

ADP000170 (2)

AD-A237 562



DTIC
ELECTE
JUN 04 1991
S C D

The Role of USAF Flight Surgeons During The Vietnam Conflict

COPY
6

by

Thomas I. Clements*

Accession For	
DTIC GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Avail and/or	
Dist	Special
A-1	

Submitted to:

Colonel John Bishop

for fulfillment of major project requirements

RAM, 1987

CLASSIFICATION
Approved for public release;
Distribution Unlimited

91 6 3 018

91-01007
[Barcode]

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE Mar 87	3. REPORT TYPE AND DATES COVERED Final	
4. TITLE AND SUBTITLE The Role of USAF Flight Surgeons During the Vietnam Conflict			5. FUNDING NUMBERS	
6. AUTHOR(S) Thomas I. Clements				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) School of Aerospace Medicine Brooks AFB, Texas			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING, MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)				
14. SUBJECT TERMS Aviation Medicine Vietnam Military Medicine Vietnam Conflict Flight Surgeons			15. NUMBER OF PAGES . 37	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT UL	

ABSTRACT

The author reviewed the historical literature from 1917 through the Korean War in order to ascertain the origin of the roles and functions of flight surgeons in combat. The only existing study that interviewed the consumer (aircrew) to measure the value of flight surgeons (in World War II) recorded a 71.6% favorable response rate and an 18.9% unfavorable response rate. Significantly positive comments centered around medical expertise, presence of flight surgeons at briefings and on the flight line, and the instruction given. Interviews with 30 USAF aircrew members who flew in Southeast Asia for a total of 35 tours revealed some comparably favorable evaluations. These now-senior officers rated their remembered flight surgeons high in the area of medical expertise and in interpersonal relations. Those who had no recollection or limited contact agreed that interpersonal relations and medical expertise rated high in their judgment of flight surgeons. The area of military expertise, to include personal appearance, military courtesies, and use of military systems, rated slightly positive (comparable to aircrew members) and was viewed as not particularly valuable for flight surgeons. In contrast to the World War II experience, teaching and instruction were rarely existent during their combat flying. Most felt strongly that it would have enhanced the value of the flight surgeon and improved the flying mission if instruction, classes, etc., had been present. These findings hold significance for those who train, supervise, and plan doctrine for military flight surgeons.

"Every new thing is liable to be met with indifference, if not with actual hostility." --William H. Wilmer, Col., M.C., U.S. Army.

From Aviation Medicine in the A.E.F.

Much has been written about the military flight surgeon, and many worthy men and women have served in that capacity. Like most occupations, performing in the role of a military flight surgeon is a combination of technical knowledge, actual instruction, and on-the-job training. Additionally, like most occupations, those performing in the role think that they know how to do it! Performing as a flight surgeon, like other service occupations, is a function of performing for a "boss," performing in an established discipline in accordance with the tenets of that discipline (as one perceives them), and performing for a consumer. This paper will review some of the historical information that has led current flight surgeons to a modern perception of their role. By means of comparison, the role of flight surgeons functioning in Southeast Asia (SEA) during the Vietnam conflict will be studied from the point of view of the flyers who flew there. The perspective of this whole paper will be examining this role during war. Though some arguments can be made for the value of the flight surgeon and his/her role in peacetime, military flight surgeons, like all military services, exist to go to war.

BACKGROUND

The occupation of flight surgeon is relatively new (as are most medical specialties), coming at the time of the involvement of the United States in World War I. The American kernel of the "flight surgeon's idea" occurred just 70 years before the writing of this paper, when Col. Lyster toured the combat flying units in France in 1917 (3). The idea of medical men studying illnesses, defects, and accidents of flying personnel did not originate with

Lyster nor with the United States Army. The British, French, and Italians designated men to perform in this role as early as 1914 (6).

The actual term "flight surgeon" reportedly emerged from a discussion on 11 March 1918 at the Medical Research Laboratory, Air Service, Mineola, New York, according to Andrews. That is inconsistent with the recollection of Robert J. Hunter, M.D., who was then a captain in the medical corps and en route to the laboratory for training (5). Capt. Hunter was ordered to duty, after six weeks of training at Mineola, to an aviation school on 8 May 1918. Hunter was one of three otologists who were trained and deployed together. "Flight surgeon" was not used in that order (WDSO #108, para 199); however, the order was amended on 6 June 1918 to read, "amended so as to have the officers report in person to the Commanding Officers at the places specified for duties as Flight Surgeons."

Hunter quotes a letter written to him on 11 March 1918 by Lt. Col. Isaac Jones, an otologist, asking him if he would like to be "a medical advisor to be responsible for the physical fitness of each individual to fly." This was the first description of a flight surgeon. So, between 11 March and 6 June 1918, Brig. Gen. Lyster, an otological colleague of Lt. Col. Jones', and others coined the term "flight surgeon" and got it published in an order.

Capt. Hunter reported a conversation with Lt. Col. Crabtree, Assistant Chief Surgeon of the Air Service, which occurred en route to the captain's first duty station as a flight surgeon. It is instructive and prescient. Lt. Col. Crabtree said, "You are being assigned to a newly created grade, that of flight surgeon. The commandant of an aviation school is the ultimate authority at that post. The ranking medical officer is the Post Surgeon. Your new duties may be interpreted as taking some prerogatives from each of the gentlemen. Therefore, watch your step, because in Army life it is very

difficult to do something in a different way from that in which it was done before." Capt. Hunter reported in to his aviation school on 13 May 1918, two days before the others on his order, thus becoming the first flight surgeon.

Putting a flight surgeon in the care of combat flyers did not occur immediately. In fact, the record is quite blurred as to this event. Capt. Hunter and the early trainees went to a flying school environment. Even the first group into the Allied Expeditionary Force (A.E.F.) did not go to combat-deployed airfields. Combat fighter/bomber aviators in those days trained in stages to proficiency for combat, just like current U.S. Air Force doctrine. Col. William Wilmer took the Medical Research Laboratory, Air Service, A.E.F., to Europe, reporting on 2 September 1918 (2). The laboratory was co-located with the Third Aviation Instruction Center at Issoudun, France. During the first month, flight surgeons and branch laboratories were deployed to other instruction centers. In October, Col. Wilmer met with the Chief, First Army Air Service, A.E.F., Col. (later Brig Gen) William Mitchell, and they agreed to request 50 more flight surgeons and four more laboratories in preparation for the spring campaign. Of course, the war ended the next month, leaving the number of flight surgeons serving with combat units unclear, but assuredly small.

