NC OFFICER HEALTH, FITNESS, AND WELLNESS:

A Report to The N.C. Criminal Justice Education and Training Standards Commission and the N.C. Sheriffs' Education and Training Standards Commission

Christopher J. Marier, Ph.D. & Daniel B. Baker, Ph.D.

Appalachian State University

Department of Government and Justice Studies

Executive Summary

At the direction of the N.C. Criminal Justice Education and Training Standards Commission and the N.C. Sheriffs' Education and Training Standards Commission, and in a joint effort with partners at the North Carolina Justice Academy, researchers from Appalachian State University conducted a study aimed at understanding what benefit, if any, there would be to requiring ongoing, in-career fitness standards for North Carolina police and detention officers. In addition, we sought to understand the hurdles and concerns associated with requiring or implementing ongoing fitness standards. This report responds to these questions in three parts. First, we report findings about the mental and physical health of officers in North Carolina, as well as the relationship between the availability of officer fitness and the availability of fitness support and programming. Second, we assess police leader concerns about the implementation and obstacles related to ongoing fitness standards. Finally, using secondary data from a different Southeastern state, we assess the relationship between ongoing fitness standards and officer attrition.

- Study 1 reveals that, overall, officers in North Carolina are in poor physical and mental health, and in many ways are in even poorer health than the general public. Furthermore, officer health affects several aspects of job performance. Mandatory in-service physical fitness evaluations are associated with improved officer health and more frequent exercise, even in the absence of formal consequences like termination.
- Study 2 reveals that physical fitness standards for incumbent officers are uncommon, and the biggest concern identified by agency leaders was staffing.
- Study 3 reveals that neither mandatory nor voluntary physical fitness programs are associated with significantly more attrition.

Our report culminates in four recommendations:

1. Require physical fitness testing throughout the career of a law enforcement officer.
2. Do not incrementally adjust in-service physical fitness standards based on age.
3. Promote physical activity among officers irrespective of in-service physical fitness standards through in-agency fitness centers and on-duty exercise.
4. Implement holistic employee wellness programs in law enforcement agencies.

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Project Background and Overview

One of the many requirements of NC Senate Bill 300 was the directive that the North Carolina Criminal Justice Education and Training Standards Commission and the North Carolina Sheriffs' Education and Training Standards Commission jointly study the benefits, if any, of requiring physical fitness testing throughout the career of a law enforcement officer. Research is needed on officers' physical and mental health and what relationship, if any, these factors have to on-the-job performance. This research is intended to inform administrative rules and policies by the NC Criminal Justice Education and Training Standards Commission, NC Sheriffs' Education and Training Standards Commission, and local and state agencies. Study 1 examines the current state of officer health in the state of North Carolina, and how it varies with some aspects of work performance.

In addition to officer health and job performance, information is needed on current practices and policies in the state of NC and beyond. There may be obstacles to implementation that must be considered in tandem with policy recommendations. Study 2 therefore examines the nature and number of fitness standards and wellness programs throughout the state of North Carolina and agency leaders' attitudes toward such programs, including reported obstacles.

Finally, given an acute staffing crisis in law enforcement as of the date of this study, Study 3 of this report examines the effect of fitness standards and wellness programs on attrition and retention in another Southeastern state.

Study 1: Law Enforcement Fitness and Wellness

Study 1 provides a snapshot of the current state of physical and mental wellness among law enforcement and detention officers in the state of North Carolina.

Study Design

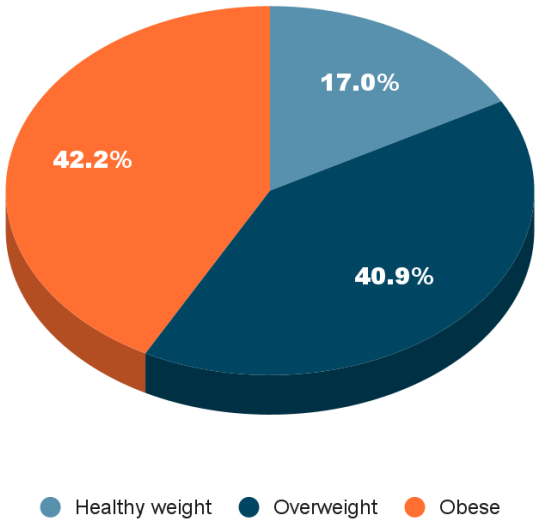
North Carolina law enforcement officers and detention officers were invited to complete an online survey on their physical health, mental health, and agency programs. Emails were sent to all users in the Acadis database maintained by the North Carolina Justice Academy which maintains records of CJ personnel who have completed in-service training through Acadis. Emails were also sent to all jail administrators, who were asked to forward the invitation to all of their detention staff, since detention officers were less likely to be in the Acadis database. Approximately 62,700 invitations were emailed, leading to 6,684 responses, which corresponds to a 10.7% response rate. From these, 1,143 respondents were excluded because they were either non-sworn CJ employees or retirees. The final sample consists of 4,886 completed surveys.

Unless otherwise reported, statistical significance for all analyses herein are reported at the $p < .001$ level.

Officers' self-reported physical and mental health

Officers' physical and mental health can be summed up with a few key findings. The vast majority of NC law enforcement and detention officers are overweight or obese. They exercise infrequently, and few consistently control their calorie intake. Fewer than half get sufficient sleep regularly, and one in five suffers from a mental or emotional health problem. About 1 in 12 officers is a heavy drinker, and 1 in 5 uses tobacco. Stress is widespread, and is associated with demonstrable somatic health problems, including headaches, digestion problems, upper respiratory infections, and trouble sleeping.

Are NC officers physically fit?



NC officers are not physically fit. 83% of all officers are overweight or obese, as calculated by their Body Mass Index (BMI).[1] This is higher than national samples of U.S. adults, where about 73% are overweight or obese.[2]

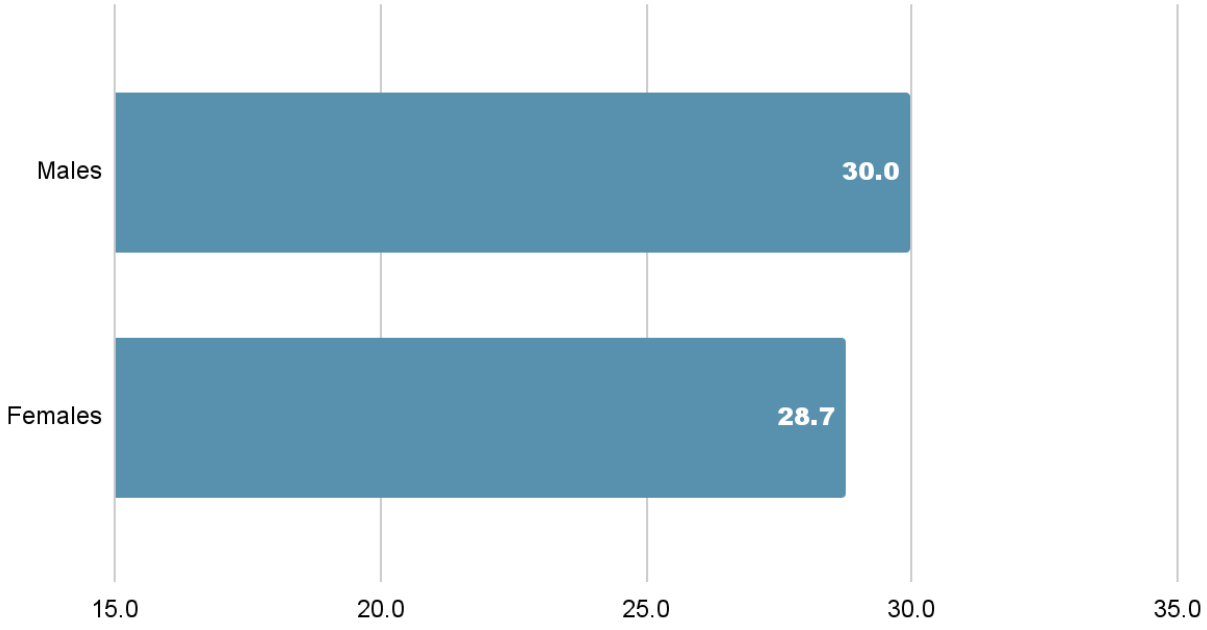
Nonetheless, officers tend to *perceive* that they are in good health. 26% agree or strongly agree that they are at their ideal body weight; 50% agree or strongly agree that they are in good physical shape; and 47% agree or strongly agree that their overall health is "excellent." Officers' self-assessments do strongly correlate with more objective indicators of health (such as BMI); however, in general, officers are more likely to suggest they are at a healthy weight in self-assessment than actually demonstrate a healthy weight by BMI.

Although mean differences are often small, there are statistically significant differences in BMI by gender, race, certification, education, and urbanicity. Specifically, BMIs were significantly higher among male officers, Black officers, detention officers, less-educated officers, and officers in rural agencies.

