



# Military service and smoking in a cohort of northern Vietnamese older adults

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## Abstract

**Objectives** Wide-ranging scholarship demonstrates war's impacts on US veterans' health. We ask whether, among Vietnamese men of a certain age, wartime experiences contributed to initiating smoking, and thus shaped one behavioral pathway linking war exposure and older adult health.

**Methods** We analyze the Vietnam Health and Aging Pilot Study (VHAPS), a survey of adults ages 55 and older ( $N = 405$ ) conducted in one commune of northern Vietnam. We implement Cox discrete-time proportional hazards models to discern the effects of military service upon the initiation of smoking.

**Results** Military service results in a heightened risk of initiating smoking within this cohort (HR 2.13, [CI 1.36, 3.35]). Smoking initiation is also significantly gendered and age graded. Socioeconomic position and social capital variables in the models are statistically insignificant.

**Conclusions** This study finds that, among older northern Vietnamese men whose early adulthood coincided with mass mobilization in the Vietnam War, involvement in formal military service significantly increased the risk of initiating smoking. Military-induced smoking emerges where tobacco products were not provided by the military institution, but where social availability of tobacco was widespread.

**Keywords** Veterans · War · Smoking · Tobacco · Vietnam · Aging and health

## Introduction

Studies of US veterans demonstrate a marked effect of military service upon health in later adulthood (Elder et al. 1997). One pathway along which military service influences health is via health behaviors, such as the relatively high rates of lifetime and current smoking among veterans and current service members relative to nonveterans and civilians (Wedge and Bondurant 2009). Bedard and Deschênes (2006) have attributed significant excess premature mortality among US veterans to 'military induced' smoking. Cross-nationally, once nations have progressed beyond the earliest stages of the tobacco epidemic, smoking is most common among the poor and poorly educated (Giskes et al. 2005; Morrow et al. 2002; Schaap and Kunst 2009; Schulze and Mons 2006; Siegel 2014). Yet, military service's association with smoking often emerges independent of robust socioeconomic determinants (Boyko et al. 2015; Smith et al. 2008). Heightened risk of smoking among veterans seems to arise due to social aspects of service, for instance conformity to normative behaviors and maladaptive coping to occupational stresses, especially combat duties (Bray et al. 1999; Smith et al. 2008). Tobacco industry and military institutional forces also play a role in the situation of US veterans, as evidenced by the tobacco industry's heavy marketing toward US military personnel. Support for smoking may be particularly pronounced in the US armed services case as a result of practices which made cigarettes easily and cheaply available, e.g., the inclusion of cigarettes in rations issued to

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overseas personnel, and the discounted sale of cigarettes on military bases (Ballweg and Li 1991; Smith and Malone 2009).

With few exceptions, the association between military service and smoking has not been established in other populations that have broadly mobilized for war. Vietnam provides a valuable case for consideration. Men in Vietnam have among the highest rates of smoking in Asia, yet Vietnamese women exhibit among the lowest rates of smoking in the world (Jenkins and Dai 1997; Morrow et al. 2002). In Vietnam, widespread tobacco use has been linked to transnational tobacco companies' aggressive Asia-focused marketing campaigns, as well as to profitable Vietnamese state-managed tobacco production (Morrow and Barraclough 2003; Wike 1996). In a country where male smoking is pervasive, the highest rates have been observed among those in the military (Le et al. 1999). The highest prevalence of daily smoking (27 %) exists among middle-age men (i.e., ages 45–64 in 2010), whose young adulthood coincided with heavy military mobilization for the Vietnam War (Palipudi et al. 2012). These patterns raise questions about the interplay between military service and smoking behavior, and the ways military service may shape the diffusion and consumption processes associated with tobacco epidemics (Schulze and Mons 2006).