During the final three months of the war, some duties and roles of flight surgeons were recorded. In September, two movies, "Fit to Fight" and "Fit to Fly," were requested and presumably shown. In October, the Medical Research Board and the laboratory department heads started writing articles for the "Plane News," a unit newspaper. The commander or the deputy commander of the Medical Research Laboratory was requested to attend daily staff briefings which included subordinate airfield commanders. This occurred in the first month. Also, the commander (or the deputy commander) was requested to sit on the

accident board in the first month overseas. Finally, a comment about exceptionally efficient medical officers not living in close contact with the flyers revealed that the concept of the unit flight surgeon included a close living arrangement. Thus we see four duties and roles outlined in the three months flight surgeons were present in a combat theater: 1) showing movies; 2) writing informative articles (both 1 and 2 as forms of education); 3) sitting on accident investigation boards; and 4) living (in concept at least, though not demonstrated) in close contact with the flyers. The flight surgeons were there to support.

Lt. Col. Louis Bauer documented the first complete description of the duties and role of the flight surgeon while serving as the second commander of the Medical Research Laboratory and School of Aviation Medicine at Hazelhurst Field, succeeding Col. Wilmer (4). Dr. Bauer quotes the first official publication of *military aviation medicine*, the Air Service Medical(1): "The duty of the flight surgeon is to act as advisor to the commanding officer of flying schools and squadron groups. Although under the post surgeon, he has freedom of independent initiative in all questions of flying fitness of aviators or cadets. Subject to the approval of the commanding officer, he is expected to institute such measures as periods of rest, recreation, and temporary excuse from duty as may seem to him advisable. He takes sick call for aviators and cadets and recommends a disposition of cases excused from duty. He will visit such cases as may be in the hospital at the post and consult with the attending physician regarding them. From time to time, he will make routine examinations as he may deem advisable, being assisted therein by the Medical Research Laboratory. He will live in as close touch with the fliers and cadets at his station as is consistent with the conditions."

After quoting the above duties, Dr. Bauer and his co-author, Maj. MacLake, go on to elaborate on the role of the flight surgeon as they perceived it. This is the earliest description of how the flight surgeon is to perform the duties that are expected. Again quoting Drs. Bauer and MacLake: "Thus the aviators meet him on the flying field, at mess, in quarters, and during their recreation time. He is one of them, a flier as well as a "medico," and while having the finest opportunity for observing them, soon becomes their confidant and advisor. The post surgeon never sees them unless they are physically incapacitated and report at the hospital. This is usually too late so far as maintaining the highest efficiency of the aviator is concerned. Thus we see that, no matter how well qualified as a medical officer the post surgeon may be, he cannot fill the place of the specially trained flight surgeon.

The flight surgeon should be in close touch with the commanding officer of the flying field and with the officer in charge of flying and the stage commanders, to be ready to advise them on all occasions, go around from day to day and inquire from them whether any particular man is doing anything unusual. If he is told that a certain flier has been making bad landings for the last week, there is probably some reason for it which he can detect. He can make himself the most valuable man on the flying field, without exception, if he appreciates the possibilities of his position. On the other hand, he must remember that there will always be a few who will be invariably trying to get out of some unpleasant duty or to obtain sick leave. In granting sick leaves, he must be cautious. The responsibility is his if he sends a man into the air who complains of being ill and who has an accident. On the other hand, it does not speak for efficiency if he grounds every man who comes to him at sick call. Thus the flight surgeon, by examinations and personality studies of his fliers, will prevent accidents."

The Air Service Medical document gives a quote from a flight surgeon in Italy that gives some insight into how the above role was accomplished: "I get up at 4 a.m. with the cadets and put in the day with them. I hold sick call at 5:30 and try to find out every cadet that is not feeling fit for his day's flying. If I recommend that a man be taken off of flying temporarily, I have him report to me every morning, and then I am able to tell when he is fit to return to the flying field. I have already recommended a man for discharge with a distinct psychoneurosis. I have completed my solo flying sufficiently to be ready for my R.M.A. test. This is fine business and is going to be a great help to me in understanding the conditions of the flying game."

This first official publication of the flight surgeon business listed some instructions and guidelines. Though read mainly by flight surgeons, it did have the mantle of authority as a military publication, though not regulatory in nature. To quote, "The fundamental principle of the service of the Flight Surgeon must be emphasized and understood by everyone in the command from the commanding officer down; namely, the flight surgeon's function is to keep members of the command mentally and physically fit, and by so doing, prolong their usefulness in the service."

"The flight surgeon is definitely instructed to consider himself authorized at all times to make independent investigations of conditions in any way bearing upon the health and fitness of the fliers and forward such reports direct to the officer in order that each flight surgeon's experience in this way might be rendered available to the flight surgeons in other fields."

Regarding accident investigation: "The flight surgeon makes it his particular business to gather from every possible source every bit of information.

His reports are to be based upon the opinions of everyone who knows anything of the crashes, from the commanding officer down."

The earliest recorded description of the duties of a flight surgeon by Dr. Lyster occurred in May 1918, when he presented a paper before the American Neurological Association and again before the American Laryngological, Rhinological, and Otological Society (10). In his description of the newly formed Aviation Service of the Medical Department of the Army, he commented, "A flight surgeon is a medical officer whose duties will be to have charge of all that pertains to the physical well-being of the cadet flier."

Thus, the duties and role of flight surgeons started out broadly and were defined slowly over time. Though the great patriarchs of aerospace medicine may have had ideas and perceptions of duties, it must be remembered that they never performed those duties directly. In the years between World War I and World War II, it fell to practitioners to perform their roles and to record those roles and duties.

In 1920, Maj. Sheep reported of flight surgeons in the Journal of the American Medical Association, "New to duties not clearly defined, their status not always understood, the importance of their services at first not fully appreciated, they showed keen enthusiasm and marked intelligence in the performance of their tasks and, by practical demonstration of their worth, paved the way for the establishment on a permanent basis of the office of the flight surgeon. Further, these pioneers rendered reports of their observations and experiences which have been of great assistance in formulating the present system of instruction prescribed for medical officers who desire to qualify as flight surgeons."

