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CHARACTERISTICS OF MEDICALLY DISQUALIFIED AIRMAN APPLICANTS IN --ETC(U)  
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**CHARACTERISTICS OF MEDICALLY DISQUALIFIED  
AIRMAN APPLICANTS IN  
CALENDAR YEARS 1973 AND 1974**

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I. Dark, S. J.

Federal Aviation Administration, Office of Aviation Medicine, Civil Aeromedical Institute, Oklahoma City, Oklahoma. **CHARACTERISTICS OF MEDICALLY DISQUALIFIED AIRMAN APPLICANTS IN CALENDAR YEARS 1973 AND 1974** by Shirley J. Dark, 10 pp. Report No. FAA-AM-76-10.

*Descriptors*  
Airman  
Certification  
(Medical)  
Pilots, Denied  
Statistical  
Analysis

This study provides comprehensive data reflecting pertinent denial rates with respect to the medical and general attributes of those airmen denied medical certification in calendar years 1973 and 1974. The study provides such descriptive epidemiologic data as age, sex, occupation, class of medical certificate applied for, total flying time, and cause-specific annual denial rates for medically disqualified applicants.

In calendar years 1973 and 1974, 13,455 airmen were denied medical certification for various medical and/or administrative reasons. The active airman population (758,243) as of December 31, 1973, was used as the population base for rate computation as it is the midpoint for the denied applicant group. The annual denial rate based on airman applicants was 8.9 per 1,000 airmen. By class of certificate applied for, the annual denial rate per 1,000 applicants was 4.5 for first class, 7.1 for second class, and 11.2 for third class.

As anticipated, general aviation and new applicants contributed greatly to total denials. Eighty-three percent of all denied applicants indicated nonaeronautical occupations on their medical application. Fifty-three percent indicated less than 40 hours total flying time. The most significant causes for denial (regardless of class applied for) were cardiovascular, the miscellaneous pathology category, neuropsychiatric, and, at a substantially lower level, eye pathology. These four categories are involved in 90 percent of all denials.

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## CHARACTERISTICS OF MEDICALLY DISQUALIFIED AIRMAN APPLICANTS IN CALENDAR YEARS 1973 AND 1974

### I. Introduction

The Federal Aviation Administration (FAA) and its predecessor, the Civil Aeronautics Administration, have been charged with the responsibility for medical certification of all United States and some international civil airmen since 1927. Except for glider and balloon pilots, each airman must hold a current, corresponding class of medical certificate for performing the duties of any pilot certificate he may possess. Federal Aviation Regulations stipulate that a first-class physical examination must be performed at 6-month intervals for duties requiring an air transport pilot rating; a second-class physical examination must be performed annually for duties requiring commercial pilot ratings, an air traffic control tower operator rating, etc.; and, a third-class physical examination must be performed at 2-year intervals for duties requiring a private pilot rating. Different medical standards apply to the different categories of medical certification.

Medical certification criteria will continue to change as a result of the evolution of aviation medicine and increased efforts in the area of aeromedical research. These changes are sometimes brought about by a study such as this.

Previous studies<sup>1,2</sup> that provided descriptive data concerning airmen who were denied medical certification have proved to be of great value. Numerous questions have been answered for the FAA and the aviation community concerning these airmen. However, more comprehensive data reflecting pertinent denial rates with respect to the medical and general attributes of those airmen denied medical certification have been needed for program monitoring with respect to workload information, aeromedical standards, appeal system appraisal, research direction, and risk determinations by the aviation

community. Of course, the primary purpose of these efforts continues to be the promotion and enhancement of aviation safety through medical program data analysis.

This study provides descriptive epidemiologic data, such as age, sex, occupation, and cause-specific rates for denied airman applicants. A study providing this type of data is planned every 2 years to monitor any changes in the epidemiologic findings concerning airmen denied medical certification.

### II. Methods and Source

The Aeromedical Certification Branch of the Civil Aeromedical Institute is the central screening facility and repository within the FAA for the collection, processing, adjudication, investigation, and analyses of medical data generated by the aeromedical certification and related regulatory programs.

The Aeromedical Certification Branch's computerized medical records provide historical data both for daily screening of document input and for statistical/research purposes. The "active master tape file" contains the most recent record within the past 3 years of an airman's medical application for certification. The tape file includes applications issued, pending, or denied and abbreviated records of significant pathology cases retained indefinitely for further medical reference in the event an inactive airman decides to again exercise his flying privilege.

The denial data were obtained from the active master tape files as of July 1, 1974, for calendar year (CY) 1973 applicants and July 1, 1975, for CY 1974 applicants. The 6-month time lapse was allowed to assure that final certification action had been taken in the majority of cases. The data were summed for the 2 calendar years to provide a larger group for comparison with the active airman population.

A medically certified airman is considered "active" for a maximum of 24 calendar months following his most recent FAA medical examination; i.e., regardless of the class of medical certificate issued, it is valid for third-class purposes for a period of time up to 24 calendar months unless otherwise limited or recalled by the FAA.

The active airman population as of December 31, 1973, was used as the population base for rate computation. This population was used since it is the midpoint for the denied applicant group.

Data from the most recent medical record were selected and extracted from the active master tape file for construction of the various frequency tables presented in this study.

Data presented are descriptive in nature, and appropriate population comparisons are made via conventional statistical methodology where compatible data exists and statistical treatment would be meaningful.

