

## A7 Homicide Fracture Pattern Frequencies by Sex and Geographic Location

*Cortney N. Hulse, MA\*, Reno, NV 89503; Kyra E. Stull, PhD, University of Nevada, Reno, Reno, NV 89557; Laura D. Knight, MD, Washoe County Regional Medical Examiner's Office, Reno, NV 89512*

**Learning Overview:** After attending this presentation, attendees will understand how analyzing skeletal trauma should not be independent of an individual's demographics.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by increasing the practitioner's knowledge regarding common injury location patterns of homicide victims. By documenting and subsequently exposing normal patterns, one can simultaneously recognize abnormal patterns.

Analyzing skeletal fractures associated with violent deaths is generally conducted independent of population, sex, ancestry, or geographic location. However, injury patterns, or the locations where fractures occur on an individual, can differ dependent on these demographic variables. This study is an analysis of individuals with a manner of death of homicide from two geographically diverse Medical Examiner's Offices (MEO). The MEOs are located in New York, NY, and Reno, NV, further differing in terms of one being metropolitan and the other encompassing largely rural areas. Along with a manner of death classified as a homicide, all individuals had a cause of death associated with traumatic injuries, such as blunt force trauma, gunshot wounds, and sharp force trauma. All skeletal fracture locations were recorded per bone with associated demographic data and cause of death information. Previous research has shown that males and females exhibit varying fracture patterns. Therefore, the sample was separated by sex for all analyses to better elucidate patterns in injury locations. Frequency distributions were created to analyze the relationship between common fracture location and all recorded demographic variables; chi-square tests were performed to test the significance of the relationships.

There were 52 individuals that fit the criteria from Nevada and 76 from New York for a total sample of 128 individuals. When comparing by regions, there is a clear difference in the frequencies associated with cause of death. In the more rural population location, the most common cause of death was gunshot wounds (80%), whereas in the metropolitan area the most common cause of death was sharp force trauma (40.6%). The most common fracture location for both regions was the head (metro 34.3%, rural 46.1%).

Males from geographically diverse areas most frequently incurred fractures to the ribs (rural 80%, metro 37.2%). Females from both MEOs also exhibited a similar trend in injury locations across both samples, with the highest frequency of fractures to the head region (46.1% metro, 80% rural). In contrast to the males, females had comparatively less trauma to the rest of the body.

The results of this study demonstrate that skeletal injury locations are similar within the sexes, regardless of geographic location and cause of death. Interestingly, even though the injury patterns were similar in similar anatomical locations, each geographic location had unique causes of death. Knowing this information provides a foundation for the expected injury types and locations and therefore facilitates understanding overall trauma for an individual. Furthermore, future trauma research should consider differences that may be occurring based on demographics and make an effort to create samples that are inclusive of demographic variables to capture possible variations in cause of death or injury patterns.

---

### Trauma Analysis, Homicide, Frequency Tables