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# The Interrelations between Work Factors, Family and Work Health Climate, Work Schedule, and Individual Behaviors

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The Interrelations between Work Factors, Family and Work Health Climate,  
Work Schedule, and Individual Behaviors

Jennifer Christine Buden

B.S., University of Connecticut, 2014

A Thesis

Submitted in Partial Fulfillment of the

Requirements for the Degree of

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APPROVAL PAGE

Masters of Science Thesis

The Interrelations between Work Factors, Family and Work Health Climate,  
Work Schedule, and Individual Behaviors

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## Definition of Variables

*The following variables are defined for interpretation throughout this thesis. These variables were self-reported measures in a Healthy Workplace Survey, assessed to better understand and make inferences about the target population in this study. Details on specific measurement items will be described further in the chapters of this thesis.*

### Demographic Characteristics

#### Age

#### Gender

**Race/Ethnicity:** Participants were able to select as many categories with which they identify, including: Asian, Asian American, or Pacific Islander; Black, African American, or African; Hispanic, Latino or Hispanic American; Middle Eastern, Arab, or Arab American; Native American or Alaskan Native; White, European, or European American; Other.

**Educational Attainment:** Participants were asked to indicate the highest level of education they had completed, including: Less than high school; High school graduate or GED; Some college; College degree (2 or 4-year college); Graduate degree.

**Job Classification:** Participants were asked to select their job category within the Department of Corrections, including: No supervisory responsibility; Counselor Supervisor; Lieutenant; Captain.

**Total Family Income:** Participants were asked to describe the range of their income as a combination of salaries, wages, investments, and rents, including: \$50,000-74,999; \$75,000-99,999; \$100,000-124,999; \$125,000-149,999; More than \$150,000.

### Health Climate

**Work Health Climate (WHC):** Work health climate (WHC), is a construct commonly used to understand health and safety outcomes within the workplace and encompasses perceptions of management and coworker support for health.<sup>1</sup> WHC was assessed with 5 items following a 5-point Likert scale to assess experiences at the workplace. Questions included: “In

this facility, management considers employee safety to be important”, “In this facility, management considers employee health and well-being to be important”, “My coworkers would support my use of sick days for illness or mental health”, “My supervisor encourages healthy behaviors”, and “My organization provides me with opportunities to be healthy”. This construct was created using the sum score from survey items, and a higher score indicates better perceived work health climate. The total possible score for this item was 25. This scale was created by Zweber et al (2013).<sup>1</sup>

**Family Health Climate (FHC):** Family health climate (FHC) is a construct that aims to capture the relationships between social factors and the home environment that influence diet and exercise behaviors via opinions and attitudes.<sup>2</sup> FHC was assessed with 4 items following a 5-point Likert scale to assess experiences with those whom the participant shares a close relationship (i.e., family, friends). Questions included: “We talk about improving health and preventing disease”, “Most people are very health conscious”, “People notice how well you take care of your health”, and “We encourage each other to make changes to improve our health.” This construct was created using the sum score from survey items, and a higher score indicates better perceived family health climate. The total possible score for this item was 20. This item was created using a participatory design with agreement between the research team and supervisor union group (2014).<sup>3</sup>

## **Health Behaviors**

**Nutrition:** Dietary and eating habits. The Dietary Guidelines for Americans recommends a balanced diet consisting of fruits, vegetables, whole grains, lean protein, low-fat or fat-free dairy products and water as the primary beverage choice. Unhealthy dietary habits are considered a risk factor for weight gain and obesity.<sup>4</sup> Nutrition habits were self-reported with 1 item following a Likert scale using the following question: “Nutrition experts recommend filling half your plate with fruits and vegetables at every meal and snacking occasion. How often do you meet this goal?” The question was adapted from the U.S. Dietary Guidelines for Americans (2010).<sup>5</sup> A higher score is indicative of healthier dietary intake.

**Physical Activity:** Cardiorespiratory and resistance training. The Physical Activity Guidelines for Americans recommend at least 150 minutes of moderate physical activity or 75 minutes of vigorous physical activity, in addition to at least two days of strength training per week. Lack of physical activity is considered a risk factor for weight gain and obesity.<sup>4</sup> Physical activity habits were assessed with the following question: “Health experts say that you should do strength training exercise twice a week plus do other activities that increase your heart rate and breathing on several days each week. How often do you meet this goal?” This question was adapted from the U.S. Department of Health and Human Services Physical Activity Guidelines for Americans (2010).<sup>6</sup> A higher score is indicative of more frequent physical activity.

**Sleep:** Sleep is categorized as a health behavior because of its association to health problems and increased chronic disease risk. One researcher argues that it should be viewed equally important to eating and exercise behaviors.<sup>7</sup> Sleep duration were assessed by asking respondents, “During the work week, about how many hours of sleep do you typically get per 24-hour period?” Response choices included: 6 hours or less, about 7 hours, about 8 hours, about 9 hours, about 10 or more hours. Lastly, sleep quality was assessed by asking participants to rate the quality of their sleep on a typical night ranging from “very poor” to “very good”. These items were developed by investigators of the Center for the Promotion of Health in the New England Workplace (CPH-NEW).<sup>8</sup>

### **Work Schedule Factors**

**Shift:** Participants’ reported the assigned shift they typically work (first, second, or third).

**Overtime:** This item was assessed by asking the participant to report how many hours of overtime they typically work per week. Response choices included: None, 1-8 hours, 9-16 hours, 17-23 hours, 24 or more hours. Items were recoded using a scale of 0-4 for statistical analyses.

### **Health Measures**

**Body Mass Index (BMI):** This item was assessed using self-reported height (in feet, inches) and weight (in pounds) to calculate BMI. Classifications for adult underweight (below

18.5 kg/m<sup>2</sup>), normal weight (18.5-24.9 kg/m<sup>2</sup>), overweight (25.0-29.9 kg/m<sup>2</sup>) and obesity (>30 kg/m<sup>2</sup>) followed the international classifications from the World Health Organization.<sup>9</sup>

**Health Status Indicators:** Diabetes and heart disease are considered chronic diseases by the Centers for Disease Control and Prevention.<sup>10</sup> Hypertension and elevated cholesterol are considered risk factors for heart disease,<sup>11</sup> and will be used as indicators in this present study. Anxiety and depression are considered measures of mental health.<sup>12</sup> Health status indicators were assessed by asking if the individual has ever been diagnosed with, or currently taking medication for: elevated blood sugar or diabetes, hypertension, elevated cholesterol level, anxiety/depression. These two items were combined to determine the frequency of participants reporting either diagnosis, medication, or both. This strategy was used because of associations between perception of medication curing the ailment and medication compliance. Individuals may only report that they are taking medication for a condition, but not diagnosed with, due to the perception that the medication is “treating” or “curing” their condition. Likewise, some individuals may only report a diagnosis and not report taking medication due to lack of prescription or perception of having control over their condition resulting in poor medication adherence and compliance.<sup>13</sup>

## **Work Characteristics**

**Burnout:** A psychological term used to describe emotional exhaustion, detachment from occupational responsibilities and feelings of lack of accomplishment.<sup>14</sup> Burnout was assessed from the mean score of the following 2 items following a Likert scale: “More and more often, I talk about my work in a negative way” and “At work, I often feel emotionally drained.” This item was developed by investigators of the Center for the Promotion of Health in the New England Workplace (CPH-NEW) and has previously been used in the occupation studied.<sup>8</sup>

**Job Meaning:** Often described in the literature as meaningful work, is the perceived value of the work experience that contributes to psychological well-being. Includes factors such as purpose and opportunities for growth.<sup>15</sup> Job meaning was assessed from the mean score of the following 3 items following a Likert scale: “The work I do is very important to me”, “My job

activities are personally meaningful to me”, and “The work I do is meaningful to me.” These items were created by Spreitzer (1995).<sup>16</sup>

**Job Satisfaction:** The extent to how one feels positively about their job, feelings of content.<sup>17</sup> Job satisfaction was assessed from the mean score of 2 items following a Likert scale: “All in all, I am satisfied with my job,” and “Overall I would recommend working with this organization to my family and friends.” These items were adapted from the Organizational Assessment Survey.<sup>18</sup>

**Coworker Support:** Feelings of psychosocial support by individuals in the work environment that may reduce job stress, improve safety climate and have positive associations with other work-factors such as job performance.<sup>19-21</sup> Coworker support was assessed using the mean score of the following 2 items following a Likert scale: “The people I work with take a personal interest in me,” and “The people I work with can be relied on when I need help.” These items were adapted from the Job Content Questionnaire (Karasek et al, 1985).<sup>22</sup>

**Supervisor Support:** Engagement with supervisor staff through provision of resources, emotional support, and guidance. These feelings of psychosocial support may share associations with feelings of control over work schedule,<sup>23</sup> reduced work and non-work conflict,<sup>23</sup> less job stress,<sup>24</sup> and higher job satisfaction.<sup>24</sup> Supervisor support was assessed from the mean score of 2 items following a Likert scale: “My supervisor is concerned about the welfare of those under him/her,” and “My supervisor is helpful in getting the job done.” These items were adapted from the Job Content Questionnaire (Karasek et al, 1985).<sup>22</sup>

## Abstract

**Background:** The rates of obesity in the United States continue to rise, particularly with disparities in high stress, low job control occupations such as corrections. Employers are in a unique position to improve employee health through development of Total Worker Health interventions that integrate worker safety and health promotion to improve employee health and well-being.<sup>25</sup> Understanding influences on health behaviors in the workplace such as social support, and work schedules as well as family environment, may aid in developing worksite preventive strategies with the anticipation of chronic disease reduction and weight management.

**Purpose:** The purpose of these studies was to explore general health status, health behaviors, and contributing factors to behavior and health outcomes in a sample of correctional supervisors. Measures of burnout, job meaning, job satisfaction, workplace social support, and work schedule (shift, overtime) were explored in relation to nutrition, physical activity, sleep, and health outcomes. A secondary aim was to explore the relationships between work and family health climate on obesity mediated by health behaviors. A multi-level approach was used to explore potential moderating effects of work schedule on the health climate, health behavior, and obesity relationships. **Methods:** This was a cross-sectional study on a sample of correctional supervisors (n=157) that completed an online healthy workplace survey. General health status, demographics, height/weight, psychosocial work characteristics, and perceived health climate for work and family were self-reported. Descriptive statistics, logistic ordinal regression and ANOVA tests were used to examine the relationships between work characteristics, health behaviors, and health outcome measures. Modeling techniques were used to test the mediating relationships of health behaviors on health climate and BMI. Further, moderated-mediation models were used to assess the multi-level effects of work schedule factors (shift, overtime) on

health climate, health behaviors, and BMI. **Results:** Survey respondents had elevated rates of overweight (37.8%), obesity (50.6%), diabetes (10.2%), elevated cholesterol (24.2%), and anxiety/depression (14.6%) compared to the general population of U.S. adults (33.6%, 34.9%, 9.3%, 13.4%, and 9.8%, respectively). In addition, some of the tested models were supported suggesting that work ( $\beta=-0.03$ ,  $p=0.16$ ;  $\beta=-0.04$ ,  $p=0.12$ ) and family health climate ( $\beta=-0.06$ ,  $p=0.12$ ;  $\beta=-0.13$ ,  $p<0.05$ ) may be associated with obesity, mediated by health behaviors (nutrition and physical activity, respectively). Last, work schedule factors such as shift and overtime may negatively impact obesity, though practicing healthy behaviors may reduce harmful effects. **Conclusions:** Consistent with previous research in COs,<sup>26</sup> correctional supervisors portray elevated rates of chronic disease risk factors, evidenced by poor health behaviors and obesity rates that exceed the general public. Consideration of psychosocial work characteristics such as levels of burnout, job meaning, job satisfaction, workplace social support, and health climate may be one approach to produce sustainable health behavior change. Efforts to improve health climate in the workplace environment and acknowledgement of family health norms may produce behavior changes and thus, lower obesity rates to support economic savings and a public health impact.

## Overview

This thesis consists of three chapters. The aim is to provide an understanding of general health status, and relationships among work characteristics, work schedule factors, health climate, health behaviors and health outcomes in a sample of correctional supervisors.

### **Chapter 1 – Work characteristics as predictors of correctional supervisors’ health**

**outcomes:** In this Chapter, utilizing descriptive analysis, chi-squares and logistic regressions, we will provide detailed analyses relating to the health behaviors and health status of supervisory staff at 20 correctional facilities in the Northeast United States. Comparisons will be made to the general population of US adults utilizing available databases. We will explore work characteristics (burnout, job meaning, job satisfaction, coworker support, and supervisor support) in relation to health behaviors (nutrition, physical activity, and sleep), and health outcomes (diabetes, hypertension, elevated cholesterol, anxiety/depression). Work schedule factors (shift, overtime) will also be explored in relation to health behaviors. Lastly, we will explore relationships among body mass index (BMI), health behaviors and work characteristic measures.

### **Chapter 2 – Associations among work and family health climate, health behaviors, work**

**schedule and body weight:** In this Chapter, we propose analyses using statistical modeling to explore relationships among perceived work and family health climate in relation to health behaviors (nutrition, physical activity), and a chronic disease risk factor (body mass index), using a multilevel approach. The multi-level effects of work schedule factors (shift, overtime) will be explored with a discussion on practical applications for future Total Worker Health initiatives utilizing a social ecological approach.

**Chapter 3 – Conclusion:** Provides a comprehensive summary based on the findings from Chapters 1 and 2 and provides implications for future research.



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# INTRODUCTION

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## **Background**

Research on the economic impact of obesity has identified multiple levels of influence, including direct medical costs, comorbid conditions, loss in productivity, increased transportation spending, and human capital costs.<sup>27</sup> In the literature, direct costs are easiest to recognize, however, indirect costs from lost productivity such as presenteeism, absenteeism, disability and premature mortality have a significant impact on employers and society.<sup>27</sup> Prevention efforts to reduce the obesity epidemic can have positive economic influences and improve health-related quality of life in individuals experiencing the direct and indirect effects, such as health care costs and weight stigma or bias in social and career opportunities.<sup>28</sup>

Health behaviors such as eating and exercise habits are considered known controllable risk factors in the development of obesity. In addition, sleep is considered a health behavior due to its association with chronic disease and metabolic changes that may contribute to obesity and other comorbidities.<sup>7</sup> Other contributing risk factors are complex in nature, such as genetics, physical environment, disease processes, stress and psychological influences.<sup>4</sup> Therefore, in an effort to reduce obesity and its' associated comorbid conditions, understanding factors that may indirectly play a role on health behaviors is important for Total Worker Health initiatives. The Centers for Disease Control and Prevention (CDC) describe the nutrition and physical activity environment as one influence on obesity risk.<sup>4</sup> A social ecological approach to health is needed to understand the various influences on health behaviors in multiple environments that may contribute to obesity.

According to the Bureau of Labor Statistics, the average American adult aged 25-54 spends approximately 8.7 hours at work per day. Further, 83% reported some or all work done at their workplace and 23% reported working from home.<sup>29</sup> Built environments supportive of health include those that promote physical activity, have healthy food options as well access to health-care and related resources. Likewise, lack of opportunities and resources supportive of health are associated with unhealthy behaviors and chronic diseases.<sup>30</sup> With recognition that adults spend a significant portion of their time in the workplace, the physical built environment at work may play a vital role in promoting healthy behaviors, and thus, reduced chronic disease risk. Of additional importance is the social environment. Factors such as social support, health norms, and social capital can play a critical role in health behaviors, coping mechanisms, and health outcomes.<sup>30</sup> Utilization of a social ecological approach with consideration of work-related characteristics and family influences that may be associated with health behaviors and outcomes may provide implications for sustainable behavior change and reduced financial burden for employers.

Workplace Health Promotion (WHP) has gained attention as an approach to improve employees' health. A comprehensive WHP program may accomplish this by addressing work environment, developing policies and programs, enhancing wellness culture within organizations, considering outside levels of influence, such as family and home environment, and increasing social support for healthy behaviors (from coworkers, supervisors, family, and friends). A healthy workforce has a multitude of benefits, such as reducing the development of chronic diseases, decreasing health care costs among employees and employers, and improving worker productivity.<sup>31</sup> Implementation of a successful worksite health intervention necessitates attention to job characteristics (such as level of demand on the job and job control by employee),

employee demographics, accessibility to health care, and identification of barriers and facilitators to achieving optimal health at all levels.

Karasek (1979) proposed the Job Demands-Control-Support model to conceptualize the relationships between job decision latitude and control. High strain jobs are those that offer limited opportunities for decision making, but are physically and/or psychologically challenging. The categorization of job types (strain vs. decision latitude) can contribute to inferences about occupation and health. High strain jobs that offer little control may contribute to psychological ailments due to lack of resources to cope with stress.<sup>32</sup> Research using the Job Demands-Control-Support model found that correctional officers with high job demands experience increased physical and mental health problems, especially when they lack social support.<sup>33</sup> Corrections is recognized as a high-stress workplace because of the low level of control, exposure to stressful and unsafe circumstances, and reported negative impact on psychological well-being<sup>34</sup> which may influence health behaviors.<sup>35-37</sup> Long shifts due to short staffing and high-stress demands in corrections may be contributing factors to overweight and obesity in this population.<sup>38-40</sup> Poor psychological health may increase the need for social support from coworkers, supervisors, family and friends. Aspects of the work and home environment have a critical influence on health behaviors and outcomes.

Correctional officers' experience unique stress on-the-job and must be prepared to face unpredictable situations, such as responding to emergency codes. Methods of coping with stress and mental health may influence lifestyle behaviors such as dietary habits,<sup>34</sup> excess alcohol intake, or poor social relationships. Further, despite being physically fit going into the job, aspects of the environment limit activity while on shift and personal demands at home may interfere with priorities to maintain activity level. Sedentary behavior influences chronic disease

risk for individuals in this occupation.<sup>37</sup> Inadequate sleep from frequent overtime and rotating shifts may contribute to mood disorders, decreased immune function, increased injuries at the workplace, and metabolic changes.<sup>7,41,42</sup>

Baseline data from an intervention study done in two Northeastern corrections facilities revealed higher levels of overweight and obesity, hypertension, alcohol consumption, and perceived stress among officers. Qualitative aspects of this study revealed concern for diet and exercise habits due to inmate stress, lack of access to healthy foods, and time constraints interfering with health behaviors. In addition, rotating shifts and overtime were barriers to achieving better sleep and consuming a healthy diet. Officers may falsely underreport their stress levels and coping mechanisms, as officer's revealed distress for their personal safety.<sup>26</sup> Another study examining correctional employees demonstrated underreporting of emotional health measures, factors that may predict nutrition, physical activity, and sleep quality.<sup>34</sup>

Despite the relationship between nutrition, physical activity, sleep and obesity, limited research has assessed work characteristics such as burnout, job meaning, job satisfaction, workplace social support and perceived health climate at work or home in relation to health behaviors and outcomes. Further, work schedule factors such as overtime and rotating shifts may interact in a reciprocal fashion with these constructs. Perception of one's health environment, social support for health behaviors, and cultural health norms may strongly influence behavior practices and health outcomes. Future efforts to develop effective health interventions for correctional employees should consider these variables. These factors and proposed directions for future research and interventions will continue to be explored throughout this thesis.

## **Purpose**

The purpose of this thesis was to examine a cross-sectional population of correctional employees using findings from a healthy workplace survey. We aimed to build an understanding of health behaviors (nutrition, physical activity, sleep) and general health status in correctional supervisors. Measures of obesity, diabetes, hypertension, elevated cholesterol, and anxiety/depression in a sample of correctional supervisors were compared to general U.S. adults. In addition, work characteristics (burnout, job satisfaction, job meaning, and workplace social support) were examined in relation to health behaviors and health outcomes. We also explored the relationships between health and work schedule factors.

Further, this study aimed to evaluate the relationships between perceived work (WHC) and family health climate (FHC), health behaviors (nutrition, physical activity), work schedule factors (overtime, shift), and body mass index (BMI). Statistical models were created to predict BMI using perceived health climate scores (WHC, FHC), health behaviors, and work schedule factors. We hypothesized that poor perceived WHC and FHC and unhealthy behaviors (poor diet, lack of physical activity) are associated with higher BMI. The interaction effect between work schedule factors (overtime, shift) and health behaviors (nutrition, physical activity) may play a role. This thesis is organized into two primary chapters, 1) *Work characteristics as predictors of correctional supervisors' health outcomes*, and 2) *Associations among work and family health climate, health behaviors, work schedule and body weight*.

## **Specific Aims**

- 1) To compare the health status of correctional supervisor staff to the general U.S. population of adults.

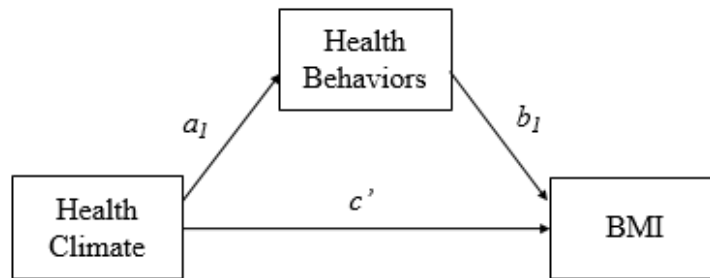
- 2) To examine health behaviors (nutrition, physical activity, sleep) and work schedule factors (shift, overtime), and potential associations between them in correctional supervisor staff.
- 3) To identify the relationships among work characteristics (burnout, job meaning, job satisfaction, coworker support, and supervisor support) and health behaviors (nutrition, physical activity, sleep).
- 4) To identify the relationships among work characteristics (burnout, job meaning, job satisfaction, coworker support, and supervisor support) and health outcome measures (BMI, diabetes, hypertension, elevated cholesterol, and anxiety/depression).
- 5) To determine if general health status is a predictor of work health climate and family health climate.
- 6) To examine the effect of work health climate and family health climate on body mass index mediated by health behaviors (nutrition, physical activity) using mediation modeling.
- 7) To identify the role of work schedule factors (shift, overtime) on the health climate, health behavior, and body mass index relationships.

## **Hypotheses**

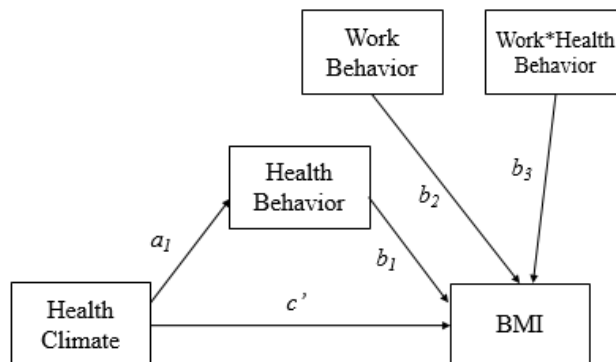
- 1) Correctional supervisors will exhibit: a) a high rate of unhealthy behaviors (nutrition, physical activity, sleep) and, b) worse health status, evidenced by a higher prevalence of chronic disease risk factors than the general adult population in the United States.
- 2) Work characteristics (burnout, job meaning, job satisfaction, coworker support, supervisor support) will be associated with: a) health behaviors (nutrition, physical activity, sleep duration, sleep quality), and b) health outcome measures (diabetes,

hypertension, elevated cholesterol, anxiety/depression, obesity [BMI]) among correctional supervisors.

- 3) There will be positive associations between perceived work health climate (WHC), family health climate (FHC), health behaviors (nutrition, physical activity) and lower BMI (see **Figure 1**).
- 4) Work schedule factors (overtime, shift work) will decrease healthy behaviors, provoke negative feelings about health norms (lower WHC, FHC), and increase BMI (see **Figure 2**).



**Figure 1: Mediation Model** – health climate (WHC or FHC) on BMI mediated by health behaviors (nutrition, physical activity).



**Figure 2: Moderated-Mediation Model** – health climate (WHC or FHC) on BMI mediated by health behaviors (nutrition, physical activity) and moderated by work schedule factors (overtime hours, shift).

