthmatic medications prevents the progression of disease from that of a generalized, reversible airway disease to that of irreversible obstructive lung disease.

Epidemiologic studies indicate that individuals with occupational asthma have a more favorable prognosis if exposure to the sensitizing agent is halted within the first months following the onset of symptoms and if pulmonary function tests, at the time of diagnosis, are close to normal.

Prevention is the best method of treatment for occupational asthma. If a causative agent is identified in the workplace, industrial hygiene control methods should be promptly instituted in order to prevent the potential exposure of non-exposed workers. These control methods in order of decreasing efficacy are: (1) substitution of a less hazardous material for the known/suspected agent(s); (2) isolation of the industrial process thereby physically separating the agent from the workers; (3) changing the industrial process in order to minimize exposure to workers; (4) establishing general and local exhaust ventilation in order to reduce the airborne concentration of the agent(s); (5) the use of wet methods whenever possible to reduce the generation of dusts; (6) education and training of workers on the use of "effectively proven" personal respiratory protection devices; (7) promoting good housekeeping and maintenance habits among management and workers; and (8) establishing a medical surveillance program in order to identify affected workers early in the disease process. All of these engineering methods should be considered in order to prevent or limit the incidence of occupational asthma in the workplace.

Crescencio Torres
Editor, FlightLines
The most recent Grand Rounds was presented on 15 July, 1994. This case was selected from the AETC archives to illustrate aeromedical issues related to physical selection standards. Previous cases have concentrated on retention standards. These two types of physical standards have different goals which should be kept in mind when dealing with aeromedical cases.

BACKGROUND: Selection standards must reduce the unwieldy initial applicant pool to a more manageable size while simultaneously ensuring the best possible quality of accepted applicants. These are the individuals we expect will be most likely to provide the USAF with the greatest return on our investment. Retention standards are less strict for a number of reasons, one being that we have already invested a tremendous amount of time, energy, and dollars in these individuals. It is only sensible to keep these persons in their career fields, as long as we are convinced that there is not likely to be a serious safety or health risk to the individual.

Admitting the need for standards, certain characteristics are important for standards. Standards should be consistent, but not inflexible. This improves credibility with the applicant pool. Few things are as frustrating as games where the rules frequently change. However, it is important to update standards as new data becomes available. This leads to the second characteristic, standards should be scientifically sound and based on current, pertinent clinical data. Finally, standards must be unbiased, ensuring fair and even application among all applicants.

CASE PRESENTATION: A 26 year old male submitted a FC-IA package for waiver consideration in view of his history of a surgically corrected aortic coarctation. The coarctation was discovered incidentally during a routine physical examination at age 17 when an elevated blood pressure was noted. Subsequent evaluation revealed the coarctation. Surgical repair initially consisted of an end-to-end anastomosis. Acute post-operative bleeding required reoperation and due to excessive pressure at the anastomotic site a several cm length of Dacron graft was inserted using adsorbable sutures. There was an uneventful recovery and no persistence of hypertension. The applicant had been cleared for unlimited physical activities some years earlier. The applicant was a civilian scientist with multi-lingual talents who worked in intelligence.

Physical Examination: Blood Pressure 1 10/78 (Rt), 108/80 (Lt); peripheral pulses were symmetric and normal; no cardiac murmur was noted. Additional Tests: Echocardiogram, exercise treadmill, and cycle ergometry were all within normal limits.

BASIC CLINICAL INFORMATION: Incidence - 4.8/10,000 live births with a 4:1 male to female ratio. There are two basic types, infantile and adult, differing in the site of the coarctation being respectively proximal or distal to the ductus arteriosus. Further information is provided only on the adult form, that which is usually asymptomatic (although some individuals present with complaints of headaches, exercise intolerance, or lower extremity symptoms of pallor, weakness, numbness, or cold). Diagnosis is usually made based on the finding of an exaggerated gradient between upper and lower extremity blood pressures as well as decreased and delayed femoral pulses. Associated abnormalities include hypertension, bicuspid aortic valve (40%), Circle of Willis aneurysms (10%), ventricular or atrial septal defects, aortic stenosis, patent ductus arteriosus, abnormalities of the proximal aorta (including aneurysmal dilation, atherosclerosis, and cystic medionecrosis). The average lifespan for an untreated case is 20-40 years with death usually occurring from hypertensive related complications such as stroke, congestive heart failure, or a ruptured aortic aneurysm.