Additionally, he commented that, of 48 flight surgeons on active duty, 29 were on flight status, 7 of whom were qualified pilots, with 5 more taking

instruction. He instructed, "The flight surgeon should be out on the line with the fliers during the hours that flying is actively engaged in." It is interesting to note that the next year flight surgeons were removed from flight status, according to Andrews (3).

Returned to flying status again in 1922, Maj. Woolford described the flight surgeon in a military medical professional journal, Military Medicine, in 1925 (13). His description of duties included the following statements: "The flight surgeon is in intimate contact with his charges, the flyers. As their friend and advisor, he must have their respect and their confidence. He should be one of them in every respect. His work is with them, and his recreation, his moments of play, should be with them as well... Although not essential, it is believed best for a flight surgeon to participate in aerial flights."

As time went by, the actual duties of the flight surgeon became more entrenched and thus traditional. By 1932, the size of the U.S. Army and the aviation medicine community had shrunk to its all-time low. The Chief Flight Surgeon was now a lieutenant colonel. Dr. Jones, the Chief Flight Surgeon, expanded the view of the flight surgeon in an article in an aviation magazine (as opposed to a professional medical journal) by addressing the personality traits and character of the flight surgeon (9). "The flight surgeon should be particularly well-equipped professionally and thoroughly trained and experienced in making the special tests included as a part of the examination of flying personnel. He should be tactful, approachable, sympathetic, resourceful, forceful, tolerant, broad-minded, optimistic, fearless, and energetic, and should have that interest in people and experience in life which make for 'understanding human nature.' When the flight surgeon does his part and meets his responsibility, his accomplishment will be reflected very positively in

the flying efficiency of personnel and the reduction of aircraft accidents. Upon him rests the serious responsibility of selecting from those applying for flying training the ones most physically and temperamentally fit."

"The flight surgeon should have the unalloyed respect and confidence of the officers whom he serves and their families, and nothing will so encourage this as the combination of fine character and demonstrated professional skill. His bearing and conduct should command the respect and invite the confidence of the flying personnel of whom he is the advisor." This indicates that the care and interest of the family had become another responsibility of the flight surgeon.

Finally, Dr. Jones concludes his description, "Positive and forceful in his decision designed to safeguard life and property, the flight surgeon should develop tolerance, be slow to criticize but abundant in encouragement, and command recognition as an influence promoting the general good, on the ground and in the air. He is better identified in his field of endeavor as an inspiration to the maintenance of physical fitness to perform any and all flying missions than as a mere healer of ills incident to the vicissitudes of the body (an obvious reference to the nonflight surgeon physician). In order to know and understand the flying personnel and their reaction patterns, tendencies, and capabilities, the flight surgeon must cultivate the social contacts open to him. The most valuable information about the pilot is gathered by seeing him in his element, the air, in the performance of his real tasks. Therefore, the flight surgeon should, whenever the occasion presents, fly with his associates under all conditions." This last is an acknowledged reference to maintaining social contact with the aviator and points out that it is closely tied to flying. The context of this paper can best be appreciated by realizing that the School of Aviation Medicine at Randolph Field was unable

to fill its two classes yearly with 20 students per class. In addition, one class was cancelled the next year when the staff of the school was required to work in a Conservation Corps project, according to Andrews (3). In 1935, flight surgeons were removed from flying status.

It is apparent that the aviation medicine community viewed the flight surgeon as a multitasked and broadly trained specialist. Capt. Jensen, writing in 1936, tried to put forth the argument (perhaps in response to the evolving specialization of medicine)(6) that "Reviewing both the research and practical problems of the flight surgeon, it at once becomes evident that flight surgeons must not only possess a knowledge of general medicine, but must be versed in the various specialties and the equipment which is used in the varied examinations. At first thought, it might appear that several specialists would be better able to handle the problems of aviation medicine, but on closer study, it is apparent that a unification of these specialties and procedures is necessary from the viewpoint of efficiency, as well as to provide a well-rounded appreciation of the physical and mental qualifications necessary in both the prospective and qualified aviator."

Dr. Jensen laid out a rather large plate to fill. But there is more! Despite being off flying status and not receiving flight pay, these professionals were doing research. To quote Dr. Jensen, "These problems involve considerable research and experimental work, and as these problems are the outgrowth of the various types of flying, their solution involves and necessitates regular and frequent flying on the part of all flight surgeons on duty with the Air Corps."

With the onslaught of World War II, the role of the flight surgeon became an exercise in applying the traditions of more than twenty years of peacetime practice without the presence of any of the few physicians who had

actually practiced aviation medicine in a combat theater. Additionally, aircraft and tactics were considerably different. Flying altitudes were an important factor, as was the long range and payload capacity of modern bombers. Maj. Olson, writing from the Aeromedical Laboratory at Wright Field, had apparently served with a heavy bomber (B-17) group from 1942 to 1944 in England. He gives the most complete description of duties and the role of the flight surgeon (11). "Ideally, flight surgeons are assigned to units soon after their formation and thus play an active role in the early indoctrination and training of the unit. During this precombat training period, the flight surgeon can become intimately acquainted with his flying personnel and can note emotional backgrounds and reactions, eccentricities, and individual thresholds to stress and strain."

Under general duties, Dr. Olson included, "To enhance close personal relationships, he lives with the combat flyers; eats with them; plays cards with them; has 'bull sessions' with them; and goes on pass with them.

He must see that adequate amounts of nutritious food and comfortable living quarters, necessary to high morale, are provided. Whenever possible, combat crew messes are established for serving special foods to combat crewmen and to assure them of hot, freshly-prepared meals before briefing and after return from an mission.

The flight surgeon takes part in the athletic and recreation program at his station and advises the Special Service officers in planning this important program.

Problems of sanitation are met by the flight surgeon. Fortunately, the problem of sanitation in the British Isles has not been serious."

In describing the flight surgeon's part in planning and executing combat missions, Dr. Olson mentions, "Every good flight surgeon gets up with his men,

eats breakfast with them, and attends briefing with them. During this period, the flight surgeon can learn a great deal about his men. By careful observation, he notes their psychological reactions, the state of their appetite, the number of cigarettes they smoke, and whether they look rested or tired, happy or depressed, anxious or reluctant.

Information given during briefing will be of some value to the flight surgeon. Frequently he can anticipate the number and severity of his casualties if he knows the length of the mission, the altitude and the predicted temperature, the flight position of his squadron, and the anticipated strength of the enemy's defense.

