



## Smoking among males in the UK Armed Forces: Changes over a seven year period

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### ABSTRACT

**Objectives.** We assessed socio-demographic and military factors associated with smoking among males in the UK Armed Forces; made comparisons with the general population; and, tested the hypothesis that smoking has declined in the Armed Forces.

**Methods.** Using data from two cross-sectional studies (conducted in 1998 and 2004), we examined the patterns of smoking among regular male UK Service personnel aged 20–49 years and made comparisons with general population data from England, Scotland and Wales.

**Results.** In 2004, the prevalence of smoking among military males aged 20–49 years was 30% ( $n = 2276$ ), compared to 33% within the general population. Among current smokers, the mean number of cigarettes smoked per day was 15 for the military and 14 for the general population. The prevalence of smoking has decreased in lower ranks between 1998 and 2004 by 5.1% in 20–24 year olds to 6.3% in 35–49 year olds. These decreases are similar to those seen within those in the routine, manual or intermediate socio-economic group.

**Conclusions.** Smoking among males in the UK military is associated with similar factors to those in the general population. As these factors are clustered in younger personnel, policies to decrease smoking should be targeted at younger recruits.

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### Introduction

General population data from the UK show a steady decrease in smoking rates over recent years (Office for National Statistics, 2005). There is only one comparison of smoking prevalence in a military cohort and the general population over a three year period (Hooper et al., 2008). Using data from two large UK military health studies (Hotopf et al., 2006; Unwin et al., 1999), we compared the current smoking prevalence among males in UK Armed Forces with that of the general population; and, tested the hypothesis that smoking has declined in the UK Armed Forces in line with the general population.

### Methods

#### UK military health studies

We conducted two large health studies of UK Armed Forces personnel (Hotopf et al., 2006; Unwin et al., 1999). The first included those who were in service at the time of the 1991 Gulf War, data were collected between 1997 and 1998, and yielded a 65.1% participation rate (8195 respondents) (Unwin et al., 1999). The second included those who were in service during the 2003 Iraq War, data were collected between 2004 and 2006, and yielded a 61.0% participation rate (10272 respondents) (Hotopf et al., 2006).

Both studies asked respondents whether they had smoked more than 100 cigarettes in their lifetime, whether they currently smoke, and how many cigarettes.

All analyses were restricted to male regular Service personnel aged 20–49 years.

#### Comparisons with the general population

Data from the UK military were compared to data from the General Household Survey (GHS). The 1998 survey presents smoking data from 3334 men (aged 20–49 years), and has an overall response rate of 66% (Office for National Statistics, 2000). The 2004 survey presents smoking data from 3346 men (aged 20–49 years), and has an overall response rate of 69% (Office for National Statistics, 2005). We estimated 95% confidence intervals (CI) for percentages, information was unavailable to calculate 95% CIs for the mean number of cigarettes smoked. Rank was used as a proxy measure for socio-economic status in the military. Age at leaving education (GHS) was used as a proxy measure of educational qualifications.

#### Statistical analyses

We present the percentage of smokers and the mean number of cigarettes smoked from the 2004 military study (Hotopf et al., 2006), and compare these to general population data from the 2004 GHS (Office for National Statistics, 2005). We made further comparisons by age group and rank/socio-economic status for the 1998 military study and 1998 GHS (Office for National Statistics, 2000; Unwin et al., 1999). In addition, multiple logistic regression and

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multiple regression analyses, to adjust for socio-economic and demographic factors in the military studies, were undertaken.

Analyses were conducted using STATA (version 10) (STATA Corporation, College station, TX, USA).

#### Ethical approval

The study received approval from the UK Ministry of Defence (Navy) personnel research ethics committee and the King's College Hospital local research ethics committee.

## Results

### Prevalence of smoking and number of cigarettes smoked among males: UK Armed Forces compared to the general population

In 2004, the prevalence of smoking among males in the general population was 33% (compared to 29.8% in the military) (Table 1). In both populations, smoking prevalence decreased with age, but this was more marked in the military.

