1997

AMSARA Annual Report

Accession Medical Standards Analysis & Research Activity

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The Accession Medical Standards Analysis and Research Activity is housed within the Division of Preventive Medicine, Walter Reed Army Institute of Research, U. S. Army Medical Research and Materiel Command.

Abbreviations

AD	active duty
ADHD	Attention-Deficit/Hyperactivity Disorder
AFQT	Armed Forces Qualifying Test
ASD	Academic Skills Defect
AMSARA	Accession Medical Standards Analysis and Research Activity
CLIA	Clinical Laboratory Improvement Act
CY	calendar year
DMDC	Defense Manpower Data Center
DOD	Department of Defense
DOD Directive	Directive 6130.3 "Physical Standards for Enlistment, Appointment, and Induction"
DODMERB	DOD Medical Evaluation Board
EPTS	Existed Prior to Service
FTA	fluorescent treponemal antibody test
FY	fiscal year
HS	high school
ICD9	International Classification of Diseases 9th revision
IPDS	Individual Patient Data System
JDETS	Joint Disability Evaluation Tracking System
MEPCOM	Military Entrance Processing Command
MEPRS	Medical Expense and Performance Reporting System
MEPS	Military Entrance Processing Station
MOS	Military Occupational Specialty
PASBA	Patient Administration Systems and Biostatistical Activities
ROTC	Reserve Officers Training Corp
RPR	rapid plasma reagin test
SF-88	Physical Examination form used at MEPS
USAHDS	U. S. Army HIV Data System
USAPDA	U. S. Army Physical Disability Agency
VASRD	Veterans Administration System for Rating Disability
VDRL	Venereal Disease Research Laboratory test
WRAIR	Walter Reed Army Institute of Research

Executive Summary

The **Accession Medical Standards Analysis and Research Activity (AMSARA)** was established in 1996 within the Division of Preventive Medicine at the Walter Reed Army Institute of Research to support the efforts of the DOD Accession Medical Standards Working Group. AMSARA's mission is to support the development of evidence-based accession standards by guiding the improvement of medical and administrative databases, conducting epidemiologic analyses, and integrating into policy recommendations relevant operational, clinical, and economic considerations. In its first year, AMSARA has illustrated its capability to reduce medical attrition, save the Department of Defense money, and positively affect readiness.

- AMSARA identified that **eliminating syphilis screening** can save $2.5 million that can be reallocated to a higher yield cause. No accession screening is also medically defensible. In contrast to the 1940's when the screening RPR was initiated, syphilis is now a treatable disease that is relatively rare. Seropositivity alone should not be a disqualifier. Those with syphilis will likely be identified by other means before long term effects appear.

- AMSARA found that **attrition is not unusually high among those waived for asthma**. Preliminary evidence suggests that guidelines for administering waivers for asthma do not need to be more strict. AMSARA plans to continue the study by examining those getting asthma EPTS discharges to search for more information about the individual's true diagnosis, severity of illness, and factors precipitating the discharge, all of which will aid in developing better assessment and screening policies. 70% of those receiving asthma EPTS discharges concealed their asthma at the MEPS and did not pass through the waiver process.

- **Considering AFQT scores more strongly when deciding waivers for Academic Skills Deficit (ASD)** will save money and resources. Individuals waived for ASD remaining on active duty after 2 years had significantly higher AFQT scores than those accessing without ASD. Those waived and subsequently discharged had significantly lower AFQT scores than those accessing without ASD.

- **AMSARA's efforts resulted in more accurate data in useful form being available more rapidly**. AMSARA has focused on acquiring complete data relevant to accessions for CYs 1995 and 1996, and great progress has been made. Good data are needed for quality results and policy recommendations. Data sets used had to be acquired from the sources and put into useable form. AMSARA has also improved

the data collection, including ICD9 coding the EPTS data and waiver data. Hard copy data have been replaced with faster electronic data. In the future, improved communication with and cooperation from the basic training sites should improve data accuracy and availability from various secondary sources such as DMDC and MEPCOM. Disability data from JDETS and outpatient data from the Ambulatory Data System should be made available to AMSARA and examined.

- In addition to the cost-saving recommendations resulting from the specific investigations above, AMSARA has identified other areas where interventions may be needed to decrease attrition, improve readiness, and save money. **Future deliverables** include a survival analysis of those waived for orthopedic knee problems, survival analyses comparing people that passed through different MEPS, studies using DODMERB officer data, and expansion of the asthma survival analysis and ASD study. AMSARA will also describe those receiving EPTS discharges for psychological reasons and those females and older individuals hospitalized and discharged.

With continuous improvements in the data, AMSARA will be able to perform routine, systematic statistical evaluations, noting potentially modifiable problem areas, tracking trends, and examining the impact of policy changes to reduce medical attrition and save money and resources on a regular basis.

Background

The Accession Medical Standards Steering Committee was established by the Under Secretary of Defense (Personnel and Readiness) to integrate the medical and personnel communities so they could provide policy guidance and establish standards for accession requirements. These standards will stem from evidence-based information provided by analysis and research. The committee is co-chaired by the Deputy Assistant Secretary of Defense (Military Personnel Policy) and the Deputy Assistant Secretary of Defense (Clinical Services). Its members include representatives from the Office of the Assistant Secretary of Defense (Force Management Policy), Office of the Assistant Secretary of Defense (Health Affairs), Office of the Assistant Secretary of Defense (Reserve Affairs), Offices of the Service Surgeons General, Offices of Service Deputy Chiefs of Staff for Personnel, and Chief of Personnel and Training, HQ U.S. Coast Guard.

The Accession Medical Standards Working Group is a subordinate working group that reviews accession policy issues. This group is made up of representatives from each of the offices listed above.

AMSARA was established in 1996 within the Division of Preventive Medicine at the Walter Reed Army Institute of Research to support the efforts of the Accession Medical Standards Working Group. AMSARA's mission is to support the development of evidence-based accession standards by guiding the improvement of medical and administrative databases, conducting epidemiologic analyses, and integrating into policy recommendations relevant operational, clinical, and economic considerations. AMSARA has six main objectives:

- Validate current and proposed standards (e.g., Should flat feet be disqualifying?)
- Validate assessment techniques (e.g., Improve current screening tools.)
- Perform quality assurance (e.g., Monitor geographic variation.)
- Optimize assessment techniques (e.g., Develop attrition prediction model.)
- Track impact of policies, procedures, and waivers
- Recommend changes to enhance readiness, protect health, and save money

Military staffing to support this effort includes the Division of Preventive Medicine Director, LTC(P) Patrick W. Kelley; the Chief of the Department of Epidemiology, LTC Margot Krauss; and a staff physician epidemiologist, CPT(P) Kathryn L. Clark. AMSARA is augmented with contract support through Allied Technology Group, which currently includes the following:

James Onaitis	Project Manager
Dr. Y. Li	Senior Biostatistician
Timothy Powers	Programmer Analyst
Janice Gary	Data Manager
M. Rene Howell	Health Economist

Carmen Cheeyou	Data Clerk
Igor Pototski	Programmer and System Analyst

Allied Technology Group has more than 10 years of corporate experience with various Army medical and personnel data. They have also provided expert biostatistical and analytical support to the U.S. Army HIV Data System (USAHDS) and the Army Medical Surveillance System.

Descriptive Statistics

MEPS

The following tables describe the characteristics of enlisted applicants at MEPS who received a physical exam in 1995. These applicants are further divided into subsequent accessions in 1995 or 1996, applicants who did not access because they were physically disqualified, and those that did not access but were physically qualified. Approximately 96,000 examinations of applicants for the Reserve or National Guard were excluded because information about whether they came onto AD was not available. Also excluded were 19,000 retention physical examinations and 1,125 applicants for other government departments such as the Department of State or the Public Health Service. Percents may not total 100 owing to rounding.

Active Duty Enlisted Applicants at MEPS Who Received a Medical Examination, 1995

Sex	All Applicants	Applicants Who Accessed	Did Not Access, Physically Disqualified	Did Not Access, but Physically Qualified
Total	244,939	157,911	27,368	59,660
% of all applicants	(100%)	(64.5%)	(11.2%)	(23.4%)
	% of Total	% of Total	% of Total	% of Total
Male	80.2	82.4	75.8	76.1
Female	19.8	17.6	24.2	23.9

Age at Physical Exam	All Applicants	Applicants Who Accessed	Did Not Access, Physically Disqualified	Did Not Access, but Physically Qualified
	% of Total	% of Total	% of Total	% of Total
17-20	71.5	73.5	68.4	67.9
21-25	22.2	21.6	23.8	22.7
26-30	4.9	4.0	5.6	6.8
Over 30	1.4	0.9	2.2	2.5

Race/Ethnic Group	All Applicants	Applicants Who Accessed	Did Not Access, Physically Disqualified	Did Not Access, but Physically Qualified
	% of Total	% of Total	% of Total	% of Total
White	67.8	68.2	66.9	67.2
Black	18.5	17.8	20.5	19.5
Hispanic	9.0	9.3	7.8	8.9
Other	4.6	4.6	4.8	4.4

Enlisted Applicants at MEPS Who Received a Medical Examination, 1995 (continued)

Education Level When Applying	All Applicants	Applicants Who Accessed	Did Not Access, Physically Disqualified	Did Not Access, but Physically Qualified
	% of Total	% of Total	% of Total	% of Total
Less than HS diploma	31.4	29.0	31.6	37.8
HS diploma	65.4	68.3	65.1	57.9
Some college	0.8	0.8	0.8	1.0
Bachelor's degree	2.2	1.8	2.3	3.2
Graduate study	0.1	0.1	0.1	0.2

Note that the education level data are preliminary. Many applicants are enrolled in high school at the time they apply. The education level initially reported for many of these applicants does not reflect their subsequent receipt of a high school diploma. Those applicants who access are most likely to have their records updated, and this may account for the higher percentage with a high school diploma compared with the other groups. However, even for these applicants the data are incomplete.

The following table describes the distribution of applicants by AFQT score. Category 1 includes the highest scores, with AFQT percentile scores 93-99.

AFQT Category	All Applicants	Applicants Who Accessed	Did Not Access, Physically Disqualified	Did Not Access, but Physically Qualified
	% of Total	% of Total	% of Total	% of Total
1 (Score 93-99)	4.6	4.8	4.0	4.3
2 (Score 65-92)	36.1	37.9	33.2	32.6
3A (Score 50-64)	26.7	27.3	26.2	25.2
3B (Score 31-49)	28.5	27.6	31.4	29.3
4A (Score 21-30)	2.3	1.0	3.3	5.3
4B (Score 16-20)	0.2	0.0	0.3	0.7
4C (Score 10-15)	0.1	0.0	0.1	0.3
5 (Score 01-09)	0.0	0.0	0.0	0.0
Unknown	1.5	1.3	1.6	2.2

Overall Disqualification Rates (Standard Error) in 1995 for the Five Most Common Medical Failures at MEPS

Condition	All Stations %	Location of Highest Rates	%	Location of Lowest Rates	%
Hearing	1.42	Butte, MT	3.15 (0.289)	Chicago, IL	0.60 (0.055)
		Jackson, MS	2.73 (0.179)	Baltimore, MD	0.63 (0.057)
Lower extremity	1.29	Indianapolis, IN	2.51 (0.144)	San Juan, PR	0.33 (0.059)
		Minneapolis, MN	2.40 (0.154)	New York, NY	0.55 (0.049)
Lungs/chest	1.24	San Juan, PR	2.84 (0.171)	Boise, ID	0.40 (0.112)
		Fargo, ND	2.24 (0.264)	Memphis, TN	0.53 (0.089)
Feet	0.97	Memphis, TN	5.36 (0.277)	Baltimore, MD	0.15 (0.028)
		Jackson, MS	3.12 (0.191)	Montgomery, AL	0.18 (0.031)
Psychiatric	0.97	Seattle, WA	2.54 (0.159)	San Juan, PR	0.15 (0.040)
		Fargo, ND	2.36 (0.271)	New York, NY	0.35 (0.039)

Large discrepancies do exist. Some MEPS appear more than once in this table as outliers. The discharge rates of those passing through the MEPS that appear more than once in the table above were examined, and those processing through Baltimore and Jackson in 1995 had statistically significantly higher discharge rates through 1996 when compared with the total population accessing in 1995. AMSARA plans to develop a quality assurance study to see if these rates persist over time.

Conclusions

Females, those over age 25, and those with higher education have a higher likelihood of not accessing even if found medically qualified for military service. Because such a small percentage of the applicable population has more than a high school diploma, it may be helpful to determine what factors influence females and those older than 20 about accession after medical qualification. Decreasing the number who do not serve after receiving costly recruiting and assessment would save valuable dollars.

MEPS such as Jackson, New York, Baltimore, Fargo, and San Juan should be investigated further to determine why their rates of disqualification for certain diagnoses,

and ultimately some discharge rates differ from the rest. It is important to know if the decisions made at these MEPS with rates that are outliers are legitimate or erroneous. Disqualification rates using ICD9 diagnoses will be important to follow over time and can be used to prioritize which MEPS and processes need closer evaluation.

Waivers

Accessed and Not Accessed Individuals with Waivers by Service

Service	Total (%)	Accessed (%)	Not Accessed (%)
Army	482 (100)	168 (34.9)	314 (65.1)
Air Force	307 (100)	250 (81.4)	57 (18.6)
Navy	3,713 (100)	1,843 (49.6)	1,870 (50.4)

There is a greater percentage of waived Air Force individuals accessing. Although there seems to be a greater percentage of waived Army individuals not accessing, the Army waiver data are more incomplete than the other services, so concrete conclusions about the likelihood of accessing if waived by the Army cannot be made. The remainder of waiver tables are for all services combined.