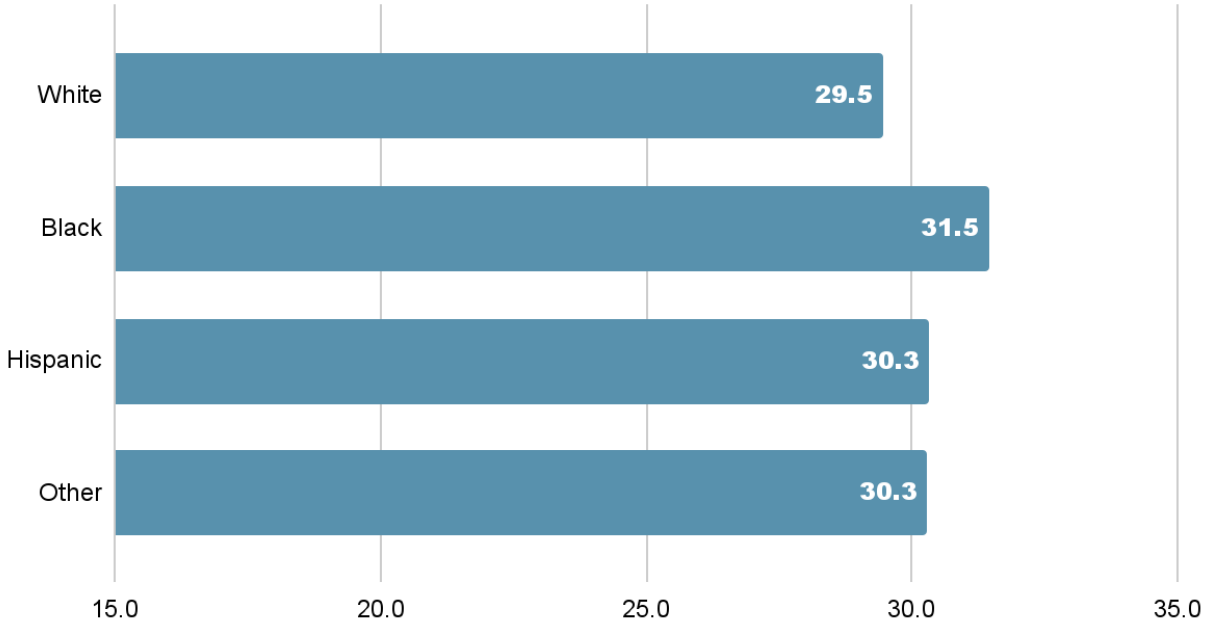
[1] BMI is an imperfect measure of body composition. Officers with substantial muscle mass from regular strength training/bodybuilding may have a high BMI even though they have low body fat percentages. Nonetheless, it is safe to assume this exception applies to a relatively small portion of the sample, especially given the infrequency of exercise indicated by most respondents.

[2] Fryar CD, Carroll MD, Afful J. Prevalence of overweight, obesity, and severe obesity among children and adolescents aged 2–19 years: United States, 1963–1965 through 2017–2018. NCHS Health E-Stats, Centers for Disease Control and Prevention. Updated January 29, 2021. Accessed April 22, 2021. www.cdc.gov/nchs/data/hestat/obesity-child-17-18/overweight-obesity-child-H.pdf

