Health Disparities by Rank Among Veterans[1]

Alair MacLean
Department of Sociology
Washington State University Vancouver

Ryan D. Edwards
Department of Economics
Queens College and the Graduate Center,
City University of New York
and NBER

[1] This work was supported by training grants to the RAND Corporation from the National Institute of Child Health & Human Development and the National Institute on Aging, T32 HD 07329 and T32 AG 00244, and by NIA research grants R03 AG 029275 and R03AG028277. We are grateful to Julie DaVanzo, Robert M. Hauser, Michael D. Hurd, Jacob A. Klerman, James P. Smith, seminar participants at UW Madison's Center for Demography of Health and Aging, and to participants at the conference on Military Service, Social (Dis)Advantage, and the Life Course at Syracuse University for comments on earlier versions of this paper. Questions and comments can be directed to Alair MacLean, Washington State University Vancouver, 14204 NE Salmon Creek Ave, Vancouver, WA 98686, maclean@vancouver.wsu.edu.

Health Disparities by Rank Among Veterans

May 6, 2009

ABSTRACT

Previous research has shown that higher socioeconomic status is associated with better health in most populations. Other research has explored the relationship between military service and health. But little attention has been paid to the role of rank or status within the military. Rank is associated with other measures of socioeconomic status, since entry into the officer corps has typically required a college degree before service. Several papers also show that officers have higher income than enlisted veterans after service. In this paper, we examine four datasets that measure rank among veterans in order to explore social gradients in self-reported health. We find evidence that such a gradient in health exists along the dimension of rank; that this gradient appears to be independent of gradients in race, education, and income; and that the association is stronger among veterans who served longer.

KEYWORDS: military service, socioeconomic gradients, inequality, life course, aging

"Start wrapping up. I could use another one."
"Anybody know if he's an officer or an enlisted man?"
"He's an enlisted man."
"Make the stitches big."

— O.R. dialogue in Robert Altman's M*A*S*H (1970)

For more than three decades, researchers have socioeconomic gradients in health and the links between social inequality and health outcomes.[1] Beginning in the aftermath of the Vietnam conflict, which raised awareness of mental health consequences in particular, research into the relationship between health and military service has burgeoned into a vibrant field.[2] Despite much activity in both these active areas of research, relatively little work to date discusses or even reveals social gradients in health among veterans.

In the first literature, people with higher socioeconomic status (SES) have better health than those with lower status; they live longer, have fewer chronic health conditions, and self-report their health as better. In the famous Whitehall Studies begun in the 1960s, British civil service workers at higher ranks were less likely to die of all causes than those at lower ranks.[3] Health disparities in a variety of health outcomes, ranging from cardiovascular disease to depression, appear across other measures of socioeconomic status such as income, education, wealth, and occupational status.[4] Researchers have examined a variety of mechanisms that might explain the gradient, which range from standard socioeconomic and sociodemographic pathways to psychosocial elements, social capital, and the psychology of healthy behaviors.[5] Much of the extant literature presumes that these influences determine health rather than the reverse, but research suggests that causality can also run in the opposite direction, at least during later stages of the life cycle.[6] Regardless of the causal direction, all previous research reveals a positive correlation between socioeconomic status and health over long periods of time.[7]

The second literature examines veterans' health relative to that of nonveterans. Most work focuses on the health of veterans who have been exposed to combat, examining the impact of war via post-traumatic stress disorder (PTSD) and other measures of physical and mental health. This research consistently finds that combat veterans suffer worse health than non-combat veterans and than non-veterans, revealing a direct pathway through which military service erodes health.[8] Two recent papers explore somewhat more indirect channels, increased cigarette smoking and drinking, revealing somewhat mixed evidence.[9]

In this paper, we document and discuss health disparities by rank among veterans, reveal that they appear to be distinct from the SES gradient in health, and set the stage for future inquiries into causal pathways with better data. Our basic finding is certainly not unexpected; like members of the British civil service in the Whitehall studies, veterans of the military were assigned a pay grade and rank during service, which creates a distinct within-group social gradient.[10] Ranks may be conceptualized as similar to groupings of the civilian Duncan socioeconomic index (SEI) for the military.[11] Like the SEI, military rank organizes service-members by socioeconomic reward and job characteristic and is thus another measure of social standing similar to education, income, occupation, and wealth. To be sure, these markers are highly interrelated. Education also affects rank, since admission to the officer corps typically requires a college degree, and family background and wealth could also affect eligibility. It is an empirical question whether rank is simply a function of other well-known indicators of socioeconomic status or if it affects health independently.

We know of only two previous papers that have examined how rank is related to health. The first, published in this journal, examines a single cohort of enlisted veterans from World War II and finds that those with higher rank at the end of the war were less likely to die than

those who left with lower rank, regardless of differences in educational attainment.[12] A more recent study documents wide and growing disparities in life expectancy among male military retirees according to final rank, but it is unable to control for SES due to data limitations.[13]

This paper seeks to expand this previous research by revealing the extent of social disparities in old-age health among veterans using individual-level data covering many cohorts. In addition, we examine several alternative explanations for the social gradient among veterans. By examining veterans from a variety of eras and from the entire spectrum of rank, our study takes a broader scope than the 1978 study of enlisted men in a World War II cohort.[14] We also begin the more difficult task of exploring factors that may explain the association between health and rank, and we have in mind the standard framework of identification based on analysis of the timing of events. At issue is whether the relationship is explained by pre-service characteristics and thus more a marker than a treatment, or whether it is closely associated with elements of military service or post-service outcomes and thus results from a treatment. For example, except in extremely rare cases, officers have higher pre-service educational attainment than enlisted veterans, which may, in turn, explain their better health. On the other hand, officers may obtain better access to medical care or knowledge of healthy behaviors because of their service and position in the hierarchy. Differentially greater exposure to psychosocial, combat, or other forms of stress could penalize enlisted men. A key problem is that cross-sectional observation rarely informs decisive inference. The higher post-service socioeconomic attainment we observe among officers[15] could be evidence of a marker, or it could be a treatment effect of military service on SES, which could then improve health, or it could reflect reverse-causality from health into SES, whether caused by military service or not. Untangling this dizzying array of interrelationships is beyond the scope of this paper and largely beyond the ability of current data

to inform, but we offer a first attempt at an explanation. Our strategy is to examine health disparities by rank among subgroups that are differentially exposed to service, service-related disability, and combat exposure, which is like modeling interaction effects and thus a crude version of specifying treatment and control groups within the pool of military veterans. To the extent that service is a treatment, longer service, combat-related disability, and combat exposure should amplify the effects; if service is simply a marker, they should not.