Annual rates were computed to provide data more useful for answering the many questions received concerning airmen denied medical certification. In CY 1973 and 1974, 13,455 airmen were denied medical certification for various medical and/or administrative reasons; i.e., failure to provide additional medical information. The frequency tables that follow were compiled based on data extracted from these airmen's medical records and comparable data extracted from the active airman population as of December 31, 1973. The active population at that time totaled 758,243 airmen.

A copy of the application for medical certification is provided for reference to block numbers cited in the following discussion.

Age of denied airmen was computed to last birthday as of the date of the physical examination. Age of the active population airmen was computed to last birthday as of December 31, 1973. Date of birth is provided by the airman in block 3 of the medical application form, and computer edits assure a reasonable month, day, and year.

Class of certificate applied for is determined from information supplied by the applicant in blocks 9A and 9B (Class of Medical Certificate Applied For and Type of Airmen Certificate(s) Held) of the application.

In many areas, accuracy of data is contingent upon the completeness and accuracy of information supplied by the airman applicant. Other data are coded by Aeromedical Certification Branch personnel. Some human error is recognized but is not considered significant enough to seriously bias the data provided in this study.

Some first-class airmen will have applied for medical certification four times during the 2-year period, some second-class airmen will have applied twice, and third-class airmen will have applied once. However, rate data are provided for the number of applicants versus the number of applications, except for a portion of Table 1. The active master tape file provides applicant data because it contains only the most recent examination of an airman. Both the denial data and the population data are maintained on the active master tape file.

Previous examination data were determined by whether the applicant entered a date in block 20 of the application form and a "match" was made to a previous examination on the active master tape file. If the applicant indicates a previous FAA examination has been performed, a notification will be received by medical review personnel if the previous examination cannot be located on the active master file with the same control data information (last name, first initial, date of birth, and sex). This action helps to assure accuracy of the control data by providing manual review of the medical record.

Occupation is coded from information furnished by the applicant in block 10 of the application form. Only aeronautical occupations are coded for input to the automated system. If the item is left blank by the applicant and cannot be determined from other information provided on the examination, the occupation is entered as "nonaeronautical".

The cause for denial was determined by the presence of an alpha prefix to a specific pathology code. The prefix and code are assigned by medical review clerks in the Aeromedical Certification Branch. Internal computer edits assure logical assignment of such prefixes and pathology codes. These edits are applied when initial file maintenance to an airman's record is made and again at the end of each month to eliminate discrepancies in pathology and denial data on the active master tape file. Data presented in

MEDICAL CERTIFICATE \_\_\_\_\_ CLASS  
AND STUDENT PILOT CERTIFICATE

THIS CERTIFIES THAT (Full name and address)

DATE OF BIRTH HEIGHT WEIGHT HAIR EYES SEX  
Has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate

LIMITATIONS

DATE OF EXAMINATION EXAMINER'S SERIAL NO.

EXAMINER SIGNATURE  
TYPED NAME  
AIRMAN'S SIGNATURE

WHEN ISSUED AS A MEDICAL STUDENT PILOT CERTIFICATE, the holder has met standards prescribed in Part 61, FAR's for such certificate, and is prohibited from carrying passengers.

APPLICATION FOR  AIRMAN MEDICAL CERTIFICATE  AIRMAN MEDICAL AND STUDENT PILOT CERTIFICATE

1 FULL NAME (Last, first, middle) PATH CONTROL  
2A ADDRESS (No. Street, City, State, ZIP No.) 2B SOCIAL SECURITY No.

Counties:  
2C PLACE OF BIRTH (Student pilot applicants only)

3 DATE OF BIRTH (Mo., Day, Year) 4 HEIGHT (Inches) 5 WEIGHT (Pounds) 6 COLOR OF HAIR 7 COLOR OF EYES 8 SEX

9A CLASS OF MEDICAL CERTIFICATE APPLIED FOR 9B TYPE OF AIRMAN CERTIFICATE(S) HELD  
AIRLINE TRANSPORT FLIGHT INSTRUCTOR  
COMMERCIAL PRIVATE  
FIRST ATC SPECIALIST STUDENT  
SECOND FLIGHT ENGINEER NONE  
THIRD FLIGHT NAVIGATOR OTHER

10 OCCUPATION (If ATC Specialist, specify position and facility)

11 EXTENDED ACTIVE DUTY MEMBER OF 12 EMPLOYER  
a AIR FORCE d COAST GUARD  
b ARMY e NATL GUARD 13 LENGTH OF TIME IN PRESENT OCCUPATION  
c NAVY MARINES f NONE

MILITARY SERVICE NO. 14 PRIMARY TYPE OF FLYING  
BUSINESS PLEASURE

15 CURRENTLY USE ANY MEDICATION (Including eye drops)  
YES TYPE AND PURPOSE  
NO

TOTAL PILOT TIME 16 TO DATE 17 LAST 6 MOS 18 HAS AN FAA AIRMAN MEDICAL CERTIFICATE EVER BEEN DENIED, SUSPENDED, OR REVOKED? YES DATE NO 19 HAVE YOU, AS A PILOT, HAD AN AIRCRAFT ACCIDENT WITHIN THE PAST 2 YEARS? YES DATE NO 20 DATE OF LAST FAA PHYSICAL EXAM (If none, state so)

