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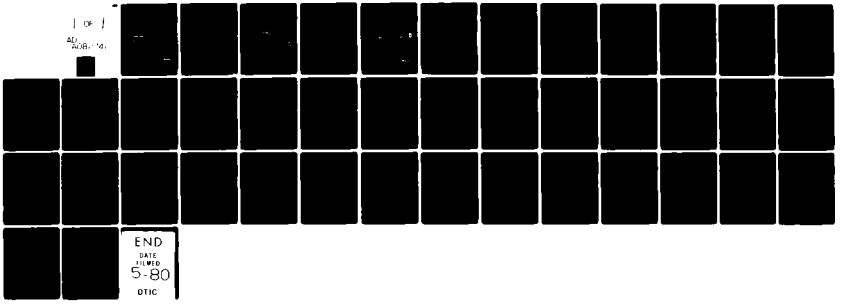

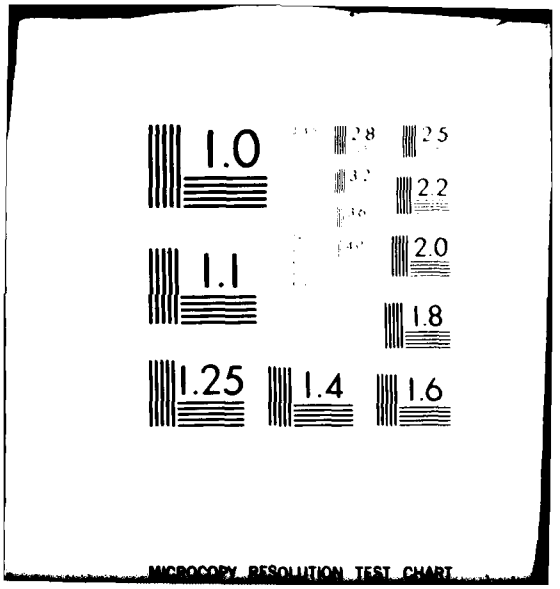
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POTENTIAL CIVILIAN EARNINGS OF MILITARY PHYSICIAN'S ASSISTANTS

Susan Hosek

A Rand Note
prepared for the
United States Air Force

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This paper discusses the adequacy of military physician's assistants' (PAs') pay under two grade options: warrant officer and commissioned officer. Military career pay profiles are compared with estimated civilian experience-earnings profiles. These estimated civilian earnings profiles are estimated from 1978 earnings data collected by the Association of Physician Assistant Programs. Because military PAs are relatively well qualified, the earnings estimates are based on a sample of comparably qualified civilian PAs. Comparisons of military and potential civilian earnings profiles under the two grade options and assuming varying amounts of pre-PA military service fail to provide conclusive support for either commissioning or warrant officer status. However, the comparisons do suggest that, if the military wishes to follow the Air Force's lead and intensively employ PAs, commissioning may be needed to guarantee an adequate supply of qualified PAs. 20 pp. (Author)

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Susan Hosek

A Rand Note
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PREFACE

This Note was requested by Colonel Richard Conaway, USAF (Office of the Directorate of Personnel Plans), and Mr. Fred Ippoliti, USAF (Office of the Surgeon General). It estimates the income that military physician's assistants could make in civilian life and discusses the adequacy of military pay under two grade structures: warrant officer and commissioned officer.

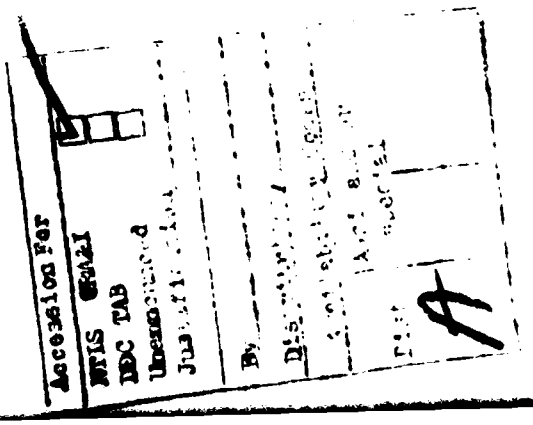
The work described was undertaken under the Project AIR FORCE project entitled "Air Force Health Delivery Systems." The project has addressed three health care issues: (1) the supply of military physicians, (2) the demand for military outpatient services, and (3) the delivery of outpatient medical care in Air Force clinics. In the third area, the research has focused on the Air Force's use of physician's extenders to deliver primary medical care. (Physician's extenders include both physician's assistants and primary care nurse practitioners.) Related Rand publications concerning physician's assistants include:

N-1019-HA, *Military Utilization of Physician's Assistants,* Susan Hosek and Charles R. Roll, Jr., April 1979

N-1184-AF, *The Quality of Air Force Outpatient Care: How Well Do Physician Assistants Perform?,* George Goldberg, Andrew F. Siegel, David S. C. Chu, and David G. Jolly, June 1979

N-1303-AF, *Patient Acceptance of the Air Force Physician Assistant,* David J. Armor, November 1979

R-2436-AF, *Quality of Care Provided by Physician's Extenders in Air Force Primary Medicine Clinics,* George Goldberg and David G. Jolly, forthcoming



SUMMARY

This paper describes the potential earnings of military physician's assistants (PAs) in the civilian sector and discusses the adequacy of military PA pay in light of civilian opportunities. The analysis provides information useful in determining whether Air Force PAs should be warrant officers or commissioned officers.

At the present time, the Army and Navy make their PAs warrant officers, while the Air Force has been commissioning its PAs. In the 1980 Defense Department appropriations bill, Congress denied funding to continue the Air Force PA commissioning program, although it concedes both that already commissioned PAs may retain their commissions and that the Air Force may honor current commitments to confer commissions. Continuation of the Air Force's PA program will depend on final resolution of the PA grade structure issue so as to ensure an adequate supply of PAs.

The appropriate grade for Air Force PAs should be determined by considering what size and quality PA force the Air Force can build, and at what cost, under alternative grade structures. Differences between military pay and civilian earnings, especially at certain career points, will contribute importantly to the Air Force's success in attracting and retaining PAs.

Only recently has detailed and reliable data become available on civilian PA earnings. In 1976, the Association of Physician's Assistants Programs (APAP) initiated collection of a longitudinal data file. Their file now describes the training, personal characteristics, practice setting, and earnings of over five thousand PAs. The earnings information has been updated to 1978.

Using the APAP data, this paper estimates civilian PA earnings functions. On average, civilian PAs earned close to $18,000 in 1978. The first earnings function, estimated from the full sample of civilian PAs, indicates that more highly qualified civilian PAs earn more. Thus, the well-qualified Air Force PAs could probably earn above average incomes in the civilian sector. Air Force PAs train in a program approved by the American Medical Association, they have bachelors degrees and

NCCPA certification,[1] and they work full time. To predict the civilian earnings opportunities of Air Force PAs at different points in their careers, an additional earnings function was estimated from a small sample of civilian PAs with characteristics similar to Air Force PAs. The earnings predicted at important career points by the second earnings function are:

Year of PA Service	Potential Civilian Earnings
1	$16,740
5	20,768
10	25,591
20	34,382

Because the data include no PAs with more than ten years in practice, predictions past the ten year point extrapolate beyond actual experience. However, for evaluating alternative grade structures, the first ten or twelve years are more important than later years.