## Significance

Chronic diseases remain a national public health concern, and worksite environments are an appropriate setting to provide tailored interventions by targeting multiple levels that influence health behaviors. Dietary habits, level of activity and sleep mediate chronic disease risk by aiding in weight management and maintaining psychological function. Correctional employees may face additional barriers to engage in healthy lifestyle behaviors that mitigate chronic disease risk. Rotating shifts, understaffing, high levels of stress, low job control, work-family conflict, perceived health climate and other work culture factors may reduce an individuals' motivation to engage in healthy behaviors. This present research is significant because it assesses work characteristics (burnout, job meaning, job satisfaction, and workplace social support), health behaviors (nutrition, physical activity, sleep) and work schedule factors (overtime, shift) that may contribute to level of obesity and other comorbidities in a high-risk population. This study expands on previous research reporting on the general health status of correctional employees. In addition, little research exists to-date that explores perceived WHC and FHC in relation to health behaviors and obesity in a high-stress occupational group, using robust statistical modeling. Work characteristics such as increased burnout, lack of social support, poor job satisfaction, WHC and FHC may play elevated roles in health behaviors and chronic disease risk due to psychologically demanding aspects of the job that may escalate the need for social support and appropriate coping mechanisms. The findings from this study are the first of our knowledge reporting exclusively on correctional supervisor health in the United States. Lastly, this research contributes by exploring predictors of obesity using a modeling approach, with application to other public safety occupations.



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# CHAPTER ONE

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## **Work characteristics as predictors of correctional supervisors' health outcomes**

### **Abstract**

Corrections is a high-stress workplace with elevated rates of overweight and obesity. Little research exists examining the health status of middle-management supervisor staff. The purpose of this study was to examine general health status and associations among health behaviors (nutrition, physical activity, and sleep), psychosocial work factors, and health status. Correctional supervisors (n=157) completed a survey that assessed interpersonal and organizational views on health. Chi-square and logistic regressions were used to examine relationships among variables. Respondents had a higher prevalence of obesity (50.6%) and comorbidities compared to the general U.S. adult population (34.9%). Burnout was significantly associated with nutrition ( $p<0.05$ ), physical activity ( $p<0.01$ ), sleep duration ( $p<0.01$ ), sleep quality ( $p<0.0001$ ), diabetes ( $p<0.05$ ), and anxiety/depression ( $p<0.01$ ). Job meaning, job satisfaction and workplace social support may also be associated with health behaviors and outcomes. Correctional supervisor staff are an understudied population and as our results show, have poor overall health status. Improving health behaviors of middle-management employees may have a beneficial effect on the health of the entire workforce. This paper demonstrates the importance of psychosocial work factors that may contribute to health behaviors and outcomes. Future research is needed to understand additional contributing factors to obesity and chronic disease in correctional employees.

## **Introduction**

The reported health status of correctional employees is alarming. In 1984, the life expectancy of corrections officers (COs) was 59 years,<sup>1</sup> and recent data suggests no significant improvement.<sup>2,3</sup> The current life expectancy in the United States is 79 years.<sup>4</sup> In Connecticut, male COs life expectancy trails that of other State workers by more than 12 years. Correctional employees are faced with unique sources of job stress<sup>5,6</sup> and have poor psychological health<sup>7,8</sup> compared to other professional groups. Studies reporting on the health status of COs<sup>3,6,9,10</sup> describe elevated rates of overweight, obesity, hypertension, and less healthy eating and exercise habits compared to the general population of U.S. adults.<sup>3,11</sup>

To date, the only existing research on correctional supervisor health has examined job stress;<sup>12,13</sup> little else is known regarding their health status. Supervisory staff (including lieutenants, captains, and counselor supervisors) represent middle management, placing them between senior-level administrators and line-level officers. The supervisory group likely experiences additional stress from job content that includes administrative responsibilities, lack of higher level support, and conflict resolution between officers.<sup>12,14</sup> This may potentially contribute to increased sedentary behaviors, unhealthy eating habits, and poor sleep. The health status of this level of middle management in the Department of Corrections (DOC) organizational structure should be prioritized, due to potential ripple effects on the health and well-being of line-level officers. Research is needed reporting on the health status of this occupational group to develop effective and sustainable health interventions for the corrections workforce.

Supervisors and middle-management are well-represented in the literature as employees exposed to role ambiguity that may contribute to job stress and decreased job satisfaction.<sup>15-20</sup>

Job stress is documented among middle-management in many occupations, including healthcare,<sup>16,17</sup> military,<sup>18</sup> and the hospitality industry.<sup>19,20</sup> It is well established that stress has a negative effect on the body due to altered coping mechanisms, physiological and behavioral changes.<sup>21</sup> In particular, any employee working under high job demands, low control, low workplace support (i.e., coworker, supervisor), and a high effort-reward imbalance is at increased risk of a stress-related disorder, such as burnout.<sup>22</sup>

Aspects such as rotating shift work,<sup>23,24</sup> overtime<sup>25,26</sup> and job strain<sup>26,27</sup> have been linked to lifestyle behaviors such as sugar-sweetened beverage intake, average sleep duration, and increases in BMI and waist circumference. In addition, challenging work environments have been linked to psychological,<sup>28,29</sup> musculoskeletal,<sup>30</sup> and behavioral processes<sup>31</sup> that contribute to chronic disease risk. Numerous studies have reported associations between the workplace environment and health behaviors associated with chronic disease,<sup>32-36</sup> such as nutrition,<sup>37-39</sup> physical activity,<sup>40,41</sup> and sleep.<sup>42-44</sup>

Understanding the psychosocial components of work such as burnout, job meaning, job satisfaction, social support, and work schedule factors that may contribute to health behaviors and outcomes can guide the development of effective and sustainable health interventions. For correctional supervisors, a high stress occupational group that experiences unique barriers to achieving optimal health, there is particular pertinence. Different health behaviors may coincide with one another, and therefore inclusion of multiple health behavior measures in research is warranted. The following section will provide a brief review of the literature relating to these variables.

## **Burnout**

Working under high job demands, low control, low workplace support (i.e., coworker, supervisor), and a high effort-reward imbalance is particularly associated with the psychosocial construct of burnout.<sup>22</sup> Burnout is a psychological term used to describe emotional exhaustion, detachment from occupational responsibilities and feelings of lack of accomplishment.<sup>45</sup> Unhealthy behaviors such as uncontrolled and emotional eating,<sup>46</sup> lack of physical activity<sup>47,48</sup> and sleep deprivation<sup>49,50</sup> have been associated with burnout. Healthy behaviors such as adequate sleep<sup>51</sup> and increases in physical activity level<sup>52</sup> may be protective against burnout. Burnout is also linked to health outcomes, such as obesity and cardiovascular disease risk.<sup>46,48,53</sup> From a precursor standpoint alone, the occupational stress that often precipitates burnout is associated with poor health outcomes such as heart disease.<sup>54</sup>

Burnout in correctional officers has been studied,<sup>5,55-58</sup> and linked to increased sick leave, higher medical expenses, mental illnesses such as anxiety/depression,<sup>57</sup> and lower life satisfaction.<sup>58</sup> Research examining the consequences of burnout in correctional employees primarily targets work-related outcomes such as organizational commitment, sick leave, absenteeism and job turnover.<sup>58</sup> The relationships between burnout, health behaviors, and outcomes may vary in different occupational groups due to confounding demographic factors and work stressors. There is a deficiency of research on the physical and psychological impacts of work in correctional supervisors, a group that potentially experiences elevated rates of burnout.

### **Job Meaning and Job Satisfaction**

Job meaning, or “meaningful work”, is the perceived value of the work experience that contributes to psychological well-being.<sup>59</sup> This construct includes factors such as purpose and opportunities for growth.<sup>59</sup> Job satisfaction describes current contentment with job



responsibilities.<sup>60</sup> Job meaning and job satisfaction have been linked to measures of mental health, well-being and depression.<sup>61,62</sup> These factors may have a spill-over effect on other work-related psychosocial factors such as organizational commitment, and therefore remain an important area of research.<sup>63-65</sup>

Job satisfaction is linked to sleep disorders,<sup>66</sup> depression,<sup>67</sup> physical ailments, such as headaches and gastrointestinal problems,<sup>66</sup> and mental health traits, such as anxiety, depression, and low self-esteem. Findings are mixed in regards to job satisfaction and physical health outcomes.<sup>68</sup> One randomized control study assessed job satisfaction and nutrition habits as an outcome measure for intervention worksites receiving produce deliveries. The authors hypothesized that employees with unhealthy diets may be dissatisfied with their job due to limited access or resources available to promote health and well-being. Therefore, an intervention with fresh fruit deliveries may improve employees' job satisfaction. The authors did not find statistically significant differences in job satisfaction between intervention and control groups. However, both groups had relatively high reports of job satisfaction at baseline potentially limiting intervention effects.<sup>69</sup> The relationship between job satisfaction and health behaviors remains unclear. To date, limited research examines relationships between job meaning, health behaviors and health outcome measures.

Correctional employees report decreases in job satisfaction coincident with job tenure.<sup>70</sup> Supervisor staff likely have more years working in DOC than lower ranked employees due to qualifications needed for advancement. Prolonged exposure to administrative and psychological stress in the corrections environment may negatively impact health behaviors and attitudes. Poor job satisfaction, lack of perceived meaningfulness in work, and occupational stress in

correctional employees may decrease health behaviors and increase chronic disease risk, as demonstrated in COs.<sup>10</sup>

### **Workplace Social Support**

Health behavior decisions are made in context to an individual's social environment. Coworker support describes feelings of psychosocial support by individuals in the work environment that may reduce job stress, improve safety climate and share positive associations with other work-factors such as job performance.<sup>71-73</sup> Supervisor support describes engagement with supervisor staff through provision of resources, emotional support, and guidance. Higher perceived psychosocial support may share associations with feelings of control over work schedule,<sup>74</sup> reduced work and non-work conflict,<sup>74</sup> less job stress,<sup>75</sup> and higher job satisfaction.<sup>75</sup> Sorensen et al. (1998) emphasize the importance of workplace social support in promoting health behavior change.<sup>76</sup>

Worksite environment and social influences may improve dietary habits<sup>77</sup> and physical activity levels.<sup>31,78-81</sup> Likewise, higher perceived supervisor support might be associated with improved sleep. Sleep habits may partly account for the relationship between work factors (job strain, supervisor support) and dietary habits.<sup>82</sup> Different health behaviors may coincide with one another, and therefore inclusion of multiple health behavior measures in research is warranted. The findings mentioned above highlight the importance of evaluating measures beyond the physical work environment to include the psychosocial environment and its' impact on health behaviors and outcomes.

To-date, limited research exists examining the role of workplace social support, health behaviors and outcomes among employees in correctional institutions. Social support, job stress, burnout and health in COs may be indirectly related to workplace support (coworker, supervisor)

and health. There may be an overlap among psychosocial work factors. Social support in the corrections environment may be critical due to psychosocial stressors associated with job responsibilities that could potentially impact coping mechanisms via health behaviors. There may be complex relationships among psychosocial variables that interact with the physical work environment, and thus the role of social support on health may be indirect in nature.

### **Work Schedules (Shift, Overtime)**

Shift work is defined by Wang et al. (2011) as working hours outside of the typical daytime schedule that are uncommon or inconsistent.<sup>83</sup> Shift work is considered one contributing risk factor to physical health problems in correction officers.<sup>6</sup> Previous studies have reported associations between night shift work with risk of type 2 diabetes,<sup>84</sup> obesity,<sup>85</sup> and breast cancer.<sup>83</sup> Shift work in general (rotating shifts, working outside of day time hours) has been associated with unhealthy lifestyle behaviors (i.e., diet and exercise), body weight, comorbid conditions, and cardiovascular disease risk.<sup>23,24,83,86-89</sup>

Corrections is an occupation that requires line officers to work in rotating shifts and frequent overtime hours to accommodate short staffing. There are complex behavioral and physiological mechanisms in which shift work and overtime are related to obesity.<sup>90-92</sup> A vast number of studies examines the negative health implications of night shifts, rotating shift work, and long working hours.<sup>87,88,93-95</sup> To-date, there is paucity in research examining the health effects of shift work and overtime in correctional employees. Health behaviors may partly explain the relationship between overtime work and health outcomes. However, physiological processes from increased overtime may also cause strain and worsen health status.<sup>96</sup> Findings from longitudinal research is mixed when evaluating increased overtime and effect on body mass index and waist circumference. The researchers infer that eating behaviors may play a role in

moderating this relationship, however, more research is needed.<sup>25</sup> To our knowledge, no studies presently exist that explore shift, overtime, and physical health measures in correctional supervisors.

### **Significance**

A high prevalence of obesity, hypertension and cardiovascular disease risk factors have been reported among corrections staff,<sup>3,6,11</sup> but little is known about the health status or behaviors of correctional supervisors. This group likely experiences their own sources of occupational stress, and may act as a gatekeeper to health promoting practices in the workplace. Understanding work aspects that influence supervisors' health will provide an opportunity to develop more effective and tailored interventions for this workgroup, which may eventually improve quality of life and life expectancy. Further, the findings from this study may have application to other public safety sector occupations that mandate physical fitness and good health as an occupational safety requirement going into the job (i.e., police, fire, EMS, etc.).

### **Purpose**

The purpose of this study was to 1) use findings from a healthy workplace survey to evaluate health behaviors (nutrition, physical activity, sleep) and health status indicators (BMI, diabetes, hypertension, elevated cholesterol, anxiety/depression) in a sample of correctional supervisor staff (counselor supervisor, lieutenant, or captain) compared to the general population of U.S. adults, and 2) to examine work schedule factors (shift, overtime) and potential work-related characteristics (burnout, job meaning, job satisfaction, workplace social support) that may be associated with health behaviors and outcomes.

### **Study Objectives**

The objectives of this study are listed below:

- 1) To compare the health status of correctional supervisor staff to the general U.S. population of adults.
- 2) To examine the relationship between health behaviors (nutrition, physical activity, sleep) and work schedule factors (shift, overtime).
- 3) To identify the relationships among work characteristics (burnout, job meaning, job satisfaction, coworker support, and supervisor support) and health behaviors (nutrition, physical activity, sleep).
- 4) To identify the relationships among work characteristics (burnout, job meaning, job satisfaction, coworker support, and supervisor support) and health outcome measures (BMI, diabetes, hypertension, elevated cholesterol, and anxiety/depression).

## **Hypotheses**

- 1) Correctional supervisors will exhibit: a) a high rate of unhealthy behaviors (nutrition, physical activity, sleep) and, b) worse health status, evidenced by a higher prevalence of chronic disease risk factors than the general adult population in the United States.
- 2) Work characteristics (burnout, job meaning, job satisfaction, coworker support, supervisor support) will be associated with: a) health behaviors (nutrition, physical activity, sleep duration, sleep quality), and b) health status measures (diabetes, hypertension, elevated cholesterol, anxiety/depression, obesity [BMI]) among correctional supervisors.

## **Methods**

### **Measures**

This was a cross-sectional observational study examining health behaviors, health outcomes, and psychosocial work characteristics in supervisory staff (lieutenants, captains,

counselor supervisors) within the Department of Corrections (DOC) in a northeastern state. As part of a participatory action research project, a design team consisting of six correctional supervisors and two university researchers, developed a survey to enable the teams' development of tailored health interventions for correctional supervisors. The survey was administered in January 2015. Survey questions were developed using a PAR design in which university researchers and supervisors/union representatives contributed equally to ensure acceptability and feasibility of item content. Survey data is currently being used for the development of health, wellness and safety initiatives for supervisor staff based on the priority topics identified from survey results. Thus, participation was encouraged to as many union members as possible.

The primary variables analyzed include: demographics, health behaviors, work schedule factors, health status variables and work characteristics.

**Demographic Variables.** Age, sex, race, family income, educational level, marital status and job classification were self-reported and explored in statistical analyses.

**Health Behaviors.** Nutrition, physical activity, sleep duration, and sleep quality were all self-reported using a Likert scale. *Nutrition* habits were assessed using the following question: "Nutrition experts recommend filling half your plate with fruits and vegetables at every meal and snacking occasion. How often do you meet this goal?" The question was adapted from the U.S. Dietary Guidelines for Americans (2010).<sup>97</sup> A higher score is indicative of healthier dietary intake. *Physical activity* habits were assessed with the following question: "Health experts say that you should do strength training exercise twice a week plus do other activities that increase your heart rate and breathing on several days each week. How often do you meet this goal?" This question was adapted from the U.S. Department of Health and Human Services Physical Activity Guidelines for Americans (2010).<sup>98</sup> A higher score is indicative of more frequent physical

activity. *Sleep duration* was assessed by asking respondents, “During the work week, about how many hours of sleep do you typically get per 24-hour period?” Response choices included: 6 hours or less, about 7 hours, about 8 hours, about 9 hours, about 10 or more hours. This item was developed by investigators of the Center for the Promotion of Health in the New England Workplace (CPH-NEW).<sup>99</sup> Lastly, *sleep quality* was assessed by asking participants to rate the quality of their sleep on a typical night ranging from 1 (*very poor*) to 4 (*very good*). This item was also developed by CPH-NEW investigators.<sup>99</sup>

**Work Schedules.** *Shift* and *overtime* were self-reported with demographic data. Participants were asked to report the primary shift to which they are assigned (first, second, or third) and the number of overtime hours they typically work per week. Response categories included: none, 1-8 hours, 9-16 hours, 17-23 hours, 24 or more hours.

**Health Status.** Four major health conditions and the respondents’ body mass index (BMI) were assessed by self-report. The four health conditions - *elevated blood sugar or diabetes, hypertension, elevated cholesterol level, anxiety/depression* - were characterized as ever diagnosed or currently requiring medication. Diagnosis and dose were combined as a single variable. That is, each of the four health conditions was coded dichotomously as 0 (*no diagnosis received nor medication taken*) and 1 (*yes, diagnosis received and/or medication taken*). The two factors were combined because of uncertainty, recognized in focus groups, over the distinction between curative treatment, which tended to censor an associated diagnosis, and compliance. Another uncertainty involved perception of having control over their condition resulting in poor medication adherence and compliance.<sup>100</sup> Refinement of accuracy was deemed non-contributory. *BMI* was calculated from the reported height (in inches) and weight (in pounds) using the Centers for Disease Control and Prevention (CDC) formula below.<sup>101</sup>

$$\text{BMI} = \text{weight (lb)} / [\text{height (in)}]^2 \times 703$$

**Work Characteristics.** All measures used to assess burnout, job meaning, job satisfaction, coworker support, and supervisor support used a Likert Scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A mean score was created by averaging the survey items for each construct. *Burnout* was assessed using the following 2 items: “More and more often, I talk about my work in a negative way” and “At work, I often feel emotionally drained.” This factored construct was developed by CPH-NEW investigators<sup>99</sup> and has previously been used in surveys for correctional personnel. Spreitzer’s (1995) measure of *meaningful work*, or *job meaning* was adopted.<sup>102</sup> It includes the following 3 items: “The work I do is very important to me”, “My job activities are personally meaningful to me”, and “The work I do is meaningful to me.” *Job satisfaction* was assessed using the following 2 items: “All in all, I am satisfied with my job,” and “Overall I would recommend working with this organization to my family and friends.” These items were adapted from the Organizational Assessment Survey.<sup>103</sup> *Coworker support* was assessed using the following 2 items: “The people I work with take a personal interest in me,” and “The people I work with can be relied on when I need help.” These items were adapted from the Job Content Questionnaire (Karasek et al, 1985).<sup>104</sup> Lastly, *supervisor support* was assessed using the following 2 items: “My supervisor is concerned about the welfare of those under him/her,” and “My supervisor is helpful in getting the job done.” These items were adapted from the Job Content Questionnaire (Karasek et al, 1985).<sup>104</sup>

## **Sample**

Participants were recruited using convenience sampling methods among membership of the supervisors’ bargaining unit. Of 452 invitations, a total of 157 individuals from 20 facilities completed the survey. The survey was administered online and open over a four week period.



Supervisors received access to the survey electronically via email. The voluntary, anonymous survey consisted of 64 items and took approximately 20 minutes to complete, see **Appendix A**. Participants were assured that their responses were confidential and could not be linked to their name or employee identification number. This study was approved by the Institutional Review Board at the University of Connecticut. Participants provided consent electronically prior to beginning the survey (**Appendix A**).

### **Statistical Analyses**

Data was analyzed using IBM SPSS™ version 21 to recode variables and create new variables (i.e., mean scores) and SAS version 9.3 for statistical test assumptions, descriptive statistics, frequency distributions, correlations, chi-square tests, simple linear regression and logistic regression. The primary variables analyzed included: demographic variables, health behaviors, work schedule factors, health status including BMI, and work characteristics. Nonparametric tests were used when applicable due to the ordinal nature of the variables.<sup>105</sup> However, new variables were also created from mean scores of Likert items and were treated as continuous variables, as this is considered an acceptable statistical approach.<sup>106,107</sup>

Key variables were assessed for normality and appropriate test assumptions prior to running statistical inference tests. Missing variables were excluded from syntax. The maximum number of participants excluded from any analysis due to missing data was two. Frequency analyses were run for categorical variables. Spearman's correlation ( $\rho$ ) was used due to the ordinal nature of variables within the dataset and violations of the normality assumption among mean scores for work characteristics (burnout, job meaning, job satisfaction, coworker support, supervisor support). The following criteria for correlations were used: between  $\pm 0-0.3$  (weak),  $\pm 0.3-0.7$  (moderate), and  $\pm 0.7-1.0$  (strong).<sup>108</sup> Chi square tests were performed to examine

differences between categorical variables. Linear regressions were used to evaluate continuous variables to determine predictors of BMI. Ordinal logistic regressions were used to evaluate continuous work-related variables as predictors of categorical health behavior and health outcome survey items. An odds ratio of greater than 1 was used as a cut-off to explain that the predictor variable was associated with higher odds of the outcome dependent variable.<sup>109</sup> A *p* value of < 0.05 was set as the cut-off for statistical significance.

## Results

### Descriptive Statistics

Demographics and anthropometric data are depicted in **Table 1**. Over three-quarters of the sample were male (78.2%), and the mean [standard deviation (SD)] age was 42.3 [ $\pm$ 6.1] years. The majority of participants attained at least some college education (84.6%) and were married or living with their partner (73.0%). Most were supervising lieutenants (59.6%) followed by captains and counselors.