21 MEDICAL HISTORY - HAVE YOU EVER HAD OR HAVE YOU NOW ANY OF THE FOLLOWING (For each "yes" checked, describe condition in REMARKS)  
Yes No Condition Yes No Condition Yes No Condition Yes No Condition  
a. Frequent or severe headaches g. Heart trouble m. Nervous trouble of any sort v. Medical rejection from or for military service  
b. Dizziness or fainting spells h. High or low blood pressure n. Any drug or narcotic habit w. Rejection for life insurance  
c. Unconsciousness for any reason i. Stomach trouble o. Excessive drinking habit u. Admission to hospital  
d. Eye trouble except glasses j. Kidney stone or blood in urine p. Attempted suicide x. Record of traffic convictions  
e. Hay Fever k. Sugar or albumin in urine q. Motion sickness requiring drugs y. Record of other convictions  
f. Asthma l. Epilepsy or fits r. Military medical discharge z. Other illnesses

REMARKS (If no changes since last report, so state) FOR FAA USE REVIEW ACTION CODES

22 HAVE YOU EVER BEEN ISSUED A STATEMENT OF DEMONSTRATED ABILITY WAIVER? NO YES (Give defects and waiver no.) PHYSICAL DEFECTS NOTED ON STATEMENT OF DEMONSTRATED ABILITY WAIVER WAIVER SERIAL NO.

23 MEDICAL TREATMENT WITHIN PAST 5 YEARS  
DATE NAME AND ADDRESS OF PHYSICIAN CONSULTED REASON

NOTICE: Whoever in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or who makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than 5 years, or both. (U.S. Code, Title 18, Sec. 1001.)  
24 APPLICANT'S DECLARATION: I hereby certify that all statements and answers provided by me in this examination form are complete and true to the best of my knowledge, and I agree that they are to be considered part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.  
SIGNATURE OF APPLICANT (In ink) DATE

FIGURE 1a. FAA Form 8500-8 (front)—Application for Medical Certification.

REPORT OF MEDICAL EXAMINATION													
NOR MAL	CHECK EACH ITEM IN APPROPRIATE COLUMN (Enter <i>NF</i> if not evaluated)				AB NOR MAL	NOTES Describe every abnormality in detail; enter applicable item number before each comment. Use additional sheets if necessary and attach to this form.							
	25	Head, face, neck and scalp											
	26	Nose											
	27	Sinuses											
	28	Mouth and throat											
	29	Ears, general <small>(Internal and external canals; Eustachian tubes under skin flap)</small>											
	30	Drums <small>(Perforations)</small>											
	31	Eyes, general <small>(Visual acuity under stress (D &amp; C))</small>											
	32	Ophthalmoscopic											
	33	Pupils <small>(Quality and reaction)</small>											
	34	Ocular motility <small>(Estimated parallel movement; no lag/strab)</small>											
	35	Lungs and chest <small>(Including breaths)</small>											
	36	Heart <small>(Throat area; Murrain sounds)</small>											
	37	Vascular system											
	38	Abdomen and viscera <small>(Including breaths)</small>											
	39	Anus and rectum <small>(Hemorrhoids, fistula, prostates)</small>											
	40	Endocrine system											
	41	G-U system											
	42	Upper and lower extremities <small>(Strength, range of motion)</small>											
	43	Spine, other musculoskeletal											
	44	Identifying body marks, scars, tattoos											
	45	Skin and lymphatics											
	46	Neurologic <small>(Tendon reflexes, equilibrium, crises, coordination, etc.)</small>											
	47	Psychiatric <small>(Sprits and personality deviations)</small>											
	48	General systemic											
						FOR FAA USE - PATHOLOGY CODE NOS							
49 HEARING		RIGHT EAR		LEFT EAR		50 DISTANT VISION <small>(Standard test types only)</small>			51 NEAR VISION <small>(Use linear values)</small>				
WHISPERED VOICE		FT		FT		RIGHT EYE		20		CORRECTED TO 20			
STANDING SIDEWAYS						LEFT EYE		20		CORRECTED TO 20			
DISTANT EAR CLOSED		500 1000 2000 4000		500 1000 2000 4000		BOTH EYES		20		CORRECTED TO 20			
Audiometer <small>(Decibel Loss)</small>													
52 INTRAOCULAR TENSION <small>(Tonometry required for Air Traffic Control Specialist)</small>						53 COLOR VISION <small>(Test used, number of plates missed)</small>							
TACTILE		RIGHT EYE		LEFT EYE									
TONOMETRIC													
54 FIELD OF VISION				55 HETEROPHORIA DIOPTERS <small>(Not required for Class Three)</small>									
RIGHT EYE		LEFT EYE		DISTANCE		ESOPHORIA		EXOPHORIA		RIGHT H.		LEFT H.	
56 BLOOD PRESSURE						57 PULSE <small>(Wrist)</small>							
RECUBENT MM MERCURY		SYSTOLIC		DIASTOLIC		RESTING		AFTER EXERCISE		2 MINUTES AFTER EXERCISE			
58 URINALYSIS				59 ECG <small>(Date)</small>		60 OTHER TESTS							
ALBUMIN		SUGAR											
61 COMMENTS ON HISTORY AND FINDINGS, RECOMMENDATIONS <small>(Attach all consultation reports, ECGs, X-rays, etc. to this report before mailing)</small>										FOR FAA USE			
										CODED			
										PUNCHED			
										VERIFIED			
62 APPLICANT'S NAME						63 DISQUALIFYING DEFECTS <small>(List by item no.)</small>							
HAS BEEN ISSUED <input type="checkbox"/> MED. CERTIF. <input type="checkbox"/> MED. AND STUDENT PILOT CERTIF.													
NO CERTIF. ISSUED - FURTHER EVALUATION REQUIRED.													
HAS BEEN DENIED - LETTER OF DENIAL ISSUED <small>(Copy attached)</small>													
64 MEDICAL EXAMINER'S DECLARATION													
<i>I hereby certify that I personally examined the applicant named on this medical examination report, and that this report with any attachment embodies my findings completely and correctly.</i>													
DATE OF EXAMINATION				AVIATION MEDICAL EXAMINER'S NAME AND ADDRESS <small>(Type or print)</small>				AVIATION MEDICAL EXAMINER'S SIGNATURE					