A series of charts compare this predicted civilian earnings profile with military pay lines for warrant officers and commissioned officers (see Sec. III, pp. 22, 24, and 26). Each chart assumes a different number of years enlisted service prior to PA service. For PAs with eight years prior service, their civilian earnings opportunities lie between warrant and commissioned pay. For PAs with less service, commissioned pay is comparable. Finally, for potential civilian PA recruits of equal quality to military-trained PAs, the warrant pay line falls more than $2000 short of probable civilian alternatives. This gap would probably preclude the Air Force from extensive civilian PA recruiting under the warrant option.

Any conclusions about PA grade structure drawn from these pay comparisons must be tempered by an inability to precisely estimate the accession and retention effects of the two grade options. Future PAs' retention rates, if they are made warrant officers, will depend on whether relatively generous military retirement benefits compensate

[1] National Commission on the Certification of Physician's Assistants.

for relatively low active duty pay. Nonetheless, commissioning clearly presents less risk to the Air Force's innovative PA program. Finally, regardless of whether Air Force PAs are given warrant or commissioned status, their cost effectiveness in the outpatient clinics seems assured unless physician incomes drastically fall relative to PA incomes.

ACKNOWLEDGMENTS

The author would like to thank the Association of Physician Assistant Programs and its Director, Dr. Donald Fisher, for releasing their data. Dr. Robert Bloom and Mr. Stan Quick provided generous assistance in understanding and using the data file. Captain David Gwinn, U.S. Air Force, gave us valuable information on the Air Force physician's assistants.

Leola Cutler prepared the data files used in this analysis. Andrea Barras, Richard Buddin, Richard Fernandez, David Jolly, and C. Robert Roll reviewed an earlier draft and contributed useful suggestions.

CONTENTS

I. INTRODUCTION

This paper discusses the adequacy of military physician's assistants' (PAs') pay in light of estimates, developed in the paper, of civilian PA earnings. These estimates rely on recent PA surveys conducted by the Association of Physician Assistant Programs (APAP). An assessment of military PA pay is timely because of recent discussions on whether to make Air Force PAs warrant officers or commissioned officers. Comparing civilian and military pay profiles cannot resolve all the issues surrounding PA grade structure, but the comparison does add substantially to understanding the potential effects of adopting either grade.

At the present time, the Army and Navy make their PAs warrant officers, while the Air Force has been commissioning its PAs. As part of the 1980 Defense Department Appropriations Bill, Congress withheld funding for continuing the Air Force commissioning program. This Congressional action implements the recommendation resulting from a study recently completed (but not yet issued) by the Office of the Assistant Secretary of Defense (Health Affairs).[1] The study recommended a uniform grade for all military PAs, and concluded this grade should be warrant officer. Unfortunately, in developing this recommendation, Health Affairs did not directly consider the impact civilian earnings opportunities have on the appropriateness of the warrant or commissioned grades.

The appropriate grade for military PAs should be determined by asking the question: What size and quality PA force can the Air Force (or the other services) build, and at what cost, under alternative grade structures? Important quality dimensions include training and experience, both as a PA and in the military. The size, quality, and cost of the PA force in turn depend on the accessions of new PAs and retention into a military PA career. Differences between military pay and civilian earnings opportunities, especially at certain career points, will

[1] Report on Physician Assistants in the Military Health Care System.

contribute importantly to the services' success in attracting and retaining PAs.

The importance of accessions is evident since, without an adequate supply of PAs, their use cannot continue in the military. Although the Air Force has recently recruited some civilian-trained PAs, most military PAs are former corpsmen trained in military programs. The grade chosen must therefore guarantee a pool of qualified corpsman applicants for PA training. Our results indicate that the differences in warrant and commissioned pay, relative to civilian earnings, should not noticeably affect the number of corpsman applicants. But the situation could change if, as the PA profession continues to grow, military pay does not keep pace with civilian opportunities.

In contrast to accessions of military-trained PAs, the services probably cannot successfully recruit civilian PAs without commissioning. Warrant pay for civilian PA recruits, who do not have prior military service, lies well below civilian earnings.

Military-civilian pay comparisons suggest that the retention effects of PA grade structure (and thus pay) may outweigh the accession effects. The cost effectiveness of the PA force depends on retention in at least two ways. First, so long as PAs are trained in-house, the training costs per man-year increase substantially as retention falls off. Second, the productivity of a PA should increase with his military PA experience. He becomes more experienced not only in performing his PA functions but also in carrying out uniquely military duties.

In deciding on a military career, the PA ending his obligated service will increasingly consider his civilian opportunities. Until now, the civilian market has not strongly influenced retention for two reasons, neither of which will continue to apply. First, civilian alternatives to military PA service have been limited by the newness of the profession. Second, at least in the Air Force, PA trainees have had so much prior enlisted service that they can retire soon after their obligated service

ends.[1] Recent PA retention rates thus provide a poor guide to long-term retention under either grade structure.

In this context, any implications drawn from military-civilian pay comparisons are tentative. The evidence related to retention is particularly mixed. Nonetheless, some inferences can be drawn. In the future, the Air Force faces less risk to their PA program under the commissioning option. The current gap in civilian versus warrant pay profiles suggests the warrant option is risky.

The following section describes the civilian experience-earnings functions estimated from the APAP data. Section III compares commissioned and warrant pay with a civilian pay profile, derived from the estimated earnings functions for similarly qualified civilian PAs. The comparisons focus on identifying implications for accessions and retention, and ultimately for the cost effectiveness of Air Force PAs. Also, other employment benefits, including retirement, are briefly contrasted. The paper concludes with a brief summary of findings.

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[1]Many have chosen to remain since they need ten years' commissioned service to retire as an officer.

II. ESTIMATION OF CIVILIAN EARNINGS FUNCTIONS

This section describes the estimation of civilian PA earnings functions. These functions indicate what a PA with qualifications similar to Air Force PAs can earn throughout the early stages of his career (up to twenty years). Readers not interested in the estimation technique may choose to skip this section.

To estimate the civilian earnings functions, I have used multiple regression analysis. Regressions can separate the returns to experience from the returns to quality of training and other qualifications or explanatory factors. PA earnings are disperse, perhaps because the profession is new; mean incomes can therefore be misleading. In addition, profession entrants, training, and employment opportunities have all been changing; these changes can easily be confused with experience unless they are disentangled in a multivariate fashion.

The data come from mail surveys fielded by the Association of Physician Assistant Programs (APAP).[1] In 1976, APAP set out to create a longitudinal data base on all PAs trained in programs approved by the American Medical Association or certified by the National Commission on Certification of Physican Assistants. APAP periodically updates information on PAs in the sample, and adds newly trained or certified PAs. To date, the data base includes 5379 PAs. Information on earnings and other changeable items now refers to mid-1978. From the original file, I created a working file of 4463 observations. Most of the losses were records originating in 1976 and missing updated 1978 data.