Accessed and Not Accessed Individuals with Waivers by Race/Ethnic Group

Race/Ethnic Group	Total (%)	Accessed (%)	Not Accessed (%)
White	3,949 (100)	1,976 (50.0)	1,973 (50.0)
Black	308 (100)	159 (51.6)	149 (48.4)
Hispanic	122 (100)	65 (53.3)	57 (46.7)
Other	123 (100)	61 (50.0)	62 (50.0)

There was no significant difference in the likelihood of accessing among races.

Accessed and Not Accessed Individuals with Waivers by Sex

	Total (%)	Accessed (%)	Not Accessed (%)
Female	915 (100)	460 (50.3)	455 (49.7)
Male	3587 (100)	1801 (50.2)	1786 (49.8)

There was no significant difference in the likelihood of accessing between sexes.

Accessed and Not Accessed Individuals with Waivers by Age Group

Age	Total (%)	Accessed (%)	Not Accessed (%)
17-20	2,787 (100)	1,388 (49.8)	1,399 (50.2)
21-25	1,169 (100)	622 (53.2)	547 (46.8)
26-30	335 (100)	157 (46.9)	178 (53.3)
Over 30	205 (100)	93 (45.4)	112 (54.6)

Age	Odds Ratio (vs. 17-20)	95% CI
17-20	1.00	
21-25	1.15	1.14-1.16
26-30	0.89	0.87-0.91
Over 30	0.84	0.80-0.87

Waived individuals aged 21-25 were most likely to access.

Accessed and Not Accessed Individuals with Waivers by AFQT Category

AFQT Category	Total (%)	Accessed (%)	Not Accessed (%)
1	305 (100)	135 (44.3)	170 (55.7)
2	1,599 (100)	827 (51.7)	772 (48.3)
3A	985 (100)	503 (51.1)	482 (48.9)
3B	993 (100)	497 (50.1)	496 (49.9)
4A	197 (100)	100 (50.8)	97 (49.2)
4B	73 (100)	37 (50.7)	36 (49.3)
4C	32 (100)	14 (43.8)	18 (56.3)
5	32 (100)	16 (50.0)	16 (50.0)
Unknown	286 (100)	132 (46.2)	154 (53.9)

AFQT Category	Odds Ratio (vs. 1)	95% CI
1	1.00	
2	1.35	1.31-1.39
3	1.29	1.25-1.33
4	1.26	1.20-1.33
5	1.26	0.96-1.65

If waived, an individual was more likely to access if in category 2 , 3 or 4.

Accessed and Not Accessed Individuals with Waivers by Education Level

	Total (%)	Accessed (%)	Not Accessed (%)
Less high school	79 (100)	41 (51.9)	38 (48.1)
HS diploma [?]	1,351 (100)	621 (46.0)	730 (54.0)
HS diploma	2,790 (100)	1,463 (52.4)	1,327 (47.6)
Some college	64 (100)	33 (51.6)	31 (48.4)
College degree	204 (100)	98 (48.0)	106 (52.0)
Graduate study	14 (100)	5 (35.7)	9 (64.3)

	Odds Ratio	95% CI
Less high school	1.00	
HS diploma [?]	0.79	0.71-0.88
HS diploma	1.02	0.92-1.13
Some college	0.99	0.79-1.23
College degree	0.86	0.75-0.98
Graduate study	0.51	0.25-1.05

[?] When applying, they were a senior high school student.

Conclusions

Once granted a waiver, those older than 25 and those with a college degree were less likely to access. Studying why they do not access after receiving a medical waiver has the potential to save substantial amounts of money by eliminating unnecessary recruiting and processing while increasing those entering the service after getting a waiver.

Hospitalizations

The following tables describe the 26,464 enlisted persons with less than 1 year of service who were hospitalized in 1995 or 1996. All services except the Coast Guard are included. The rates of hospitalizations per 1,000 enlisted accessions are shown in column 2. Rates were calculated by dividing the number of hospitalizations by the number of new accessions in 1995 and 1996 and multiplying the product by 1,000. Many of these 337,317 new accessions had a MEPS physical before 1995. Some soldiers were hospitalized more than once.

The characteristics of the 26,464 hospitalized (column 3) are also compared with the 149,456 MEPS applicants who accessed (in column 4).

Percents may not total 100 owing to rounding.

Hospitalized Active Duty Enlisted with Less than 1 Year of Service by Sex

	Admissions per 1,000 Accessions	Number Admitted	MEPS Applicants Who Accessed
Total	91.0	26,464	149,456
	Rate	**% of Total**	**% of Total**
Male	77.8	71.4	82.2
Female	156.5	28.6	17.8

	Number Admitted	Percent of MEPS Accessions Admitted	Odds Ratio (vs. Male)	95% CI
Male	18,888	15.51	1.00	
Female	7,576	30.74	2.42	(2.35, 2.49)

Among individuals with less than 1 year of service, females were more than twice as likely to be admitted as males.

Hospitalized Active Duty Enlisted with Less than 1 Year of Service by Age

	Admissions per 1,000 Accessions	Number Admitted	MEPS Applicants Who Accessed
		% of Total	**% of Total**
17-20	83.5	67.1	73.1
21-25	98.9	24.4	22.6
26-30	114.4	4.4	3.5
Over 30	392.6	4.1	0.8

	Number Admitted	Percent of MEPS Accessions Admitted	Odds Ratio (vs. 17-20)	95% CI
17-20	17,619	16.27	1.00	
21-25	6,402	19.08	1.21	(1.18, 1.25)
26-30	1,155	22.50	1.49	(1.40, 1.60)
Over 30	1,084	91.09	5.60	(5.15, 6.09)

For individuals with less than 1 year of service, there were increasing odds of being hospitalized as age increases. Those older than 30 were more than five times more likely to be hospitalized than those in the youngest group.

Hospitalized Active Duty Enlisted with Less than 1 Year of Service by Race

	Admissions per 1,000 Accessions	Number Admitted	MEPS Applicants Who Accessed
		% of Total	% of Total
White	60.0	57.4	68.2
Black	101.9	26.3	17.7
Hispanic	65.3	8.8	9.1
Other	104.5	7.6	4.9

	Number Admitted	Percent of MEPS Accessions Admitted	Odds Ratio (vs. Black)	95% CI
White	11,691	11.56	0.51	(0.49, 0.53)
Black	5,363	20.41	1.00	
Hispanic	1,791	13.33	0.60	(0.57, 0.63)
Other	1,527	20.66	1.01	(0.95, 1.08)

Hispanics and whites were less likely to be hospitalized than blacks, among those with less than 1 year of service. Other races combined (primarily Asian/Pacific Islanders, Alaska Natives, and Native Americans) had virtually the same hospitalization rate as blacks.

Hospitalized Active Duty Enlisted with Less than 1 Year of Service by Education

	Admissions per 1,000 accessions	Number Admitted	MEPS Applicants Who Accessed
		% of Total	% of Total
Less than HS diploma	48.2	0.6	0.7
HS diploma	60.9	93.9	93.0
Some college	56.1	3.6	4.0
Bachelor's degree	54.4	1.7	2.0
Graduate study	44.6	0.0	0.1

	Number Admitted	Percent of MEPS Accessions Admitted	Odds Ratio (vs. Less than HS diploma)	95% CI
Less than HS diploma	108	9.90	1.00	
HS diploma	15,826	11.66	1.20	(0.98, 1.46)
Some college	602	10.32	1.04	(0.84, 1.29)
Bachelor's degree	298	10.00	1.01	(0.80, 1.27)
Graduate study	12	8.16	0.81	(0.43, 1.51)

These education data are from DMDC, which has provided more complete data than that currently available to AMSARA from MEPCOM. Thus fewer are listed as having less than a high school diploma than in the tables describing the MEPS data. However, the hospitalization rates shown are artificially low because approximately one-third of those hospitalized had no education data available.

For those with less than 1 year of service, the hospitalization rate declined slightly as education level rose, except for those without a high school diploma. However, none of the differences were significant.

Hospitalized Active Duty Enlisted with Less Than 1 Year of Service by AFQT

	Admissions per 1,000 accessions	Number Admitted	MEPS Applicants Who Accessed
		% of Total	% of Total
1	71.1	7.7	7.6
2	58.7	35.5	37.2
3A	62.6	27.6	27.0
3B	58.9	28.5	27.4
4A	64.7	0.8	0.6
4B	81.1	0.0	0.0
4C	153.8	0.0	0.0

AFQT Category	Number Admitted	Percent of MEPS Accessions Admitted	Odds Ratio (vs. Category 1)	95% CI
1	1,345	11.97	1.00	
2	6,187	11.25	0.93	(0.88, 0.99)
3A	4,815	12.06	1.01	(0.95, 1.08)
3B	4,969	12.25	1.03	(0.96, 1.09)
4A	134	13.87	1.18	(0.98, 1.43)
4B	3	25.00	2.45	(0.69, 8.70)
4C	1	16.67	1.47	(0.18, 12.23)

These hospitalization rates are artificially low because no AFQT information was available for approximately one-third of those hospitalized.

Hospitalization rates for those with less than 1 year of service remained similar as AFQT scores declined. The differences between category 2 and category 1 were marginally significant. Because there were very few accessions among applicants scoring in categories 4A through 4C, the increased rate in these groups was not significant.

The table below shows the most common primary discharge diagnoses for hospital admissions of active duty individuals in 1995 and 1996. Although up to 8 diagnosis codes may be recorded, only the primary diagnosis is reported here. Some have more than one admission.

Top 10 Three-Digit ICD9 Primary Discharge Diagnoses, 1995-1996
AD Enlisted Persons with Less Than 1 Year of Service
vs. All AD Enlisted

Less Than 1 Year of Service			All Lengths of Service Combined	
Total admissions	30,684		Total admissions	277,669
Diagnosis	% of Total	Admissions per 1,000 Accessions	Diagnosis	% of Total
Adjustment reaction	10.7	9.7	Internal derangement of knee	4.4
Disorders of tooth development and eruption	4.6	4.2	Alcohol dependence	3.4
Pneumonia, organism unspecified	3.9	3.5	Adjustment reaction	3.2
Viral and chlamydial infection in conditions classified elsewhere and of unspecified site	3.5	3.2	Inguinal hernia	2.5
Personality disorder	2.8	2.5	Other derangement of joint	2.1
Dentofacial anomalies, including malocclusion	2.8	2.5	Other disorders of synovium, tendon, and bursa	2.0
Acute pharyngitis	2.7	2.5	Disorders of tooth development and eruption	1.9
Alcohol dependence	2.5	2.3	Dentofacial anomalies, including malocclusion	1.9
Other cellulitis and abscess	2.5	2.3	Trauma to perineum and vulva during delivery	1.9
Bronchitis, not specified as acute or chronic	2.3	2.1	Deviated nasal septum	1.4

Conclusions

Females and blacks with less than 1 year of service were more likely to be hospitalized than their counterparts. Determining further why females and black persons are hospitalized and how the admissions can be prevented should be a priority.

Those new to the service and older than 30 are also more likely to be hospitalized than younger individuals in their first year of service. Even though the number that access in this age group is small, the elevated odds of hospitalization and the high costs involved with inpatient care may make further study important.

Some 10.7% of the 30,684 hospital admissions for those with less than 1 year of service in 1995 - 1996 were for adjustment reaction. Studying these people may lead to findings that influence training and limit the money and readiness lost.

Existing Prior To Service Discharges

Data on EPTS discharges from AD during 1995 and 1996 are shown in the tables below. The number of EPTS discharges and the discharge rate for those 2 years are shown in columns 2 and 3.

EPTS Discharges by Service

	EPTS Discharge	Percent of Accessions Lost due to EPTS	Odds Ratio (vs. Navy)	95% CI
Army	4,513	3.68	1.69	(1.61,1.78)
Air Force	1,961	3.18	1.45	(1.37,1.93)
Coast Guard	26	0.44	0.20	(0.13,0.29)
Marine Corps	1,774	2.87	1.31	(1.22,1.39)
Navy	2,069	2.21	1.00	

The differences in EPTS loss rates among the services were significant. The percent of accessions lost due to EPTS was higher in the Army and Air Force than in other services. The rate in the Coast Guard was the lowest.

EPTS Discharges by Sex

	EPTS Discharge	Percent of Accessions Lost Owing to EPTS	Odds Ratio (vs. Male)	95% CI
Female	2,424	4.04	1.48	(1.42,1.56)
Male	7,804	2.76	1.00	

A significant difference in EPTS losses between females and males was found; it was higher in females than in males. Data with missing sex were excluded.

EPTS Discharges by Age

	EPTS Discharge	Percent of Accessions Lost due to EPTS	Odds Ratio (vs. 17-20)	95% CI
17-20	6,890	2.88	1.00	
21-25	2,433	3.24	1.13	(1.08,1.18)
26-30	739	3.17	1.10	(1.02,1.19)
Over 30	281	3.52	1.25	(1.10,1.41)

Significant differences in EPTS discharge rates were found among the youngest (17-20), middle (21-30), and oldest (over 30). The rate of EPTS discharges was highest in the oldest group. There was no significant difference between groups aged 21-25 and those aged 26-30.

EPTS Discharges by Race/Ethnic Group

	EPTS Discharge	Percent of Accessions Lost due to EPTS	Odds Ratio (vs. Black)	95% CI
White	7,963	3.20	1.26	(1.19,1.33)
Black	1,651	2.56	1.00	
Others	729	2.27	0.89	(0.81,0.97)

There were significant differences in EPTS loss rates among race/ethnic groups. The rate of EPTS discharge was the highest in whites, lower in blacks, and lowest in other races combined.