Obviously, uncorrected coarctation is not compatible with a productive lifespan. So, what can we do to improve the odds for these individuals? Surgery is recommended for all identified cases, but is not without hazards. Table 1 lists common complications after
surgery. Disagreement exists as to the best age at which to perform the surgery. As the table shows, some complications are more likely if the condition is repaired at a later age, especially the problem of hypertension and its associated problems, which may remain permanently in up to 33% of cases corrected after age 15 years. Recurrent coarctation is only seen when the surgical repair has been made at a young age, before the aorta has reached its adult dimensions. Dacron and Gortex are the only materials routinely used as arterial graft material, with Dacron being by far the most common. Dacron is porous and allows the ingrowth of fibroblasts which eventually form a complete pseudo-endothelium. Surgeons report that after a few years the graft is completely encased and is extremely difficult to remove or revise. They feel that such a graft is equivalent to a normal aorta, although they note that there is no adventitial or muscularis layers in the pseudo-endothelium. The vascular surgeons state that any disruption of the graft from sudden G stresses is highly unlikely, their only concern would be that a sudden, severe stress might cause a piece of the pseudo-endothelium to break off and embolize downstream. Absorbable sutures are preferred as they reduce the likelihood of subsequent arteritis and allow a stronger bond between the graft and the native aorta. The grafts will occasionally deteriorate with time, especially those placed in the 70s and early 80s.

<table>
<thead>
<tr>
<th>COMPLICATION</th>
<th>FREQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent or Recurrent Hypertension *</td>
<td>7-33%</td>
</tr>
<tr>
<td>Residual or Recurrent Coarctation</td>
<td>0-8%</td>
</tr>
<tr>
<td>Anastomotic Site Aneurysms</td>
<td>0-2%</td>
</tr>
<tr>
<td>CVA with normal Blood Pressure</td>
<td>2.6%</td>
</tr>
<tr>
<td>Left Ventricular Hypertrophy *</td>
<td>10%</td>
</tr>
<tr>
<td>Congestive Heart Failure *</td>
<td>9%</td>
</tr>
<tr>
<td>Premature Coronary Artery Disease</td>
<td>5-33%</td>
</tr>
<tr>
<td>Sudden Death</td>
<td>0-7%</td>
</tr>
</tbody>
</table>

* More common when the repair is accomplished after the age of 15 years.

Table 1- Complications of Coarctation Repair

AEROMEDICAL CONSIDERATIONS: As the waiver authority, you would be concerned with any associated developmental abnormalities, such as the possible berry aneurysm; any post-surgical complications, and the ability of the individual with this condition to perform in the aerospace environment (especially under increased Gs). AFR 160-43 6-19b(4), for FC-I and IA, states that “Any significant congenital abnormality…” is disqualifying. Additionally, 6-19b(6) also lists any major vascular synthetic graft as disqualifying. The guidance is rather clear in this case, the applicant will not be acceptable, unless you choose to waive his condition. Before doing so, consider each of the following requirements for a condition to be waiverable.

Is there a risk of sudden incapacitation?

Is there a risk of subtle incapacitation?

Is the condition stable (or resolved)?

Will progression or recurrence be easily detectable?

Will ongoing monitoring be noninvasive and easily obtainable?

His risk of sudden incapacitation is hard to assess. No pre-surgical angiography was obtained so the possibility of a berry aneurysm had not been excluded. There is no animal data or long term human observation to know how this condition would behave under G stress. The consequences of subjecting the applicant to a potentially hazardous exam such as a centrifuge test, simply to try and “qualify” him for pilot training is unacceptable. The other requirements for waiver would appear to be met. We have no evidence of subtle incapacitation with this condition. The applicant was ten years post-surgical correction without evidence of progression, recurrence, or complication. The only anticipated problem at this point would be the aforementioned potential embolization of a portion of the pseudo-endothelium, which would probably be readily apparent to the individual but would be unlikely to result in acute incapacitation, or the possible degeneration of the graft. Ongoing monitoring could be accomplished with a CT scan and blood pressure tests every 6 months, which would be noninvasive but not
inexpensive and might not always be readily available (probably not advisable for worldwide mobility status).