We reason that, even in the absence of government practices which actively facilitate soldiers' easy access to cheap or free tobacco, military service will enhance men's initiation of smoking. Smoking behavior is embedded within a wider social context, such that social capital, normative expectations, and lines of stratification influence patterns of smoking initiation, practice and cessation (Morrow et al. 2002; Pfortner et al. 2015; Takakura 2015). In North Vietnam, direct involvement of tobacco companies and the armed forces in promoting or distributing tobacco products did not occur (to the best of our knowledge). In this sense, the institutional context around smoking diverged from the US case. However, other elements of service comparable to US soldiers' experiences suggest a heightened propensity for smoking initiation and persistence. Given that anxiety and depression influence smoking onset (Patton et al. 1998), the highly stressful conditions in which wartime service was performed, often on very lengthy deployments, promote smoking initiation. Highly male-dominated military milieu and shared wartime stressors embedded soldiers in contexts with widespread social availability of cigarettes and unquestioned social acceptance of smoking (Cronan et al. 1991). The association of smoking with heroic masculinity was captured in popular, widely circulated photos of the revered Ho Chi Minh smoking a cigarette. Recent research conducted in Vietnam reveals widespread perceptions of smoking as

“normal” male behavior (Morrow et al. 2002), as well as a broad social availability of tobacco, in which men convey camaraderie and polite manners by sharing a cigarette (Morrow and Barraclough 2003). Assuming that service in the war-time armed forces placed young men in highly stressful, male-dominated contexts that heightened the social availability and normative acceptance of smoking even beyond relatively high levels in civilian life (Ma et al. 2002; Tsai et al. 2008), we reason that youthful smoking and the risks of initiating smoking were heightened by military service.

Research investigating the link between military service and smoking in nonwestern and developing societies remains sparse. The few studies conducted in Asia and the Middle East do suggest that in certain settings, especially where military institutions provide free or discounted cigarettes (as in South Korea until 2009), military service exacerbates smoking initiation (Allem et al. 2012). Elsewhere, as in Syria, smoking within the military is pervasive, but the association is attributable to confounding characteristics such as enlistees' relatively low levels of education (Maziak et al. 2001). A main objective of the current study is to ascertain whether the gender- and age-specific risks of starting smoking among Vietnamese young adults were made even greater as a result of participation in war-era military service. We hypothesize that, as a result of occupational stressors and social availability of cigarettes in the war-era military institutional context, military service will result in heightened risk of initiating smoking.

## Methods

### Sample

Data from the Vietnam Health and Aging Pilot Study (VHAPS) form the basis of our analyses. Conducted in 2010, in collaboration with Hanoi's Institute for Family and Gender Studies, the VHAPS collected extensive information on health, wellbeing, and life-course measures of military service and war exposure. Face-to-face interviews were conducted in one northern commune of the Red River Delta, a densely populated region widely affected by US bombing campaigns (Merli 2000). The VHAPS sample was constructed by combining two complementary approaches. The first consists of a follow-up with older adults first surveyed in the Vietnam Longitudinal Survey (VLS). Conducted annually from 1995 to 1998, the VLS utilized two-stage, stratified random sampling from commune and district household registrations to arrive at a representative sample of the Red River Delta (Hirschman and Nguyen 2002). VHAPS investigators determined the survival and residential status of original VLS respondents

in the targeted war-era age cohorts and sought to conduct follow-up interviews. The rate of follow-up with original VLS respondents in the study commune was 70 %, resulting in a sample size of 215. Most sample attrition between 1995–1998 and 2010 was due to mortality in the intervening years. To achieve sufficient sample size and statistical power for analyzing the effects of military service and war exposures, the VLS follow-up sample was supplemented with an additional random sample of adults 55 and older drawn from the same commune household registration ( $N = 190$ ). The response rate for this supplementary sample was greater than 90 %. Informed consent was obtained from all participants prior to initiation of the interview.

Regarding sample representativeness, a comparison of VHAPS sample characteristics to province and region resident characteristics in the 2009 census of Vietnam suggest VHAPS sample demographics (e.g., sex, age, marital status and education) does not diverge significantly from regional or provincial demographics.

#### Analytical model and measures

Our dependent variable derives from a series of questions, asked of all VHAPS respondents, regarding current and past smoking behavior. Respondents indicating that they currently smoke (either hand-rolled or manufactured cigarettes or water pipe), or smoked in the past, were asked to provide the age at which they first began smoking and, where applicable, the age at which they stopped smoking. With this information, we model initiation of smoking in the life-course using discrete-time event history analysis, a method commonly used to model the association between smoking and time-variant life-course factors (Chen and Unger 1999; Sartor et al. 2008). Discrete-time event history methods utilize information on the timing of events to estimate a baseline hazard function to account for the relative probability of an outcome occurring at particular points in time (Kleinbaum and Klein 2005). Event history methods also account for biases associated with incomplete event information due to arbitrary data collection timing and resultant censoring of cases (Allison 2014). The data are structured as person-years and our dependent variable, initiating smoking, is coded “1” in the person-years in which individuals reported beginning the use of smoked tobacco. Smoking initiation is treated as a single event with individuals no longer a part of the risk set after the event’s occurrence.