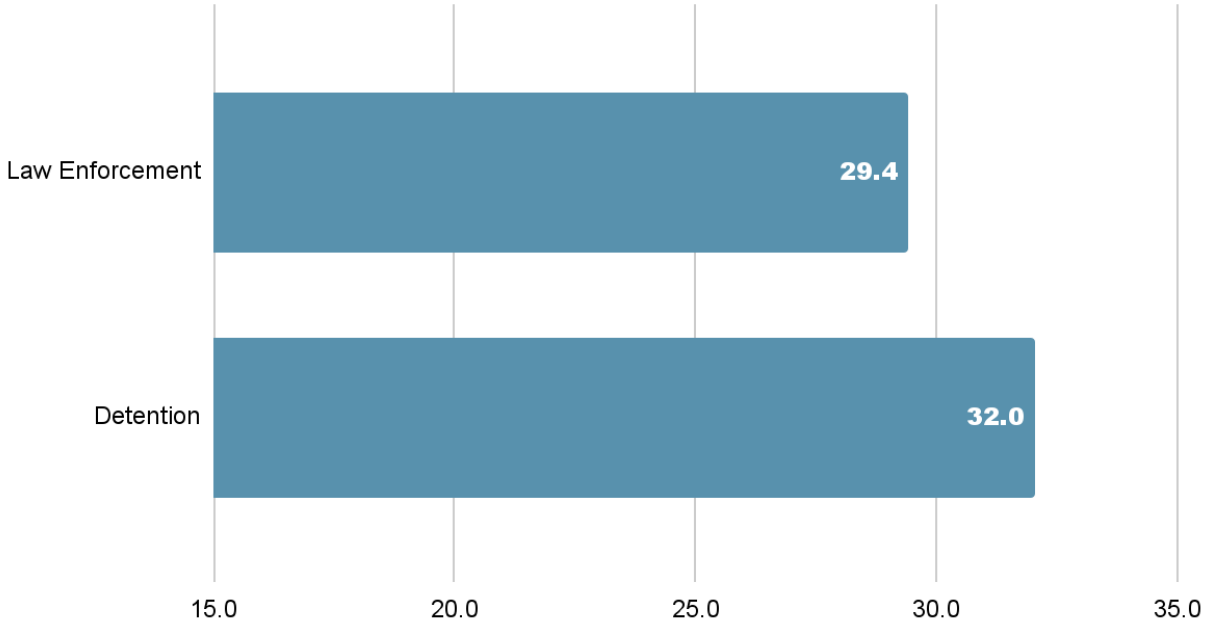
Average BMI by Gender



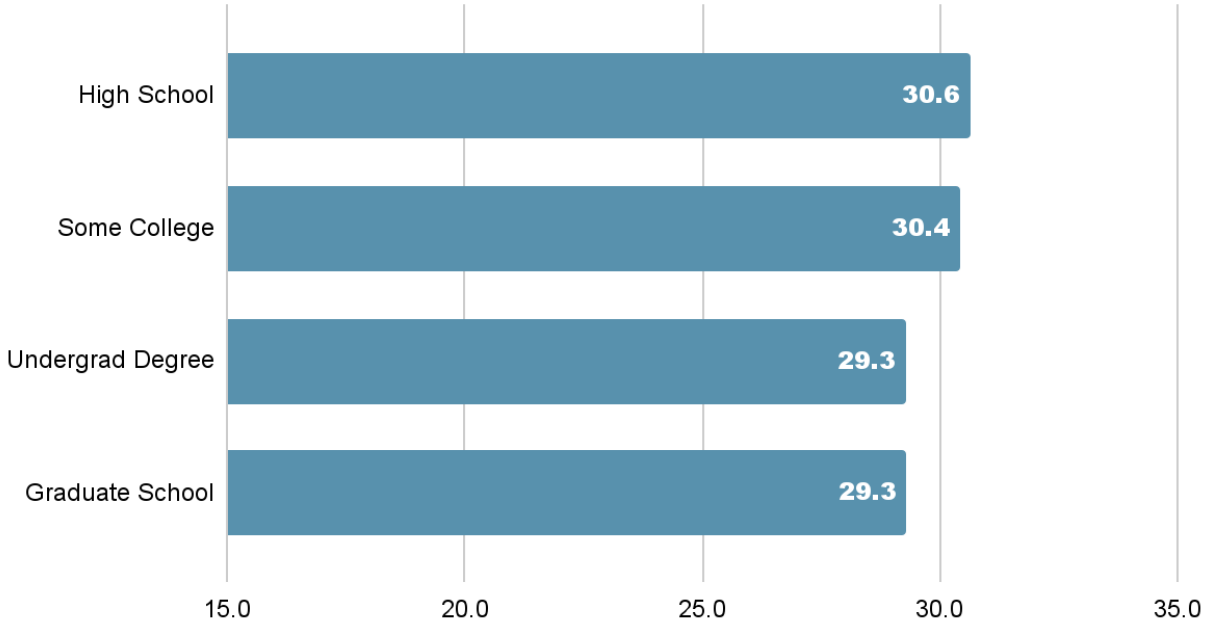
Average BMI by race

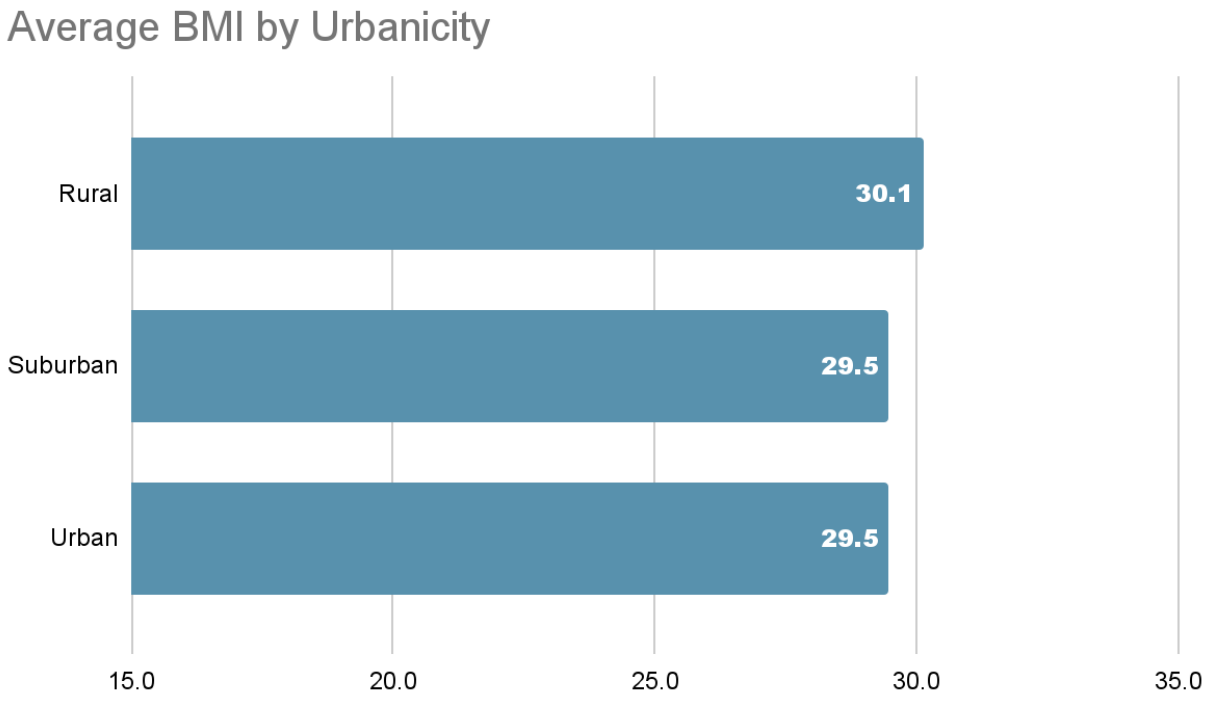


Average BMI by Certification



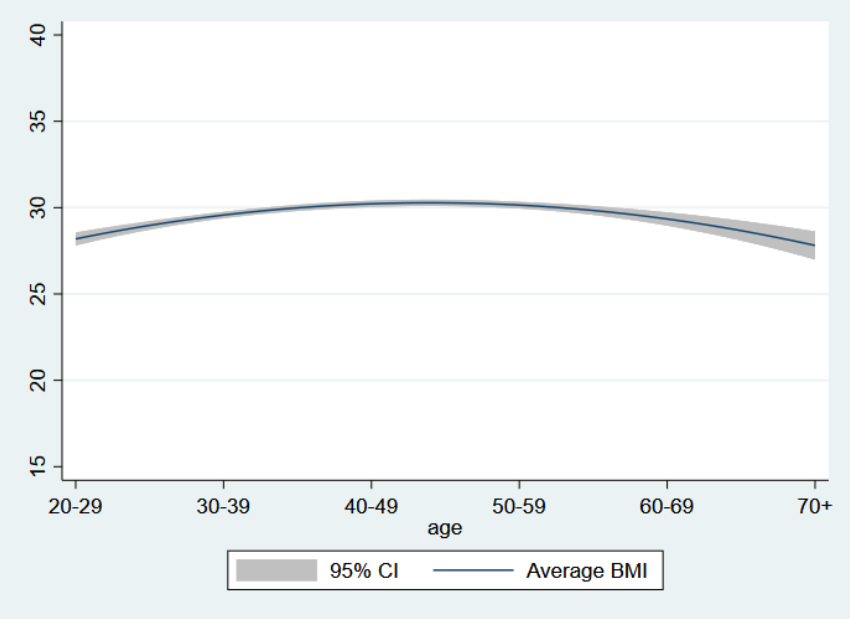
Average BMI by Education




Average BMI by Urbanicity
Rural
30.1
Suburban
29.5
Urban
29.5
15.0
20.0
25.0
30.0
35.0

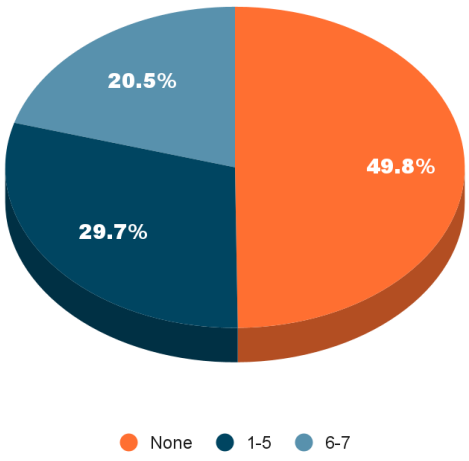
Does BMI vary by age?

BMI varies by age, but not by much, and the relationship is not linear. All age groups have an average BMI in the "overweight" classification (25 or higher). BMI tends to be lowest for *both* the youngest and oldest officers, and highest for officers between about 40 to 59 years of age. Because BMI is related to overall general health, the apparent drop in BMI with age may be attributable to higher rates of health-related retirements among heavier officers.

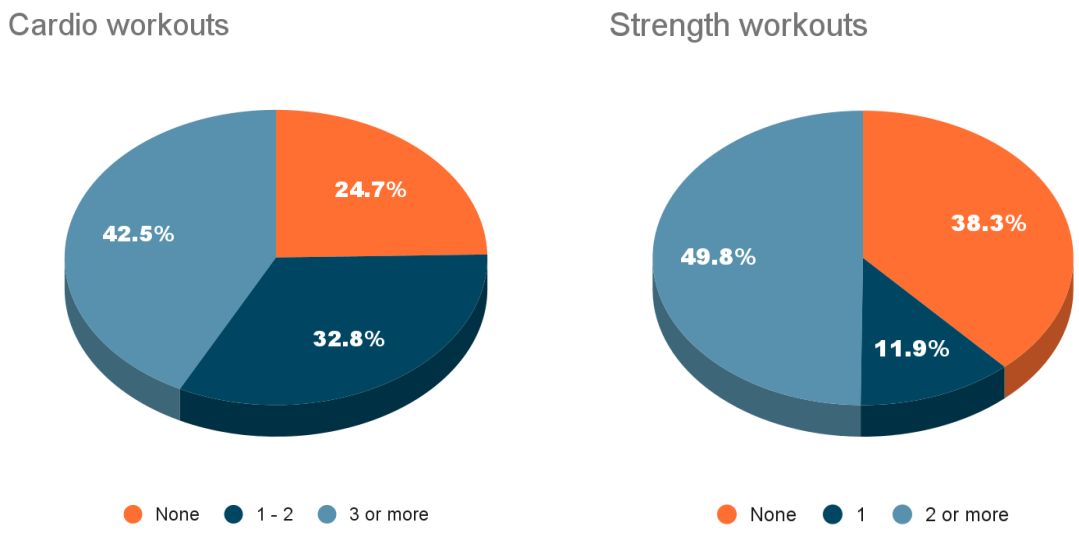


Do officers practice calorie restriction, given that they are overweight?

About half of all officers reported no calorie restriction at all in the past week. Just 20% practiced calorie restriction consistently (6 or 7 days in the past week).



Do officers exercise regularly?



Fewer than half of all officers reported doing 3 or more cardiovascular workouts in the week preceding the survey; about a quarter did none at all. The number of cardiovascular workouts was significantly correlated with lower BMI (r = -.179).

About half of all officers reported doing 2 or more strength training workouts in the past week. 38% did none at all. The number of strength training workouts was significantly correlated with lower BMI (r = -.183)

About 33.9% of officers did *both* 3 or more cardio workouts *and* 2 or more strength workouts, which approximately corresponds to the CDC's physical activity guidelines.[3] For comparison, only about 22.9% of all American adults meet the physical activity guidelines.[4]

Do officers engage in other types of exercise?

In the previous week, about 9% of officers participated at least once in martial arts; about 20% engaged in a meditation or mindfulness practice; and about 6% practiced yoga.

[3] Piercy, K. L., Troiano, R. P., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D. A., ... & Olson, R. D. (2018). The physical activity guidelines for Americans. Jama, 320(19), 2020-2028.

[4] Blackwell, D. L., & Clarke, T. C. (2018). State variation in meeting the 2008 federal guidelines for both aerobic and muscle-strengthening activities through leisure-time physical activity among adults aged 18-64: United States, 2010-2015. National health statistics reports, (112), 1-22.

Do officers have access to fitness centers/gyms provided by their agency?

More than half of all officers (56.9%) said they had access to an in-house fitness facility/gym that was provided by their agency. More than a quarter (28.7%) were provided with discounts to use a fitness center in their community. About 18.5% of officers had both and 33% had neither.

In-house fitness centers were associated with a small but statistically significant increase in the average number of cardiovascular workouts (2.31 vs. 2.16, $p < .01$) and strength workouts (1.96 vs. 1.75, $p < .001$) performed in the prior week. However, gym discounts had no association with exercise frequency.

Do officers suffer from physical health problems?