DISPOSITION AND FOLLOW-UP: - This applicant was very persistent. His goals also escalated with each rejection. After a course of orthokeratology, his visual acuity was adequate to meet FC-I standards and he requested another review at that level. He also became more demanding in that he would only be satisfied with jet fighter aircraft. He continued to apply between the years of 1988 and 1993, even after he no longer met age requirements. As one might expect, all of his applications for flying training approval with waiver were denied.

K.A. Cox, Resident Aerospace Medicine

EPI INFO UPDATE, VERSION 6

A major upgrade of Epi Info has been released. This program is becoming the standard for Field and office epidemiological investigations around the world. It is the result of extensive collaboration between CDC and WHO. I have encountered it in public health offices throughout the military, in city, state, and federal agencies. 40,000 copies of version 5 were officially distributed to 117 countries, with many more copies provided informally (local copying and distribution is both permitted and encouraged). Flight surgeons and public health officers/technicians should be familiar with how to use this program. Epi Info includes word processing, database management, and preprogrammed epidemiological statistics. Version 6 users are now able to:

* Create their own pulldown menus or hypertext displays
* Draw boxes and lines in text files
* Sort or relate huge files (tested to 1.5 million records)
* Work with large lists of codes (e.g. cities or diseases)
* Create context-sensitive help for questionnaires
* Analyze data from complex sample surveys
* Export graphs from ANALYSIS to other programs
* Create a relational surveillance system with maps and graphs as outputs (requires Epi Map)
* Create multitable hypertext reports highlighting unusual results, directly from ANALYSIS

Epi 6 requires an IBM-compatible (no Apple versions are available) running PC-DOS or MS-DOS (Version 2.0 or higher), 640Kb of RAM, a graphics adapter board (Hercules or IBM monochrome, EGA, VGA, IBM3270, IBM 8514, and AT&T standards are supported), and at least one floppy disk drive. The program requires a bit less than 7MB of space if it is fully installed to your hard drive. This new version is more user friendly than version 5. It is a great program to put on a portable computer for use on deployments. Consider getting one original for the office and then distribute copies to all who are interested. It is available from:

USD, Incorporated
2075-A West Park Place
Stone Mountain, Georgia 30087
Voice 404/469-4098  FAX 404/469-068

Epi Info Manual & Disks $50.00
Manual Only 35.00
Disks Only 16.00
Epi Map Manual &Disks 38.00

Prices include shipping for orders within the continental U.S. and were current as of 1 Jul 1994.
6 June 1994 marked the 50th Anniversary of D-day. Those of us at Brooks AFB were given the rare opportunity of hearing a World War II veteran reminisce about those unsettling times. Dr. Tredici, a well loved and respected institution at Brooks AFB was the last World War II pilot to retire from the USAF active duty roster. He was kind enough to present a synopsis of his wartime experience. It is interesting to review the changes which have occurred in flying operations by discussing the situation with those who have participated in various campaigns, both from the medical and line perspective. This article is the first in what I hope will be a series relating the experiences of both flight surgeons and pilots in recent campaigns, including WW-II, Korea, and Vietnam.

Thomas J. Tredici, in August of 1942 at the age of 19, applied for pilot training shortly after completing his high school education. He passed the aviation cadet examination and entered into the training process. There were "dual tracks" for bomber and fighter cadets (so USAF training is not so new after all!) with separate training immediately after graduation from advanced acrobatic flying. The Stanine Military Aptitude Test was one tool used to help select individuals for specific training. Those with scores of 7, 8, or 9 were usually selected for pilot slots. A score of 8/9 had been found to correlate with a 95% probability of completing the pilot training course. Those with a score of 5 or less were guided toward toward navigator or bombardier slots. Of course, if there was a shortage of pilots, the results of the aptitude tests were sometimes ignored. Dr. Tredici was selected for bomber pilot training.

His aviation cadet basic training occurred in Miami Beach, FL. Hotels were used for barracks and the cadets were in civilian clothes for a while since the Army Quartermaster was having trouble keeping up with uniform supply needs. Major Clark Cable had his uniform though (better for patriotic advertising) and was frequently seen on the local streets of Miami Beach.

