TOBACCO USE AND PHYSICAL FITNESS ACTIVITY AMONG U.S. NAVY AND MARINE CORPS: RESULTS FROM THE ANNUAL PERIODIC HEALTH ASSESSMENT, 2017-2021

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NMR&D NAVY MEDICINE RESEARCH & DEVELOPMENT

BACKGROUND

- Service members (SMs) who use tobacco may have poorer physical fitness
- The degree that fitness activity differs by tobacco-use type remains to be quantified
- Little is known about longitudinal changes of fitness activity by tobacco use
- Health behaviors, including physical fitness and tobacco, are reported on the annual Periodic Health Assessment (PHA)

OBJECTIVES

1. To examine associations of tobacco use with physical fitness activity
2. To assess longitudinal trends of fitness activity according to tobacco-use

METHODS

Study Population
- U.S. Navy and Marine Corps personnel
- N = 496,108 who completed ≥1 PHA from 2017-2021

Serial cross-sectional design
- Repeat data on some people lets us study change over time

PHA
- Self-reported:
  1. tobacco behaviors and history
  2. physical fitness activities

Poisson regression for population-averaged estimates
- Generalized Estimating Equations (GEE) approach for correlation of within-subject repeated measures
- Crude and adjusted prevalence ratios of sufficient fitness-activity by tobacco-use (relative to never tobacco) across all years of the 5-year study period
- Model-estimated adjusted prevalence of sufficient fitness-activity by tobacco at:
  1. Initial: first PHA during the study period
  2. Follow-up: estimated at 365 days using all PHAs after the initial PHA

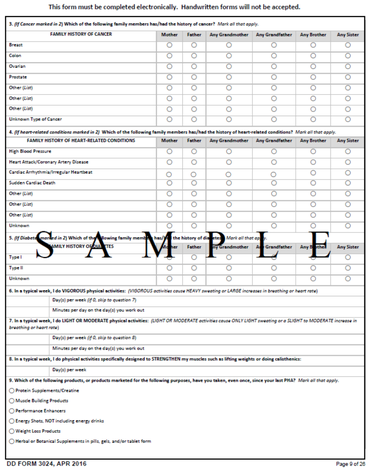
RESULTS

TABLE 1. Population demographics and fitness-activity characteristics by tobacco-use status

	Never	Former	Cigs	E-cigs	Cigs & E-cigs	Other
	n = 264K	n = 85K	n = 28K	n = 31K	n = 8K	n = 80K
Age, % <30 years	70%	55%	62%	87%	86%	72%
Sex, % female	22%	13%	15%	14%	13%	6%
Pay grade, % enlisted	80%	84%	96%	98%	99%	89%
Number of previous deployments						
% Zero	62%	48%	49%	67%	65%	55%
% ≥1	38%	52%	51%	33%	35%	45%
Service branch						
% Marine Corps	37%	37%	38%	47%	50%	53%
% Navy	63%	63%	62%	53%	50%	47%
How long have you been using tobacco products?						
% ≥1 year	…	…	81%	62%	74%	74%
How many packs per day do you smoke?						
% ≥1/2 pack per day	…	…	28%	…	17%	6%
Are you interested in quitting tobacco?						
% yes, I would like a referral	…	…	11%	3%	6%	5%
Meets physical fitness recommendation?						
% yes	69%	71%	61%	65%	60%	70%
% no	31%	29%	39%	35%	40%	30%
Exercise intensity per week						
≥150 min. light- moderate, % yes	40%	39%	39%	43%	43%	43%
≥75 min. vigorous, % yes	70%	73%	66%	67%	65%	74%
≥2 days strength training[1], % yes	76%	77%	67%	71%	66%	76%

Outcome – "Sufficient fitness activity (yes/no)"

Defined as strength training ≥2 days per week **AND** either ≥150 minutes of moderate intensity aerobic activity, ≥75 minutes of vigorous intensity aerobic activity, **OR** an equivalent combination of moderate and vigorous activity



This form must be completed electronically. Handwritten forms will not be accepted.

