

USAARL Report No. 94-2



**U.S. Army Aviation Epidemiology Data Registry:
Incidence and Outcomes
of Aviator Flying Evaluation Boards**

By

Kevin T. Mason

and

Samuel G. Shannon

Aircrew Protection Division

October 1993

Approved for public release; distribution unlimited.

**United States Army Aeromedical Research Laboratory
Fort Rucker, Alabama 36362-0577**

Notice

Qualified requesters

Qualified requesters may obtain copies from the Defense Technical Information Center (DTIC), Cameron Station, Alexandria, Virginia 22314. Orders will be expedited if placed through the librarian or other person designated to request documents from DTIC.

Change of address

Organizations receiving reports from the U.S. Army Aeromedical Research Laboratory on automatic mailing lists should confirm correct address when corresponding about laboratory reports.

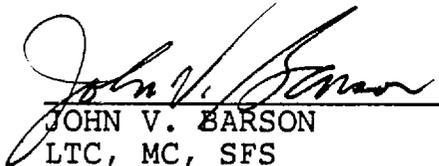
Disposition

Destroy this document when it is no longer needed. Do not return it to the originator.

Disclaimer

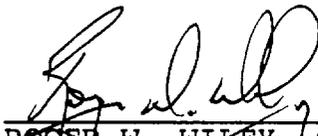
The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other official documentation. Citation of trade names in this report does not constitute an official Department of the Army endorsement or approval of the use of such commercial items.

Reviewed:



JOHN V. BARSON
LTC, MC, SFS
Director, Aircrew Protection
Division

Released for publication:



ROGER W. WILEY, O.D., Ph.D.
Chairman, Scientific
Review Committee



DAVID H. KARNEY
Colonel, MC, SFS
Commanding

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release, distribution unlimited			
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) USAARL Report No. 94-2			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Aeromedical Research Laboratory		6b. OFFICE SYMBOL (if applicable) SGRD-UAD-IE	7a. NAME OF MONITORING ORGANIZATION U.S. Army Medical Research and Development Command		
6c. ADDRESS (City, State, and ZIP Code) P.O. Box 620577 Fort Rucker, AL 36362-0577			7b. ADDRESS (City, State, and ZIP Code) Fort Detrick Frederick, MD 21702-5012		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (if applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO. 0602787A	PROJECT NO. 3M162787A879	TASK NO. BH
11. TITLE (Include Security Classification) Aviation epidemiology data registry: Incidence and outcomes of aviator flying evaluation boards					
12. PERSONAL AUTHOR(S) Kevin T. Mason, and S. G. Shannon					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) 1993 October		15. PAGE COUNT 12
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) Databases, epidemiology, aviators, aircrew, incidence, flying evaluation boards		
FIELD	GROUP	SUB-GROUP			
05	02				
06	05				
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
<p>The Aviation Epidemiology Data Registry (AEDR) is a family of databases storing history and physical information on Army aircrewmembers. The AEDR lacks some aviation career endpoints, one being the outcome of flying evaluation boards (FEBs) for nonmedical disqualifications. The outcomes of 170 new FEB actions from 1985 through 1992 in active duty and U.S. Army Reserve aviators were reviewed. The overall incidence was 1.13 per 1,000 aviator-years. Aviators aged 25 through 39 were twice as likely to undergo FEB actions. The likelihood of restoration to flying duties after FEB was significantly lower if the FEB was for habits, character, and motivation, than if the FEB was for poor flying proficiency or failure to follow flight rules. Many nonmedical disqualifications leading to FEB require medical evaluation to rule out underlying mental disorders.</p>					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL Chief, Scientific Support Center			22b. TELEPHONE (Include Area Code) (205) 255-6907	22c. OFFICE SYMBOL SGRD-UAX-SI	

Table of contents

	Page
Background	3
Flying evaluation board process	3
Methods	5
Results	5
Discussion	9
Summary and conclusions	10
References	12

List of tables

Table	Page
1. AR 600-105 categories of nonmedical disqualifications as grounds for flying evaluation boards	4
2. Possible flying evaluation board outcomes	4
3. Incidence of flying evaluation board actions for active duty and USAR aviators	6
4. Age-specific rates of new flying evaluation board actions for the period 1986 through 1992	7
5. Flying evaluation board outcomes by cause of nonmedical disqualification	8
6. Major causes for FEB and likelihood of restoration to flying duties	8
7. Comparison of likelihood for restoration to flying duties between Group A and Group B	9

=====
This page left blank intentionally.
=====

Background

Aviators may have medical and nonmedical disqualifications during their careers. Evaluation of these disqualifications may result in medical or nonmedical suspension from flying duties. Medical terminations from aviation service are managed by the aeromedical board process through the flight surgeon's office, the U.S. Army Aeromedical Activity, and the appointed aviation command waiver authorities. Nonmedical terminations from aviation service are evaluated using the flying evaluation board (FEB) process through the local aviation commander and the approval authorities. Sociobehavioral factors affecting adaptability or suitability for aviation service may result in concurrent medical and nonmedical evaluations.

