THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON

FINAL PROGRESS REPORT

Development of a Police Officer Stress Algorithm to Prevent Adverse Events: A Mixed-Methods Approach

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National Institute for Occupational Safety and Health

Katelyn Jetelina, MPH PhD, Principal Investigator
Email: Katelyn.k.jetelina@uth.tmc.edu

The University of Texas Health Science Center at Houston (UTHealth)
PO Box 20036
Houston, Texas 77225-0036

Table of Contents

LIST OF TERMS AND ABBREVIATIONS

LEO= Law Enforcement Officer

DPD= Dallas Police Department

COVID-19: SARS-CoV-2 Pandemic

Development of a Police Officer Stress Algorithm to Prevent Adverse Events: A mixed-methods approach

Grant No. K01OH011532
PI: Katelyn Jetelina, PhD
Email: Katelyn.k.jetelina@uth.tmc.edu
Phone: 949-422-3487

Abstract

During this award, Dr. Katelyn Jetelina was an Assistant Professor in the Department of Epidemiology at the University of Texas Health Science Center, School of Public Health. She had three years of funding (with one additional no cost extension year) through the Mentored Research Scientist Development Award (K01).

Dr. Jetelina conducts research in examining the acute and chronic stresses of law enforcement by evaluating the effects of reactive outcomes, like coping mechanisms and excessive use-of-force, on officer health and safety. This area of study is significant due to the recent, highly visible concern that has largely framed reactive outcomes as police mismanagement rather than occupational health. Dr. Jetelina's long-term career goals are to become an independent investigator and mixed methods expert, and to develop a system-level intervention to reduce rates of police officer and citizen injury.

Dr. Jetelina accomplished five short-term goals throughout the award period that linked her quantitative skills to new methodological techniques. These were:

1) Accumulated a strong knowledge base in qualitative methodology;
2) Gained formal training in mixed-methods design;
3) Learned the appropriate techniques and processes for stakeholder engagement;
4) Extended her current knowledge of officer health to community police based training; and
5) Oriented herself with the science of team science.

These goals were achieved through a combination of mentoring by a multi-disciplinary team of established researchers, attendance at national workshops and conferences, focused coursework, and the awarded study.

The research plan sought to contribute to the NORA Sector: *Public Safety*, Cross-sector: *Traumatic Injury Prevention*, and Strategic Goal 5: *Evaluate information sources collected by stakeholders that may be enhanced to conduct effective occupational health and safety surveillance among law enforcement workers*. This study identified predisposing multi-dimensional factors that converged to create high-stress calls for Dallas Police Department (DPD) officers using a mixed-methods design. Specifically, her completed aims were:

1) To identify themes associated with consecutive high-stress calls and current stress decompression techniques through structured observations, focus groups, and distributing a stress survey among DPD officers;
2) To build a multi-level database that will classify calls for service on a stress continuum scale by triangulating new and pre-existing data from multiple DPD sources; and
3) To test the predictive capability of the integrated database, by evaluating statistical relationships between multi-level factors and adverse events (e.g. injury).

Identifying predictors that contributed the greatest to high-stress calls was instrumental to inform a R01 application where Dr. Jetelina proposed to improve the mental illness of officers, which would consider compound stress of a police officer's shift and evaluate whether it reduces the likelihood of officer (and citizen) injury.

Section 1

Key Findings

Through the triangulation and integration of quantitative data (surveys, secondary data sources like dispatch records) and qualitative data (focus groups, interviews, and structured observations), there were several overarching findings concluded from this project:

1. **Cyclical stress**. LEOs become susceptible to adverse events (e.g. injury, excessive use of force) after repeated exposure to high-stress calls for service. Ongoing exposures to stress continue to occur throughout the shift. **Five multi-level factors influenced officer stress**: 1) officer characteristics (e.g. military experience; gender); 2) civilian behavior (e.g. resistance, displaying a weapon); 3) supervisor factors (micromanagement); 4) environmental factors (e.g. time of year); and, 5) situational factors (e.g. audience present; complexity of calls). Four themes that characterized **cumulative stress**: 1) cyclical risk; 2) accelerators; 3) decelerators; and 4) experience of an adverse event. Findings were published in *BMC* in 2020.
2. **Mental health prevalence** of law enforcement officers (LEOs) is higher than the general public with a very rate of seeking mental health services. Four **primary barriers in accessing mental health services** were as follows: (1) inability to identify when they are experiencing a mental illness, (2) concerns about confidentiality, (3) belief that psychologists cannot relate to their occupation, and (4) stigma that officers who seek mental health services are not fit for duty. The study found that although few officers were seeking treatment, they were interested in seeking help, particularly those with suicidal ideation or self-harm. Additional interventions appear to be needed to systematically identify and refer officers to healthcare services while mitigating their concerns, such as fear of confidentiality breach. Findings were published in *JAMA* in 2020.
3. **Social stressors, organizational stressors, and physical strains are related to suicidal ideation (SI)**. Specifically, the likelihood of SI increased incrementally as higher number of stressors were reported, suggesting a significant dose-response relationship. This study found organizational and social stress were the strongest predictors of SI for law enforcement officers, as opposed to physical strain. This study serves to further inform the multi-dimensionality of police stress pathways to advise department psychological prevention efforts. Findings were published in *Occupational Health Science* in 2021.
4. **Geography (urban, suburban, and rural) impact stressors for law enforcement officers**. Three stressor similarities emerged across geographic region: 1) lack of manpower; 2) fluid management; and 3) environmental stressors (time-of-day). Rural officers reported unique stress due to 1) distance to calls, 2) lack of partners, 3) lengthy backup response, and 4) limited mental health options. Urban officers uniquely reported 1) large volume of calls and 2) negative perceptions from the public. Findings were published in *Injury Prevention* in 2020.
5. **Personal and residential vulnerability to COVID-19 impacted first responders differentially**. For every unit increase in neighborhood Severe COVID-19 Health Risk Index at a first responder's residential location there was an increase in the odds of a possible substance use disorder. The increased occupational stress of this population, and an established pattern of maladaptive coping, elucidates the need for preventative and clinical approaches to strengthen the resilience of this population. Findings were published in the *American Journal of Drug and Alcohol Abuse* in 2022.
6. **Physical activity of LEO's impact occupational stress**. Officers with moderate occupational stress were significantly less likely to exercise daily and/or weekly compared to low or high occupational stress officers. Officers that were moderately stressed were also less likely to walk for exercise. Officers that reported high levels of occupational stress were more likely to report a "great deal" of hard physical activity at work. A manuscript of these finding is currently in preparation.
7. A brief, real time intervention, like a smart watch notification, is **feasible and acceptable** in reducing LEO stress during a shift. Findings were published in *BMC Public Health* in 2021.

Translation of Findings

Law enforcement officers experience a multitude of acute and chronic occupational stressors that lead to poor mental health, poor job performance, and poor physical health. Through this award, we identified a variety of barriers to addressing stress over the course of an officer's shift. And, perhaps more importantly, we developed several intervention points *with* police officers and leadership in order to break the cyclical nature of stress and harm.

Throughout the course of the award, results were "translated" and disseminated using three main routes. ***First***, we developed a key stakeholder team (i.e. chiefs, internal affairs, patrol officers, etc.) to provide iterative, bidirectional feedback periodically throughout the funding period. Infographics shared with this stakeholder team and study participants can be found in *Appendix B*. At the end of the project, a formal report of the findings was disseminated to the Dallas Police Department. ***Second***, we anticipated results to have a high-impact in occupational health and safety, criminology, and public health. Throughout this process, we published the mixed-methods results, model elements, barriers, and facilitators that can be used to guide interventions for police officer stress and related injury. ***Third***, we presented the findings at several conferences including the *American Public Health Association* and *SAVIR* where police officer injury and violence prevention was widely anticipated.