The baseline hazard function in this study is modeled as a semi-parametric function of time using a cox proportional hazards model. No assumptions are made regarding the shape of the baseline hazard function, allowing for wide

possible variance over time in the hazard of smoking initiation due to the age-dependent nature of this behavior (Cox 1972). This approach allows for assessment of the *ceteris paribus* influence of explanatory variables that vary with time and across subjects, under the assumption of proportional hazards—that the magnitude of the effect of time-varying covariates remains stable with time (Allison 2014).

Given the dichotomous measure of smoking onset, a logistic regression taking the form of the following equation is estimated as follows:

$$h(t) = h_0(t) \times \exp(X_{it}\beta),$$

where the hazard of initiating smoking behavior is a function of the baseline hazard of onset of smoking behavior at age  $t(h_0)$ , and a vector of independent variables for individual  $i$  at age  $t$  ( $X_{it}$ ).  $\beta$  is the estimated vector of parameters for the effects of the independent variables. We estimate this model using the `stcox` model in STATA version 12.1.

Having experienced active military duty is the focal explanatory variable in our models. All VHAPS respondents were asked whether they had ever served in the military. For those answering in the affirmative, among other details on location, branch and terms of service, they were also asked for the year they first entered the military and the year and month they left active military service. We measure active military service involvement as a time-variant, binary variable coded “1” in those person-years in which an individual was involved in formal military service in any branch of the Vietnam People’s Army; we exclude paramilitary volunteers in this measure. Although paramilitaries’ duties at times approximated military service, the more informal, sporadic nature of their service prevents systematic analysis in this pilot study.

We also employ a series of control variables (summarized in Table 1) that measure respondents’ socioeconomic positions and dimensions of social capital. Previous research suggests that, dependent on stage in the tobacco epidemic, education and other indicators of socioeconomic status are significant predictors of smoking and thus potential confounders in our models (Giskes et al. 2005; Schaap and Kunst 2009; Schulze and Mons 2006). Other studies observe that across diverse settings social capital, measured through friendship ties and participation in social organizations, influences youth smoking behavior (Takakura 2015; Pfortner et al. 2015). To address potential confounders, we include in our models measures of lifetime occupation, educational attainment, current household financial circumstances, marital status, and frequency of association with community organizations and friends.

**Table 1** Outcome and explanatory variables in cox proportional hazards models. Source: Vietnam Health and Aging Pilot Study, VHAPS

Variable	Description	Form
Current smoking status	Person-year use of any smoked tobacco product	Time-variant
Involvement in military service	Person-year involvement in formal military service (1), or not involved in formal military service (0)	Time-variant
Age	Age in years	Subsumed in model
Gender	Male (0) or female (1)	Time-invariant
Marital status	Person-year marital status, respondent is currently married (1), or currently unmarried (0)	Time-variant
Educational attainment	10+ years of education (1), or fewer (0)	Time-invariant
Main lifetime occupation	Whether employed in agriculture (1) or nonagricultural occupation (0)	Time-invariant
Current financial condition of household	Respondent report if household income is adequate to meet daily needs (1) or inadequate (0)	Time-invariant
Social engagement- community level	Community involvement at least monthly (1), or less than monthly (0)	Time-invariant
Social engagement: friends	Socializes/visits with friends at least weekly (1), or less than weekly (0)	Time-invariant

## Results

Table 2 provides descriptive statistics for the full VHAPS sample, and male and female subsamples. Just over one-quarter of the VHAPS sample (26.9 %), and over half of male respondents, are military veterans. Given that slightly greater than half of the sample consists of women (54.6 %), and that women are highly unlikely to have smoked in their lifetimes (2.3 % of women versus 72.3 % of men) or to be veterans, in subsequent regression models we produce estimates for the full sample and male subsample. The small number of smoking onset events prevents our estimate of hazard ratios within the female subsample. Most of the VHAPS sample is currently married (74.1 %), their average age is 66.5, most have worked in agriculture as their primary occupation (79 %), and the majority has fewer than 10 years of education (89.1 %). Significantly greater proportions of female respondents than males are currently unmarried, have less than 10 years of schooling, and have labored in agriculture as their main occupations. Our time-invariant measures of social participation suggest high levels of social engagement among respondents, with males more likely to engage in community activities and visit friends regularly as compared to sampled females.