Following briefing, the flight surgeon goes to the flight line for a final check on his men at takeoff, paying particular attention to the adequacy of their flying clothing and oxygen equipment. When missions are long and time between meals is great, the flight surgeon usually supervises the feeding of a small lunch to the flyers."

In referring to flying, he writes, "From the medical standpoint, little is gained from actual participation in a mission, although it may bring the flight surgeon closer to his men and create a common understanding of their reactions. Most combat flyers would rather see the medical officer stay at home, where he will be on the line to care for their wounded."

He and his medical crew were located on the flight line. "This crew meets all aircraft that 'abort' or return before completion of the mission. Their purpose is not only to care for the casualties, but to investigate the reason for aborting, if it is of a medical nature. This would include oxygen trouble and physical complaints of crewmembers."

"One hour before the ETA (expected time of arrival) of the airplanes, four or more ambulances, each manned by four enlisted men and one flight

surgeon, are present on the flight line. Two of these ambulances proceed to the distal end of the runway on which the planes will land, and the other two remain at the control tower, in constant communication with flying control officers, usually by means of radios installed in the ambulances."

Finally, concerning the post-mission debriefing, "Just prior to the interrogation, coffee and sandwiches are served to combat airmen who have participated in that particular mission. Whenever the flight surgeon is not occupied in treating casualties, he attends the interrogation immediately following the mission. He has the opportunity to check his men for mild frostbite or aero-otitis media, to observe their psychologic reactions to the mission, to receive reports of unsatisfactory personal equipment, and again to prove his interest in the welfare of his men."

Unfortunately, no similar description has been published about the Korean War. Thus we move forward more than 20 years to find flight surgeons undergoing discovery of their roles and duties in combat in the Republic of Vietnam and Southeast Asia.

Dr. David Jones, a trained psychiatrist and specialist in aerospace medicine, reported his view of these duties in a technical report published in 1986 (7). Based on his service with a USAF commando unit in the mid-1960s, he writes, "As we have discussed at length, fliers are different from other combat troops. This difference extends to their medical support, which is provided on a highly personal and individualized basis by the squadron flight surgeon. Thus morale support and first-echelon mental health care may well be furnished by the flight surgeon rather than by enlisted medical technicians or by 'buddy care' nonmedics. The flight surgeon is an intrinsic part of the squadron's internal support system and should be present on a day-to-day basis

to furnish primary medical care and advise the squadron commander on matters of preventive medicine, including matters of morale."

In reference to flying duties, he writes, "The flight surgeon must fly combat missions, if at all possible. To do this is to set in motion a complex set of tried-and-true interpersonal dynamics which pay off with several specific benefits." These benefits include the flight surgeon's better understanding of the mission; a gain in credibility with his patients by 'speaking the language' and sharing their fears and reactions; becoming accepted by his patients and assuming a symbolic importance which is important in performing his duties; seeing first hand the reactions of his patients; and being able to intercede on their behalf with the command authority.

In accomplishing flying duties, Dr. Jones points out elsewhere (8) the hidden duties that are accomplished or facilitated. They include seeing multiple fliers in action at their job, giving out three or four bits of medical advice, discussing old and new problems about equipment with the personal (life support) equipment technician, collecting two or three appointments for his appointment book, and, maybe, getting a request to write a letter or two.

In addition to flying duties, Jones points out the role of teacher as a preparer and deliverer of speeches. This is a natural outgrowth of interacting with the line leadership. He also points out the universality of meeting attendance and reviewing the medical, flying, and safety literature.

In viewing the role of the flight surgeon in its evolution, it is apparent that flight surgeons have propagated their duties and roles from senior to junior physicians. Only once, at the end of World War II, has any study been attempted regarding the aircrew's view of the flight surgeon.

The technical report was published in May 1945 by the Air Technical Service Command of the Army Air Force (13). The subjects were 2700 returning

aircrew (enlisted and officers) of the 2nd Army Air Force and were interviewed in redistribution stations from 4 February 1945 to 28 March 1945.

Of the 2700 men, 2600 replied to the question, "Of what value was your squadron flight surgeon?" The responses were collected, recorded, and categorized. Forty-five percent of the responses were one or two words, while the remainder were more substantive. Of the total number of responses, 71.6% were favorable, in the authors' opinion, and ranged from "very valuable" and "very good" (18.9%) to "professional skill" (0.7%) and "attention to personal equipment" (0.5%). Ten percent of the responses were noncommittal, such as "no contact," "does not have enough authority," or "five flight surgeons per group not necessary." The unfavorable responses included "none," "no good," "does not have interests of the flyers at heart," "drank to excess," etc., which accounted for 18.4% of all responses.

Of those comments which were somewhat expansive, the most frequently mentioned value attributed to the flight surgeon mentioned his ability to recognize and treat operational fatigue. Comments by a fighter pilot included, "Our flight surgeon was very good. He recognized fatigue symptoms early." A navigator of a B-17 responded with "Of great value. He saved several boys by recognizing and treating combat fatigue early."

The authors singled out the contributions of the flight surgeon in the area of instruction. A waist gunner of a B-24 commented, "Favorable. Gave many lectures on oxygen, first aid, etc." A radio operator in a B-17 responded with "He gave complete information on use of all flight equipment, oxygen systems, etc. Very satisfactory."

Also singled out were the responses relating to the flight surgeon's presence at briefings, takeoffs, and landings. A bombardier of a B-17 responded, "He was a definite asset--would meet planes when returning from

combat flight--his generally was the first smiling face we saw." A tail gunner of a B-24 commented, "He always was on the line for takeoffs, and when a crew landed, he would ask each man how he felt." A pilot's response included, "Squadron flight surgeon meeting all planes at end of landing roll is a great morale booster. The boys like to give him the 'I'm OK' wave of the hand."

The availability of the flight surgeon to the squadron members was a most valuable aspect of his role. Availability-of-service comments included those of a B-17 pilot who said, "Excellent, always available and a good friend." A waist gunner of a B-17 responded, "We could go see him any time of the day or night and he would do everything he could to help you."

Other valuable functions and roles included the flight surgeon as morale builder, psychologist, confidant, and chaplain. Sample comments included those from a ball turret gunner of a B-17 who said, "My flight surgeon was a very good man, one who took care of a man's mind as well as body. One of the most understanding men I have ever known. Believe he saved many men from cracking under the strain because of it." A pilot responded likewise, "Performed duties excellently. Saved several crews from quitting by talking to them--changing their mental attitude."