EPTS Discharges by Education Level

	EPTS Discharge	Percent of Accessions Lost from EPTS	Odds Ratio (vs. Less than HS diploma)	95% CI
Unknown	1,903	1.99	0.60	(0.52,0.70)
Graduate study	7	2.30	0.70	(0.33,1.50)
Bachelor's degree	93	2.08	0.63	(0.49,0.81)
Some college	60	3.34	1.16	(0.89,1.50)
HS diploma	5,995	3.63	1.12	(0.96,1.29)
Poten. HS cip.	2,103	2.90	1.00	(0.94,1.06)
Less than HS	182	3.26	1.00	

The association of education level with EPTS discharge rates is significantly different between some categories. The rate of EPTS discharge was slightly lower for the group with a college degree or graduate study.

EPTS Discharges by AFQT Category

	EPTS Discharge	Percent of Accessions Lost from EPTS	Odds Ratio (vs. Category 1)	95% CI
Unknown	1937	1.99	0.60	(0.52,0.70)
1	334	2.55	1.00	
2	2,885	3.10	1.22	(1.09,1.37)
3A	2,441	3.59		
3B	2,605	3.72	1.45	(1.30,1.62)
4A	128	3.28		
4B	9	2.52	1.26	(1.03,1.54)
4C	2	2.35		
5	2	3.77	1.50	(0.36,6.18)

There were significant differences in EPTS discharge rates among the groups with different AFQT scores. The loss rates for categories with highest scores was lower than that in other categories. 3A and 3B were grouped together to determine odds ratios, as were 4A, 4B, and 4C. The small numbers in categories 4 and 5 prohibit making strong conclusions because the odds ratios may change as more data are collected.

EPTS Type by Service (% of Total EPTS for That Service)

	Applicant Unaware	Not DQ	MEPS Error	Concealed	Waived	No Data
Army (n=4,513)	23.3	16.9	0.9	50.2	5.5	3.2
Air Force (n=1,961)	34.6	17.0	0.7	40.7	5.1	2.0
Marine Corps (n=1,774)	21.6	14.9	1.2	38.6	6.3	17.4
Navy (n=2,069)	27.2	14.5	1.8	42.4	6.9	7.2

All of the services were statistically significantly different from each other with respect to the distribution of EPTS types. Concealment of a disqualifying condition is a major problem in all of the services. According to data coded at MEPCOM from EPTS discharges, as many as 50% of people with EPTS discharges concealed their condition at the MEPS. Concealment should be addressed as a way to decrease EPTS discharges across the services. Better methods to test for any common diagnoses in this group should be sought. Those not disqualified at MEPS should be examined further to see if there is a common nondisqualifying diagnosis or diagnoses among them warranting possible tightening of the standards.

The EPTS discharge rates for different medical categories by service and overall are listed in the following tables. The types of medical categories that were reported in the EPTS electronic data file are listed below. (This file does not have ICD9 coding.)

EPTS Discharges per Population Accessed in 1995 by Broad Medical Category and Service

	All Services (%)	Army (%)	Air Force (%)	Coast Guard (%)	Marine Corps (%)	Navy (%)
Orthopedics-knee	0.453	0.70*	0.60*	0.085*	0.312*	0.142*
Chest and lungs-asthma	0.435	0.60*	0.30*	0.034*	0.215*	0.436
Orthopedics-other	0.426	0.70*	0.40	0.034*	0.372*	0.157*
Orthopedics-feet	0.366	0.60*	0.40*	0.068*	0.250*	0.097*
Orthopedics-back	0.318	0.60*	0.40*	0.051*	0.126*	0.098*
Psychiatric-other	0.188	0.40*	0.008*	0.00*	0.317*	0.015*
Other	0.182	0.30*	0.128*	0.051*	0.084*	0.152*
G-U system	0.143	0.30*	0.438*	0.000*	0.032*	0.125
Neurology-other	0.131	0.10	0.247*	0.017*	0.061*	0.120
Eyes-vision/refraction	0.113	0.20*	0.052*	0.017*	0.040*	0.137*
Abdomen and viscera	0.098	0.10*	0.094	0.000	0.047*	0.073*

*Discharge rate is significantly different between one service and the other services combined.

In general, most discharges rates were significantly different from one service to others. The discharge rates in the Army were higher than those in other services for most medical categories, particularly orthopedics, for which the Navy had significantly lower rates. The discharge rates in the Coast Guard were the lowest.

In addition to the electronic EPTS data for 1995 and 1996 described above, AMSARA has begun receiving hard copy EPTS forms to code more completely for the time period beginning September 1996. Electronic data coded by broad, less useful categories are no longer received. The newer, hard copy forms have been ICD9 coded for diagnosis type, but information on age, race, sex, educational level, and AFQT scores was unavailable at the time of this report. From this hard copy data, the top 10 diagnoses by service for 4,142 EPTS discharges of enlisted soldiers occurring between September and December 1996 are shown in the table below.

EPTS Discharges by Specific Disease and Service, September - December 1996

Air Force	Count	% of Total	*Army*	Count	% of Total
Total	457		Total	2,143	
Asthma	98	21.4	Asthma	330	15.4
Back pain	49	10.7	Back pain	238	11.1
Chronic pain-lower extremities	46	10.1	Pes planus	154	7.2
Headaches	25	5.5	Chronic pain-lower extremities	136	6.3
Chronic knee pain	23	5.0	Chronic knee pain	131	6.1
Pes planus	22	4.8	Psychological	112	5.2
Allergic reaction	17	3.7	Hip	45	2.1
Dental	13	2.8	Hip dislocation	44	2.1
Injury-lower extremities	11	2.4	Foot-ankle	41	1.9
Prior knee surgery	7	1.5	Curvature of the spine	35	1.6

Navy	Count	% of Total	*Marine Corps*	Count	% of Total
Total	950		Total	592	
Personality disorder	188	19.8	Psychological	83	14.0
Asthma	129	13.6	Personality disorder	47	7.9
Psychological	73	7.7	Asthma	47	7.9
Attention deficit/ hyperactivity disorder	62	6.5	Chronic pain-lower extremities	40	6.8
Adjustment disorder	46	4.8	Back pain	35	5.9
Alcohol abuse	31	3.3	Chronic knee pain	28	4.7
Substance abuse	29	3.1	Shoulder dislocation	21	3.5
Chronic knee pain	22	2.3	Adjustment disorder	16	2.7
Hearing	22	2.3	Bone injury-lower extremities	14	2.4
Eating disorder	22	2.3	Hypertension	12	2.0

No information on any potential differences in reporting from the different services' basic training sites is available, but it is known that 80-90% of the EPTS discharge paperwork for all the services combined is returned to MEPS. Different patterns among the services warrants attention. Chronic knee pain is a problem in all 4 services, but the Air Force does not have discharges for psychological reasons in their 10 most common diagnoses. Discovering differences in reporting is crucial for interpretation of the data.

Seven common diagnoses associated with EPTS discharges are listed in the following table. The overall EPTS discharge rates as well as those by services are given. Overall, the cause of EPTS discharge varied among the services. For example,

discharges owing to asthma and chronic pain-lower extremities were much higher in the Air Force than that in other services; discharges owing to back pain and psychological reasons were much higher in Marine Corps; discharges owing to personality disorder were much higher in Navy; and discharges owing to chronic knee pain and pes planus were higher in Army.

EPTS Discharges per Population Accessed (%)

Medical Category	All Services	Air Force	Army	Marine Corps	Navy
Asthma	0.146	0.214*	0.154	0.079*	0.136
Back pain	0.080	0.107*	0.111*	0.215*	0.012*
Psychological	0.065	0.002*	0.052*	0.140*	0.077
Personality disorder	0.061	0.002*	0.007*	0.079*	0.198*
Chronic pain-lower extremities	0.059	0.101*	0.063	0.0676	0.023*
Chronic knee pain	0.049	0.050	0.061*	0.047	0.023*
Pes planus	0.047	0.048	0.071*	0.014*	0.013*

* Loss rate is significantly different between one service and the other services.

Conclusions

Females had a significantly higher EPTS discharge rate than males, and those in the older age categories had significantly higher rates than their younger counterparts. EPTS discharge rates were lower for blacks, those with a higher education, and those with higher AFQT scores.

Orthopedics and asthma were common reasons for an EPTS discharge. AMSARA plans to take a more in-depth view of those who have received an EPTS discharge for asthma to gain information about the individual's true diagnosis, severity of the illness, and factors precipitating the discharge, all of which will aid in developing better assessment and screening policies. Orthopedics, particularly relating to knees, will be investigated with regard to the waiver process this fiscal year. Further investigating service differences may reveal ways one service can learn from another in reducing early attrition. The current coding of the EPTS information with ICD9 codes will allow more information and conclusions as more data are collected in the future. Limiting these EPTS discharges by changing the assessment process or training will save money.

Disability

The following tables give the rates of Army AD enlisted soldiers with disability discharges in 1995 or 1996. Rates of disability discharge per 1,000 enlisted accessions were calculated by dividing the number of disability discharges in 1995 and 1996 by the number of new accessions in 1995 and 1996 and multiplying the product by 1,000.

The characteristics of those discharged with less than 1 year of service are also compared with those with more than 1 year of service.

Disability Discharges of Army AD Enlisted Soldiers, 1995-1996

Disability Discharges by Sex

	Discharges per 1,000 Accessions	Less than 1 Year of Service	More than 1 Year of Service
Total discharges	1.3	455	8,356
		% of Total	% of Total
Male	1.0	58.5	82.9
Female	3.2	41.3	17.1

	Discharged Soldiers	Percent of MEPS Accessions	Odds Ratio (vs. Male)	95% CI
Male	188	0.22	1.00	
Female	266	0.76	3.51	(2.91, 4.23)

Females were more than three times as likely to be discharged as males.

Disability Discharges by Age

	Discharges per 1,000 accessions	Less than 1 Year of Service	More than 1 Year of Service
		% of Total	% of Total
17-20	0.8	42.2	5.6
21-25	2.0	33.4	38.3
26-30	5.7	15.4	26.7
Over 30	12.8	9.2	29.6

	Discharged Soldiers	Percent of MEPS Accessions	Odds Ratio (vs. 17-20)	95% CI
17-20	192	0.18	1.00	
21-25	152	0.45	2.56	(2.07, 3.17)
26-30	70	1.36	7.79	(5.91, 10.25)
Over 30	40	3.36	19.59	(13.87, 27.67)

There was an increasing risk of being discharged as age increases. Those older than 30 were more than nineteen times more likely to be discharged than those in the youngest group.

Percents may not total 100 owing to rounding.

Disability Discharges by Race/Ethnic Group

	Discharges per 1,000 Accessions	Less than 1 Year of Service % of Total	More than 1 Year of Service % of Total
White	1.5	72.3	65.0
Black	1.3	17.4	25.5
Hispanic	0.9	6.2	3.9
Other	1.1	4.2	5.6

	Discharged Soldiers	Percent of MEPS Accessions	Odds Ratio (vs. Black)	95% CI
White	329	0.33	1.08	(0.85, 1.38)
Black	79	0.30	1.00	
Hispanic	28	0.21	0.69	(0.45, 1.07)
Other	19	0.26	0.85	(0.52, 1.41)

Whites had a higher disability discharge rate than blacks. Hispanics and members of other groups (primarily Asian/Pacific Islanders, Alaska Natives, and Native Americans) had lower discharge rates than blacks. However, none of the differences were significant.

Percents may not total 100 owing to rounding.

Disability Discharges by Education Level

	Discharges per 1,000 accessions	Less than 1 Year of Service % of Total	More than 1 Year of Service % of Total
Less than HS diploma	0.4	0.2	0.3
HS diploma	1.0	66.8	73.8
Some college	0.7	1.8	4.0
Bachelor's degree	1.1	1.5	2.4
Graduate study	0.0	0.0	0.2
Unknown	8.0	29.7	19.4

	Discharged Soldiers	Percent of MEPS Accessions	Odds Ratio (vs. Less Than HS Diploma)	95% CI
Less than HS diploma	1	0.09	1.00	
HS diploma	304	0.22	2.45	(0.34, 17.44)
Some college	8	0.14	1.48	(0.19, 11.88)
Bachelor's degree	7	0.22	2.57	(0.32, 20.88)
Graduate study	0	0		

Discharge rates were not significantly different as education level increased. The lower rate for those with less than a high school diploma is based on very small numbers.

Percents may not total 100 owing to rounding.

Disability Discharges by AFQT Category

	Discharges per 1,000 Accessions	Less Than 1 Year of Service % of Total	More Than 1 Year of Service % of Total
1	1.4	7.0	7.9
2	0.9	23.3	24.3
3A	1.1	21.3	21.4
3B	0.9	19.3	22.0
4A	3.3	1.8	2.7
4B	0.0	0.0	0.4
4C	0.0	0.0	0.0
Unknown	7.1	27.3	21.3

	Discharged Soldiers	Percent of MEPS Accessions	Odds Ratio (vs. Category 1)	95% CI
1	32	0.28	1.00	
2	106	0.19	0.68	(0.46, 1.00)
3A	97	0.24	0.85	(0.57, 1.27)
3B	88	0.22	0.76	(0.51, 1.14)
4A	8	0.83	2.92	(1.34, 6.36)
4B	0	0		
4C	0	0		

As AFQT score declined, discharge rates fell for categories 2 and 3 and then rose for category 4A. Rates were marginally significantly lower for category 2 compared with category 1 and higher for category 4A versus category 1.

The leading causes of physical disability discharges of AD Army soldiers in 1995 and 1996 are given in the table below. Orthopedic conditions dominate, accounting for 9 of the top 10 reasons for discharge of soldiers with less than 1 year of service and 7 of the top 10 reasons for soldiers with more than 1 year of service. Six diagnoses account for half of all discharges. As many as four diagnoses may be reported; however, only the first diagnosis was analyzed.