In the bivariate analyses, across the full sample and male and female subsamples, we observe a significant association between veteran status and lifetime smoking. Descriptive statistics (results not shown) also reveal that military veterans begin smoking behavior at an earlier age than nonveterans, with veterans averaging 20.9 years old at onset, versus 21.4 years old for non-veterans. And smoking onset tends to occur after respondents joined

the military, with 66.1 % of veterans beginning smoking after having joined the military. Of this 66.1, 16.7 % begin smoking the year of enlistment, 8.3 % the year following enlistment, and the remainder in subsequent years.

Results of our discrete-time Cox proportional hazards models are shown in Table 3. We report hazard ratios (HRs) and 95 % confidence intervals for the full sample and male subsample. The Cox proportional hazards model allows for estimation of time-variant covariates under the assumption that predictive covariates are multiplicatively related to the hazard function. The Schoenfeld residual test assesses whether an estimated model complies with this assumption (Schoenfeld 1982). *P* values for each predictor produced by the Schoenfeld residual test are displayed in Table 3.

Results displayed in Model 1 indicate that having performed military service in the era of the American War significantly increased respondents' odds of initiating smoking (HR = 2.13, [CI 1.36, 3.35]). This result maintains in the male subsample analysis as displayed in Model 2 (HR = 1.88, [CI 1.18, 2.98]). This suggests that military service in the Vietnam People's Army (VPA) enhanced the high risk of initiating smoking among males in young adulthood within this heavily mobilized cohort of men. It is also evident that smoking is a strongly male-dominated practice, as women demonstrate far lower odds of having started smoking in any given person-year in comparison with their male counterparts (HR = 0.02, [CI 0.01, 0.05]). Due to their small number of smoking initiation events, clustered heavily among those with military service, Cox proportional hazard models yield unstable results for the female subsample (not shown).

**Table 2** Social and demographic characteristics of sample, by gender, Vietnamese adults age 55 and older (Vietnam Health and Aging Pilot Survey, VHAPS 2010)

	Full sample N/ (%)	Male subsample N/(%)	Female subsample N/(%)	Ever smoked, total sample (%)	$p > \chi^2$	Ever smoked, male subsample (%)	$p > \chi^2$	Ever smoked, female subsample (%)	$p > \chi^2$
Total	405 (100)	188 (46.4)	217 (54.6)	34.8		–		–	
Military veteran	109 (26.9)	102 (54.2)	7 (3.2)	78.9	***	81.4	**	42.9	***
Nonveteran	296 (73.1)	86 (45.7)	210 (96.8)	14.6		61.6		1	
Female	217 (54.6)	–	–	2.3	***	–		–	
Male	188 (46.4)	–	–	72.3		–		–	
Currently unmarried (i.e., widowed, divorced, never married)	105 (25.9)	20 (10.6)	85 (39.2)	13.3	***	65		1.2	
Currently married	300 (74.1)	168 (89.4)	132 (60.8)	42.3		73.2		3	
Current age: 55–64	211 (52.1)	101 (53.7)	110 (50.7)	38.4		78.2	*	1.8	
Current age: 65–74	110 (27.2)	48 (25.5)	62 (28.6)	33.6		72.9		3.2	
Current age: 75+	84 (20.7)	39 (20.7)	45 (20.7)	27.4		56.4		2.2	
Less than 10 years of education	357 (89.1)	153 (81.4)	204 (94.0)	22.7	***	71.1		2	
10+ years of education	48 (11.9)	35 (18.6)	13 (6.0)	49.2		76.9		6.3	
Lifetime occupation: outside of agriculture	85 (21.0)	57 (30.3)	28 (12.9)	54.1	***	80.7		0	
Lifetime occupation: in agriculture	320 (79.0)	131 (69.7)	189 (87.1)	29.7		68.7		2.7	
Income inadequate to meet daily needs	135 (33.3)	55 (29.3)	80 (36.9)	29.6		69.1		2.5	
Income adequate to meet daily needs	270 (66.7)	133 (70.7)	137 (63.1)	37.4		73.7		2.2	
Community involvement: less than monthly	233 (57.5)	85 (45.2)	148 (68.2)	25.8	***	64.7	*	3.4	
Community involvement: at least monthly	172 (42.5)	103 (54.8)	69 (31.8)	47.1		78.6		0	
Socializes with friends: less than weekly	57 (14.1)	15 (8.0)	42 (19.4)	19.3	**	66.7		2.4	
Socializes with friends: at least weekly	348 (85.9)	173 (92.0)	175 (80.7)	37.4		72.8		2.3	