Using ordinary least squares, I estimated earnings functions with varying specifications. The dependent variable was income or log income. Many of the independent variables are dichotomous; the two important continuous variables, age and experience, were entered in quadratic as well as linear form. Table 1 defines all the variables; generally, the definitions are straightforward. However, several of the variables require comment.

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[1] See Judy A. Light, Mary Jane Crain, and Donald W. Fisher, "Physician Assistant: A Profile of the Profession, 1976," The P.A. Journal, Vol. 7, No. 3, Fall 1977, for a more detailed description of these data.

Table 1

VARIABLE DEFINITIONS

INCOME	Total yearly income from professional activities at survey date.
LGINC	Natural logarithm of INCOME.
AGE	1978 - Year of birth.
AGESQ	$(AGE)^2$
YRSPA	1978 - Year graduated from PA training.
YRSPASQ	$(YRSPA)^2$
INFORMAL) AMANP) MEDEX) FEDERAL) PAPROG)	Dummy variables indicating the type of individual training: informal, AMA-approved nurse practitioner, Medex, Federal, AMA-approved PA; the omitted group were trained in non-AMA programs.
FEMALE	= 1, if person is female.
BLACK) HISPANIC) OTHERACE)	Dummy variables indicating person is black, Mexican American/Puerto Rican/Latin American, or Asian/Indian. Caucasians constitute the omitted variable.
PACERT	= 1, if person is certified by the NCCPA.
BACHLRS	= 1, if person has received bachelors degree at any time.
HLTHEXP	= 1, if person has health experience prior to becoming PA.
FULLTIME	= 1, if worked 35 or more hours per week (excluding hours on call)
CALL	= 1, if hours on call positive.
RMTCLIN	= 1, if person works in a remote clinic.
AREAUSRV	= 1, if person works in an underserved area.
EMPHOSP	= 1, if employed by a hospital.
PRIVHOSP	= 1, if person has hospital privileges.
LRGCTY) LRGSURB) MEDCTY) MEDSURB) SMLCTY)	Dummy variables indicating size of community person works in: Large city (≥250,000) — Suburb of medium city Suburb of large city — Small city (10,000-50,000) Medium city (50,000-250,000) — Omitted: <10,000
ALASKA	= 1, if person employed in Alaska.

INCOME. The wording of the income question in the survey is less precise than one might desire. It asks: "What is your total yearly income from professional activities?" First, the term "professional activities" is vague, though most respondents probably correctly interpreted it as PA employment. Second, the time period referred to could be clearer.[1]

YRSPA. This variable measures experience by the number of years since graduation, assuming that this time period was primarily spent working as a PA. In the working sample, 11 percent were not working as a PA and were eliminated from the sample.

FULLTIME, CALL. The hours worked and hours on call data include numerous large values, leading one to suspect exaggeration (perhaps again due to imprecise survey questions). Also a large number of hours on call may translate to only a few hours worked. For these reascns and to minimize problems of endogeneity (of wages and hours worked), we recoded these variables to dummies indicating full time employment and some on call duty.

PAs differ in training, precise location, and numerous other ways. Air Force PAs (in common with most other military PAs) are among the more highly qualified. They are trained in an AMA-approved two year program, almost all are certified, and most have bachelors degrees.[2] I have taken two approaches to identifying civilian earnings opportunities for Air Force PAs. The first estimates a regression from the full working sample (2522 records after missing values and military PAs are omitted), including, in addition to age and experience, variables for training, practice setting, and other potentially important characteristics. The second approach uses a smaller sample of civilian PAs similar to Air Force PAs. This sample is

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[1] Typically, employment surveys ask for earnings and both hours and weeks worked during clearly specified time periods: "the previous twelve months."

[2] The Air Force now requires a bachelors degree by the end of training so that all PAs may be commissioned. However, even without the requirement, most would obtain the extra credit hours (30) needed for the BS. Two-thirds of similarly trained civilian PAs have bachelors degrees.

described below on page 10; the most important exclusions are PAs not trained in AMA-approved PA programs and/or not certified. Table 2 gives the variable means for both the full working sample and the smaller sample of comparable civilian PAs.

FULL-SAMPLE EQUATIONS

For the general labor force, experience-earnings (or age-earnings) profiles appear to increase at a decreasing rate, leveling off as workers become older and more experienced. I tried various specifications of the PA earnings equations, exploring possible nonlinear relationships between earnings and experience. With the full sample, the nonlinear specifications yielded unrealistic earnings profiles. None of the PAs in this sample graduated more than ten years ago. Consequently, the data lack observations at higher levels of experience which would expose any nonlinearity.[1] The full-sample equation was estimated to evaluate whether Air Force PAs have characteristics which would allow them to earn more or less than the typical civilian PA. For this purpose, the linear specification is adequate. The results, shown in Table 3, indicate that Air Force PAs can probably earn above average incomes. Therefore, predicted civilian opportunities of Air Force PAs should come from a sample of comparable civilian PAs.

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[1] Jacob Mincer, in Schooling, Experience, and Earnings, National Bureau of Economic Research, 1974, derives relationships between log earnings and various specifications of schooling and experience from human capital theory. He fits these equations to the 1/1,000 1960 Census data of 31,093 white, nonfarm, nonstudent men up to age 65. Annual earnings in this sample typically rise sharply over the first 10-15 years of experience, then remain relatively flat until 35-40 years, after which they decline (apparently due to decreased weeks worked). Depending on specification, Mincer's model obtains R^2 from .3 to .6. However, imposing similar log-linear specifications on the PA earnings data yielded predicted experience-earnings curves whose slope increased until well past retirement. Without data on experienced PAs, the curve is fit only in the experience range Mincer shows has sharply increasing earnings. Specifying earnings in linear form produced virtually the same experience-earnings curve for the first ten years; after twenty years, the linear equation predicted earnings 10-13 percent below the earnings predicted by the log-linear equation. In another attempt at nonlinearity, I added experience squared to the independent variables in the linear specifications. This specification predicted an earnings-experience profile that peaked and then began to fall at 13 years' experience, too quickly to be believable.

Table 2

VARIABLE MEANS*
(Standard deviations in parentheses)

	All Civilian PAs (N=2522)	Comparable Civilian PAs (N=929)
INCOME	17,913	18,696
AGE	35.5 (8.36)	31.6 (4.99)
YRSPA	2.77 (1.66)	2.77 (1.69)
INFORMAL	.035	-
AMANP	.031	-
MEDEX	.135	-
FEDERAL	.049	-
PAPROG	.606	-
OTHPROG	.149	1.000
FEMALE	.303	-
CAUCASIAN	.879	n/a[a]
BLACK	.052	n/a
HISPANIC	.023	n/a
OTHERACE	.046	n/a
PACERT	.867	1.000
BACHLRS	.535	.630
HLTHEXP	.782	.847
CALL	.481	.547
FULLTIME	.178	1.000
CITY	.449	.492
SUBURB	.072	.053
EMPHOSP	.309	.303
PRIVHOSP	.583	.620

*Variable definitions in Table 1.

[a]Not available.