Research and Training Impact

The most impactful aspect of this award was solidifying the bi-directional relationship with police leadership and officers themselves and our research time. This vulnerable population is notoriously difficult for researchers to access from the outside, as police officers are largely skeptical and secretive. It takes time to gain their trust; something we were able to build given this award. Not only do a large majority of officers now recognize our team, but they actively email with new ideas and are a participant in the innovation of future projects at the Dallas Police Department. This strong relationship will, no doubt, have an impact on the feasibility, acceptability, and sustainability of future research projects.

In addition, this award informed three additional grants. **Grant funding was secured for two of them:**

1. CDC/NIOSH Education and Research Center Pilot: 5T42OH008421
   Primary Mentor (Mentee: R Molsberry)
   Leveraging personal technology to intervene on continuous occupational stress among law enforcement officers
   Direct Costs: $10,000
2. U.S. Department of Justice, COPS Law Enforcement Mental health and Wellness Act (LEMHWA)
   Implementing and Evaluating a Statewide University Police Peer-Support Network at The University of Texas System
   Role: PI
   Total Budget: $124,991

The third grant application was scored and has since been re-submitted:

3. R01: NIMH
   The effectiveness and implementation of personal, health information technology service options to improve mental illness among law enforcement
   Total Budget: $2.286 million
   Role: PI
   Status: Score 46; Resubmitting Feb 2022

Because the current K01 award was a training grant, I would like to highlight the **immense impact this award had on my career**. This award launched me professionally. I increased my knowledge in injury prevention strategies among police officers, served as Principal Investigator on my own study on the inter-relations of violence and stress exposure, which set me up for applying for tenure at my research institution. This award allowed me to pursue my long-term goals of becoming an independent investigator and a mixed-methods expert, developing a systematic intervention to reduce rates of police officer injury, and submitted a R01 using data from this grant to develop new and emerging technology. From this experience, built a strong occupational violence prevention research program and eventually started building a center for injury and violence prevention. In 2022, I was awarded the Safe States Research Award for this work in violence and injury prevention.

Section 2

Specific Aims

The occupational health and safety needs of police officers are unique due to their constant exposure to danger. In the past five years, law enforcement has ranked as one of the top 10 deadliest occupations in the United States. Over the course of their employment, one third of police officers experience serious acute and chronic health problems including intentional and unintentional injury, metabolic diseases, and psychological disorders. Officers experience an above average level of *chronic* stress due to the unpredictable nature of the police occupation, which may explain the shorter life expectancies and higher rates of disease compared to the general population. Police officers are also exposed to bursts of *acute* stress when responding to calls for service, particularly before, during, and after "high-stress" calls (e.g. active shooters, domestic violence). Consecutive and continuous exposure to high-stress calls may influence police officers' immediate risk for morbidity and mortality and inhibit their decision-making ability.

Police 911 operators and dispatchers are responsible for classifying each call for service according to the perceived severity of the incident given the citizen's description. To illustrate, a priority 5 (low priority) call could be a noise complaint, while a priority 1 (highest priority) call could be an active shooter. These call priority levels were designed to reflect risk to the citizen rather than risk to the officer. For example, Dallas police officers are typically dispatched to 8-10 calls per shift and can be assigned to any call for service, regardless of previous exposure to high-stress calls. Responding to consecutive high-stress calls may cause the police officer to react more quickly under compound stress. However, to our knowledge, no study has comprehensively evaluated what situational (e.g. citizen displaying a firearm), environmental (e.g. time of day), and individual (e.g. years of police officer tenure) factors contribute to a "high-stress" call from the police officer perspective. *Further, no studies to date have attempted to create a call classification scheme that will incorporate level of officer risk in an effort to protect both public and officer safety given immediate prior call history.*

In this study, we took the first step in the development of an officer safety predictive algorithm by identifying predisposing factors that converge to create high-stress situations through a mixed-methods design. Specifically, we conducted observations and focus groups with key stakeholders, including Dallas Police Department (DPD) police officers who have first-hand experience of compound call response anxiety. This information was then synthesized and combined with pre-existing departmental data from multiple sources (e.g. incident reports and workers compensation) to build a multi-level, multi-factorial database. Gathering this information was the first step to develop a predictive algorithm that will classify calls for service on an intensity continuum scale to help predict officer safety. Specifically, our aims were:

> **Aim 1**: *To identify themes associated with consecutive high-stress calls for service and current stress decompression techniques* by combining three strategies: 1) observing police officer workflows; 2) conducting focus groups with key stakeholders including police officers, 911 operators, dispatch, and command staff; and, 3) distributing a brief survey to all DPD police officers.
>
> **Aim 2**: *To build a multi-level, longitudinal database that will classify and index calls for service on a stress continuum scale* by triangulating new and pre-existing data from multiple DPD sources including incident reports, internal affairs, and workers' compensation.
>
> **Aim 3**: *To test the predictive capability of the integrated database,* by evaluating statistical relationships between multi-level (e.g. individual, situational, environmental) factors and adverse events (e.g. officer injury, citizen injury, citizen complaints on officer, and firearm discharge).

Our inability to track and manage the intensity and stress experienced by police officers on a day-to-day basis has inhibited police-citizen interactions and could potentially explain police officers high rates of injury. Identifying predictors that contribute the greatest to high-stress calls is instrumental for **improving overall occupational health and safety of police officers**. This study will inform a R01 application where we will develop an intervention that **takes into account police stress** and evaluate whether it reduces the likelihood

of officer injury due to lower stress over the course of a police officer's shift, as officers will not be permitted to respond to multiple and continuous 'high stress' calls.

Background and Significance

Police officers are more likely to experience acute and chronic illness and premature mortality when compared with the general population. Mortality rates continue to be significantly higher among police officers compared to the general public.[26] In 2007, more than half of workplace fatalities involved law enforcement officers; ranking the law enforcement profession as the 10th deadliest occupation in the United States.[27] Law enforcement officers also continue to suffer disproportionality from cardiovascular, gastrointestinal and metabolic diseases,[28-30] chronic insomnia,[31, 32] and psychological disorders[33, 34] compared to those employed in other occupations. Twenty percent of police officers are injured at one point in their career,[35] with the most common types of injury being sprains (47%), contusions (15%), and lacerations (14%).[36] Twenty seven percent of these injuries required a police officer to miss days of work and 22% of the total injuries required the officer to receive rehabilitative treatment.[36]

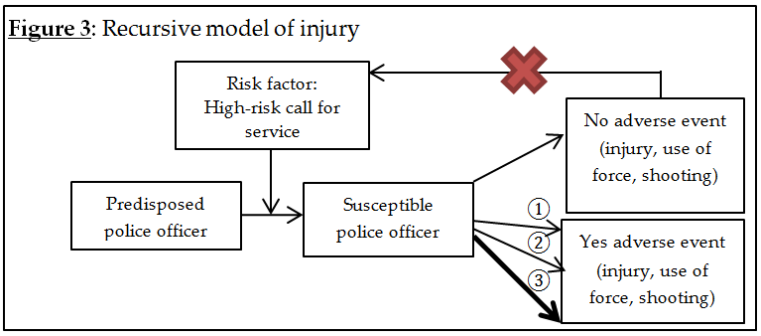
A police officers' work environment is unique due the constant unpredictability and dangerous nature of the job. Evidence suggests that exposure to this constant unpredictability increases many forms of stress, including physical, psycho-social, and anticipatory stress.[37-39] Repeated exposure to these stressors over time acts as a catalyst to other physical and mental health problems like anxiety, depression, somatization, PTSD, burnout, back pain, and even aggressive behavior among police officers.[40] In addition, the long work hours and nature of shift work increases the likelihood of adverse police officer health, safety, performance[41] and sleep disorders.[31, 42] Given the high-risk nature of the law enforcement profession, further effort should be focused on how occupational injuries might be systemically improved to reduce stress and decrease morbidity and mortality among police officers.