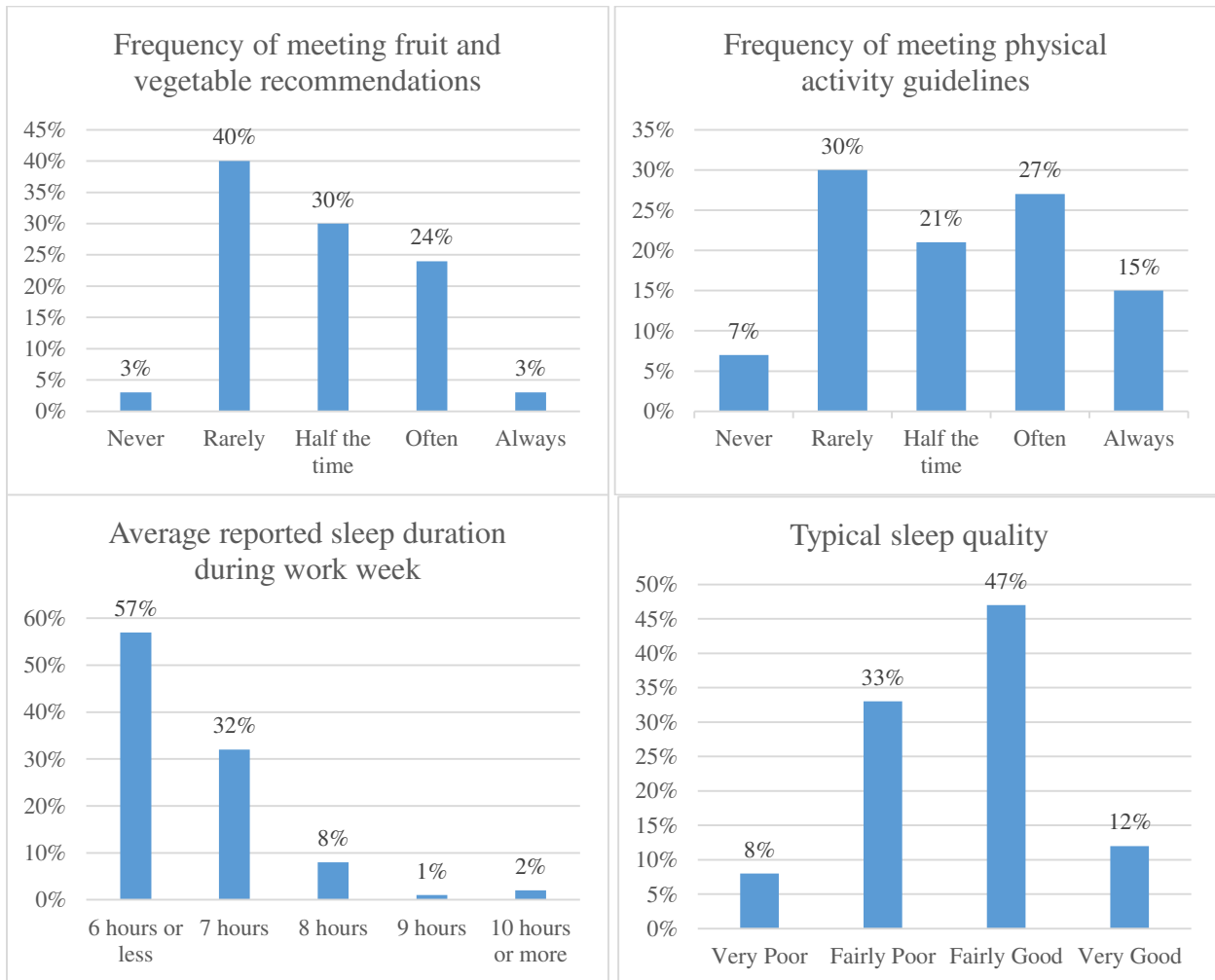
<b>Table 1: Demographic &amp; Anthropometric Results (n=157)</b>	
Male	78.2 % (n=122)
Female	21.8% (n=34)
<i>Age</i> in years (mean $\pm$ SD)	42.29 ( $\pm$ 6.05)
<i>Body Mass Index (BMI)</i> in kg/m <sup>2</sup> (mean $\pm$ SD)	30.057 ( $\pm$ 4.64)
Underweight (<18.5) or Normal Weight (18.5-24.9)	11.5%
Overweight (25.0-29.9)	37.8%
Obese ( $\geq$ 30)	50.6%
<b><i>Race/Ethnicity</i></b>	
White, European, or European American	69.2%
Black, African American, or African	16.0%
Hispanic, Latino or Hispanic American	9.6%
Other	3.2%
Asian, Asian American, or Pacific Islander	1.3%
Middle Eastern, Arab, or Arab American	0.6%
<b><i>Education</i></b>	
High school graduate or GED	15.3%
Some college	38.8%
College degree (2 or 4-year college)	35.0%
Graduate degree	10.8%
<b><i>Marital Status</i></b>	

Married or live with partner	73.0%
Widowed	1.9%
Divorced or separated	16.0%
Single, never married	8.9%
<b><i>Family Income</i></b>	
\$50,000-74,999	1.3%
\$75,000-99,999	24.5%
\$100,000-124,999	29.7%
\$125,000-149,999	15.5%
More than \$150,000	29.0%
<b><i>Job Classification</i></b>	
Counselor Supervisor	11.5%
Lieutenant	59.6%
Captain	28.8%

## Hypothesis 1

**Health Behaviors.** Frequency distributions were performed on categorical health behavior variables to assess the prevalence of unhealthy behaviors (see **Figure 1**). Analyses of survey item responses revealed that 43% of respondents reported never or rarely meeting the guideline for fruit and vegetable intake. Only 3% of respondents reported always meeting these guidelines. For comparison, findings from the Behavioral Risk Factor Surveillance System (BRFSS) conducted in the United States revealed 13.1% of adults consumed the recommended servings of fruit and 8.9% consumed the recommended servings of vegetables in 2013.<sup>110</sup> Similarly, approximately 37% of respondents reported never or rarely meeting the guidelines for cardiorespiratory and resistance exercise and approximately 42% often or always meet these guidelines. In comparison, findings from the National Health Interview Survey in 2014 suggests that of U.S. adults over the age of 18, 49.2% meet recommendations for aerobic physical activity, and 20.8% meet recommendations for both cardiorespiratory and resistance activities.<sup>111</sup> Over half the sample (57%) reported that they typically slept an average of 6 hours or less during the work week, which is less than the 7 to 9 hours that the National Sleep Foundation recommends adults over the age of 18 sleep per night.<sup>112</sup> In comparison, findings from the 2014

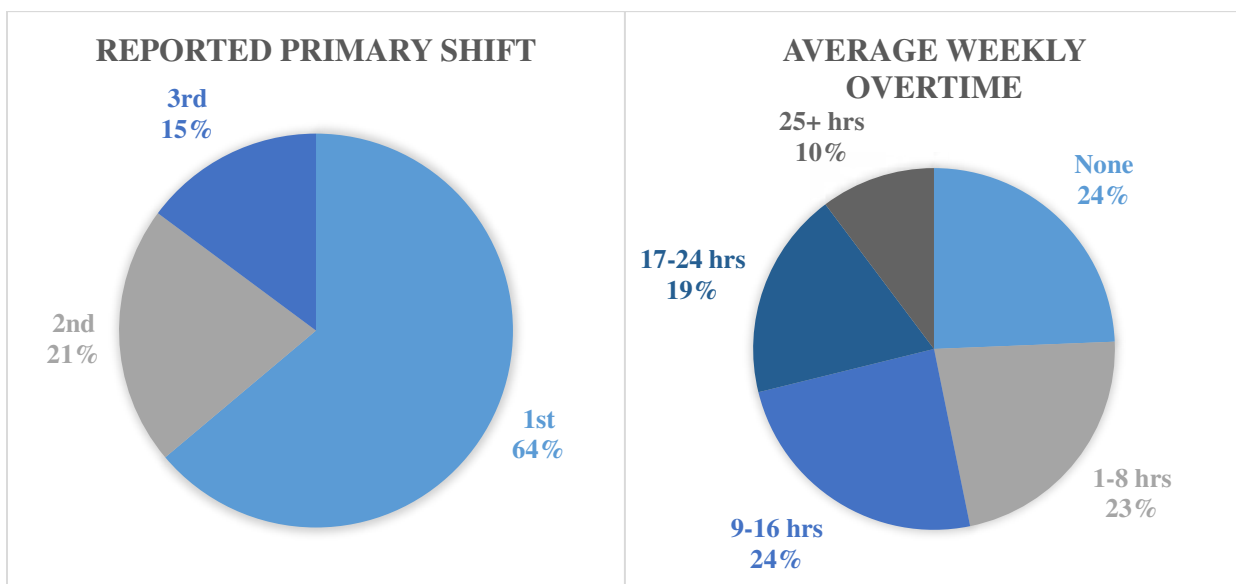
BRFSS reveal that approximately 65% of US adults meet the recommended sleep guidelines of  $\geq 7$  hours per night.<sup>113</sup> Further, 41% of respondents reported poor sleep quality. Consistent with Hypothesis 1a, survey respondents exhibited a high rate of unhealthy behaviors compared to US national data averages pertaining to nutrition, physical activity, sleep duration, and sleep quality.



**Figure 1:** Distribution of lifestyle behaviors (nutrition, physical activity, sleep duration, sleep quality) among survey respondents (n=157).

Almost two-thirds of participants worked first shift (63.8%). Respondents reported a mean amount of overtime hours per week of 12.8 hours, indicating that on average, participants work a 53-hour work week. Almost one-third of participants reported doing at least 2 or more overtime shifts per week (**Figure 2**). There was a weak correlation between overtime hours and

age ( $p=0.027$ ). There were statistically significant differences in overtime by job classification ( $p=0.000^*$ ). Of respondents that worked two or more additional shifts per week, lieutenants worked most frequently (85.5%), followed by captains (12%), and then counselors (2.4%). Shift was not significantly associated with nutrition ( $p=0.163$ ), physical activity ( $p=0.723$ ), sleep duration ( $p=0.187$ ) or sleep quality ( $p=0.211$ ). Overtime hours were not significantly associated with shift ( $p=0.141$ ), nutrition ( $p=0.700$ ), physical activity ( $p=0.735$ ), sleep duration ( $p=0.306$ ) or sleep quality ( $p=0.604$ ).



**Figure 2:** Distribution of shift and average weekly overtime among survey respondents (n=157).

**Health Status.** Corresponding to Hypothesis 1b, participants in this sample of supervisors were primarily overweight or obese - mean [SD] BMI of 30.2 [ $\pm 4.3$ ] - with 37.8% of the participants being overweight and 50.6% being obese, formally surpassing the threshold for obesity. **Table 2** provides a comparison to rates in the US adult population, where the percentage of overweight and obesity is 33.6% and 34.9%, respectively.<sup>114</sup> There was no significant difference in BMI by job class or shift. In addition, 10.2% of the sample reported being diagnosed with and/or taking medication for elevated blood sugar. In comparison, 9.3% of the American population had diabetes in 2012.<sup>115</sup> Of the total sample, 22.9% reported being

diagnosed with and/or taking medication for high blood pressure (hypertension). This was lower than the national average of 29% in the National Health and Nutrition Examination Survey in 2011-2012.<sup>116</sup> In addition, 24.2% of the sample reported being diagnosed with and/or taking medication for elevated cholesterol. This was nearly double the average adult percentage in the U.S. (13.4%).<sup>117</sup> Of the total participants, 14.6% reported being diagnosed with and/or taking medication for anxiety/depression. In comparison, 3.1% of U.S. adults reportedly suffer from anxiety and 6.7% of adults suffer from depression.<sup>118</sup> In summary, with the exception of hypertension, which was not adjusted for age, survey respondents exhibited a higher prevalence of chronic diseases than the general adult population in the United States, which is consistent with Hypothesis 1b.

**Table 2:** Comparison of general health status measures between study sample and general population of U.S. adults.

	<b>Study Sample (n=157)</b>	<b>General U.S. Population</b>
<b>BMI (in kg/m<sup>2</sup>)</b>		
<i>Overweight</i>	37.8%	33.6% <sup>114</sup>
<i>Obese</i>	50.6%	34.9% <sup>114</sup>
<b>Elevated blood sugar/diabetes</b>	10.2%	9.3% <sup>115</sup>
<b>Hypertension</b>	22.9%	29% <sup>116</sup>
<b>Elevated cholesterol</b>	24.2%	13.4% <sup>117</sup>
<b>Anxiety or depression</b>	14.6%	9.8% <sup>118</sup>

## Hypothesis 2

**Health Behaviors.** Chi-square tests were performed to examine the relationships between measured health behaviors. In general, nutrition and physical activity behaviors were significantly associated with each other ( $p < 0.001$ ). Participants reporting “never” meeting nutrition recommendations were more likely to also report never meeting physical activity recommendations. Nutrition behavior was significantly associated with sleep quality ( $p < 0.05$ ), but not sleep duration ( $p = 0.32$ ). Participants reporting “often” or “always” meeting nutrition recommendations were more likely to report good sleep. Physical activity behavior was not

associated with sleep duration ( $p=0.66$ ) or sleep quality ( $p=0.47$ ). Reported sleep duration and sleep quality shared a significant association ( $p<0.01$ ). Participants reporting “very poor” quality sleep were most likely to report sleeping 6 hours or less per night.

**Health Behaviors and Work Characteristics.** Prior to examining their relation to health behaviors, spearman’s correlations ( $\rho$ ,  $\rho$ ) were run to assess the association between work characteristics (**Table 3**). There were moderate, negative correlations between burnout and job satisfaction ( $\rho=-0.432$ ,  $p<0.000$ ). In contrast, there were moderate, positive correlations between job satisfaction, coworker support ( $\rho=0.396$ ,  $p<0.000$ ), and supervisor support ( $\rho=0.330$ ,  $p<0.000$ ). Coworker support and supervisor support also shared positive correlations ( $\rho=0.496$ ,  $p<0.000$ ).

**Table 3:** Spearman’s correlations between work characteristics.

	<b>Burnout</b>	<b>Job Meaning</b>	<b>Job Satisfaction</b>	<b>Supervisor Support</b>	<b>Coworker Support</b>
<b>Burnout</b>	1.000				
<b>Job Meaning</b>	-.169*	1.000			
<b>Job Satisfaction</b>	-.432**	.263**	1.000		
<b>Supervisor Support</b>	-.119	.131	.330**	1.000	
<b>Coworker Support</b>	-.251**	.195*	.396**	.496**	1.000

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

Logistic ordinal regression tests were used to test Hypothesis 2a and examine associations between mean scores of psychosocial work characteristics, the independent variables (IVs) and health behaviors, the dependent variables (DVs). Burnout was significantly associated with nutrition, physical activity, sleep duration and sleep quality. A one-unit increase in burnout was associated with a 0.35 increase in the odds of a lower nutrition score (indicating less frequently meeting nutrition guidelines), with an odds ratio of 0.71 (95%CI: 0.54, 0.92),

p<0.05. Similarly, a one-unit increase in burnout was associated with a 0.39 increase in the odds of lower physical activity, with an odds ratio of 0.68 (95%CI: 0.52, 0.88), p<0.01. No other work characteristics (job meaning, job satisfaction, coworker support, supervisor support) were significantly associated with nutrition or physical activity.

Job satisfaction and coworker support were significantly associated with sleep duration. A one-unit increase in job satisfaction was associated with a 0.41 increase in the odds of higher reported hours of sleep, with an odds ratio of 1.5 (95%CI: 1.01, 2.24), p<0.05. Higher coworker support more than doubled the odds (OR=2.25, 95%CI: 1.40, 3.61) of greater reported sleep duration (p<0.01). All work characteristics (burnout, job meaning, job satisfaction, coworker support, supervisor support) were significantly associated with sleep quality. Positive work characteristics were associated with better sleep quality, evidenced by a positive parameter estimate, whereas burnout was associated with poor sleep quality, evidenced by a negative parameter estimate. Higher job satisfaction (OR=2.12, 95%CI: 1.46, 3.08, p<0.001) and coworker support (OR=2.39, 95%CI: 1.58, 3.63, p<0.001) were associated with more than double the odds of better sleep quality. **Table 4** summarizes the associations between work characteristics and health behaviors. In summary, burnout was associated with most health behaviors (nutrition, physical activity, sleep duration, sleep quality); job satisfaction and coworker support were associated with sleep duration; and all work characteristics (burnout, job meaning, job satisfaction, coworker support, supervisor support) were associated with sleep quality. The results are consistent with Hypothesis 2a.

**Table 4:** Work characteristics as predictors of health behaviors.

Dependent Variable	Independent Variable	Model $\chi^2$	Parameter Estimate ( $\pm$ SE)	p value	Odds Ratio	95% Confidence Interval
Nutrition	Burnout	6.66	-0.35 $\pm$ 0.14	0.010*	0.71	0.54, 0.92
	Job Meaning	2.35	0.27 $\pm$ 0.18	0.125	1.32	0.93, 1.87
	Job Satisfaction	0.00	0.01 $\pm$ 0.18	0.946	1.01	0.72, 1.42



	Coworker Support	3.12	0.35 ±0.20	0.078	1.42	0.96, 2.10
	Supervisor Support	0.01	-0.01 ±0.15	0.930	0.99	0.73, 1.33
<b>Physical Activity</b>	Burnout	8.79	-0.39 ±0.13	0.003**	0.68	0.52, 0.88
	Job Meaning	0.05	0.04 ±0.17	0.824	0.96	0.69, 1.34
	Job Satisfaction	3.52	0.32 ±0.17	0.061	1.38	0.99, 1.94
	Coworker Support	2.63	0.31 ±0.19	0.105	1.37	0.94, 1.99
	Supervisor Support	0.35	0.09 ±0.15	0.554	1.09	0.81, 1.47
<b>Sleep Duration</b>	Burnout	6.73	-0.38 ±0.15	0.009**	0.68	0.51, 0.91
	Job Meaning	0.39	-0.12 ±0.19	0.534	0.89	0.62, 1.28
	Job Satisfaction	4.10	0.41 ±0.20	0.043*	1.51	1.01, 2.24
	Coworker Support	11.11	0.81 ±0.24	0.001**	2.25	1.40, 3.61
	Supervisor Support	2.80	0.29 ±0.17	0.094	1.34	0.95, 1.88
<b>Sleep Quality</b>	Burnout	34.44	-0.92 ±0.16	<0.0001**	0.40	0.29, 0.54
	Job Meaning	5.45	0.42 ±0.18	0.020*	1.53	1.07, 2.18
	Job Satisfaction	15.73	0.75 ±0.19	<0.0001**	2.12	1.46, 3.08
	Coworker Support	16.79	0.87 ±0.21	<0.0001**	2.39	1.58, 3.63
	Supervisor Support	12.73	0.59 ±0.17	0.0004**	1.80	1.30, 2.49

\* p < 0.05, \*\* p < 0.01

**Health Status and Work Characteristics.** Simple linear regression tests were run to evaluate predictors of BMI. Physical activity was significantly associated with BMI ( $\beta=-0.96$ ,  $p<0.001$ ). However, no other work measures or health behavior variables shared a statistically significant relationship. Despite lack of statistical significance, all relationships tested had regression coefficients that trended in the predicted direction. See **Table 5**.

<b>Independent (Predictor) Variable</b>	<b>R-squared</b>	<b>Regression Coefficient</b>	<b>p value</b>	<b>Interpretation</b> <i>(i.e., could be inferred if p value &lt;0.05)</i>
<b>Burnout</b>	0.01	0.42	0.178	For a one-unit increase in burnout, we would see approximately a 0.4 ↑ in BMI
<b>Job Meaning</b>	0.00	-0.25	0.546	For a one-unit increase in job meaning, we would see approximately a 0.2 ↓ in BMI
<b>Job Satisfaction</b>	0.00	-0.23	0.570	For a one-unit increase in job satisfaction, we would see approximately a 0.2 ↓ in BMI
<b>Coworker Support</b>	0.00	-0.15	0.749	For a one-unit increase in coworker support, we would see approximately a

				0.1 ↓ in BMI
<b>Supervisor Support</b>	0.00	-0.15	0.675	For a one-unit increase in supervisor support, we would see approximately a 0.2 ↓ in BMI
<b>Nutrition</b> (i.e., frequency of meeting recommended fruit & vegetable intake)	0.02	-0.65	0.083	For a one-unit increase in nutrition behavior, we would see approximately a 0.6 ↓ in BMI
<b>Physical Activity</b> (i.e., frequency of meeting activity recommendations)	0.07	-0.96	<b>0.0008*</b>	For a one-unit increase in physical activity behavior, we would see approximately a 0.9 ↓ in BMI
<b>Overtime</b>	0.00	0.20	0.445	For a one-unit increase in overtime hours (category), we would see approximately a 0.34 ↑ in BMI
<b>Summary:</b> one relationship showed significance with $p < 0.05$ , indicating that there are likely multiple predictors influencing BMI. All relationships occurred as would be predicted – positive items decrease BMI and negative items increase BMI.				

Binomial logistic regression tests were used to test Hypothesis 2b and evaluate associations between mean scores of work characteristics, the independent variables (IVs) and health status measures, as dependent variables (DVs). Obesity ( $BMI \geq 30$ ) was an additional variable used to examine relationships between comorbidities. **Table 6** provides logistic regression results. Burnout and job satisfaction were significantly associated with elevated blood sugars/diabetes. A one-unit increase in mean burnout score was associated with a 0.60 greater odds of diabetes risk, with an odds ratio of 1.80 (95%CI: 1.10, 3.03),  $p < 0.05$ . In contrast, job satisfaction was protective against diabetes, as evidenced by a negative parameter estimate ( $\beta = -0.56$ ,  $p < 0.05$ ). Burnout was also significantly associated with anxiety/depression, and a one-unit increase in burnout was associated with a 0.67 increase in nearly double the odds of having anxiety/depression, with an odds ratio of 1.90 (95%CI: 1.25, 3.03),  $p < 0.01$ . Supervisor support was protective against anxiety/depression ( $\beta = -0.53$ ,  $p < 0.05$ ). No work characteristics were

significantly associated with hypertension or elevated cholesterol in this sample. Elevated BMI was significantly associated with diabetes ( $p < 0.05$ ) and hypertension ( $p < 0.01$ ), but not elevated cholesterol ( $p = 0.14$ ) or anxiety/depression ( $p = 0.35$ ). In summary, with the exception of work characteristics sharing associations with hypertension or elevated cholesterol, some work characteristics (burnout, job satisfaction, supervisor support) were associated with diabetes and anxiety/depression. The results are consistent with Hypothesis 2b.

**Table 6:** Work characteristics and BMI as predictors of health status measures using binomial logistic regression.

Dependent Variable	Independent Variable	Model $\chi^2$	Parameter Estimate ( $\pm$ SE)	p value	Odds Ratio	95% Confidence Interval
<b>Elevated blood sugar/ diabetes</b>	Burnout	5.46	0.60 $\pm$ 0.26	0.020*	1.83	1.10, 3.03
	Job Meaning	0.00	-0.01 $\pm$ 0.31	0.971	0.99	0.54, 0.97
	Job Satisfaction	3.91	-0.56 $\pm$ 0.28	0.048*	0.57	0.33, 0.99
	Coworker Support	2.20	-0.49 $\pm$ 0.33	0.138	0.62	0.32, 1.17
	Supervisor Support	0.16	0.12 $\pm$ 0.29	0.687	1.12	0.64, 1.97
	BMI	5.97	0.15 $\pm$ 0.06	0.015*	1.16	1.03, 1.31
<b>Hypertension</b>	Burnout	1.85	0.24 $\pm$ 0.17	0.174	1.27	0.90, 1.78
	Job Meaning	0.30	-0.12 $\pm$ 0.22	0.584	0.89	0.58, 1.37
	Job Satisfaction	1.28	0.28 $\pm$ 0.24	0.257	1.32	0.82, 2.12
	Coworker Support	0.04	0.05 $\pm$ 0.25	0.844	1.05	0.64, 1.73
	Supervisor Support	0.00	0.01 $\pm$ 0.20	0.957	1.01	0.68, 1.50
	BMI	11.32	0.17 $\pm$ 0.05	0.001**	1.18	1.07, 1.30
<b>Elevated cholesterol</b>	Burnout	0.42	0.11 $\pm$ 0.17	0.519	1.11	0.80, 1.55
	Job Meaning	0.01	0.02 $\pm$ 0.22	0.916	1.02	0.66, 1.56
	Job Satisfaction	0.05	0.05 $\pm$ 0.22	0.829	1.05	0.68, 1.63
	Coworker Support	0.11	-0.08 $\pm$ 0.25	0.744	0.92	0.57, 1.50
	Supervisor Support	0.08	0.06 $\pm$ 0.20	0.776	1.06	0.72, 1.56
	BMI	2.15	0.06 $\pm$ 0.04	0.143	1.07	0.98, 1.16
<b>Anxiety/ depression</b>	Burnout	8.66	0.67 $\pm$ 0.23	0.003**	1.95	1.25, 3.03
	Job Meaning	0.44	-0.17 $\pm$ 0.26	0.509	0.85	0.51, 1.39
	Job Satisfaction	0.01	-0.03 $\pm$ 0.27	0.920	0.97	0.58, 1.65
	Coworker Support	0.23	-0.14 $\pm$ 0.29	0.631	0.87	0.49, 1.55
	Supervisor Support	5.52	-0.53 $\pm$ 0.22	0.019*	0.59	0.38, 0.92
	BMI	0.88	0.05 $\pm$ 0.05	0.348	1.05	0.95, 1.16

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

## Discussion

Previous research suggests there is an association between an obesogenic environment and weight status.<sup>119,120</sup> For example, physical environment factors such as access to healthy foods, ability to incorporate physical activity, and distance to healthy food outlets may contribute to health behaviors.<sup>119</sup> Correctional institutions are often located in desolate areas, food choices are limited to take-out food or vending machines, and employees often have long work days due to mandated overtime or rotating shifts. In addition, correctional employees experience unique job stress, psychological demands, and little job control. These factors and many others put correctional employees at high-risk of comorbid conditions influencing their longevity and health-related quality of life. These individual costs also unfavorably affect the employer and society. This present study is a considerable addition to what is admittedly a sparse existing literature on workplace and health associations in correctional supervisors. Previous studies are particularly limited in their exploration of the psychosocial environment and its' impact on health.