Most cadets initially flew in a Stearman biplane trainer during primary flight school, but his initial aerobatic training occurred in the 100mph open cockpit Ryan PT-22 at the Ryan School of Aeronautics in Tucson, AZ. After successfully crossing this hurdle, Dr. Tredici continued his Basic Flight Training in the Vultee BT-13, fondly referred to as the "Vibrator." The aircraft was like the AT-6, but with a nonretractible gear. These flights included his first night sorties and were supplemented with time in Link trainers for further instrument experience. Next came Advanced Flight Training in the Cessna UC-76B "Bamboo Bomber" Bobcat. Now he was participating in cross-country, night, formation flying, and the never ending ground school. This took place at the Pecos Army Air Field outside of Pecos, Texas (then renowned as the cantaloupe capital of the world). An instrument card was issued after successful completion of this phase and the cadet was assigned to a specific aircraft, the B-17G Fortress II for Dr. Tredici. This training in "operational aircraft" was done in Yuma, AZ to qualify the candidate for co-pilot status in the B-17. Aircrew training itself was done at Biggs Army Air Field in El Paso, TX. Here the entire crew of 10 trained as a team that would remain intact throughout combat operations, if at all possible.

So, now it was off to England to join his squadron and begin local area training and begin his wartime duties with the 75 1st squadron of the 457th Bomb Group of the 1st Bomb Division of the 8th Air Force. The bomber's crew included a pilot, co-pilot, navigator, bombardier (chin turret), radio operator, engineer (top turret), ball turret gunner, two waist gunners, and a tail gunner. Although the plane had an autopilot, only the lead aircraft employed it. The other aircraft, (up to 12 in a squadron, 36 in a group), flew formation off of the lead aircraft. This aircraft was very pilot intensive and a person could usually only fly for about 15 minutes at a time, constantly handing off to the co-pilot and back again for the entire 8-10 hour average mission. There were also some interesting design features with the aircraft. The only urinary "relief tube" was located on the aft wall of the
bomb bay. Unfortunately, the bomb bay support columns were so close together that a forward crewmember needed to remove all of his accessory gear in order to squeeze through. This condition was aggravating enough that most crewmembers would try to avoid any need to relieve themselves during a combat mission. Some would skip breakfast and usually flew in a dehydrated state. Drinking water was not routinely carried on bombing missions and after a long day of flying under these conditions, a crew might find themselves flying on consecutive days.

Most missions were flown at a steady climb to altitude. The profile would usually end up at 30,000 to 40,000 feet. All of this in an unpressurized aircraft. Demand oxygen was employed; 100% oxygen could not be used since it would deplete the reservoir far too quickly, especially with 10 crewmembers using the supply. Despite the lack of pre-breathing, the unpressurized aircraft, the limited availability of oxygen, the poor hydration state, and the need for physical exertion at altitude, Dr. Tredici was unaware of any episodes of decompression sickness of any form among his crewmembers.

Frostbite was the most common physiological problem encountered, especially in the waist gunners. The ball turret gunner had to stay curled up in a ball-shaped position for 5-6 hours with consequent nerve compression injuries. Ocular trauma from shattered glass and plastic was another common hazard, usually the result of flak strikes.

Flight suits were worn over complete uniforms, including a tie (and we think today’s 35-10 standards are tough!). Then a fleece lined jacket, pants, boots, and gloves were added. Next came the Mae West plus the parachute harness and finally, the flak suit over everything (now we know what led to the Michelin Man logo). The flak suits were too heavy for some to wear during flight, so they were used to line the bottom of the aircraft and help protect the occupants from antiaircraft fire.

The conference attendees were especially interested in the interactions between the aircrew and flight surgeons and asked Dr. Tredici to expand on this subject. He related that his first experience with a flight surgeon was positive. Rather than simply adhering to existing regulations as they related to a particular borderline abnormal physiological response, the physician took extra time with the applicant and was able to certify him as acceptable for pilot training. After the initial examination phase and the mandatory sexually transmitted disease briefing, he only recalls seeing flight surgeons for annual examinations (this was a reflection of how the good doctor never got sick and did not need to go to sick call). He never had a flight surgeon on board during any of his 25 combat missions (but the flight surgeon did fly with other aircrews). This was not unusual since each flight surgeon was responsible for the medical care of at least one (sometimes more) entire bomber squadron. As each squadron consisted of several hundred personnel, the flight surgeon was kept very busy running sick call and was considered too valuable a resource to risk unnecessarily. Dr. Tredici does not recall that this inability to fly routinely during wartime adversely affected the flight surgeon’s ability to interact and to care for the flyers.