Disability Discharges of Army AD Enlisted Soldiers, 1995-1996
Top 10 Primary Diagnoses

Less Than 1 Year of Service		More Than 1 Year of Service	
Total discharges	455		8,356
Diagnosis	**% of Total**	**Diagnosis**	**% of Total**
Arthritis, degenerative (hypertrophic or osteoarthritis)	23.7	**Arthritis, degenerative (hypertrophic or osteoarthritis)**	16.6
Femur, impairment of	7.0	**Lumbosacral strain**	14.5
Periostitis	6.8	**Knee, other impairment of**	9.5
Lumbosacral strain	6.4	**Intervertebral disc syndrome**	3.9
Knee, other impairment of	5.7	**Asthma, bronchial**	3.8
Tibia and fibula, impairment of	5.5	**Ankle, limited motion of**	2.1
Ankle, limited motion of	2.0	**Humerus, other impairment of**	1.4
Tarsal or metatarsal bones, malunion of, or nonunion of	2.0	**Flatfoot, acquired**	1.3
Asthma, bronchial	2.0	**Diabetes mellitus**	1.3
Intervertebral disc syndrome	1.8	**Bipolar disorder, manic, depressed, or mixed**	1.3

Conclusions

Females and those in the older age groups with less than 1 year of service were more likely to be discharged with a disability. Females were more than three times as likely to be discharged as males. Those older than 30 were more than nineteen times more likely to be discharged in the first year of service than those aged 17-20. AMSARA plans on describing these discharges and the conditions warranting the discharge. These females and older individuals should be examined further to determine if disability can be prevented once on AD. Examining how to improve detection of and prevent arthritis can decrease the number of early and costly disability discharges.

Cost-effective Syphilis Screening In Military Recruit Applicants: Policy Decision

A cost-effectiveness analysis of accession syphilis screening programs from a military perspective with a 4-year analytic horizon was performed. Strategies compared included no screening, selective screening, universal testing by MEPS, universal testing at basic training centers (including treatment without discharge), and contracting centralized commercial screening. Probabilities of events relating to disease were derived from medical and administrative military data from 1989 to 1991 (n=1,588,143) and the published literature. Cost estimates were derived from costs currently incurred by the military and those projected from implementing new strategies. Sensitivity analyses were performed. Modifying the existing contract for HIV screening to include the syphilis screening via the rapid plasma reagin test (RPR) and subsequent fluorescent treponemal antibody test (FTA) was more cost-effective than the current method of screening all recruit applicants at the MEPS with the actual testing being performed at the MEPS. However, the no-screening option was significantly more cost-saving than the current method. Syphilis is relatively rare and treatable, and those with syphilis will likely be identified by other means. It is recommended that syphilis screening of recruit applicants at the MEPS cease, saving the military $2,541,000 per year.

Introduction

Syphilis is a disease caused by the spirochete *Treponema pallidum*. It is usually spread by sexual contact. Infection can manifest itself in three stages, each with its typical symptoms: primary (chancre), secondary (rash, condyloma lata, oral mucous patches), or tertiary (gummata, neurosyphilis, and tabes dorsalis).[1] Screening and appropriate antibiotic treatment will prevent these manifestations.

In the early 1930s, the Public Health Service estimated that 1 in 10 Americans was infected with *Treponema Pallidum*.[2] During World War II, after Public Health Service Surgeon General Thomas Parran's campaign against syphilis, which included prenatal and premarital screening laws as well as the public health novelty of case-finding, prevalences decreased from 10% to 4.8% in the first 2 million men drafted.[2] By 1991, these high prevalence levels had decreased to 0.023% in U.S. males.[3]

In the military, testing serum of enlisted recruit applicants to detect syphilis is routinely conducted before to allowing them to access to prevent the time lost to treatment and costs of the sequelae. When military screening was instituted, syphilis was common and untreatable. Now it is rare and treatable. The RPR is used initially for screening. The RPR measures a non-treponeme-specific antigen in the organism's membrane. If this test is positive, the applicant then gets a confirmatory FTA, which is more specific, time consuming, and expensive than the RPR.[1] A positive FTA

disqualifies an individual from entering active military service unless the individual can provide proof of prior adequate treatment.

In fiscal year 1995, the CLIA was instituted within DOD. Under CLIA, the RPR is the only laboratory test conducted at the MEPS that is classified as moderate; the others are of a minimal degree of complexity. Moderate procedures must be conducted by a trained laboratory technician who otherwise could be utilized elsewhere. Maintaining a technician at every MEPS solely to perform this moderate-complexity-level test was estimated to cost the military syphilis screening effort an additional $2 million per year. Elimination of the RPR was then considered by MEPCOM, and this investigation performed.

Because of the low prevalence of syphilis in officer applicants, DODMERB discontinued RPR screening in the accession medical examination for military academy and ROTC applicants in 1987.[4]

Methods

Data from 1,588,143 military recruit applicants passing through the 65 nationwide MEPS from 1989 to 1991 were the source of prevalence rates of positive FTAs, probabilities of medical disqualification for service for other than a positive FTA, probability of being granted a waiver for a disqualifying medical condition other than syphilis, pregnancy rates, and attrition rates.

A decision tree (DecTree Version 0.38,© Henry M. Jackson Foundation, 1401 Rockville Pike, Rockville, MD 20852) was used to assess the relative cost-effectiveness of four programmatic strategies for a syphilis screening program in military recruits. The four strategies compared were no screening, the current MEPS policy of universal testing of all recruit applicants at the MEPS with MEPS processing of the RPRs and resultant disqualification for service based on a positive follow-up FTA, universal testing of all applicants at the MEPS with contractual commercial laboratory processing of the RPRs and resultant disqualification for a positive follow-up FTA, and universal testing of all recruits at basic training with contractual commercial laboratory processing of the RPRs and treating without disqualification or discharge. There were greater than 500 terminal branches in the decision tree model.

Effectiveness of a strategy was measured in terms of years of service weighted by rank using the 1996 pay scale. The weighting was performed to represent the higher value of a higher-ranking individual with more years of service to the military than a lower-ranking one with less experience. This was done to reflect the DOD investment in training. Because of its strongly negative connotation, an EPTS discharge was taken as -0.40 weighted years of service. Less than 1 year of service was assigned 0.00. The weighted effectiveness assigned to completion of 1 year of service was 0.98, year 2 was 2.06, year 3 was 3.38, and year 4 was 4.76.

The dates of any losses from the service for all 1,588,143 applicants were retrieved from DMDC. Years of service were calculated using the AD start date from MEPCOM and the date the individual left the service from DMDC.

The source of the costs, all expressed in 1996 U.S. dollars, was actual U.S. military expenditures for performing the RPR and FTA at the MEPS and the estimated cost of contractual commercial laboratory processing of the RPR and FTA. Actual treatment costs incurred by the military were obtained from the MEPRS from October

through June 1996 and the 1996 military pay scale for the cost of time off from work for medical visits or sick days. The cost of death included the $200,000 life insurance payment paid by the military. The cost of a syphilis infection EPTS discharge included administrative personnel time and applicant travel and did not incorporate the cost of bringing another applicant to the training level of the individual being discharged.

Only events occurring in the first 4 years of service were incorporated into the analysis. Future costs were thus not discounted. The analysis was approached from a DOD perspective. A sensitivity analysis was conducted to assess the effect of uncertainty around many model parameters.

Some assumptions were made. Some people delay entry into the military for up to 2 years after the medical examination at the MEPS. Before these people go to basic training, they undergo a cursory examination for any obvious changes in their health. It was assumed that in this examination, no signs of syphilis would be noted. Because there are no data regarding which individuals initially had positive FTAs, were disqualified, and then returned after treatment, it was assumed that they were demographically similar to those with positive FTAs who did not return. Last, it was assumed that the screening effort itself would not influence the risk of acquiring new infection.

Probabilities

The overall prevalence of positive FTAs in the MEPS files for this population was 0.021%. This prevalence is an underestimate because it only includes those individuals with a positive FTA that did not return after treatment. Those that returned after treatment had the disqualification erased from their record at MEPCOM.

The probability of being disqualified for military service at the MEPS for a medical reason other than a positive FTA was 7.4% overall, and of those 7.4%, 15% obtained a medical waiver for their condition and were allowed to enter basic training. Data were unavailable on the number of individuals disqualified for syphilis who returned to the MEPS with proof of treatment and then qualified. Chief physicians at the various MEPS estimated that 95% of those disqualified for a positive FTA would later return and qualify (personal communication, 1996).

The sensitivity and specificity of the RPR and FTA were obtained from the medical literature.[5] The sensitivity and specificity of the RPR were 97% and 98%, respectively. The sensitivity and specificity of the FTA were 97% and 100%, respectively.

The probability of treatment failure in an individual with early syphilis was estimated as 3%.[6] The chance that any individual has a documented allergy to penicillin and thus would not receive penicillin treatment is 12.5%.[7,8] Of those without known penicillin allergy, the probability of a new allergic reaction was 2.5%.[8,9,10,11] Of those 2.5%, 0.6% would have anaphylaxis and 0.03% would die.[8,11,12] If infected and untreated, 75% would become symptomatic with secondary syphilis.[1]

To estimate birth rates, all females in the population were matched by social security number to Defense Medical Information System data for hospitalization during childbirth using diagnostic related group codes 370-375. Approximately 2% of all females gave birth within the first year of military service and we assumed, in accordance

with the guidelines of American College of Obstetrics and Gynecology, to have received prenatal syphilis screening and treatment if necessary.

Individuals diagnosed with syphilis in the first 6 months of service had a probability of receiving an EPTS discharge, as opposed to being treated without notification to personnel of the pre-existing condition, of 90% as estimated by MEPCOM.

The overall probability of finishing the first year of military service was 98.1%. The probability of finishing the second year given completion of the first year was 95.9%. The probability of finishing the third year given completion of the second year was 93.0%. The probability of finishing the fourth year given completion of the third year was 82.7%. Probabilities are summarized in Table 1.

Table 1. Probabilities of Events Used in the Analysis

Event	Probability (%)
Final positive FTAs	0.021
Disqualified for medical reason other than positive FTA	7.4
Disqualification waived	15.0
Returned treated if disqualified for positive FTA	95.0
Sensitivity of RPR	97.0
Specificity of RPR	98.0
Sensitivity of FTA	97.0
Specificity of FTA	100.0
Syphilis treatment failure	3.0
Secondary syphilis if untreated	75.0
Documented penicillin allergy	12.5
New penicillin allergy	2.5
Anaphylaxis as new allergic manifestation	0.6
Death as new allergic manifestation	0.03
Females screened prenatally	2.0
EPTS discharge if diagnosed	90.0
Compete first year of military service	98.1
Complete second year of military service given completion of first	95.9
Complete third year of military service given completion of second	93.0
Complete fourth year of military service given completion of third	82.7

Costs

The cost to MEPS of the RPR included the cost of the test kits, test controls, and replacement parts. It also included the cost of the trained military laboratory technician necessary to conduct the RPRs. The annual cost of the military laboratory technician was obtained from the FY96 personnel procurement report (the 804 report). The total MEPS cost of the RPR was estimated as $7.07 per test. The FTAs are performed by local arrangement, with some MEPS using local military treatment facilities and others using

private contracting. The costs of the FTA by private contracting varied, and $10 was used as the base case.

The current contract for MEPS HIV testing expired on 31 July 1997. At renewal of this contract, the RPR could have been added to the list of services provided, resulting in an RPR cost of $2 per serum specimen and an FTA cost of $2.99 per serum specimen, as per contract quote.

The administrative cost of $445.30 was used for an EPTS discharge. The costs of an outpatient visit, occupied bed day, and emergency department visit were $146, $1,548, and $265, respectively. The costs estimated for the lowest-ranking enlisted person to have 2 hours off , 1 day off, and 3 days off were $7.30, $29.20, and $87.60, respectively. For the next highest rank the same costs were $8.18, $32.72, and $98.16, respectively.

Cost-Effectiveness Results

Table 2. Reference Case Results Based on 350,000 Recruit Applicants per Year

Intervention	Cost (1996 Dollars)	Effectiveness (Years of Service)	Incremental Cost	Incremental Effectiveness (Years of Service)	C/E (Incr. Cost/Incr. Years of Service)
No screening	$3,500	1,354,500	--	--	
Test/treat at basic training	$630,000	1,430,800	626,500	76,300	$8.21
Test by commercial contract	$770,000	1,445,500	$140,000	14,700	$9.52
Test by MEPS	$2,544,500	1,445,500	--	--	Dominated by another option

The cost per years of service provided is presented in Table 2. Not screening for syphilis would cost the military $3,500 per year and yield 1,354,500 cumulative years of service based on 350,000 new recruit applicants passing through the MEPS each year. Testing everyone at basic training cost the military $626,500 more than no screening and provided 1,430,800 years of military service, costing $8.21 for each additional year of service provided. The cost of testing everyone at the MEPS with processing of the RPR and FTA using a commercial contract is $770,000, yielding 1,445,500 years of service. This option costs an extra $140,000 above the testing at basic training option but provides 14,700 more total years of military service at a cost of $9.52 per additional year of military service. Testing everyone at the MEPS with specimen processing conducted on site, as it is done now, costs the military $2,544,500 per year and provides 1,445,500 years of service. This option costs the military an additional $1,774,500 per year for no

additional years of service provided when compared with the option of testing everyone at the MEPS using commercial contract specimen processing.