In regard to flying of combat missions, sample responses from gunners included, "Very good, he went on missions to see for himself on what conditions we were flying." "He wasn't worth a damn until he went on a rough mission with us, then he was all right."

Of the unfavorable comments, of interest were those relating to lack of interest in personnel, lack of professional skill, and disinclination to fly. Sample comments relating to interest in his squadron personnel included, "He

could have been more of a mixer" and "not enough personal contact with all men. Ran around with CO unless called upon."

In regard to professional skills, a bombardier evaluated the flight surgeon as "Unfavorable. Only remedy for a cold was aspirin and warm salt water." A nose gunner said, "The squadron flight surgeon in our case was no Doc. He referred all cases to group surgeon and inspired no confidence in the men as to his ability as a doctor."

Choice comments addressing motivation for flying included a pilot saying, "He was some help but never participated in a combat flight." A copilot added, "Why not let them fly one mission overseas to get a better idea of what his problems are?" Finally, a navigator responded, "He could have been much more valuable if he had not confined himself to four hours a month."

The conclusion of the report was that flight surgeons did make an important contribution to the winning of the war in the air. By their preoccupation with the problems of the flyer, they were essential in maintaining morale and efficiency.

METHODS

For this study, aviators who were referred to the U.S. Air Force Aero-medical Consultation Service at the USAF School of Aerospace Medicine, Brooks Air Force Base, San Antonio, Texas, were interviewed. Only those officers who were active duty (as opposed to USAF Reserve or Air Guard) and admitted to having flown in combat over SEA were selected. All were volunteers and were interviewed in one session scheduled at some convenient time during their evaluation or consultation. All of these patients were referred to the Consultation Service for suspected new conditions or follow-up of preexisting medical conditions.

The investigator personally interviewed all subjects in an open-ended interview which was tape recorded and transcribed. The primary data source was from the notes of the investigator, with the transcripts referred to secondarily for clarification, as needed.

Questions included those of a demographic nature, such as current age, rank, position, and total combat flying hours. Additional demographic data about their combat tours was elicited, to include the following: Dates and locations of tours, rank during the tour, duty positions during the tour, and aircraft flown in SEA.

The search for commonality among the many areas of flight surgeon duties in the history given earlier was complex. Multiple ways to organize these duties is evident to each reader. The author sorted the roles into four areas: medical expertise, military expertise, teaching expertise, and interpersonal relations.

Thus, the main part of the interview included the following:

1. Whether a flight surgeon was assigned to the unit.
2. How the subject evaluated the flight surgeon's performance in areas of medical expertise, military expertise, teaching expertise and interpersonal relations.
3. How the subject's evaluation influenced his opinion of the flight surgeon's role (that is, the value of that aspect of his role to the subject's total evaluation of the flight surgeon).
4. If the aviator had no flight surgeon assigned or had no flight surgeon specifically identified as 'his own,' then how the subject might like to see the flight surgeon perform in the four areas of interest and the value of that performance in the overall evaluation.

RESULTS

The 30 aircrew personnel interviewed served a total of 35 tours flying in a combat environment over SE Asia. This flying was logged between 1964 and 1973. The results of these interviews can be grouped into demographic data at time of interview and at time of tour, plus responses covering the role of the flight surgeon.

First, the subjects interviewed between November 1986 and April 1987 had a mean age of 45 years (range: 39-55) and a mean rank of lieutenant colonel (range: captain to major general). Twenty-five were pilots and the remaining five were navigators or weapons systems officers. They were currently serving in command positions at the squadron or wing level, or were staff officers at many different levels, from the Joint Chiefs of Staff, to Headquarters U.S. Air Force, to major commands, on down to base level. Only one was holding a primary job of aircraft commander and regularly flying operationally on a regular (daily) schedule.

The experience in SE Asia involved many aircraft. Nineteen tours were in fighter, attack or reconnaissance (FAR) aircraft. Fourteen flew in tanker, transport, or bomber (TTB) aircraft during their tours, while two flew combat tours in helicopters. The location in SEA was liberally interpreted. While 16 tours were in the Republic of Vietnam and 9 were in Thailand, the remaining 10 tours were scattered. Because of the nature of the mission and aircraft, 4 tours were in more than one location, including the Republic of Vietnam, Thailand, Guam, and Okinawa. The tours that were located outside of the SEA land mass generally involved extensive temporary duty flying over the combat zone. These tours were flown from Okinawa, Guam, Taiwan, and even New Jersey.

While performing the flying, the crewmembers averaged 10.8-month flying tours (range: 4 to 16 months) and flew an average of 398 hours of combat

time (range: 19 to 1750 hours). The individuals averaged 27.3 years of age (range: 23-35 years) and served in the average rank of first lieutenant (range: second lieutenant to major).

Measuring the results of the value and role of flight surgeons was difficult and somewhat subjective. Some personnel responded with short, direct answers, while others were permitted to eloquently discuss their impressions. Still others were encouraged to expand on their image of the flight surgeon as he should be. These answers can be summarized in table form, as shown in Table 1.

TABLE 1. COMMENTS BY INTERVIEWEES REGARDING FLIGHT SURGEONS

	No comment	Positive comment	Negative comment	"Should have"
Medical expertise	10	22	2	1
Military expertise	9	18	5	3
Instruction expertise	25	9	0	1
Interpersonal relations	9	16	6	4

Of the 35 tours, 22 crewmembers felt that a flight surgeon was identified as assigned, attached, or directly supporting their unit. Usually, the flight surgeon was assigned to the same squadron (this was doctrine in the FAR squadrons). A large number of times, the flight surgeon was assigned to the hospital or clinic, but was specifically identified to care for a given unit's aviators. Generally, this was supposed to happen (doctrinally) with all other flying units. Twelve crewmembers could not remember flight surgeons

identified as "theirs," and one crewmember honestly couldn't remember any flight surgeon at all.

Since all interviewees were being evaluated in the USAF Aeromedical Consultation Service, all were at risk of being indefinitely suspended from flying duties. In fact, several were recommended for suspension. Thus, it was felt that attitudes at the time of interview could be biased. The interviewer, not a member of the U.S. Air Force, asked each subject to identify his own feelings about bias. Twenty-seven subjects felt that their experience with the Consultation Service did not bias their recollections about flight surgeons. One felt the bias was "minimal" and one responded with a "maybe." The one "yes" response, by a wing commander, reflected a bias in favor of his flight surgeon memories, since his experience at Brooks Air Force Base was so positive.