The paper proceeds according to the following plan. The next section describes the characteristics of each of the four data sets that we examine. The key characteristic of these data is the measurement of military rank among veterans, which is quite rare. Following the description of the data, we conduct parallel multivariate analyses using each of the data sets and present our results. These analyses show that officers routinely report better health than enlisted men in the two veterans-only data sets, even after controlling for other socioeconomic covariates and length of military service. In the data covering both nonveterans and veterans, in which officers are a small minority, the evidence is somewhat less clear but still consistent with an independent association of health with rank. We conclude by speculating about the meaning of our results and proposing plans for future research.

Data on health and rank among veterans

Although many sociodemographic and health surveys in the U.S. ask respondents about their military service, rank is infrequently measured. When it is, health is often measured imprecisely. Thus measuring health and rank together is relatively difficult. We have identified two recent national cross-sectional surveys based on military populations and two population-based longitudinal studies that contain both measures. The first two are the 2003 Survey of Retired Military (SRM) and the 2001 National Survey of Veterans (NSV), which are large-scale,

nationally representative samples solely of veterans. The third is the Panel Study of Income Dynamics (PSID), a much smaller representative panel of people in households who were asked their rank in 1994 and have sporadic coverage of health. The fourth data set, the Wisconsin Longitudinal Study (WLS), also asks rank and health but only covers a single cohort of predominantly white high school graduates mostly born in 1939.

Each dataset has significant limitations. Mortality is hard to measure because the data from military samples are cross-sectional, while the longitudinal studies are too small. We therefore focus on self-reported health status, which researchers have shown is linked to mortality.[16] The military surveys include information about health, and their large size enhances precision. However, they do not include information provided by nonveterans, which makes it difficult to interpret the effects of rank versus those of other socioeconomic variables on health. The civilian data sets allow comparison of veterans and nonveterans, but their smaller size hampers inference, and the racial homogeneity of the WLS cohort is problematic for examining disparities. Our strategy will be to compare coefficients in a uniform linear model across all data.

Before modeling health in a multivariate setting, we examine tabulated characteristics of veterans and nonveterans in our four samples. Table 1 presents means and proportions by rank and veteran status in each dataset. The first two columns display data for all males aged 40 and older in the 2003 SRM, which covered over 32,000 military retirees. Retirees typically have 20 years of military service and thus tend to be at least 40 years old, but veterans with service-related disabilities can also qualify for retirement payments and will also appear in the data. The second two columns display data from the 2001 NSV, which sampled over 20,000 and was designed to represent the entire surviving population of U.S. veterans. The fifth through seventh columns show statistics drawn from a subsample of respondents in the 2001 wave of the PSID

who also answered the questions on military service included in the 1994 wave. The last three columns report means and proportions from the 2004 wave of the WLS. In these data sets, pay grade is measured on the day before retirement, and we group warrant officers and officers together while including noncommissioned officers with other enlisted men. Other research has demonstrated that finer gradations of rank are informative for health but not required.[17] Very small samples in our two civilian data sets preclude examination by individual ranks.

The first row in table 1 shows that officer veterans tend to be about 4 years older on average than their enlisted counterparts in each dataset, which could reflect either the standard bottom-heavy force composition, greater prevalence of enlisted among the Vietnam cohort, or both. Military retirees in the SRM are about 5 years younger than veterans in the NSV, reflective of the relative scarcity of career military in the large and aging World War II and Vietnam cohorts. As a result of the transition to an all-volunteer force and the reduction in military service among people born in 1955 and later years, nonveterans in the 2001 wave of the PSID were almost 10 years younger on average than the older, largely draft-era veterans.

<<TABLE 1 ABOUT HERE>>

In each dataset, enlisted veterans report worse health than do officers. In either the SRM or NSV, about 35 percent of enlisted veterans report their health as fair or poor, compared with only about 20 percent of officers. High prevalence of poor self-reported health in the military datasets is partly due to sample design; fewer veterans in the PSID, which does not oversample disabled veterans, report poor health or VA disability. Regardless of rank, a majority of military retirees in the SRM report having a VA disability rating, and between 30 and 40 percent of all veterans in the NSV had one. By comparison, veterans in the WLS report relatively good health; those birth cohorts served primarily during peacetime and report hardly any VA disability.

It is noteworthy that self-reported health is poorer among enlisted veterans in the PSID than among nonveterans, which is consistent with some findings that suggest military service is bad for health.[18] But enlisted veterans in this sample are also older than nonveterans, which could account for worse health, and officer veterans actually report better health than nonveterans in the PSID. The picture is even blurrier in the WLS, where there is no real difference between enlisted and nonveterans and a majority of officers are in excellent health even by age 64. We revisit the association between military service and health in the multivariate analysis of the next section.

Combat exposure, which is measured in all datasets except the SRM, is somewhat more common among veterans of the officer corps, but the differences are small. Years spent on active duty, the next row in table 1 and also an indicator of exposure, is higher among officers in each dataset except the SRM, where long-term service is largely requisite. The same patterns are evident in the following line, which reports the percentage by rank with 20 years of service.

The socioeconomic and sociodemographic characteristics of respondents are shown in the bottom half of table 1. Rates of marriage and ever-married are higher among officers than among enlisted veterans in all datasets, but enlisted veterans also report more marriage than nonveterans. African-American veterans were predominantly enlisted, a pattern that probably captures the lingering effects of segregation ending only after World War II but which also mirrors greater representation in the enlisted ranks on active duty today.[19] The PSID oversamples African Americans, which explains why 25.7 percent of the sample is black, but fewer veterans in the PSID are African-American. Hispanics are a distinct minority across all datasets; where they do appear, albeit in small numbers, is among enlisted veterans and retirees.