Officers reported a number of somatic complaints, including sleep disturbance, headaches, digestive issues, and upper respiratory infections. Fewer than half of all officers (43%) said that they get sufficient sleep often or all of the time. This is especially problematic since insufficient sleep predicted nearly every work performance outcome measured, as presented later in this report. Poor sleep quality or duration is also consistently linked to overweight and obesity.[5]

Sleep problems, headaches, GI issues, and upper respiratory infections were significantly associated with less frequent cardiovascular exercise. Digestive issues and upper respiratory infections were significantly associated with higher BMI. Headaches and digestive problems were also associated with less frequent strength training. Exercise and weight loss may reduce somatic complaints among officers.

Stress was an especially strong predictor of somatic health problems, indicating that officers are quite literally "worried sick."

[5] Beccuti, G., & Pannain, S. (2011). Sleep and obesity. *Current opinion in clinical nutrition and metabolic care*, *14*(4), 402.

How many officers use and abuse alcohol and nicotine?

Most officers (57%) consumed no alcohol in the week preceding the survey. However, 8.5% of officers reported heavy drinking in the past week, which is defined as more than 14 drinks for men and 7 drinks for women. For comparison, 5.1% of American adults are heavy drinkers.[6]

About 19% of officers reported using tobacco products, and 5% reported using e-cigarettes or vapes. For comparison, about 20.8% of U.S. adults use tobacco products, and 4.5% report using e-cigarettes.[7]

How many officers suffer from mental or emotional problems?

More than 1 in 5 officers (21%) reported suffering from a mental or emotional problem such as PTSD, depression, suicidal thoughts, or an anxiety disorder in 2021. Of these officers, 89% attribute their mental health problems to their current work, in whole or in part.

Ten survey items that asked about officers' stress were summed into a single stress scale (**α** = .858). Higher stress was associated with the following:

- BMI (*r* = .049). Heavier officers experienced more stress.
- Cardiovascular exercise (*r* = -.109). More frequent cardio workouts were associated with less stress.
- Weight training (*r* = -.087). More frequent strength training was associated with less stress.
- Number of alcoholic drinks (*r* = .069). More drinks were associated with higher stress.
- Gender (*r* = .111). Female officers reported more stress.
- Age (*r* = -.110). Younger officers experienced more stress.
- Experience (*r* = -.083). Newer officers reported more stress.
- Work-related injury (*r* = .116). Injured officers reported more stress.

[6] Boersma, P., Villarroel, M. A., & Vahratian, A. (2020). Heavy drinking among US adults, 2018. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.
[7] Cornelius ME, Wang TW, Jamal A, Loretan CG, Neff LJ. Tobacco Product Use Among Adults - United States, 2019. MMWR Morb Mortal Wkly Rep. 2020 Nov 20;69(46):1736-1742. doi: 10.15585/mmwr.mm6946a4. PMID: 33211681; PMCID: PMC7676638.

Health and work-related outcomes

Measures of physical and mental health, such as those described in the previous section, are associated with work-related outcomes such as officer injuries, absences, job satisfaction, and use-of-force self-efficacy.

Insufficient sleep, high stress, and a mental or emotional health problem were the most consistent correlates of work-related outcomes.

Work-related injuries

About 8% of officers said they had a work-related injury in 2021. Work-related injuries most commonly occurred during arrest/assault/use-of-force, at 40.6%. Other common causes of work-related injuries included training (20%), repetitive stress injuries such as carpal tunnel syndrome (20.5%), and auto crashes (9.5%).

Work-related injuries were significantly correlated with sleep, shift work, and mental health. When officers reported getting sufficient sleep more often, they also reported significantly fewer workplace injuries (r = -.113). Officers who worked nights or frequently rotated shifts were significantly more likely to report a work-related injury (11.3% vs. 6.5%).[8] Officers who reported a mental or emotional health problem were significantly more likely to be injured on the job (13.7% vs. 6.6%). Finally, officers who scored higher on the perceived stress scale were significantly more likely to report being physically injured (r = .116).[9]

BMI, frequency of exercise, and alcohol use had no association with work-related injuries.

Absenteeism

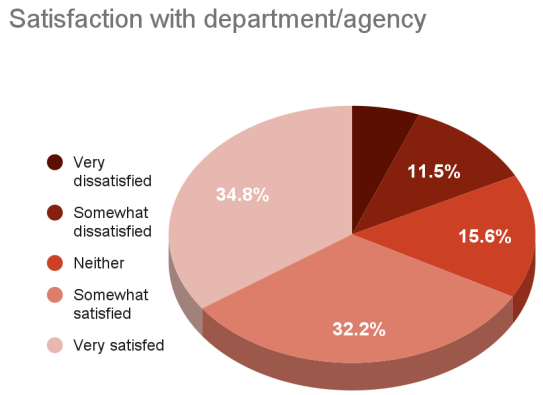
Unsurprisingly, work-related injury was the factor most strongly correlated with absenteeism (r = .219). Several other measures had small but statistically significant relationships with number of absences in the prior year: a mental/emotional health problem (7.32 vs. 4.76 absences); insufficient sleep (6.32 vs. 4.10 absences); obesity (6.56 vs. 4.38 absences); and shift work (6.26

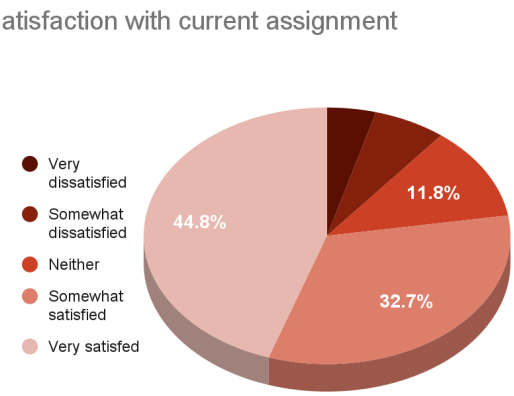
[8] The relationship between shift work and injuries could be related to sleep, but could also be related to the different types of police activities and environments encountered at night.
[9] It is possible that poor mental health and high stress are a *result* of work-related injuries, rather than a *cause* of work-related injuries. This study cannot determine causal order.

vs. 4.82 absences). Frequency of exercise, tobacco use, and alcohol use demonstrated no significant relationship with the reported number of absences.

Job Satisfaction and Burnout

Two-thirds of NC officers (67%) are satisfied working at their agency, and more than three-quarters (78%) are satisfied with their current assignment. Satisfaction with current assignment is significantly associated with regularly getting sufficient sleep (r = .191), day shift (r = .109), mental/emotional health problems (r = -.142), and stress (r = -.278).





Burnout refers to the long-term psychological effects of prolonged work-related stressors.[10] Several factors appear to be associated with burnout among NC law enforcement and detention officers, including experiencing a mental/emotional health problem (r = .334), poor sleep (r = .382), and stress (r = .560). More frequent drinking is associated with burnout (r = .076), although drinking may be both a consequence and a cause. Officers who more frequently participate in cardiovascular exercise or weight training report significantly less burnout (r = -.073 and r = -.071 respectively).

Use-of-Force Self-Efficacy and Apprehensiveness

Use-of-Force (UOF) self-efficacy refers to self-confidence in determining the appropriate force to use during an arrest, self-defense, or response-to-resistance situation. Four survey items asked about officers' confidence using force, and were summed into a single scale (**α** = .785). Regular, sufficient sleep was associated with more UOF self-efficacy (r = .130). Officers reported

[10] Maslach, C., & Leiter, M. P. (2006). Burnout. Stress and quality of working life: current perspectives in occupational health, 37, 42-49.

significantly less UOF self-efficacy when they had higher levels of stress (r = -.228). Officers scored slightly lower on the UOF self-efficacy scale, on average, when they also suffered from a mental or emotional health problem. BMI, alcohol use, tobacco use, and frequency of exercise were not directly related to UOF self-efficacy.

Apprehensiveness is a related concept, but it is distinct from UOF self-efficacy. Apprehensiveness refers to an inability to perform one's duties due to fear or anxiety. Three survey items asked about officers' apprehensiveness to use force and were summed into a single scale (α = .664). Four health factors were related to apprehensiveness to use force: stress (r = .324), a mental or emotional health problem (r = .173), insufficient sleep (r = -.167), and having a work-related injury (r = .058).

The relationship between fitness standards/wellness programs and officer health

Officers in agencies with mandatory in-service fitness standards report small but statistically significant improvements on several measures of health. Importantly, these additional standards do not significantly worsen work-related attitudes.

Are officers healthier in agencies with in-service fitness standards?

Officers in departments with mandatory in-service physical fitness standards report improvements on some measures, and no differences on others. No significant differences were found among detention officers with/without in-service fitness standards, so the results reported in this section are limited to law enforcement officers.

NC LEOs in agencies with in-service fitness standards…

- …have significantly lower mean BMIs (28.96 vs. 29.57).
- …report significantly more frequent cardiovascular exercise in the prior week (2.50 vs. 2.24 days per week).
- …report significantly more frequent strength training in the prior week (2.22 vs. 1.85 days per week).
- …are significantly less likely to say they did no exercise at all in the prior week (16.6% vs. 22.0%).
- …are half as likely to report being injured during training (1.28% vs. 2.79%).
- …report NO significant differences in stress, burnout, job satisfaction, absences, or use-of-force attitudes.

