Review Article

# Workplace Violence in Orthopaedic Surgery: A Survey of Academy of Orthopaedic Surgeons Membership

Brent Ponce, MD
Eric Gruenberger, MD
Gerald McGwin, PhD, MS
Julie Samora, MD, PhD
Joshua Patt, MD, MP

## ABSTRACT

**Introduction:** Workplace violence (WPV) in US health care is increasing, and many workers are likely to experience WPV during their careers. This study aims to assess the scope of WPV in orthopaedics.

**Methods:** A 20-item survey adopted from the World Health Organization's 'Workplace Violence in the Health Sector Country Case Studies Research Instruments Survey Questionnaire' was sent to Academy of Orthopaedic Surgeons members, including residents and fellows. Deidentified responses were collected electronically over a 1-month period and assessed.

**Results:** Overall, 1,125 Academy of Orthopaedic Surgeons members participated (5% response rate). Most respondents were male (86%) and identified with the majority ethnic group (80%). WPV of any type was reported by 77.1%. Verbal abuse was the most common type (71.6%), and patients were the most common perpetrators. WPV was most prevalent among traumatologists, tumor surgeons, female surgeons, and those with 0 to 15 years in practice. Female surgeons reported more WPV events per practice year (2.25 versus 0.65, $P < 0.01$) and increased likelihood of physical threats and physical assaults from coworkers ($P = 0.004$).

**Discussion:** WPV in orthopaedic surgery is largely perpetrated by patients and directed toward traumatologists, tumor surgeons, female surgeons, and less experienced surgeons. These data can be used to address safety measures in the workplace.

From the Hughston Clinic and Foundation, Columbus, GA (Ponce and Gruenberger), Department of Epidemiology, Birmingham, University of Alabama Birmingham, School of Public Health, AB (McGwin), Nationwide Children's Hospital, Columbus, OH (Samora) Atrium Health Levine Cancer Institute, Charlotte, NC (Patt).

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Musculoskeletal complaints are among the most common reasons patients seek medical treatment.[1] Pain and loss of function can often be alleviated through nonsurgical and surgical treatments; however, these are not always successful. Unmet expectations, complications, and suboptimal function along with high costs can undermine the foundation of the patient-physician relationship, which may become volatile.[2,3] The orthopaedic community experienced such a situation on June 1, 2022, when Preston Phillips,

an orthopaedic spine specialist; Stephanie Husen, a sports medicine specialist; Amanda Glenn, a receptionist; and William Love, a patient, were shot and killed in a Tulsa, Oklahoma clinic by a patient who only weeks prior had spine surgery.[4] On July 11, 2023, hand surgeon Dr. Benjamin Mauck was shot and killed in the examination room by a patient during a follow-up visit at the Campbell Clinic in Tennessee.

The World Health Organization has estimated that 38% of healthcare workers globally will experience some type of workplace violence (WPV) during their careers.[5] Asia and North America have the highest rates of WPV in the healthcare setting, and the prevalence of *physical assault*, specifically, was found to be 19% in North, South, and Central America.[6] The US Department of Labor's Bureau of Labor Statistics reports that healthcare workers have the highest rate of nonfatal WPV, exceeding the rate of workers overall by a factor of 5.[7] The rate of healthcare WPV incidents increased by 57% from 2013 to 2020, with physicians accounting for 10% of these incidents overall.[7-9] Although most WPV cases are nonfatal, an estimated 40% of physician deaths due to WPV have been homicides, and all but a small fraction of the remaining 60% are suicides.[10]

Rates of WPV among physicians are higher for women, minority groups, trainees, emergency medicine, and psychiatry specialists, although the groups at highest risk vary considerably across the world due to systemic, structural, political, and cultural differences.[11,12] In the United States, most WPV literature is generated by emergency medicine, although there are reports from internal medicine, neurosurgery, general surgery, and other specialties as well. Considering the tragic shooting in Tulsa occurred at an orthopaedic clinic, we conducted a literature review for WPV in orthopaedic surgery and determined that the prevalence of WPV among orthopaedic surgeons and the associated risk factors are currently unknown.[13-15]

This study reports the results of a survey of American Academy of Orthopaedic Surgeons (AAOS) members to determine the prevalence and effect of WPV among orthopaedic surgeons. Understanding the WPV data in orthopaedic surgery is a step toward the overarching goal of providing a culture of safety and advocacy for patients and providers alike.