Officers report having 3 to 4 years more education than enlisted veterans in each dataset, about the difference between a high school and a college degree. Typically only a quarter of enlisted veterans had graduated from college by the time of interview. But while their attainment is less than that of officers, who are typically required to have a college degree, enlisted veterans have about the same education as nonveterans. It is therefore remarkable that nonveterans report higher household incomes than enlisted veterans, although they do not earn more than officers. We know that military retirees in general tend to pay a penalty for lost time in the labor market;[20] what is surprising here is that even the relatively short-serving veterans in the PSID appear to be similarly penalized. Lower household income could be a product of or a contributor to the relatively worse health reported by enlisted veterans.

Logit models of self-reported health status

To examine the associations between rank, military service, and health in a multivariate setting, we model the probability of person *i*'s self-reporting either fair or poor health, a dichotomous variable, using the logit transformation:

$$\text{logit[fair or poor health]} = \alpha + \beta \cdot rank_i + \gamma \cdot nonveteran_i + \delta \cdot age_i + B \cdot X_i. \qquad (1)$$

The first two covariates are indicator variables of rank, namely whether person *i* was an officer as opposed to being an enlisted man, and nonveteran status; age is a continuous variable; and X_i is a vector of covariates including race, ethnicity, marital status, education, and income.[21]

An estimate of β, the coefficient of interest, that equals –0.60 for example implies that the odds of reporting fair or poor health are 60 percent lower among officers than enlisted men, ceteris paribus. That is, a negative coefficient is good in this context. To the extent that the covariates control adequately for preexisting conditions and similar concepts, a negative and

significant estimate of β provides evidence of a health disparity by rank favoring officers. Similar interpretations apply in the case of γ, the marginal effect of military service.

We proceed to estimate equation (1) among various subgroups of veterans and nonveterans in our four datasets, reporting the results in tables 2-5. In table 6 we examine how the marginal association of rank with health depends on the composition of the covariate vector X_i in one dataset, the NSV.

Military retirees

Table 2 displays patterns of self-reported health among military retirees in the 2003 SRM. The first column contains the widest subsample of respondents, all males aged 40 and older, while the second through fourth columns examine several subgroups. The top-left cell in the table shows that after controlling for age, race, ethnicity, marital status, education, and income, the odds of an officer reporting fair or poor health are lower by 58.2 percent in the broadest sample, significantly different from zero at the 1 percent level. This is more than twice the impact of having a college degree in these data, a lowering of the odds by 26.2 percent.

<<TABLE 2 ABOUT HERE>>

The odds of reporting poor or fair health increase about 4 percent per year of age in these data. Being African-American increases the odds by 38.6 percent, while being Hispanic is insignificant due to the small subsample. Military retirees who are currently married see odds that are 16.5 percent lower, while never having married has a negative but insignificant association here, probably again due to the small size of the subsample. Education is protective, as is household income, and both associations are statistically significant.

In order to explore what characteristics of veterans may be important for these results, we next restrict the sample to those with 20 years of active-duty service in column 2, then to those

without a VA disability rating in column 3, and finally to the intersection of those two subgroups in column 4. As shown in table 1 and in the second column here, more than 90 percent of the full SRM sample has 20 good years. It comes as little surprise then that restricting the sample to those with 20 good years in the second column changes the coefficients very little.

But when we restrict the sample to retirees without a VA disability rating, interesting patterns emerge. In columns 3 and 4, the officer coefficient is about –0.72, somewhat larger than in columns 1 and 2 although not significantly larger. Remarkably, being African American no longer draws any health penalty, even though the share African American remains at 9 percent, albeit down from 13.6 percent in column 1. The coefficient on having a college degree roughly doubles while the coefficient on log income falls somewhat, but both changes are technically insignificant. Altogether, these patterns are consistent with differential incidence and/or treatment in health outcomes across rank, age, race, and income. Since there is not much variation in length of service in the SRM, it is difficult to say what role it may play in health disparities by rank. Disability, which does vary in this sample, may dampen the effect of rank, but the effect seems negligible. We turn next to a broader sample of veterans with more heterogeneous service experiences.

All veterans

In the four columns of table 3, we reestimate the logit model in equation (1) using data from the 2001 NSV, a survey designed to include all veterans regardless of how long they served. Each column restricts the sample in a manner corresponding to the sample restrictions used in table 2.

<<TABLE 3 ABOUT HERE>>

The first column reports estimates from the model using all male veterans aged 40 and over in the NSV. It reveals an officer effect, –0.201, that is smaller in magnitude than the effect in the SRM but still significant at the 5 percent level. The coefficient on age is also smaller, but the effect of being African American is larger. Marital status has a muted effect in the NSV compared to the SRM. Having less than a high school diploma is significantly associated with a higher probability of poor health in the NSV, and the coefficient on college graduate is also significant and equal and opposite in sign at –0.365. Log income is more protective here than in the SRM, with a coefficient of about –0.68.

As in table 2, the second column in table 3 restricts the sample to those with 20 years of active duty service, which reduces the sample by 85 percent. The officer coefficient jumps to –0.581, is highly significant, and is very similar to that shown in the second column of table 2. Many other coefficients are quite different when compared either to table 2 or to column 1 in table 3. The effect of a college degree reverses sign and becomes highly insignificant, while the coefficient on log income rises to –0.95.

The estimates in the third column, which only conditions on VA disability and has a much larger sample again, are almost identical to those in the first. The officer coefficient is again smaller and falls to 10 percent significance, a college degree is again protective, and the coefficient on income is around –0.70 again.

In the fourth column, the sample dwindles to the mere 575 veterans in the NSV who served for 20 years and did not have a VA disability, and standard errors become correspondingly large. But the coefficient on officer regains significance at the 5 percent level even though it has risen to –0.671, back into the range we saw among retirees in table 2. The coefficients on officer status in columns 2 and 4 provide further evidence that the health gradient

according to rank is associated with length of service. The officer effect is also quite robust in table 3, which is noteworthy given the non-robustness of the education effect. Only age and household income are similarly significant across all four columns. As in columns 3 and 4 in table 2, we see an insignificant association of fair or poor health with being African American in column 4 when the sample is restricted to long-serving, nondisabled vets in the NSV, a small subgroup that is still 10 percent black.