5. *(If Cancer marked in 2)* Which of the following family members has/had the history of cancer? *Mark all that apply.*

FAMILY HISTORY OF CANCER	Mother	Father	Any Grandmother	Any Grandfather	Any Brother	Any Sister
Breast	○	○	○	○	○	○
Colon	○	○	○	○	○	○
Ovarian	○	○	○	○	○	○
Prostate	○	○	○	○	○	○
Other (List):	○	○	○	○	○	○
Other (List):	○	○	○	○	○	○
Other (List):	○	○	○	○	○	○
Unknown Type of Cancer	○	○	○	○	○	○

4. *(If heart-related conditions marked in 2)* Which of the following family members has/had the history of heart-related conditions? *Mark all that apply.*

FAMILY HISTORY OF HEART-RELATED CONDITIONS	Mother	Father	Any Grandmother	Any Grandfather	Any Brother	Any Sister
High Blood Pressure	○	○	○	○	○	○
Heart Attack/Coronary Artery Disease	○	○	○	○	○	○
Cardiac Arrhythmia/Irregular Heartbeat	○	○	○	○	○	○
Sudden Cardiac Death	○	○	○	○	○	○
Other (List):	○	○	○	○	○	○
Other (List):	○	○	○	○	○	○
Other (List):	○	○	○	○	○	○
Unknown	○	○	○	○	○	○

5. *(If Diabetes marked in 2)* Which of the following family members has/had the history of diabetes? *Mark all that apply.*

FAMILY HISTORY OF DIABETES	Mother	Father	Any Grandmother	Any Grandfather	Any Brother	Any Sister
Type I	○	○	○	○	○	○
Type II	○	○	○	○	○	○
Unknown	○	○	○	○	○	○

6. **In a typical week, I do VIGOROUS physical activities:** *(VIGOROUS activities cause HEAVY sweating or LARGE increase in breathing or heart rate)*
   - Day(s) per week *(If 0, skip to question 7)*
   - Minutes per day on the day(s) you work out

7. **In a typical week, I do LIGHT OR MODERATE physical activities:** *(LIGHT OR MODERATE activities cause ONLY LIGHT sweating or a SLIGHT to MODERATE increase in breathing or heart rate)*
   - Day(s) per week *(If 0, skip to question 8)*
   - Minutes per day on the day(s) you work out

8. **In a typical week, I do physical activities specifically designed to STRENGTHEN my muscles such as lifting weights or doing calisthenics:**
   - Day(s) per week

9. **Which of the following products, or products marketed for the following purposes, have you taken, even once, since your last PHA?** *Mark all that apply.*
   - ○ Protein Supplements/Creatine
   - ○ Muscle Building Products
   - ○ Performance Enhancers
   - ○ Energy Shots, NOT including energy drinks
   - ○ Weight Loss Products
   - ○ Herbal or Botanical Supplements in pills, gels, and/or tablet form

SAMPLE

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Photo by: Eric Pilgrim. Available at: https://www.dvidshub.net/image/5724930/health-officials-warn-vaping-dangers-death-illness-toll-rises-across-nation

RESULTS

TABLE 2. Relation of tobacco-use with sufficient physical fitness activity

Tobacco Status	N	Prevalence of sufficient fitness activity	Unadjusted Prevalence Ratio	Adjusted* Prevalence Ratio	95% Confidence Limits
Never	259K	69.3%	Referent	Referent	
Former	83K	71.1%	1.03	1.01	1.01, 1.01
Cigs only	27K	60.5%	0.87	0.89	0.88, 0.90
E-cigs only	31K	64.8%	0.94	0.92	0.92, 0.93
Cigs & E-Cigs	8K	60.3%	0.87	0.87	0.86, 0.88
Other	78K	70.4%	1.02	0.97	0.97, 0.97

TABLE 3. Adjusted* fitness-activity trajectories according to tobacco-use

Tobacco status	Initial, %	Change over time, % per year	Follow-up, % (Day 365 model-estimate)	Test of trend
Never	66.4%	-0.3 (-0.4, -0.1)	66.2%	0.0010
Former	67.4%	-1.2 (-1.4, -0.9)	66.6%	<.0001
Cigs only	59.0%	-1.4 (-2.1, -0.8)	58.1%	<.0001
E-cigs only	61.4%	-1.5 (-2.1, -1.0)	60.4%	<.0001
Cigs & E-cigs	57.8%	-1.6 (-2.9, -0.2)	56.9%	0.0023
Other	64.5%	-0.8 (-1.2, -0.5)	63.9%	<.0001

Prevalence of outcome was estimated by complete case analysis that excluded missingness
*Model-estimated population-level ("between subject") associations
*Covariates: age, sex, service, and pay-grade

CONCLUSIONS

- Compared with tobacco non-users, self-reported sufficient fitness activity was approximately 11% and 8% less likely among smokers and e-cig users, respectively
- Cig or e-cig users had the greatest % change per year (i.e., fastest decrease of sufficient fitness activity)
- The study demonstrates a method for estimating longitudinal trends with the PHA
- Findings have implications for tobacco cessation programs and military health policies

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