



University of Wisconsin
Eau Claire



EAU CLAIRE POLICE DEPARTMENT

Vest Summary and Implementation

The Eau Claire PD Ordered 5 Load Bearing Vests from BlueStone for evaluation during their Research Study. After the study was completed, BlueStone was chosen to Manufacture Load Bearing Vests for the Entire Eau Claire PD.

The Eau Claire Police Department, University of Wisconsin – Eau Claire, and Mayo Clinic conducted a collaborative research project on the health benefits of load-bearing vest carriers in comparison to the traditional police duty belt. This summary will address why this research occurred, study results and implementation considerations.

PURPOSE OF THE STUDY

Policing is a physically demanding profession. Officers wear a duty belt with over 20 pounds of equipment, spend extended periods of time seated in a police vehicle and deal with combative people. As a result, the Eau Claire Police Department has a number of Officers dealing with lower back and hip pain. This results in a diminished quality of life, lost time due to injury and increased healthcare costs that are shared by our entire community.

The utilization of a load-bearing vest carrier is commonly viewed as a healthier alternative than the traditional duty belt for Officers to carry the required equipment. However, there were several concerns with transitioning all Eau Claire Police Officers to a load-bearing vest carrier. These concerns were:

- Lack of published research on efficacy of load-bearing vest carriers.
- Unintended health consequences of load-bearing vest carriers.
- A load-bearing vest carrier is inconsistent with uniform standards.
- Militaristic in appearance, does not conform to community expectations.

In order to address these concerns collaborative research project was conducted by the UWEC, Mayo Clinic and the Eau Claire Police Department.

STUDY DESIGN

The six-month research project was facilitated by Dr. Jeff Janot, Professor of Kinesiology at UWEC, and

several of his students. Additionally, support was provided by Mayo Clinic. Fifteen Eau Claire Police Officers volunteered as participants in this study. For the first three months of the study, the officers were divided into two groups, a load bearing vest group and a duty belt group. After this initial period, officers were reassigned to the opposite group for the last three months. The following information was collected during the research study:

- A biometric screening involving measures of aerobic fitness, body composition, blood cholesterol, blood pressure, core endurance, and spine range of motion.
- An Oswestry Low Back Pain Disability questionnaire to determine the level of the officer's low back functional ability.
- A daily journal self-reporting the level of lower-back and overall discomfort on a visual-analog scale utilizing a rating of 0-10 (0 = no pain; 10 = worst pain imaginable).
- Physical activity and sedentary time while on-duty as measured by accelerometers worn by each officer.
- Informed consent for the results being shared amongst the research partners and documented in a written report.

For the purposes of the study, the following equipment was moved off of the duty belt onto the load-bearing vest carrier:

- Handcuffs
- Ammunition magazines
- Pepper spray
- Expandable baton
- Portable radio
- Flashlight

The handgun and electronic control device (Taser) remained on the duty belt.



STUDY RESULTS

Figure 1. Average ratings of low-back discomfort across the 6-month study period for both vest and belt groups.

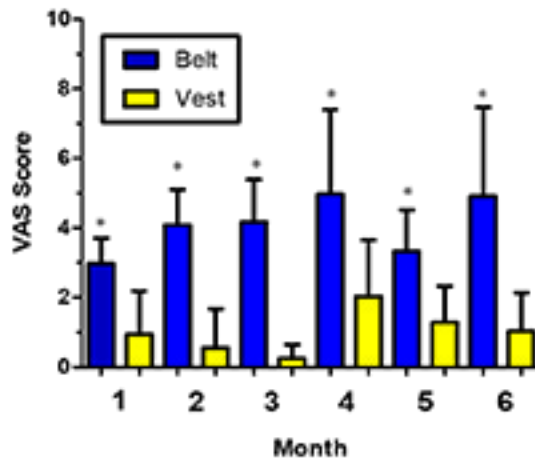


Figure 2. Average time in seconds for core endurance measures.

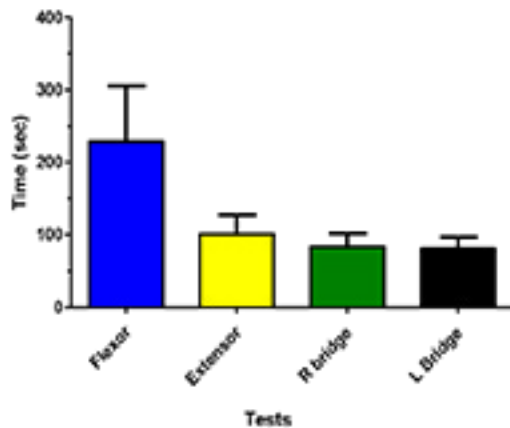
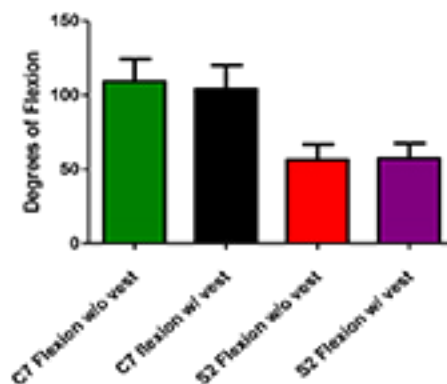


Figure 3. Average scores in degrees of flexion for spine range of motion with or without wearing the load bearing vest.