Veterans and nonveterans in the PSID

Table 4 presents our first look at health and rank within a data set that includes nonveterans alongside veterans. The first column presents estimates of equation (1) based on the entire sample, including nonveterans, and the estimated effect of nonveteran status γ appears below that of officer status β. Both coefficients are estimated at approximately –0.32, although significance varies between 10 and 5 percent. That is, enlisted veterans suffer poorer health than both officers and nonveterans, holding all else constant. Viewed this way, rank appears to be protective against the ill effects of military service.

<<TABLE 4 ABOUT HERE>>

Results in table 4 also strongly suggest that rank is more than just a proxy for socioeconomic status. The point estimate of the officer coefficient in column 1 is on par with estimates in tables 2 and 3, and the marginal associations between health and other markers of SES such as race, education, and income are also comparable. The PSID extract includes three times as many nonveterans as veterans, so it is highly unlikely that the coefficients on the SES variables are somehow attenuated by the presence of rank in the equation. Rather, we see a strengthening of the marginal effect of education; not having graduated from high school increases the odds of fair or poor health by 61.2 percent, while a college degree reduces them by

69.8 percent. Household income is less strongly related to health here than in the NSV, but the coefficient, –0.485, is larger than found in the SRM.

The second column in table 4 reestimates the model after dropping nonveterans from the PSID sample, which reduces the sample size by almost two-thirds, to 923. Although the point estimate of the officer effect increases to –0.502, the standard error more than doubles, reducing significance. Sample size is clearly an issue, but estimates were more precise in an even smaller subsample in column 4 of table 3. Sample composition is apparently also important; those 575 veterans in the NSV subsample served considerably longer and were more likely to have seen combat and have a disability rating than were the 923 veterans in the PSID sample.

The third column in table 4 further limits the sample to veterans who were not receiving a VA disability check, our only available measure of VA disability in this dataset. As in column 2, large standard errors in column 3 impede firm conclusions. Removing veterans with combat disabilities reduces the point estimate of the officer effect to –0.357, although the change is technically not significant. There is virtually no change in any of the coefficients on socioeconomic characteristics. We skip running the model on PSID veterans with 20 good years because that subsample dips to a mere 40 people.

Veterans and nonveterans in the WLS

Table 5 mirrors table 4 but uses the 2004 wave of the Wisconsin Longitudinal Study, a follow-up survey of a cohort mostly born in 1939 comprised entirely of white, non-Hispanic high school graduates. Accordingly, we drop from the model variables on age, African American, Hispanic, and less than high school attainment. Although the homogeneity of this cohort is a drawback, its high rate of military service, 54 percent compared to 35 percent in the PSID, makes the WLS an attractive dataset for our purposes.

<<TABLE 5 ABOUT HERE>>

Despite the high rate of military service and relatively large sample size, the marginal effects of both officer status and veteran status on health are statistically insignificant in the first column. The officer coefficient, –0.648, is large and on par with what we found among military retirees, but it is estimated with a very high degree of imprecision. Looking across the columns, we see that restricting the sample to veterans and to veterans without disability payments does not appreciably change the magnitude or the significance of the officer effect. Coefficients on marital status are fairly stable across the columns, as are coefficients on education, which are strongly significant and of comparable size to earlier results. The only incongruent result is that household income is only significant in the first column. But overall, we conclude that as in the PSID, the socioeconomic indicators do not appear to be stealing the thunder of the officer variable, nor the reverse. The statistical insignificance of rank we see in table 5 is probably associated with some aspect or set of qualities of the WLS veteran subsample.

Homogeneity in race, ethnicity, age, and to some extent education are potential culprits, but so are characteristics of the average military experience. In a previous version of this paper, we explored these explanations by re-estimating equation (1) on three subsamples: one drawn from the SRM that was observationally equivalent to the WLS veterans along the dimensions of year of birth, race, and ethnicity; a second drawn from the NSV but otherwise the same as the first; and a third drawn from many NSV birth cohorts but limited to those who served only during peacetime and for a relatively short period of time. The officer effect was of standard size and significance among the first subsample of homogeneous career military but nonexistent among the second and third subsamples. This suggests to us that the SES gradient is not central

to the rank gradient in health, while length of service and combat exposure, two characteristics rare or absent in the PSID and WLS samples, probably are.

Rank versus other measures of SES

We have demonstrated how the association of rank with health is independent of the well-known SES gradient, but a final exercise using cross-sectional data is additionally informative in this regard and as pertains to the pathways. Table 6 depicts a series of nested models estimated on NSV data with sequentially expanding sets of covariates. The first three columns reveal that the officer effect on health is clearly not a proxy for race or marital status. The inclusion of race reduces the officer effect by only a small amount, and marital status affects it even less. But education and income definitely account for some of the broad association between rank and health. When education is included in column 4, the officer effect is attenuated by nearly half. Net of educational differences, officers had 38 percent lower odds than enlisted men of reporting poor or fair health. But the officer effect again shrinks by almost a factor of two when post-service household income is included in column 5, down to 20 percent.

<<TABLE 6 ABOUT HERE>>

We draw two broad inferences here. As we had showed in earlier tables, including all the SES covariates does not remove the effect of officer status on health; we interpret this as evidence of health disparities by rank. Additionally, we find in table 6 that it is education and income at older ages that appear to be more important conduits of the officer effect, rather than race, age, or marital status. This tells us little about whether rank is more a treatment or a marker, but it is suggestive of future strategies to untangle causal pathways.

Discussion

We have revealed a persistent association between military rank and self-rated health in a variety of datasets. Officers are less likely than were enlisted men to report fair or poor health even after controlling for a variety of socioeconomic characteristics typically associated with health. Large samples of military retirees and veterans provided the strongest evidence for health disparities according to rank; in the two non-military datasets, the independent association of rank with health was estimated with considerably less precision, but the coefficients on the officer variable were actually larger.