FIGURE 1b. FAA Form 8500-8 (back)—Report of Medical Examination.

the pathology tables represent conditions cited as cause for denial, not applicants. Some airmen denied medical certification for legal or administrative reasons or for failure to provide additional medical information would not necessarily have a pathology code assigned. Some airmen are denied for more than one cause, but most are denied for a single cause.

### III. Findings and Discussion

#### A. General Comments.

As of December 31, 1973, there were 758,243 active airmen in our automated system; 78,695 held first-class medical certificates, 298,912 held second-class certificates, and 380,636 held third-class certificates.<sup>3</sup> In CY 1973 and 1974, 13,455 airmen were denied medical certification.<sup>4</sup> The annual denial rate based on airman applicants is, therefore, 8.9 per 1,000 airmen. During the same 2-year period, 1,025,205 FAA physical examinations were performed giving a denial rate per 1,000 applications of 13.1.

The annual denial rate per 1,000 applicants is 4.5 for first-class, 7.1 for second-class, and 11.2 for third-class certification.

In the previous study of CY 1971 applicants,<sup>2</sup> the denial rate per 1,000 applicants was 9.5 and the rate per 1,000 applications was 8.8. It would appear that this study's per-applicant denial rate is slightly lower; however, the applicant data used in the previous study were estimated by using the total number of applications performed as the data base. This study uses the midpoint airman population as the data base to obtain a more accurate denial rate per applicant. The denial rate per 1,000 applications is comparable between studies and shows an increase from 8.8 to 13.1 per 1,000 applications. This rate increase is due largely to a significant increase in air traffic controller denials (see para. D).

#### B. Age Distribution of Denied Airmen.

Tables 1 and 2 reflect the age distribution and age-specific denial rates by class applied for. Table 1 shows that airmen applying for third-class certificates account for 63 percent of all denials, with second-class accounting for 32 percent and first-class applicants only 5 percent.

Denial rates by class applied for also indicate that the highest crude rates for denials are ap-

plicants for third-class medical certification (general aviation/private or student airmen) with an annual denial rate of 11.2 per 1,000 applicants. Occupationally connected airmen require first- or second-class medical certificates, and denial rates for these categories (4.5 and 7.1 per 1,000 applicants respectively) are substantially lower than the general aviation (third-class) category or the total population denial rate (8.9 per 1,000 applicants).

Airmen may apply for and obtain any class of medical certificate for which they qualify; however, most new applicants apply for third-class medical certification, consistent with their intended use of the certificate. First- and second-class medically certified airmen are more likely to be occupationally connected airmen, either on a full-time or part-time basis. As such, these airmen are, to some extent, medically purged and denial rates for these two classes are more likely to reflect incidence rather than prevalence of disqualifying pathology among a more stable numerical group. Third-class applicants, however, are comprised of many new applicants whose medical statuses have not been previously appraised by the FAA (as many as 138,000 for CY 1973 and 1974, or 34 percent of all third-

TABLE 1. CY 1973 and 1974 denied applicants by age and class of medical certification applied for.

Age	First Class	Second Class	Third Class	Total
Less than 20	32	75	418	505
20-24	32	509	1,081	1,622
25-29	47	750	953	1,750
30-34	45	382	767	1,174
35-39	65	412	702	1,179
40-44	76	465	913	1,454
45-49	85	428	1,122	1,635
50-54	180	671	1,112	1,963
55-59	132	365	745	1,242
60-64	32	130	399	561
65-69	4	50	189	243
70 and over	1	21	105	127
TOTAL DENIED	711	4,238	8,506	13,455
Percent of Total Denials	5.3	31.5	63.2	100.0
Total Issued-1973 & 1974*	180,874	431,508	399,369	1,011,750
Percent of Total Applications Issued	17.9	42.6	39.5	100.0
Total Applications 1973 & 1974	181,585	435,746	407,874	1,025,205
Denial Rate per 1,000 Applications	3.9	9.7	20.9	13.1
Total Applicants	78,695	298,912	380,636	758,243
Annual Denial Rate per 1,000 Applicants	4.5	7.1	11.2	8.9
Mean Age of Denied Airmen**	45.6	39.6	40.4	40.4
Mean Age of Active Population Airmen***	36.7	35.9	36.0	36.1

\*Examination Computer Submission Summary Reports, R2S: AC 8500-3, Calendar Years 1973 and 1974.