Are officers healthier in agencies with optional wellness programs?

In agencies with *optional* physical fitness programs, officers do cardiovascular exercise slightly more frequently than in agencies with no wellness program (2.33 vs. 2.20 days per week, $p < .05$). They also demonstrate a slightly smaller share of officers reporting mental/emotional health problems (19.4% vs. 22.3%); however, they do *not* demonstrate lower BMIs and they do not strength train more often.

Overall, officers whose agencies offer an optional mental health program report slightly lower stress (22.62 vs. 23.12, $p < .01$) and slightly better sleep quality (3.21 vs. 3.29, $p < .01$). Officers in these agencies do not report a significantly lower share of officers with reported mental health issues (21.1% vs. 21.4%, $p = .776$).

Officers who actually *participate* in optional fitness programs tend to workout significantly more often than those who choose not to, and officers who choose to participate in optional mental health programs tend to suffer from more stress and mental health problems than their peers. However, this should *not* be interpreted such that optional fitness programs lead to more exercise or mental health programs lead to poorer mental health. Rather, officers that exercise more frequently are more likely to participate in exercise-related programs, and officers with mental health challenges or high stress are more likely to participate in mental health-related programs. That is, officers with relevant interest will participate in optional health programming, but those programs' efficacy is not necessarily well established.

Nearly two-thirds (63.8%) of officers who said optional physical fitness programs were available also said they participated in them. Furthermore, nearly one-third (29.1%) of officers who said an optional mental health program was available said they participated.

Study 2: Agency Programs and Standards, and Leaders' Attitudes and Concerns

Study 2 provides a snapshot of existing fitness standards and wellness programs in NC law enforcement agencies, as well as the attitudes of agency leaders toward them generally.

Study Design

Survey invitations were emailed from the Chairs of the North Carolina Criminal Justice and Sheriffs' Education and Training Standards Commissions to all police chiefs and sheriffs in the state of North Carolina (N = 668). 182 completed surveys were returned, corresponding to a response rate of 27.2%.

New Hire Fitness Assessments

Agency leaders were asked whether sworn new-hires were required to pass psychological evaluations and physical fitness tests. 94% of responding police departments and 95.4% of sheriff's offices required psychological evaluations for new hires; however, just 22.2% of police departments and 28.6% of sheriff's offices required new applicants to pass a physical fitness test. This appears to be a remarkable decline in new-hire fitness assessments compared to previous years[11] and may be due to COVID-19 mitigation and/or a historically challenging recruitment environment at the time of this study.

In-Service Fitness Assessments

About one-fifth of police departments (19.8%) and one-fourth of sheriff's offices (28.6%) in North Carolina require a periodic fitness test for in-service officers. Among the agencies with a mandatory fitness test for in-service officers, however, only one-third make passing such a test a condition of continued employment. In fact, 39% of agencies with mandatory physical fitness tests for in-service officers report there is no consequence at all for not passing the test.[12]

[11] Crews, Zackery A. 2017. Evaluation of Health and Fitness Programs and Policies for North Carolina Law Enforcement Agencies. Unpublished Master's Capstone. Appalachian State University.
[12] Anecdotally, some agency leaders indicate that they are transitioning to a standard by requiring the regular evaluation but waiting several years to impose consequences for failing to meet a standard.

In addition to our survey of NC agency leaders, members of the international Association of Directors of Law Enforcement Standards and Training were polled by the Director of the NC Justice Academy regarding in-service fitness standards. Responses were received for twenty-five states. Of those, three states mandate physical fitness testing: Delaware (for State Police only); New Jersey (for State Police only, and not under auspices of the central law enforcement training commission); and New Hampshire, which requires all officers to perform at the 35th percentile or better every three years in order to maintain certification.

In-Service Training or Programming

The following table reports the share of agencies that provide various types of mandatory or optional health-related programs. The most common type of training/programming involves mental/emotional health, which 16.6% of agencies require and 45.6% offer as an option. That agencies have prioritized this type of programming is reassuring given findings in the previous section linking mental and emotional health to every work-related outcome that was measured.

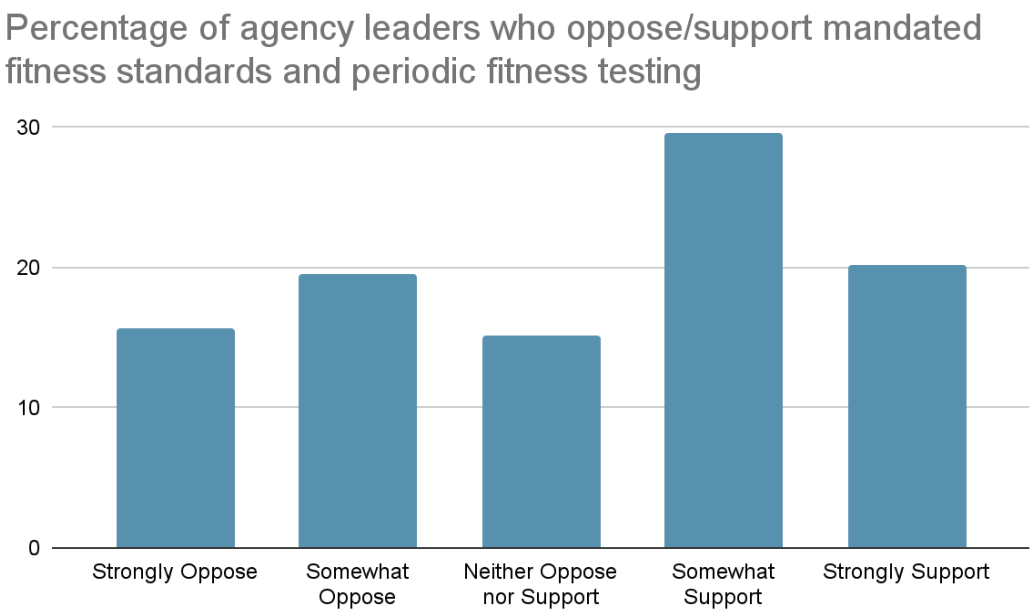
Additionally, 21.9% of agency leaders say they offer optional nutrition counseling, and 43.2% offer optional physical fitness programs.

Type of Programming	**Mandatory**	**Optional**
Physical Fitness	9.5%	43.2%
Nutrition	6.5%	21.9%
Mental or Emotional Health	16.6%	45.6%
Meditation or Mindfulness	1.8%	6.5%

A substantial share of agencies provide access to workout facilities in some form or another. Nearly half (47.9%) offer an on-site fitness facility, and 42% offer a discount for a community fitness center of some kind. Fewer than one-third (32.5%) offer neither, and this did not vary substantially by police departments or sheriff's offices.

Agency Leader Support for Fitness Mandates

Police Chiefs and Sheriffs were asked whether they supported or opposed mandated fitness standards and periodic testing as a condition of continued law enforcement/detention certification. As illustrated in the figure, there was somewhat more support than opposition. Support was slightly higher among police chiefs than sheriffs, although the difference was not statistically significant.



Perceived Challenges with In-Service Physical Fitness Standards

Agency leaders were asked to identify the biggest barriers to mandatory in-service physical fitness standards, whether or not they already existed at their department and whether or not they personally support or oppose such standards. They were asked to choose their top three concerns from a list of 10 possible options (including an "other" category). The responses appear in the following table.

By far, the biggest concern for agency leaders was that they might be unable to meet staffing needs because physical fitness standards could negatively impact recruitment and retention, where 41.4% identified it as a top concern. Scheduling challenges (27.4%) and officer opposition/resistance (24.8%) were also top concerns.

Perceived Barrier	Percentage Identifying as Top-3 Concern
Staffing	41.4%
Scheduling	27.4%
Officer Resistance/Opposition	24.8%
Challenges with Implementation	18.5%
Lack of Guidance on Best Practices	14.6%
Liability Concerns, including Injuries	13.4%
Lack of Support from Local Government	10.8%
Other Concern not Listed	5.7%
Lack of Support from Command Staff	3.2%

Staffing

We analytically address staffing concerns related to physical fitness standards in the following section; for now, note that there is no evidence that mandatory or optional fitness programs significantly worsen attrition or retention, and in fact there might be small *improvements* in retention.

Officer Resistance/Opposition

Regarding officer resistance or opposition, it is worth highlighting the results reported earlier that found that officers did not suffer from more stress or burnout, nor did they have lower job satisfaction, in agencies that had mandatory fitness standards. In short, there appear to be no overall reductions to officer morale.

Challenges with Implementation and Lack of Guidance on Best Practices

Agency leaders may lack the information and resources they need to implement a high-fidelity in-service physical fitness evaluation program. As we note in our recommendations, the CJ and Sheriffs' commissions ought to create and disseminate clear written guidance for safe, effective, and legally defensible in-service fitness programs.

Liability

Agency leaders also noted liability concerns, which include injuries to officers. In private comments, some feared that their agency would be liable for injuries that occur during exercise or evaluation.