Our results strongly suggest that length of service is important for the officer effect. In the PSID and WLS, veterans were far less likely than those in the military samples to have served for more than several years. The independent association of health with rank was by far most robust in the Survey of Retired Military, composed almost entirely of career military men who had served at least 20 years. It was second-most robust in the National Survey of Veterans, especially among career veterans, and not at all robust in the WLS, which is comprised of a cohort with very high rates of military participation but extremely low average duration of service, little combat exposure, and no career military. In the PSID sample, which is meant to be representative of the civilian population and thus contains a heterogeneous subsample of veterans, the officer effect was clearly present but estimated with some imprecision.

That length of service appears to amplify the officer effect is certainly interesting. It is worth pointing out that it contrasts sharply with our discovery that length of service seems to erase one well-known health disparity, namely the negative impact of being African American, at least among nondisabled vets in the SRM and the NSV. Although we still see racial disparities in health among many other veteran subpopulations, our findings coincide with those on racial disparities among VA patients.[22] A strengthened effect of rank on health due to longer service

could reflect the opposite of what we believe has happened with race in the military: an extended period of unequal rather than equal treatment in the broad sense of the word. If psychosocial stress or combat exposure is bad for health and inversely related to rank, then we would expect extended service to amplify health disparities in rank.

Length of service could also reflect heightened selection, which if differentially felt through rank could also result in widening health inequality. Officers typically face an "up or out" policy with respect to job tenure, meaning that officers who have completed 20 years of active duty obviously progressed upward rather that outward. Higher ability, whether innate or learned, likely produces both promotion and tenure and better health, so if felt differentially, this selection could show up in health inequality. To be sure, if long-serving enlisted men were subject to the same "up or out" policy, then both subgroups should be equally select, and there would be no health inequalities based solely on selection. The degree of selection across rank, which must be more important now in the context of the all-volunteer force, is an interesting topic for future research.

It is certainly plausible that health disparities by rank reflect differential exposure to psychosocial stress, a treatment that is amplified by length of service. Researchers studying the Whitehall cohorts have speculated that the effects of rank in civil service stem from control over their environments. According to this view, people lower in a bureaucratic hierarchy suffer more psychosocial stress, which, in turn, leads them to have worse health.[23] In qualitative interviews, officer veterans describe learning skills such as leadership and self-confidence, while enlisted men describe having learned discipline and how to obey orders.[24] That is, officers clearly have more control than enlisted men over their work environments and would be at greater risk of psychosocial stress.

Of course, a very acute form of job-related stress in this context, namely combat exposure, may be a key source of the health disparities we have found, but it is not obvious which way it cuts. In our samples, officers are actually more likely to report combat exposure when it is measured, but restricting the sample to long-serving veterans who have likely seen combat amplifies the officer effect on health. To be sure, the Survey of Retired Military does not ask about combat exposure, so it is difficult to say whether it is length of service or combat exposure that is more important for the officer effect; owing to recent U.S. military history, they are practically collinear variables. Combat exposure is a compelling explanation because it is a stress like none other. Further research into the effects of combat exposure is a promising avenue for future efforts.

Combat-related or VA disability is also a compelling explanation for health disparities, but it does not appear to be central to the story in any particular way. In the SRM, we see an attenuated effect of officer status among retirees with VA disability; the reverse is true among veterans in the NSV. We can think of two possible reasons for these contradictory results. First, if injury during combat is a random event, VA disability may be evenly distributed across rank and thus contain little information. Second, if officers are more adept at obtaining a VA disability rating due to their higher status, the effect of disability per se may be confounded in the variable. Patterns in table 1 could support either hypothesis.

We remain circumspect about our current conclusions. Statistical power is weak with only 90 officers in the 2001 wave of the PSID, a very unfortunate situation given the potential of the rich longitudinal data in the PSID to inform us about causal pathways and the evolution of health over the life cycle. Inferences drawn from cross-sectional patterns in the large datasets of veterans must be tempered with the usual caveats. Service-members have different experiences

in the armed forces, and we explore only one such experience, that of serving at a particular rank, and only to a lesser extent the length of service, combat exposure, and disability. Members of the military serve in different branches, receive different types of training, and experience very different day-to-day operations. Some are deployed to other countries while others are not. All of these diverse experiences may have different relationships with health, with causality potentially running in either direction.

Still, we stand by our basic finding that, for whatever reason, veterans who served as officers have better health than veterans who served in the enlisted ranks, even after taking their higher levels of education and income into account. Future work should examine whether this benefit stems from pre-service demographic differences between officers and enlisted men, such as family background and cognitive aptitude, from psychosocial factors such as on-the-job stress and combat exposure, from behavioral factors such as smoking and drinking, or from differential access to health care.

[1] Irma T. Elo and Samuel H. Preston, "Educational differentials in mortality: United States, 1979-85," *Social Science & Medicine* 42, 1 (1996): 47-57; Evelyn M. Kitagawa and Philip Morris Hauser, *Differential mortality in the United States: a study in socioeconomic epidemiology*. Cambridge, MA: Harvard University Press, 1973; Michael G. Marmot, George Davey Smith, Stephen Stansfeld, Chandra Patel, Fiona North, Jenny Head, Ian White, Eric Brunner, and Amanda Feeney, "Health inequalities among British civil servants: the Whitehall II study," *Lancet* 337, 8754 (1991): 1387-1393.

[2] Kelly Bedard and Olivier Deschênes, "The Long-Term Impact of Military Service on Health: Evidence from World War II and Korean War Veterans," *American Economic Review* 96, 1 (2006): 176-194; Carlos Dobkin and Reza Shabani, "The Health Effects of Military Service: Evidence From the Vietnam Draft," *Economic Inquiry* 47, 1 (2009): 69–80; Glen H. Elder, Jr., Michael J. Shanahan, and Elizabeth Colerick Clipp, "Linking combat and physical health: The legacy of World War II in men's lives," *The American Journal of Psychiatry*, 154, 3 (1997): 330-336; Alan Fontana and Robert Rosenheck, "Traumatic war stressors and psychiatric symptoms among World War II, Korean, and Vietnam War veterans," *Psychology and Aging* 9, 1 (1994): 27-33; Norman Hearst, Thomas B. Newman, and Stephen B. Hulley, Delayed Effects of the Military Draft: A Randomized Natural Experiment," *New England Journal of Medicine* 314, 10 (1986): 620-624; Andrew S. London and Janet M. Wilmoth, "Military service and (dis)continuity in the life course: Evidence on disadvantage and mortality from the Health and Retirement Study and the Study of Assets and Health Dynamics Among the Oldest-Old," *Research on Aging* 28, 1 (2006): 135-159.