\*\*Age as of the date of examination to last birthday.

\*\*\*Age at last birthday as of December 31, 1973.

TABLE 2. Age distribution comparison—active airmen vs. CY 1973 and 1974 denied applicants.

Age Group*	First Class			Second Class			Third Class			Total		
	Denied Airmen	Active Airmen	Annual Age Specific Denial Rate**	Denied Airmen	Active Airmen	Annual Age Specific Denial Rate**	Denied Airmen	Active Airmen	Annual Age Specific Denial Rate**	Denied Airmen	Active Airmen	Annual Age Specific Denial Rate**
Less than 20	12	1,201	5.0	75	5,924	6.3	418	27,720	7.5	505	34,845	7.2
20-24	32	5,127	3.1	509	32,793	7.8	1,081	59,009	9.2	1,622	96,929	8.4
25-29	47	12,829	1.8	750	63,334	5.9	953	52,155	9.1	1,750	128,338	6.8
30-34	45	18,145	1.2	362	49,823	3.6	767	48,202	8.0	1,174	116,170	5.1
35-39	65	13,321	2.4	412	44,992	4.6	702	41,538	8.4	1,179	99,851	5.9
40-44	76	9,164	4.1	465	37,228	6.2	913	45,119	10.1	1,454	91,511	7.9
45-49	85	6,408	6.6	428	24,400	8.8	1,122	45,804	12.2	1,635	76,612	10.7
50-54	180	8,057	11.2	671	24,253	13.8	1,112	31,726	17.5	1,963	64,036	15.3
55-59	132	3,535	18.7	365	10,786	16.9	745	17,456	21.3	1,242	31,757	19.6
60-64	32	758	21.1	130	3,649	17.8	399	7,741	25.8	561	12,148	23.1
65-69	4	123	16.3	50	1,271	19.7	189	2,925	32.3	243	4,319	26.1
70 and older	1	27	18.5	21	459	22.9	105	1,241	42.3	127	1,727	36.1
TOTAL	711	78,695	4.5	4,238	298,912	7.1	8,506	380,636	11.2	13,455	758,243	8.9

\*Age as of date of examination to last birthday for denied airmen; age at last birthday as of December 31, 1973, for active airmen.

\*\*Per 1,000 Applicants.

class examinations performed during those years). Only 1 percent of all first-class examinations and 9 percent of all second-class examinations performed are for new applicants.<sup>5</sup> Therefore, the substantially higher denial rate for the third-class group more likely results from a combination of prevalence and incidence of disqualifying pathology than from any recognizable epidemiologic factor.

Also shown in Table 1 are the mean ages for the three class applied for denial groups and the three class issued population groups. First-class airmen were oldest (denied airmen—45.6, active airmen—36.7); third-class airmen were the next oldest (denied airmen—40.4, active airmen—36.0); and second-class airmen were the youngest (denied airmen—39.6, active airmen—35.9). The mean age for all denied applicants was 40.4, compared to a mean age of 36.1 for the active airman population. Denied airmen's average age was 4 years older than the active population airmen's average age.

Table 2 reflects similar age trends by class of medical certificate; however, age-specific rates were higher for second-class over first-class and third-class over both first- and second-classes. Overall, the age-specific denial rates for the younger age intervals (less than 20, 20-24, 25-29) were higher than the 30-34 through the 40-44 age intervals. Again, this is attributed to new applicants not having been previously screened by the FAA. At the 45-49 age interval the denial rates again start upward. Second-class, third-class, and total denied airmen rates continue upward from that point reaching the highest age-specific denial rate at the 70-and-

older age interval. Whereas, first-class rates go upward from the 45-49 age interval reaching the highest age-specific denial rate at the 60-64 age interval, dropping at the 65-69 age interval, and rising again at the 70-and-older age interval.

#### C. Previous Application Status of Denied Airmen.

Data contained in Table 3 provide a more detailed breakdown of denied airmen by age, class of medical certificate applied for, and whether a previous FAA medical examination was recorded for the individual. This breakdown allows for appraisal of denied airmen by "new applicant" versus "previously certified" status. Comparable data from the active population were not available and denial rates could not be computed. However, trends from the proportional comparisons can be observed and certain assumptions made on the basis of relative contribution to overall denials from the data provided.

For total applicants, the ratio of new applicants to previously certified applicants is approximately 1 to 1 (new applicants—48 percent; previously certified applicants—52 percent). However, within the three classes of medical certification, a different picture emerges. Approximately 87 percent of the first-class denials and 67 percent of the second-class denials were previously certified airmen. In sharp contrast to the relationship existing in the first- and second-class categories, more than half (58.2 percent) of the third-class denials were new applicants, with 51.6 percent of these appearing in the "student pilot" category.

TABLE 3. CY 1973 and 1974 denied applicants by age, class of medical certificate applied for, and whether a previous examination was recorded.