DISCUSSION

The flight surgeon today has evolved from a tradition which was founded in the combat of World War I. The great leaders and prolific writers, so often quoted, have laid down certain tenets which the flight surgeons of today have applied in peacetime and combat. Curiously, the great early pioneers who are responsible for the tenets which have led to the roles of today were never practicing flight surgeons themselves.

Nonetheless, the flight surgeon, in his role as physician-healer, military officer/flyer, teacher, and confidant-counsellor, seems to be the man for all seasons of combat, if we follow the literature. This prototypical flight surgeon has only been compared to the real thing once, at the end of World War II. This study has attempted to validate that study and the image portrayed to all flight surgeons in the U.S. Air Force.

At the outset, the author looked to validate certain prejudices. First, since FAR-type units tended to have flight surgeons intrinsically assigned, it was felt that they would be more favorably evaluated than those flight surgeons assigned to hospitals and clinics. In fact, the respondents did not indicate this. What was indicated was that a forceful or notable flight surgeon who was perceived to possess desirable traits or interests was identified and his unit of assignment was an independent variable.

Another preconceived notion was that flight surgeons in practice in SEA were substandard in their military expertise (including appearance, use of the military system for logistic or personnel support, and interest in the mission). This could not be substantiated by the interviews. Its relevance will be discussed later.

The significance of the recollections of these officers after more than 13 years cannot be underestimated. The group of aircrew interviewed is certainly not random. Their reason for appearing at Brooks Air Force Base is independent, as far as one can discern, of their SEA duties of flight surgeon memories. (It should be pointed out that one pilot's pericarditis first appeared in Vietnam and was misdiagnosed at that time. Since then, he has been a regular visitor to the Aeromedical Consultation Service.) The significance of this group is their seniority and positions of leadership in the U.S. Air Force. Regardless of flying position, location, mission, or performance in and over SEA, as a group they have made it. This group includes four general officers, five colonel-level commanders, three lieutenant colonel-level commanders, and one system program manager. Their opinions and experience have mattered in the past to the U.S. Air Force in order to achieve their positions, and it is likely that their opinions will continue to matter in the future as well. In addition, they were a collection

of pilots, navigators and weapons systems officers who flew in many different aircraft throughout nine years of the war and flew into and out of multiple bases. During their tours, they were lieutenant and captain aviators. Only one served as a senior staff officer of a squadron during his tour, and he was a major. Thus, these were the workers and the men who were "on the line" regularly; therefore, their opinions cannot be overlooked.

The comments addressing the medical expertise of the flight surgeons were very favorable. Of the 22 positive comments regarding flight surgeons, some typical answers included a C-130 transport pilot's, who said (speaking of flight surgeons whom he knew, since none were assigned to his unit), "They were quite good at what they did and made an effort to learn a lot...about the area we were flying in and around."

A pilot of an F-4 fighter responded, "He seemed to pay quite a lot of attention to detail and I'll give you an example. I got sick one time and had a short bout of both diarrhea and throwing up blood or something. He was worried about dehydration immediately, and in that climate, of course, there was a lot of sweating and whatnot. He immediately put me on I.V. just to get some fluids back into me. As a matter of fact, that's the first time anybody has ever done anything like that."

A general officer who served as a squadron life support officer (responsible for overseeing the unit's personal protective equipment) said, "I would have had to assume that it was pretty good. I say that because all of the physicians who were assigned, including the flight surgeons, were very much involved in trauma management, because we were under attack a lot and we saw a lot of trauma. Having some interest in that area, I also saw a lot of it, both clinically and in the field. My general impression was that medical care

was good across the board, considering the number of physicians that we had and the experience level that they had."

In addition to the positive comments, one must consider the "no comments." These interviewees were not being reticent in their response; rather, they either did not see the flight surgeon as he performed his clinical role, or they felt that they knew so little about the requirements that they could not objectively comment. In no way should this group of respondents be considered negative.

The actual negative comments were two: One F-4 pilot called his flight surgeon a "quack" who used his nurse to do the work. One request for help was reported, "Hey, I need some stuff. They used to give me some stuff in the States that I could pour in my ear. Then I could douche it out and hear good, because I am starting to have trouble hearing. It's not that I'm not hearing loud voices, it's just that it is getting fouled up and I know the cause (based on prior experience in the States). I've got too much wax in there and need to get some stuff to get it out. The guy said--this is the one time I went to the flight surgeon in combat--'No, you don't want to do that. Because in Thailand the dust is very bad. If we clean your ears out, you get ear infections because the dust is very bad. That wax is protecting you from infection.' I thought to myself, this wax is about to get my _____ killed, but it's really protecting me from infection!

"I went to a buddy of mine who was flirting with one of the nurses. I asked him to get her to steal a bottle of this stuff, which was uncontrolled, and some syringes. Then I got a best buddy to help me wash it out. After that, I could hear gnats screwing at 50 feet; you know, like a champ."

The other negative comment came from an O-2 (observation-type aircraft) pilot who was living at and flying out of an Army artillery fire base. After

suffering from mild throat pain and having no physician around, he flew to Cam Rahn Bay Air Force Base. He reported, "I got maybe five minutes with him and I just told him how I felt. He said, 'Well, you probably have a cold,' and sent me back. But in his defense, he had a lot of people that were trying to see him. He was overworked." The interviewee ended up seeing a U.S. Army flight surgeon four to five months later and received the same evaluation; no thorough examination or laboratory or radiological tests were done. He continued to fly with a low-grade fever and chest pain throughout his tour. His diagnosis of pericarditis was given later.

The evaluation of military expertise addressed another one of my prejudices. My impression of physicians serving in the Republic of Vietnam was a distinct "Hawkeye Pierce" image. I was confident that combat aviators would identify a gross disparity between their own standards and those of their flight surgeons in the area of military officership.