Table 3

REGRESSION RESULTS FROM SAMPLE
OF ALL CIVILIAN PAs*

Dependent Variable: Income
(t-statistics in parentheses)

Explanatory Variable	Coefficient	Explanatory Variable	Coefficient
R^2	.1874	OTHERACE	-650.14 (1.42)
CONSTANT	9362.12	PACERT	810.64 (2.85)
YRSPA	831.66 (14.23)	BACHLRS	500.49 (2.64)
AGE	64.17 (3.97)	HLTHEXP	232.72 (1.00)
CALL	1240.57 (6.39)	LRGCTY	872.78 (3.07)
FULLTIME	1249.40 (3.43)	LRGSURB	1456.80 (3.32)
INFORMAL	580.13 (0.65)	MEDCTY	633.78 (2.04)
AMANP	476.47 (0.74)	MEDSURB	1493.44 (2.05)
FEDERAL	867.63 (1.54)	ALASKA	4134.68 (5.86)
MEDEX	987.96 (2.09)	RMTCLIN	140.85 (0.29)
PAPROG	1015.80 (2.38)	AREAUSRV	293.84 (1.38)
FEMALE	-1445.51 (6.66)	EMPHOSP	-433.89 (2.09)
BLACK	-230.01 (0.52)	PRIVHOSP	464.79 (2.40)
HISPANIC	141.67 (0.22)		

*Variable definitions in Table 1.

Experience (YRSPA) has a large and significant effect on earnings; for this sample, PAs earn about $830 more with each year of experience. Earnings also increase slightly with age, perhaps as a return to experience more broadly defined.[1]

In addition, a fair number of other factors such as training, personnel characteristics, and practice location affect earnings. Compared with PAs trained in other programs,[2] graduates of MEDEX and AMA-approved PA training programs earn about $500 more.[3] Consistent with the increase in earnings with better training, certification and a bachelors degree bring higher incomes.

Women earn 8 percent less. Women are more likely to work part time and not be on call; their lower earnings probably reflect decisions to accept jobs less demanding in other ways as well. In contrast, a PA's race does not significantly alter his earnings.

Finally, earnings depend on job type and location. Hospital employees earn somewhat less. Jobs requiring the PA be on call pay better, as do jobs in cities and their suburbs.

The full-sample equation suggests that Air Force PAs (who are certified, male, graduated from an AMA-approved program and have degrees) could earn somewhat more than average wages in the civilian market. Consequently, to generate a civilian pay profile for comparing military pay, I estimated earnings functions using a smaller sample of civilian PAs comparable to Air Force PAs.

SMALL-SAMPLE EQUATIONS

The sample of comparable PAs was selected with the following characteristics: certified, trained in an AMA-approved program, working

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[1] The elasticities of earnings with respect to experience (.129) and age (.127) are remarkably similar.

[2] Informal, non-AMA-approved, nurse practitioner, federal, and other miscellaneous programs.

[3] Remember that the sample includes only PAs certified or graduated from AMA-approved programs. Presumably it excludes the lowest-paid PAs and I therefore may underestimate the returns to quality training and certification.

full time, male, and not employed in Alaska. This smaller file contained 929 records with these characteristics and with valid data for the regression variables.

Again, I estimated the equation with linear and several non-linear specifications. Table 4 presents the results. When age is entered in quadratic form, the coefficients for this sample produce a more reasonable quadratic function (equation 1); earnings increase with age at a very gradually decreasing rate. The coefficients on YRSPA and CALL resemble those estimated from the large sample. However, unlike before, other variables have little effect (equation 3).

Despite the significant coefficients, the R^2 (proportion of the variance in earnings explained by the independent variables) remains low. This reflects the large dispersion in PA earnings, which may partly be due to the newness of the profession. Over time, the employment market for PAs should become more highly developed, the job(s) better defined, and job information more readily available. In the current situation, Air Force PAs might do better or worse in the civilian market than the earnings predicted by these regressions. But the stability of the coefficients indicates these regressions are a reasonable measure of expected civilian earnings opportunities.

Table 4

REGRESSION RESULTS FROM SAMPLE OF COMPARABLE CIVILIAN PAs*
(t-statistics in parentheses)

Explanatory Variable	Dependent Variable			
	Income			GLNC
	(1)	(2)	(3)	(4)
R^2	.1606	.1588	.1601	.1680
CONSTANT	6755.75	13407.34	12988.03	9.2030
YRSPA	827.71 (10.31)	855.91 (10.88)	883.75 (10.86)	.4373-01 (10.79)
AGE	465.16 (2.03)	76.75 (2.72)	72.19 (2.53)	.2397-01 (2.07)
AGE^2	-5.42 (1.71)	-	-	.2866-03 (1.79)
CALL	887.99 (3.54)	901.54 (3.59)	748.55 (2.80)	.4514-01 (3.57)
BACHLRS			233.32 (0.88)	
LRGCTY			457.97 (1.51)	
LRGSURB			967.42 (1.47)	
MEDCTY			126.71 (0.35)	
MEDSURB			19.00 (0.00)	
EMPHOSP			-303.20 (1.03)	
PRIVHOSP			435.74 (1.54)	

*Variable definitions in Table 1.

III. COMPARISON OF MILITARY AND CIVILIAN PAY PROFILES

This section has three parts. The first calculates a civilian career pay profile (for twenty years), based on the earnings functions from the previous section, and summarizes the data on other civilian benefits from the APAP surveys. The second subsection similarly describes military compensation for warrant officer and commissioned officer PAs. Military paylines are constructed for in-house trained PAs with five and eight years enlisted service, and for civilian-trained PA recruits. The final subsection compares the estimated civilian earnings profile with the military paylines for each of the prior service-grade alternatives, drawing implications for the cost effectiveness of the PA force.

CIVILIAN COMPENSATION

Estimation of the pay component of civilian compensation proceeds directly from the earnings functions in Section II by predicting for each year of practice, the income a civilian PA earns. The APAP data have only sketchy information on other benefits; a summary follows the description of the income predictions.

Career Earnings Profile

To construct potential civilian earnings profiles for Air Force PAs, I assumed they begin their careers at age 28, and would have on call duty in the same proportion as civilian PAs. The civilian earnings profiles for Air Force PAs predicted by the various regressions on the sample of comparable civilian PAs (Table 4 in the previous section) differ little for the first ten years of experience, the period covered by the data. Beyond fifteen years, the profiles diverge, depending on the assumed functional form. The profile most consistent with general age-earnings profiles derives from equation (1), where age is quadratic. This profile also predicts the lowest incomes past 10 years' experience. For comparison with military

paylines, therefore, I have used this profile. Table 5 gives the earnings predicted for the first twenty years. Predicted income (PREDINC) for each year of practice is calculated using the coefficients from equation (1) as follows:

$$\text{PREDINC}(t) = \{6755.75 + .4283\,(887.99) + 827.71\,(t-1) + 465.16\,(28=t-1) - 5.4232\,(28+t-1)^2\} \times (A)$$

The adjustment factor (A=1.05) adjusts for the difference in timing between the APAP survey and the military pay tables. APAP mailed their survey in mid-July, 1978, and the bulk of the questionnaires were returned by mid-August. Assuming pay raises for civilian PAs tend to occur randomly through the year, the APAP data report income earned on average during the year February 1978 to February 1979. The military pay schedule used in the following section was effective October 1, 1978. At an annual rate of increase of 8 percent for civilian pay, the predicted incomes should be inflated 5 percent to make them comparable to military incomes.