The rank order of results and the magnitude of differences were unchanged after sensitivity analysis around almost all of these costs and probabilities. Because the cost of the FTA was not uniform and complete information on all of the agreements and private contracts was unavailable, the cost was varied in the analysis from $0 to $10, which did not affect the results. The model was not sensitive to varying the chances that those with side effects, anaphylaxis, and death would utilize different combinations of the health care system such as no use, outpatient visits, emergency department visits, and overnight stays. When a disqualified person returns to the MEPS after being treated for syphilis, the record of disqualification is replaced with qualification, and it is impossible to determine the true prevalence of syphilis. For this reason, the prevalence was varied from 0.02% to 0.40%. The results remained unchanged with this 20-fold increase. When the specificity of the RPR was varied from 0.98 to 0.93 there was no substantial difference in the results. The probability of discharge if diagnosed with syphilis in the first 6 months of duty as opposed to being treated and not discharged is unknown. This probability was varied from 0.90 to 0.75 without changing the results. The probability of returning to the MEPS after initial disqualification with proof of treatment for syphilis was varied from 0.95 to 0.70 without changing the results. Attrition probabilities were varied to those calculated by the 1996 attrition model of the Deputy Chief of Staff for Personnel. Using the probability of finishing the first year of 0.88, the second year given completion of 1 year of 0.86, the third year given completion of 2 years of 0.91, and the fourth given completion of 3 years of 0.70 did not alter the results. The inability of these variations to change the results illustrate the robustness of the model.

The only variation from the base case model parameters that had an impact on the results was the cost of the testing in the screen-at-basic-training-and-treat option. By using the costs quoted for modification of the MEPS HIV contract, the annual cost based on 350,000 recruit applicants per year was $630,000, providing 1,430,800 years of military service as presented in Table 2. If the RPR could be obtained via commercial contract at the basic training centers for $1 and the FTA for $1.99, the cost decreased to $315,000, with no loss in the years of service provided. This would result in 76,300 additional years of service over the no screening option at $4.08 per year provided. If the RPR could be obtained for no less than $3 and the FTA for $3.99, the cost increased to $945,000 with the same years of service provided, making this option dominated by the test all by commercial contract option.

Discussion

With CLIA prompting a review of syphilis screening policies, we found that the current strategy of screening all applicants and processing the specimens at the MEPS was not cost-effective. The most cost-saving program would be no screening for syphilis. The most effective strategy would be to test everyone at the MEPS and disqualify for seropositivity while contracting centralized commercial RPRs and FTAs at an additional cost of $766,500 per year to the DOD over no screening. Sensitivity analysis proved the robustness of the model, with changes in the cost of obtaining the RPR moderately

affecting the results. This is not surprising because the RPR applied to all applicants and the other parameters applied to small percentages of people.

Screening only females, screening only African Americans, or screening only those from high-risk MEPS based on geographic prevalences, all with the testing being performed at the MEPS are other options because the prevalence in these subsets of the recruit applicant pool were elevated. When looking at these strategies, effects incurred from individuals in the other groups who were not screened were considered. Screening only African Americans was dominated by screening only those from geographically high-risk MEPS. Screening only females, who had a higher prevalence of final positive FTAs, would provide 1,368,500 years of military service, 14,000 more than the no screening option with a increased cost of $416,500, and screening those from geographically high-risk MEPS would provide 1,372,000 years of service at a cost of $476,000 more than the no screening option. Screening only females, African Americans, or those from high-risk MEPS based on geographic prevalences, all with the testing being performed at the MEPS, may be inappropriate policy options because of their inequitable or discriminatory nature.

One limitation of this study is that other potential sources of syphilis screening exist. Even though all applicants are currently tested for syphilis at the MEPS, as modeled in this study, all Navy basic trainees get tested again by RPR upon arrival at the Great Lakes Training Center, the only basic training site for the Navy. The Navy is currently identifying approximately 5 individuals with untreated, latent syphilis as a result of inprocessing screening per year.[13] If syphilis screening were abandoned at the MEPS but all Navy recruits were still tested upon arrival at basic training, the number of positives would remain extremely low. It is recommended that the Navy discontinue its separate testing at basic training, particularly if syphilis screening is continued at the MEPS using commercial contract testing.

Syphilis may also be detected through screening of blood donated during basic training on which an RPR or VDRL is done. Although recruits do not donate blood during Navy basic training, it is common at most Army basic training sites, with an estimated 10-15% donating, and at the sole Air Force basic training site, with approximately 60% donating.[13,14] Many recruits will also get screened for syphilis and treated if necessary when applying for a marriage license in the states of Georgia, Illinois, Massachusetts, Mississippi, Oklahoma, Pennsylvania, Rhode Island, and West Virginia.[15] One can assume some individuals will be treated for other diseases with antibiotics also effective against the syphilis spirochete. These other opportunities for screening for syphilis further support the discontinuation of RPR screening in new military recruit applicants.

Another limitation of this study was that the costs used for medical care were not available in discrete form. Some overhead costs not directly related to syphilis screening and treatment may have been included, causing an over-estimation of costs. Because the likelihood of utilizing the health care system was varied in the sensitivity analysis without altering the model, this is not expected to affect the results.

The relatively few years of service provided in the no screening option reflects the sensitivity of the results to the negative value assigned to the EPTS in the analysis. This prompts one to examine the practice of an EPTS discharge for syphilis. If no screening

were implemented and those found to have syphilis after entering basic training were treated and returned to duty instead of given an EPTS discharge, the effectiveness of the no screening option would increase substantially and any costs of the EPTS discharge would not be incurred.

Although it is relatively unusual to recommend doing nothing as an optimum medical policy for individuals, in this case we believe that from the DOD population perspective, discontinuation of screening may indeed by the best option. This is bolstered by the other screening and treatment effects inherent in today's medical system and the results of this analysis. Because of this, the multiple other avenues of syphilis screening that exist, and based on the results of the analysis, the best screening option is to discontinue syphilis screening in military recruit applicants. Discontinuation of screening would save the military $2,541,000 per year, and the $2.5 million annual savings could be reallocated to a disease with greater prevalence and population health impact than syphilis.

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THE ASTHMA ACCESSION STANDARD: A SURVIVAL ANALYSIS OF ENLISTED ACCESSIONS 1995-1996

Asthma has had an impact on military readiness in the past. The DOD Directive addressing disqualifications for entrance into the military was recently changed regarding asthma. Asthma diagnosed at any age is currently cause for disqualification. A survival analysis comparing length of time until discharge for individuals waived for asthma and others was performed. Cases were 368 enlisted recruit applicants in Army and Navy (including Marine) disqualified at the MEPS who received a waiver for asthma and started training in 1995 or 1996. 1,104 enlisted controls who starting basic training in those years were matched on age, sex, race, and service. No significant differences were found between cases and controls in the Army, Navy, or Marines with respect to length of time served until discharge.

Introduction

One top priority for AMSARA is to examine the accession process with respect to asthma. Asthma is common and affects approximately 2-6% of the American population at any time.[1,2,3] There has been a rise in the hospitalization rate, death rate, and overall prevalence of asthma in the U.S. over the last 20 years.[2] Asthma is especially problematic to the military because AD persons are exposed to various factors that exacerbate asthma, such as exercise, cold, dust, stress, smoke, fumes, and pyridostigmine. Unknown environmental factors also may be involved. One study found higher asthma-related hospitalization rates and mortality for U.S. Army soldiers in Europe than for those in the U.S.[4]

Although increasing today, asthma has been a problem in the past around the world. In World War II, 30% of applicants were disqualified for military service, 2% of those 30% were for asthma.[2] In a British study, it was predicted that of Army enlistees with a history of childhood asthma and remission in their teens, 40% would flourish, but 25% would require downgrading of their duties, and 35% would be discharged because of asthma.[5] In Operation Desert Storm, 500 Army soldiers could not deploy because of asthma, and 200 who did deploy were then evacuated from the theater because of asthma.[3] The extensive costs and loss of readiness associated with illness, disability, and discharge related to asthma are well-known.

The previous DOD directive did not allow anyone to access who had asthma symptoms after the age of 12.[6] This directive has recently been changed. The current disqualification, effective 30 August 1995, is for asthma reliably diagnosed at any age. The current directive also specifies that a substantiated history should include symptoms persisting generally more than 6 months, not the shorter time or isolated instances of wheezing often used. The results presented here are from data gathered under the 1995 directive.

Methods

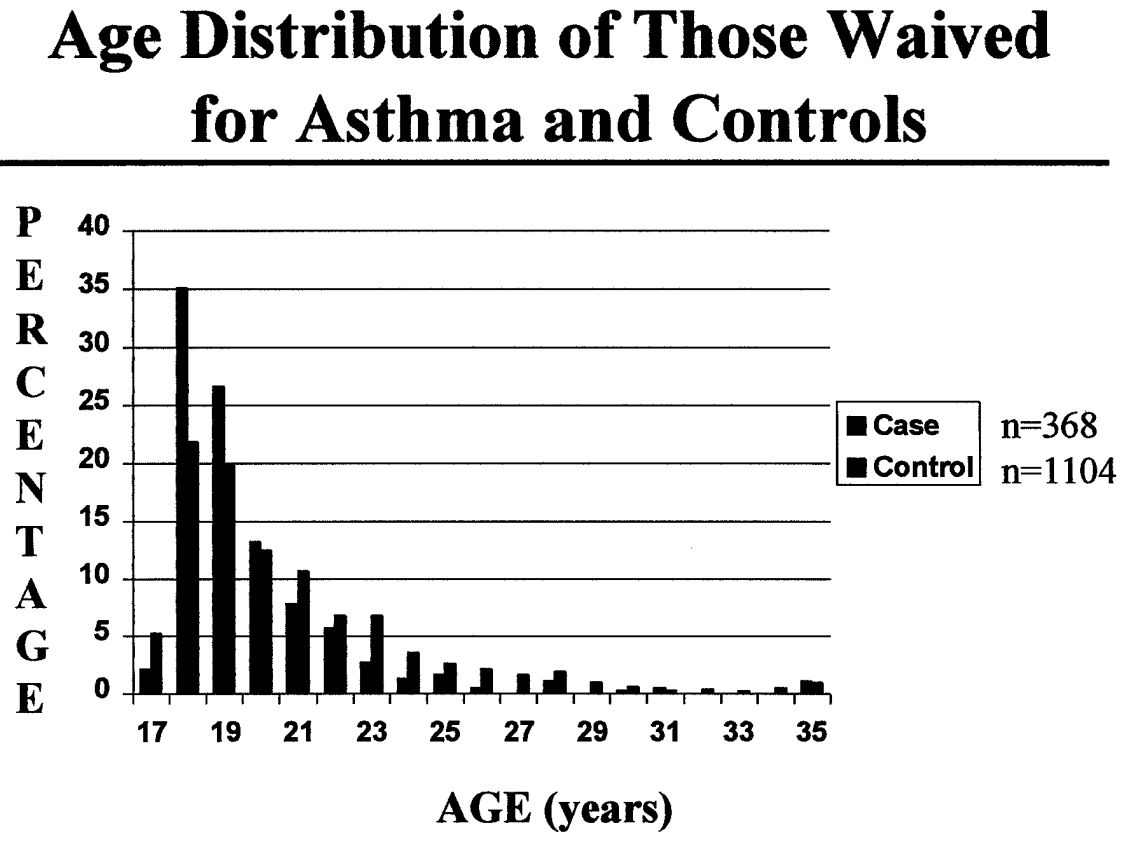
The goal was to perform a survival analysis comparing survival on AD or remaining free of an asthma related hospitalization or discharge, of those receiving asthma waivers with others. SAS software (SAS Institute, Cary, North Carolina) was used. Significance was based on the logrank, Wilcoxon, and log likelihood ratio tests. Cases were enlisted recruit applicants disqualified at the MEPS who received a waiver for asthma and started training in 1995 or 1996. They were verified to have started basic training by gain files in DMDC. Controls were chosen from the DMDC gain files from 1995 to 1996, meaning they started basic training in those years. Controls were matched with cases in a 1:3 ratio on age within 1 year, service, sex, month started basic training, and race. In the analysis, the first endpoint was failure to survive, defined as discharge from the service for any reason, including a condition existing prior to service (EPTS), a disability, and a nonmedical condition. These discharges were obtained from the AD loss files at DMDC. The second endpoint used was an asthma related EPTS discharge, a disability discharge for asthma (Veterans Benefits Administration Department of Veterans Affairs code 6602), or a hospitalization for asthma (ICD9 codes 493.0, 493.1, 493.2, and 493.9). All losses were weighted equally in this analysis.

Results

13 individuals in the Air Force met the case definition. None of them were hospitalized for asthma or discharged at the conclusion of the study period. These individuals were not included in the following analyses because there were so few.