Public safety sector occupations, such as corrections, that require new recruits to perform at high levels of fitness and health, have a positive baseline for maintaining and improving health of all employees. The hierarchical organizational structure also provides supervisors with opportunity to model behavior for lower-ranked employees. There are studies that emphasize the role of middle-management in improving lower ranked employees' physical<sup>121,122</sup> and mental health in other sectors.<sup>123</sup> In the correctional employee literature, several studies have highlighted the role of supervisor support, suggesting that these middle managers can be instrumental in reducing occupational stress<sup>124,125</sup> and burnout,<sup>126</sup> improving job satisfaction,<sup>127</sup> increasing organizational commitment among COs, and potentially reducing job turnover.<sup>128</sup> Correctional

supervisors have the opportunity to act as gatekeepers to health promoting practices and initiatives in the workplace. Support from supervisors has the potential to improve the physical and mental health of correctional officers, a group that has well-known adverse health status.<sup>3,6</sup> An effort-reward imbalance at work may be associated with increased chronic disease risk<sup>129-131</sup> and depression.<sup>132</sup> However, there is an absence of research evaluating the health status of middle-management personnel within corrections. Despite the prominent role of supervisors in supporting the health of other employees, limited literature exists examining their health status and potential relationships among health behaviors, work schedule factors, health outcomes, and work characteristics.

### **Health Status of Supervisors**

A large percentage of the sample in this study reported not meeting nutrition recommendations, physical activity recommendations or sleep guidelines. Nutrition behavior shared associations with physical activity and sleep quality. This is consistent with previous studies reporting relationships between nutrition, exercise,<sup>133</sup> and sleep quality.<sup>134</sup> Physical activity was an independent predictor of BMI. Correctional supervisors in this study exhibited poorer health status than the general U.S. population. Over 85% of the sample was overweight or obese, a contributing risk factor to cardiovascular disease. Potential explanations for the elevated rates of obesity in supervisor staff may be related to changes in job tasks promoting sedentary behavior and the level of job responsibilities may interfere with leisure time physical activity.

Participants in this study had higher rates of diabetes, elevated cholesterol, and anxiety/depression compared to the general U.S. population. The study sample had averages for hypertension that were lower than the national population. This finding conflicts with previous research reporting higher hypertension in male and female COs compared to national norms.<sup>3</sup> In

our own evaluation of the CO population (Cherniack et al., 2016), where blood pressure was directly measured, age-adjusted hypertension was considerably higher than national norms.<sup>135</sup> In addition, a recent report on cardiovascular health reported that 17% of U.S. adults have undiagnosed hypertension;<sup>136</sup> it is possible that hypertension was underreported in this study. Consistent with previous work,<sup>137</sup> BMI was significantly associated with diabetes and hypertension, but was not associated with elevated cholesterol in this sample. Understanding contributing workplace factors that increase obesity and chronic disease risk in correctional employees remains an important area of research.

### **Health Behaviors and Work Schedule Factors**

Study participants primarily worked first shift and over one-third worked two or more additional overtime shifts per week. The distribution of overtime work was not equivalent among all supervisor staff, with lieutenants working the most overtime. This may provide direction for interventions aiming to target individuals at highest health risk. This study did not find a direct relationship between shift and overtime with health behaviors, which may be attributed to small sample size. This finding contradicts previous research reporting relationships between shift and unhealthy eating/exercise behaviors, sleep,<sup>23</sup> BMI,<sup>23,24,85-88</sup> and chronic disease risk factors.<sup>83,86</sup> Studies have also reported relationships between overtime, decreased physical activity and lower intake of fruits and vegetables.<sup>96</sup> Previous research suggests changes in health behaviors may only be captured longitudinally, and moderate amounts of overtime may not severely impact health.<sup>96</sup> The cross-sectional nature of this study and small sample size may limit the ability to recognize these relationships. Understanding factors, such as shift and overtime, which may promote or contribute to unhealthy behaviors in this high-stress occupational group remains an area of future research.

## **Work Characteristics and Health Behaviors**

Regarding psychosocial work factors, health behaviors and health outcomes in correctional supervisor staff, Faghri et al. (2015) examined COs and found that positive emotions were associated with better nutrition, physical activity, and sleep quality. Those findings in line-officers from this same workforce duplicate the associations seen here in their supervisors. The authors did not find a relationship between stress and health behaviors, contradicting existing literature, which they attribute to underreporting of negative survey items in this population. The authors of this study emphasize several meaningful implications, such as a need for education, training, and counseling related to psychological health in public safety employees.<sup>10</sup> The psychological and physiological health impact from poor coping mechanisms, changes in health behaviors, morbidity and mortality among correctional employees reiterates a need for understanding the relationships among work characteristics and health behaviors.

Burnout was significantly associated with all four health behaviors. There was an inverse relationship, indicating that higher burnout was associated with poorer nutrition, physical activity, less sleep and poor sleep quality. Similarly, Hu et al. (2015) reported associations between emotional exhaustion and cynicism (domains within burnout) with sleep disorders, exercise, chronic disease, work hours, and shift.<sup>56</sup> Mignano et al. (2016) used a theory-driven approach and created the psychological health, behavior and body weight (PBBW) model based on the CO population described in this study. The authors found that poor psychological health, such as higher depression levels, were associated with less healthy diet and exercise behaviors, and increased body weight. Stress may play a moderating role on the relationship between mood, health behaviors, and obesity.<sup>138</sup> This finding was absent when depression was used as a predictor variable, which may be attributed to underreporting of stress levels in this occupational

group.<sup>10,139</sup> There may be an indirect relationship between psychological health and chronic disease risk factors, such as obesity, which may be explained by health behaviors.<sup>138</sup> In summary, reducing feelings of burnout in correctional employees may have a spill-over effect on health behaviors.

Job satisfaction and coworker support were associated with sleep duration, suggesting that individuals who feel positively about their job and social network at the workplace may be more likely to meet sleep guidelines. The relationship between supervisor support and sleep duration approached significance. All five psychosocial work characteristics (burnout, job meaning, job satisfaction, coworker support, and supervisor support) were associated with sleep quality. Burnout was inversely related, whereas the other variables were positively related. This finding suggests that emotional experiences at work may significantly influence sleep hygiene. Previous research has linked sleep to physical<sup>140,141</sup> and mental health,<sup>142</sup> and therefore improving psychosocial work factors and health climate in the workplace may have a spillover effect on health.

We did not find relationships between job meaning, job satisfaction, or social support with nutrition or physical activity. This conflicts prior research demonstrating relationships among coworker<sup>31,143-145</sup> and supervisor support,<sup>146</sup> to higher fruit and vegetable intake and inversely associated with obesity. Cross-sectional and observational studies suggest that higher levels of perceived coworker support are associated with healthier behaviors for eating and exercise.<sup>79,81</sup> In general, more supportive social work environments are associated with healthier behaviors.<sup>78,81,147,148</sup>



## **Work Characteristics and Health Outcomes**

Burnout was associated with diabetes and anxiety/depression. Participants were nearly twice as likely to report anxiety/depression if reporting symptoms of burnout. This finding is consistent with previous research suggesting relationships between burnout, mental health outcomes,<sup>149</sup> and type 2 diabetes.<sup>150</sup> Job satisfaction was significantly associated with diabetes and supervisor support was significantly associated with anxiety/depression. These items were inversely related, suggesting that higher levels of job satisfaction or supervisor support would be associated with lower odds of developing the respective health outcome. Therefore, psychosocial work factors may increase the odds of developing some comorbid conditions, or alternatively, may protect against chronic disease risk factors. No psychosocial work factors were associated with hypertension or elevated cholesterol in this study. Future research is needed examining the potential relationships between psychosocial work factors and objective health outcome measures controlling for potential confounding variables.

Consistent with Faghri et al. (2015),<sup>10</sup> the present findings suggest that individuals with negative feelings about work and exhaustion from work-tasks may have negative attitudes and practice less healthy behaviors. However, the direction of these relationships is unclear, and provides a direction for future research. Due to the cross-sectional nature of this study, we are unable to determine if higher levels of burnout influence health behaviors. It may be that individuals that have poor health behaviors also have poor coping mechanisms, feel more exhausted from work tasks, are less satisfied with their job, and feel less supported by their coworkers, and thus at greater risk of developing burnout syndrome. It is likely there are complex interrelationships among demographic, environmental, biological, and psychosocial factors.

## **Limitations**

Despite the significant findings of this study, there are several limitations that need to be acknowledged. This study was limited by the measures used to capture health behaviors and outcomes. However, this study utilized a participatory action research approach, involving supervisors in survey development, possibly improving the acceptability of the questions used. In addition, this study relies on self-reported data, and thus, the ability to generalize to other correctional supervisors or public safety occupations may be limited. However, survey respondents represented 20 correctional facilities, thus increasing the likelihood that the supervisors were a representative sample.

In addition, this present study may be limited by the significant proportion of respondents working first shift and an uneven distribution of overtime among job classification, in which we were unable to identify differences between groups. Despite these limitations, this study adds to existing literature examining work characteristics and health behaviors in a worker group at elevated chronic disease risk. A large proportion of the sample was classified as overweight or obese, and therefore it may be difficult to determine predictors of obesity. Despite these limitations, this study provides much-needed insight into the health status of correctional supervisors.

## **Conclusions and Practical Applications**

This study adds to the existing literature on correctional supervisors. To our knowledge, this is the first study that examines correctional supervisor health status in the United States. Correctional supervisors are an understudied population within the DOC organization, and this group of middle-management has the opportunity to encourage health-promoting practices in the workplace by connecting policies from administrators to fellow coworkers and line-level

officers. Further, this study utilizes psychosocial and physical health measures with an aim of understanding perceptions of worksite environment in relation to health behavior practices and outcomes. Unhealthy behaviors are associated with weight gain,<sup>151</sup> and future research is needed to understand the potential interrelationships between psychosocial work factors and health behaviors. Workplace health promotion programs primarily direct interventions towards individual-level behavior change. Use of psychosocial work constructs will allow investigators to direct their attention to organizational factors that may derail health behaviors and outcomes in the workplace, posing additional costs from increased use of sick days, workers compensation claims, and lost productivity.

This study examined work factors that may predict health behaviors and outcomes in a group of high stress employees. In addition, this study examined the role of work schedule (shift, overtime) and health behaviors. Psychosocial work factors were explored in relation to health behaviors and outcomes. Higher levels of burnout and lower levels of meaningful work, job satisfaction and workplace social support were associated with poor health behaviors and outcomes. This may be due to negative emotions associated with work responsibilities and the environment. Burnout was significantly associated with nutrition, physical activity, sleep duration, sleep quality, diabetes, and anxiety/depression. Job meaning, job satisfaction, and workplace social support may also be associated with sleep. Sleep may impact numerous physiological processes and chronic disease risk,<sup>42</sup> and thus, improving the psychosocial work environment may support a public health impact. Future research should utilize psychosocial work measures and objective health outcome measures to clarify these relationships. Additional factors such as shift and overtime that may positively or negatively impact health behaviors should be explored longitudinally. The health status and behaviors of correctional supervisors

versus officers should be a research comparison, as this may provide direction for policy change and interventions.

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## CHAPTER TWO

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### **Associations among work and family health climate, health behaviors, work schedule and body weight**

#### **Abstract**

Corrections is a high-stress workplace with elevated rates of overweight and obesity, with many employees working overtime hours and rotating shifts. An unhealthy work and family environment may unfavorably affect health behaviors, contributing to obesity. Correctional supervisors (n=157) completed a survey that assessed work health climate (WHC) and family health climate (FHC). Latent variables were created for each construct using sum scores, where a higher score is indicative of better perceived climate. Health climate, body mass index (BMI), health behaviors, and work schedule factors (shift, overtime) were examined using mediation and moderated-mediation analysis. Over 85% of the sample was overweight or obese, with a mean BMI of 30.20. Controlling for age and gender, higher WHC score was associated with lower BMI mediated by nutrition ( $\beta=-0.03$ ,  $p=0.16$ ) and physical activity ( $\beta=-0.04$ ,  $p=0.12$ ). Higher FHC was associated with lower BMI mediated by nutrition ( $\beta=-0.06$ ,  $p=0.12$ ) and physical activity ( $\beta=-0.13$ ,  $p<0.05$ ). Addition of overtime as a moderating effect revealed statistically significant differences in the indirect effect when comparing no overtime to high amounts of overtime for WHC and FHC mediated by nutrition (95%CI=0.04,0.28 and 95%CI=0.09,0.56, respectively). First ( $\beta=-0.12$ ) and second ( $\beta=-0.11$ ) shifts may be more conducive to physical activity when individuals have a positive perceived FHC. Higher WHC and FHC scores were associated with healthier behaviors and decreased BMI. Higher overtime, as a moderator was associated with increased BMI, this effect was less significant for shift. The interaction effect



between health behavior and work schedule revealed a protective effect on BMI. These findings may have implications for reexamining organizational policies on maximum weekly overtime allowed in corrections. The influences of the workplace and home environments should further be evaluated and considered when developing health promotion programs for correctional staff.

## **Introduction**

Obesity rates in the United States continue to climb, with recent statistics indicating 78.6 million U.S. adults are obese.<sup>1</sup> Healthcare costs, reductions in employee productivity, increased sick day use, workers' compensation claims, and many other consequences of obesity continue to challenge employers.<sup>2,3</sup> Despite awareness of the economic consequences of obesity, preventive health efforts remain crucial and there is a growing need for innovative research to develop sustainable evidence-based interventions that target employee health.<sup>4,5</sup> Obesity has been characterized by health experts as an occupational risk factor due to increased risk of musculoskeletal diseases and workplace injury. However, obesity can also be considered an outcome of workplace conditions due to factors such as sedentary behavior, shiftwork, and job stress.<sup>6</sup> Biopsychosocial factors influence health behaviors and must be taken into consideration when developing interventions to address obesity. Work health climate (WHC) and family health climate (FHC) are relatively new constructs to understand how aspects of work and family life influence behaviors and attitudes towards health. This study explored associations among health climate constructs (WHC, FHC), health behaviors, work schedule factors, and body mass index (BMI) in a sample of correctional supervisor staff.

Assessing health climate is one approach to understanding different biopsychosocial environments in which people live, such as the workplace and home. The beliefs and attitudes about health in a setting (e.g., workplace) may influence whether and how an individual practices

a healthy lifestyle in and outside of that setting. Regarding the influence of work health climate, perceptions of organizational commitment and concern for employee health have been linked to lower BMI, and perceptions of healthy behaviors among coworkers are shown to potentially improve dietary habits.<sup>7</sup> On the contrary, lack of positive health norms within the workplace are consistent with less healthy behaviors, providing evidence that work climate may influence health choices.<sup>8</sup> Family health climate (FHC) describes how routine, everyday life tasks and experiences shape behavior and perceptions of health through interactions among family members.<sup>9</sup> Many studies have supported relationships between health behaviors, such as nutrition and physical activity, with the social home environment.<sup>10-13</sup>

Correctional employees, the target population in the present study, are at risk for developing obesity and related comorbidities. Correctional institutions require 24-hour supervision and staffing. The nature of the work environment and interactions with an incarcerated population may not be conducive to psychological and physical health. Rotating shifts and working excessive overtime may lead to unhealthy eating choices and physical inactivity. Additionally, stress at work and lack of access to healthy foods may impact nutritional status. Furthermore, methods of coping with stress and mental health may influence lifestyle behaviors such as dietary habits,<sup>14</sup> excess alcohol intake, or poor social relationships. Correctional officers are unable to participate in organized sports due to inconsistent rotating work schedules. These scheduling conflicts paired with environmental aspects of the workplace (e.g., a locked building) limit opportunities for daily physical activity and promote sedentary behavior.<sup>15</sup> Consequently, correctional officers (COs) exhibit higher levels of overweight, obesity, hypertension, alcohol consumption, heart disease and diabetes compared to similar occupational groups.<sup>15,16</sup>

Occupational stress may be more intense in supervisor staff who must manage administrative responsibilities, line level employees and inmates.<sup>17</sup> Improving work health climate in correctional institutions may be one approach to target health behavior change. In particular, efforts to improve health climate may be more feasible than restructuring time-based factors. Consideration of unique challenges, such as overtime and shiftwork among these employees may provide insight into obesity risk factors.

A literature review on correctional officer wellness and safety reported elevated rates of suicide among COs, with some research suggesting a higher prevalence than other public safety occupations, such as police.<sup>18</sup> The average life expectancy of this population is significantly lower than the general population,<sup>16,19</sup> and the costs associated with chronic disease are skyrocketing. Work schedules are recognized as a primary source of work-related stress for COs.<sup>20</sup> Elevated rates of chronic disease among correctional employees<sup>15,18</sup> may be extenuated by overtime and rotating shifts, which may exacerbate pre-existing health conditions during the work career and decrease life expectancy. Generalizations from other occupations may be limited due to differences in job rotation, stress at work, mandatory versus elective overtime, and number of rest days between work periods which may confound interactions between overtime and health.

A study on COs reported a number of barriers, such as inability to leave the facility during shifts, unable to walk outside on breaks, and inability to use on-site fitness facilities during working hours due to concerns for injuries or delayed response to emergency codes.<sup>15</sup> Supervisors (the study population) may also be challenged by administrative responsibilities and increased sedentary time. Sedentary behavior influences chronic disease risk for individuals in this occupation.<sup>21</sup> In addition, this is an occupation where overtime is viewed as an economic

incentive.<sup>15</sup> Correctional employees tend to work maximum amounts of overtime during the end of their career to increase their pension payout. However, increased rates of chronic disease and escalating health care costs are a concern. Addressing workplace and home environments as contributors to health behavior may be one approach to stimulate changes or prevent worsening of lifestyle behaviors, particularly in an authoritative, and understudied group in the correctional employee workforce.

The Department of Corrections (DOC), like many organizations, is dependent on its hierarchical organizational structure for key decision making, dissemination of messages, and creation of an organizational culture. Supervisors play an important role in the organization, linking upper management policies or actions to line-level officers and may act as an intermediary for key health messages. Correctional supervisors' own perspective of the work environment may have a ripple effect on line-level officers and may play an influential role in how line-level officers perceive the work environment, work culture, and health climate. To-date, we are unaware of any research examining perceived health climate in correctional supervisor staff. The following sections will provide a review of the literature for the direction of this study.

### **Total Worker Health**

The National Institute for Occupational Safety and Health (NIOSH) defines Total Worker Health (TWH)<sup>®</sup> as an integration of occupational health and safety practices with health promotion and prevention initiatives to improve health and well-being of employees. This approach encompasses two traditionally independent disciplines, Occupational Safety and Health (OSH) with Workplace Health Promotion (WHP). Workplace factors such as job stress, coworker support and physical health environment may contribute to chronic disease risk. TWH

initiatives encourage health professionals to efficiently use resources and develop best practices to improve health in the workplace.<sup>22</sup>

Research on the effectiveness of TWH interventions have reported consistent and promising conclusions in regards to the benefit of this approach in improving physical and mental health, and reduced injury risk among employees.<sup>23,24</sup> Findings from one review reporting on economic outcomes were generally positive for productivity, reduced absenteeism and sick days. However, the authors warrant that future research is needed on integration of these two approaches to evaluate long-term benefits on reducing mortality.<sup>23</sup> Anger et al. (2015) emphasize that instead of cost outcomes, the research focus should be on objective changes in health status and health behaviors associated with chronic disease risk factors, such as increased physical activity, weight loss and smoking cessation.<sup>24</sup>

Consistent with the concern discussed above, a review (Cherniack, 2013) on the return on investment (ROI) of WHP programs brings attention to misleading reports on ROI of health preventive programs. In particular, there are inadequate procedures to generate monetary conclusions from efforts such as health prevention, increased productivity, and reduced absenteeism. The author reiterates a need for integrated health prevention programs that acknowledge work-life balance and organizational buy-in. For example, the included interventions within the review often relied on low cost intervention input per person, with limited efforts to change aspects of the work organization or integration in design methodology.<sup>25</sup> These findings offer direction for TWH initiatives in planning and reporting cost-effectiveness.

Measures of work and family health climate constructs align with TWH criteria by acknowledging the individual in context to both the physical and social environment. Further,

inclusion of the FHC construct considers the individual outside the workplace environment. Health norms and social support from coworkers, supervisors, family, and friends may contribute to health behaviors, and thus, obesity. Total Worker Health initiatives must acknowledge the individual as a whole, not just an employee.

### **Social Ecological Model**

The social ecological model is one framework used to describe how an individual interacts with the physical and social environment in a manner that influences health behaviors. This approach suggests that multiple levels (i.e., interpersonal, organizational, community, etc.) affect behavior, and the relationship is bidirectional. For example, an individual makes choices about their behavior, but also may be influenced by their physical and social environment.<sup>26</sup> Factors such as the norms, or “culture” within an environment, policies and regulations play an influential and reciprocal role in shaping health behaviors.

McLeroy et al. (1988) proposed the social ecological model for health promotion initiatives. The authors argue that the social environment is an important consideration for health behavior change and chronic disease prevention. In particular, McLeroy views behavior as an outcome which is influenced by intrapersonal factors, interpersonal processes, institutional factors, community factors, and public policy.<sup>26</sup> At the *intrapersonal* level, an individual may make dietary choices based on their knowledge, skills, and beliefs relating to nutrition. At the *interpersonal* level, choices may be shaped by habits of family members, friends, or coworkers with whom the individual frequently dines with. At the *organizational* level, access to healthy foods in the workplace, cost, and availability such as in vending machines may influence eating habits. At the *community* level, cultural norms within the organization, such as frequency of ordering take-out or acceptable practices regarding what types of foods are brought into the

workplace. At the final level of *public policy*, influences may include policies regarding when or where meals are prepared and consumed based on job rotation that shape eating decisions in the workplace. As portrayed in the examples above, it is evident the role health climate may play in this framework. Health norms and social support from family, friends, coworkers and management may be influential in health behavior choices made both in and outside of the workplace.

Understanding factors that may influence each of the social ecological levels requires research consideration prior to planning TWH interventions. Consistent with these ideas, Stokols (1992) introduced the concept of creating health-promotive environments, and acknowledged the complex relationships between individual-level characteristics with the physical and social environment. In a broader sense, Stokols brings attention to the role of multiple environments that may play different contextual and interactive roles, such as the home and workplace. Health interventions should utilize a social-ecological approach by introducing multi-level change through individual-level directives that are reinforced at organizational, community, and public policy levels.<sup>27</sup>

Studies often research the influence of the physical or “built” environment on health behaviors.<sup>28-31</sup> For example, perceptions of personal safety and accessibility are factors associated with physical activity.<sup>28,29</sup> In addition, proximity to fast food restaurants, convenience stores,<sup>30</sup> and worksite policies<sup>32</sup> are factors associated with health habits and obesity risk. Health-reinforcing aspects in the home environment may be associated with increased leisure-time physical activity.<sup>31</sup> Though aspects of the physical environment remain important, limited research-to-date has explored the psychosocial influences within these environments that may share an association with health behaviors.

Despite many prominent leaders in health promotion literature recommending a social-ecological approach, compliance has been limited. Golden and Earp (2012) reviewed the utilization of social ecological theoretical approaches in 132 interventions conducted in 1989-2008 and reported that more than one-third of interventions did not use any theoretical framework for which they based their program. Further, consideration of organizational-level (39%), community-level (20%), and policy-level (6%) directives were far below that of intra- (95%) and interpersonal (67%) targets for interventions. The authors of this review reiterate the need for health promotion interventions operating from theoretical grounds, particularly the utilization of multi-level approaches such as the social ecological model for sustainable behavior change.<sup>33</sup> As chronic disease prevention efforts become increasingly important, use of a social ecological model may be one approach in planning total worker health initiatives to promote a healthy work environment.