The mean number of cigarettes smoked per day in the military was 15.4 compared to 14 in the general population (Table 2). Within the military, the number of cigarettes smoked did not vary by age, while in the general population, the number smoked increased with age.

In a separate analysis restricted to military personnel those holding a lower rank, being in the Army, and of lower education status were more likely to report being smokers, but age, relationship status, role within unit and serving status were not associated with smoking status after adjustment for these independent variables (data not shown). Likewise rank, educational status, relationship status, age and being in the Army remained significantly associated with number of cigarettes smoked after adjustment for these independent variables (data not shown).

### Changes over time among men by age and rank/socio-economic status: prevalence of smoking

As smoking patterns differed by age and rank/socio-economic status (Table 1), we examined smoking over time by age and rank/socio-

economic status (Table 2). This showed that the prevalence of smoking among ranks decreased between 1998 and 2004 by 5.1% in 20–24 year olds to 6.3% in 35–49 year olds. The magnitude of these decreases is similar to that seen within the general population for those in the routine, manual or intermediate socio-economic group. No significant decrease was observed for officers or those in the managerial/professional socio-economic group. There was, however, a lower prevalence of smoking in officers compared to managerial and professional groups in the general population in the two surveys.

## Discussion

Smoking in the UK military among males aged 20–49 years was 30% compared to 33% in the general population. Among current smokers, a similar mean number of cigarettes are smoked per day, except for those in the youngest age groups where the military smoked more than the general population. The prevalence of smoking has decreased more among those holding lower ranks than officers. Smoking is especially common in those males under 25 years of age who smoke more cigarettes per day than the general population.

Estimates of smoking prevalence in the UK Armed Forces were of 35.1%, in the 1989 Tri-Service Health Questionnaire (Lodge, 1991) and varying between 24.6% and 31.2% by deployment grouping in our 1998 study (Unwin et al., 1999). The marked differences in smoking rates between officers, non-commissioned officers and other ranks has been observed before (Boos and Croft, 2004; Lodge, 1991) and may be accounted for by socio-economic factors, as has been established in the general population (Office for National Statistics, 2005).

Our study demonstrated a high proportion of current smokers in those under 25 years of age who smoked more cigarettes per day than their counterparts in the general population. This difference was accounted for by socio-economic factors in our study and may reflect the fact that the Army recruits typically from areas of socio-economic deprivation (Iversen et al., 2007). These recruits then join a culture where smoking is popular and cigarettes are available at discounted rates.

This study is based on two large studies based on random samples, each with satisfactory response rates (Hotopf et al., 2006; Unwin et al.,

**Table 1**

Smoking prevalence and mean number of cigarettes smoked per day (current smokers only) for the UK military (ages 20–49 years only) and the general population (2004), males only.

Smoking prevalence, %	Mean number of cigarettes							
	Group	95% CI <sup>a</sup>	Military	95% CI	General population	Military	95% CI	General population <sup>b</sup>
<i>Overall</i>		32.5–33.1	29.8	28.7–30.8	33	15.4	15.1–15.7	14
<i>Age (years)</i>								
20–24		33.5–38.6	38.0	35.4–40.6	36	15.3	14.7–15.9	11
25–34		33.4–36.7	31.2	29.6–32.8	35	15.3	14.8–15.7	12
35–49		29.8–32.3	24.5	23.0–26.1	31	15.6	15.0–16.1	16
<i>Relationship status</i>								
Current relationship		30.4–31.1	28.5	27.4–29.6	31	15.2	14.8–15.5	13
Single		34.6–35.7	34.2	31.5–36.9	35	15.4	14.7–16.1	14
Past relationship		42.0–44.6	34.7	30.4–39.0	43	17.5	16.3–18.6	14
<i>Rank/socio-economic status</i>								
Other rank/routine and manual		42.4–43.6	40.3	37.8–42.9	43	14.8	14.3–15.4	15
Non-commissioned officer/Intermediate		29.4–30.6	30.9	29.6–32.2	30	16.0	15.7–16.4	14
Officer/Managerial and professional		23.6–24.4	13.5	11.5–15.4	24	11.0	9.8–12.2	13
<i>Educational status/age leaving education (years)</i>								
No qualifications or O-levels <sup>c</sup> only/<18 years		38.5–39.3	34.8	33.3–36.3	39	16.0	15.6–16.4	15
A-levels <sup>d</sup> /18–20 years		29.9–30.1	28.5	26.6–30.4	30	14.7	14.2–15.3	12
Degree/21+ years		19.4–20.5	14.8	12.8–16.8	20	12.9	11.6–14.1	11