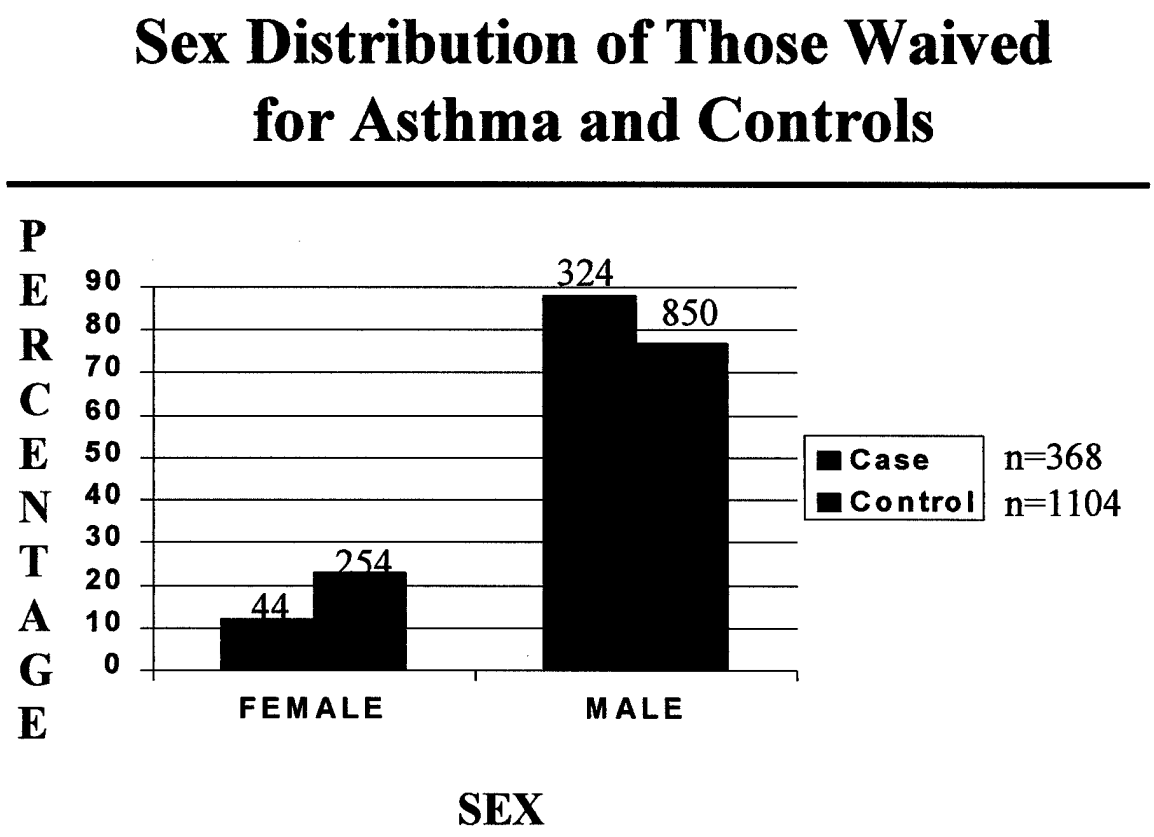
Graph 1. Illustrates the ages of cases and matched controls. Controls were matched to the cases and not to the overall population coming into the military.

Graph1.



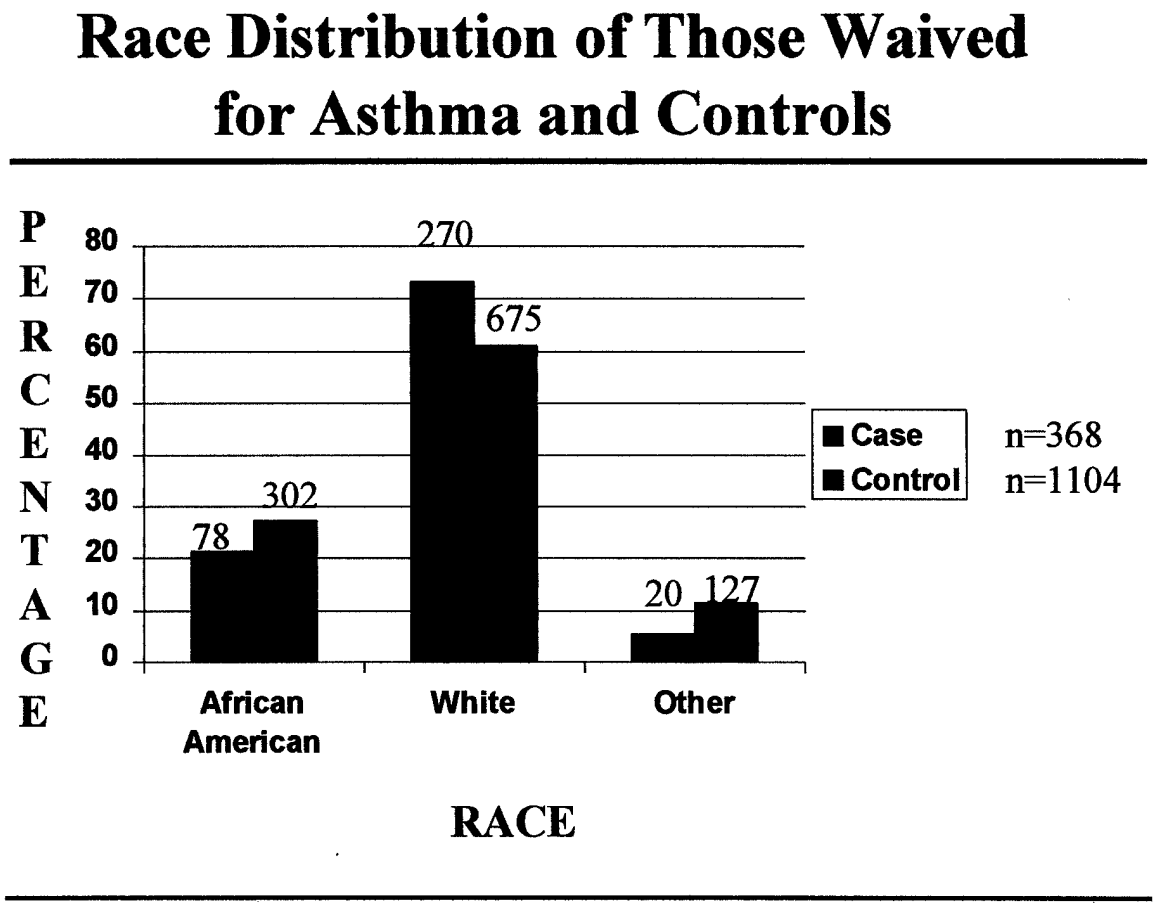
The sex distribution is shown in Graph 2. Listed above the bars are the total number in each group.

Graph 2.



Graph 3. Shows the race distribution. Both cases and controls were predominantly white.

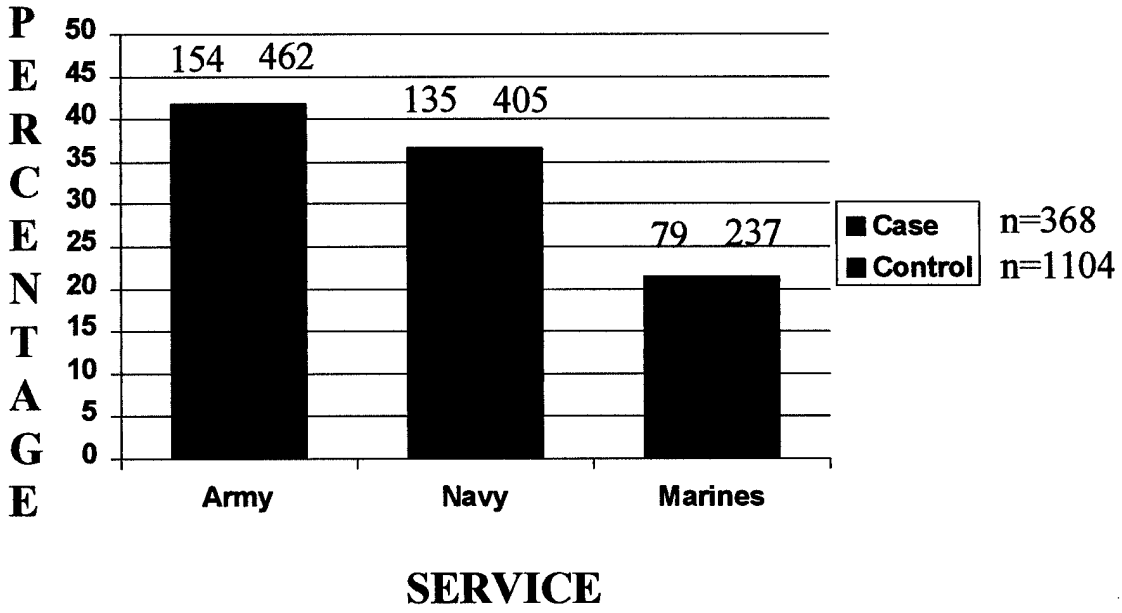
Graph 3.



Graph 4. Shows the distribution of cases and controls by service. The proportion of each service making up the whole military is not reflected. Cases were taken using accessible and useable data and controls were matched to cases.

Graph 4.

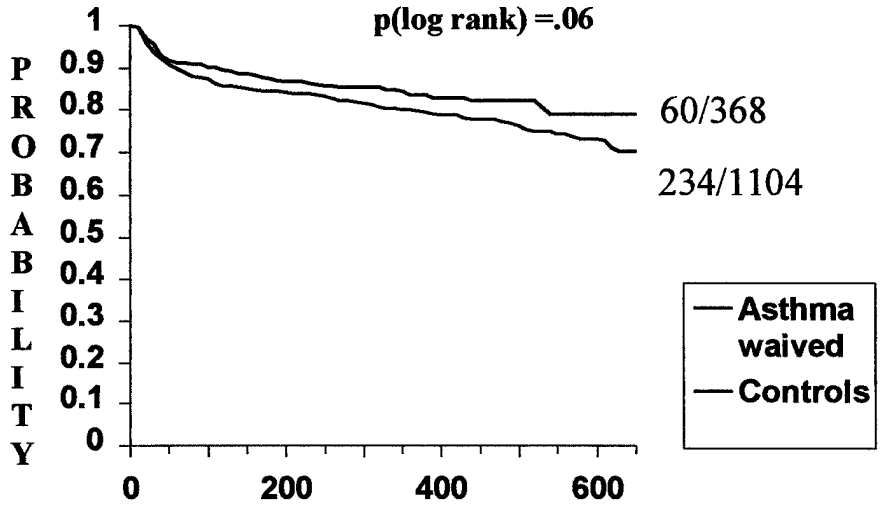
Service Distribution of Those Waived for Asthma and Controls



Graph 5. Shows the experience of remaining in the service for cases and controls. 100% start on AD at the beginning of training on the left. The vertical axis is the probability of remaining on AD over time. As days go by, some are discharged. Cases (asthma waiver recipients) are not discharged faster than the controls. Numbers on right of lines are number of failures out of the total. The difference between the two groups is not statistically significant. The reasons for discharge are not necessarily because of asthma; they are any loss from the service.

Graph 5.

Probability of Remaining on AD after Accession: All Services*



* excludes AF

Table 1. Shows the most common reasons for loss from the service. Of the 60 cases that left the service out of 368, the two most common reasons for discharge were Unqualified for Active Duty Other (a medical discharge other than EPTS, disability, or failure to meet weight/body fat standards) and Trainee Discharge/Entry Level Performance and Conduct. Of the 234 controls that left the service out of 1,104, more were also coded as medically Unqualified for Active Duty Other and Trainee Discharge/Entry Level Performance and Conduct. Other reasons were conduct, character, or behavior disorders, or fraudulent entry. The remaining parts of both groups were broken into many categories with few in each. In previous studies, however, it has been shown that unit records of the reason for discharge and DMDC files may not match.

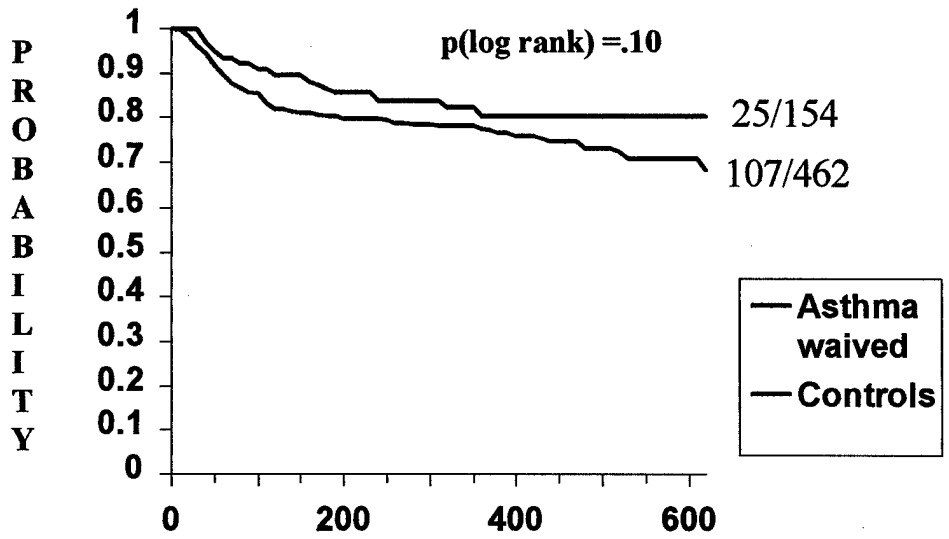
Table 1
Reasons for Discharge From the Service

Reason	Cases Discharge (n=60 of 368 cases)	Controls Discharged (n=234 of 1,104 controls)
Unqualified for Active Duty Other	24.6%	23.0%
Fraudulent Entry	9.8%	12.8%
Character or Behavior Disorder	11.5%	10.7%
Trainee Discharge / Entry Level Performance and Conduct	24.6%	18.4%
Erroneous Enlistment or Induction	6.6%	3.1%
Others	22.4%	32.0%

Graph 6. Shows that for the Army, no significant differences were found in experiences for the cases and controls over time.

Graph 6.