There are several reasons these liability concerns may be unfounded. In the NC officer surveys analyzed here, training-related injuries were reported less than *half* as often among officers in agencies with in-service fitness standards (1.28% vs. 2.79%). There were no significant differences for other types of injuries, although there was a non-significant trend toward fewer arrest- or use-of-force-related injuries among officers in agencies with in-service fitness standards (2.88% vs. 3.28%, p = .504). Other research conducted in North Carolina also finds that in-service fitness standards are associated with fewer injuries and worker's compensation claims.[13]

Though not necessarily related to work-related injuries or woker's compensation claims, there are other areas of liability agency leaders may also want to consider. Two other areas related to fitness standards of legal concern for agencies include possible negligence in the *delivery of the standards*, and possible negligence for *not having a fitness standard* (though the case law is limited and is not binding precedent, it can still be considered by our courts as persuasive). We will briefly discuss those two aspects here.

Negligence in the Delivery

First, in order to mitigate the risk of civil liability for claims of negligence, there should be policies and procedures in place to ensure the safest delivery possible. These may include factors such as choosing appropriate instructors, inspecting equipment before use, and updating policies on how to address injuries. The standard of care is *reasonableness* in a negligence case.

Failing to Maintain a Standard

The second area of negligence agencies should be aware of is about failing to even have a physical fitness standard in the first place. To date, there is only a limited amount of litigation

[13] Fortenbery, J. (2016). *An exploratory study on physical fitness policies among police departments in North Carolina*. Nova Southeastern University.

on this issue, but it is worth noting. Possible areas open for challenges include negligent hiring, negligent training, negligent supervision, and negligent retention.

Parker v. District of Columbia Police Department, 1988 - A man severely injured in an arrest by a Washington, D.C. officer won a substantial lawsuit on an excessive force claim. The injured citizen was shot by the officer after he could not control him with physical force. The officer, who testified he had no physical training in years, could not take the resisting citizen from the driver's seat of the car. The citizen was shot when the officer claimed he saw the citizen reach toward his waistband. The federal court of appeals ruled the District of Columbia had a policy of tolerating unfitness among its officers, making higher levels of force more likely. Because unfit officers were more likely to use higher levels of force, a policy of tolerating unfit officers encouraged excessive force by the agency. Ultimately, the officers' condition and the lack of fitness training for that period of time created a foreseeable risk of harm to others.

Hutton v. City of Martinez - This case was decided in 2003 and relied on the decision in the *Parker* case. Here, the plaintiff was shot in the back by an officer with the City of Martinez. The plaintiff alleged that the officer shot him in the back because the officer was in such poor physical condition that he was unable to pursue the plaintiff on foot. The Court stated if the officer, "was unable to pursue a fleeing suspect due to his poor physical condition, it could lead to the conclusion that the Martinez Police Department did not adequately train its officers to assure that their physical condition was adequate for the performance of their duties."

Wellness Programs - Voluntary vs. Mandatory

Agencies that do implement wellness programs must also consider liability when determining whether to choose a voluntary or mandatory wellness program. As stated earlier, officers in agencies with mandatory in-service fitness standards report small but statistically significant improvements on several measures of health. However, there is a higher risk of civil liability for those agencies implementing mandatory programs. When meeting or failing to meet a fitness standard is the basis for employment decisions such as hiring, promotion, demotion, termination, reassignment, pay incentives, etc., the agency may have to defend the job-relatedness of the test if it is challenged by an employee.

If a mandatory fitness program is the chosen route, which could simply include periodic completion of the POPAT, there are several guidelines that, if followed, may help mitigate an agency's civil liability risk. Briefly, they include: following the Uniform Guidelines for Employee

Selection Tests (is the test job-related and consistent with business necessity?), ensuring compliance with Title VII of the Civil Rights Act (not adjusting scores or using different scores on the basis of race, color, religion, sex, or national origin; same job = same standard), and ensuring the use of valid tests (does the test measure what it claims to measure; is it fair, reliable and repeatable?). Though it is impossible to completely eliminate liability, agencies can take steps to mitigate risk.

Study 3: Attrition Related to Fitness Programs

As reported in the previous section, the most commonly perceived barrier to mandating in-service physical fitness standards is staffing: agency leaders are frequently concerned that retention will suffer in what is already an acute staffing crisis.

Retention and attrition are driven by multiple factors. Most existing research on police retention and attrition focuses on surveys with individual officers that measure their "intent to quit." Since an officer's actual departure is almost never measured in these studies, very little is actually known about the organizational factors associated with retention and attrition that agency leaders might actually exercise control over. This study remedies that shortcoming.

It is plausible that in-service fitness requirements could impact retention in several ways. First, some officers may be terminated for failing to meet the standard. Second, officers may grow dissatisfied with their agency if they feel that the new standards are too demanding, particularly if they are given little direction, few resources, and are asked to make substantial new investments of unpaid personal time meeting their employer's new demands. Third, and conversely, improved employee health is a well-established predictor of employee retention and productivity,[14] and it is plausible that well-implemented standards – with effective guidance and support, including paid duty time for exercise – could actually *reduce* turnover because of its improvements to physical and mental health.

In order to explore these possibilities, this study examines data from all municipal police departments and county sheriff's offices in another Southeastern state (N=321). Data are compiled by the state's central law enforcement commission on an annual basis, based on both their central computerized recordkeeping (e.g., certified officers hired or terminated anywhere in the state) as well as agency surveys (to gather additional details such as salary and benefits). Data for this study are based on the year 2019 in order to avoid confounding the impact of COVID-19 and anti-police protests in the summer of 2020.

The key dependent variable is attrition, measured as the number of officers who separated employment for any reason between July 1, 2018 and June 30, 2019 (converted to a rate in the regression analysis). There are three key predictor variables: whether or not the agency has a

[14] Sears, L. E., Shi, Y., Coberley, C. R., & Pope, J. E. (2013). Overall well-being as a predictor of health care, productivity, and retention outcomes in a large employer. *Population health management*, *16*(6), 397-405.

"Mandatory in-service physical fitness/wellness program"; whether or not the agency has a "Voluntary in-service physical fitness/wellness program"; and how frequently the agency requires in-service physical fitness training, ranging from never to biannually. Several control variables are also included, since they likely also have an effect on both voluntary and involuntary separation: starting salary, agency accreditation (yes/no), the presence of a collective bargaining unit/union (yes/no), whether take-home cars are provided (yes/no), and whether the agency is a police department (rather than a sheriff's office). An exposure term controls for agency size. After accounting for a small amount of missing data, the final sample size was 312 agencies.

Poisson regression results are reported in the following table as incident rate ratios. In short, *none* of the physical fitness programs were associated with changes in attrition, although *all* of the control variables were. In fact, mandatory fitness programs were associated with a 9% *reduction* in the attrition rate ratio, although this was not statistically significant. Optional fitness programs were associated with no significant difference in attrition, nor was frequency of physical fitness training. Among the control variables, higher salaries, agency accreditation, collective bargaining units, and sheriff's offices were all associated with lower rates of attrition. (IRR's above 1 indicate an increase in the attrition rate ratio; IRRs below 1 indicate a decrease in the attrition rate ratio.)

Of the 312 agencies included in this analysis, 143 had optional physical fitness programs and 32 had mandatory programs. Importantly, the data suggests that fitness programs and regular in-service fitness training are *not* associated with higher levels of attrition. The available evidence, therefore, should provide some reassurance that mandatory law enforcement fitness standards are unlikely to contribute to staffing shortages.

Poisson Regression Analysis of Attrition, N = 312

	IRR	SE
Mandatory Fitness Program	.901	.069
Voluntary Fitness Program	1.009	.054
Frequency of Fitness Training	1.020	.017
Salary	.965***	.003
Agency Accreditation	.761***	.038
Collective Bargaining Unit	.891*	.043
Take Home Car	1.119*	.051
PD	1.390***	.060
Constant	.385***	.046
Exposure term: ln(Officer Population)	1	

Pseudo R^2 = .174, Log likelihood = -873.731

*p < .05, ** p < .01, ***p < .001

Recommendations and Conclusions

A law enforcement officer's daily routine includes stretches of inactivity coupled with unpredictable, intense bursts of intense physical activity[15]. Simultaneously, law enforcement officers exhibit poor cardiovascular disease health profiles compared to other occupations[16],[17] and greater risk for on-duty cardiovascular death events.[18] In addition, police officers experience higher levels of job-related stress compared to the average worker, which can be associated with higher levels of anxiety and depression among police officers as they age.[19] There are also potential liability issues for departments whose officers' poor health leads to increased levels of physical force. These risk factors combine to make officer health and wellness a priority for many police leaders and police departments. To close this report, we synthesize the prior literature on officer wellness, the key findings from our original research reported herein, and our key recommendations.

Recommendation 1: Require physical fitness testing throughout the career of a law enforcement officer.

The weight of the evidence from both prior research and our survey of NC law enforcement and detention officers indicates that officers are in poor health–in many respects, even poorer health than the general public. Our research and others' also finds clear improvements on a variety of health- and work-related outcomes when physical fitness standards are implemented, including less absenteeism, fewer worker's compensation claims, lower BMIs, and more frequent exercise, without worsening employees' job-related attitudes. Furthermore, even in-service fitness testing without formal consequence was associated with significantly lower body mass index and significantly more exercise in our sample.