The predicted civilian earnings profile, shown in Table 5, demonstrates that average income figures can be misleading. More highly qualified civilian PAs earn an average of only $18,696 because they average less than three years' experience. The predicted profile suggests that their earning potential throughout their careers is considerably above current mean income.

Other Benefits

As indicated above, the APAP survey includes very limited information on compensation other than pay. For a list of standard benefits, the survey asked whether the individual's employer pays all, part, or none. In addition, it asked for the number of days paid leave for vacation, holidays, sick leave, and attendance at continuing medical education (CME) courses.[1]

Table 6A shows the proportion of PAs comparable to Air Force PAs receiving the more important benefits. Most are covered by malpractice

[1]Most states require some continuing education for certification.

Table 5

PREDICTED CIVILIAN INCOME PROFILE
(Effective October, 1978)

Year of Practice	Predicted Income
1	$16,704
2	17,737
3	18,759
4	19,769
5	20,768
6	21,749
7	22,731
8	23,697
9	24,649
10	25,591
11	26,521
12	27,440
13	28,348
14	29,244
15	30,129
16	31,002
17	31,864
18	32,715
19	33,554
20	34,382

Table 7 gives income profiles for the grade/prior-service combinations. The Army W-1 is shown only at eight years' service because even here it is so clearly inadequate. To calculate the profiles, we used the regular military compensation (RMC) figures in the 1979 Uniformed Services Almanac. These pay rates became effective October 1, 1978.

The Military Personnel Center, Randolph Air Force Base, furnished an expected promotion schedule for Air Force commissioned PAs with the following promotion points: O-2: two years; O-3: two years; O-4: seven years; and O-5: four years.[1] For the Navy warrant officer options we followed the promotion schedule in the Health Affairs report: W-3: four years, W-4: four years.

In some cases, we had to extrapolate to fill in incomes omitted from the Almanac RMC tables. We extended the tables by adding or subtracting changes in base pay; this provides a close approximation to expected RMC in the omitted year of service and grade combinations.[2]

We'll discuss the implications of the differences in pay profiles later in this section. To summarize the differences, looking first at the profiles for civilian PA recruits, we note that the warrant officer options fall far short of civilian earnings. Even with the present discounted value of the generous retirement benefit, commissioning probably offers the only chance of successful recruiting of well qualified civilian PAs. Regardless of whether the trainees graduate with the minimum five years or current average of eight years' service, commissioning offers more generous pay and warrant status offers less generous pay than civilian employment. The more prior years service, the closer warrant pay comes to matching civilian pay.

Two facts concerning military-civilian pay comparisons in general have relevance for the PA pay comparisons made here. First, surveys

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[1] Estimates prepared for the Health Affairs report used an unusually quick promotion to O-4 of five years.

[2] In the case of commissioned officers with eight years prior service, the tables indicate no years-of-service pay increment for captains after 14 years. These PAs would receive no raises for five years, until their promotion to major.

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Table 6

SELECTED BENEFITS OF CIVILIAN EMPLOYMENT[a]

A. Proportion Receiving Selected Benefits

	Employer Pays All	Employer Pays Part	Employer Pays None
Malpractice Insurance	85%	3%	12%
Retirement	42	30	28
Continuing Medical Educational Course Expenses	30	30	40

B. Median Days Paid Leave

Vacation	14.5 days
Holidays	10 days
Sick Leave	9 days
Continuing Medical Education Course	7 days

[a]Estimated from the Air Force-comparable working data set.

insurance paid by their employer, three-quarters have some retirement plan (over half fully paid for), and 60 percent are reimbursed for expenses incurred during CME courses.

Table 6B gives the median days provided for vacation, holidays, and other paid leave. In each case, some respondents reported they receive large numbers of days. Therefore, the median will better reflect the typical case than the mean would. In fact, the median nearly equals the mode in all cases. Civilian PAs appear to receive generous amounts of paid leave.

MILITARY COMPENSATION

Currently, each service has its own grade structure. The Army promotes its graduating PAs (trained in the Air Force program) to W-1. Its pay scale is thus the lowest. The Navy promotes to W-2 upon graduation. The Air Force, of course, has been commissioning its officers. Overall, the Army pay scale compares poorly with civilian earnings. Consequently, most of this section will compare only the Navy warrant and Air Force commissioned scales with the estimated civilian earnings profile.

Pay Profiles: Warrant Versus Commissioned

In addition to grade structure, military compensation for PAs depends on whether the services train their PAs and, if so, how many years enlisted service they have had, or whether the services recruit civilian-trained PAs. For each grade structure, three pay profiles are calculated: (1) for service-trained PAs with eight years' service at graduation (the figure used in the Health Affairs study); (2) for service-trained PAs with the minimum five years' service;[1] (3) for direct recruits trained in the civilian programs. Prior to the Congressional ban on commissioning, the Air Force had wanted to recruit civilian PAs laterally, giving credit for civilian PA experience. The civilian recruit pay profile is for a new graduate, and I assume experienced PAs would enter at the pay level associated with their years of experience.

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[1] Three years as a corpsman, two in training.

Table 7 gives income profiles for the grade/prior-service combinations. The Army W-1 is shown only at eight years' service because even here it is so clearly inadequate. To calculate the profiles, we used the regular military compensation (RMC) figures in the 1979 Uniformed Services Almanac. These pay rates became effective October 1, 1978.

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Table 7

ALTERNATIVE MILITARY PAY PROFILES:
PRIOR SERVICE AND STARTING PAY GRADE

Year of Service	Military Trained					Civilian Trained	
	8 years			5 years[a]		0 years[a]	
	0-1	W-2	W-1	0-1	W-2	0-1	W-2
1						12927	14532
2						12927	14532
3						16295	15375
4						18810	15375
5						21699	17683
6				15455	16392	21699	17683
7				16306	17002	22530	17830
8				19623	17002	22530	17830
9	16795	17490	15534	20126	17490	23186	20820
10	16795	17490	15534	23187	18752	23186	20820
11	20966	17984	17984	24190	19604	24190	21446
12	20966	17984	17984	24190	19604	25702	21446
13	25167	20098	18473	25167	20098	26881	22537
14	25167	20098	18473	25167	22537	26881	22537
15	26009	20598	18984	26009	23364	27905	23364
16	26009	20598	20598	26009	23364	29934	23364
17	26009	24024	21078	28923	24024	31820	24024
18	26009	24024	21078	28923	24024	31820	24024
19	26009	24528	21590	29604	24528	33397	24528
20	29604	24528	21590	29604	24528	33397	24528
Retirement Pay with 20 Years							
	11533	9576	8105	11533	9576	12935	9576

[a]Years of service as an enlisted member.

taken in 1966 and 1976 show military officers underestimate the value of their RMC by close to ten percent. Second, a (1974) comparison of the age profiles of officer pay (RMC) and wage and salary incomes of white college graduates indicates the military pays officers at approximately the seventy-fifth percentile of civilian incomes.[1] Both observations strengthen the plausibility of the inferences I draw below concerning the appropriate grade for Air Force PAs.