## Methods

### Study Population

After approval of the AAOS Patient Safety Committee (now entitled the Healthcare Safety Committee) and endorsement of the AAOS executive leadership, AAOS members, including trainees and fellows, were sent an e-mail requesting completion of a 20-question anonymous Qualtrics[xm] survey. The survey was open from July 19 to August 19, 2022. In addition to the initial e-mail invitation, two reminder emails were sent 1 and 2 weeks after the initial e-mail was distributed. Survey responses were deidentified, collected, and managed using electronic data capture tools hosted by the AAOS.

### Categories of Workplace Violence

Four categories of WPV were investigated (1) verbal abuse, (2) verbal or written threat, (3) physical threat, and (4) physical assault. Examples of verbal abuse included berating, belittling, marginalization, and humiliation. Verbal threats of violence included phone calls, text messages, emails, online forums, and written letters. Physical threats included face-to-face encounters with or without the brandishing of a weapon and the threat of physical harm. Physical assault included in-person altercations with or without a weapon and the use of physical force to harm or instill fear in the victim.

### Survey Content

The survey used in this study was adopted from the World Health Organization's 'Workplace Violence in the Health Sector Country Case Studies Research Instruments Survey Questionnaire (English).'[16] The modified questionnaire included questions pertaining to respondent demographic characteristics, frequency, and details of WPV events; consequences of WPV; and opinions toward preventing WPV. A copy of the administered survey is provided (see supplemental Appendix 1, http://links.lww.com/JAAOS/A999).

### Statistical Analysis

The prevalence of WPV according to provider characteristics was compared using chi-square tests. *P*-values of $< 0.05$ were considered statistically significant. All analyses were conducted using SAS (SAS Institute, Cary).

## Results

Invitations to participate were sent to approximately 21,500 AAOS candidates and active fellows of whom 1,125 participated, yielding a response rate of approximately 5%. Most respondents were male (86%) and identified as members of the majority ethnic group (80%) in their community. Surgeons reported an average 21.4 years in practice, and the most common specialties were

general orthopaedics (29.1%), hip/knee arthroplasty (24.1%), and sports medicine (21.1%). Additional demographics are summarized in Table 1.

More than three-quarters of respondents (77.1%) had experienced WPV of any type, and verbal abuse was by far the most common (71.6%) compared with verbal threats, physical threats, and physical assault. Respondents reporting any WPV typically reported multiple events and different categories of those events. This finding was most apparent for physical assault, with 90% of respondents also reporting verbal and/or physical threats. WPV rates varied among the specialties, and Figure 1 demonstrates a greater proportion of traumatologists and tumor surgeons reporting WPV ($P < 0.05$).

The overall rate of any WPV event was 0.87 events per year in practice. Female surgeons reported 2.25 events per year in practice, significantly higher than male surgeons' 0.65 events per year in practice ($P < 0.01$). There was a lower prevalence of WPV overall reported by surgeons with 30 or more years in practice compared with those with fewer years in practice. Surgeons 16 to 29 years in practice reported a lower prevalence of WPV than those with 0 to 15 years in practice.