The highest levels of stress occur before and during officer-perceived "high stress" incidents.[37] Police officers' calls for service can vastly range from traffic accidents and noise complaints ("low stress" incidents that are unlikely to end in injury or death) to armed robberies or active shooters ("high stress" incidents that may result in injury or death). According to the Federal Bureau of Investigation, most shootings of police officers occurred in "high stress" situations, such as family violence calls, entrapment calls, and suspicious persons or circumstances.[39, 43] Further, more than 224,000 police officers were assaulted when responding to family violence calls between 1980 and 2003.[44, 45] Violanti and colleagues discovered the most frequent police officer stressor are family disputes and crisis situations (prevalence=83% in the past month) and the most stressful event was exposure to a battered child (prevalence=27% in past month).[39] Officers do not fully recover from high-risk call stress before responding to the next call or leaving their shift,[37] which can lead to negative coping behaviors like substance use disorders and depression.[46, 47] High-risk calls for service also have short and long term physiological reactions such as nausea, anger, a sense of numbness, and an increased sense of danger.[48] *We believe the excess stress and anxiety from consecutive high-stress, high-intensity calls for service can further lead to decreased safety and increased injury among police officers and the general public.*

There has been a breadth of recent research seeking to improve the health and safety of law enforcement officers. MacDonald et al.[49] found the frequency of officer and public injury was significantly reduced when officers used Tasers, compared to physical force, in use-of-force incidents. Similarly, emerging data suggest that body cameras reduce use of force and complaints against police officers,[50] which may indirectly reduce officer's levels of anxiety and acute stress. Body armor performance and coverage[51] has shown to reduce the likelihood of death during shooting incidents and police officer counseling and training has been demonstrated to improve officer health.[52] Further, research has suggested that tailoring shift work[53] and team-based health promotion[54] has significantly reduced stress and injury rates among police officers.[55] **Past law enforcement occupational health interventions have focused on protective equipment, situational training, and**

treatment to improve police officer health; *however there have been very few structural, system-level changes to improve health or few studies that address this critical factor.*

Conceptual Framework. The framework guiding this study (**Figure 3**) is informed by an injury prevention recursive model of etiology.[56, 57] We hypothesize that police officers become susceptible to adverse events (e.g. injury, excessive use of force) after repeated exposure to high-risk, high-stress calls for service. If no adverse event occurs, ongoing exposures to stress continue to occur throughout the shift. ***This pilot study allowed us to assess the applicability of this model by identifying risk factors (e.g., environmental and situational).*** In combination with predisposing officer characteristics that enhance risk, these extrinsic risk factors work together to create high-risk situations in which adverse events are more likely to occur. Our long term goal (noted by the 'x') is to interrupt this repetitive, cumulative process by restricting the number of consecutive high-risk, high-intensity calls an officer is permitted to respond to. We theorize that by reducing exposure to multiple high-risk calls in succession, the likelihood of adverse events to the officer and public will decline.



Knowledge Gap. Although there have been studies targeting officer safety through improved equipment provision or enhanced training, *there has been no attempt to re-configure the process by which officers are dispatched to calls for service*. Information from this study would be used to assess whether consecutive high-risk, high-intensity calls to service increase the likelihood of officer injury, use-of-force, or complaints made against the officer. Our long-term goal is to reconfigure the dispatch procedures and develop new dispatch technologies so that officers cannot respond to high-stress, high intensity calls in succession. This study represents the first step in this line of research. During this study, we will interview key stakeholders to further understand characteristics of high-stress calls, which will help us inform and develop a new predictive algorithm that will classify and index calls for service in terms of *both* public and officer safety.

Methods

The Dallas Police Department (DPD) is the 13th largest U.S. police department in the United States and serves 1.3 million citizens. DPD officers cover more than 340 square miles with six primary patrol divisions based on the geographic location in the city. In 2016, DPD employed 3,551 full-time sworn officers (**Table 2**). From one of our articles currently under review, we estimated 10% of DPD officers sustained injuries, including bites, fractures, and lacerations, and 2% of DPD officers were hospitalized calls that could have posed a high level of stress or anxiety, like citizen aggression.[8]

Located at Dallas Police Headquarters, the Caruth Police Institute (CPI), the research core of the DPD, was created to empirically inform and guide DPD policy and practice. **Dallas Police Department Sergeant and Associate Director of Research at the Caruth Police Institute, Dr. Steven Bishopp, has made police officer stress a priority for the Dallas Police Department**. In 2010, Dr. Bishopp created the Police Work Experience Survey and distributed to DPD officers, as well as two other large Texas city police departments, to assess the negative affective responses to stress. Particularly, CPI was interested in environmental strain (e.g. the death of a police colleague), organizational stress (e.g., negative comments from the public, court proceedings, and internal investigations), and suicide ideation, the most dangerous maladaptive coping technique.[58-60] *There was no research at DPD evaluating compound and consecutive stress events over the course of a police officer's shift prior to this project.* This award provided another level of valuable information for the Dallas Police Department to develop policies, prevention intervention mechanisms for police officer stress, and structural changes. **The Caruth Police Institute has assisted in our study by identifying key stakeholders and resources to facilitate study aims.**

3.2 Methods

3.2a Aim 1: ***To identify themes associated with consecutive high-stress calls for service and current stress decompress techniques*** by combining three strategies: **1)** observing police officer workflows; **2)** conducting focus groups with key stakeholders including police officers, 911 operators, dispatch, and command staff; and, **3)** distributing a brief survey to all DPD police officers.

Data collection: Observations

Structured observations ("ride-along") – Quiet, unobstructed observation of daily work with opportunistic discussion with police officers occurred at the each of the six divisions (e.g., one during the day shift and one during the night shift). Adapted from anthropological participant observation, this method lent itself to multiple levels of observation and analysis.[61-64] Dr. Jetelina conducted 48 hours of structured observation (6 divisions x 2 shifts x 4 hours) by attending "ride-alongs" with police officers. Ride-alongs are an arrangement for a public citizen to spend a shift in the passenger seat of a police officer vehicle and will be arranged through Dr. Steve Bishopp and the precinct command staff. The ride-alongs allowed Dr. Jetelina to observe current decompression techniques among police officers, high-stress calls for service, and the compound stress over the course of a shift. Further, her presence allowed for trust and familiarity with the police officers before engaging in focus groups, as recommended by the Caruth Police Institute. At the end of each ride-along, Dr. Jetelina prepared detailed, post-observational summaries, noting key thematic issues observed. These were combined, coded, and analyzed during the analysis phase of the study.

Structured 911 dispatcher observations- Dr. Jetelina also conducted 10 hours of structured observation of daily work with opportunistic discussion within the DPD 911 dispatcher call center. She spent time observing how calls for service are answered, categorized, dispatched, and updated in real time.

Data collection: Focus Groups

Police officer focus groups assessed experience and frequency of high-stress calls for service and its broader effects on police officer injury and occupational health, as well as the mechanistic effects of police officer tenure, attitudes toward consecutive high-stress calls, confidence in how calls for service are correctly categorized by dispatch, and decompression techniques used during and after a shift. During focus groups, we will also requested feedback on the conceptual model (Figure 3) and follow-up on questions that arose during structured observations. The focus groups were stratified by police officer gender and patrol division. Interviewing across these groups elucidated the experience of stressful calls for service and enable us to generate new knowledge about how stressful situations may differ across a number of multi-level factors (e.g., type of call, geospatial factors, etc.). Police officers involved in the ride-alongs were invited to participate. Further, other officers that may have insight on high-stress calls for service will be invited to participate through snowball sampling. Sampling ended once saturation was reached. Focus groups were held two hours before shifts and took place in a conference room. Officers that completed the focus group were offered a gift card for their time and effort.