Age Group*	First Class		Second Class		Second Class ATC - CIV/FAA		Second Class ATC-Military		Second Class Engineer/Navigator		Second Class Commercial Pilot/ATC		Second Class Pvt. or Stu. Pilot/ATC		Third Class Private		Third Class Student		Total				
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	Percent	No	Percent	
Class (Date)	1	9	15	44	2	7	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-24	10	16	97	127	48	176	27	3	-	-	10	2	4	3	7	4	29	378	60	0.4	445	2.3	
25-29	26	21	147	140	78	208	15	11	-	-	31	8	28	8	102	24	121	706	395	4.4	1,155	8.6	
30-34	61	4	162	80	50	45	7	1	-	-	21	-	11	4	123	23	91	530	487	3.0	587	5.1	
35-39	58	9	210	70	77	14	14	-	1	-	15	1	10	-	155	32	91	424	629	4.7	550	4.1	
40-44	68	8	213	89	85	12	6	1	4	-	18	1	13	-	301	63	127	422	658	6.4	536	4.4	
45-49	76	9	240	78	61	6	3	-	5	-	20	3	8	3	499	101	124	390	1,017	7.7	598	4.4	
50-54	169	11	369	95	85	15	1	-	10	-	62	1	26	1	545	147	104	321	1,371	10.7	592	4.4	
55-59	128	4	229	49	33	14	-	-	4	-	18	1	15	-	413	33	52	197	862	4.8	350	2.6	
60-64	29	3	99	11	3	11	-	-	1	-	4	-	2	1	249	37	38	75	423	3.1	138	1.0	
65-69	4	-	47	3	-	-	-	-	-	-	-	-	-	-	112	22	18	37	181	1.4	62	0.5	
70 and older	1	-	18	3	-	-	-	-	-	-	-	-	-	-	80	8	8	9	107	0.8	20	0.1	
TOTAL	617	94	1,894	789	525	341	78	19	26	-	146	23	127	20	2,651	557	906	4,392	7,020	6,415			
Percent***	86.8	13.2	44.7	18.6	12.4	12.8	1.8	0.5	0.6	-	4.8	0.5	3.0	0.5	31.2	6.6	10.4	51.6			52.2		47.8

\*Airman's age as of the date of examination to last birthday.

\*\*The date, if any, in Block 20, FAA Form 8500-8, indicates whether a previous examination was recorded.

\*\*\*Percentages provided are within the three major class applied for categories (first, second, third).

This relationship was expected because the first- and second-class categories are normally associated with professional pilots who have been previously medically appraised by the FAA, whereas new pilots are more likely to make application for third-class medical certification.

This relationship is further substantiated, as previously discussed, in that 34 percent of all third-class, 9 percent of all second-class, and 1 percent of all first-class examinations performed in 1973 and 1974 were "new applications".

#### D. Occupations of Denied Airmen.

The majority of denied airmen are not occupationally connected with aviation (see Table 4). Eighty-three percent of all denied airman

applicants indicated nonaeronautical occupations on their application. These applicants yield an annual denial rate of 8.8 per 1,000 applicants. The largest denial percentage of applicants occupationally connected to aviation was the 11 percent among air traffic controllers (ATCs), which also includes flight service station (FSS) specialists. The ATC category also experienced the highest overall annual denial rate (21.3 per 1,000 applicants). Of the occupationally connected airmen, self-employed commercial pilots had the second highest rate, flight navigators the third, aircraft mechanics the fourth, and airline pilots the fifth, with annual denial rates of 7.4, 6.7, 5.5, and 4.4 per 1,000

TABLE 4. CY 1973 and 1974 denied applicants by occupation and class of medical certificate applied for.\*

Occupation	First Class	Second Class	Second Class ATC-CIV/FAA	Second Class ATC-Military	Second Class Engineer/Navigator	Second Class Commercial Pilot/ATC	Second Class Pvt. or Stu. Pilot/ATC	Third Class Private	Third Class Student	Total Denied Airmen	Total Active Airmen**	Annual Rate per 1,000 Applicants
Pilot, First-Class Airlines Only	325	-	-	-	-	-	-	-	-	325	36,938	4.4
Flight Engineer	2	11	-	-	21	-	-	-	-	34	4,137	4.1
Flight Navigator/ Radio Operator	-	-	-	-	3	-	-	-	-	3	224	6.7
Pilot, First-Class Non-Airlines	105	2	-	-	-	-	-	-	-	107	13,260	4.0
Commercial Pilot, Self-Employed	-	51	-	-	-	-	-	-	-	51	3,424	7.4
Commercial Pilot, Not Self-Employed	-	78	-	-	-	-	-	1	-	79	11,133	3.5
Aero Application	-	23	-	-	-	-	-	-	-	23	2,673	4.3
Air Traffic Controller***	-	-	1,063	96	-	218	147	-	-	1,524	35,799	21.3
Flight Instructor	8	29	-	-	-	-	-	-	-	37	6,949	2.7
Aircraft Mechanic	2	25	-	-	-	-	-	18	10	55	5,005	5.5
Non-Aeronautical or Not Given	269	2,464	3	1	2	1	-	3,189	5,288	11,217	638,701	8.8
TOTAL	711	2,683	1,066	97	26	219	147	3,208	5,298	13,455	758,243	8.9
Percent	5.3	19.9	7.9	0.7	0.2	1.6	1.1	23.9	39.4	100.0		

\*Blocks 9A and B, FAA Form 8500-8, determine class applied for.

\*\*As of December 31, 1973.

\*\*\*Flight Service Station Specialists are included in this category.

applicants respectively. Only 2.4 percent of the total denials were in the airline pilot occupation category. All the other occupation categories combined represented less than 3 percent of total denials.