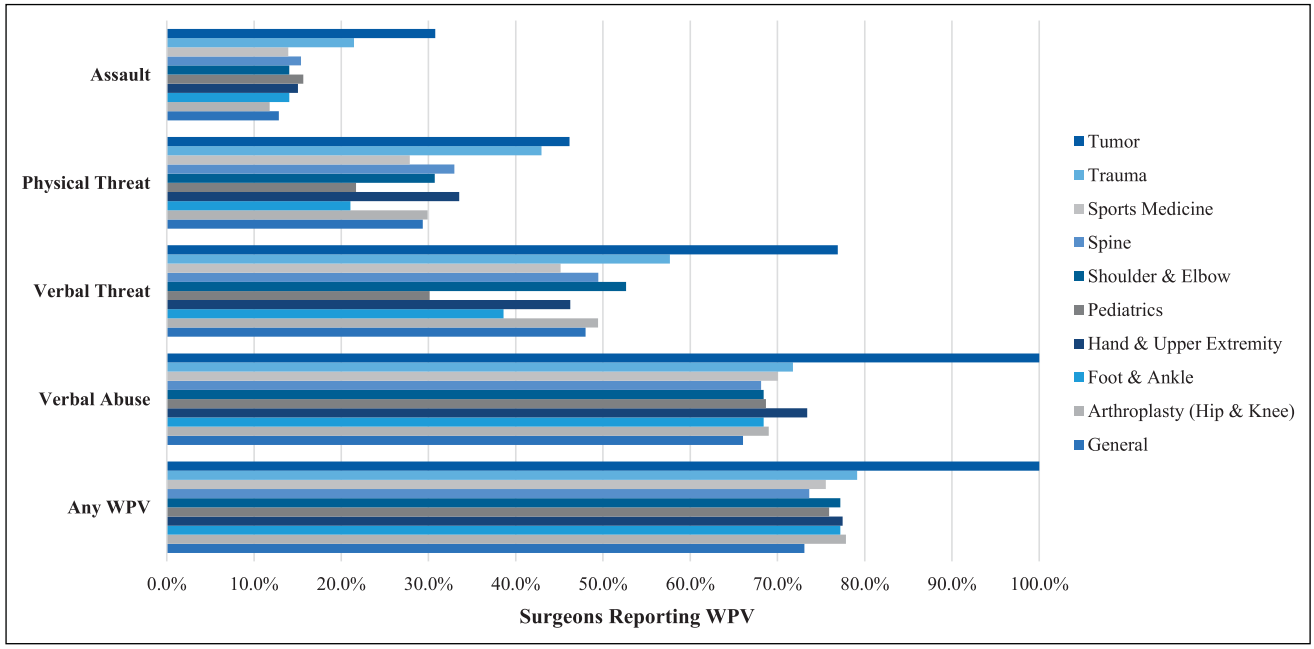
Across all types of WPV, patients were the most frequent perpetrators. For the categories of physical threat and physical assault, women were more likely than men to report WPV perpetrated by coworkers (staff, managers, and other healthcare workers; $P = 0.004$; Table 2). A weapon was used in 25% of physical threats and 16% of physical assaults; use of a firearm was reported in 11% of physical threats and 6% of physical assaults. Among the respondents who experienced physical assault, one in 10 required time away for physical and/or psychological treatment. Seeking treatment was not associated with the type of WPV, specialty, sex, or years' experience.

**Table 1.** Demographic and Subspecialty Results

| Categories | N | (%) Overall | Any WPV (%) | Verbal Abuse (%) | Verbal Threat (%) | Physical Threat (%) | Physical Assault (%) | Rate[a] |
|---|---|---|---|---|---|---|---|---|
| *Overall* | 1,125 | — | 77.3 | 71.8 | 45.6 | 29.8 | 14.6 | 0.86 |
| *Subspecialty* | | | | | | | | |
| General | 327 | 29.1 | 73.1[b] | 66.1[b] | 48.0 | 29.4 | 12.8 | 0.76[b] |
| Arthroplasty (hip and knee) | 271 | 24.1 | 77.9 | 69.0 | 49.4 | 29.9 | 11.8 | 0.71 |
| Foot and ankle | 57 | 5.1 | 77.2 | 68.4 | 38.6 | 21.1 | 14.0 | 0.35 |
| Hand and upper extremity | 173 | 15.4 | 77.5 | 73.4 | 46.2 | 33.5 | 15.0 | 1.09 |
| Pediatrics | 83 | 7.4 | 75.9 | 68.7 | 30.1[b] | 21.7 | 15.7 | 0.97 |
| Shoulder and elbow | 114 | 10.1 | 77.2 | 68.4 | 52.6 | 30.7 | 14.0 | 0.68 |
| Spine | 91 | 8.1 | 73.6 | 68.1 | 49.5 | 33.0 | 15.4 | 0.69[b] |
| Sports medicine | 237 | 21.1 | 75.5 | 70.0 | 45.1 | 27.8 | 13.9 | 0.75 |
| Trauma | 163 | 14.5 | 79.1 | 71.8 | 57.7[b] | 42.9[b] | 21.5[b] | 1.18[b] |
| Tumor | 26 | 2.3 | 100.0[b] | 100.0[b] | 76.9[b] | 46.2 | 30.8[b] | 1.20[b] |
| Others | 104 | 9.2 | 88.5[b] | 86.5[b] | 47.5 | 25.0 | 19.5[b] | 4.75[b] |
| Sex | | | | | | | | |
| Female | 143 | 12.7 | 90.9[b] | 90.2[b] | 44.8 | 30.1 | 25.2[b] | 2.25[b] |
| Male | 852 | 75.7 | 74.7[b] | 67.6[b] | 45.4 | 29.7 | 12.3[b] | 0.65[b] |
| *Years in practice* | | | | | | | | |
| 0-15 | 361 | 32.1 | 83.4[b] | 81.4[b] | 47.6[b] | 29.1 | 16.6 | 0.44[b] |
| 16-29 | 382 | 34.0 | 76.2[b] | 68.3[b] | 48.7[b] | 32.5 | 14.4 | 1.10[b] |
| 30 or more | 289 | 25.7 | 68.5[b] | 60.2[b] | 38.4[b] | 28.0 | 11.8 | 2.90[b] |