Other Benefits

The retirement benefits of military service are well known to be generous when compared with the civilian sector. After twenty years of total service, including from twelve to twenty years of service as a PA, military PAs can retire and receive an annual income of from $8105 (Army warrants) to $12,935 (commissioned civilian PAs). We do not know what civilian retirement benefits are, but they are certainly less generous.

The military retirement system has been under attack lately. The President's Commission on Military Compensation proposed establishment of a retirement annuity collectable, with at least ten years' service, by age sixty-two. In addition, servicemen would accrue a deferred compensation trust fund after five years' service, collectable upon leaving the service. These changes, or other similar changes, would weaken the incentive for PAs with prior enlisted service to stay to twenty years or beyond.

Air Force PAs receive three or four days' paid leave for continuing medical education, less than civilian PAs. But, unlike some civilian employers, the services also pay all other expenses of CME attendance. From the limited information available, important differences in other benefits do not seem likely.

IMPLICATIONS FOR AIR FORCE PA GRADE STRUCTURE

As argued above in the Introduction, the appropriate grade structure for Air Force PAs must be determined by the number of qualified

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[1] Richard V. L. Cooper, Military Manpower and the All-Volunteer Force, R-1450-ARPA (Santa Monica, California: The Rand Corporation), September 1977.

PAs and the costs per man-year produced by alternative grade structures. PA supply and costs in turn depend on the accessions and retention rates resulting from each grade option. A discussion of the implications of the comparative pay profiles for accessions and retention follows, first for military-trained PAs and then for civilian-trained PAs. This subsection concludes with brief comments on the cost effectiveness of extensive PA use in military clinics under the alternative grade structures.

Again, the PA profession is so new that recent experience with accessions and retention is useless in predicting future experience. The discussions that follow therefore will remain general, and the conclusions will be somewhat tentative.

Accessions and Retention of Military-Trained PAs

For military-trained PAs, accessions are (qualified) applicants to the training programs from the ranks of corpsmen. Once trained, these PAs must serve four years, so the most important retention point comes after four years.

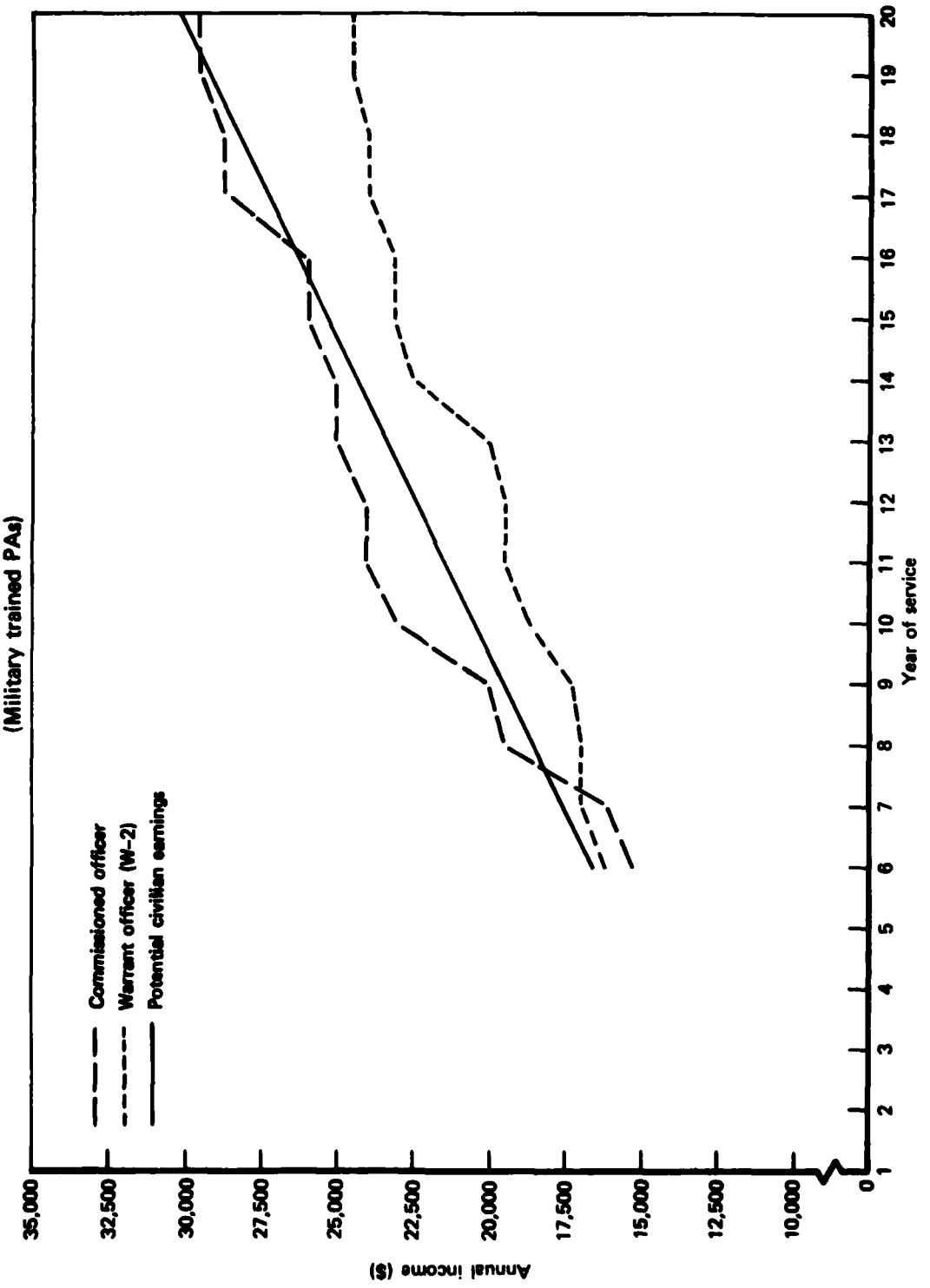
Recent PA retention is a particularly poor guide to what the Air Force can expect under either grade option. The bulk of the current PA force entered training with considerable enlisted experience (more than ten years).

The likely effects of adopting warrant officer or commissioned status on accessions and retention depend on how many years prior enlisted service the PAs have. By selecting and even encouraging either younger or older applicants, the services can alter their trainee's enlisted seniority. In the Air Force, since the early '70s, the average years of prior service have fallen by almost one-half.

To see how pay and prior enlisted service combine to affect accessions and retention, consider two corpsmen interested in PA training, one with the required minimum three years' service and the other with six or more years' service.

The less senior corpsman would graduate from the program with five years' service and complete his four years' payback at nine years. Referring to Chart 1, notice that, as a warrant officer, his PA service would begin at pay rates near civilian market incomes, but, as

CHART 1
Pay profiles for PAs with 5 years prior service
(Military trained PAs)



a commissioned officer, he would earn less. After two years, however, warrant pay falls behind the civilian market while commissioned pay catches up (and even exceeds civilian pay in the mid-career years, 10-14).