All focus groups were audio recorded to avoid data loss and will be transcribed within seven days of the interview. Officer names or badge numbers were not be included in the transcript to ensure anonymity. Instead, each officer was assigned a unique participant identification number. Systematic procedures of qualitative analysis will include thematic comparative analysis with iterative, sequential analysis between focus group sessions to capitalize on data accumulation. All excerpts will be coded without pre-determined themes in mind to avoid introduction of bias in the coding process.[65-67] All coding, organization, and data reduction will be conducted using the NVivo software program.[68, 69]

Data collection: DPD survey

Mental and physical health surveys were administered to all Dallas police patrol officers during their briefings. The survey included 50+ questions. The primary purpose of this survey was to assess occupational stress, mental illness, physical health, coping behaviors, and healthcare utilization. The survey also included brief demographic information, employment history (e.g. current position, tenure), and PTSD screener (PC-

PTSD).[70] We expected a shorter survey and small incentive ($5) increased the small response rates from past experiences with DPD officers.[59, 60] Data was compiled and we conducted simple descriptive analyses, including tabulations and bivariate analyses, to expand our understanding of high-stress calls for service from the police officer perspective. See **Appendix A** for all survey constructs.

3.2b Aim 2: ***To build a multi-level, longitudinal database that will classify calls for service on a stress continuum scale****, by triangulating new and pre-existing data from multiple DPD sources.* Qualitative data from Aim 1 was synthesized and used to expand our understanding of high-stress calls for service and compound stress over the course of a police officer's shift. The qualitative data contextualized pre-existing quantitative data by mapping specific variables across other departmental databases (**Figure 4**). For example, focus groups and observational findings directed us to extract pre-existing, quantitative data to include individual characteristics of the police officer and suspect, environmental factors (such as weather conditions, time of day, other officers on scene), situational factors (such as weapon on scene, call-to-service priority number, response time, number of offenders), and reported police officer and citizen injuries. Currently, all DPD information is stored within different departments in "sub-datasets"; there is no master dataset. We obtained all "sub-datasets" by working closely with the Dr. Bishopp and a variety of departments within DPD, including Human Resources and Internal Affairs. Once all data were obtained, datasets were linked using the police officer badge number and dates (while still protecting and destroying individual responses obtained qualitatively and quantitatively). The final product was a robust, multi-level, longitudinal dataset that links all data sources for analysis.

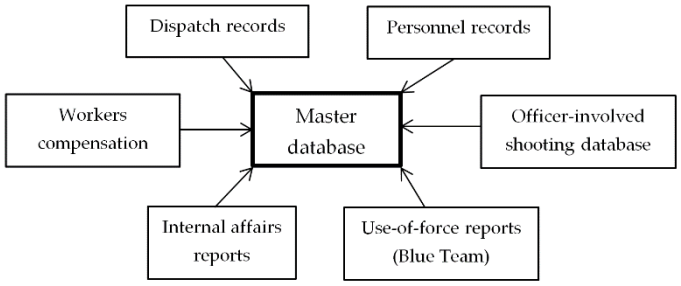


Figure 4: Database mapping for final master DPD database

Results

Through the triangulation and integration of quantitative data (surveys, secondary data sources like dispatch records) and qualitative data (focus groups, interviews, and structured observations), there are several overarching findings concluded from this project.

1. **Cyclical stress**. LEOs become susceptible to adverse events (e.g. injury, excessive use of force) after repeated exposure to high-stress calls for service. Ongoing exposures to stress continue to occur throughout the shift. **Five multi-level factors influenced officer stress**: 1) officer characteristics (e.g. military experience; gender); 2) civilian behavior (e.g. resistance, displaying a weapon); 3) supervisor factors (micromanagement); 4) environmental factors (e.g. time of year); and, 5) situational factors (e.g. audience present; complexity of calls). Four themes that characterized **cumulative stress**: 1) cyclical risk; 2) accelerators; 3) decelerators; and 4) experience of an adverse event. Findings were published in *BMC* in 2020.
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strain. This study serves to further inform the multi-dimensionality of police stress pathways to advise department psychological prevention efforts. Findings were published in *Occupational Health Science* in 2021.

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7. A brief, real time intervention, like a smart watch notification, is **feasible and acceptable** in reducing LEO stress during a shift. Findings were published in *BMC Public Health* in 2021.

Conclusion and Next Steps

Results from this project will lead to a larger multi-site, cohort study, which will determine the amount of time necessary to mitigate the stress and risk associated with calls and correlated to injury, officer-involved shootings, and use of force. Using this information, we seek to create a feasible and acceptable interventions that would reduce adverse events (such as officer-involved shootings) due to lower stress over the course of a shift. This project addresses *NIOSH National Public Safety Agenda* aimed at addressing occupational safety and health issues for the current 1.1 million law enforcement officials in the United States.

References

1. Waltermaurer E., Akers T.A. Epidemiological Criminology: Theory to Practice. New York, NY: Routledge; 2013.

2. Reingle Gonzalez J.M., Cannell B., Jetelina K.K. Barriers in detecting elder abuse among Emergency Medical Technicians. *BMC Emergency Medicine* 2016;16(1):36-43.

3. Jennings W.G., Fridell L.A., Lynch M., Jetelina K.K., Reingle Gonzalez J. A quasi-experimental evaluation of the effects of police body-worn cameras (BWCs) on response-to-resistance in a large metropolitan police department. *Deviant Behavior* in press.

4. Balasubramanian B.A., Cohen D.J., Jetelina K.K., Dickinson L.M., Davis M., Gunn R., Gowen K., deGruy F.V., Miller B.F., Green L.A. Effects of integrating primary care and behavioral health care on patient outcomes: A mixed methods study. *Journal of General Internal Medicine* in press.

5. Jetelina K.K., Reingle Gonzalez J.M., Brown C.V.R., Foreman M.L., Field C. Acute alcohol use, history of homelessness, and intent of injury among a sample of adult emergency department patients. *Violence and Victims* in press.

6. Jetelina K.K., Reingle Gonzalez J.M., Cuccaro P.M., Peskin M.F., Elliott M.N., Coker T.R., Mrug S., Davies S.L., Schuster M.A. The Association between Familial Homelessness, Aggression, and Victimization among a Cohort of Children *Journal of Adolescent Health* 2016;59(688-695).

7. Jetelina K.K., Reingle Gonzalez J.M., Vaeth P.A.C., Mills B.A., Caetano R. An Investigation of the Relationship Between Alcohol Use and Major Depressive Disorder Across Hispanic National Groups. *Alcoholism: Clinical and Experimental Research* 2016;40(3):536-542.

8. Jetelina K.K., Reingle Gonzalez J.M., Bishopp S.A. Gradual escalation of use-of-force reduces police officer injury. *Injury Prevention* under review.

9. Jetelina K.K., Jennings W.G., Bishopp S.A., Piquero A.R., Reingle Gonzalez J.M. The dynamic relationship between police officer-citizen race/ethnicity dyads and sub-lethal use-of-force. *American Journal of Public Health* under review.

10. Reingle Gonzalez J.M., Jetelina K.K., Cannell M.B. A systematic review and meta-analysis of financial abuse among older adults: Implications for financial abuse prevention programs. *The Gerontologist* under review.

11. Reingle Gonzalez J.M., Cannell M.B., Jetelina K.K., Froehlich-Grobe K. Disproportionate Prevalence Rate of Prisoners With Disabilities. *Journal of Disability Policy Studies* 2016;27(2):106-115.

12. Reingle Gonzalez J.M., Bishopp S.A., Jetelina K.K. Rethinking police training policies: large class sizes increase risk of police sexual misconduct. *J Public Health* 2016;38(3):614-620.

13. Reingle Gonzalez J.M., Jetelina K.K., Jennings W.G. Structural school safety measures, SRO's, and school-related deliqueny behavior and perceptions of safety: A state-of-the-art review. *Policing: An International Journal of Police Strategies & Management* 2016;39(3):438-454.