[a]WPV events/practice year.
[b]Within each column, results of category comparison were significant at the $P < 0.05$ level.

## Figure 1




Graph showing the prevalence of workplace violence among subspecialties.

## Concerns, Opinions, and Prevention Recommendations Regarding Workplace Violence

Most respondents (69%) reported little to no concern over WPV before the Tulsa shooting in June 2022. By contrast, after the Tulsa incident, most respondents reported concerns on a regular basis, and those reporting 'major concern' nearly tripled from 5% to 14%. Most respondents (62.2%) also felt WPV events against all physicians and staff were increasing. Three in four respondents (75%) reported first-hand knowledge of a colleague who had experienced verbal abuse or threats, and 25% knew of at least one colleague that had been physically assaulted.

Among the 15% of respondents reporting physical assault, 40% believed it was preventable, whereas 29% believed it was not. When offered a list of various

**Table 2.** Perpetrator of 'Most Significant' Workplace Violence Event for Female (F) and Male (M) Surgeons

| Perpetrators | Verbal Abuse | | Verbal Threat | | Physical Threat | | Physical Assault | |
|---|---|---|---|---|---|---|---|---|
| N | 808 | | 493 | | 320 | | 155 | |
| | % | | % | | % | | % | |
| | F | M | F | M | F | M | F | M |
| Patient | 51.9 | 67.0 | 62.5 | 77.8 | 76.7 | 81.3 | 63.9 | 77.1 |
| Relative of patient | 18.6 | 18.4 | 14.1 | 12.7 | 9.3 | 13.0 | 2.8 | 10.5 |
| Staff member | 5.4 | 2.3 | 7.8 | 2.3 | 9.3 | 0.4 | 5.6 | 1.0 |
| Manager or supervisor | 7.8 | 5.2 | 7.8 | 3.6 | 2.3 | 0.4 | 8.3 | 2.9 |
| Colleague/coworkers | 6.2 | 1.9 | 3.1 | 1.3 | 0 | 1.2 | 8.3 | 1.9 |
| General public | 0.0 | 0.2 | 0 | 0.3 | 0 | 0.8 | 0 | 0 |
| Other | 10.1 | 5.0 | 4.7 | 2.1 | 2.3 | 3.2 | 11.1 | 6.7 |
| — | $P < 0.001$[a] | | $P < 0.05$[a] | | $P < 0.05$[a] | | $P < 0.01$[a] | |

[a]Corresponds to comparison of women versus men in the distribution of reported perpetrators within each category of WPV. The overall *P*-value comparing the distribution of perpetrators between WPV categories is $P < 0.0001$.