Lower-back discomfort

The Oswestry Low Back Pain Disability questionnaire is the gold standard of low back functional outcome questionnaires. The score is calculated as a percentage based on ratings out of a total possible score of 50. The lower the percentage, the less limited by low back issues the person is. The Oswestry data indicated that officers reported *minimal disability* (mean score was 8.1% with a score of less than 20% indicating minimal disability) prior to start of the study.

Figure 1 details the self-reported low-back discomfort scores that officers provided at the end of every shift using a 0-10 visual-analog pain and discomfort scale. The 6-month average score that officers reported while wearing the load bearing vest was 0.88 (range 0-4.75 over the course of the study) which was interpreted as *little to no pain*. The 6-month average score that officers reported while wearing the duty belt was 3.95 (range 2.0-8.5 over the course of the study) which was interpreted as *mild to moderate pain*.

Core Endurance and Spine Range of Motion

Figures 2 and 3 present the officer's data collected for core endurance and spine range of motion measures. Core endurance was reported as time in seconds that officers were able to hold four distinct postures until absolute fatigue. Overall, core endurance for the group was rated as average for three tests (extensor, right side bridge, and left side bridge) and above average for one (flexor test). Spine angle of motion was measured using inclinometers placed on the spine. Officers were asked to flex forward in a standing posture while wearing the load bearing vest and without wearing the vest. The scores in Figure 3 indicate no differences in spine motion (degrees of flexion) with or without the load bearing vest at selection measure points on the spine (C7 and S2). Additionally, average total lumbar spine flexion was within normal limits for the group.

INTERPRETATION OF FINDINGS

According to the Oswestry questionnaire data, the officers in the study were healthy and had no limitations regarding low back pain and disability. Thus, if anything contributed to increased pain or discomfort while on duty, it was not likely a pre-



existing issue. Also, core endurance and spine range of motion data all fell within normal limits of function, thus indicating that it is unlikely that these issues were contributory to any pain or discomfort experienced while on duty. It was clear from the visual-analog data that officers rated their pain and discomfort significantly higher while wearing the duty belt compared to the load bearing vest

Based on these data, it seems the load bearing vests are more effective at evenly distributing the weight of police equipment and put less strain on the hips and lower back compared to the traditional duty belt. Additionally, there were no unintended consequences discovered related to the health of the officers or functional safety of the vest while on duty. It could be concluded that the use of the load bearing vest carrier may well have potential short- and long-term health and wellness benefits for officers.

EAU CLAIRE POLICE DEPARTMENT'S IMPLEMENTATION

Once the study results were presented to the Eau Claire Police Department it was determined to offer a load-bearing vest carrier as a uniform option for all sworn Officers. The primary implementation concerns were functionality, maintaining uniform standards and a militarized appearance.

All of the Officers who participated in the study were asked to provide feedback on the load-bearing vest carrier utilized during the study. Once these Officers provided their thoughts on functionality, fit, durability, and any other issues, the department began researching load-bearing vest carrier options. The research focused on vests that addressed the input from the study group, maintained a professional appearance, uniform standardization, functionality and carried the same equipment as examined by the study.

One area of importance identified was the challenge some study Officers had in having adequate space on the vest carrier for the designated equipment. Several Officers with smaller body frames could not properly carry all required equipment on the vest carrier. Another area of importance identified related to Patrol supervisors who spend significant time working within the police department.

Bluestone Safety Products was selected as a possible long-term option. Bluestone developed a vest carrier intended at meeting the functionality and fit parameters identified by the Officers who participated in the research study. Additionally, the vest carrier developed by Bluestone Safety products also remained consistent with the department's traditional uniform.





The Eau Claire Police Department ordered several load-bearing vest carriers from Bluestone. These vest carriers were worn by five Officers for a three-month period. At the completion of this additional study period the feedback offered by these Officers was shared with staff at Bluestone and incorporated into the vest carrier designed and manufactured for all Eau Claire Police Department Officers.

The Eau Claire Police Department revised its uniform policy to reflect the offering of a load-bearing vest carrier as a uniform option. The updated policy allows Patrol Officers to wear the department approved load-bearing vest carrier as part of the standard uniform of the day. The policy outlines that six equipment holders are included on the vest carrier



to contain ammunition magazines, a flashlight, expandable baton, handcuffs, pepper spray, and portable radio. The revised policy also allowed the exception for the portable radio to be placed on the duty belt if space on the vest carrier is limited or a Patrol supervisor. Officers are allowed the option of utilizing a traditional duty belt.



A concern related to the utilization of load-bearing vest carriers is their militarized appearance. This was addressed through the design of the load-bearing vest carrier and community outreach. The collaborative nature of the research study, the evidence-based decision making, the health benefits and the likely cost savings made for a very positive message to share with our community. In conjunction with UWEC, several articles were published by local print and internet-based media outlets as well as several features produced by television media outlets. We found this transparency helped garner community understanding and support for the uniform change.

Berthiaume, Judy (2018, Nov 12) "Load-bearing vest vs. duty belt: Ergonomic researchers determine the winner." Retrieved from *PoliceOne.com* <https://www.policeone.com/Officer-Safety/articles/482040006-Load-bearing-vest-vs-duty-belt-Ergonomic-researchers-determine-the-winner/>

If you have further questions regarding the load-bearing vest summary or implementation, you can contact UWEC Professor, Dr. Jeff Janot at JanotJM@uwec.edu or Eau Claire Police Department Deputy Chief Matt Rokus at Matt.Rokus@eauclairewi.gov