Booth et al. (2001) proposed an ecological framework that considers settings where health behaviors (eating and physical activity) occur. The proposed framework includes leverage points within each setting that influence health habits. The workplace and home environments are frequently cited as settings where “leverage points” influence nutrition and physical activity. The authors reported that most physical environment changes are difficult to change (ex: the information environment from food industry, media, entertainment industry, etc.), though the impact of doing so would likely be successful. The authors consider the societal influences that interact with physical environmental features, an area which requires further research to understand their role in environmental and policy-level interventions. Though not explicitly discussed in the framework proposed by Booth et al. (2001), work and family health climate may represent one societal influence that interacts with physical environment. The authors suggest



that changing social variables likely requires more effort and time than changing physical aspects. However, social influences require buy-in to be accepted by the target population. This ecological framework demonstrates inclusion and attention paid to understanding the multi-level synergistic influences on health behaviors.<sup>34</sup>

### **Work Health Climate**

Using a social ecological approach to the workplace, researchers investigate and address how behavior is influenced at the individual, interpersonal, and organizational levels.<sup>26</sup> The majority of studies examine work health climate in two major ways, 1) the perceived environment and if it is supportive of health via policies, resources, or incentives and, 2) coworker social support for health. Higher levels of perceived coworker support and a supportive social work environment are associated with healthier behaviors.<sup>7,32,35-38</sup> Organizational health climate, referred to in this study as “work health climate” (WHC), is a relatively new construct in the literature. Zweber et al. (2015)<sup>39,40</sup> identify three levels in the workplace (i.e., workgroup, supervisor, organization) that play a role in developing a worksite culture supportive of health and well-being. Despite coworker and social support being well studied in relation to health behaviors, the role of supervisor and organizational support for health is not yet understood. For example, supervisors may play an important role in supporting health by increasing communication, helping workers manage stress, or encouraging participation in health promotion programs. Organizational-level aspects that contribute to a positive health climate include policies, resources, or opportunities to engage in healthy behaviors. These factors are important to direct intervention efforts to either individual or multiple levels that contribute to organizational health climate.<sup>40</sup>

Research on the relationship between organizational or work health climate, as the construct it is operationally defined, with health behaviors as an outcome measure is very limited to-date. WHC, as measured with Ribisl and Reischl's (1993) worksite health climate scales (incorporating three domains of health norms, interpersonal support and organizational support) was associated with health behaviors such as nutrition and physical activity. As they hypothesized, Ribisl et al reported differences in perceived health climate at different worksites, indicating that the measures were able to differentiate between perceived health climate in different organizations. These findings suggest that workplace support and norms for health habits share a relationship with the behaviors practiced within that environment.<sup>41</sup> Hoert (2014) reported positive associations between organizational health climate, employee engagement, health behaviors, and participation in health promotion activities. The study reported negative associations between organizational health climate, job stress and intention to turnover.<sup>42</sup> These findings provide rationale for the hypothesized relationships between work health climate and health behaviors. Further, outcomes may extend to the organizational level.

Numerous studies assess aspects of the WHC construct in relation to health behaviors.<sup>32,35-38,43</sup> These findings provide guidance for future health promotion programs in the worksite setting. However, future research must recognize measures beyond the physical work environment and be more inclusive of the psychosocial environment and its' impact on health behaviors and outcomes. This present study aims to fill this gap in the literature.

Despite making changes to the physical environment, failure to intervene on a social level may not produce adequate behavior changes to support a public health impact.<sup>43</sup> It is uncertain what is of greatest influence, but providing opportunities to be healthy, having access to health-

related cues and information, and a culture and social network supportive of health behaviors may all have positive benefits for employees.

### **Family Health Climate**

Studies have shown that factors within the family and home environment may explain over 50% of variance in fruit and vegetable consumption in children.<sup>44</sup> Obesity prevention efforts must recognize the subsequent benefits that may result from changing adult health behaviors by acknowledging potential spillover on spouse and child health behaviors. Several studies have evaluated the effect of parent role modeling and behavior on child health behaviors.<sup>44-46</sup> Longitudinally, parents' dietary habits are modeled by their children over time.<sup>45,46</sup> Factors such as food availability in the home, parent dietary behaviors and child involvement in meal choices may influence dietary intake of the child.<sup>44-46</sup> Understanding adult health behaviors indirectly contributes to adolescent behaviors and child obesity risk.

Family health climate (FHC) describes how routine everyday life tasks and experiences shape behavior and perceptions of health through interactions among family members. This construct, first defined by Niermann et al. (2014) encompasses daily health behaviors such as nutrition and physical activity that occur both in and outside the home environment. A positive perception of this climate indicates that these health behaviors are intrinsic in daily motivations and actions.<sup>9</sup> Studies typically assessing FHC and health behaviors use inclusive psychosocial measures consistent with the concept, such as spouse or family social support for health behaviors, but not as an intuitive measure of health climate that captures relationships, attitudes, and behaviors in the home and family environment.<sup>47-50</sup>

Studies often examine multiple levels of influence and several environments simultaneously. Higher levels of social support and social health norms among family and social

networks are associated with healthier behaviors.<sup>11,38,49,50</sup> Furthermore, interventions may have a carryover effect on untreated members in the household.<sup>47,48</sup> There may also be a combined benefit of a supportive physical and social environment, such as cues within the home, access to resources (i.e., healthy foods, exercise equipment), and support from family members.<sup>38,49,50</sup> In contrast, family social undermining, or interactions that sabotage goals for healthy eating may be associated with weight gain.<sup>10</sup> Thus, having a social network supportive of health and positive health norms within different social contexts are factors associated with weight management. Future research is needed to examine long-term health behaviors and outcomes from supportive physical and social environments within the home. A social ecological approach to health will be an influential model to develop health interventions aiming to reduce the prevalence of obesity.

### **Work Schedules**

Certain features of work, such as long working hours and overtime are associated with poor health outcomes. However, some relationships between overtime and health behaviors remain unclear.<sup>51</sup> Work schedules are recognized as one source of work-related stress for correctional officers.<sup>20</sup> According to Swensen et al. (2012), the negative health implication of these work schedule factors may impact cognitive, emotional, and physical function.<sup>52</sup>

Shift and long working hours may share a reciprocal relationship with health behaviors and outcomes. For example, one study on police officers reported an association between long working hours, waist circumference and BMI in males on midnight shift, even after controlling for potential covariates. This finding was nonsignificant for first and second shifts, indicating shift may play a role. The authors attribute these findings to changes in lifestyle behaviors such as nocturnal eating, dysregulation in sleep patterns and stress.<sup>53</sup> Health behaviors may play a partial role in health outcomes, but changes in physiological processes from increased overtime

may cause strain and worsen health status.<sup>54</sup> However, only weak associations were found between increased overtime, BMI and waist circumference when assessed longitudinally. Eating behaviors may play a role in moderating this relationship, however, more research is needed.<sup>55</sup>

Night<sup>56</sup> and rotating shift work<sup>57</sup> are associated with increased obesity risk even when accounting for lifestyle behaviors. There may be important effects dependent on age and length of time working night shift, as a dose-response relationship may influence chronic disease profile.<sup>58</sup> For example, working night shift short-term and in younger adults (< 25 years) may allow for resilience back to daily routines, and less harmful to health.<sup>58</sup> However, sleep deprivation from prolonged night shift may exacerbate health related conditions in an aging workforce. Research has been inconclusive when accounting for potential confounding variables such as body weight or activity level.<sup>59,60</sup> Similar to findings in shift work,<sup>58</sup> the negative health risks of overtime longitudinally may be dose dependent, in that working more hours over a period of time may have a damaging effect on health status.<sup>54</sup> Further research using high-quality designs and assessing a variety of different occupational groups is needed.<sup>59,60</sup>

### **Significance**

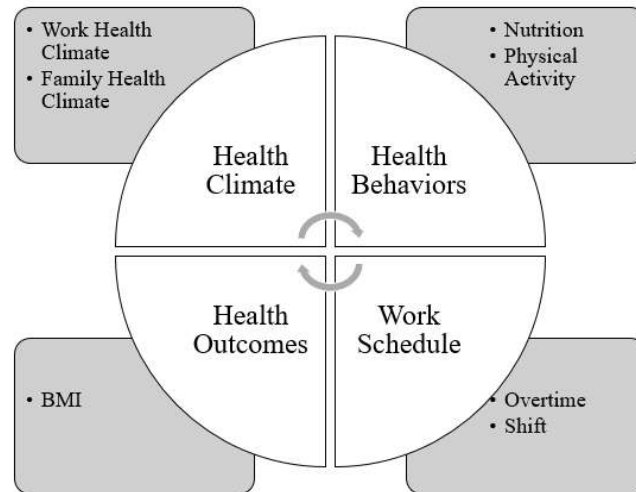
To our knowledge, no studies have collectively evaluated work health climate, family health climate, health behaviors and work schedule as predictors of obesity in a high-stress work environment. Although correctional supervisors may be exposed to shift work and excessive overtime, limited research examines the interacting relationship of health climate and health behaviors in this group. This assembly of middle managers may have the opportunity to change the health climate in the work environment, creating a ripple effect of perceived support for health, health norms, and health behavior change in the organization.

Complex factors influence health behaviors, in many environments, and these must be taken into consideration to understand variables associated with obesity and chronic disease. In addition, research emphasizes the importance of evaluating multiple levels of influence on health behaviors, and a social ecological approach is a commonly cited theoretical model.<sup>32,36-38</sup> WHC and FHC may be one approach to examine how psychosocial aspects of work and personal life are associated with health behaviors.

The role of health climate may have varying levels of influence depending on the occupation studied, such as in groups with job stress in high demand, low control safety occupations where social support may be uniquely important. In summary, previous research has explored the role of the built environment, workplace factors on health, and the influence of adult health behaviors on their children's health habits. However, limited research has collectively evaluated workplace and family influences and how these may interact with health behaviors and BMI. In summary, there is a need for TWH initiatives in the workplace that recognize both environmental and social influences on chronic disease risk. The findings from this study have implications for TWH interventions utilizing a social ecological approach.

### **Purpose**

The purpose of this study was to explore two health behaviors (nutrition and physical activity) as mediators of the relationships between work and family health climate and obesity, and to explore if work schedule factors (shift, overtime) moderate these relations. **Figure 1** provides a visual representation of how these variables may be associated. These findings will add to the literature by examining work schedule and health in an occupational group at increased risk of chronic disease.



**Figure 1:** Conceptualized associations among health climate, health behaviors, work schedule, and health outcomes in correctional employees.

### Study Objectives

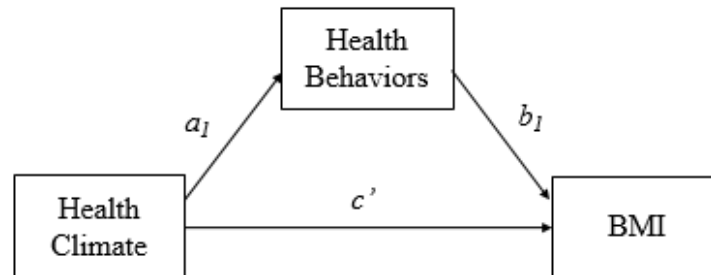
The primary study objectives are as follows:

- 1) To determine if general health status is a predictor of WHC and FHC.
- 2) To assess the relationships between WHC and FHC with health behaviors (nutrition, physical activity).
- 3) To examine the effects of WHC, FHC and BMI as mediated by health behaviors (nutrition, physical activity) using mediation modeling.
- 4) To evaluate the role of work schedule (overtime, shift work) on the health climate, health behavior and BMI relationships.

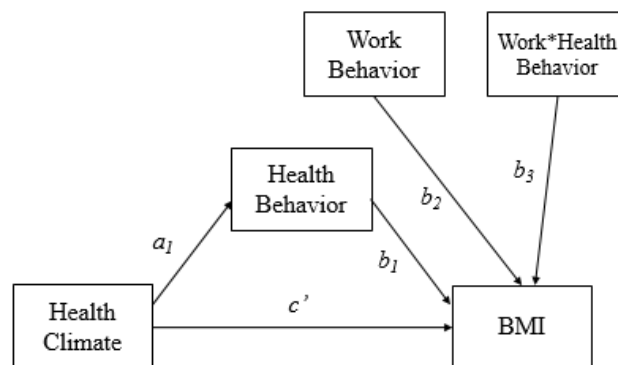
### Hypotheses

- 1) There will be positive associations between perceived work health climate (WHC), family health climate (FHC), health behaviors (nutrition, physical activity) and lower BMI (see **Figure 2**).

- 2) Work schedule factors (overtime, shift work) will decrease healthy behaviors, provoke negative feelings about health norms (lower WHC, FHC), and increase BMI (see **Figure 3**).



**Figure 2: Mediation Model** – health climate (WHC or FHC) on BMI mediated by health behaviors (nutrition, physical activity).



**Figure 3: Moderated Mediation Model** – health climate (WHC or FHC) on BMI mediated by health behaviors (nutrition, physical activity) and moderated by work schedule (overtime hours, shift).

## Methods

### Design

This was a cross-sectional study using data collected from an online survey.

### Participants and Survey Development

A total of 157 correctional employees completed the survey. Participation was voluntary and anonymous. Participants were recruited via convenience sampling through internal advertising in the supervisors' bargaining union. Inclusion criteria included: supervisory title



(lieutenant, captain, or counselor supervisor), union member, and employee in a Connecticut DOC facility. Information was circulated prior to survey launch to raise awareness of the survey purpose, for future health initiatives of the supervisor workgroup, and thus encourage participation. Prior to participation, respondents were informed that there were no risks associated with participation, and the potential benefits of participating extend to future health and wellness initiatives for their work group.

A participatory process was used in developing an accepted and tailored survey for this project. Supervisor staff collaborated with the research team to develop the survey. An online platform was used to launch the survey to maximize statewide participation and increase response rate. Survey respondents had access to an online link for four weeks in January 2015. They were able to complete the survey on a computer or smartphone device during work hours or personal time. The survey consisted of 64-items and took approximately 20 minutes to complete. The survey required completion in one session to prevent loss of response items. Items could be skipped if the participant felt uncomfortable answering any question. These methods were approved by the Institutional Review Board at the University of Connecticut and participants were required to provide electronic consent prior to beginning the survey.

## **Measures**

The following items were self-reported in the survey and explored in statistical analysis.

**Demographic Variables.** Age, sex, race, family income, educational status, marital status and job classification were self-reported on the healthy workplace survey.

**Health Status.** General health status and body mass index (BMI) were self-reported. *General health status* was assessed using one item asking the participant to rate their health on a Likert scale ranging from 1 (*poor*) to 5 (*excellent*).<sup>61</sup> *Body mass index (BMI)* was used as an

indicator of health status, and calculated using self-reported height (in inches) and weight (in pounds) with a conversion factor of 703, following the Centers for Disease Control and Prevention (CDC) equation.<sup>62</sup>

**Health Climate.** Work health climate (WHC) and family health climate (FHC) were assessed using a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). *WHC* was assessed with 5 items to assess experiences at the workplace. Questions included: “In this facility, management considers employee safety to be important”, “In this facility, management considers employee health and well-being to be important”, “My coworkers would support my use of sick days for illness or mental health”, “My supervisor encourages healthy behaviors”, and “My organization provides me with opportunities to be healthy”. This construct was created using the sum score from survey items, and a higher score indicates better perceived work health climate. The total possible score for this item was 25. This scale was created by Zweber et al (2015).<sup>39</sup> *FHC* was assessed with 4 items to assess experiences with those whom the participant shares a close relationship (i.e., family, friends). Questions included: “We talk about improving health and preventing disease”, “Most people are very health conscious”, “People notice how well you take care of your health”, and “We encourage each other to make changes to improve our health.” This construct was created using the sum score from survey items, and a higher score indicates better perceived family health climate. The total possible score for this item was 20. This item was created using a participatory design with agreement between the research team and supervisor union group (Dugan, 2014).<sup>63</sup>

**Health Behaviors.** Nutrition and physical activity were each assessed with 1 item following a Likert scale ranging from 1 (*never*) to 5 (*always*) following the health behavior guidelines. *Nutrition* habits were assessed by asking the frequency of meeting guidelines for fruit

and vegetable consumption, where a higher score indicates healthier eating habits. The question was adapted from the U.S. Dietary Guidelines for Americans (2010).<sup>64</sup> *Physical activity* habits were assessed by asking the frequency of meeting guidelines for cardiovascular and resistance exercise, where a higher score indicates more likely meeting national goals. This question was adapted from the U.S. Department of Health and Human Services Physical Activity Guidelines for Americans (2010).<sup>65</sup>

**Work Schedule.** *Shift* and *overtime* were reported with demographics. Participants were asked to report the primary shift to which they are assigned (first, second, or third) and the number of overtime hours typically worked per week. Response categories included: none, 1-8 hours, 9-16 hours, 17-23 hours, 24 or more hours.

### **Statistical Analyses**

Data was analyzed using IBM SPSS<sup>TM</sup> version 21 to recode variables and create new variables; SAS version 9.3 for descriptive statistics, frequency distributions, one-way ANOVAs, simple linear regression, and statistical test assumptions; and R version 3.2.2 for mediation and moderated-mediation modeling. The primary variables analyzed included: general health status, demographic variables, BMI, and scores from the online workplace survey. Key variables were assessed for normality and the appropriate test assumptions prior to running statistical inference tests. Frequency analyses were run for categorical variables. Sum scores were created from Likert scale health climate measures and treated as continuous variables, as this considered a satisfactory statistical method.<sup>66,67</sup> One-way ANOVA tests were used to analyze categorical demographic variables and health status as predictors of continuous health climate constructs. Scheffe tests were used for post hoc analyses to determine where significant differences occurred. Simple linear regressions were run to analyze mediation assumptions by examining the

$a_1$ ,  $b_1$ , and  $c'$  paths. Residuals were analyzed due to violations of the normality assumption for health climate variables (WHC, FHC). The cut-off for statistical significance was set at  $p < 0.05$ .

The mediation package was used in R software to evaluate different mediation and moderation modeling effects. Mediating and moderating variables were categorical (ordinal), and the independent and dependent variables were continuous. Mediation analyses use a series of multiple regression equations to help explain the mechanism of a particular outcome, in a sequential pattern. In mediation analysis, there are distinct differences between independent and dependent variables. In contrast, structural equation modeling (SEM) is more complex and is typically represented with a path diagram where regression-style equations are linked to each other, and variables may play different roles depending on conceptualizations of the model.<sup>68</sup> SEM can be used to conduct mediation, but is not used with the mediation package in R. The mediation package allows for model-based causal and multi-level mediation analyses and is appropriate for an observational study design. In addition, the model assumptions are more flexible, as rigid assumptions are considered one limitation of previous modeling packages.<sup>69</sup> This package is also appropriate to test the hypotheses of this study because it allows for examination of mediation effects with a nonparametric approach using multiple types of variables (continuous, ordinal, etc.), and provides confidence intervals for interpretation of results.<sup>70</sup>

Mediation models were first tested independently prior to adding moderators to interpret the average causal mediation effects (ACME, indirect) and average direct effects (ADE). Exploratory analyses were performed to examine moderator effects on both the  $a_1$  and  $b_1$  paths. Proportion of the model mediated was examined for interpretation when there was absence of statistical significance to examine model effects. Bootstrapping was used when running model

syntax to estimate conditional indirect effects with a nonparametric approach. A generalized linear model function was used because the independent variable did not meet normality assumptions. Confidence intervals were recorded to assess interval estimates and provide conclusions for statistical significance. Missing values were removed from analyses using a “drop observation” syntax. At most, only 1-2 participants were removed from statistical testing, leaving a minimum sample of n=155. Causal mediation is an appropriate method for analysis as it allows for comparison of effects while controlling for other variables included in the model, regardless of their position.

## Results

### Descriptive Statistics

Study respondents were primarily white (69.2%), male (78.2%), lieutenants (59.6%) and worked first shift (63.8%). In addition, respondents had some college (38.8%) and were married or living with their partner (73.0%). See **Table 1** for additional demographic findings. Respondents had elevated rates of overweight (37.8%) and obesity (50.6%), defined as a body mass index  $\geq 30$  kg/m<sup>2</sup>. The mean [standard deviation (SD)] BMI was 30.06 ( $\pm 4.6$ ), which is classified as obese. On average, respondents were 42.3 ( $\pm 6.1$ ) years old. There was a significant difference in BMI by gender, and females (28.7 $\pm$ 4.2) had a slightly lower mean BMI than males (30.7 $\pm$ 4.2). BMI did not significantly differ by job classification, shift, or weekly reported overtime. Over half the sample (53%) reported working more than two additional overtime shifts per week.

<b>Table 1</b>	
<i>Demographic Results of Study Sample (n=157)</i>	
	%
<b>Gender</b>	
Male	78.2 %
Female	21.8%

<b><i>Race/Ethnicity</i></b>	
White, European, or European American	69.2%
Black, African American, or African	16.0%
Hispanic, Latino or Hispanic American	9.6%
Other	3.2%
Asian, Asian American, or Pacific Islander	1.3%
Middle Eastern, Arab, or Arab American	0.6%
<b><i>Education</i></b>	
High school graduate or GED	15.3%
Some college	38.8%
College degree (2 or 4-year college)	35.0%
Graduate degree	10.8%
<b><i>Marital Status</i></b>	
Married or live with partner	73.0%
Widowed	1.9%
Divorced or separated	16.0%
Single, never married	8.9%
<b><i>Family Income</i></b>	
\$50,000-74,999	1.3%
\$75,000-99,999	24.5%
\$100,000-124,999	29.7%
\$125,000-149,999	15.5%
More than \$150,000	29.0%
<b><i>Job Classification</i></b>	
Counselor Supervisor	11.5%
Lieutenant	59.6%
Captain	28.8%
<b><i>Shift</i></b>	
First	64%
Second	21%
Third	15%

Demographic variables (age, gender, race/ethnicity, education status, marital status and family income) were not significantly associated with WHC or FHC. Family income as a predictor of FHC approached statistical significance ( $p=0.09$ ). WHC score did not differ by shift ( $p=0.45$ ), job tenure ( $p=0.82$ ), job classification ( $p=0.12$ ) or reported weekly overtime ( $p=0.28$ ). There were statistically significant differences in WHC score by facility the participant worked in ( $p<0.001$ ).

## General Health Status

ANOVA tests were used to explore general health status as a predictor of WHC and FHC. **Table 2** depicts general health status as a significant predictor of perceived WHC ( $p < 0.01$ ) and FHC ( $p < 0.0001$ ). There was a significant difference in mean WHC score for respondents reporting “excellent”, “very good”, or “good” general health compared to “poor” health. There was a significant difference in WHC score for respondents reporting “fair” or “good” versus “excellent” health status. Last, there was a significant difference in mean FHC score for respondents reporting “fair” or “good” health compared to “poor” health.

	Overall Mean $\bar{x}$	Poor $\bar{x} \pm$ SD	Fair $\bar{x} \pm$ SD	Good $\bar{x} \pm$ SD	Very Good $\bar{x} \pm$ SD	Excellent $\bar{x} \pm$ SD	p value
WHC	17.1	5.0	14.1 $\pm$ 3.7	17.2 $\pm$ 3.7	17.4 $\pm$ 3.7	18.8 $\pm$ 4.5	0.001**
FHC	14.1	20.0	12.4 $\pm$ 2.3	13.7 $\pm$ 2.1	14.4 $\pm$ 2.4	16.3 $\pm$ 3.3	<0.0001**

\*  $p < 0.05$ . \*\*  $p < 0.01$ .