**Table 3.** Regarding the Potential for Workplace Violence, Have You Pursued or Advocated for Any of the Following?

| Intervention | N | % Overall |
|---|---|---|
| Increased patient screening | 187 | 16.6 |
| Add or enhance a security checkpoint (more personnel, armed personnel, etc.) | 237 | 21.1 |
| Staff training (ie, active shooter drills, etc.) | 343 | 30.5 |
| Hired armed security for you or your clinic | 53 | 4.7 |
| Concealed carry weapon (personal) | 182 | 16.2 |
| Concealed carry weapon (staff) | 66 | 5.9 |
| Various physical barriers | 189 | 16.8 |
| Change practice location within building | 4 | 0.4 |
| Change practice location to different building within the city/community | 11 | 1.0 |
| Change practice location to different city/community | 21 | 1.9 |
| Change practice specialty | 3 | 0.3 |
| Other (Specify) | 91 | 8.1 |
| None of these | 384 | 34.1 |



prevention and mitigation strategies, approximately two-thirds of respondents indicated they had adopted or advocated for one or more of the options in response to WPV: Staff training, enhanced security checkpoints, physical barriers, and concealed-carry were most common (Table 3). When offered free-response items, 32% of respondents proposed AAOS action or advocacy: Supporting firearm bans and firearm regulations were the most common suggestions (13.5%), followed by support for concealed carry (5.5%). AAOS-provided training and best practice guidelines were suggested by 34% of respondents.

## Discussion

The results of this study add to the mounting evidence that WPV directed toward physicians in the United States is largely perpetrated by patients, with risk factors being female sex, lower experience levels, and practicing in trauma or oncology specialties. WPV in health care may be attributed to unmet and potentially unrealistic expectations, delays in care, perceived prejudices, substance use or abuse, mental illness, and dementia, which parallels reasons for violent behavior occurring outside the workplace.[9]

Much of the literature regarding WPV toward physicians was generated in the 1990s and early 2000s.[6] Violence in the US health system over the past decade has since increased, especially during years associated with the COVID-19 pandemic.[7-10] Sporadic specialty-specific investigations have been conducted. Within the United States, only emergency medicine has consistently published recent survey data on this topic.[14,15] International reports over the same period demonstrate wide differences based on country and specialty. The Chinese Hospital Association has reported an average of nearly 30 WPV incidents per hospital per year, with 25% of the incidents involving physicians.[17] In India, 4 to 6% of physicians report physical assault annually.[18] In Norway, 14% of emergency-care general practitioners and psychiatrists reported physical assault by patients over a mean of 20 years of practice.[19] By contrast, 8% of general practitioners in Canada reported physical assault, sexual physical assault, or stalking within the preceding *month*.[20] The layered complexity of factors influencing WPV within individual countries underscores the importance of considering WPV in the United States as a unique entity.

In this orthopaedic focused assessment, female surgeons identified a 50% increased prevalence of verbal abuse and physical assault, and a quadrupled WPV event rate compared with their male counterparts. Increased verbal abuse toward female surgeons has also been reported in a similar survey of neurosurgeons, although it is more common to find no difference between men and women in rates of verbal abuse.[21] This finding may be a specialty-specific phenomenon but may also be due to lower sample size and the frequency of verbal abuse. On the other hand, the risk of physical assault among

female physicians in emergency medicine, internal medicine, dermatology, and neurosurgery is markedly increased, with rates 60 to 460% higher than men.[21-24] Physical assaults perpetrated by orthopaedic healthcare staff, colleagues, and supervisors were more common among female surgeons (22%) than male surgeons (6%). This rate aligns with the 22.6% prevalence of female emergency medicine physicians that reported unwanted sexual acts or advances by their colleague or supervisor.[24] Although we did not specifically account for WPV that was sexual in nature, sexual harassment (which includes discrimination) and sexual physical assault fall under Occupational Safety and Health Administration's (OSHA) definition of WPV and disproportionately affect female and nonbinary physicians.[22,25]