These findings are consistent with previous experience as to denial data by occupation. However, the percentage of total ATC denials has increased by almost 4 percent since the 1971 study. The annual denial rate for ATCs is more than twice the total denial rate. Implementation of the FSS Program in early 1974, increased recruitment of ATC and FSS applicants, and effects of the second-career program no doubt contributed to this denial rate increase.

#### E. Total Flying Time of Denied Airmen.

Flying time data further emphasize the contribution of new applicants to total denials. Table 5 shows total civilian flying time as recorded by the applicant on his denied application for medical certification. Fifty-three percent of the denied airmen indicated less than 40 hours total flying time (the number of hours required for a private pilot's license). Thirty-three percent of these airmen indicated no flying time. Of course, some of these airmen indicating no hours flown, as many as 1,163, are strictly air traffic controllers (see Table 3). However, if the 1,163 controller denials are subtracted, the remainder still indicates that new pilot applicants are the major contributor to total denials. The "less than 40 hours flying time" category still equals 44.5 percent when the "air traffic controller only" figure is subtracted.

TABLE 5. CY 1973 and 1974 denied applicants by total recorded flying time.

Total Flying Time* (Hours)	Number Denied	Percent Of Total
0	4,445	33.0
1 - 10	1,667	12.4
11 - 20	623	4.6
21 - 40	412	3.1
Subtotal	7,149	53.1
41 - 99	881	6.6
100 - 299	1,681	12.5
300 - 499	746	5.6
500 - 1,000	461	3.4
More than 1,000	2,037	15.1
Subtotal	6,396	46.9
TOTAL	13,455	100.0

\*The total civilian flying time recorded in Block 16, FAA Form 8500-8, determines total flying time.

The next largest percentage of denials occurs at the "more than 1,000 hours" interval (15.1 percent) followed by the "100-299 hours" interval (12.5 percent).

#### F. Medical Characteristics of Denied Airmen.

Tables 6 and 7 provide annual cause-specific denial data, per 10,000 applicants, by class of medical certificate applied for and by sex. In Table 6, one can observe an increasing denial rate for third-class over second-class and for second-class over first-class. This is also true for the cause-specific rates except in the eye; ear, nose, throat, and mouth; and bones and joints categories where the second-class rates are larger than the first- and third-class rates. The most significant cause for denial (regardless of class applied for) are cardiovascular (with an annual denial rate of 30.4 per 10,000 applicants); the miscellaneous category, which includes endocrinopathies, general systemic conditions, use of disqualifying medications, and administrative denials for failure to provide additional medical information (with an annual denial rate of 27.4 per 10,000 applicants); and neuropsychiatric (with an annual denial rate of 16.4 per 10,000 applicants). Eye and abdominal pathology are next in importance at substantially lower rates. These findings are essentially the same as the findings of the study of 1971 applicants.

Administrative denials for failure to provide additional medical information represent a large portion of the denials in the miscellaneous pathology category. Of the 4,156 denials in this category, 1,933 or 46.5 percent were for failure to provide additional medical information. Also, 55 percent of the females and 46 percent of the males denied in the miscellaneous pathology category were denied for failure to provide additional information.

As shown in Table 7, cause for denial by sex indicates that males were most frequently denied for cardiovascular reasons, second for miscellaneous causes, and third for neuropsychiatric reasons. Females, however, were most often denied for miscellaneous causes (almost 40 percent) followed by neuropsychiatric reasons, eye pathology, and cardiovascular reasons. These findings differ slightly from those in the study of 1971 applicants in that eye pathology rated third in this study as compared to fourth (be-

TABLE 6. Cause for denial of CY 1973 and 1974 denied applicants by pathology series and class of medical certificate applied for.

Pathology Series	First Class		Second Class		Third Class		Total	
	Cause For Denial*	Annual Rate per 10,000 Applicants	Cause for Denial*	Annual Rate per 10,000 Applicants	Cause for Denial*	Annual Rate per 10,000 Applicants	Cause for Denial*	Annual Rate per 10,000 Applicants
Eye	29	1.8	474	7.9	405	5.3	908	6.0
Ear, Nose, Throat, and Mouth	26	1.7	147	2.5	101	1.3	274	1.8
Respiratory	9	0.6	44	0.7	65	0.9	118	0.8
Cardiovascular	320	20.3	1,254	21.0	3,035	39.9	4,609	30.4
Abdominal	32	2.0	226	3.8	299	3.9	557	3.7
Neuropsychiatric	153	9.7	1,018	17.0	1,310	17.2	2,481	16.4
Bones and Joints	21	1.3	70	1.2	72	0.9	163	1.1
Muscles	2	0.1	13	0.2	13	0.2	28	0.2
Miscellaneous (Disqualifying Medication, Endocrinopathies, etc.)	184	11.7	1,154	19.3	2,818	37.0	4,156	27.4
TOTAL	776	49.3	4,400	73.6	8,118	106.6	13,294	87.7

\*Refers to distinct pathological conditions cited as cause for denial. Data does not represent airman applicants; however, most are denied for a single cause. Some applicants are denied for administrative reasons, e.g., failure to provide required ancillary or history data, may not have a specific pathology code assigned.

TABLE 7. CY 1973 and 1974 denied applicants by pathology series and sex.