14. Cannell M.B., Jetelina K.K., Zavadsky M., Reingle Gonzalez J.M. Towards the development of a screening tool to enhance the detection of elder abuse and neglect by emergency medical technicians (EMTs): A qualitative study. *BMC Emergency Medicine* 2016;16(19).

15. Salas-Wright C.P., Reingle Gonzalez J.M., Vaughn M.G., Schwartz S.J., Jetelina K.K. Age-related changes in the relationship between alcohol use and violence from early adolescence to young adulthood. *Addictive Behaviors* 2016;4:13-17.

16. Reingle Gonzalez J.M., Salas-Wright C.P., Connell N.M., Jetelina K.K., Clipper S.J., Businelle M.S. The long-term effects of school dropout and GED attainment on substance use disorders. *Drug Alcohol Depend* 2016;158:60-6.

17. Cannell M.B., Reingle Gonzalez J.M., Livingston D., Animashaun R., Jetelina K.K. Pilot Testing a Brief Elder Abuse and Neglect Screening Tool for Emergency Medical Services: Results from the DETECT Project. *Annals of Emergency Medicine* under review.

18. Creswell J.W., Plano Clark V.L. Designing and conducting mixed methods research. Thousand Oaks, CA: SAGE Publications; 2011.

19. Bryman A. Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research* 2007;1(8):8-22.

20. Fetters M.D., Curry L.A., Creswell J.W. Achieving integration in mixed methods designs-principles and practices. *Health Serv Res* 2013;48(6 Pt 2):2134-56.

21. Zhang W., Creswell J. The use of "mixing" procedure of mixed methods in health services research. *Med Care* 2013;51(8):e51-7.

22. Creswell J.W., Klassen A.C., Plano Clark V.L., Clegg Smith K. Best practices for mixed methods research in the health sciences. Bethesda, MD: Office of Behavioral and Social Sciences Research, National Institutes of Health; 2011.

23. Tomei F., Rosati M.V., Baccolo T.P., Cherubini E., Ciarrocca M., Caciari T., Tomao E. Ambulatory (24 hour) blood pressure monitoring in police officers. *J Occup Health* 2004;46(3):235-43.

24. Garbarino S., Magnavita N. Work Stress and Metabolic Syndrome in Police Officers. A Prospective Study. *PLoS One* 2015;10(12):e0144318.

25. Shiozaki M., Miyai N., Morioka I., Utsumi M., Koike H., Arita M., Miyashita K. [Assessment of the risk of ischemic heart disease and its relevant factors among Japanese police officers]. *Sangyo Eiseigaku Zasshi* 2013;55(4):115-24.

26. Violanti J.M., Vena J.E., Petralia S. Mortality of a police cohort: 1950–1990. *American Journal of Industrial Medicine* 1998;33(4):366-373.

27. Kirdahy M. America's most dangerous jobs. 2008.

28. Hartley T.A., Fekedulegn D., Burchfiel C.M., Mnatsakanova A., Andrew M.E., Violanti J.M. Health disparities among police officers. In: Violanti JM, editor. Dying for the job: police work exposure and health. Springfield, IL: Thomas Publisher, Ltd.; 2014. p. 21-35.

29. Hartley T.A., Burchfiel C.M., Fekedulegn D., Andrew M.E., Knox S.S., Violanti J.M. Associations between police officer stress and the metabolic syndrome. *Int J Emerg Ment Health* 2011;13(4):243-56.

30. Joseph P.N., Violanti J.M., Donahue R., Andrew M.E., Trevisan M., Burchfiel C.M., Dorn J. Police work and subclinical atherosclerosis. *J Occup Environ Med* 2009;51(6):700-7.

31. Neylan T.C., Metzler T.J., Best S.R., Weiss D.S., Fagan J.A., Liberman A., Rogers C., Vedantham K., Brunet A., Lipsey T.L., Marmar C.R. Critical incident exposure and sleep quality in police officers. *Psychosom Med* 2002;64(2):345-52.

32. Bond J., Hartley T.A., Sarkisian K., Andrew M.E., Charles L.E., Violanti J.M., Burchfiel C.M. Association of traumatic police event exposure with sleep quality and quantity in the BCOPS Study cohort. *Int J Emerg Ment Health* 2013;15(4):255-65.

33. Maguen S., Metzler T.J., McCaslin S.E., Inslicht S.S., Henn-Haase C., Neylan T.C., Marmar C.R. Routine work environment stress and PTSD symptoms in police officers. *J Nerv Ment Dis* 2009;197(10):754-60.

34. Liberman A.M., Best S.R., Metzler T.J., Fagan J.A., Weiss D.S., Marmar C.R. Routine occupational stress and psychological distress in police. *Policing: An International Journal of Police Strategies & Management* 2002;25(2):421-441.

35. Thejus T., Jayakrishnan T., Meharoof R., Jeeja M.C. Pattern of occupational injury and its effect on the health of male police officers. *Annals of Tropical Medicine and Public Health* 2013;6(6):622-626.

36. International Association of Chiefs of Police. Reducing Officer Injuries: A summary of data findings and recommendations from a multi-agency injury tracking study. Washington, D.C.: U.S. Department of Justice; 2009.

37. Anderson G.S., Litzenberger R., Plecas D. Physical evidence of police officer stress. *Policing: An international journal of police strategies and management* 2002;2(399-420).

38. Zhao J.S., He N., Lovrich N. Predicting five dimensions of police officer stress: Looking more deeply into organizational settings for sources of police stress. *Police Quarterly* 2002;5(1):43-62.

39. Violanti J.M., Fekedulegn D., Hartley T.A., Charles L.E., Andrew M.E., Ma C.C., Burchfiel C.M. Highly Rated and most Frequent Stressors among Police Officers: Gender Differences. *American Journal of Criminal Justice* 2016;41(4):645-662.

40. Gershon R.R.M., Lin S., Li X. Work Stress in Aging Police Officers. *Journal of Occupational and Environmental Medicine* 2002;44(2):160-167.

41. Vila B. Impact of long work hours on police officers and the communities they serve. *American Journal of Industrial Medicine* 2006;49:972-980.

42. Rajaratnam S.W., Barger L.K., Lockley S.W., Shea S.A., Wang W., Landrigan C.P., O'Brien C.S., Qadri S., Sullivan J.P., Cade B.E., Epstein L.J., White D.P., Czeisler C.A. Sleep disorders, health, and safety in police officers. *JAMA* 2011;306(23):2567-2578.

43. Federal Bureau of Investigation. FBI Releases 2014 Preliminary Statistics for Law Enforcement Officers killed in the line of duty. Washington, D.C.: FBI National Press Office; 2015.

44. Johnson R.R. Surviving firearm assaults at domestic violence calls. . *Law Enforcement Executive Forum* 2007;7(7):155-167.

45. Johnson R.R. Assessing the true dangerousness of domestic violence calls. *Law Enforcement Executive Forum* 2008;8(5):19-29.

46. Band S.R., Manuele C.A. Stress and police officer performance: An examination of effective coping behavior. *Journal of Police and Criminal Psychology* 1987;3(3):30-42.

47. Adjeroh L.C., Andrew M.E., Charles L.E., Gu J.K., Fekedulegn D., Burchfiel C.M., Violanti J.M. Posttraumatic stress disorder and alcohol drinking behavior in police officers. *Journal of Law Enforcement Leadership and Ethics* 2015;2(1):5-23.

48. Solomon R.M., Horn J.H. Post-shooting traumatic reactions: A pilot study. In: Reese HT, Goldstein HA, editors. Psychological Services for Law Enforcement Officers. Washington, D.C.: U.S. Government Printing Office; 1986.

