

Running the Numbers

*A Periodic Feature to Inform North Carolina Health Care Professionals
About Current Topics in Health Statistics*

Understanding the Prevalence of Eye and Ear Injuries in North Carolina

Background

Eye and ear injuries range in severity from minor bruises, scrapes, or scratches to severe trauma that may cause long-term hearing or vision loss [1, 2]. The extent of the injury is a direct result of the force or object that causes it [2]. Corneal abrasion, caused by scratches from small objects, is the most common injury impacting the eye [1]. Injuries to the ear can vary from trauma induced injuries resulting from a fall or blow to the head to injuries acquired through exposure to noise that often lead to chronic hearing loss [2]. A large proportion of injuries sustained to the eye or ear are preventable, particularly through the use of protective wear such as eyewear or earplugs [1, 2].

Methods

This analysis used data from North Carolina emergency department (ED) visits in 2014, obtained from the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). Ear and eye injuries were identified within the 2014 ED data using the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes. The sample was limited to 2014 data due to the transition of the ICD codes from the 9th to the 10th revision in October of 2015. ICD-10-CM offers additional, more specific codes that could increase the number of injuries captured within the last quarter of 2015, potentially impacting the total number of ear and eye injuries captured for that year.

The ICD-9-CM codes used to identify eye injuries followed the Armed Forces Health Surveillance Branch (AFHSB) Surveillance Case Definitions report on eye injuries [1]. In addition, the external cause code (E-code) for a foreign body accidentally entering the eye and adnexa (E914) was included to identify any additional eye injuries,

particularly in cases where diagnosis codes were not present. The ICD-9-CM codes used to identify ear injuries also followed the AFHSB guidelines from the Surveillance Case Definitions Report on noise-induced hearing injuries [2]. Because these codes were limited to noise-induced injuries, ICD-9-CM codes obtained from the American Speech-Language-Hearing Association report on ICD-9-CM diagnosis codes related to speech and hearing disorders were also included in the case definition [3]. Cases were included if the ear or eye injury codes were present in any diagnosis field, and were limited to North Carolina residents. Rates of ear and eye injury per 100,000 North Carolina residents were calculated by age and sex. Percentages were calculated for the top diagnoses for both eye and ear injuries. A severity index was unavailable to determine the severity of the injuries. The discharge date of patients was also unavailable, preventing the calculation of length of stay. The final patient disposition and transport mode were used as proxies to understand injury severity.

Results

Ear Injuries

In 2014, ED visits for ear injuries totaled 8,164. North Carolina residents accounted for 7,795 (95.5%) of these injuries. Slightly more ear injuries occurred among males than females, 53.4% and 46.6%, respectively. The rate of ear injury per 100,000 was 1.2 times greater among males than females. Ear injuries were more prevalent among

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the oldest and youngest of the population, with the highest rates occurring among those aged 85 and older and those 9 and younger for both males and females (see Figure 1). The majority of ear injuries seen in the ED had a first-listed diagnosis code for foreign body in ear (34.3%). Open wound of the ear was the second most common (14.0%), followed by tinnitus (5.6%) and otalgia (3.1%). Open wound of the ear included wounds to the ear drum, external ear, and unspecified parts of the ear. The top 5 first listed diagnoses are shown in Figure 2.

Information on how the patient arrived to the ED was available for 88.4% of ear injuries (n = 6,893), with most injuries arriving as walk-ins (79.7%); 13.5% of injuries were transported by ambulance, while only 22 cases (0.3%) that included an ear injury diagnosis were severe enough to require air transport. Final disposition was available for 97.5% of ear injuries (n = 7,604). Most individuals were discharged home (91.1%). Less than 5% of ear injuries seen in the ED required hospitalization, with only 8 cases (1.1%) severe enough to be admitted to the Intensive Care Unit. Only two cases where ear injury was listed among the diagnoses resulted in death. Payment source information was available for 93.9% of ear injuries seen in the ED. Medicaid was the most frequently used payment

source (30.1%), followed by an insurance company (21.3%) and self-pay (19.6%).

Eye injuries

In 2014, ED visits for eye injuries totaled 22,167, of which 20,999 (94.9%) were North Carolina residents. More eye injuries occurred among men (61.6%) than women (38.4%). The rate of eye injury was 1.7 times greater for male residents than for female residents, 266.8 per 100,000 and 158.2 per 100,000, respectively. The rate of injury was greatest for males between the ages of 25 and 34 (412.6 per 100,000), whereas the rate of eye injury for women peaked among those aged 85 and older (324.1 per 100,000) (see Figure 3). Most eye injuries seen in the ED were for a superficial injury of the cornea (18.7%), followed by eye contusions (8.5%), foreign body on external eye (7.8%), and pain in or around the eye (5.4%). Eye contusions included unspecified contusions of the eye, contusions of orbital tissue, and contusions of eyelids and periocular area. The top 5 first listed diagnoses can be found in Figure 4. E-codes were listed in 83.2% of eye injury cases, of which E914 was the most common E-code present (16.0%). 3,188 cases were missing an eye injury diagnosis code. Of these, 87.9% had E914 listed as the first listed E-code.