[3] Michael G. Marmot and Michael E. McDowall, "Mortality decline and widening social inequalities," *Lancet* 328, 8501 (1986): 274-276.

[4] David R. Williams and Chiquita Collins, "US Socioeconomic and Racial Differences in Health: Patterns and Explanations," *Annual Review of Sociology* 21 (1995): 349-386.

[5] Jason Beckfield, "Does Income Inequality Harm Health? New Cross-National Evidence," *Journal of Health and Social Behavior* 45, 3 (2004): 231-248; Leonard I. Pearlin, Scott Schieman, Elena M. Fazio, and Stephen C. Meersman, "Stress, Health, and the Life Course: Some Conceptual Perspectives," *Journal of Health and Social Behavior* 46, 2 (2005): 205-219; Jason Schnittker and Jane D. McLeod, "The Social Psychology of Health Disparities," *Annual Review of Sociology* 31 (2005): 75-103; Linda A. Wray, Duane F. Alwin, and Ryan J. McCammon, "Social Status and Risky Health Behaviors: Results From the Health and Retirement Study," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 60B (2005): S85-S92.

[6] Peter Adams, Michael D. Hurd, Daniel McFadden, Angela Merrill, and Tiago Ribeiro, "Healthy, wealthy, and wise? Tests for direct causal paths between health and socioeconomic status," *Journal of Econometrics* 112, 1 (2003): 3-56; James P. Smith, "Healthy Bodies and Thick Wallets: The Dual Relation between Health and Economic Status," *Journal of Economic Perspectives* 13, 2 (1999): 145-166.

[7] Paradoxically, population health may temporarily improve during economic bad times; see for example Christopher J. Ruhm, "Are Recessions Good For Your Health?" *Quarterly Journal of Economics* 115, 2 (2000): 617-650. But secular declines in SES reduce health.

[8] Elder, Shanahan, and Clipp, "Linking combat and physical health: The legacy of World War II in men's lives"; Fontana and Rosenheck, "Traumatic war stressors and psychiatric symptoms among World War II, Korean, and Vietnam War veterans"; Paula P. Schnurr and Avron Spiro III, "Combat exposure, posttraumatic stress disorder symptoms, and health behaviors as predictors of self-reported physical health in older veterans," *Journal of Nervous and Mental Disease* 187, 6 (1999): 353-359.

[9] Bedard and Deschênes, "The Long-Term Impact of Military Service on Health: Evidence from World War II and Korean War Veterans"; Dobkin and Shabani, "The Health Effects of Military Service: Evidence From the Vietnam Draft."

[10] The correspondence between pay grade and ranks is technically only one-to-one within and not necessarily between branches of the armed services. We will speak of the two concepts as though they were identical because rank is a more familiar term to lay people and because our measures are based off of pay grade, which is uniform across branches.

[11] Otis Dudley Duncan, "A Socioeconomic Index for All Occupations," in *Occupations and Social Status*, ed. Albert J. Reiss (New York: Free Press, 1961).

[12] Robert J. Keehn, "Military Rank at Separation and Mortality," *Armed Forces & Society* 4, 2 (1978): 283-292.

[13] Ryan D. Edwards, "Widening Health Inequalities Among U.S. Military Retirees Since 1974," *Social Science & Medicine* 67, 11 (2008): 1657-1668.

[14] Keehn, "Military Rank at Separation and Mortality."

[15] Aimée Dechter and Glen H. Elder, Jr., "World War II mobilization in men's work lives: Continuity or disruption for the middle class," *American Journal of Sociology* 110, 3 (2004): 761-793; Hirsch, B. T. and S. L. Mehay, "Evaluating the Labor Market Performance of Veterans Using a Matched Comparison Group Design," *Journal of Human Resources* 38, 3 (2003): 673-700; Alair MacLean, "The privileges of rank: The peacetime draft and later life attainment," *Armed Forces & Society* 34, 4 (2008): 682-713.

[16] Ellen L. Idler and Yael Benyamini, "Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies," *Journal of Health and Social Behavior* 38, 1 (1997): 21-37.

[17] Edwards, "Widening Health Inequalities Among U.S. Military Retirees Since 1974."

[18] Bedard and Deschênes, "The Long-Term Impact of Military Service on Health: Evidence from World War II and Korean War Veterans."

[19] David R. Segal and Mady Wechsler Segal, "America's Military Population," *Population Bulletin* 59, 4.

[20] David S. Loughran, *Wage Growth in the Civilian Careers of Military Retirees* (Santa Monica: RAND National Defense Research Institute, 2002).

[21] Dichotomizing health in this way is standard in the literature. Ordered logit results were similar, a standard result. We experimented with a quadratic in age and with age categoricals, but we found they did not outperform a basic linear specification. We also explored results using the probit, but because the underlying probability of fair of poor health varied substantially across samples, we prefer the logit for its more easily interpretable and uniformly valid marginal

effects. We tried treating self-reported health status as ordered, but we found that the substantive results did not differ from when the outcome is treated as dichotomous.

[22] Kevin G. Volpp, Roslyn Stone, Judith R. Lave, Ashish K. Jha, Mark Pauly, Heather Klusaritz, Huanyu Chen, Liyi Cen, Nancy Brucker, and Daniel Polsky, "Is Thirty-Day Hospital Mortality Really Lower for Black Veterans Compared with White Veterans?" *Health Services Research* 42, 4 (2007): 1613-1631.

[23] Marmot et al., "Health inequalities among British civil servants: the Whitehall II study."