49. MacDonald J.M., Kaminski R.J., Smith M.R. The Effect of Less-Lethal Weapons on Injuries in Police Use-of-Force Events. *American Journal of Public Health* 2009;99(12):2268-2274.

50. Ariel B., Farrar W.A., Sutherland A. The effect of police body-worn cameras on use of force and citizens' complaints against the police: A randomized controlled trial. *Journal of Quantitative Criminology* 2015;31(3):509-535.

51. Grant H., Kubu B., Taylor B., Roberts J., Collins M., Woods D.J. Body Armor Use, Care, and Performance in Real World Conditions: Findings from a National Survey. Bethesda, MD: National Institute of Justice; 2012.

52. Gupton H.M., Axelrod E., Cornell L., Curran S.F., Hood C.J., Kelly J., Moss J. Support and Sustain: Psychological Intervention for Law Enforcement Personnel. *The Police Chief* 2011;78:92-97.

53. Ma C.C., Andrew M.E., Fekedulegn D., Gu J.K., Hartley T.A., Charles L.E., Violanti J.M., Burchfiel C.M. Shift work and occupational stress in police officers. *Saf Health Work* 2015;6(1):25-9.

54. Kuehl K.S., Elliot D.L., Mackinnon D.P., O'Rourke H.P., DeFrancesco C., Miocevic M., Valente M., Sleigh A., Garg B., McGinnis W., Kuehl H. The SHIELD (Safety & Health Improvement: Enhancing Law Enforcement Departments) Study: Mixed Methods Longitudinal Findings. *Journal of Occupational and Environmental Medicine* 2016;58(5):492-498.

55. Violanti J.M., Fekedulegn D., Andrew M.E., Charles L.E., Hartley T.A., Burchfiel C.M. Shift work and injuries among police officers. In: Work, Stress, and Health 2009: Global Concerns and Approaches. San Juan, Puerto Rico; 2009.

56. Emery C.A. Injury prevention in paediatric sport-related injuries: A scientific approach. *Br J Sports Med* 2010;44:64-69.

57. Meeuwisse W.H., Tyreman H., Hagel B.E., Emery C.E. A dynamic model of etiology in sport injury: The recursive nature of risk and causation. *Br J Sports Med* 2007;17:215-219.

58. Bishopp S.A. An examination of general strain theory and the effects of violent crime exposure on police suicide ideation, alcohol consumption, and divorce. *Dissertation* 2013.

59. Bishopp S.A., Worrall J., Piquero N.L. General strain and police misconduct: the role of organizational influence. *Policing: An International Journal of Police Strategies & Management* 2016;39(4):635-651.

60. Bishopp S.A., Boots D.P. General strain theory, exposure to violence, and suicide ideation among police officers: A gendered approach. *Journal of Criminal Justice* 2014;42:538-548.

61. Stacey C.L., Henderson S., MacArthur K.R., Dohan D. Demanding patient or demanding encounter?: A case study of a cancer clinic. *Social Science & Medicine* 2009;69(5):729-737.

62. Dohan D. Managing Indigent Care: A Case Study of a Safety-Net Emergency Department. *Health Services Research* 2002;37:361-376.

63. Sinding C. Using Institutional Ethnography to Understand the Production of Health Care Disparities. *Qualitative Health Research* 2010.

64. Wind G. Negotiated interactive observation: Doing fieldwork in hospital settings. *Anthropology & Medicine* 2008;15(2):79-89.

65. Bradley E.H., Curry L.A., Devers K.J. Qualitative data analysis for health services research: developing taxonomy, themes, and theory. *Health Serv Res* 2007;42(4):1758-72.

66. Basit T. Manual or electronic? The role of coding in qualitative data analysis. *Educational Research* 2003;45(2):143-154.

67. Thomas D.R. A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation* 2006;27(2):237-246.

68. NVivo [computer program]. Qualitative data analysis software, Version 10. QSR International Pty Ltd.; 2012.

69. Richards L. Using NVivo in Qualitative Research. Los Angeles: SAGE; 1999.

70. Prins A., Ouimette P., Kimerling R., Cameron R.P., Hugelshofer D.S., Shaw-Hegwer J., Thrailkill A., Gusman F.D., Sheikh J.I. The Primary Care PTSD Screen (PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry* 2003;9:9-14.

Publications

1. Beauchamp AM*, Weerakoon SM*, Ponder W, **Jetelina KK**+. Possible Substance Use Disorders Among First Responders During the COVID-19 Era: A Quasi-Experimental Study of Personal and Residential Vulnerability. (in press) *The American Journal of Drug and Alcohol Abuse*.
2. **Jetelina KK**, Molsberry RJ*, Malthaner LQ*, Beauchamp AM*, Cannell MB, Hall T, Fowler E, Anderson L. (2022). Acceptability of a real-time notification of stress and access to self-help therapies among law enforcement officers. *BMC Public Health*, 22.
3. Beauchamp AM*, **Jetelina KK+** (2021). Effects of social, occupational, and physical stressors on suicidal ideation among law enforcement. *Occupational Health and Science*.
4. Molsberry RJ*, **Jetelina KK+** (in press). The impact of geographical context on law enforcement stress and adverse events. Injury Prevention.
   ***Winner of the SAVIR Brooks Webb Student Paper Competition
5. **Jetelina KK**, Molsberry RJ*, Reingle Gonzalez JM, Beauchamp AM*, Hall T. (2020). Prevalence of mental illnesses and care utilization among law enforcement officers. *JAMA Network Open*, 3(10): e2019658.
   ***Featured on Reuters, Medscape
6. **Jetelina KK,** Beauchamp AM*, Reingle Gonzalez JM, Molsberry RJ*, Bishopp SA, Lee SC. (2020). Cumulative, high-stress calls impacting adverse events among law enforcement and the public. *BMC Public Health*, 20(1): 1137.
7. Perez, R.A., **Jetelina, K.K.,** Herrera, I., & Reingle Gonzalez, J.M. (in press). A Qualitative Study of the Stressors Experienced by Police Communications Workers. *Safety and Health at Work*.
8. **Jetelina KK**, Bishopp SA, Weigad JG*, Reingle Gonzalez (2020). Race/Ethnicity Composition of Police Officers in Officer-involved Shootings. *Policing: An International Journal*, 43(2): 263-270.
9. Paddock E*, **Jetelina KK**, Bishopp SA, Gabriel KP, Reingle Gonzalez JM. (2019) Factors associated with civilian and police officer injury during 10 years of officer-involved shooting incidents. *Injury Prevention*. DOI: 10.1136/injuryprev-2019-043467
10. Cannell, M.B., Reingle Gonzalez, J.M., Bishopp, S.A., **Jetelina, K.K.,** & Gabriel, K.P. (invited commentary, 2019). The role of military experience on officer-involved shootings: Towards a constructive research agenda. *Journal of Public Health*.

Inclusion of Children

No children were enrolled in this study because this was an examination of police officer compound stress over the course of a work shift.

Materials Available for other Investigators

Databases are available upon request.