[15] Kales, S. N., Tsismenakis, A. J., Zhang, C., & Soteriades, E. S. (2009). Blood pressure in firefighters, police officers, and other emergency responders. *American journal of hypertension*, *22*(1), 11-20.
[16] Ramey, S. L. (2002). *Relationship between cardiovascular disease morbidity, risk factors, and stress in a law enforcement cohort*. Iowa State University.
[17] Ramey, S. L., Downing, N. R., & Franke, W. D. (2009). Milwaukee police department retirees: cardiovascular disease risk and morbidity among aging law enforcement officers. *AAOHN journal*, *57*(11), 448-453.
[18] Kales, S. N., Tsismenakis, A. J., Zhang, C., & Soteriades, E. S. (2009). Blood pressure in firefighters, police officers, and other emergency responders. *American journal of hypertension*, *22*(1), 11-20.
[19] Gershon, R. R., Lin, S., & Li, X. (2002). Work stress in aging police officers. *Journal of occupational and environmental medicine*, 160-167.

The Police Officer's Physical Abilities Test (POPAT), developed by Rhodes and Fernandez in 1985 to serve as a selection tool for municipal police forces, simulates police officer work activities by asking participants to simulate chasing a suspect, controlling a suspect, and physically carrying a subject away from the scene. There is limited peer-reviewed research validating POPAT's various components or examining the effects of POPAT on officer performance. One example is Rhodes and Fahrenholtz' study of police officer physical fitness.[20] These authors examined the relationship between POPAT and traditional lab or field tests of officer fitness. Their results suggest that maximal aerobic power and anaerobic capacity helped to explain variation in performance on the run component of the POPAT. Anderson, Plecas, and Segger, based on surveys of officers regarding what they deem essential for doing police work, suggest that POPAT is an effective job-specific test of fitness.[21] They conclude this because POPAT includes physical tasks that officers encounter day-to-day, even if the distances and times of POPAT's standardized model are, as should be expected, sometimes inconsistent with day-to-day scenarios officers will face.

Despite a limited number of peer-reviewed studies of POPAT's efficacy, there are multiple examples of POPAT validation testing. Validation testing includes an effort to identify and properly simulate activities that officers will encounter fairly regularly, an acknowledgement that simulating these activities should be simple, reliable, and repeatable across different test settings, and an effort to understand whether these simulation methods accurately reflect an officer's physical competency to perform key job activities. A review of fitness standards at 75 federal, state, and local agencies validated a variety of fitness measures as predictive of law enforcement-related work performance, including aerobic power, anaerobic power, upper-body strength, upper-body muscular endurance, abdominal muscular endurance, explosive leg power, and agility.[22]

Results of a re-validation test of POPAT's use and efficacy in North Carolina suggest that experienced police officers find POPAT's simulated activities reasonably similar to tasks they might be expected to perform in actual job scenarios. Furthermore, results of this re-validation study indicate that most Basic Law Enforcement Training participants can complete POPAT

[20] Rhodes, E. C., & Farenholtz, D. W. (1992). Police Officer's Physical Abilities Test compared to measures of physical fitness. *Canadian journal of sport sciences*, *17*(3), 228-233.
[21] Anderson, G. S., Plecas, D., & Segger, T. (2001). Police officer physical ability testing–Re-validating a selection criterion. *Policing: An International Journal of Police Strategies & Management*.
[22] Collingwood, T. R., Hoffman, R., & Smith, J. (2004). Underlying physical fitness factors for performing police officer physical tasks. *Police Chief*, *71*(3), 32-38.

within the proposed cutoff.[23] The results suggest that POPAT is a valid assessment tool for determining whether someone has the minimum physical abilities to perform the expected duties of an officer. It is important to note that POPAT is only valid for establishing minimally acceptable physical standards. POPAT scores do not predict overall officer performance, and necessarily exclude a variety of aspects of officer health that are known to affect officer performance. Improving police service will often require strategies for officer wellness beyond a minimum acceptable POPAT standard.

Given a lack of peer-reviewed research, an absence of validation studies, and null results in our own analyses, we are unable to make recommendations for incumbent physical fitness standards for NC detention officers. Job task analyses and validation studies of detention officer duties are advised.

Recommendation 2: Do not incrementally adjust in-service fitness standards based on age.

The authors are not attorneys, and this does not constitute legal advice, but age-adjusted fitness standards may not be advisable. In-service fitness standards must be objectively based on relevant job tasks and performance, and not the personal characteristics of employees, else claims of discrimination may be brought.

Recent research consistently indicates that age-associated declines in strength and fitness are primarily attributable to poor nutrition and inactivity, not age per se.[24,25,26,27] It is likely that older officers may struggle with in-service fitness standards if they have experienced many years of poor exercise and nutrition, but this is reversible. Studies consistently show that even people

[23] Work Physiology Associates, Inc. (2014). Final Report: Re-Validation of Police Officer Physical Ability Test (Revised in January 2016).

[24] Lowndes, J., Carpenter, R. L., Zoeller, R. F., Seip, R. L., Moyna, N. M., Price, T. B., Clarkson, P. M., Gordon, P. M., Pescatello, L. S., Visich, P. S., Devaney, J. M., Gordish-Dressman, H., Hoffman, E. P., Thompson, P. D., & Angelopoulos, T. J. (2009). Association of age with muscle size and strength before and after short-term resistance training in young adults. *Journal of strength and conditioning research*, *23*(7), 1915–1920. https://doi.org/10.1519/JSC.0b013e3181b94b35

[25] Venturelli, M., Saggin, P., Muti, E., Naro, F., Cancellara, L., Toniolo, L., Tarperi, C., Calabria, E., Richardson, R. S., Reggiani, C., & Schena, F. (2015). In vivo and in vitro evidence that intrinsic upper- and lower-limb skeletal muscle function is unaffected by ageing and disuse in oldest-old humans. *Acta physiologica (Oxford, England)*, *215*(1), 58–71. https://doi.org/10.1111/apha.12524

[26] Wroblewski, A. P., Amati, F., Smiley, M. A., Goodpaster, B., & Wright, V. (2011). Chronic exercise preserves lean muscle mass in masters athletes. *The Physician and Sportsmedicine*, *39*(3), 172-178.

[27] Pontzer, H., Yamada, Y., Sagayama, H., Ainslie, P. N., Andersen, L. F., Anderson, L. J., ... & IAEA DLW Database Consortium §. (2021). Daily energy expenditure through the human life course. *Science*, *373*(6556), 808-812.

over the age of 60 lose an equivalent amount of body fat and build an equivalent amount of muscle as people in their 20's and 30's when participating in identical diet and exercise programs, and this is true in both men and women.[28,29,30,31] Cardiovascular improvements from exercise are not correlated with age, either.[32,33] In short, there are neither legal nor physiological rationales for age-graded minimum fitness standards. The problem is inactivity, not age, and in-service physical fitness tests are associated with increases in physical exercise in our NC sample.

Recommendation 3: Promote physical activity among officers irrespective of in-service physical fitness standards through in-agency fitness centers and on-duty exercise.

Generally, the extant literature on physical fitness among officers suggests that officers maintaining higher levels of physical fitness get injured less and miss fewer days of work. This is supported by Fortenberry's 2016 examination of the relationship between physical wellness policies and officer injuries across the state of North Carolina.[34] Fortenberry finds that North Carolina departments with mandatory *physical* fitness standards experienced significantly lower medical costs and lost work days compared to departments with no physical wellness standards and only general wellness, rather than physical wellness, standards. Evidence from the International Association of Chiefs of Police (2014) also suggests that officers who regularly participate in physical fitness training are less likely to suffer work injuries. Furthermore,

[28] Roth, S. M., Ivey, F. M., Martel, G. F., Lemmer, J. T., Hurlbut, D. E., Siegel, E. L., Metter, E. J., Fleg, J. L., Fozard, J. L., Kostek, M. C., Wernick, D. M., & Hurley, B. F. (2001). Muscle size responses to strength training in young and older men and women. *Journal of the American Geriatrics Society*, *49*(11), 1428–1433. https://doi.org/10.1046/j.1532-5415.2001.4911233.x

[29] Ivey, F. M., Roth, S. M., Ferrell, R. E., Tracy, B. L., Lemmer, J. T., Hurlbut, D. E., Martel, G. F., Siegel, E. L., Fozard, J. L., Jeffrey Metter, E., Fleg, J. L., & Hurley, B. F. (2000). Effects of age, gender, and myostatin genotype on the hypertrophic response to heavy resistance strength training. *The journals of gerontology. Series A, Biological sciences and medical sciences*, *55*(11), M641–M648. https://doi.org/10.1093/gerona/55.11.m641

[30] Mayhew, D. L., Kim, J. S., Cross, J. M., Ferrando, A. A., & Bamman, M. M. (2009). Translational signaling responses preceding resistance training-mediated myofiber hypertrophy in young and old humans. *Journal of applied physiology*, *107*(5), 1655-1662.