The corpsman's desire to receive high-quality PA training in the service (valuable in and out of the military) at the cost of incurring the four years' obligated service should not change noticeably with grade. Discounted to the year of graduation, the value of the first four years' income from military PA service (warrant or commissioned) and civilian employment are nearly equal.[1] Indeed, unless the corpsman has a strong aversion to military service, either military option probably leaves him better off than supporting civilian training largely by himself.

The more junior corpsman's behavior as a warrant officer or commissioned officer would most likely differ with respect to retention. In the fifth year of PA service, commissioning temporarily offers very generous pay ($2400 above civilian pay) while warrant status offers less ($2000 under). The civilian-warrant officer gap remains approximately the same thereafter, while commissioned pay keeps pace with civilian pay. Whether the warrant option would reduce PA retention rates depends on the counterbalancing attraction of retirement eligibility in eleven years. Certainly, the risk of lower retention rates rises under the warrant officer option.

If PA training were inexpensive, lower retention rates would not be worrisome. But at around $35,000 per graduate, the difference in training costs per man-year between retention for four years and eleven years is over $5500.

Let us turn now to the slightly more senior corpsman whose earnings opportunities are shown in Chart 2. With his added enlisted service, his pay under either grade option is higher. Warrant pay still lies below civilian pay throughout; but the differences are smaller. Commissioned pay, on the other hand, is generous after the first two years.

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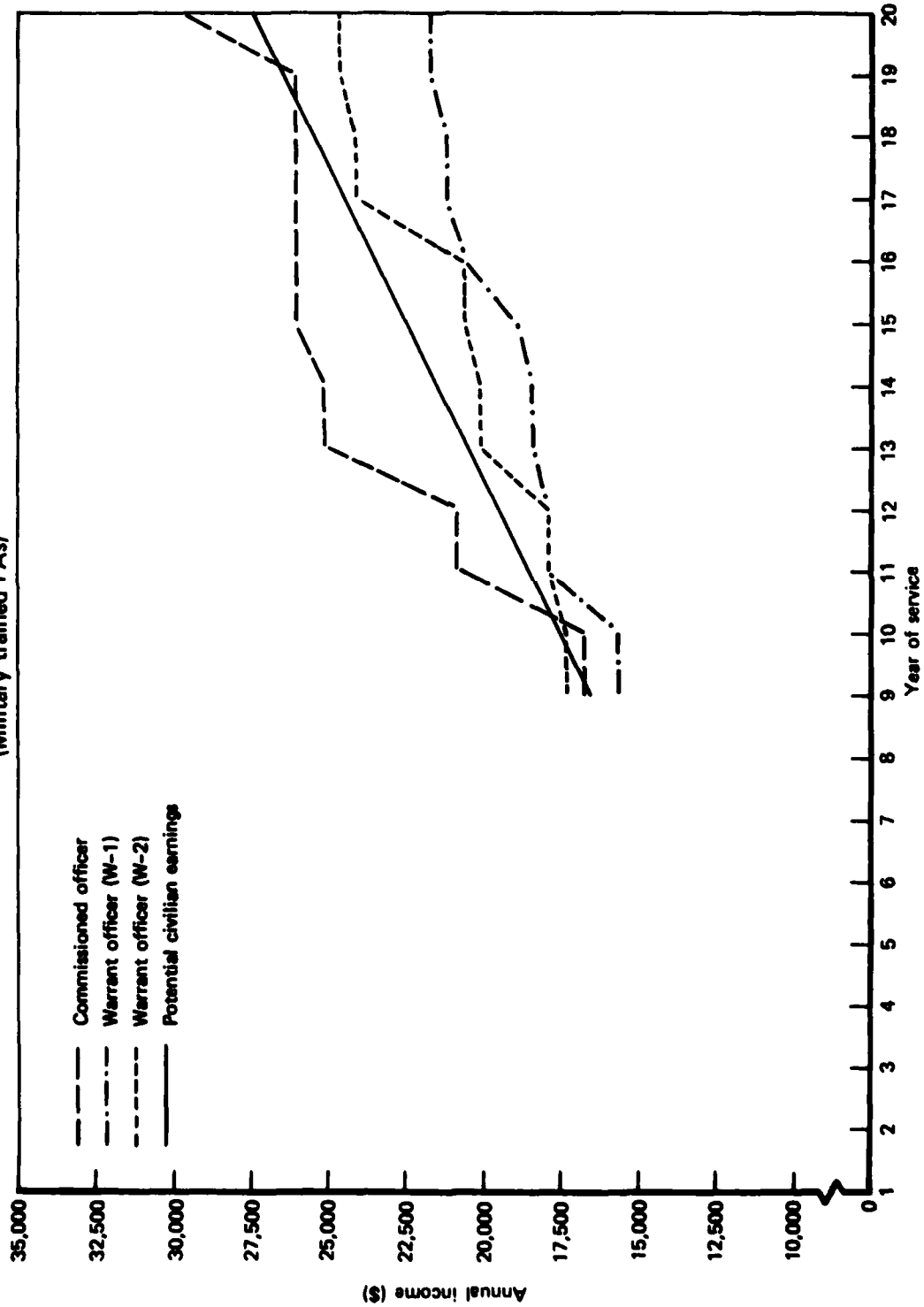
[1] W-2: $60,595; O-1: $63,353; civilian: $64,903. I used an i percent discount rate.

CHART 2

Pay profiles for PAs with 8 years prior service
(Military trained PAs)



Applicants to the training program should respond even less to grade in this more senior group. Military pay under either grade option compares well with civilian earnings, so the argument advanced above that the free education compensates for the four years payback should be more persuasive for the more senior group.

Similarly, retention after the obligated period should be higher for this group, both because, compared with more junior PAs, their military pay (unlike their potential civilian income) is higher but also because they can retire in only eight years.[1] The pull of retirement, of course, depends on the willingness of civilian employers to pay retired military PAs for their military experience. (The APAP data contain too few retired military PAs to evaluate their civilian earnings potential; objectively, the civilian market should fully recognize military experience.) Once again, however, high retention is more certain if the PAs are commissioned.

At this point, one might conclude that the services should opt to make their PAs warrant officers and at the same time select for training more senior corpsmen to maximize retention. This policy, however, could fail for two reasons. First, as good civilian training programs multiply and the profession becomes more established, qualified corpsmen interested in becoming PAs might elect to leave the service after their four-year initial obligation rather than wait for military training. Indeed, potential corpsman recruits may bypass the service altogether in favor of a quicker civilian path toward becoming a PA. Second, training more experienced corpsmen is costly, since military training costs are spread over fewer years' service for those who become career PAs.

To summarize the implications of warrant versus commissioned status for military-trained PAs, of the two, commissioning clearly requires higher pay. But this extra pay does not significantly exceed civilian opportunities for these PAs. For all PAs, regardless of prior service, there may be compensating returns to commissioning in the form of an assured supply of qualified training applicants and higher retention rates.