APPENDICES

Appendix A: Officer Wellness Survey

Stress	***Physical Health***	***Mental Health/Substance Use***	***Sleep/Nightmares***	***Physical Activity***	***Healthcare Utilization***	***Demographics***
Job satisfaction (2)	Chronic disease domain (18) (Year of dx; currently suffering; taking rx)	PTSD PC-PTSD-5 and Ever PTSD dx	PSQI Duration of sleep	NHIS Vigorous, moderate and strength training activity (frequency)	SIPP # healthcare provider visits in past year	Gender (Male, Female, Other)
Social Stress (43), Social Readjustment Rating Scale		Anxiety: GAD-2	PSQI Sleep disturbance	NHANES Types of exercise (past 2 weeks)	NHIS Frequency of visits	Age
Physical stress (12); Physical Symptoms inventory		Depression: PhQ2	PSQI Sleep latency	NHIS Physical work at job	City insurance incentive	Race/ethnicity
Occupational stress (9); Police Organizational Stress Scale		Suicide Ideation: from PhQ9	PSQI Daytime dysfunction due to sleepiness	NHANES Physical work limitations	NHIS Type of physician visits	Height
		TAPS Tobacco (frequency 12 months; strong desire; Anyone expressed concern)	PSQI Sleep efficiency		NHIS Type of setting for primary care	Weight
		DSM-V Binge drinking (frequency 12 months; strong desire; Anyone expressed concern)	PSQI Overall sleep quality			# of years of service
		TAPS Any drug use (frequency 12 months; strong desire; Anyone expressed concern)	PSQI Need medication to sleep			Marital status
		TAPS Any prescription drug use (frequency 12 months; strong desire; Anyone expressed concern)	PC-PTSD-5 PTSD related nightmares (duration; sought help)			Education
		Interest in getting help				Shift/Partner
		Phone number for MH services				Number of extra job hours
		Stimulant use (ever use; substance type)				Current rank
		NHIS Mental healthcare utilization				Military history

Appendix B: Infographics

Stress among officers

Evidenced-based, peer reviewed research published at *BMC Public Health* in 2020

Top 5 overall stressors...

HOME		WORK
DEATH OF A CLOSE FAMILY MEMBER	1	NEGATIVE COMMENTS FROM PUBLIC
MARRIAGE		FATIGUE
MAJOR CHANGE IN HEALTH		SUPERVISORS
DIVORCE		RISK OF INJURY
FINANCES	5	OVERTIME

Call-for-service causes of stress

audience
call type
complexity
anticipation

"My focus is taken away from my job [when] having an audience. It would take away from my natural inclinations, how I would actually normally handle the call because I'm thinking about who's recording me, what I'm doing."

"Rape, killings, stabbings, child abuse, women slapped,..."

"And then your partner says he has a bad feeling about this. I had the hair on the back of my neck stand up."

weather
time of day/year

"When it gets warm and summer hits, you're lucky if you can go to the bathroom"

"Any time the Cowboys are playing. Especially if they lose"

"Like just being able to see what's going on better reduces your stress already, because you can see. In the dark you can't."

civilian resistance
weapon
mental health

"The highest stress is gonna be resistance, where you're going to have to take physical action against a person or protect yourself or your partner from something physical happening."

"Any gun type of call. Anything with the potential for weapons"

Officer stress during shift is a rollercoaster...

"...a rollercoaster from hell"

...it can go up.

through *burnout* from jumping from call to call and *pressure to move forward* to the next call, even if not mentally ready.

"A supervisor will say, 'Are you done with your call, wink, wink, hint, hint? Cause there's a call coming out"

"If it was something really impactful to you and then you go right to another call, that's where something goes wrong".

...it can go down.

by taking a break, changing mental state, and addressing mental health over time.

"Like I tell my rookies, if you make a mistake, leave it back there. Focus on your call now because if you focus on that mistake, you're gonna mess up on your future calls".

...& speed is dependent on tenure.

Once an officer experiences an adverse event, their tolerance for high-stress becomes a protective factor for future calls

"Younger officers have an even harder time bringing it back down. A lot of the younger officers or even ones that already have [PTSD] stay stuck in the loop"

"I really don't think I get stressed out as much anymore, because you've hit that level. You have that new threshold of stress"

We could not conduct this research without the support of local police departments and the brave officers who volunteered and trusted our team to use their sensitive data in a meaningful way. The results are from...

3 Police departments

28 Patrol officers in 9 focus groups

434 Patrol officers in surveys

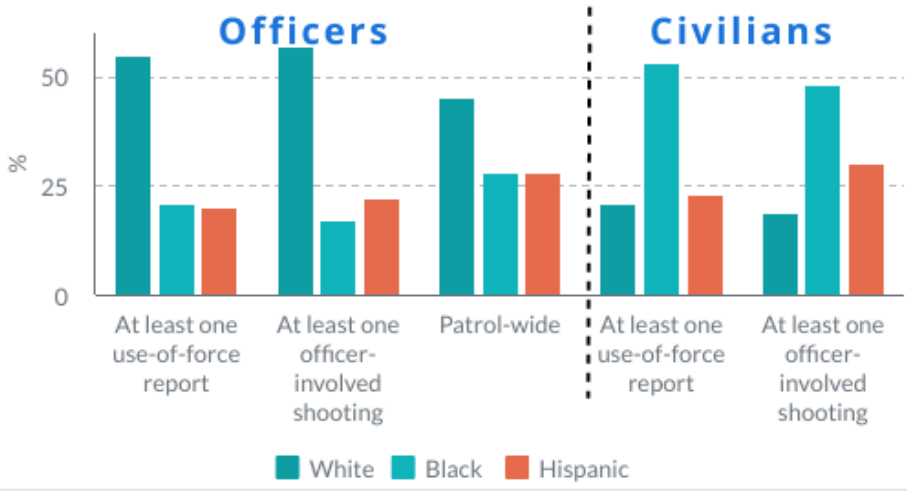
Institutional review board approval was received from the University of Texas Health Science Center (HSC-SPH-18-0782). This study was funded by a National Institute of Occupational Health and Safety grant (K01-OH011532). For more information, please email the PI, Dr. Katelyn Jetelina, at katelyn.k.jetelina@uth.tmc.edu.

UTHealth | The University of Texas Health Science Center at Houston | School of Public Health Dallas

Race and Use-of-force at the Dallas Police Department

Evidence-based, peer-reviewed research from 2005 onward

By: Katelyn K Jetelina, MPH PhD; Assistant Professor at UTHealth
Funded: Research funded by CDC

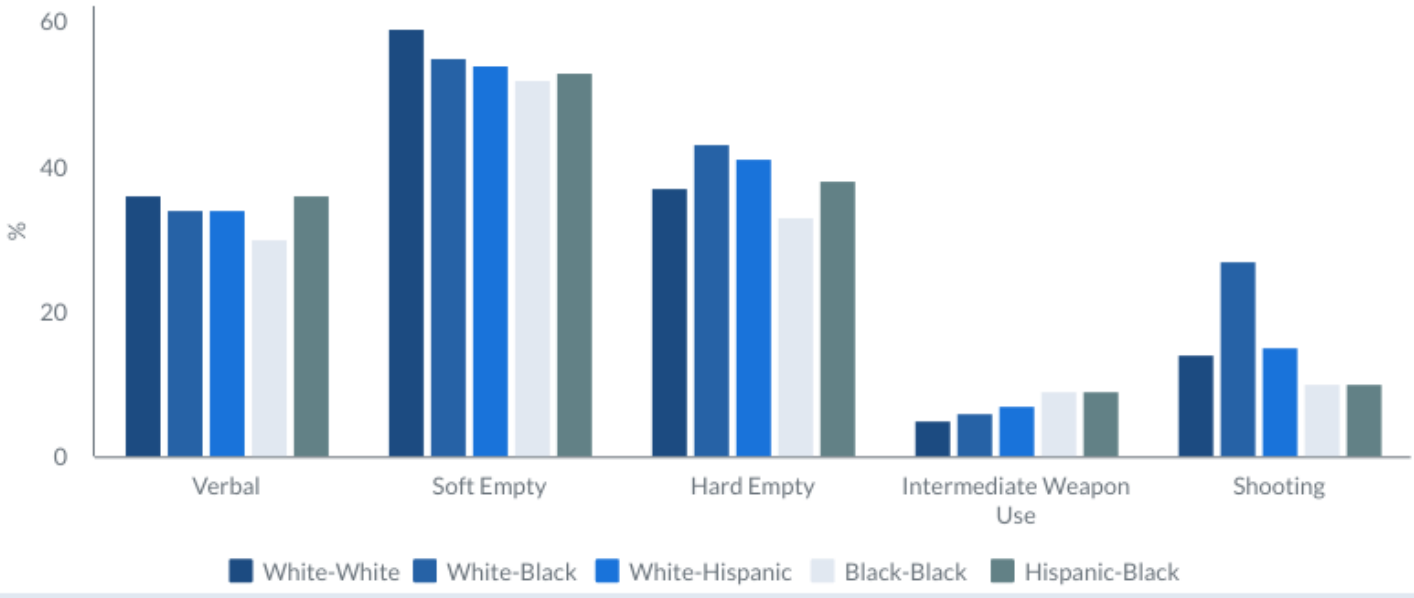


Use-of-force Interactions: Officer race- Civilian race

White-Black	White-Hispanic	White-White	Black-Black	Hispanic-Black
32%	14%	14%	10%	10%