Quite the contrary proved to be true. Eighteen crewmembers had positive comments about the flight surgeons' military expertise. Much of this had to do with flight surgeons who enjoyed flying. An F-4 fighter pilot commented, "I characterize him as one of the guys. He was extremely well liked, and I think for a couple of reasons. One, he had a real personality for the environment. He seemed to be enjoying himself in that environment, taking care of the guys and loving to fly. I've actually flown with him on combat missions. One of them was a pretty testy one, as a matter of fact. And we got shot at a bunch. I don't know how many rounds, but it was a couple or 300 rounds, probably. He was just like one of the guys. He was in the backseat of the F-4 and, as you know, flight surgeons in the Air Force, if they fly enough, can almost function as a backseater in limited ways. But this was a fairly hefty combat mission to go on, and he was in my backseat. He did quite well

and he just ate that stuff up. He loved it! And I think that's another reason he was so well liked. He didn't shy away from it. He was going to get involved like his guys did."

A C-130 transport pilot who had several flight surgeons fly temporary duty with him responded, "Some of them obviously had a lot of expertise. I believe one of them was a graduate of West Point. Most of the others, of course, came from civilian schools. Some of them appeared to fit (when they initially arrived) more into a M.A.S.H. program than they did in the military program. But because of the commander, they were brought in line relatively quickly, within three or four months of their arrival. The outlook of both the wing commander and medical commander was that they had to fit. We didn't have to fit with them, they had to fit with us. That is pretty much what they did."

Other positive comments included the story of one flight surgeon in a search-and-rescue helicopter squadron who was required to fly on missions if the downed pilot was thought to be wounded. After the wounding of his crew chief on the first attempt, he manned the machine gun, rescued the aviator, and won a silver star for his valor.

The military expertise of flight surgeons was not observed or remembered in nine crewmembers' tours. Generally, however, these individuals felt that the function of a military officer was somewhat important in the role of the flight surgeon.

Negative comments included one from a C-47 pilot who observed, "My general impression is less than average. I didn't really mind because I understood it...I think it tended to set the physician apart from the rest of the military folks, and I think in some cases they contributed to that. You've got to work hard as a professional physician, lawyer, whatever, to

become a member of the military family, and some are not willing to do that, quite frankly."

A C-130 transport pilot evaluated flight surgeons as, "They were as military as any other medical types that I've ever seen, or probably more so. They were in amongst them (aircrew), as opposed to medics and flight surgeons back in the States that had never been involved in that (the war)... Well, my opinion of them was based primarily on their medical expertise, not their military bearing, courtesies, or anything else."

Generally speaking, the military role was considered less important to the pilots. Most of the "should haves" addressed spending more time in the unit and flying with the unit.

The function of the flight surgeon as teacher, instructor, and communicator differed significantly from the views of World War II aviators. Of the 35 tours queried, only nine viewed the teaching role in a positive manner. No one viewed the instruction negatively. One general officer felt that any teaching done should be direct and graphic, rather than technical, and merely a lecture. The remaining 25 observations were without comment because they did not see any evidence of teaching by the flight surgeon.

Of the instruction that was received, most were country orientation medical briefings about the personal hygiene, venereal diseases, and the climate. One exception to this was recalled by a helicopter pilot in a search-and-rescue unit, who said, "He even got the PJs (pararescue personnel) to give them quite a bit. He was always prodding them in the ___ with a bayonet to make them (remember). You forget things if you don't review them. The mechanics on the flight line, he gave, you know, stopping the bleeding and that type of stuff. He would give a class on that...when the new guys came in. He was constantly doing something, because we always had new guys coming

in or were rotating people out. He would give half a day's lecture on practical experience." The pilot then proceeded to give a proficient practical lesson on stopping the bleeding, which he still remembered from his 1968 tour.

The "no comment" numbers are significant because of the absence of teaching. An F-4 fighter pilot tried to remember his classes. "I don't remember any. That is not to say that they didn't. We had lots of group training sessions and the opportunity was there, but I just don't remember any presentation by a flight surgeon."

An O-2 observation pilot tried to remember. "No! If it was there, it may be my fault, but I just don't remember so far back." In addressing the positive value of instruction, he responded, "Absolutely."

A C-130 transport pilot who did not receive any instruction commented on the value of classes if such had occurred. "Yes, very definitely would have helped. They do today. They teach. They come down, and they talk. In those days, they didn't. They didn't participate in the safety meeting. They flew with you. They never took the time to debrief."

Thus, whether it was the workload, lack of training, or disinterest, the flight surgeons in combat either gave no classes or classes were distinctly unmemorable. The pervasive attitude of the interviewed aviators was that such classes, if given well, could have helped significantly in developing rapport between the flight surgeon and the unit served. Additionally, the classes that were remembered distinctly enhanced the whole unit mission.

By far the most important aspect of the flight surgeon's duty in combat was his ability to relate to the members of the unit. Both those who felt that the flight surgeon's interpersonal relations were positive and those who didn't agree felt that it was or would have been most valuable. Less than one-half (16) of the remembered tours included a positive comment. Only

six commented negatively about the flight surgeon/aviator relationship. The nine "no comments" were due to the absence of the flight surgeon in the interviewee's life of combat flying. Generally, he had little or no contact with the flight surgeon and could not evaluate his interpersonal skills.

An F-100 fighter pilot's evaluation about his flight surgeon's interpersonal abilities was "I think that's absolutely essential. I think you have got to get in there. If you don't get in there and mix with them when times are good and when times are bad...that's a bridge you have got to fill. I think everybody in the squadron felt that any time they could say, 'Hey, Bob, let's go talk' and get him off in the corner. I think that was the atmosphere he fostered because he was there... It's like carrying an insurance policy." (This particular flight surgeon chose not to fly on combat missions and had been an All-American football player for Notre Dame.)

A pilot in a special operations unit training indigenous personnel on his second SEA tour felt that he knew his flight surgeon and what motivated him. He reported, "All in all, I think that the fact that we knew who he was, he knew who we were, and he cared... He cared about us and the mission. He took time to get involved. If I was to describe a model flight surgeon, it would be this guy."

This same pilot contrasted the above flight surgeon to the ones he served with on his first SEA tour. They were described, "As far as being doctors, I assume they're all competent. As far as their contributing to the mission, I would rate them, on a scale of 10 being outstanding and 1 substandard, I would rate them a 4... So if there was a place where a flight surgeon could have probably got a lot of work as far as measuring stress, measuring the impact of the mission on the man, that was probably one of the better missions. We had 24-hour (round the clock) detail. They (flight scheduling) circulated

you through that. But you very seldom saw a flight surgeon come down there to really check on the guys... In their hearts, they thought that this (hospital care) was what they were doing there... I think it was because they thought it was going to take them away from their hospital and the office to really go out there and spend some time and see the kind of conditions that the men were living and working in... They had a narrow view of what their job was. By that, I mean they were there to dispense medicine and give flight physicals and take care of families. I don't think they saw their role as being directly related to the mission."