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

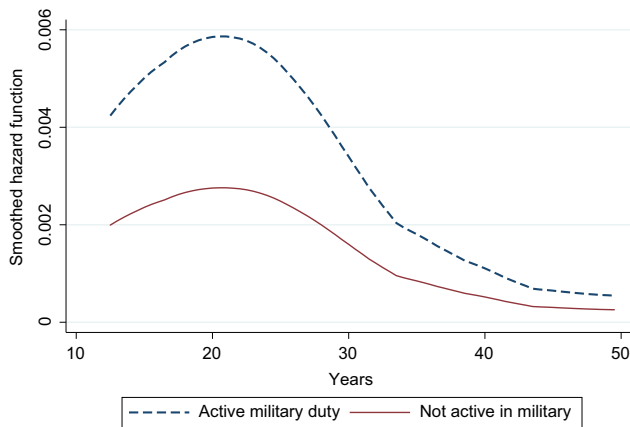
Figure 1 presents a graph of the smoothed curve of the baseline hazard function produced using kernel density estimation and stratified by military status using the `stcurve` command in STATA 12.1. Besides the statistically significant hazard ratios associated with military service and gender, and a pronounced age effect (see the survival curve shown in Fig. 1), other covariates included in the model do not exhibit statistically significant associations with smoking onset. The absence of a significant effect of socioeconomic position, as indicated by educational attainment, lifetime occupation, or current household financial conditions, may be due to Vietnam’s relatively early stage in the tobacco epidemic in the mid-twentieth century, the relatively small sample size, or the time-invariant nature of our socioeconomic status variables.

Schoenfeld testing indicate non-compliance with the proportional hazard assumption for one covariate—lifetime occupation in agricultural work. The indication that the slope of the residuals against time for this variable did not equate to zero suggests that having one’s main occupation in agriculture exerted inconsistent influence upon the initiation of smoking at different ages. To check for robustness of findings given the result of non-proportionality for this control variable, we estimate models that allow for the effect of the lifetime agricultural work variable to vary with time (Allison 2014). Models 3 and 4 in Table 3 present these results. We find that engagement in agricultural occupations increases the risk of engaging in smoking as reflected in statistically main effects (HR = 3.61, [CI 1.22, 10.67] in Model 3). The statistically

**Table 3** Cox proportional hazard models predicting imitation of smoking behavior in a sample of northern Vietnamese adults age 55 and older (Vietnam Health and Aging Pilot Survey 2010)