[31] Loenneke, J. P., Rossow, L. M., Fahs, C. A., Thiebaud, R. S., Grant Mouser, J., & Bemben, M. G. (2017). Time-course of muscle growth, and its relationship with muscle strength in both young and older women. *Geriatrics & gerontology international*, *17*(11), 2000-2007.

[32] Kohrt, W. M., Malley, M. T., Coggan, A. R., Spina, R. J., Ogawa, T. A. K. E. S. H. I., Ehsani, A. A., ... & Holloszy, J. O. (1991). Effects of gender, age, and fitness level on response of VO2max to training in 60-71 yr olds. *Journal of applied physiology*, *71*(5), 2004-2011.

[33] Lawrenson, L., Hoff, J., & Richardson, R. S. (2004). Aging attenuates vascular and metabolic plasticity but does not limit improvement in muscle VO2 max. *American Journal of Physiology-Heart and Circulatory Physiology*, *286*(4), H1565-H1572.

[34] Fortenbery, J. (2016). *An exploratory study on physical fitness policies among police departments in North Carolina*. Nova Southeastern University.

officers who maintained a healthy weight missed fewer days of work as officers who were overweight or obese, according to a 2014 IACP report. Guffey, Larson, and Lasley also found a significant relationship between physical health and injury, as overweight officers were more likely to have reported injuries[35], while McGill et al. found that a combination of multiple fitness indicators was associated with more occurrences of back injury across a five-year period.[36] Lower levels of physical fitness are also associated with higher levels of sickness and worker's compensation claims,[37,38] as well as higher levels of absenteeism[39] that were not due to job-related injury.

Knapik and colleagues found that the relationship between lower levels of physical fitness and higher levels of injury was consistent across both male and female law enforcement officers.[40] Furthermore, this relationship seems consistent across different career paths that require similar levels of exertion, such as fire services[41] and military services.[42,43]

This relationship may also extend to the psychological well-being of officers. There is limited research on the relationship between physical health and psychological well-being among police officers; however, there was a significant relationship between stress and poorer physical health among police and emergency workers.[44] Furthermore, among police workers, higher perceived fitness scores were associated with higher mental health scores. Across other types of public sector employees, the evidence remains mixed. Some studies suggest that participants in an exercise program saw improvements in psychological well-being measures

[35] Guffey, J. E., Larson, J. G., & Lasley, J. (2015). Police officer fitness, diet, lifestyle and its relationship to duty performance and injury. *Journal of Legal Issues and Cases in Business*, *3*, 1.
[36] McGill, S., Frost, D., Lam, T., Finlay, T., Darby, K., & Cannon, J. (2015). Can fitness and movement quality prevent back injury in elite task force police officers? A 5-year longitudinal study. *Ergonomics*, *58*(10), 1682-1689.
[37] Fortenbery, J. (2016). An exploratory study on physical fitness policies among police departments in North Carolina. Nova Southeastern University.
[38] Chenoweth, D. H., Rager, R. C., & Haynes, R. G. (2015). Relationship between body mass index and workers' compensation claims and costs. *Journal of Occupational and Environmental Medicine*, *57*(9), 931-937.
[39] Boyce, R. W., Jones, G. R., & Hiatt, A. R. (1991). Physical fitness capacity and absenteeism of police officers. *Journal of occupational medicine*, 1137-1143.
[40] Knapik, J. J., Cosio-Lima, L. M., Reynolds, K. L., & Shumway, R. S. (2015). Efficacy of functional movement screening for predicting injuries in coast guard cadets. The Journal of Strength & Conditioning Research, 29(5), 1157-1162.
[41] Poplin, G. S., Roe, D. J., Peate, W., Harris, R. B., & Burgess, J. L. (2014). The association of aerobic fitness with injuries in the fire service. *American journal of epidemiology*, *179*(2), 149-155.
[42] Lisman, P., O'Connor, F. G., Deuster, P. A., & Knapik, J. J. (2013). Functional movement screen and aerobic fitness predict injuries in military training. *Med Sci Sports Exerc*, *45*(4), 636-643.
[43] Meigh, N., Orr, R. M., & Steele, M. (2012). Metabolic fitness as a predictor of injury risk in conditioned military trainees undertaking an arduous field training exercise. In *1st Australian Conference on Physiological and Physical Employment Standards*.
[44] Gerber, M., Kellmann, M., Hartmann, T., & Pühse. U. (2010). Do Exercise and Fitness Buffer Against Stress Among Swiss Police and Emergency Response Service Officers? Psychology of Sport and Exercise journal 11, 286-294.

compared to those who did not exercise,[45] while others reported no relationship between fitness and psychological well-being.[46]

In our survey of NC law enforcement officers, officers exercised significantly more frequently when their agency had an in-agency fitness center or gym, but not when they merely provided free or discounted access to a community fitness center. Given the financial resources or the leverage of community partnerships, sponsorships, or donations, agencies ought to prioritize the establishment of fitness facilities within their departments. If feasible, we also recommend that paid, on-duty time be provided for exercise; although no formal research studies have evaluated on-duty/paid police officer exercise, comments to the authors of this study from both officers and agency leaders suggests that it is a remarkably powerful incentive.

Recommendation 4: Implement holistic employee wellness programs in law enforcement agencies.

This study and others have consistently found that in addition to poor physical health, officers suffer from a variety of mental, emotional, and behavioral health problems including stress, depression, PTSD, poor nutrition, and sleep disorders. These problems are consistently linked to poorer work outcomes and somatic health problems.[47]

Evaluation studies have found that some interventions and wellness programs demonstrate significant improvements in officers' overall health. For instance, a proactive resilience intervention training conducted by Arnetz et al. taught officers how to anticipate and cope with job-related stress and trauma through targeted training *before* mental health symptoms developed.[48] It demonstrated significant improvements as long as two years post intervention.

A model program in Seminole County, Florida provides a good example of a systematic and well-structured wellness program. It involved seven steps to initiate, develop, implement, and evaluate the program. With officer input and command approval, a program was developed

[45] DiLorenzo, T. M., Bargman, E. P., Stucky-Ropp, R., Brassington, G. S., Frensch, P. A., & LaFontaine, T. (1999). Long-term effects of aerobic exercise on psychological outcomes. *Preventive medicine*, *28*(1), 75-85.
[46] Abbott, A. V., Peters, R. K., & Vogel, M. E. (1990). Type A behavior and exercise: a follow-up study of coronary patients. *Journal of psychosomatic research*, *34*(2), 153-162.
[47] Violanti, J. (2021). *Occupation Under Siege: Resolving Mental Health Crises in Police Work* (Vol. 1). Charles C Thomas Publisher.
[48] Arnetz, B. B., Nevedal, D. C., Lumley, M. A., Backman, L., & Lublin, A. (2009). Trauma resilience training for police: Psychophysiological and performance effects. *Journal of Police and Criminal Psychology*, *24*(1), 1-9.

and periodic health screenings monitored improvement in four key areas (exercise, nutrition, sleep, and stress management). Another program called the "Safety & Health Improvement: Enhancing Law Enforcement Departments" (SHIELD) program incorporated twelve 30-minute peer-led sessions for six months and led to significant improvements in diet, sleep, stress, and overall quality of life.[49] Relatively small time investments therefore yielded significant returns. Encouragingly, our own data shows that a substantial share of NC officers chose to participate in voluntary wellness programs when they were made available.

In short, there is ample evidence that intervention/wellness programs significantly improve officers' physical and mental health, and there are existing models that may be efficiently emulated. The Police Executive Research Forum has produced a technical assistance report entitled *Promising Strategies for Strengthening Police Department Wellness Programs* that succinctly guides agency leaders through the process of implementing a successful program uniquely suited to their agencies' particular needs.[50] This report ought to be widely distributed to agency leaders throughout North Carolina.

Conclusion

The physical and mental health of law enforcement and detention officers are generally poor. Leaders and policymakers must address poor officer health, which carries both financial and human costs for police and the public. Our review suggests that periodic physical fitness tests for incumbent law enforcement officers produce incremental improvements in officer health, but even more is likely needed. The current crisis in police health requires a multi-faceted approach, including targeted and evidence-based wellness programs. Officers, agencies, and the communities they serve will require both financial and educational resources to see substantial improvements in officer health and wellness, and its accompanying improvements for public service.

[49] Kuehl, K. S., Elliot, D. L., MacKinnon, D. P., O'Rourke, H. P., DeFrancesco, C., Miočević, M., ... & Kuehl, H. (2016). The SHIELD (Safety & Health Improvement: enhancing law enforcement departments) study: mixed methods longitudinal findings. *Journal of occupational and environmental medicine/American College of Occupational and Environmental Medicine*, *58*(5), 492.

[50] Police Executive Research Forum. 2021. Promising Strategies for Strengthening Police Department Wellness Programs: Findings and Recommendations from the Officer Safety and Wellness Technical Assistance Project. Washington, DC: Office of Community Oriented Policing Services. Retrieved from https://cops.usdoj.gov/RIC/ric.php?page=detail&id=COPS-W0964.

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