Adverse FEB outcomes result in premature aviation career endpoints. The outcomes of active duty (AD) and U.S. Army Reserve (USAR) FEBs for aviators have not been studied. This report summarizes FEB outcomes during the period 1985 to 1992, which represents about 114,000 person-years of aviator experience.

Flying evaluation board process

Methods for convening and conducting FEBs are outlined in Army Regulation 600-105, Aviation Service (Department of the Army, 1984). Table 1 lists the AR 600-105 categories of nonmedical disqualifications that may be grounds for a FEB. FEBs are convened when officers in aviation service are not professionally qualified or have marginal potential for continued aviation service. It is an administrative process that is conducted in a legal hearing format. The board examines the aviator's qualifications by review of records and testimony, evaluates the potential for continued aviation service, and forwards recommendations to the approval authority. Local flight surgeons conduct medical evaluations and consultation. The flight surgeon may be called to give testimony and/or may serve as a nonvoting member of FEBs for aviators. FEBs do not replace legal actions for criminality.

Table 2 lists possible FEB outcomes with the status in the Aviation Epidemiology Data Register (AEDR) and the AEDR history code for the outcome. These history codes do not conflict with current codes used in the AEDR following the International Classification of Diseases, 9th revision, clinical modification, ICD-9-CM (Karaffa, 1993). They are provided for the reference of others working with the AEDR and for possible standardization with other AEDR coding systems.

Table 1.

AR 600-105 categories of nonmedical disqualifications
as grounds for flying evaluation boards.

Flight proficiency

Poor proficiency affecting flying
Failure to maintain minimum qualifications
Failure to pass written examinations

Violation of flight rules

Poor judgment or proficiency in following flight rules
Flagrant violation of flight rules

Undesirable habits or traits of character

Unstable or undesirable personality traits affecting flying
Illegal use of drugs
Alcohol abuse

Insufficient motivation

Conscious fear of flying
Refusal to fly assigned aircraft or mission
Self-imposed deficiency affecting flying duties
Administrative failure to maintain medical certification

Request for voluntary disqualification from aviation service

Table 2.

Possible flying evaluation board outcomes.

FEB outcome	AEDR status	AEDR Code
Not specified	Disqualified	M7110
Disqualified, may be reconsidered	Suspension granted	M7111
Permanent disqualification, aviator skill badge retained	Suspension granted	M7112
Permanent disqualification, aviation skill badge taken	Suspension granted	M7113
Restored to aviation service	Qualified, information only	M7114

Methods

The U.S. Army Personnel Command forwarded a list of active duty and USAR FEB actions from 1985 to 1992. Army National Guard (ARNG) aviators were not included since the ARNG Aviation Operations Center has not computerized their FEB cases at this time. The list was put into a Clipper 5.2 database (Computer Associates International, 1993). AEDR records were matched to the FEB database Social Security number index. An AEDR history and physical summary sheet was generated for each unique Social Security number. Summary sheets list outcomes of all flying duty medical examinations (FDMEs) and aeromedical board actions by disqualifying diagnosis and outcome. AEDR summary sheets and the FEB database were evaluated. The degree of flight surgeon involvement in each FEB case was unknown.

One assumption was that an aviator undergoing a FDME in a given calendar year represented an aviator working for the entire year. The number of person-years was derived from the number of FDMEs done on individual aviators in that year. The person-years are from now on called "aviator-years." The total aviator-years for each age group was found in U.S. Army aviator age distribution tables (Mason, 1993). An exception for the study period is that the total number of active duty and USAR aviators serving in 1985 is unknown in the AEDR system.

Results

During the study period of 1985 through 1992, no aviator had more than one FEB action. One-hundred and seventy new FEB actions were reported.

The overall incidence for flying duty suspension due to FEB was 1.13 per 1,000 aviator-years (1985 through 1992). Table 3 shows the incidence of FEB actions per 1000 aviator-years by calendar year and outcome.

Table 4 shows the age-specific rates of new FEBs per 1,000 aviator-years. For the 17 FEB actions in 1985, the aviators' ages were unknown and are excluded from this calculation. Each age group was divided into 5-year intervals. There was about a two-fold increase in the age-specific rates for the age groups ranging from 25 through 39 years of age, compared to the 24 years of age or younger and the 40 years of age or older.

Table 3.

Incidence of flying evaluation boards actions
for active duty and USAR aviators.