## Simple Linear Regression

Corresponding to **Figure 2**, simple linear regressions were used to evaluate health climate (WHC, FHC) as predictors of health behaviors (nutrition, physical activity),  $a_1$  path; health behaviors (nutrition, physical activity) as predictors of BMI,  $b_1$  path, controlling for health climate measures; and health climate (WHC, FHC) as predictors of BMI,  $c'$  path. These analyses were performed to test the assumptions for running a mediation model. First examining the  $a_1$  path, WHC was a significant predictor of nutrition ( $\beta = 0.04$ ,  $p < 0.05$ ), but not physical activity ( $\beta = 0.04$ ,  $p = 0.11$ ) and FHC was a significant predictor of nutrition ( $\beta = 0.09$ ,  $p < 0.01$ ) and physical activity ( $\beta = 0.13$ ,  $p < 0.01$ ). Next, examining the  $b_2$  path, physical activity was a significant predictor of BMI when controlling for both WHC ( $\beta = -0.96$ ,  $p < 0.01$ ) and FHC ( $\beta = -0.95$ ,  $p < 0.01$ ).

All relationships occurred as hypothesized, better perceived health climate was associated with healthier nutrition and physical activity, observed by the value of the parameter estimate ( $\beta$ ). Last, examining the  $c'$  path, perceived WHC score ( $\beta=-0.02$ ,  $p=0.79$ ) and FHC score ( $\beta=-0.13$ ,  $p=0.35$ ) did not significantly predict BMI in a linear fashion. However, these scores trended in the direction hypothesized, in that better perceived health climate at work or home would be associated with lower BMI. Residuals for all models were normal, so a log transformation was not needed because it would not significantly influence the overall model.<sup>71</sup> Lack of a significant regression between health climate measures and BMI does not justify a conclusion that complete mediation will not occur. Rather, statistical analysts suggest further analysis to evaluate other potential mediating effects.<sup>72</sup>

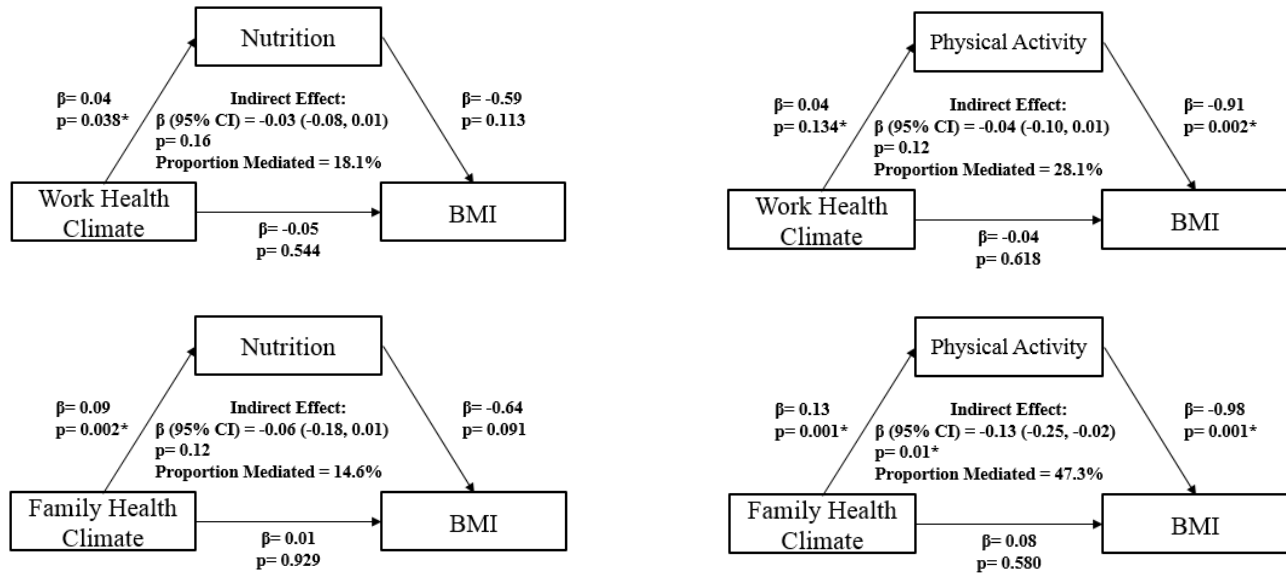
## **Mediation**

Mediation analyses were performed to test Hypothesis 1 and examine the effects of health climate (WHC, FHC) on obesity mediated by health behaviors, controlling for age and gender. FHC was associated with obesity mediated by physical activity, with a significant indirect effect ( $p<0.05$ ) and 47.3% of the model mediated. However, the total effect was not significant ( $p=0.40$ ), indicating that there was not complete mediation in this model. There was no significant indirect or total effect for the relationship between FHC on BMI mediated by nutrition. The indirect effects for WHC on BMI mediated by health behaviors (nutrition, physical activity) were not statistically significant ( $p=0.16$  and  $p=0.12$ , respectively). However, nutrition mediated 18.1% of the model, and physical activity mediated 28.1%. No models revealed complete mediation, demonstrated by an absence of a significant total effect (not shown). **Figure 4** provides visual depictions of these findings. In summary, all four models tested displayed results consistent with Hypothesis 1 in that better perceived health climate (WHC, FHC) was



associated with healthier behaviors (nutrition, physical activity), and decreased BMI, as interpreted from the point estimates for the *a* and *b* paths of each model, refer to **Figure 2**.

However, there was an absence of complete mediation in the four models.



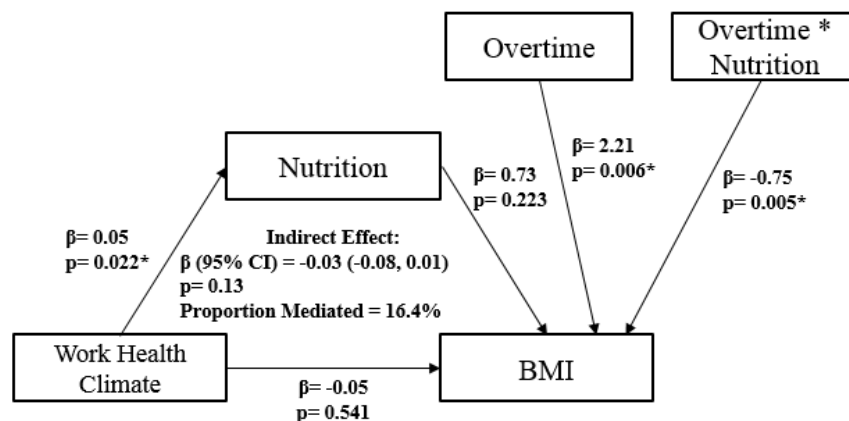
**Figure 4: Mediation models** for health climate (WHC, FHC) and BMI mediated as mediated by health behaviors (nutrition, physical activity).

### Moderated-Mediation

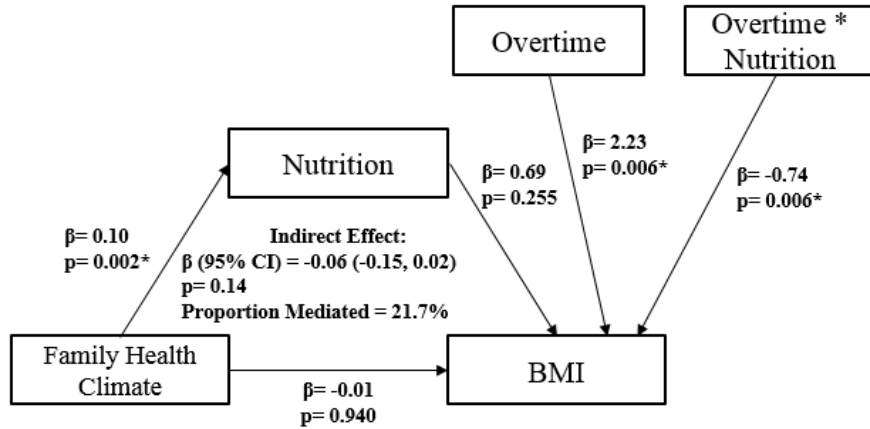
To test Hypothesis 2, we proceeded with moderated-mediation modeling to determine the role of another predictor variable. Moderated-mediation models allow us to determine the strength of the indirect effect on different levels of the moderating variables, overtime and shift. Using guidance from Preacher, Rucker, and Hayes (2007),<sup>73</sup> a model was created in which the moderator exhibits its' effects on the *b*<sub>1</sub> path, as this lead to the most significant effects for interpretation of the data. Examination of the *b*<sub>1</sub> path allows for interpretation of changes in BMI when health behaviors interact with the associated work schedule factor. Regression coefficients ( $\beta$ ) and *p* values were analyzed for the moderating paths to interpret effects on the dependent outcome variable (BMI). Exploratory analyses were performed with several different approaches

to determine the conditional indirect effect, i.e., the mediation effect occurring at different levels of the categorical overtime and shift variables, controlling for age and gender. A concluding syntax was performed to test for statistically significant differences in the indirect (ACME) and direct (ADE) effects at the lowest and highest levels of overtime and first versus third shifts.

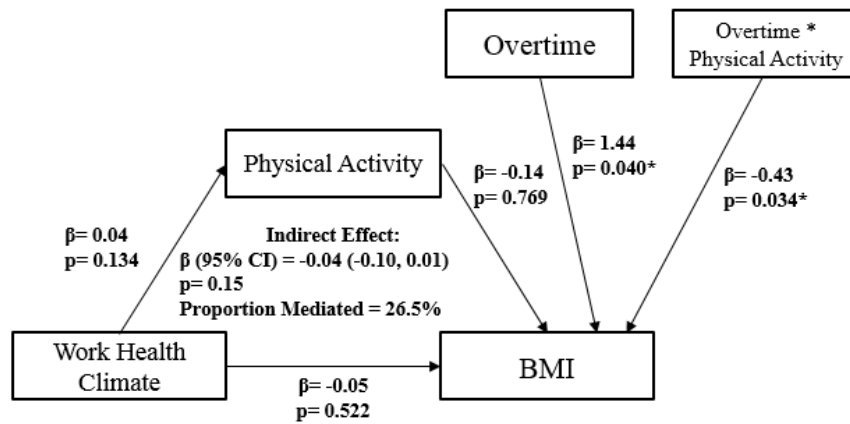
**Overtime.** There was a conditional indirect effect for all four models tested, suggesting inconsistent mediation. This means the indirect effect is conditional depending on the level of the moderating variable, overtime hours. Demonstrated in **Figures 5-8** and examining the  $b_2$  path (overtime  $\rightarrow$  BMI), overtime acted as a significant moderator for WHC mediated by nutrition ( $\beta=2.21$ ,  $p<0.01$ ) and physical activity ( $\beta=1.44$ ,  $p<0.05$ ); and for FHC mediated by nutrition ( $\beta=2.23$ ,  $p<0.01$ ) and physical activity ( $\beta=1.40$ ,  $p<0.05$ ). The interaction effect for the moderator overtime with the mediating health behavior variable revealed a negative estimate, indicating that the interaction was associated with decreased BMI. When evaluating the models as a whole, FHC on BMI mediated by physical activity had a significant indirect effect ( $p<0.05$ ). The indirect and total effects of all other models did not reach statistical significance, which is attributed to inconsistent mediation discussed below.



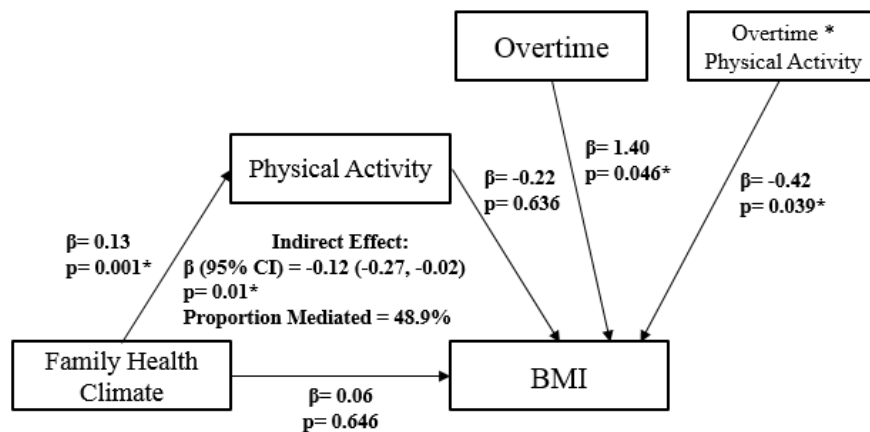
**Figure 5: Moderated-mediation** – Relationship of work health climate (WHC) and BMI as mediated by nutrition and moderated by overtime hours.



**Figure 6: Moderated-mediation** – Relationship of family health climate (FHC) and BMI as mediated by nutrition and moderated by overtime hours.



**Figure 7: Moderated-mediation** – Relationship of work health climate (WHC) and BMI as mediated by physical activity and moderated by overtime hours.



**Figure 8: Moderated-mediation** – Relationship of family health climate (FHC) and BMI as mediated by physical activity and moderated by overtime hours.

Comparison of the models mediated at different levels of overtime provides insight as to when the relationships become significant and reveal inconsistent mediation. Overtime became a

significant moderator when working more than one additional shift per week (for 9-16 hours, 17-23 hours, 24 or more hours) for work and family health climate mediated by nutrition (indirect effect for 9-16 hours:  $\beta=-0.04$ ,  $p<0.05$  and  $\beta=-0.08$ ,  $p<0.05$ , respectively) and family health climate mediated by physical activity ( $\beta=-0.14$ ,  $p<0.001$ ), demonstrated in **Tables 3-4**. The proportion of the model mediated increased with overtime frequency.

Inspection of the indirect effects at different levels of overtime reveal a non-significant moderated-mediation when individuals work no overtime. As mentioned above, the protective effect of health behaviors was due to inconsistent mediation in the model. This finding is confirmed by a negative proportion mediated for WHC mediated by nutrition when the moderator, overtime, was set at 0 hours/week. Similarly, this is confirmed by a proportion mediated greater than 100% when FHC is mediated by physical activity. Mediation is still occurring, but due to the unique nature of the variables, the direct and indirect effects cancel each other out, resulting in a small total effect, which was not statistically significant. Displayed in **Figures 5-8** this relationship is occurring because of the suppressor effect from the mediating variables, nutrition and physical activity, and can be confirmed by evaluating the signs of  $ab$  and  $c'$ .<sup>72,74</sup>

**Table 3**  
*Moderated-mediation effect for work health climate on BMI moderated by different levels of overtime*

Overtime Hours	Direct Effect Path c' ( $\beta$ )	Indirect Effect Bootstrapped Path a*b ( $\beta$ )	Total Effect Path c ( $\beta$ )	Proportion Mediated (%)	Bootstrapped 95% CI for Indirect Effect
Work health climate mediated by nutrition					
<b>0</b>	-0.05	0.03	-0.02	-5.48	-0.02, 0.10
<b>1-8</b>	-0.05	-0.00	-0.05	0.25	-0.05, 0.04
<b>9-16</b>	-0.05	-0.04*	-0.09	25.70	-0.09, -0.00*
<b>17-23</b>	-0.06	-0.07*	-0.13	46.30	-0.16, -0.01*
<b>24+</b>	-0.05	-0.11**	-0.16	59.80	-0.24, -0.02*

Work health climate mediated by physical activity					
<b>0</b>	-0.05	-0.01	-0.06	3.18	-0.05, 0.04
<b>1-8</b>	-0.05	-0.02	-0.08	16.50	-0.07, 0.01
<b>9-16</b>	-0.06	-0.04	-0.10	30.90	-0.10, 0.01
<b>17-23</b>	-0.06	-0.06	-0.11	39.60	-0.14, 0.02
<b>24+</b>	-0.05	-0.07	-0.13	47.10	-0.19, 0.02

\* p < 0.05. \*\* p < 0.01.

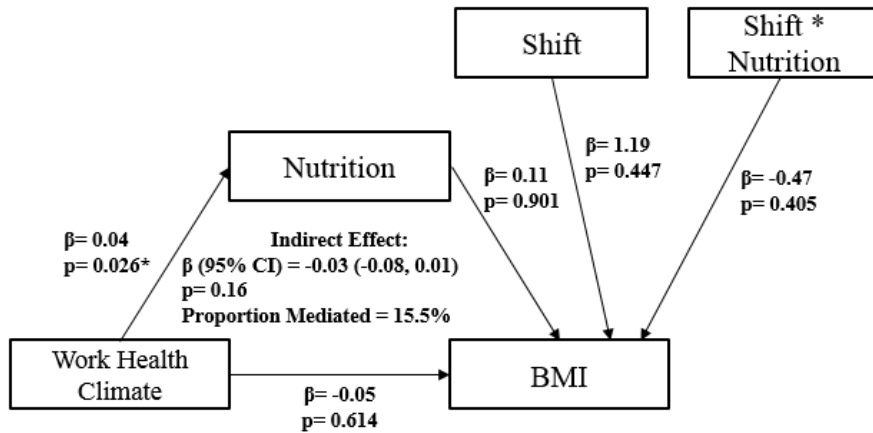
**Table 4**  
*Moderated-mediation effect for family health climate on BMI moderated by different levels of overtime*

Overtime Hours	Direct Effect Path c' (β)	Indirect Effect Bootstrapped Path a*b (β)	Total Effect Path c (β)	Proportion Mediated (%)	Bootstrapped 95% CI for Indirect Effect
Family health climate mediated by nutrition					
<b>0</b>	-0.01	0.07	0.05	23.80	-0.04, 0.21
<b>1-8</b>	-0.01	-0.01	-0.01	2.43	-0.10, 0.09
<b>9-16</b>	-0.01	-0.08*	-0.08	39.20	-0.17, -0.01*
<b>17-23</b>	-0.01	-0.15**	-0.16	70.40	-0.29, -0.04**
<b>24+</b>	-0.01	-0.22**	-0.23	89.00	-0.43, -0.06**
Family health climate mediated by physical activity					
<b>0</b>	-0.07	-0.03	0.04	2.42	-0.18, 0.09
<b>1-8</b>	0.07	-0.08	-0.02	8.75	-0.20, 0.00
<b>9-16</b>	0.07	-0.14**	-0.07	72.20	-0.26, -0.04**
<b>17-23</b>	0.06	-0.20**	-0.14	99.90	-0.37, -0.07**
<b>24+</b>	0.07	-0.25**	-0.19	110.99	-0.48, -0.08**

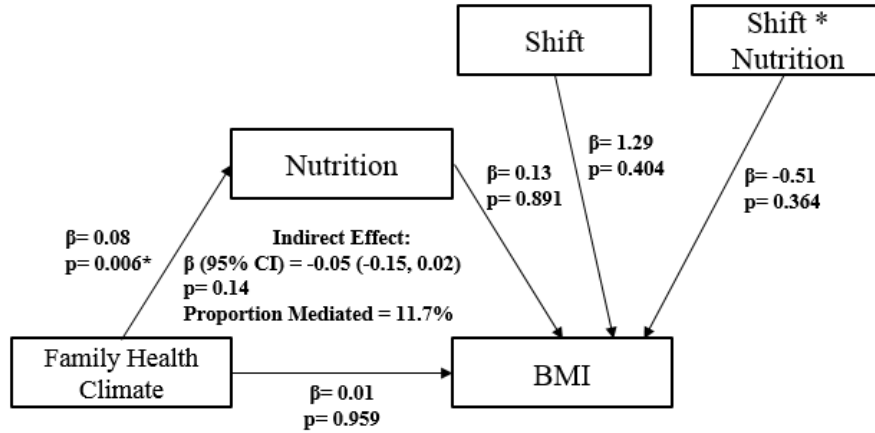
\* p < 0.05. \*\* p < 0.01.

**Shift.** Similar to the overtime models, there was inconsistent mediation in the models for health climate (WHC, FHC) on BMI mediated by health behaviors (nutrition, physical activity), and moderated by shift. Though nonsignificant, examination of the  $b_2$  paths (shift → BMI) in **Figures 9-10** revealed positive parameter estimates, suggesting this pathway would be associated with higher BMI. The opposite was true when FHC was the independent variable, and the  $b_2$  paths (shift → BMI) had negative parameter estimates, suggesting this pathway would be associated with lower BMI, though nonsignificant (refer to **Figures 11-12**). The interaction

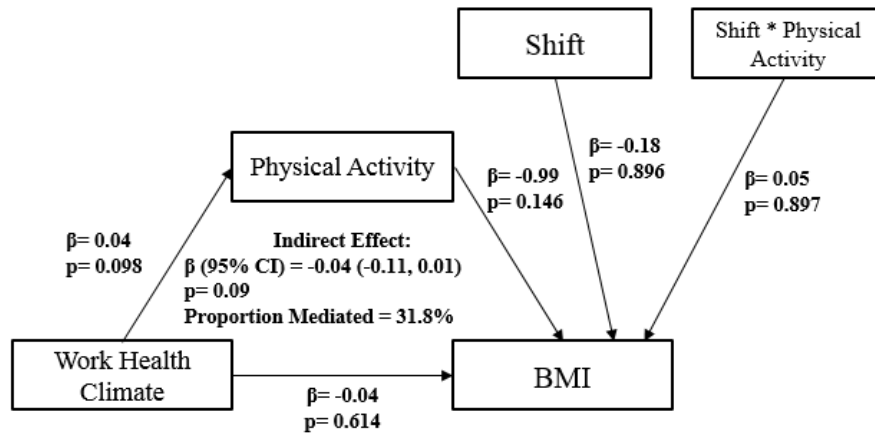
effect in all models between shift and health behaviors (nutrition, physical activity) was also nonsignificant. Working first ( $\beta=-0.12$ ,  $p<0.05$ ) or second shift ( $\beta=-0.11$ ,  $p<0.05$ ) were significant moderators for the indirect model effect of FHC on BMI mediated by physical activity. First and second shifts mediated 44.5% and 46.1% of the models, respectively. The overall model had a significant indirect effect, but nonsignificant total effect, revealing inconsistent mediation ( $\beta=-0.12$ ,  $p<0.05$ ). The overall model approached significance for WHC on BMI mediated by physical activity ( $\beta=-0.04$ ,  $p=0.09$ ). Working first ( $\beta=-0.04$ ,  $p=0.07$ ) or second shift ( $\beta=-0.04$ ,  $p=0.08$ ) approached significance for the indirect model effect of WHC on BMI mediated by physical activity. The proportion of the model mediated was highest for third shift for WHC on BMI mediated by nutrition (40.5%) and FHC on BMI mediated by nutrition (50.4%), see **Tables 5-6**.



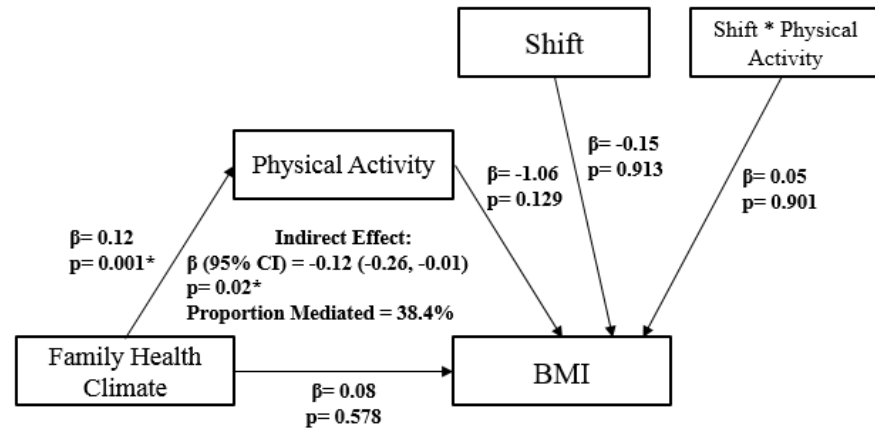
**Figure 9: Moderated-mediation** – Relationship of work health climate (WHC) and BMI as mediated by nutrition and moderated by shift (first, second, third).



**Figure 10: Moderated-mediation** – Relationship of family health climate (FHC) and BMI as mediated by nutrition and moderated by shift (first, second, third).



**Figure 11: Moderated-mediation** – Relationship of work health climate (WHC) and BMI as mediated by physical activity and moderated by shift (first, second, third).



**Figure 12: Moderated-mediation** – Relationship of family health climate (FHC) and BMI as mediated by physical activity and moderated by shift (first, second, third).