Dr. Tredici completed his 25 combat sorties between November 1944 and June 1945. He returned to the USA and completed a Bachelor’s degree, medical school, and residency training. His only long term war related injury was a right sided hearing loss (ear defenders were not available during his flying career). This did not stop him from pursuing his career in ophthalmology, which he continues at the Aeromedical Consult Service well after his “retirement” from active duty in 1987.

K.L. Cox
TECNET stands for “Test and Evaluation Community Network.” So why should flight surgeons care about TECNET? Because it offers a useful method for operational flight surgeons to communicate worldwide, to discuss aeromedical issues in a u-i-service forum, and to gain Internet access. TECNET is registered with the Defense Data Network, which is a part of Internet. Internet may be familiar to readers as the worldwide computer network that connects academia and industry around the world; the DOD also maintains a presence. Information moves along Internet from node to node in “packets.” This means that, essentially, information is bundled in packages to be delivered, much as a packages of goods are carried along a highway to their destination. TECNET is a node (cloverleaf) on the Internet, meaning that it can be accessed via Internet and can send information out on Internet. TECNET is governed by a Joint Service Steering Committee with the goal of promoting testing and evaluation (T&E).

As noted above, TECNET was established to support T&E, not the medical community. However, military operational physicians (i.e. flight surgeons) from all services are allowed to sign up. There is no cost to the user. This is a great opportunity. Besides the benefits listed above, the user gains access to Internet. Deals like this are pretty rare in the military! (Indeed, sign up may become more restrictive in the future.)

Access to TECNET can be accomplished by several methods. If there is a computer shop in your building they can probably provide access to TELNET. TELNET is an Internet application that allows remote log-in. Used with the dedicated data lines available in most computer shop very fast communications are possible. For off-base access a modem can be used. The majority of military bases around the world maintain a Telecommunications Access Controller (TAC). With a TAC access card calls can be made (local number) into this controller to get on the Defense Data Network, and thereby TECNET. In the continental U.S.,1-800 access is available for special circumstances. While not as fast as the dedicated lines in the computer shop, it does allow access directly from your office or home. Messages can be sent anywhere in the world without the need for a DSN line or long distance charges! Limited space has kept my explanations brief (yes, this is brief). For more information and to sign up contact TECNET admin at DSN 326-7501. To sign up for the Aeromedical Bulletin Board send E-Mail (this can be done via TECNET) to Captain Almond at:

MALMOND@TECNET1.JCTE.JCS.MIL.NET.

Robert E. Carroll
Flight Lines Editor
Ten Important Things Every New Flight Surgeon Should Know

New flight surgeons may not always have a good idea of how to approach their new job. The ten areas that follow are not inclusive of all a flight surgeon’s responsibilities. They are not necessarily in priority order. They are, however, important areas a new flight surgeon should know about.

1. Squadron Rapport

One of the most important aspects of your job is squadron support. This function gives you the name “flight” surgeon. You will “live or die” by how well you provide this support. To do this you must gain the pilots’ trust. If not, you will be unable to catch the little things that tell you when pilot X shouldn’t fly (family stress, undocumented injury, etc.). You will also not be able to work closely with them while deployed (wartime or otherwise). To earn such trust you must show a willingness to be involved, to meet them on their terms. As a minimum, you should have “face time” at the squadron. It is difficult to become part of their group if you never leave your office. You should try to be involved in squadron activities. Participation leads to acceptance.

You should also learn “pilot-speak.” Don’t pretend to know all of their lingo, but being able to understand most of it and asking about the rest gets you more involved and shows a willingness to be a part of the team.

You MUST fly with them if at all possible. Besides the fun and the chance to see their “work environment” is the matter of trust. If you won’t entrust your life to them, why should they trust you to take care of them?

Finally, take care of their families! Making the extra effort to ensure family well-being and helping to coordinate all of their health needs in the local medical community is a must.