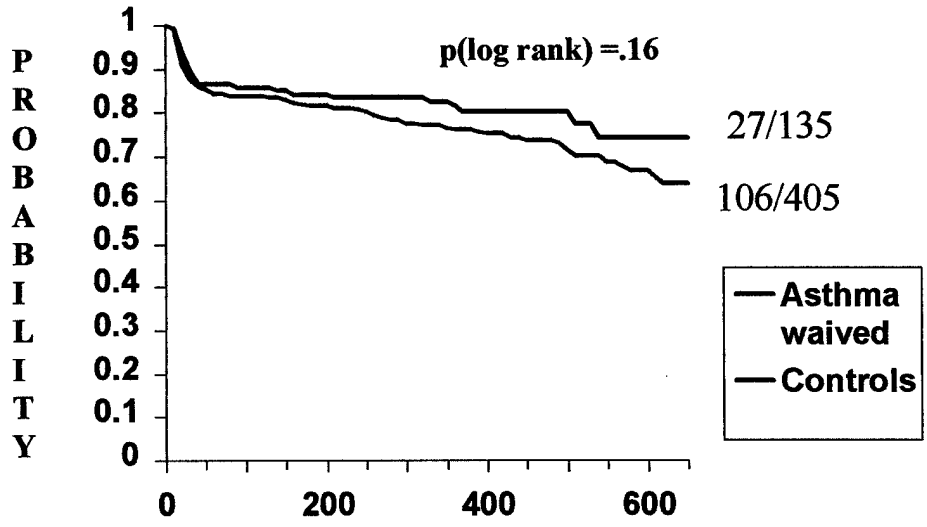
Probability of Remaining on AD After Accession: Army



The same can be said for the Navy's experience, shown in Graph 7, as for the Army.

Graph 7.

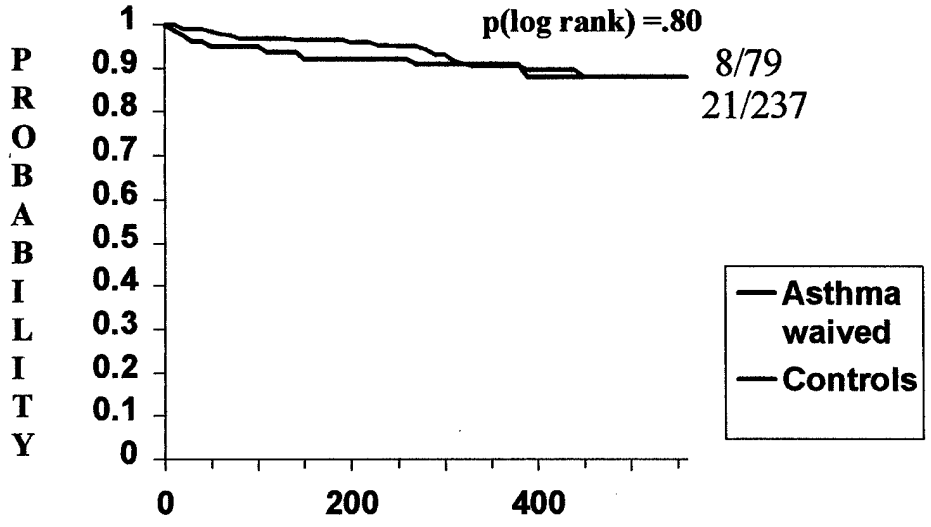
Probability of Remaining on AD After Accession: Navy



Graph 8. Shows the same for the Marines.

Graph 8.

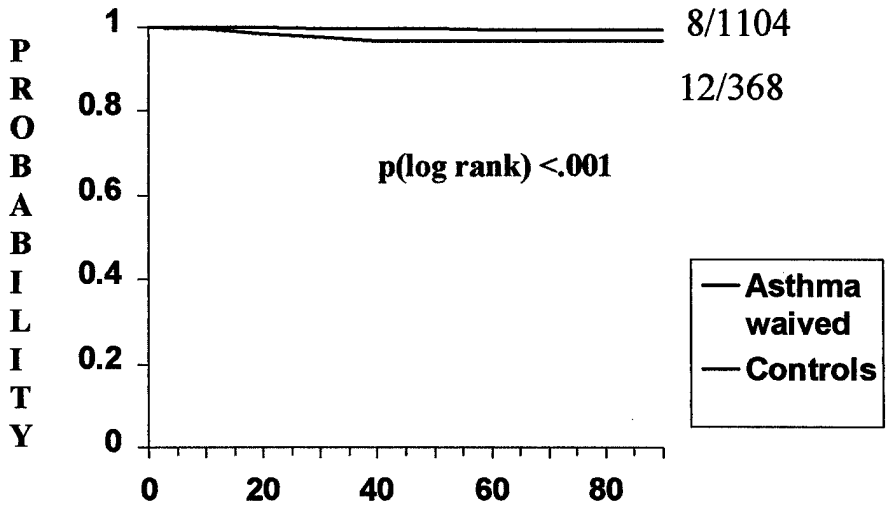
Probability of Remaining on AD After Accession: Marines



When the endpoint used was an asthma-related failure such as EPTS, hospitalization, or disability discharge, a statistical difference was found in survival of cases as compared to controls. This is depicted in Graph 9. Interpretation should be made with caution because of the small number of endpoints. More data and the introduction of ambulatory data is needed.

Graph 9.

Probability of Avoiding EPTS, Hospitalization, or Disability Discharge for Asthma: All Services*

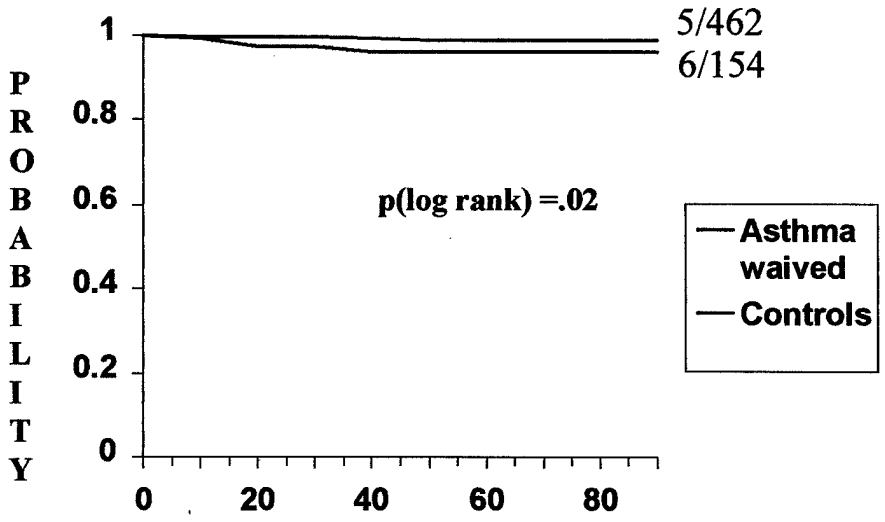


* excludes AF

The same can be said for the Army as for all services combined, as seen in Graph 10.

Graph 10.

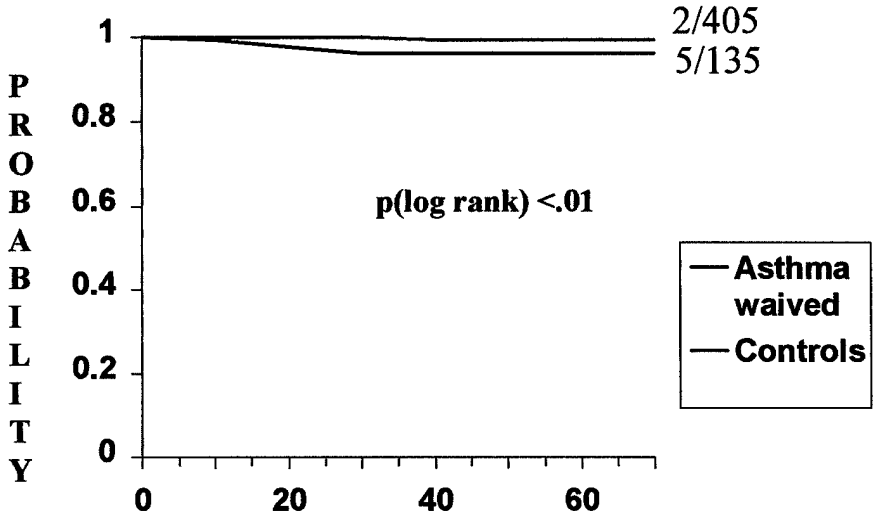
Probability of Remaining Free of Asthma Failure: Army



The same can be said for the Navy, as for the Army, as seen in Graph 11. This small difference is statistically significant but may not be truly meaningful because of the few endpoints. A graph showing the results for the Marines is not shown because there was only a single discharge for the cases and a single discharge for the controls.

Graph 11.

Probability of Remaining Free of Asthma Failure: Navy



Discussion

In this study, it was assumed that the data used had been properly recorded. Because only waivers with complete information were captured, it was assumed that known cases were similar to those with missing data and that survival times of different subjects are independent of each other.

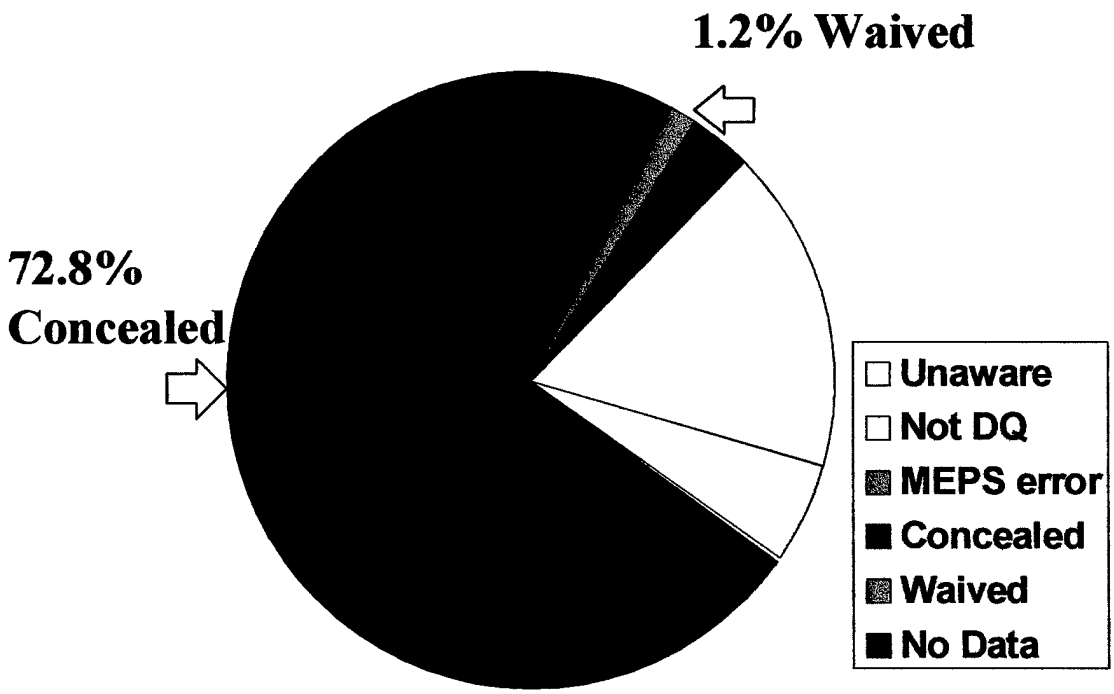
This study evaluated applicants who were disqualified for asthma and then waived, not those with asthma. For example, if asthma was diagnosed, that person was treated as if he or she had asthma in the study, just as happens in the military system. There are some people among the cases who do not truly have asthma. More individuals in the control group probably do have asthma. This misclassification would be expected to make differences more difficult to find.

Asthma outpatient morbidity has a significant impact on cost and readiness and will be incorporated into this investigation in the near future.

There are probably differences between a person coming into the service with a history of mild asthma at age 3 and an individual entering AD with a history of more severe childhood asthma. Unfortunately, this information is unavailable in any of the data sources used for this analysis, and AMSARA cannot determine the difference in survival for applicants with mild, moderate, or severe asthma.

This study was undertaken to analyze the waiver process with respect to asthma. According to the coding done at MEPS when EPTS paperwork is returned, 72.8% of the 1,014 with asthma EPTS discharges in 1995 did not reveal their asthma before entering basic training (See Graph 12). Most of those receiving an EPTS discharge for asthma in 1995 were never part of the waiver process being evaluated. Even if the waiver process is perfected, it will not resolve the issue of those getting asthma EPTS discharges when their asthma was never known to the waiver authority.

Graph 12.



In conclusion, AMSARA found that the chance of remaining on AD for someone coming into the military with a waiver for asthma is comparable to that of a matched control. Preliminary results show that the chance of remaining free of asthma-related EPTS discharge or hospitalization may be different. These cases and controls were only followed for 2 years, so differences that may occur after more is invested in an individual are not shown.

The study is ongoing and it is being extended to include more waived people, longer follow-up, and eventually ambulatory data. The next steps may include forming a model controlling for body mass index, smoking, and duty title to better predict attrition of waived people.

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Academic Skills Defect: 1995 and 1996: Preliminary Results

Attention deficit/hyperactivity disorder is not directly addressed in the DOD Directive for medical accessions. It falls into the category of ASD. A study was initiated to examine discharge rates from the military for those with ASD compared to all enlisted individuals accessed. Cases were 52 enlisted servicemembers who were waived for academic skills defect in 1995 or 1996. 15 were Army, 12 Air Force, 15 Navy, and 10 Marine. The control population was 346,511 enlisted individuals that accessed in that time period. 23% of the cases had been discharged from the service at the end of 1996, while 16% of the comparison population had been discharged. (p=0.06) A significant difference was found when comparing the mean AFQT scores. The mean score of the population was 60.20. The mean score for the individuals waived for ASD was 64.13 and was not statistically different from that of the general enlisted population. When the waived individuals were separated into those that left the service in less than 2 years and those remaining on AD at the end of 1996, those remaining on active duty had a statistically higher mean score (67.37) than the population , and those discharged had a significantly lower mean score (52.80). AFQT score should be considered when making waiver decision for ASD.