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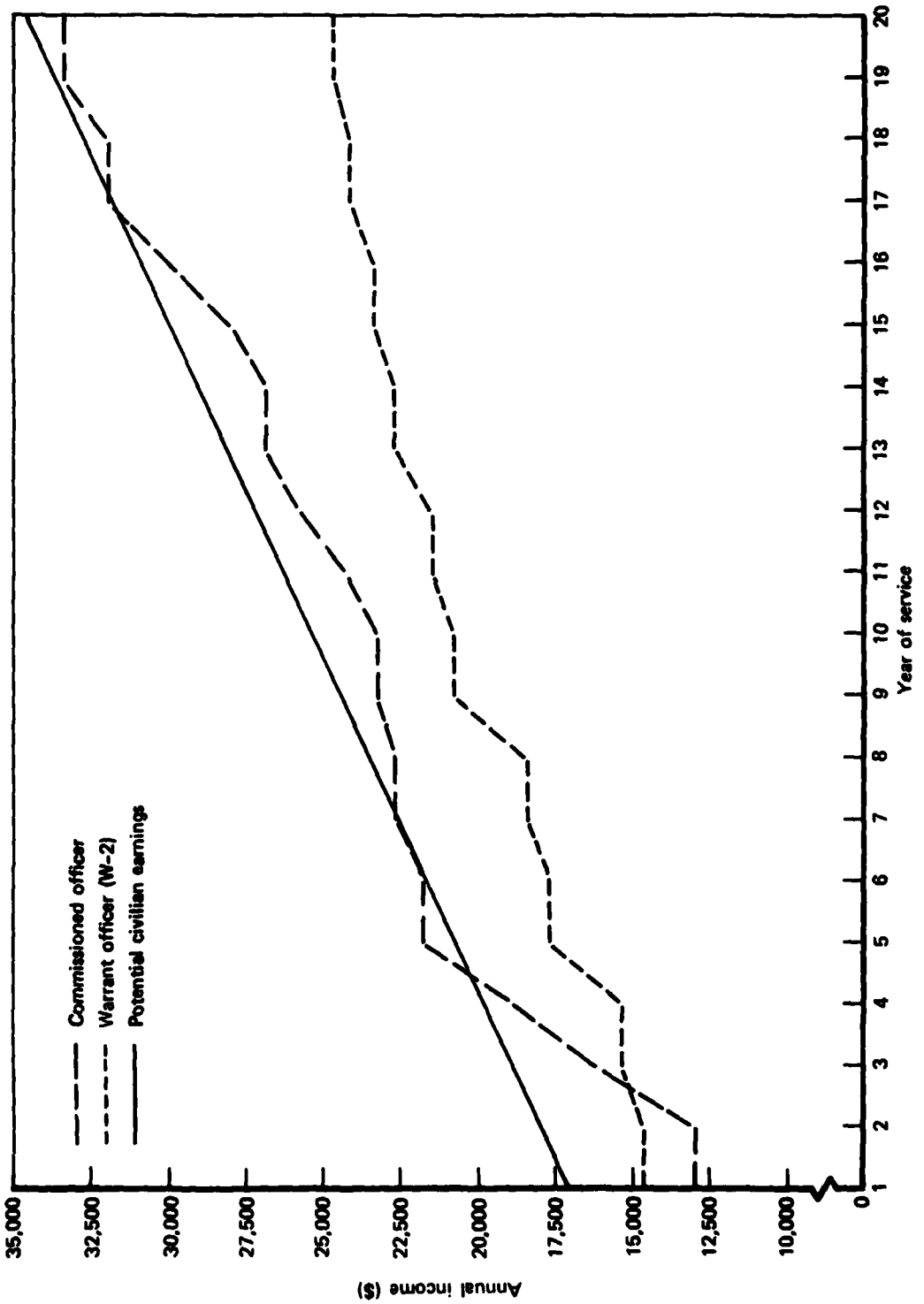
[1] Recall, however, that ten years are required to retire as an officer.

CHART 3

Pay profiles for PAs with no prior service
(Civilian trained PAs)



Recruiting of Civilian-Trained PAs

The evidence strongly supports the contention that the Air Force can recruit significant numbers of civilian-trained PAs (without weakening quality standards) only with commissioning. As Chart 3 shows, warrant officer pay begins $2000 below civilian pay, and the gap widens over time.

Even if the Air Force can offer a commission, officer pay lags far behind the civilian market for three years. After three years, officer pay becomes just competitive. Since credit (for pay purposes) can be given for civilian PA experience, however, limited recruitment of experienced civilian PAs might be sustained under commissioning. However, the failure of officer pay to ever truly achieve comparability with civilian earnings may mean civilian recruiting alone cannot supply enough PAs for Air Force needs.

PA Cost Effectiveness

Without knowing retention rates under alternative grade structures, we cannot estimate the cost per PA man-year. However, PAs certainly cost less than physicians per man-year. In addition, Rand research has shown that Air Force PAs can and do treat most primary care patients without compromising the quality of care.[1]

At 1978/79 pay levels, under the new physician pay plan, general practice physicians (GPs) would begin at just over $31,000, or $14,000 above the commissioned PA with eight years' service. After twenty years' service, GPs would earn almost $60,000. Today, none of the services can attract a sufficient supply of physicians even at these pay rates. (Civilian primary medicine physicians earned median incomes of $53,470 for GPs and $62,380 for family practitioners.)

Currently, therefore, PAs are cost-effective providers for the primary medical care problems they are trained to treat under either grade option. Even if the U.S. supply of physicians rises in the future to

[1]This research is summarized in a Rand Note, *The Quality of Air Force Outpatient Care: How Well Do Physician Assistants Perform?*, N-1184-AF, by George Goldberg, et al. (Santa Monica, California: The Rand Corporation), June 1979, and in a forthcoming report, *Quality of Care Provided by Physician's Extenders in Air Force Primary Medicine Clinics*, R-2436-AF (Santa Monica, California: The Rand Corporation).

end the military shortage at current real pay rates, the cost effectiveness of PAs would not disappear. Only if physician incomes were to fall substantially relative to PA incomes would PAs lose their advantage in treating patients with simple problems.

IV. CONCLUSION

The potential civilian earnings of Air Force physician assistants estimated in this paper give mixed implications for the adequacy of (Navy) commissioned officer pay versus warrant officer pay. To begin with, neither military pay profile clearly conforms to civilian earnings. For PAs with the current eight years prior service, their civilian earnings opportunities lie between warrant and commissioned pay. For PAs with less service, commissioned pay is comparable. Finally, for potential civilian PA recruits of equal quality to military-trained PAs, the warrant pay line falls more than $2000 short of their probable civilian alternatives.

Any conclusions about PA grade structure drawn from these pay comparisons, moreover, must be tempered by our inability to precisely estimate the accession and retention effects of the two grade options. However, the results in this paper do raise the question whether the Air Force's ability to retain PAs beyond their initial obligated service would erode with warrant status. If generous military retirement benefits result in high PA retention rates with both options, warrant officer status may allow the Air Force to pursue its innovative use of PAs. However, this option is clearly riskier than commissioning in light of the general inadequacy of warrant officer pay rates. Furthermore, future growth in civilian PA job opportunities could weaken military competitiveness in the market for PAs.

Regardless of whether Air Force PAs are given warrant or commissioned status, their cost effectiveness in the outpatient clinics seems assured unless physician incomes drastically fall relative to PA incomes.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