	Model 1: men and women			Model 2: men			Model 3: men and women			Model 4: men					
	Hazard ratio	$P >  z $	95 % CI	Test of PH $p > \chi^2$	Hazard ratio	$P >  z $	95 % CI	Test of PH $p > \chi^2$	Hazard ratio	$P >  z $	95 % CI	Test of PH $p > \chi^2$	Hazard ratio	$P >  z $	95 % CI
Military service (ref: non-military)	2.13**	0.001	(1.36, 3.35)	0.91	1.88**	0.007	(1.18, 2.98)	0.65	2.05**	0.002	(0.72, 2.20)	0.65	1.81*	0.012	(1.14, 2.86)
Female (ref: male)	0.02***	0.000	(0.01, 0.05)	0.72	-	-	-	-	0.02***	0.000	(0.01, 0.05)	-	-	-	-
Educational attainment, 10+ years (ref: attainment <10 years)	1.12	0.620	(0.72, 1.75)	0.71	1.09	0.718	(.69, 1.71)	0.57	1.14	0.558	(0.73, 1.78)	0.57	1.110	0.645	(0.71, 1.75)
Current HH financial condition: household receives adequate income (ref: inadequate income)	1.05	0.815	(0.71, 1.55)	0.75	1.04	0.658	(0.72, 1.67)	0.85	1.06	0.786	(0.71, 1.56)	0.85	1.040	0.833	(0.70, 1.55)
Married status (ref: currently non-married)	1.27	0.398	(0.73, 2.23)	0.50	1.33	0.335	(0.75, 2.36)	0.60	1.26	0.420	(0.72, 2.20)	0.60	1.310	0.350	(0.74, 2.33)
Lifetime occupation in agriculture (ref: non-agricultural occupation)	1.15	0.524	(0.75, 1.74)	0.03	1.10	0.863	(.70, 1.54)	0.03	3.61*	0.020	(1.22, 10.67)	0.03	3.57*	0.022	(1.21, 10.57)
Engages in community activities at least monthly (ref: does not engage in activities)	1.32	0.140	(0.91, 1.91)	0.73	1.38	0.091	(0.95, 2.02)	0.79	1.31	0.147	(0.91, 1.90)	0.79	1.380	0.096	(0.95, 2.00)
Visits with friends at least weekly (ref: does not visit friends)	0.77	0.428	(0.40, 1.48)	0.97	0.77	0.455	(0.39, 1.53)	0.86	0.76	0.410	(0.40, 1.46)	0.86	0.760	0.434	(0.38, 1.51)
Agricultural job × age	-	-	-	-	-	-	-	-	0.95*	0.021	(0.40, 1.46)	-	0.95*	0.019	(0.90, 0.99)
<i>N</i>	405				188				405				188.000		
Number of events	136				132				136				132.000		
Chi-squared	254.57				10.78				259.95				16.570		
Prob > Chi-squared	0.0000				0.1483				0.0000				0.036		

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



**Fig. 1** Cox proportional hazards regression, baseline hazard function of initiating smoking

significant interaction with time (HR = 0.95, CI [0.40, 1.46], Model 3) indicates that the heightened risk associated with engagement in agricultural occupations becomes attenuated at later ages. Most importantly for the validity of this study's central findings, no violation of the proportional hazards assumption occurs for the key predictive variables under study, nor does allowing the agricultural job variable to act as a time-varying covariate result in any substantive changes to the effects of the other predictive variables.

## Discussion

This study finds that, among northern Vietnamese older adults whose early adulthood coincided with mass mobilization in the Vietnam War, involvement in formal military service significantly increased the risk of initiating smoking. This result supports lends social contextual robustness to the notion of 'military induced smoking,' earlier observed by Bedard and Deschênes (2006) among US veterans, as well as by Allem et al. (2012) among South Korean immigrants who had performed compulsory military service prior to emigrating to the US. This study, and other studies analyzing the VHAPS data (Teerawichitchainan and Korinek 2012; Korinek and Teerawichitchainan 2014; Korinek et al. 2016), provides novel insights into war's long-term health consequences globally, reaching beyond oft-studied populations of US veterans. Our results also suggest that military service influences smoking risk over the life course, even in the absence of the direct provision and/or subsidy of tobacco products by military institutions, as existed in the US until 1975 and in South Korea until 2009 (Allem et al. 2012; Smith and Malone 2009). In the absence of more detailed quantitative or qualitative data on underlying mechanisms,

we reason that service in the VPA yielded social dynamics that heightened the social availability of cigarettes. Other accounts suggest that male camaraderie, in which smoking was central to male, soldierly bonding, as well as pervasive, severe war-time stress exposure, in which smoking was a device for coping with stress, were among the social processes that influenced smoking initiation in this historical context (Cronan et al. 1991; Morrow and Barraclough 2003).

We do not observe a significant association between our measures of respondents' socioeconomic position (measured as educational attainment, current financial conditions and lifetime occupation), social capital (measured as frequency of contact with community organization and friends), and smoking initiation. Many studies have underscored smoking's pronounced socioeconomic gradient, as societies once in the midst of a smoking epidemic tend to observe smoking rise first among higher status groups, then subside in these groups and diffuse to lower status individuals (e.g., Giskes et al. 2005; Siegel 2014). Recent studies have shown that smoking is more prevalent among Vietnamese men from poor backgrounds; however, an education gradient has not been observed in Vietnam as compared to other developing countries with rising smoking epidemics (Palipudi et al. 2012). Low educational attainment, inadequate household financial means, and agricultural livelihoods may not exhibit significant correlations with smoking initiation in the sampled older adults for several reasons. First, smoking initiation among these older adults occurred, on average, in the mid-1960s, when most respondents were in their early 20s. At this time, when northern Vietnam was shaped by class and gender transformation under Communist Rule, socioeconomic disparities were relatively minimized by redistribution policies. This period also represents a relatively early stage in the tobacco epidemic, when smoking was beginning to diffuse broadly, and likely remained common in higher status groups. Data limitations, in particular the VHAPS small sample size, which prohibits detailed educational attainment and wealth estimates, may also underlie these results.