[24] Alair MacLean, "The Cold War and Modern Memory: Veterans Reflect on Military Service," *Journal of Political and Military Sociology* 36, 1 (2008): 103-130.

Table 1. Sample characteristics in four datasets by rank and veteran status

	2003 SRM		2001 NSV		2001 PSID			2004 WLS		
	Enlisted	Officers	Enlisted	Officers	Enlisted	Officers	Nonveterans	Enlisted	Officers	Nonveterans
	1	2	3	4	5	6	7	8	9	10
Age	54.9	58.7	60.9	63.8	59.3	62.5	51.2	64.4	64.1	64.4
Percentage in:										
Excellent health	7.6%	19.5%	10.7%	21.0%	14.9%	31.1%	22.0%	23.9%	51.4%	24.1%
Very good health	23.9%	32.5%	22.6%	27.0%	34.7%	40.0%	30.7%	39.4%	25.7%	36.4%
Good health	33.7%	28.2%	30.5%	30.9%	28.1%	17.8%	30.8%	27.1%	20.3%	29.3%
Fair health	23.6%	14.5%	22.6%	13.1%	16.1%	5.6%	11.8%	7.5%	2.7%	7.9%
Poor health	11.2%	5.3%	13.6%	8.1%	6.2%	5.6%	4.7%	2.0%	0.0%	2.3%
Fair or poor health	34.8%	19.8%	36.2%	21.2%	22.3%	11.2%	16.5%	9.5%	2.7%	10.2%
Has a VA disability rating	65.3%	62.8%	30.0%	39.6%	4.1%	1.1%	-	0.9%	2.0%	-
Exposed to combat	-	-	48.3%	58.8%	35.5%	38.9%	-	7.5%	35.1%	-
Years on active duty	21.1	23.4	5.9	12.4	4.0	7.9	-	2.5	3.5	-
20 years of service	89.3%	94.1%	10.9%	34.9%	2.4%	18.0%	-	0.0%	0.0%	-
Married	82.1%	89.4%	71.2%	81.2%	83.2%	88.9%	82.1%	86.1%	91.9%	83.7%
Never married	2.2%	1.1%	4.6%	3.4%	1.9%	0.0%	1.9%	3.4%	2.0%	4.4%
African American	15.5%	9.4%	9.5%	4.3%	19.8%	4.4%	25.7%	-	-	-
Hispanic	4.0%	2.0%	2.5%	0.7%	0.4%	0.0%	0.5%	-	-	-
Years of education	14.4	18.4	13.0	16.1	13.3	15.8	13.3	13.4	17.5	14.5
Has a college degree	24.4%	88.1%	19.6%	73.6%	23.6%	77.8%	30.0%	21.9%	95.9%	40.1%
Household income	$72,490	$125,953	$47,843	$87,718	$72,059	$121,860	$86,539	$77,844	$143,958	$87,012
N	13,229	6,195	10,591	1,339	833	90	1,711	1,486	148	1,376

Sources: Survey of Retired Military, 2003; National Survey of Veterans, 2001; Panel Study of Income Dynamics, 2001; Wisconsin Longitudinal Study, 2004

Table 2. Multivariate logit models of self-reported fair or poor health among retired military men 40 years and older

	1		2		3		4	
Is an officer	-0.582	***	-0.560	***	-0.723	***	-0.715	***
	(0.047)		(0.050)		(0.126)		(0.128)	
Age	0.040	***	0.046	***	0.050	***	0.050	***
	(0.002)		(0.002)		(0.004)		(0.005)	
African American	0.386	***	0.408	***	0.092		0.118	
	(0.046)		(0.049)		(0.131)		(0.133)	
Hispanic	0.123		0.149		-0.199		-0.169	
	(0.089)		(0.095)		(0.266)		(0.267)	
Currently married	-0.165	***	-0.140	***	-0.376	***	-0.358	***
	(0.046)		(0.050)		(0.104)		(0.107)	
Never married	-0.175		-0.409	***	-0.556	*	-0.468	
	(0.125)		(0.153)		(0.307)		(0.310)	
Educational attainment (reference: high school graduate)								
Less than high school	0.141		-0.156		0.189		0.054	
	(0.250)		(0.281)		(0.443)		(0.461)	
Some college	-0.042		-0.025		-0.175		-0.176	
	(0.054)		(0.058)		(0.109)		(0.111)	
College graduate	-0.262	***	-0.282	***	-0.601	***	-0.623	***
	(0.061)		(0.066)		(0.138)		(0.141)	
Log household income	-0.350	***	-0.330	***	-0.245	***	-0.238	***
	(0.022)		(0.024)		(0.042)		(0.042)	
Constant	1.176	***	0.498	*	-1.358	**	-1.428	***
	(0.275)		(0.292)		(0.551)		(0.563)	
Observed π	0.300		0.289		0.117		0.119	
N	19,424		17,653		6,827		6,435	
LR $\chi 2$ statistic	1,549		181		385		362	
Prob > chi-square	0.000		0.000		0.000		0.000	
Pseudo R2	0.065		0.070		0.078		0.077	
Sample characteristics			20 years		no VA disability		no VA disability 20 years	

Source: 2003 Survey of Retired Military.
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Multivariate logit models of self-reported fair or poor health among veterans 40 years old and older