The responders with the fewest years in orthopaedic practice were also found to be at increased risk for WPV, which is a common finding in the United States and international investigations.[26,27] In this study, respondents identifying 'no subspecialty' reported less than 3 years in practice and were interpreted to be trainees or recent graduates. This group reported a prevalence of nearly 90% for any WPV event, and an annual WPV event rate four times higher than any group except for female surgeons. Twenty percent reported physical assault with an average of five physical assaults per respondent. A higher prevalence of physical assaults on trainees in other specialties has been reported, including in psychiatry (25 to 64%), internal and emergency medicine (16 to 40%), obstetrics-gynecology (20 to 24%), and general surgery (24 to 38%).[26] By contrast, pediatric residents report the lowest rates of physical assault (2 to 9%).[26,27] Residents arguably spend more time with patients than attending surgeons, suggesting that increased interactions may produce increased risk for WPV. In addition, age and experience are implicitly correlated with knowledge and skill in many cultures, and patients may perceive treatment by less experienced providers as a failure of the system to provide them with the highest quality physician.[26]

The orthopaedic subspecialties of trauma and oncology had the highest rates of WPV. Traumatologists are frequently exposed to nonelective situations involving combative intoxicated patients, psychiatric emergencies, and geriatric patients with cognitive decline. Such circumstances also comprise the bulk of physical assaults occurring in emergency and long-term care settings.[28,29] Tumor surgeons comprise the smallest orthopaedic subspecialty yet reported the highest prevalence of WPV of all specialties, including physical assaults. This result may be attributed to participation bias and small sample size. However, WPV emanating from patients and families projecting anger and disappointment after an unfavorable diagnosis or treatment outcome has previously been reported in the oncology literature.[30,31]

We found that patients and their family members perpetrated more than 80% of WPV events experienced by orthopaedic surgeons. Forty percent of events occurred in the previous year, supporting the notion held by most AAOS responders that WPV may be increasing. Although verbal abuse was most common, 15% of surgeons reported experiencing physical assault. These findings may underrepresent the true values because it is estimated that only one of five WPV events is documented. This low reporting rate has been partially attributed to the notion that WPV 'comes with the territory.' This is a common sentiment among trainees, women, psychiatry, and emergency medicine healthcare workers.[24-26] However, additional and more frequent investigation is needed to assess other potential variables including incidence and reporting differences by age, sex, practice location, surgical variables, and patient socioeconomic and psychological variables. Furthermore, more frequent assessments would identify current WPV trends and the effect of potential interventions.

Recognizing the potential for WPV escalation in various medical scenarios is critical. Predicting which patient or family members will resort to violence presents a common challenge for mitigating WPV.[32] An important finding from this survey is that verbal and/or physical threats were also reported by more than 90% of surgeons reporting physical assaults. This may indicate an opportunity for early recognition of impending physical assault. Although the details related to the fatal shooting of Dr. Mauck have not been fully elucidated, there may have been warning signs before the mass shooting in Tulsa in June 2022. This act was done by a patient with back pain after recent surgery, and the shooting was preceded by frequent calls and discussions with the surgeon and office staff requesting analgesia—whether narcotics were specifically requested was not disclosed.[4] Nevertheless, the AAOS recognizes the current challenges with narcotic abuse and addiction because narcotics are commonly prescribed after orthopaedic surgery. A 2017 survey of orthopaedic surgeons found that 97% had prescribed opiates at least once and 77% did so on a regular basis, making orthopaedic surgeons the fourth highest prescribers of opioids in the United States behind pain management, rehabilitative medicine, and family practice.[33,34] Pain management may involve

unmet patient expectations or perceived withholding of medical care, and can be emotionally charge.[35] According to pain specialists, opioid treatment is the most common source of violence in this clinical scenario, and discharging a patient from additional pain management is reportedly the most durable intervention to prevent escalation to physical assault.[36] The most common initiatives to lessen the effect of WPV events supported by AAOS respondents were staff training (eg, active shooter drills), enhanced security checkpoints, physical barriers, increased patient screening, and use of concealed carry weapons.

Fortunately, most WPV is nonfatal, and some interventions—screening patients with a documented history of violence, limiting patient access to certain floors/areas of the hospital, and the installation of metal detectors—have demonstrated utility.[9] An important caveat is that these interventions were developed after unique risk factors for WPV at each site were identified and targeted for the maximum effect. Conversely, routine preemptive patient profiling may produce discriminatory practices and limit patient access to appropriate care, and the addition of physical barriers and increased security presence may be perceived as dehumanizing.[32] Along with unmet patient expectations, the latter inequities in healthcare access and quality are known contributors to WPV.[35] Therefore, diligent site-specific risk analysis is necessary to ensure the interventions of balance safety, empathy, and efficiency to avoid a potentially self-defeating cycle.