Translation: 32% of use-of-force reports were between a White officer and a Black civilian

Type of Use-of-Force: Officer race-Suspect race



Translation: There are NO systematic racial differences across ALL types of use of force at DPD after taking into account factors like:

Type of Civilian Weapon	Time of Day	Neighborhood Income	Officer Experience	Civilian Mental Health and Drug Use
				

March 2020

Promoting productive workplaces through safety and health research

NIOSH

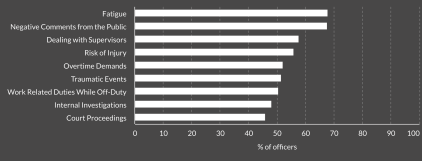
The University of Texas Health Science Center Research Study

PATROL OFFICER WELLNESS

Purpose: *To examine the mental and physical health needs of police officers in patrol at a large, urban department*

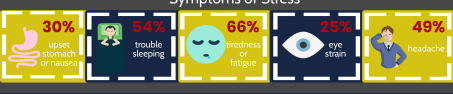
STRESSORS

Occupational Stressors



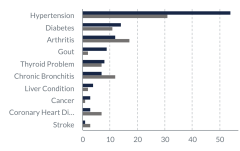
Personal Stressors

Symptoms of Stress



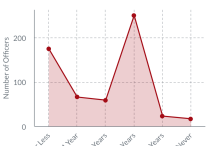
PHYSICAL HEALTH

Chronic Conditions



41% of officers rated their sleep quality as fairly bad or very bad

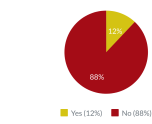
Time Since Last Healthcare Visit



37% of officers do not have a consistent healthcare provider

MENTAL HEALTH

Seen a Mental Healthcare Professional in the Past Year



Suicidal ideation is **3X** higher among officers compared to the general population

PTSD
32% experienced symptoms of post-traumatic stress disorder

19% have clinical PTSD (compared to 8% of the general population)

Anxiety
57% experienced symptoms of anxiety

17% have clinical anxiety (compared to 3% of the general population)

Depression
54% experienced symptoms of depression

16% have clinical depression (compared to 5% of the general population

3%

Only 3% received treatment

6%

Only 6% received treatment

Problem Alcohol Use

47%

Problem Tobacco Use

11%

If you have specific mental health referral questions or you are looking for a referral for a specific mental health need, please do not hesitate to contact Psychological Services Unit at: 214-617-1319 (office) or 214-316-2972 (text)
All services are confidential and will not impact your employment

RECOMMENDATIONS

To improve health among officers we recommend implementing a comprehensive wellness program, which should include:

Health

- Mindfulness Techniques to Reduce Anticipatory Stress
- Peer Support Programs
- Improve Connection to Health Care Services

Technologic Advances

- Systematic CAD Advancements to Break Cyclical Stress
- Brief, Personal, Real-Time Interventions after Critical Incidents

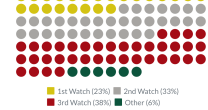
Education

- Effective Leadership Training
- Normalization of Health Problems

PARTICIPANTS

We would like to thank the officers for their service and participation in this study. Without your input, effective solutions to mental and physical health problems cannot be accomplished.

Officer Shifts



1st Watch (23%) 2nd Watch (33%)
3rd Watch (38%) Other (6%)

Officer Rank

Patrol Officer (89%) Sergeant (10%)
Lieutenant or Above (1%)

UTHealth School of Public Health
The University of Texas Health Science Center at Houston

This study was funded by a National Institute of Occupational Health and Safety grant (#01-OH011332). Institutional review board approval was received from the University of Texas Health Science Center (HSC-SPH-16-0782).
For more information, contact Dr. Katelyn Jetelina at Katelyn.R.Jetelina@uth.tmc.edu

Using smart watches to reduce officer stress

Evidence-based research conducted by the Jetelina Research Lab at UTHealth

Buzzing

Officers were notified, by a buzz on their watch in real-time, if their heart rate reached a pre-determined threshold above their resting heart rate

Types of calls the watch buzzed

- Sitting on murder suspects
- Chasing on foot
- On the way to work before a shift
- Reading call comments about weapons
- Code 3 cover

Effectiveness in stress awareness

"Just feeling that buzz and knowing that I need to maybe take some deep breaths, knowing that it's high and trying to get it back down." (DPD, male)

"The watch catches your pulse going up maybe before you do and you can start to deescalate when you're notified by the watch." (RPD, male)

"Having something that tells you, hey, this is happening, and then gives you some way to mitigate it from there" (RPD, male)

Did NOT distract from duties

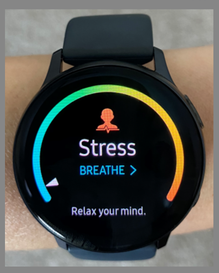
"It's not a bad distraction"

"It's different 'cause I never had a smartwatch, before, so it's different to see your notifications of messages coming in. But no more different than my phone go off in my pocket. I'll look at it later."

"No, it helped, if anything"

Visualizing

A heart rate monitor, heart rate history, and a stress continuum (based on heart rate) within the smart watches was offered as visualization tools to address real-time stress



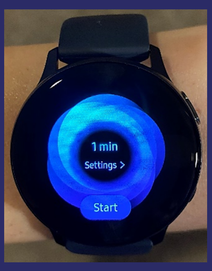
"I saw the stress level spike up, so I was just like, 'Let me try it' and it actually worked"

"I tried to be more in the moment and you know thinking about if my stress level is high. So I mean I think it did help"

"Watching my heart rate fluctuate, decrease, so I was able to manage it. It was interesting to be able to see that"

"I often checked it, especially after a high stress type thing, or a fight, or intense situation at work, and I'd look at it and see I'm elevated, and try to calm myself down"

Breathing



Officers were provided access to two self-help therapies:
(1) A 1-minute, meditation breathing exercise (left)
(2) The Calm app, which provided a mix of guided meditations, mindfulness exercises, and soothing music for officers needing a longer "cool-down" period (right)

Worked in reducing stress...

"It was interesting to sit and do some different types of breathing to see if I can make [stress app] come back down and then how low I could make it go just sitting there"

"Yeah, I would try the breathing. And I would also just walk away from the scene. I could feel myself kind of relaxing a little bit stepping away from the scene"

...but not necessarily by using the apps provided.

"I did some of the breathing. I didn't necessarily try the one on the watch"

"As soon as I realize [stress] is up, breathing exercises is what I do. I had done a class and I found that was one of the main things that helped me"

"I did the structured breathing through the watch a couple of times and then more often than that, I just did it on my own where I would focus on just breathing in four or five seconds"

Implications

1. A smart watch can deliver access to brief mental health practices in the field in a manner that is both feasible and acceptable to officers.
2. Future research is needed to assess the effectiveness of this brief, field intervention in improving mental health over time.

We could not conduct this research without the support of local police departments and the officers who volunteered and trusted our team to use their sensitive data in a meaningful way.

UTHealth | School of Public Health
The University of Texas Health Science Center at Houston

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