Year and FEB outcome	Active duty		USAR		Total FEB cases	
	N=	Incidence*	N=	Incidence	N=	Incidence
1985						
Suspension**	10	N/A***	5	N/A	15	N/A
Restored	2		1		3	
Total	12		6		18	
1986						
Suspension	26	2.08	2	1.16	28	1.97
Restored	3	0.24	2	1.16	5	0.35
Total	29	2.32	4	2.32	33	2.32
1987						
Suspension	19	1.41	5	1.95	24	1.50
Restored	5	0.37	0	0.00	5	0.31
Total	24	1.78	5	1.95	29	1.81
1988						
Suspension	11	0.86	0	0.00	11	0.73
Restored	10	0.78	4	1.76	14	0.93
Total	21	1.64	4	1.76	25	1.66
1989						
Suspension	10	0.79	1	0.50	11	0.75
Restored	2	0.16	0	0.00	2	0.14
Total	12	0.95	1	0.50	13	0.89
1990						
Suspension	13	1.04	1	0.57	14	0.99
Restored	5	0.40	1	0.57	6	0.42
Total	18	1.44	2	1.14	20	1.41
1991						
Suspension	12	0.99	3	2.39	15	1.12
Restored	4	0.33	0	0.00	4	0.30
Total	16	1.32	3	2.39	19	1.42
1992						
Suspension	10	0.93	0	0	10	0.93
Restored	3	0.28	0	0	3	0.28
Total	13	1.21	0	0	13	1.21

* Incidence is the number of new FEB cases per 1,000 aviator-years in each calendar year.

** Suspension is nonmedical termination from aviation service.

*** Population data for 1985 is unknown.

Table 4.

Age-specific rates of new flying evaluation board actions
for the period 1986 through 1992.

Age group	Total aviator-years of exposure	Aviators with new FEB action from 1986-1992	Age-specific rate of new FEB per 1,000 aviator-years
20-24	9,562	7	0.73
25-29	25,592	51	1.99
30-34	21,749	42	1.93
35-39	20,391	33	1.62
40-44	15,876	16	1.01
45-49	4,914	4	0.81
50 or greater	1,085	0	0.00
Totals	99,169	153	

* Active duty and USAR only

Tables 5 and 6 show FEB outcomes by major cause of nonmedical disqualification. The frequency of outcomes is shown in Table 5. Table 6 shows the frequency of the major causes for FEB and likelihood for restoration to flying duties as a FEB outcome. Poor flying proficiency and failure to follow flight rules resulted in 54.1 percent (92/170) of FEBs, compared to 45.9 percent (78/170) of FEBs for undesirable traits/character or poor motivation for flying duties. Aviators with poor proficiency and failure to follow flight rules were restored more often to flying duties, 34.8 percent (32/92), than for traits or motivation, 12.8 percent (10/78).

A similarity in the likelihood for restoration to flying duties after FEB was noted for two groupings. Group A included FEB actions for flying proficiency and violation of flying rules. Group B included FEB actions for habits and traits of character, and poor motivation. Tables 6 and 7 show there is no significant difference between the likelihood of restoration within the subgroups of both Group A and Group B. There is a significant difference in the likelihood of restoration between Group A and Group B.

Table 5.

Flying evaluation board outcomes
by cause of nonmedical disqualification.

Reason	Outcome ->	DQ*	PDQ**	PDQ/ BDG***	Restored
Flying proficiency		14	28	6	27
Violation flying rules		6	5	1	5
Habits/character		8	25	10	7
Poor motivation		4	20	1	3
Totals (N=170)		32	78	18	42

* "DQ" is disqualified.

** "PDQ" is permanent nonmedical disqualification with retention of the aviator skill badge.

*** "PDQ/BDG" is permanent nonmedical disqualification without retention of the aviator skill badge.

Table 6.

Major causes for FEB and likelihood
of restoration to flying duties.

Causes	Outcomes->	Restored to flying duties	Not restored to flying duties	Likelihood restoration
Group A*				
Flying proficiency		27	48	36.0%
Violation of flying rules		5	12	29.4%
Group B**				
Habits/character		7	43	14.0%
Poor motivation		3	25	10.7%

* Within Group A, not significant, odds ratio=1.35, 95 percent C.I. 0.3835, 4.968.

** Within Group B, not significant, Fisher's Exact test, p=0.485.

Table 7.

Comparison of likelihood for restoration to flying duties between Group A and Group B.

Causes	Outcomes->	Restored to flying duties	Not restored to flying duties	N=
Group A*		32	60	92
Group B		10	68	78
N=		42	128	170

* Between groups, significant, odds ratio=3.63, 95 percent. C.I. 1.550, 8.656

Discussion

The AEDR is a family of databases storing history and physical parameters of Army aircrewmembers. The AEDR is missing certain aircrewmember career endpoints.