	1		2		3		4	
Is an officer	-0.201	**	-0.581	***	-0.198	*	-0.671	**
	(0.079)		(0.171)		(0.111)		(0.328)	
Age	0.010	***	0.019	***	0.016	***	0.033	***
	(0.002)		(0.006)		(0.002)		(0.011)	
African American	0.549	***	0.550	***	0.467	***	0.078	
	(0.070)		(0.169)		(0.092)		(0.335)	
Hispanic	0.201		0.169		0.044		-1.048	
	(0.132)		(0.372)		(0.177)		(1.083)	
Currently married	0.005		0.089		-0.061		-0.278	
	(0.053)		(0.158)		(0.067)		(0.272)	
Never married	-0.197	*	-0.033		-0.264		-0.137	
	(0.106)		(0.465)		(0.130)		(0.661)	
Educational attainment (reference: high school graduate)								
Less than high school	0.365	***	-0.177		0.391	***	-0.581	
	(0.067)		(0.325)		(0.081)		(0.526)	
Some college	-0.068		0.098		-0.142	**	0.017	
	(0.051)		(0.144)		(0.065)		(0.252)	
College graduate	-0.365	***	0.135		-0.530	***	-0.316	
	(0.063)		(0.181)		(0.083)		(0.335)	
Log household income	-0.680	***	-0.950	***	-0.715	***	-0.708	***
	(0.032)		(0.117)		(0.040)		(0.205)	
Constant	5.867	***	8.236	***	5.620	***	4.779	**
	(0.367)		(1.315)		(0.459)		(2.336)	
Observed π	0.292		0.322		0.282		0.221	
N	11,930		1,619		8,224		575	
LR $\chi 2$ statistic	1,373		172		1,100		57	
Prob > chi-square	0.000		0.000		0.000		0.000	
Pseudo R2	0.089		0.085		0.112		0.094	
Sample characteristics			20 years		no VA disability		no VA disability 20 years	

Source: 2001 National Survey of Veterans.
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Multivariate logit models of self-reported fair or poor health among men 40 years and older

	1		2		3	
Is an officer	-0.325	*	-0.502		-0.357	
	(0.174)		(0.386)		(0.390)	
Is not a veteran	-0.317	**				
	(0.141)					
Age	0.040	***	0.054	***	0.052	***
	(0.005)		(0.008)		(0.008)	
African American	0.571	***	0.587	**	0.611	**
	(0.129)		(0.232)		(0.243)	
Hispanic	0.892		1.136		1.196	
	(0.658)		(1.256)		(1.259)	
Currently married	-0.080		-0.289		-0.257	
	(0.152)		(0.247)		(0.258)	
Never married	-0.515		-0.568		-0.524	
	(0.425)		(0.807)		(0.811)	
Educational attainment (reference: high school graduate)						
Less than high school	0.612	***	0.551	*	0.678	**
	(0.154)		(0.288)		(0.295)	
Some college	-0.288	*	-0.154		-0.077	
	(0.153)		(0.221)		(0.227)	
College graduate	-0.698	***	-0.735	***	-0.811	***
	(0.168)		(0.258)		(0.277)	
Log household income	-0.485	***	-0.303	**	-0.320	***
	(0.073)		(0.119)		(0.123)	
Constant	1.717	**	-1.055		-0.860	
	(0.867)		(1.412)		(1.460)	
Observed π	0.181		0.212		0.203	
N	2,681		923		888	
LR $\chi 2$ statistic	411		129		123	
Prob > chi-square	0.000		0.000		0.000	
Pseudo R2	0.162		0.135		0.137	
Sample characteristics			Veterans		Veterans no VA disability payment	

Source: 2001 Panel Study of Income Dynamics
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Multivariate logit models of self-reported fair or poor health among white men from Wisconsin 40 years and older

	1	2	3
Is an officer	-0.648	-0.724	-0.674
	(0.532)	(0.555)	(0.558)
Is not a veteran	0.155	-	-
	(0.130)		
Age	-	-	-
African American	-	-	-
Hispanic	-	-	-
Currently married	-0.354 **	-0.397	-0.263
	(0.180)	(0.261)	(0.276)
Never married	0.494 *	0.692 *	0.847 **
	(0.289)	(0.419)	(0.429)
Educational attainment (reference: high school graduate)			
Less than high school	-	-	-
Some college	-0.431 **	-0.734 ***	-0.783 ***
	(0.187)	(0.275)	(0.282)
College graduate	-0.647 ***	-0.696 ***	-0.744 ***
	(0.168)	(0.264)	(0.271)
Log household income	-0.321 ***	-0.197 *	-0.170
	(0.075)	(0.109)	(0.111)
Constant	1.678 **	0.419	-0.001
	(0.784)	(1.144)	(1.174)
Observed π	0.095	0.089	0.088
N	3,010	1,634	1,617
LR χ2 statistic	81	40	38
Prob > chi-square	0.000	0.000	0.000
Pseudo R2	0.043	0.041	0.040
Sample characteristics		Veterans Military	Veterans No VA disability payment

Source: 2004 Wisconsin Longitudinal Study
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Nested multivariate logit models of self-reported fair or poor health among veterans 40 years and older

	1		2		3		4		5	
Is an officer	-0.826	***	-0.794	***	-0.776	***	-0.382	***	-0.201	**
	(0.071)		(0.071)		(0.071)		(0.077)		(0.079)	
Age	0.022		0.024	***	0.024	***	0.020	***	0.010	***
	(0.002)	***	(0.002)		(0.002)		(0.002)		(0.002)	
African American			0.732	***	0.691	***	0.645	***	0.549	***
			(0.066)		(0.067)		(0.068)		(0.070)	
Hispanic			0.328	***	0.329	***	0.289	**	0.201	
			(0.128)		(0.128)		(0.130)		(0.132)	
Currently married					-0.435	***	-0.392	***	0.005	
					(0.048)		(0.049)		(0.053)	
Never married					-0.081		-0.062		-0.197	*
					(0.100)		(0.102)		(0.106)	
Educational attainment (reference: high school graduate)										
Less than high school							0.524	***	0.365	***
							(0.065)		(0.067)	
Some college							-0.181	***	-0.068	
							(0.049)		(0.051)	
College graduate							-0.710	***	-0.365	***
							(0.060)		(0.063)	
Log household income									-0.680	***
									(0.032)	
Constant	-1.884	***	-2.143	***	-1.816	***	-1.479	***	5.867	***
	(0.107)		(0.110)		(0.118)		(0.124)		(0.367)	
Observed π	0.292		0.292		0.292		0.292		0.292	
N	11,930		11,930		11,930		11,930		11,930	
LR χ2 statistic	291		415		502		816		1,373	
Prob > chi-square	0.000		0.000		0.000		0.000		0.000	
Pseudo R2	0.019		0.027		0.033		0.053		0.089	

Source: 2001 National Survey of Veterans
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1