**Table 5**  
*Moderated-mediation effect for work health climate on BMI moderated by different shifts*

Shift	Direct Effect Path c' ( $\beta$ )	Indirect Effect Bootstrapped Path a*b ( $\beta$ )	Total Effect Path c ( $\beta$ )	Proportion Mediated (%)	Bootstrapped 95% CI for Indirect Effect
Work health climate mediated by nutrition					
1 <sup>st</sup>	-0.05	-0.02	-0.07	11.53	-0.07, 0.03
2 <sup>nd</sup>	-0.04	-0.04	-0.08	27.29	-0.10, 0.01
3 <sup>rd</sup>	-0.05	-0.06	-0.11	40.52	-0.18, 0.02
Work health climate mediated by physical activity					
1 <sup>st</sup>	-0.04	-0.04	-0.08	33.44	-0.11, 0.00
2 <sup>nd</sup>	-0.05	-0.04	-0.09	28.85	-0.11, 0.00
3 <sup>rd</sup>	-0.05	-0.04	-0.08	23.96	-0.13, 0.02

\* p < 0.05. \*\* p < 0.01.

**Table 6**  
*Moderated-mediation effect for family health climate on BMI moderated by different shifts*

Shift	Direct Effect Path c' ( $\beta$ )	Indirect Effect Bootstrapped Path a*b ( $\beta$ )	Total Effect Path c ( $\beta$ )	Proportion Mediated (%)	Bootstrapped 95% CI for Indirect Effect
Family health climate mediated by nutrition					
1 <sup>st</sup>	0.01	-0.03	-0.02	5.20	-0.12, 0.06
2 <sup>nd</sup>	0.01	-0.08	-0.07	32.91	-0.18, 0.01
3 <sup>rd</sup>	0.00	-0.12	-0.11	50.41	-0.32, 0.03
Family health climate mediated by physical activity					
1 <sup>st</sup>	0.08	-0.12**	-0.04	44.53	-0.26, -0.03*
2 <sup>nd</sup>	0.08	-0.11**	-0.03	46.10	-0.23, -0.02*
3 <sup>rd</sup>	0.09	-0.11	-0.02	38.56	-0.30, 0.05

\* p < 0.05. \*\* p < 0.01.

The final test performed in evaluating moderated-mediation effects included a comparison test for statistically significant differences in the ACME and ADE when comparing overtime at the lowest and highest levels and comparing first versus third shifts. The indirect effects were significant for WHC mediated by nutrition ( $p < 0.001$ ), and FHC mediated by nutrition ( $p < 0.01$ ). The effect approached significance for FHC mediated by physical activity



( $p=0.052$ ). These findings in **Table 7** revealed significant moderation in the indirect effect across the different moderating levels, and indicates that working increased overtime has a strong influence on the other variables in the model and should be an important consideration for reducing obesity risk. Demonstrated in **Table 8**, there was no statistically significant difference in the ACME or ADE when comparing first versus third shifts for any of the models tested. From these findings, we can conclude there is a difference in the indirect effect of WHC and FHC on BMI, partly explained by health behaviors when an employee works no overtime compared to 2-3 shifts or more of weekly overtime. The effect of overtime on the health climate, health behavior and obesity relationships may be different from the effect of shift work.

**Table 7**  
Testing for statistically significant differences between the ACME and ADE when comparing the least amount of overtime hours (0 hours/week) to the most amount of overtime (24 or more hours/week), shown are the 95% confidence intervals.

IV	Mediator	ACME	ADE
<b>Work Health Climate</b>	Nutrition	0.04, 0.28**	-0.23, 0.25
	Physical Activity	-0.03, 0.20	-0.22, 0.23
<b>Family Health Climate</b>	Nutrition	0.09, 0.56**	-0.38, 0.38
	Physical Activity	-0.00, 0.47	-0.36, 0.39

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

**Table 8**  
Testing for statistically significant differences between the ACME and ADE when comparing 1<sup>st</sup> shift to 3<sup>rd</sup> shift, shown are the 95% confidence intervals.

IV	Mediator	ACME	ADE
<b>Work Health Climate</b>	Nutrition	-0.05, 0.17	-0.27, 0.24
	Physical Activity	-0.09, 0.10	-0.23, 0.25
<b>Family Health Climate</b>	Nutrition	-0.10, 0.30	-0.39, 0.39
	Physical Activity	-0.22, 0.20	-0.38, 0.37

In summary, with the exception of some findings where shift was the moderator, an increased frequency of overtime hours was associated with higher BMI. The interaction effect between overtime and health behavior (nutrition, physical activity) was “protective”, and

associated with lower BMI. There was a significant conditional indirect effect in the relationships between health climate (WHC, FHC), obesity, and health behaviors when moderated by one or more additional overtime shift per week; however there was no conditional indirect effect for WHC on BMI mediated by physical activity when moderated by overtime. Our findings also revealed a significant indirect model effect for FHC on BMI mediated by physical activity when moderated by first and second shifts; this approached significance for WHC. There were no other significant conditional indirect effects when shift was the moderator. The interaction effect between shift and health behavior did not consistently align with the hypothesis of this study in that some shifts may be associated with higher or lower BMI. There was an absence of complete mediation in all moderated-mediation models, which may be attributed to inconsistent mediation. However, the results of the conditional indirect effects are telling and these results are partially consistent with Hypothesis 2.

## **Discussion**

Respondents were mostly middle-aged correctional supervisors, primarily working first shift. Participants worked frequent amounts of overtime, which may have a damaging effect on health status over the work career.<sup>54</sup> Demographic and work schedule factors (shift, overtime) were not associated with WHC or FHC. However, the facility that respondents worked in was significantly associated with WHC, consistent with previous findings.<sup>41</sup>

Respondents in this study reporting better general overall health had higher WHC and FHC scores. This finding suggests that health norms and culture in the work and home environments may influence health behaviors and outcomes. Health behaviors (nutrition, physical activity) were associated with WHC and FHC. This finding is consistent with previous studies identifying a relationship between WHC and health behaviors,<sup>41,42</sup> and social support

from family members related to diet and exercise.<sup>11-13</sup> Unhealthy behaviors are associated with weight gain,<sup>75</sup> future research is needed to understand the potential interrelationships between perceived health climate and health behaviors.

Controlling for age and gender, higher WHC and FHC scores were associated with lower BMI mediated by nutrition and physical activity. Only one of four mediation models tested revealed a statistically significant indirect effect. No models had significant total effects. This lack of significance may be related to sample size and/or provides rationale for adding more variables to the models for further exploration. The model evaluating FHC and BMI as mediated by physical activity had a significant indirect effect suggesting that the relationship between health climate in the home domain and BMI may be largely influenced by physical activity level. This finding is supported by previous studies suggesting that family social support is associated with physical activity.<sup>76-78</sup> These associations may infer that lifestyle behaviors are related to access, availability, and social support for healthy eating and physical activity.

Work schedule (shift, overtime) may influence health behaviors<sup>54,79</sup> and health outcomes.<sup>54,59,80,81</sup> In this study we explored the role of overtime and shift work by examining their interrelationship with health climate, health behaviors and BMI. Moderated-mediation models tested in this study revealed a significant moderating effect on the *b* path, indicating that the mediation effect is dependent on different levels of the moderating variable, overtime. This is consistent with previous research suggesting the effects of overtime work on health may be dose dependent, and is best examined longitudinally.<sup>54</sup> There was inconsistent mediation in the models, in which the models became significant when working 2 or more overtime shifts per week. This finding indicates that at a minimum of 9-16 overtime hours a week, the role of overtime plays an interacting role with health climate, health behaviors, and BMI. Working more

than 2 additional shifts per week may begin to have a negative effect on BMI. It may be at this point that practicing healthy behaviors becomes important in protecting against weight gain.

The difference in the indirect effect for overtime levels was statistically significant for WHC and FHC on BMI mediated by nutrition and for FHC on BMI mediated by physical activity. The lack of significance for WHC on BMI mediated by physical activity may be partly explained by limited opportunities to be physically active during the work day in correctional institutions. The interaction between overtime and health behavior (nutrition, physical activity) revealed a negative parameter estimate, suggesting that despite working more hours, health behaviors may suppress, or protect against higher levels of obesity. This is consistent with prior mixed findings between overtime and obesity explained by health behaviors.<sup>51</sup> Some studies report weak and inconsistent associations between overtime, health behaviors and obesity and suggest that health behaviors are unchanged with long working hours.<sup>51,82</sup> However, working a certain number of hours in the work week<sup>83</sup> or overtime over a long period of time with minimal recovery may impact health behaviors and obesity.<sup>54,55</sup> This may explain why overtime in this study started to impact BMI as overtime frequency increased. Individuals working the most frequent overtime may benefit from practicing healthy behaviors to protect against aging and overtime work.

The moderating effect found with overtime was not significant when shift was the moderator, conflicting previous findings linking shiftwork to increased obesity.<sup>58,84</sup> Lack of significant results for shiftwork may be attributed to the small sample size or large proportion of survey respondents working first shift (64%), in which we were unable to recognize significant effects. First and second shift had a significant indirect effect on BMI in the model examining FHC mediated by physical activity. Individuals working first or second shift may have better

family support for health behaviors and less time-based barriers to being physically active, thus resulting in lower BMI. This is consistent with prior research linking family social support with increased physical activity<sup>38,50,85</sup> and lower BMI among day shift workers compared to rotating and night shifts.<sup>80,86-88</sup> Working first or second shift may have positive associations with health climate, physical activity and BMI compared to third shift. Despite finding some significant relationships when shiftwork and overtime were added to the models, the distribution of overtime throughout the work week is unknown. The importance of recovery may be vital when exposed to extended work hours.<sup>89</sup> Future research should explore whether overtime is done over a 7-day period, or crammed into a 5-day week with little time to rejuvenate between shifts. Other factors, such as what shift overtime is performed and whether it is mandatory or voluntary in nature, may influence emotional feelings associated with the workplace and limit opportunities to practice healthy behaviors. Health climate may vary within different work environments and assessing it may be one approach to direct researchers to priority populations that perceive their physical and social environment as unsupportive of health.<sup>41</sup> In addition, these findings may strengthen the validity of the WHC and FHC measures, for application in other high stress occupations.

Working overtime can have an indirect negative effect on BMI, which may be protected if an individual is still engaging in healthy behaviors. In an environment where employees may be mandated to stay extra shifts, the role of perceived health climate in the workplace may have a significant impact on long-term health outcomes. Understanding aspects of the work environment that may contribute to health behaviors and attitudes is important to develop future health interventions for employees working in high stress occupations. Further, aspects of the

home environment may play an important interactive role, and should be a consideration for development of programs that consider psychosocial influences on health at multiple levels.

### **Limitations**

Despite the promising findings from this study, there are several limitations worth discussing. This study was reliant on self-reported data and measurement tools that have not been validated to assess health behaviors or family health climate. However, use of a participatory design for survey development may have improved the validity and reliability of these findings to capture relationships within these networks. Lastly, this study may have limited generalizability to other middle-management groups, due to the high demand and low job control nature of corrections. However, limited research to-date investigates correctional supervisor staff. These employees are well-respected in the chain of command, and may have an influential role on workplace health climate.

### **Conclusions and Practical Applications**

In conclusion, corrections are high demand, low control workplaces with unstructured overtime and unpredictable shifts. There is a significant prevalence and incidence of chronic disease in correctional employees, including overweight and obesity.<sup>14,15,18</sup> A TWH approach to integrate workplace health promotion and health protection programs provides one step toward healthier employees. Understanding the interrelations between work environment, family and individual behaviors are important for developing tailored, workplace specific and cost-effective interventions. Our results indicate significant paths between FHC and BMI, mediated by physical activity ( $\beta=-0.13$ ,  $p<0.05$ ). In addition, working 2 or more overtime shifts per week may negatively impact health climate, health behavior, and obesity relationships. However, practicing healthy nutrition and physical activity behaviors despite increased overtime shifts may have a

protective effect on BMI. This finding may provide direction for interventions aiming to reduce the health consequences of overtime in occupational groups where modifying the root cause, such as mandated overtime, may not be feasible. Providing resources supportive of health in the workplace may positively contribute to health outcomes when individuals have extended work shifts. Working first ( $\beta=-0.12$ ,  $p<0.05$ ) or second shifts ( $\beta=-0.11$ ,  $p<0.05$ ) may protect against obesity if individuals have a positive FHC and engage in physical activity.

This study lays the groundwork for future research in high-stress occupations using these relatively new health climate constructs. Future research may test these models and relationships on a larger sample size and in a longitudinal manner. Interventions that address these factors are needed to expand upon these findings for application to TWH approaches that are more effective, acceptable, and feasible. Work and family health climate may be positively associated with diet quality, physical activity, and lower BMI. Too much overtime and rotating shift work may negatively impact health outcomes in correctional employees. Unhealthy work schedules such as frequent overtime hours and unpredictable shifts are associated with workplace injury rates,<sup>51,90</sup> poor performance, and unhealthy behaviors (physical activity, smoking, alcohol use),<sup>51</sup> and may contribute to unfavorable health outcomes. Other occupations such as police,<sup>91</sup> health care,<sup>92</sup> and EMS<sup>93</sup> may be exposed to similar work conditions. These associations should be considered and a more comprehensive approach with attention to work and family health climate and specific work environment is warranted.

In conclusion, this study adds to the literature on health climate constructs, one approach to conceptualize how individuals perceive their health environment in different settings. This reinforces the need for TWH interventions in this high stress workforce to reduce rates of chronic disease and improve health-related quality of life. Use of a social ecological approach

may best capture influences on health behaviors, and thus, would contribute to sustainable TWH efforts. Lack of attention paid to the social environment may be one limitation of previous workplace health promotion programs. Interventions targeting worksite and family psychosocial environments may be the most effective in changing behaviors. This study provides direction for the development of innovative policies in corrections for either maximum overtime hours or allowing split-shifts to promote employee health and well-being.

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## CHAPTER THREE

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### Conclusions

#### Summary

The purpose of this research was to: 1) examine the health status of correctional supervisors, 2) examine relationships among work characteristics, health behaviors, and health outcomes, and 3) examine perceived work and family health climate to gain an understanding of multi-level influences interacting with health behaviors, health outcomes and work schedule factors.

We hypothesized that correctional supervisors would exhibit unhealthy behaviors (nutrition, physical activity, sleep) and a higher prevalence of overweight, obesity, diabetes, hypertension, elevated cholesterol, and anxiety/depression compared to the general adult population in the United States. This was supported, and the sample of correctional supervisors in this study exhibited unhealthy behaviors and increased comorbidities compared to the general U.S. adult population. These major findings are the first of our knowledge reporting on correctional supervisor health and demonstrate a need for health interventions in this occupational group. The complex mechanisms in which work factors may contribute to unhealthy coping mechanisms and health behaviors requires future investigation. Recognizing the health risks of middle-management staff should be prioritized when targeting employee health. Supervisor staff can act as stakeholders to creating an environment supportive of health and demonstrating commitment from upper management. Intervening at the level of middle-management may provide opportunities to improve the health status of the correctional workforce.



Social-ecological variables are often under-utilized in planning interventions,<sup>1</sup> but play a key role in developing effective health promotion strategies that have the greatest impact. We hypothesized that work characteristics such as burnout, job meaning, job satisfaction, and workplace social support would predict health behaviors (nutrition, physical activity, sleep) and health outcomes (obesity, diabetes, hypertension, elevated cholesterol, anxiety/depression). This hypothesis was mostly supported, and burnout was a significant predictor of nutrition ( $p < 0.05$ ), physical activity ( $p < 0.01$ ), sleep duration ( $p < 0.01$ ), sleep quality ( $p < 0.0001$ ), diabetes ( $p < 0.05$ ), and anxiety/depression ( $p < 0.01$ ). No other work characteristics directly predicted nutrition or physical activity. However, job satisfaction predicted sleep duration ( $p < 0.05$ ), sleep quality ( $p < 0.0001$ ), and diabetes ( $p < 0.05$ ). Coworker and supervisor support also predicted sleep variables and anxiety/depression. The small sample size in this study may limit the ability to find relationships between all work, health behavior, and outcome variables tested. In addition, it is possible that some relationships are indirect in nature. For example, workplace social support may impact sleep behaviors, which in turn, may be associated with nutrition and physical activity. This research adds to the literature examining work factors and health measures, particularly in a group of high demand, low job control employees exposed to occupational stressors that may impact work characteristics and health measures.

In an attempt to gain an understanding of the potential barriers to health in correctional supervisors, this research revealed conflicting findings between health behaviors and work schedule factors (overtime, shift). Previous studies suggest that shiftwork and long working hours may negatively impact health behaviors<sup>2-4</sup> or physiological mechanisms<sup>5-7</sup> that impact health parameters. This study used a sample primarily working first shift, and found

disproportionate overtime dependent on job classification. Thus, future exploration using a more representative sample of the correctional employee workforce is needed.

Understanding multi-level influences on health behaviors accounts for the individual level and extends to social networks within the home, workplace, and other social settings. Previous research has been limited in focus to physical or built environment characteristics,<sup>8-10</sup> and must expand to consider the role of the social environment and health norms in the workplace and home. Previous studies often explore physical environment factors and occasionally expand to measure health climate domains that encompass social support or perceived environmental support. Research to date may be limited in understanding or including these measures and their role in behavior change. Higher perceived support from coworkers, family and friends may be associated with healthier behaviors,<sup>11-13</sup> and thus all of these networks should be considered in workplace initiatives.

We hypothesized that perceived work and family health climate may be associated with obesity, and health behaviors such as nutrition and physical activity may partly explain these relationships. In addition, we hypothesized that working third shift or frequent overtime may negatively impact these relationships, and increase obesity. Assessing perceived work health climate provides speculation for opportunities to improve health norms in the workplace. Health climate may vary by facility, and thus a tailored approach may be needed at multiple levels within the DOC organization. We found a mediating relationship between perceived work and family health climate on body weight by health behaviors. This demonstrates the importance of targeting lifestyle behaviors in a tailored approach for a population that faces unique barriers due to work culture. Further, this research explored health behaviors using a social ecological approach, which may be critical in understanding health behaviors in correctional employees.

The role of overtime and shiftwork, and their impact on health behaviors and outcomes remains a key area of interest. Working more frequent overtime and rotating shifts may have several potential interacting effects on health. However, the interaction effect between overtime and health behaviors may be preventive in obesity risk. These findings may support the benefit of a healthier perceived climate in the workplace where individuals are spending more frequent portions of their time. A poor perceived health climate in the workplace may be more damaging to health behaviors and increase negative feelings associated with the work environment. In addition, the role of a positive family health climate may be increasingly important if leisure time and family responsibilities are limited due to increased time spent at work and with a rotating schedule. From the findings portrayed in this thesis, use of a social ecological approach to consider work, family, and social environment characteristics may provide implications for sustainable health behavior change.

### **Implications**

Above all, this thesis adds to the literature on correctional employees. To our knowledge, this is the first study examining the health status of correctional supervisors. This fills a gap in the literature by examining relationships among work characteristics, health behaviors, work schedule factors, health climate, and health outcomes. Awareness of psychosocial work characteristics and their potential relationship with health behaviors and outcomes reinforces the need to consider behavior change beyond the individual level. Health climate variables are fairly new constructs, and thus this study adds to the literature by examining their relation to health behaviors and outcomes in a high-stress occupational group. Creation of statistical models to predict level of obesity from health behavior, climate and work schedule factors can be used in the corrections setting to identify risk for weight gain. Improving health behaviors and outcomes

among employees at high-risk of developing comorbid conditions has the potential to produce physical, social, and economic benefits. In addition, targeting individuals who work frequent overtime may benefit from practicing healthier behaviors. Allowance of split shifts, or providing resources and opportunities that support health, such as extra physical activity and meal breaks during extended shifts may improve worker well-being.

Future research would benefit from comparing the health status and behaviors of correctional supervisors versus officers. This may provide direction for policy change and intervention. Supervisors may be able to connect administrative policies and resources to line-level officers, however, their own health risks must first be known. This research provides valuable information to direct effective interventions for this population with potential application to other public safety occupations. Lastly, this research expands the literature assessing health related variables for Total Worker Health efforts in high-stress, low control occupations.

### **So What?**

The findings presented in the two studies discussed may provide direction pertaining to modifiable factors for use in future health interventions in high-stress occupations.

Based on the results of the first study, interventions should aim to reduce feelings of occupational burnout and improve positive psychosocial work measures. This would therefore improve health behaviors, including nutrition, physical activity, and sleep. Specifically, reducing burnout may improve all health behaviors, and improving job satisfaction and coworker support may increase the likelihood of meeting sleep guidelines. Positive measures of job meaning, job satisfaction, and workplace social support may all improve sleep quality. Strategies to reduce burnout<sup>14</sup> and improve job satisfaction<sup>15</sup> may include development of an employee health

program and/or policies that aide stress management. Reducing sources of stress by changing job routines, when possible, may also be an effective intervention to reduce job dissatisfaction. Improving workplace social support through training initiatives may improve morale in the workplace and benefit health measures. A participatory design is an appropriate method to investigate the most prominent sources of job stress contributing to occupational burnout and negative feelings about the workplace.<sup>15</sup>

Our results indicate that burnout was associated with greater odds of diabetes and anxiety/depression. Positive measures, such as job satisfaction and supervisor support were associated with lower odds of diabetes and anxiety/depression. Attention is needed to these psychosocial work characteristics in relation to health outcomes, particularly in a high stress occupation that may experience increased health risks due to psychologically demanding aspects of the job.

Organizational changes such as improving work health climate may have a ripple effect on several variables discussed in these studies. For example, Bronkhorst et al. (2015) reported that improved organizational climate (leadership, group behaviors and relationships, communication and participation) may reduce burnout, depression, and anxiety. Similar strategies may be effective for work health climate change. Revamping health and safety policies with a Total Worker Health perspective may be one approach to support health and well-being by creating a physical and social environment supportive of health.<sup>16</sup>

As our results indicate, the effects of increased overtime shift work may be protected if an individual is engaging in healthy nutrition and physical activity behaviors. Future interventions should consider distributing health-related resources supportive of health, perhaps through education regarding strategies to practice healthy behaviors despite increased overtime

shift work. For example, occupation-specific recommendations may include: tips to eat healthy at the workplace in absence of readily available healthy foods, tips for packing healthy meals for anticipated extended shifts, how to make healthy choices when ordering take-out, and strategies for fitting in activity during the workday by utilizing breaks and taking the stairs. These strategies may all have long-term benefits to prevent weight gain.

A final practical implication fostered from the findings presented in the second study includes consideration of family health climate. Inclusion of family-level behavior change in an intervention may be most effective in improving the health of employees that experience significant psychological distress. Consistent with previous studies,<sup>17-19</sup> the role of family social support may be important for sustained behavior change. The role of family support may be enhanced among correctional employees, and thus may reflect the need for assistance in purchasing and preparing nutritious foods, as well as incorporating leisure time physical activity when off-shift. Future interventions should consider targeting the individual, their family, and the workplace, taking a social ecological approach to health.

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## Appendix A

### CORRECTIONAL SUPERVISORS' COUNCIL HEALTHY WORKPLACE SURVEY

The Correctional Supervisors' Council has partnered with the Center for the Promotion of Health in the New England Workplace (CPH-NEW) to conduct the *Healthy Workplace Survey for Correctional Supervisors*. The survey is designed to gather supervisor views about health and wellness at DOC. It provides an overall assessment of correctional supervisors' attitudes related to health and wellness, as well as supervisor perceptions of their health and health behaviors. The survey gathers feedback on issues related to the physical work environment as well as interpersonal and social interactions that support or detract from a healthy worksite culture.

To ensure a representative overall picture of the supervisors as a group, surveys should be completed by as many supervisors in our union as possible. The results will be used to identify health and safety priorities that are important to the supervisory workforce, and the ultimate goal is to design health and wellness programs that address these specific issues.

Thank you for your participation!