Bedard and Deschênes (2006:177) concluded that the health consequences of military service were not solely attributable to traumatic experiences or injuries suffered in service. Instead, they resulted in part from the military facilitating the adoption of risky behaviors or habits early in the life of young soldiers. This view is supported by their finding of excess mortality in veterans after the age of 40, especially for two causes of death—heart disease and lung cancer—that are strongly linked to smoking (Bedard and Deschênes 2006). The VHAPS data prohibit clear delineation of cause-specific mortality in veteran and nonveteran populations. However, VHAPS data do provide tentative and preliminary evidence of long-term health

effects of military-induced smoking. Specifically, in exploratory logistic regression models estimating self-reported diseases of the lungs or heart disease, we find that both conditions are significantly, positively associated with military service (results not shown). A weak positive association between having ever smoked and each of the health conditions is attenuated when we incorporate military service into our models, suggesting that military service influences the smoking behavioral pathway shaping these poor health outcomes. This pattern is suggestive of several negative health outcomes associated with military-linked smoking that deserve further investigation.

We encounter several limitations in our study which warrant mention. First, because the data were collected in 2010 among older adult war survivors, challenges in recalling information retrospectively, such as the timing of smoking onset, may yield uncertain levels of measurement bias. Previous studies have similarly identified the challenges of recall bias in studying smoking retrospectively (Schulze and Mons 2006). With access to a larger sample and additional qualitative and quantitative detail on soldiers' experiences and the military institutional milieu surrounding smoking initiation, we would be equipped to assess how former soldiers diverge from other men in this cohort in their smoking behaviors, and the particular aspects of military service that predispose these men to early onset, high frequency, or long duration of smoking over the course of their lives. It also warrants note that the relatively small sample in the pilot study does not permit a detailed analysis of female smoking. The high rate of smoking among the few female veterans in the VHAPS raises questions as to whether military contexts lessened the strict norms governing female behavioral propriety among those women who participated alongside men in the highly stressful and masculine military milieu (Morrow et al. 2002; Waldron et al. 1988). There are clearly many additional questions of importance which warrant further investigation and which require more detailed data linking military service with smoking and other health behaviors and outcomes.

A recent nation-wide survey conducted in Vietnam found that, even in peacetime, the highest rates of smoking were observed among men serving in the military (Le et al. 1999). This suggests that military occupational contexts remain conducive to smoking and that pro-smoking norms among peers and superiors in the military are among the key influences upon young soldiers' health orientations (Schori et al. 2014). Our results suggest that the social organization of military service plays a role in the diffusion of tobacco consumption in Vietnam's smoking epidemic, heightening already dangerously high levels of social acceptance for smoking among men. By highlighting a cohort of Vietnamese whose early adulthood was

inextricably linked to war and military mobilization, and showing that the initiation of smoking was enhanced in conjunction with serving in the military, we further elaborate the nature of the linkage between military service and smoking. Our results suggest that, just as certain communities with affinity to smoking correlate with elevated smoking intensity among residents, the military provides a context with higher than usual levels affinity to or acceptance of smoking (Ladusingh and Singh 2015). In contrast with US forces serving in Vietnam, research demonstrates that NVA soldiers were drawn heavily from both socio-economically advantaged and disadvantaged backgrounds, making the NVA a "broad coalition of classes" (Merli 2000:2). Reliance upon smoking to cope or to bond together is likely to have transcended class and other divisions and spread widely in a wartime setting where immediate life threat was relatively widespread. The high rates of smoking and smoking initiation among members of Vietnam's armed forces, past and present, demonstrate a need for directing tobacco control messaging and cessation resources toward young men and women serving in such contexts. The importance of mobilizing institutional resources to address smoking behavior is particularly great in a country like Vietnam, where smoking rates among men are among the world's highest and where a rapidly aging population will face escalating rates of smoking-related morbidity and mortality in the years to come.

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