Introduction

ADHD is the most common childhood psychiatric disorder, affecting 4-6% of children; in 10-60% of children with ADHD, it persists into adulthood.[1,2] It is diagnosed by observing a pattern of inattention, with or without hyperactivity or impulsivity, that is worse and more frequent than that observed in other children of comparable age and development.[3] This pattern must interfere with functioning in two of these three settings: social, academic, or occupational.[3] Many feel that the core problems are due to an underresponsive behavioral inhibition system, with genetics playing an important role.[2,4,5] About two-thirds of children with ADHD have concurrent psychiatric disorders, such as oppositional and conduct disorders, anxiety, or mood disorders.[1] ADHD as an accession qualifier is not directly addressed in DOD Directive 6130.3 but falls under what is termed ASD, which are problems that interfere with work or school after age 12 or the current use of medication to improve or maintain academic skills.[6]

Methods

Cases were enlisted servicemembers in the Army, Air Force, Navy, and Marine who were waived for ASD in 1995 or 1996 and started AD in 1995 or 1996. The date they started AD was verified using DMDC gain files.

The comparison population used was the entire enlisted pool that started AD, again verified by DMDC gain files, in 1995 or 1996. Controls were not matched with the cases.

Results

There were 52 cases; 26 began AD in 1995 and 26 in 1996. There were 15 Army cases, 12 Air Force cases, 15 Navy cases, and 10 Marine cases. 51 of the 52 were male (sex of the remaining person was unknown); 47 of the 52 were white, 3 were black, and 2 were other races. The comparison population consisted of 346,511 individuals.

Of the 52 individuals waived for ASD, 23% had left AD by the end of 1996. Only 16% of the comparison population had been discharged by the end of 1996. The difference in this percentage is marginally significant using a one-tailed binomial test with a p value of 0.06 (Table 1).

Table 1.

Cumulative Percent Discharged With Up to 2 Years Follow Up

ASD Waived Cases 23% Discharged

Gained Population 16% Discharged

---

one tailed p value of 0.063

Table 2 illustrates the cumulative percent discharged for the different services.

Table 2.

Cumulative Percent Discharged With Up to 2 Years Follow Up by Service

		Discharged	p value
Army	**ASD Waived Cases**	**27%**	**0.10**
	Gained Population	**17%**	
AF	**ASD Waived Cases**	**17%**	**0.27**
	Gained Population	**15%**	
Navy	**ASD Waived Cases**	**33%**	**0.07**
	Gained Population	**21%**	
Marines	**ASD Waived Cases**	**10%**	**0.34**
	Gained Population	**12%**	

The average AFQT score for the gained population (subjects with unknown score were excluded) was 60.20, whereas the average AFQT score for those waived for ASD and gained was 64.13 (Table 3). There was no significant difference between them. However, the average AFQT for those waived for ASD and then discharged was 52.80, which was significantly lower than the population mean of 60.2. It implies that, on the average, the discharged individuals that had been waived for ASD had lower AFQT scores than others. Individuals waived for ASD and not discharged had a mean AFQT score of 67.37, which was significantly higher than the population average.

Table 3.
AFQT Scores for Individuals Waived for ASD and the Overall Population

Population	*Mean of AFQT*	*Standard Deviation*	*Size*	*P-value of AFQT Mean Test*
Total Gained Population	60.2	18.60	248,418	(Population)
Gained ASD-Waived cases	64.13	17.71	45	0.14
Discharged ASD-waived	52.80	12.07	10	0.05
On duty ASD-waived	67.37	17.86	35	0.02

Education level is shown in Table 4. Thirty five individuals waived for ASD and gained had a high school diploma; nine of them were discharged. Nine cases were high school seniors; only one of them was discharged. Seven cases had unknown educational levels; two of them were discharged. Only one had a college degree and remained in the service.

Table 4
Percentage of the individuals by Education

EDUCATION LEVEL	*Percentage of Gained population*	*ASD Waived and Gained*	*ASD Waived and Discharged*
Unknown	12.1	7	2
Graduate study	0.4	0	
Bachelor's degree	3.4	1	0
Some college	0.9	0	
HS diploma	54.3	35	9
Poten. HS diploma	26.8	9	1
Less than HS diploma	2.1	0	

An effect of education level on discharge was not detected in these preliminary results.

Discussion

This study does not control for time started AD so some have short follow-up times and cases may not be evenly distributed over the 2-year period. It does not incorporate the severity of the ASD. Other demographics are not controlled in this preliminary analysis, and small sample sizes and incomplete capture of all of the cases prohibit strong conclusions.

AFQT score should be considered when deciding waivers. AMSARA will continue this investigation, acquire more data, perform more analyses, and attempt to better predict which individuals with ASD, using other parameters, will fail.

References

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AMSARA Data Sources

The activities of AMSARA have initially focused on acquiring complete data for CYs 1995 and 1996. AMSARA uses only existing data collected by other agencies for administrative and medical purposes. Data on enlisted soldiers currently available to AMSARA are summarized in the table below.

	Army	Navy	Air Force	Marine Corps	Coast Guard
MEPS - 1995	Yes	Yes	Yes	Yes	Yes
MEPS - 1996					
Gain and Loss	Yes	Yes	Yes	Yes	Yes
Waivers	Partial	Yes	Yes	Yes	
Hospitalization	Yes	Yes	Yes	Yes	
EPTS Discharges	Yes	Yes	Yes	Yes	Yes
Disability	Yes	Partial			

Description of Data Sources

a. **MEPS** - MEPCOM compiles data from the 65 MEPS. Qualifying medical examinations are done at these MEPS for all enlisted and a few officer recruit applicants. MEPS data from nonapplicants receiving periodic physicals were excluded. These data contain such information as identifiers, demographics, aptitude test scores, medical test results, medical reasons for failure of the examination, various dates of service, preliminary MOS, preliminary basic training site, and prior service information. Currently AMSARA has access to MEPS data recorded in CY 1995 and 1996. This includes information on individuals who had any MEPS processing in 1995. However, some of these individuals had additional MEPS processing in 1996 or later, and these updates are not yet available to AMSARA.

Problem areas identified in the MEPS data include failure diagnoses, waiver coding, and general errors in data entry. When an individual fails the examination, the reason for failure is coded using a double-digit designator of a broad medical category that contains grouped diagnoses that may not be functionally similar. MEPCOM is planning to improve this system by using more specific ICD9 codes, the completion of which is crucial for future AMSARA studies. When a disqualified person receives more than one waiver, be it medical or administrative, only one is recorded at MEPS. In addition, AMSARA's extract files have only the first 4 letters of the last name; this problem should be resolved in future tape extracts.

b. **Gain/Loss** - DMDC compiles data on individuals who actually enter AD for all the services in the AD gain files and those who are discharged from the military in the AD loss files. These data contain such information as personal data and identifiers, service, occupation, aptitude test scores, reason for separation, and gain and loss dates. DMDC maintains many other data files not currently used by AMSARA. AMSARA has access to DMDC gain and loss data for CYs 1995 and 1996, but the 1996 data are not yet complete.

DMDC gain/loss file problems include the following: some losses are actually only temporary because of reenlistment; there are some duplicate records; and there is a time lag from events to their documentation in the files, particularly for the Air Force, as well as general data entry errors. In the gain and loss files, there are errors or omissions of birthdates. Most of these complications are overcome by scrutinizing the data and comparisons with other sources, but this is time-consuming. It has been shown that the reason coded for discharge at DMDC is often inconsistent with what has been recorded as the reason at the unit level. AMSARA is hoping to improve communication with basic training sites.

c. **Waivers** - Waiver data are accumulated by the service-specific waiver authorities, who render a decision after an individual is medically disqualified. Waiver authorities can examine the situation on a case-by-case basis to determine whether accession of the disqualified individual will benefit the military. Most of these data include identifiers, demographics, the condition for which the individual was waived, and the waiver determination or recommendation. AMSARA currently has access to enlisted waiver data from the U.S. Army Recruiting Command, U.S. Navy Bureau of Medicine and Surgery, and the Air Force Directorate of Medical Services and Training for enlisted applicants. AMSARA currently has data from portions of CYs 1995, 1996, and 1997.

Identified problems with the waiver data are many. The Air Force data have some duplicate records. The 1995 data have only the last 4 digits of the social security number, but the full number is recorded in the 1996 data. In general, there are no problems prohibiting use of the data for future studies.

The Navy data have many missing dates, but some are not essential. There are some Navy people entered more than once within a given year. ICD9 codes are assigned based on the written diagnosis when possible, but from July 1997 forward, the codes will come with the data.

The Army waiver data are in various forms and have some duplicate records. Hard copy data exist for January 1995 through December 1995, although AMSARA currently only has data from January 1995 through June 1995; 35% of these approved waivers and 31% of these disapproved waivers do not have accompanying SF-88 medical forms attached, which precludes ICD9 coding of the waived condition.

Army waiver data from January 1996 through October 1996 exist on CD ROMs in an incomplete and unorganized form, making it quite difficult and time consuming to assemble various pieces of information for a one individual. A more systematic and thorough data abstraction from these CD ROMs is expected to yield much helpful information and will be undertaken in the future, thus allowing a more complete insight into the Army waiver decision process.

d. **Hospitalization** - Triservice hospitalization data are compiled by the Patient Administration Systems and Biostatistics Activity, Fort Sam Houston, Texas. These data have information on AD hospitalizations at military and civilian institutions around the world, including up to 8 ICD9 coded diagnoses per hospitalization. AMSARA has data for enlisted personnel for CYs 1995 and 1996, but the data for 1996 may not be complete because of the lag from actual hospitalization to coding in the database. The 1996 data are subject to revision.

Identified problems with the hospitalization data are miscoding of the ICD9 diagnoses, sometimes remedied by inspection of other parts of the data record. There is also a time lag from an event to its capture in the data mentioned above.

e. **EPTS** Discharges - EPTS discharge data collection is initiated at the basic training sites. When an individual is found to have a disqualifying condition within the first 6 months of service that is believed to have been present before accession, he or she receives an EPTS discharge. The paperwork from an EPTS discharge is then forwarded to MEPCOM, where it is assigned a code for the reason the person was accessed with that problem, for example concealment, waiver, or MEPS error. The hard copy paperwork is then shared with AMSARA. The few that arrive at AMSARA without these codes are assigned codes here according to the ICD9 coded DOD Directive 6130.0. AMSARA has mostly non-ICD9-coded electronic data from January 1995 to October 1996 (without specific diagnoses or retrievable hard copies) and hard copy data from October 1996 forward.

One identified problem with the EPTS data is that paperwork for all of the discharges processed at basic training is not returned to the MEPS. According to MEPCOM, approximately 5-20% are not returned. There is generally a 4 to 6 month lag from the discharge until the paperwork reaches AMSARA. Some of the diagnoses are too broad or nonspecific to allow for ICD9 coding according to the new DOD directive, and some information is incomplete. In ten to fifteen percent of the cases, the SF-88 medical forms are missing, prohibiting ICD9 coding of the discharge diagnosis. Much of the general missing data and some typing errors can usually be captured or corrected from other data sources.

f. **Disability** - Disability discharge data are compiled separately for each service at its disability agency. The data vary somewhat for each service. The U.S. Army Physical Disability Agency is located in Bethesda, Maryland. AMSARA has access to these data for 1995 and 1996 for all diagnoses. The Department of the Navy Disability Evaluation System is located in Arlington, Virginia. Navy data are available to AMSARA for 1995 and 1996 for asthma diagnoses only. AMSARA has not yet been able to gain access to the Air Force disability data. Eventually all of the service's disability agencies will be part of the JDETS.

The problem with the Army disability data is that diagnoses are coded using the Veterans Benefits Administration Department of Veterans Affairs codes. AMSARA is working on converting many of these to ICD9 codes. Plans are underway to acquire the remainder of the Navy data and the Air Force data. Both the Army and the incomplete Navy data have duplicate entries.

Additional Data Needed

MEPS data are needed from FY 1998 forward.
DOD Medical Evaluation Review Board (DODMERB) data are needed from August 1997 forward (once the new system is operational).
DMDC gain/loss data are needed from 1997 forward in addition to any lagging 1996 data.
Waiver data are already being received for the Army and Navy enlisted personnel. All Air Force and Coast Guard waiver data are needed, as well as those for Army and Navy officers. Also missing are the Army enlisted retrospective data from June 1995-December 1996.
Hospitalization data are needed for the remainder of 1996 and forward.
EPTS data are already being received but with a 4 to 6 month delay.
Disability data are needed for the Air Force and Navy. Army data are needed from 1997 forward.

Conclusions

Many of the problems listed above for the various data sources have been previously recognized, and resolutions are being implemented by the responsible agencies. Top priority recommendations are to use ICD9 coded diagnoses and record all waivers granted at the MEPS. Honesty and collaboration between the unit from which an individual is discharged and DMDC are important for accurate, consistent, and helpful recording of reasons for discharges. Basic training sites should be responsible for forwarding accurate EPTS discharge paperwork to MEPS on all applicable individuals.

An electronic transfer of this information to MEPS and AMSARA should be initiated to relay information in a more timely manner. Proper communication with basic training sites about the need and usefulness of the information is important. It is also important for AMSARA to receive accurate waiver data electronically with ICD9 codes. Few data on officers are available to AMSARA at this time. Acquisition of these data will be an important activity for 1998. AMSARA should have access to JDETS data for complete disability data for all of the services.

Future Deliverables

In addition to the continuation of periodic, descriptive statistical analyses, noting problem areas and tracking trends, AMSARA is planning to accomplish the following in FY 1998:

Perform survival analysis of those waived for orthopedic knee problems
Perform survival analyses comparing people that passed through different MEPS
Perform studies using DODMERB officer data

Expand the asthma survival analysis
Expand the ASD study

Describe those receiving EPTS discharges for psychological reasons
Describe those females and older individuals hospitalized and discharged

Model attrition to determine factors predictive of failure.