Pathology Series	Male*		Female*	
	Cause For Denial**	Annual Rate per 10,000 Applicants	Cause For Denial**	Annual Rate per 10,000 Applicants
Eye	776	5.4	132	18.3
Ear, Nose, Throat, and Mouth	258	1.8	16	2.2
Respiratory	112	0.8	6	0.8
Cardiovascular	4,490	31.1	119	16.5
Abdominal	533	3.7	24	3.3
Neuropsychiatric	2,328	16.1	153	21.2
Bones and Joints	160	1.1	3	0.4
Muscles	27	0.2	1	0.1
Miscellaneous (Disqualifying Medication, Endocrinopathies, etc.)	3,871	26.8	285	39.5
TOTAL	12,555	86.9	739	102.5

\*Active airman population by sex (male--722,209, female--36,034) as of December 31, 1973.

\*\*Refers to distinct pathological conditions cited as cause for denial. Does not represent airman applicants; however, most are denied for a single cause.

hind cardiovascular reasons) in the earlier study for the female denied applicants. However, for all denied applicants, four pathology categories (cardiovascular, miscellaneous, neuropsychiatric, eye) account for more than 90 percent of all denials and an annual cause-specific rate of 80 per 10,000 applicants.

The female population also experienced a higher overall denial rate (102.5 per 10,000 applicants) than did the male population (86.9 per 10,000 applicants). If the "failure to provide additional information" data were deleted, the denial rates per 10,000 applicants would be comparable (74.6 for males and 80.6 for females).

#### IV. Summary

This study of CY 1973 and 1974 applicants has updated earlier data and provided more comprehensive data reflecting pertinent denial rates with respect to the medical and general attributes of those airmen denied FAA medical certification. A similar study is planned every 2 years to monitor any changes in the epidemiologic findings concerning denied airman applicants.

As of December 31, 1973 (the midpoint for the denied applicant group), there were 758,243 active certified airmen. In CY 1973 and 1974, 13,455 airman applicants were denied medical certification, resulting in an overall denial rate of 8.9 per 1,000 applicants. By class of certificate applied for, the denial rate was 4.5, 7.1, and 11.2 per 1,000 applicants for first-, second-, and third-class respectively.

As expected, the mean age of the denied airmen group was higher (by 4 years) than the mean age of the active airman population group but was consistent with previous findings. Age-specific denial rates for the younger age intervals (*less than 20-29*) were higher than for the 30-44 age intervals. This can be attributed to new applicants not having been previously screened by the FAA. At the 45-49 age interval the denial rates start upward, with the highest overall rate at the 70+ interval.

As anticipated, general aviation (third-class) applicants and new applicants contributed greatly to total denials, reflecting again that new applicants are being screened for the first time. Almost half (48 percent) of all denied applicants indicated no previous FAA medical application had been made. Eighty-three percent of all denied applicants indicated nonaeronautical occupations on their application. Of the professional categories, the air traffic controller group had the highest denial rate with 21.3 per 1,000 applicants. Airline pilots were fourth highest of the occupationally connected airmen with a rate of 4.4 per 1,000 applicants.

Total flying time data also substantiated the contribution of new applicants to total denials with 53 percent of the denied applicants indicating less than 40 hours total flying time and 33 percent indicating no flying time.

For denials by pathology, an increasing overall denial rate for third-class over second-class and for second-class over first-class was observed. This was also true for cause-specific denial rates except that second-class rates were highest in the eye; ear, nose, throat, and mouth; and bones and joints categories. The most significant causes for denial (regardless of class applied for) were cardiovascular, miscellaneous pathology, neuropsychiatric, and, at a substantially lower level, eye pathology. These four categories are involved in 90 percent of all denials.

Cardiovascular causes resulted in the highest denial rate for males, while the miscellaneous pathology category provided the highest denial rate for females (55 percent of the "miscellaneous" female denials were for failure to provide additional medical information).

Epidemiologic findings were consistent with expectations and previous findings on denied airmen. Only ATC denials have increased significantly. This increase was probably due to the implementation of the FSS Program, heavy recruitment of applicants, and effects of the second-career program. For female applicants, eye pathology was the third highest cause-specific denial rate and cardiovascular reasons was fourth highest. In the 1971 study the opposite cause-specific relationship existed for female applicants.

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L. Dark, S. J.

This study provides comprehensive data reflecting pertinent denial rates with respect to the medical and general attributes of those airmen denied medical certification in calendar years 1973 and 1974.

The study provides such descriptive epidemiologic data as age, sex, occupation, class of medical certificate applied for, total flying time, and cause-specific annual denial rates for medically disqualified applicants.

In calendar years 1973 and 1974, 13,455 airmen were denied medical certification for various medical and/or administrative reasons. The active airman population (758,243) as of December 31, 1973, was used as the population base for rate computation as it is the midpoint for the denied applicant group. The annual denial rate based on airman applicants was 8.9 per 1,000 airmen. By class of certificate applied for, the annual denial rate per 1,000 applicants was 4.5 for first class, 7.1 for second class, and 11.2 for third class.

As anticipated, general aviation and new applicants contributed greatly to total denials. Eighty-three percent of all denied applicants indicated nonaeronautical occupations on their medical application. Fifty-three percent indicated less than 40 hours total flying time.

The most significant causes for denial (regardless of class applied for) were cardiovascular, the miscellaneous pathology category, neuropsychiatric, and, at a substantially lower level, eye pathology. These four categories are involved in 90 percent of all denials.

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(Medical)  
Pilots, Denied  
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