Some missing endpoints are medical. The number of aircrewmembers suspended from flying duties due to medical conditions that are evaluated and reported by flight surgeons is well documented in the AEDR. We do not know how many aircrewmembers die in accidents, die suddenly at home or work, are medically retired from a medical center without flight surgeon participation, commit suicide, or retire or separate from the service. We only know that they are no longer sending their annual flying duty medical examinations for review.

Some missing endpoints are nonmedical. These include flying evaluation boards, court martial, voluntary and involuntary separation, and retirement.

The overall incidence rate of nonmedical termination from aviation service following FEB was 1.13 per 1000 aviator-years during the period 1986 to 1992. As a comparison, the incidence of medical suspension from flying duties was 15.3 per 1,000 aviator-years during the year 1989 (Mason, 1989). The average annual rate of attrition due to all causes is still under study. However, among a cohort of 23,300 trained Army aviators flying in 1987, 9,703 were lost to followup by 1992 (Shannon et al., 1993).

The highest age-specific rates of FEB actions were in the age groups ranging from 25 through 39 years of age. Some aviators are less likely to undergo FEBs than others based on age. The differences in incidence rates may be related to the number of aviators in each age group exposed to the responsibility of functioning as the pilot-in-command, and/or the effects of the career selection process.

Before age 24, many aviators are students or in training to become pilots-in-command. By age 40, those less motivated to make aviation a career should have left the service or voluntarily requested removal from aviation service.

After age 40, many aviators are in command or administrative positions, flying none or few hours per year, and often not as pilot-in-command. Others over age 40 are selected by the career process to be instructor, standardization, and safety leaders. These standard-bearers and successful aviators are likely at less risk for FEB.

Of the aviators undergoing FEB for lack of flying proficiency and violation of flight rules, 34.8 percent were restored to flying duties. Either the FEB decided the charges were unfounded or the aviator could be retrained to acceptable proficiency. Only 12.8 percent (10/58) of FEBs for undesirable habits/traits or poor motivation resulted in restoration to flying duties. The difference between these two groupings of causes was significant (Table 7).

Many aviators in the poor motivation category voluntarily requested nonmedical termination from aviation service due to fear of flying or other personal reasons. The chance for rehabilitation in the case of poor motivation might be lower than for poor proficiency or flight rule violation. With poor motivation, many aviators do not want to be restored to flying. In Group A, despite poor proficiency or flight rule violations, the aviator has not asked to be removed from flying duties. All these cases require further evaluation by a flight surgeon and mental health consultants since the observed psychosocial behaviors may be expressions of underlying mental health disorders.

Summary and conclusions

The AEDR lacks some aviator career endpoints, especially for nonmedical causes of attrition. A comparison of databases provided the AEDR with 170 new aviation career endpoints related to the outcome of FEB proceedings for nonmedical disqualifications of U.S. Army aviators.

The overall incidence for flying duty suspension after FEB was 1.13 per 1,000 aviator-years from 1986 to 1992. The age-specific rates were two-fold higher in age groups ranging from 25 through 39 than those in younger or older age groups. Aviators undergoing FEB for undesirable traits or poor motivation were less likely to be restored to flying duties than those undergoing FEB for flight proficiency or failure to follow flight rules.

Although FEB actions are for nonmedical disqualifications, medical evaluations are recommended since nearly half the cases involve a question of psychosocial behavior (traits and motivation). These behaviors might indicate underlying mental health disorders. Poor flying proficiency and failure to follow flight rules are administrative problems. It is possible these circumstances may be caused by medical problems, such as undiagnosed learning disabilities or personality disorders with poor impulse control. If so, flight surgeon involvement in all FEB actions might be justified.

References

- Computer Associates International. 1993. CA-Clipper, version 5.2. Islandia, New York: Computer Associates International, Incorporated.
- Department of the Army. 1993. Aviation service of rated Army officers. Washington, DC: Department of the Army. AR 600-105.
- Karaffa, M. C., ed. 1993. International classification of diseases, 9th revision, clinical modification. Los Angeles: Practice Management Information Corporation.
- Mason, K. T. 1989. Memorandum for the Aeromedical Consultant Advisory Panel. Subject: Waivers, suspensions, and medical eliminations for U.S. Army aviators in 1989.
- Mason, K. T. 1993. Reference age distribution tables for U.S. Army active duty, USAR, ARNG, and civilian aviators. Fort Rucker, AL: U.S. Army Aeromedical Research Laboratory (technical report in draft).
- Shannon, S. G., Harper, J. P., Mason, K. T., and Salter, C. A. 1993. Aviation epidemiology data registry: A comparison of the attrition rates for male and female aviators, 1987-1992. Fort Rucker, AL: U.S. Army Aeromedical Research Laboratory (technical report in draft).