Concealed carry is a common response to WPV, and recent reports indicate that 14 to 42% of U.S. physicians recently acquired or currently carry a weapon for protection.[21,37] Despite its popularity, the overall benefit of concealed-carry weapons—particularly defensive gun use—to prevent WPV or neutralize an escalating event remains controversial. Firearm use (or use of weapons in general) is much less common than assault without a weapon in healthcare WPV. This creates the potential for a disproportionate or premature response to a real or perceived threat with defensive gun use by physicians or staff.[38] Furthermore, the current efficacy of defensive gun use is questionable because the balance of evidence demonstrates violent crime and homicide rates are increased in shall-issue concealed-carry counties and cities.[39] Alternatively, security checkpoints with openly armed personnel is an obvious, observable deterrent to WPV and is effective in some settings.[9]

Considerable work regarding WPV has been done on the national legislative front. The passing of house bill H.R. 1195 in 2021 makes OHSA responsible for providing '[a] standard that requires certain employers to take actions to protect workers and other personnel from workplace violence.'[40] The 'Safety From Violence for Healthcare Employees Act' or 'SAVE Act,' and new emergency department stipulations introduced by The Joint Commission in January 2022 put the onus of prevention on institutions.[14,15] Although patients and their family/friends are implicated in most WPV events, The Joint Commission is not alone in highlighting institutional responsibility. The Crisis Prevention Institute's 'Workplace Violence Prevention' handbook outlines the importance of developing WPV prevention plans based on the unique risks of each site, including the location, structure, and role of workers at each site, polling of various individuals' experiences to identify trends and risk factors, and training of individuals based on these variables at regular intervals.[32]

The primary limitation of this study is the low response rate, and the associated potential for participation bias and recall bias. However, a 5% response rate is similar to previous peer-reviewed manuscripts of surveys of AAOS members with response rates ranging from 4% (of 16,000 potential respondents) to 16% (of 5,500 potential respondents).[41,42] Discussion with AAOS staff identifies that typical AAOS membership response rates to surveys are 1 to 2%. Female representation among all respondents in this survey is proportionally a 9% increase compared with the overall female surgeon AAOS membership pool, while male survey representation was 4% less. However, even if no other AAOS members reported physical assault, the current rate of physical assaults would be approximately 30 physical attacks on AAOS members annually. In addition, the 5% response rate is second only to emergency medicine's 9% response rate in a 2022 national survey.[15] Recall bias is another likely confounder because many of the surgeons surveyed reported careers of 30 years or more allowing considerable time for WPV incidents to have been overlooked or forgotten. We think that these factors offset the potential for overreporting due to selection bias and likely results in a general underestimation of WPV incidents in the field of orthopaedic surgery than is presented here. In hindsight, adding sexual harassment to the categories of WPV may have clarified some gender-based differences and merits additional investigation.

The data from this survey demonstrate that there is a level of actual and potential threat for orthopaedic surgeons, which is especially true for female surgeons, less experienced surgeons (residents, fellows, and recent graduates), traumatologists, and tumor surgeons. Although most perpetrators are patients or families,

female orthopaedic surgeons are also more likely than male surgeons to be assaulted by a colleague or supervisor, echoing the findings of previous specialty-specific investigations in the United States. Whether the perpetrator is a patient or a colleague, WPV in orthopaedic surgery is a symptom of long-standing, complex cultural issues that inevitably and negatively affect US health care. With no universal measure for prevention, individuals, departments, and institutions must all commit to developing site-specific strategies to curb WPV wherever it occurs. Surgeons and organizations are encouraged to use these data to advocate for increased safety measures in the workplace.



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The AAOS position statement on WPV can be found on the AAOS website under the "Quality & Practice Management" section at: https://www.aaos.org/quality/practice-management/workplace-violence/.

For Individuals and institutions seeking to address WPV locally, the AAOS has developed the "WPV Toolkit," which can also be found on the AAOS website at: https://www.aaos.org/quality/quality-programs/quality-toolkits/.

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