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*The survey is anonymous. There are 64 items, which will take approximately 20 minutes to complete.*

***NOTE: Although the survey takes an average of 20 minutes, some people may need up to 30 minutes to complete it. When you begin taking the online survey on your computer or smartphone, please make sure YOU HAVE ALLOCATED ENOUGH TIME to take the survey from start to finish, in one sitting. If you exit the survey before completing it, your responses WILL BE LOST and when you return to it the survey, you will have to start over at question 1.***

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**\*1. Before you begin the survey, please understand the following:**

- Your participation in this survey is **voluntary**. In the course of completing this survey, you may decide not to answer specific questions. You may also choose to stop the survey at any time.
- There are **no right or wrong** answers—we want to hear about your experiences and opinions.
- All of the answers you provide will be maintained in a **secure and confidential** manner. We will not disclose your responses or anything about you. Your name will not be linked to any responses you provide in this survey.
- Your responses will be combined with those from other union members to provide an **overall average for feedback**. The results will be used to guide decisions about policies and programs related to supervisors' health and wellness.
- There are **no risks or rewards** anticipated for completing the survey. However, it is possible that programs developed in the future may benefit you and other union members.

If you would like to participate, please click "Agree" below to indicate you have read the information on this page.

Agree

Please answer all of the questions to the best of your ability.

Remember that all survey responses will be kept completely confidential.

Please answer the following questions about your HEALTH AND WELL-BEING.

		<i>Poor</i>	<i>Fair</i>	<i>Good</i>	<i>Very Good</i>	<i>Excellent</i>
GenHealth	<b>1. In general, would you say your health is...</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>2. Has a doctor or other healthcare provider told you that you CURRENTLY have any of the following conditions? If so, is this condition currently being treated? Check all that apply.</b>	<i>Diagnosed</i>	<i>Taking medication for</i>
HealthRiskFactor1	Elevated blood sugar or diabetes	<input type="checkbox"/>	<input type="checkbox"/>
HealthRiskFactor2	High blood pressure/hypertension	<input type="checkbox"/>	<input type="checkbox"/>
HealthRiskFactor3	Elevated cholesterol level	<input type="checkbox"/>	<input type="checkbox"/>
HealthRiskFactor4	Low back disease or spine problems	<input type="checkbox"/>	<input type="checkbox"/>
HealthRiskFactor5	Anxiety/depression	<input type="checkbox"/>	<input type="checkbox"/>

BMI1	<b>3. What is your weight? (in pounds):</b> _____
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BMI2	<b>4. What is your height? (feet, inches):</b> _____
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		<i>Never</i>	<i>Rarely</i>	<i>Half the time</i>	<i>Often</i>	<i>Always</i>
Nutrition	<b>5. Nutrition experts recommend filling half your plate with fruits and vegetables at every meal and snacking occasion. How often do you meet this goal?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		<i>Never</i>	<i>Rarely</i>	<i>Half the time</i>	<i>Often</i>	<i>Always</i>
PhysicalActivity	<b>6. Health experts say that you should do strength training exercise twice a week plus do other activities that increase your heart rate and breathing on several days each week. How often do you meet this goal?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		<i>I have never smoked</i>	<i>I quit smoking 2 or more years ago</i>	<i>I quit smoking less than 2 years ago</i>	<i>I currently smoke less than 10 cigarettes daily</i>	<i>I currently smoke 10 or more cigarettes daily</i>
Smoking	<b>7. Smoking status: Please mark appropriate response:</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		<i>Never</i>	<i>Rarely</i>	<i>A few times per month</i>	<i>A few times per week</i>	<i>Daily</i>
<i>CigarPipe</i>	<b>8. How often do you smoke a cigar or pipe?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		<i>Never</i>	<i>Rarely</i>	<i>A few times per month</i>	<i>A few times per week</i>	<i>Daily</i>
<i>CigarPipe</i>	<b>9. How often do you chew tobacco?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		<i>Never</i>	<i>Rarely</i>	<i>A few times per month</i>	<i>A few times per week</i>	<i>Daily</i>
<i>Gamble</i>	<b>10. How often do you gamble?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		<i>Not a problem</i>	<i>A little bit of a problem</i>	<i>A moderate problem</i>	<i>A substantial problem</i>	<i>An extreme problem</i>
<i>DrugUse</i>	<b>11. In your opinion, how much of a problem do you think recreational drug use is among DOC supervisors?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		<i>None</i>	<i>1 to 7 drinks</i>	<i>8 to 14 drinks</i>	<i>15 to 20 drinks</i>	<i>21 or more drinks</i>
<i>AlcoholUse</i>	<b>10. How many alcoholic drinks do you usually have per week? (One drink is: 12 oz. beer, 5 oz. wine, or 1.5 oz. liquor)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>11. How many caffeinated beverages do you drink per day? (Please indicate number of drinks on the line provided.)</b>
<i>Caffeine Use</i>	Coffee: _____ Tea: _____ Soda: _____ High Energy Drinks: _____ Other: _____ (Please indicate what beverage)

	<b>12. To what extent do you experience the following? During a TYPICAL WEEK, I experience...</b>	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>
<i>ANX</i>	Nervousness or shakiness inside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ANX</i>	Feeling tense or keyed up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ANX</i>	Feeling so restless I couldn't sit still	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>DEP</i>	Feeling lonely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>DEP</i>	Feeling blue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>DEP</i>	Feeling no interest in things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>HOS</i>	Feeling easily annoyed or irritated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HOS	Temper outbursts that I could not control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HOS	Getting into frequent arguments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>13. In your opinion, to what extent do you think your fellow supervisors experience the following?</b>		<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>
<b>During a TYPICAL WEEK, my fellow supervisors experience...</b>						
ANX	Nervousness or shakiness inside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANX	Feeling tense or keyed up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANX	Feeling so restless they couldn't sit still	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DEP	Feeling lonely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DEP	Feeling blue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DEP	Feeling no interest in things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HOS	Feeling easily annoyed or irritated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HOS	Temper outbursts that they could not control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HOS	Getting into frequent arguments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>14. In the past 30 days,</b>		<i>No stress</i>	<i>A little stress</i>	<i>Moderate stress</i>	<i>Substantial stress</i>	<i>Extreme stress</i>
Stress1	How would you rate the average amount of stress at work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stress2	How would you rate the average amount of stress at home?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>15. In the past 30 days,</b>		<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>
HealthInt erfereWor k	I had a hard time doing my work because of my health.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HealthInt erfereWor k	My health kept me from concentrating on my work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>16. During the past 3 months, to what extent have you had pain, aching, numbness or tingling in any of these body areas?</b>		<i>None</i>	<i>Mild</i>	<i>Moderate</i>	<i>Severe</i>	<i>Extreme</i>
MusculoskeletalPain1	Hand or Wrist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MusculoskeletalPain2	Shoulder, Neck, or Upper Back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MusculoskeletalPain3	Low back	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MusculoskeletalPain4	Knee	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MusculoskeletalPain	Foot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		No difficulty	Mild difficulty	Moderate difficulty	Severe difficulty	So much difficulty that I can't sleep
<i>SleepDifficulty</i>	<b>17. During the past week, to what extent have you had difficulty sleeping because of any physical or emotional problem?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>18. Please answer the following questions about sleep.</b>	6 hours or less	About 7 hours	About 8 hours	About 9 hours	About 10 hours or more
<i>SleepActual</i>	During the work week, about how many hours of sleep do you TYPICALLY GET per 24-hour period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>SleepNeed</i>	How many hours of sleep do you USUALLY NEED to have good functioning the next day?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Very poor	Fairly poor	Fairly good	Very good
<i>SleepQual</i>	<b>19. How would you describe the QUALITY of your sleep on a typical night?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>20. Please indicate how ready you are to make CHANGES or IMPROVEMENTS in your health in the following areas:</b>	I am not interested changing	I am interested in changing	I am currently doing this to my satisfaction	Does not apply
<i>ReadyForChange1</i>	Be physically active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ReadyForChange2</i>	Practice good eating habits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ReadyForChange3</i>	Avoid smoking or using tobacco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ReadyForChange4</i>	Lose weight or maintain healthy weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ReadyForChange5</i>	Reduce the amount of stress in your daily life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ReadyForChange6</i>	Get a full night's sleep every night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ReadyForChange7</i>	Avoid alcohol or drink in moderation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>ReadyForChange8</i>	Reduce my caffeine intake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>21. Please indicate how much you agree or disagree with the following statements.</b>	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
<i>Factor1: Control</i>	If I am fated to get a life-threatening disease, then I will get the disease; there is nothing I can do to change fate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Factor1: Control</i>	Life and death are all predestined; there is nothing I can do to change my destiny.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Factor2: Responsibility</i>	Whether I enjoy good health or not depends a lot on how well I take care of myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Factor2: Responsibility</i>	Many types of diseases can be prevented; it is up to each person to do something about it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>22. For each of the following statements, select 'Yes' if it describes you, 'No' if it does not describe you, and 'not sure' if you cannot decide.</b>		No	Not sure	Yes
I have a primary care doctor that I can go to for health care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have a mental health professional that I see when I need assistance with emotional or social difficulties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I get annual check-ups and recommended screenings (e.g., cancer, cholesterol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think the State of Connecticut's Health Enhancement Plan helps to improve the health of its employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>23. Where do you usually go to receive health care when you are sick?</b>	
<input type="checkbox"/> My primary care doctor	
<input type="checkbox"/> Urgent care clinic (e.g., Minute Clinic)	
<input type="checkbox"/> Emergency room	
<input type="checkbox"/> Nowhere, I usually do not seek help when I am sick or injured	
<input type="checkbox"/> Other: _____	

**Please answer the following questions about YOUR WORK.**

<b>24. The following questions ask about your experiences at your place of work.</b>		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
In this facility, management considers employee safety to be important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In this facility, management considers employee health and well-being to be important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My coworkers would support my use of sick days for illness or mental health.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My supervisor encourages healthy behaviors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My organization provides me with opportunities to be healthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>25. Please indicate how much you agree or disagree with the following statements. In MY FACILITY...</b>		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
DOC supervisors keep in touch with supervisors who work on other shifts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On my shift, DOC supervisors keep in regular contact with each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOC supervisors meet frequently to talk both formally and informally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOC supervisors interact frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>26. Please indicate how much you agree or disagree with the following statements about how you behave when you are AT WORK.</b>		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I control my emotions by not expressing them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

When I am feeling negative emotions, I make sure not to express them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I keep my emotions to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I am feeling positive emotions, I am careful not to express them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>27. Please indicate how much you agree or disagree with the following statements.</b>	<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>
DOC advocates masculine work styles and behavior mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOC encourages male employees to show masculinity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOC encourages female employees to adopt similar work styles and behavior pattern with male employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOC believes that employees' work styles and behavior pattern have nothing to do with their gender	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOC does not take an employee's gender into consideration when it evaluates the employee's behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOC does not take an employee's gender into consideration when it evaluates the employee's work performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**28. In a TYPICAL MONTH at DOC, how many times do you witness or experience each of the following events, and how affected are you by these incidents?**

<b>Event</b>	<b>Please estimate number of times</b>	<b>How affected are you?</b>			
		<i>Not at all affected</i>	<i>Somewhat affected</i>	<i>Considerably affected</i>	<i>Extremely affected</i>
Inmate attempted suicide	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inmate assault on inmate	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**29. In a TYPICAL YEAR at DOC, how many times do you witness or experience each of the following events, and how affected are you by these incidents?**

<b>Event</b>	<b>Please estimate number of times</b>	<b>How affected are you?</b>			
		<i>Not at all affected</i>	<i>Somewhat affected</i>	<i>Considerably affected</i>	<i>Extremely affected</i>
Inmate successful suicide	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inmate death (not suicide)	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inmate assault on staff	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inmate assault on you	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coworker suicide	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coworker death (not suicide)	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Retired coworker death	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>30. Please indicate how much you agree or disagree with the following statements.</b>		<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>
	The work I do is very important to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	My job activities are personally meaningful to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The work I do is meaningful to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>31. Please indicate how much you agree or disagree with the following statements about your work.</b>		<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>
Burnout message ment	More and more often, I talk about my work in a negative way.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Burnout exhaustion	At work, I often feel emotionally drained.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Civility rm1	I would be taken seriously if I complained about disrespectful treatment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Civility rm2	Respectful treatment is the norm in my unit/workgroup.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>32. For each statement, select the answer that best describes your job.</b>		<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>
	The people I work with take a personal interest in me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	The people I work with can be relied on when I need help.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	My supervisor is concerned about the welfare of those under him/her.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	My supervisor is helpful in getting the job done.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	My job security is good.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	My job is emotionally demanding.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<b>33. Please indicate how much you agree or disagree with the following statements.</b>		<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>
JobSatis action2	All in all, I am satisfied with my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
JobSatis action2	Overall I would recommend working with this organization to my family and friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IntentToT urnover2	I often think about retirement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IntentToT urnover2	I will probably look for a new job during the next year.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>Communt eTime</i>	<b>34. Home much time do you spend traveling to and from work each day (round trip)?</b>
	<input type="checkbox"/> <i>Less than 15 minutes</i> <input type="checkbox"/> <i>15 – 30 minutes</i> <input type="checkbox"/> <i>30 – 60 minutes</i> <input type="checkbox"/> <i>60 - 90 minutes</i> <input type="checkbox"/> <i>More than 90 minutes</i>



	<b>35. Assume that your health AT ITS BEST has a value of 10 points. (0 = you are in the worst health possible; 10 = you are in the best health possible)</b>	0 Worst Health Possible	1	2	3	4	5	6	7	8	9	10 Best Health Possible
Health1	How many points would you give your current level of health TODAY?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>36. Assume that your health AT ITS BEST has a value of 10 points. (0 = you will be in the worst health possible; 10 = you will be in the best health possible)</b>	0 Worst Health Possible	1	2	3	4	5	6	7	8	9	10 Best Health Possible
Health2	How many points would you give your level of health, SIX MONTHS AFTER you retire?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>37. Assume that your happiness AT ITS BEST has a value of 10 points. (0 = you feel the least happy possible; 10 = you feel the most happy possible)</b>	0 Least Happy Possible	1	2	3	4	5	6	7	8	9	10 Most Happy Possible
Happy1	How many points would you give your level of happiness TODAY?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>38. Assume that your happiness AT ITS BEST has a value of 10 points. (0 = you will feel the least happy possible; 10 = you will feel the most happy possible)</b>	0 Least Happy Possible	1	2	3	4	5	6	7	8	9	10 Most Happy Possible
Happy2	How many points would you give your level of happiness, SIX MONTHS AFTER you retire?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	<b>39. For each of the following statements, select 'Yes' if it describes you, 'No' if it does not describe you, and 'not sure' if you cannot decide.</b>	No	Not sure	Yes
	If I worked less overtime, I probably would be healthier.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	One of the risks of this job is that I probably will die at a younger age than people in most other jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	I am aware that corrections officers have a relatively short life span (i.e., they live an average of 59 years)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	At this point in my life, I have to prioritize my earnings/job over my health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	A person should not put off having a healthy and fun life until retirement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	I plan to retire from DOC after working twenty years; I will not stay any longer than that.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Please answer the following questions about YOU AND YOUR LIFE OUTSIDE WORK.**

	<b>40. Please answer the following questions.</b>	Never	Occasionally	Sometimes	Often	Always
WFC1	How often do things going on AT WORK make you feel tense and irritable at HOME?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FWC1	How often do things going on AT HOME make you feel tense and	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	irritable on the JOB?					
WFC2	How often do the demands of your JOB interfere with your family life?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FWC2	How often do the demands of your FAMILY interfere with your work on the job?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

41. Please indicate how much you agree or disagree with the following statements.		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
WFC	The behaviors I perform that make me effective at work do not help me to be a better parent and spouse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WFC	Behavior that is effective and necessary for me at work would be counterproductive at home.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FWC	The behaviors that work for me as a parent and spouse at home do not seem to be effective at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FWC	Behavior that is effective and necessary for me at home would be counterproductive at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Dependents1	<b>42. To what extent do any adults depend on you in any way to help them due to disability, chronic illness, or aging?</b>
	<input type="checkbox"/> No adults depend on me due to disability, chronic illness, or aging <input type="checkbox"/> Another adult has primary responsibility <input type="checkbox"/> I share responsibility equally with another adult <input type="checkbox"/> I have primary responsibility

Dependents2	<b>43. How much responsibility do you personally have for any children under 18 in your household?</b>
	<input type="checkbox"/> I have no children under 18 at home <input type="checkbox"/> Another adult has primary responsibility <input type="checkbox"/> I share responsibility with another adult <input type="checkbox"/> I have primary responsibility

44. Thinking of the people I have the closest relationships with (e.g., family, friends)...		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	We talk about improving health and preventing disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Most people are very health conscious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	People notice how well you take care of your health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	We encourage each other to make changes to improve our health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

45. To what extent does each of the following words describe you?		Almost never true	Infrequently true	Sometimes true	Often true	Almost always true
	Assertive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Gentle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Aggressive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compassionate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forceful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Warm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dominant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Affectionate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**DEMOGRAPHICS**

Age	<b>46. What is your age (in years)?</b> _____
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Sex	<b>47. What is your sex?</b>
	<input type="checkbox"/> <i>Female</i> <input type="checkbox"/> <i>Male</i>

Race	<b>48. What is your racial background? (Mark all that apply)</b>
	<input type="checkbox"/> <i>Asian, Asian American, or Pacific Islander</i> <input type="checkbox"/> <i>Black, African American, or African</i> <input type="checkbox"/> <i>Hispanic, Latino or Hispanic American</i> <input type="checkbox"/> <i>Middle Eastern, Arab, or Arab American</i> <input type="checkbox"/> <i>Native American or Alaskan Native</i> <input type="checkbox"/> <i>White, European, or European American</i> <input type="checkbox"/> <i>Other: _____</i>

Education	<b>49. Please indicate the highest grade or year of school that you have completed:</b>
	<input type="checkbox"/> <i>Less than high school</i> <input type="checkbox"/> <i>High school graduate or GED</i> <input type="checkbox"/> <i>Some college</i> <input type="checkbox"/> <i>College degree (2 or 4 year college)</i> <input type="checkbox"/> <i>Graduate degree</i>

Marital Status	<b>50. What is your current marital status?</b>
	<input type="checkbox"/> <i>Married or live with partner</i> <input type="checkbox"/> <i>Widowed</i> <input type="checkbox"/> <i>Divorced or separated</i> <input type="checkbox"/> <i>Single, never married</i>

Please remember that your responses are completely confidential and anonymous.

<i>JobTenure</i>	<b>51. How many years have you worked at DOC? (answer with a number only):</b> _____
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<i>RetireAge</i>	<b>52. At what age (in years) do you expect to retire from DOC? (if you don't know enter "00")</b> _____
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	<b>53. What is your job classification?</b>
	<input type="checkbox"/> <i>No supervisory responsibility</i> <input type="checkbox"/> <i>Counselor Supervisor</i> <input type="checkbox"/> <i>Lieutenant</i> <input type="checkbox"/> <i>Captain</i>

	<b>54. What DOC facility/location do you work in?</b>																								
	<table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> <i>Enfield CI</i></td> <td><input type="checkbox"/> <i>Maloney CTSD</i></td> <td><input type="checkbox"/> <i>MacDougall CI</i></td> </tr> <tr> <td><input type="checkbox"/> <i>Robinson CI</i></td> <td><input type="checkbox"/> <i>Garner CI</i></td> <td><input type="checkbox"/> <i>Walker RSMU</i></td> </tr> <tr> <td><input type="checkbox"/> <i>Willard-Cybulski CI</i></td> <td><input type="checkbox"/> <i>New Haven CC</i></td> <td><input type="checkbox"/> <i>Webster CI</i></td> </tr> <tr> <td><input type="checkbox"/> <i>Northern CI</i></td> <td><input type="checkbox"/> <i>Brooklyn CI</i></td> <td><input type="checkbox"/> <i>UConn John Dempsey</i></td> </tr> <tr> <td><input type="checkbox"/> <i>Osborn CI</i></td> <td><input type="checkbox"/> <i>York CI</i></td> <td><input type="checkbox"/> <i>District Office</i></td> </tr> <tr> <td><input type="checkbox"/> <i>Bridgeport CC</i></td> <td><input type="checkbox"/> <i>Corrigan CC</i></td> <td><input type="checkbox"/> <i>Central Office</i></td> </tr> <tr> <td><input type="checkbox"/> <i>Cheshire CI</i></td> <td><input type="checkbox"/> <i>Radgowski CC</i></td> <td><input type="checkbox"/> <i>CTU</i></td> </tr> <tr> <td><input type="checkbox"/> <i>Manson YI</i></td> <td><input type="checkbox"/> <i>Hartford CC</i></td> <td><input type="checkbox"/> <i>Other: _____</i></td> </tr> </table>	<input type="checkbox"/> <i>Enfield CI</i>	<input type="checkbox"/> <i>Maloney CTSD</i>	<input type="checkbox"/> <i>MacDougall CI</i>	<input type="checkbox"/> <i>Robinson CI</i>	<input type="checkbox"/> <i>Garner CI</i>	<input type="checkbox"/> <i>Walker RSMU</i>	<input type="checkbox"/> <i>Willard-Cybulski CI</i>	<input type="checkbox"/> <i>New Haven CC</i>	<input type="checkbox"/> <i>Webster CI</i>	<input type="checkbox"/> <i>Northern CI</i>	<input type="checkbox"/> <i>Brooklyn CI</i>	<input type="checkbox"/> <i>UConn John Dempsey</i>	<input type="checkbox"/> <i>Osborn CI</i>	<input type="checkbox"/> <i>York CI</i>	<input type="checkbox"/> <i>District Office</i>	<input type="checkbox"/> <i>Bridgeport CC</i>	<input type="checkbox"/> <i>Corrigan CC</i>	<input type="checkbox"/> <i>Central Office</i>	<input type="checkbox"/> <i>Cheshire CI</i>	<input type="checkbox"/> <i>Radgowski CC</i>	<input type="checkbox"/> <i>CTU</i>	<input type="checkbox"/> <i>Manson YI</i>	<input type="checkbox"/> <i>Hartford CC</i>	<input type="checkbox"/> <i>Other: _____</i>
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<input type="checkbox"/> <i>Manson YI</i>	<input type="checkbox"/> <i>Hartford CC</i>	<input type="checkbox"/> <i>Other: _____</i>																							

	<b>55. What shift are you assigned to?</b>
<i>Shift</i>	<input type="checkbox"/> <i>First Shift</i> <input type="checkbox"/> <i>Second Shift</i> <input type="checkbox"/> <i>Third Shift</i>

	<b>56. How many hours of overtime do you typically work per week?</b>
<i>Overtime1</i>	<input type="checkbox"/> <i>None</i> <input type="checkbox"/> <i>1 to 8 hrs</i> <input type="checkbox"/> <i>9 to 16 hrs</i> <input type="checkbox"/> <i>17 to 23 hrs</i> <input type="checkbox"/> <i>24 or more hrs</i>

	<b>57. Which range best describes your total FAMILY income (combination of salaries, wages, investments, and rents)?</b>
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Family Income	<input type="checkbox"/> \$50,000-74,999 <input type="checkbox"/> \$75,000-99,999 <input type="checkbox"/> \$100,000-124,999 <input type="checkbox"/> \$125,000-149,999 <input type="checkbox"/> More than \$150,000
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	<b>58. How confident are you that you can meet your financial needs after you retire?</b>
Fin Confidence	<input type="checkbox"/> Not at all <input type="checkbox"/> A little bit <input type="checkbox"/> Moderately <input type="checkbox"/> Quite a bit <input type="checkbox"/> Very

	<b>59. What do you expect your household situation to be after you retire?</b>
Fin Situation	<input type="checkbox"/> Won't even have enough to meet basic expenses <input type="checkbox"/> Just meet basic expenses <input type="checkbox"/> Meet basic expenses with a little left over for extras <input type="checkbox"/> Able to live comfortably

	<b>60. What form of social media do you use most frequently?</b>
Soc Media	<input type="checkbox"/> I do not use social media <input type="checkbox"/> Facebook <input type="checkbox"/> Twitter <input type="checkbox"/> Instagram <input type="checkbox"/> Other: _____

	<b>61. What advice would you give to a new recruit about how stay a healthy and happy person in this career?</b>

	<b>62. Please provide any other comments you wish about your health and the workplace.</b>

**This is the end of this questionnaire. Thank you very much for your time and assistance with this study.**