One fighter pilot could not vocalize his negative feelings about the interpersonal relationships of his flight surgeon. Instead, he said, "Those are the three experiences I had with flight surgeons, all of them negative. Fortunately, I stayed healthy. I didn't have any blood in the cockpit. No medal, no fun! I could get away without seeing the flight surgeon... I had a flight surgeon at the the unit fighter squadron before I went to combat. He was exactly the opposite. He was good. He went into the squadron with the guys; he really was active in health care. He would help you figure out ways to make yourself better. Flu-shot time came around TAC and I was paranoid about flu shots, even in those days. He would tell you ways to get out of the flu shot. The medical community would have castrated this guy if they knew what he was doing. But there was not a guy in that squadron who would not have gone to that guy. He was so respected that, if he had turned around and said, 'Look, Charlie, you shouldn't be flying with this,' we wouldn't have flown. He was one of us, you know, and the guy had guts."

Those crewmembers who had not observed a flight surgeon in his interpersonal roles occasionally had a "should have" comment. An example from an O-2 pilot was, "Well, as a doctor, he seemed competent. I guess that's the number

one criteria for flight surgeons. I was a squadron commander before I went to the Air War College. There, I tried to use the flight surgeon kind of like I used the chaplain, as another source of input on morale and health of the unit. This guy, in terms of giving that kind of function in Vietnam, was just nonexistent... You know, my view of flight surgeons is that they are not only doctors, but they need to be involved in the unit in terms of sensing that somebody has a medical problem as much as a physical problem. You can't do that from long distance. You have to be there, flying with the unit, hanging around with the guys, that type of thing."

CONCLUSION

The hours and hours of interviews and answers to open-ended questions can be summarized. First, flight surgeons were generally highly regarded by their aircrew while serving in and flying missions over SEA between 1964 and 1973. Though each officer had his own ideas about functions and roles of flight surgeons in combat, they were generally positive in their remarks.

Their basis for positive comments came chiefly from the feeling that they were treated by highly competent physicians who would take care of them when the need arose. In this time of criticism of organized medicine, quality assurance in military hospitals, and some resentment of economic differences between military physicians and other officers, this is refreshing.

The feeling about 'militariness' of flight surgeons was that they were below standards. However, they were considered significantly more 'military' than nonflight surgeons and about the same in appearance as the aircrews they served. Generally, it was viewed as the way of combat versus a peacetime air force. Significantly, this characteristic was distinctly not a factor in the aircrew's evaluation of the flight surgeon's value or worth. In fact, some

officers felt that they were more strongly drawn to the flight surgeon since he was just like them!

Interpersonal relationships were a high-value item throughout the whole unit. The sense of trust in the flight surgeon (his medical abilities, his abilities to use the system, etc.) was most clearly related to this item. The significant deviation from this was the feeling many aviators had that they couldn't get to know the flight surgeon at all due to his absence.

This leads us to the most pervasive detractor. Those individuals who had little relationship with the flight surgeon expectedly could give little input. Often, they did not miss or even note the absence of the flight surgeon while they were flying in combat. They were aware of a medical facility and assumed that, if they were wounded, they would be cared for. Now, however, as senior officers, they generally are aware of a gap in their past flight experience by the lack of flight surgeon contact. They tended to feel that the combat mission could have been enhanced by the active presence of a flight surgeon.

The glaring lack of a teaching and education in this recent conflict is in sharp contrast to the long tradition of flight surgeons in combat since their beginnings. Oftentimes, there was little opportunity, as units were so diverse and busy, so that safety meetings and officer calls did not occur in SEA. Probably, small unit and individual teaching was going on daily and the aviators had little contact with it or don't remember it.

Not mentioned previously is that mission briefings and debriefings did not include flight surgeons often. This was in contrast to the World War II experience. Principally, this was due to small formations (two to four aircraft) being launched throughout the day and (often) night.

The total role of the flight surgeon is truly 'service' to the aircrew and military unit. Thus, the comments, memories, theories, and desires of

the medical consumer should be of some relevance. Generally, flight surgeon training programs address these wishes and desires quite adequately. However, in SEA during that time in our history, flight surgeons left some gaps in their perceived role. It is incumbent on supervising officers, training programs, and military services that the next combat mission be maximally accomplished with maximal support, especially the support of the flight surgeon.

ACKNOWLEDGEMENT

The author would like to thank the diligence, patience, and dedication of Ms. Margie Lee, who assisted as typist, editor, and advisor on this project.

REFERENCES

1. Air Service Medical, Government Printing Office, Washington D.C., 1919.
2. Aviation Medicine in the A.E.F. Government Printing Office, Washington, D.C., February 1920.
3. Andrews PW. The first half century of the School of Aerospace Medicine. (unpublished)
4. Bauer HL, MacLake W. The Air Medical Service and the flight surgeon. Milit. Surg. 1920; 46:40-50.
5. Hunter BJ. The first flight surgeon. Milit. Surg. 1942; 91:349-353.
6. Jensen, WY. Why the flight surgeon? Milit. Surg. 1936; 79:367-372.
7. Jones DR. U.S. Air Force Combat Psychiatry. USAFSAM TR-85-83, Jan 86, USAF School of Aerospace Medicine, Human Systems Division, AFSC, Brooks Air Force Base, Texas.
8. Jones DR. Why flight surgeons, or "What do you all do--operate in airplanes?" (unpublished)
9. Jones GI. The flight surgeon. Aero. Dig. 1932; 20:94-95.

10. Lyster TC. The Aviation Service of the Medical Department of the Army.
Ann. Otol. Rhin. Laryng. 1918; 28(3):851-855.
11. Olson OD. The combat flight surgeon in England. J. Indiana St. Med.
Assoc. 1944; 37:430-434.
12. Sheep WL. The flight surgeon, a new specialist in medicine. J.A.M.A.
1920; 75:265-266.
13. Technical Report #TSEAL 3-697-16. Comments by AAF Returnees on the Value
of the Flight Surgeon. HQ, Air Technical Service Command, Engineering
Service, Aeromedical Laboratory, 19 May 1945.
14. Woolford WS. The flight surgeon. Milit. Surg. 1925; 57:59-63.