CI: confidence interval.

<sup>a</sup> Estimated with data provided from the General Household Survey.

<sup>b</sup> 95% CI could not be estimated.

<sup>c</sup> Educational qualifications usually completed at 16 years of age.

<sup>d</sup> Educational qualifications usually completed at 18 years of age and required for entry into a university degree program.

**Table 2**  
Smoking prevalence (%) by age and rank/socio-economic status and 95% confidence intervals for the UK military and general population males in 1998 and 2004.

1998				
Military population			General population	
Age group (years)	Ranks (n = 6179)	Officers (n = 662)	Routine, manual and intermediate	Managerial and professional
20–24	43.7 (39.3–48.1)	<sup>a</sup>	48.7 (45.3–52.7)	31.9 (22.4–41.6)
25–34	39.9 (38.4–41.5)	15.5 (11.3–19.7)	41.8 (40.0–44.0)	25.9 (23.3–28.7)
35–49	34.6 (32.4–36.8)	13.9 (10.4–17.5)	39.2 (37.4–40.6)	22.5 (21.0–25.0)
2004				
Age group (years)	Ranks (n = 6357)	Officers (n = 1218)	Routine, manual and intermediate	Managerial and professional
20–24	38.6 (36.0–41.2)	<sup>a</sup>	41.5 (41.4–41.6)	26.1 (26.0–26.3)
25–34	34.0 (32.2–35.8)	13.9 (10.7–17.1)	42.0 (41.9–42.1)	25.4 (25.3–25.5)
35–49	28.3 (26.4–30.2)	13.3 (10.8–15.7)	36.9 (36.8–37.0)	23.0 (22.9–23.1)
Difference 1998–2004				
20–24	–5.1 (–10.2 to 0.04)	<sup>a</sup>	–7.2 (–10.9 to –3.5)	–5.7 (–14.4 to 4.4)
25–34	–5.9 (–8.3 to –3.6)	–1.6 (–6.7 to 3.8)	0.2 (–1.7 to 2.1)	–0.6 (–3.2 to 2.3)
35–49	–6.3 (–9.2 to –3.4)	–0.7 (–4.8 to 3.8)	–2.3 (–3.9 to –0.7)	0.5 (–1.5 to 2.4)

<sup>a</sup> Overall numbers too low to reliably estimate smoking prevalence.

1999). Responders tended to be older, officers, in the Army or Royal Air Force, and still serving at the time of questionnaire completion (Unwin et al., 1999; Hotopf et al., 2006). It is known that smokers tend to be over-represented in non-respondents (Difford et al., 1987). However, the two military studies and the GHS surveys would have been subjected to the same biases, thus the underestimation of smoking is likely to be similar. Our analysis precedes the recent changes in policy related to smoking in public places in the UK and within the UK Armed Forces.

## Conclusions

It is encouraging that with the exception of young men, UK Service personnel smoke less than the general population. Serving in the military necessitates good health and high levels of physical fitness and prowess, with which smoking is not compatible. Specific policies should be targeted at younger recruits to enhance smoking cessation.

## Conflict of interest statement

S. Wessely is honorary civilian advisor in psychiatry to the British Army.

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