2. Technician Support

You should support your technicians if you expect them to support you. It is amazing how hard they will work for you and the office if you take care of them. Be aware of their workload; help them with problems so they don’t feel overwhelmed. Spend some time educating them. The medical knowledge you take for granted is manna to them. When possible, get them out of the office. IFEs, TDYS, and incentive rides all offer an opportunity to break the monotony. Be ready to help them further their training; their career is as important to them as yours is to you.

3. Boss Support

Just as you should take care of those who work for you, take care of your boss! Do it right the first time. Keep him/her informed of what you’re up doing, your squadron’s status, and so forth. It is embarrassing for the Chief of Aerospace Medicine to be unable to answer questions from the wing commander or DBMS about some high profile project you’re doing with the squadron. You represent not just yourself but SGP(SG0) and the entire office when you interact with the rest of the base. Your support of the SGP(SG0) will earn you his/her support when you need it.

4. BEE Involvement

Get to know your Bioenvironmental Engineers and get involved with them early in your tour. Go on shop visits at least monthly. Work with them to plan strategies for these visits. Review criteria for occupational physicals with them (make a point of attending OHWG meetings, even if you aren’t a designated member). Occupational medicine is becoming increasingly important to the Air Force, as is the environmental aspect of wastes produced on the base.

5. MPH Involvement

Get involved with Military Public Health. Learn about the basic public health activities on your base. Learn about the epidemiology they’re doing. You’ll find they are a good source of medical intelligence on various topics, especially overseas travel.

6. Paperwork

The dreaded “P” word! No one really likes paperwork, but it goes with any job. If you can’t avoid the hassle, the next best thing is to
get it done with the minimum of effort and time. To do that you need to know the forms and how they’re filled out. Know the pertinent regulations or at least where to look. A small, early investment in time management will pay large dividends in saved time. Last of all, get organized! Have a personal plan on how to arrange and prioritize your paperwork.

7. Continuing Medical Education

As a flight surgeon you have a double responsibility. You must keep up with both the “general” medical knowledge required to maintain clinical competency and the specific medical knowledge of the aerospace medicine field. Consider available CME courses. Go to in-hospital meetings and lectures. This provides not only education but a chance to show the rest of the hospital that actual medicine is practiced in the flight medicine clinic. You should have a personal study program outlined. You should consider occasional duty as MOD. This can help to keep broad medical skills intact.

8. Accident Investigation

You MUST be prepared for mishap investigations. This is an area of medicine exclusive to flight surgeons. On the mishap board you will be the only person with significant anatomical, physiological, and clinical knowledge. You should have a good idea of how you will go about your part of the investigation and how you fit into the board process. You should have a fundamental knowledge of aerodynamics, crash forces, and some specifics on your aircraft. (You will generally be asked to investigate those incidents involving your aircraft.) Most important, have a kit ready! For local initial responses there is not time to “throw stuff together.” You must have everything (forms, regulations, markers, cameras, etc.) in one place ready to go.

9. USAF Organization

Learn how the US Air Force and your base is set up. How does the command structure work? Where does the authority come from? You should also understand who has specific authority over a given area, for example, who has authority for each type of waiver. These may seem obvious but they are important and are often overlooked. It is also useful to recognize “unofficial” lines of power. Longtime civilian workers may have a great deal of influence despite an apparent lack of designated power. Finally, you should know how your position fits into the scheme of things and why it is important.

10. ASK!

This is last but is probably the most important hint. You cannot begin to know everything you need to know when you are new. It is better to ask early. The things you should know range from the location of various functions on your base to how the medical treatment facility is organized and operates.

This list may seem like a multitude of little things -- but together they will help you do your job smoothly. Without them things may be much more difficult than they need to be.

Robert Carroll, *FlightLines* Editor

--- EDITORIAL POLICY ---

The views expressed are those of the individual authors and not necessarily those of the Society of United States Air Force Flight Surgeons. The *FlightLines* newsletter is published quarterly, in the months of March, June, September, and December.

Material for publication should be submitted at least one month in advance of the next scheduled issue. Articles may be submitted as a double spaced hard copy or as a computer file (ASCI or Word Perfect® 5.X format) on a 5.25” or 3.5” disk. Please mail information to:

*FlightLines* Editors, Box 35387, Brooks AFB, TX 78235-5387

or send the computer files via E-Mail on the PEGASUS BBS to: FlightLines Editor. Unsigned submissions will not be considered. Please include a current phone number.