FIGURE 1.
Rates of Ear Injuries Seen in Emergency Departments, North Carolina Residents, 2014

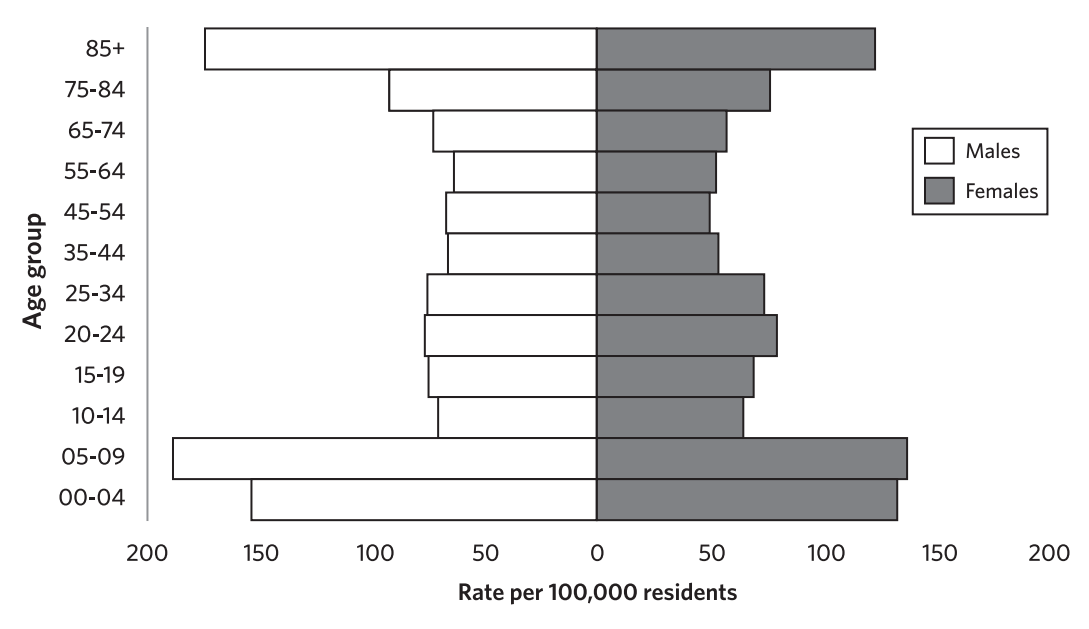
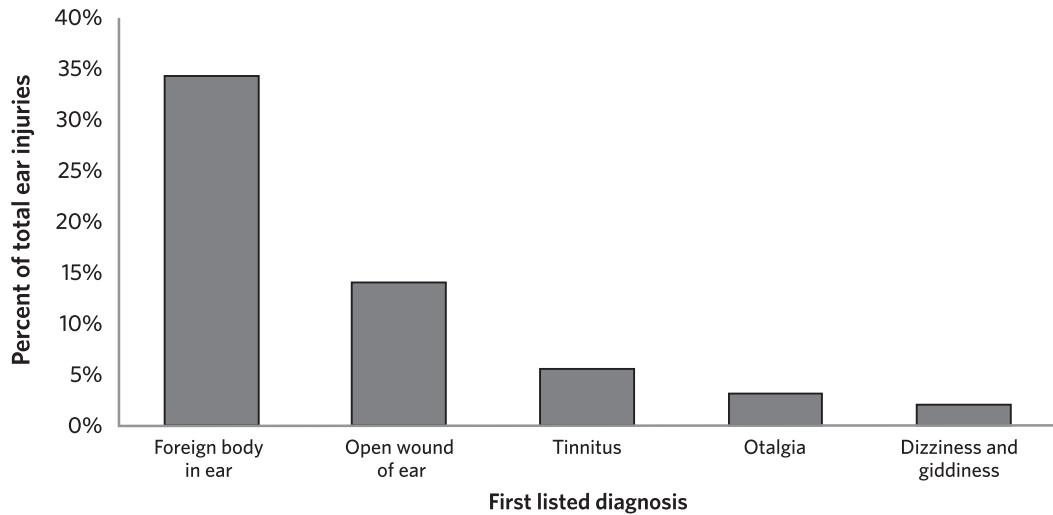


FIGURE 2.
Top Five First Listed Diagnoses for Ear Injuries Among North Carolina Residents Seen in Emergency Departments, 2014



Transport mode was available for 87.8% of eye injuries (n = 18,430). Most eye injuries were walk-ins (76.5%), followed by those arriving by ambulance (16.2%). 93 cases (0.5%) where eye injury was listed among the diagnoses were severe enough to require air transport to the ED. The final

disposition was available for 97.9% of eye injuries (n = 20,559), of which most were discharged home (90.0%). 5.6% of eye injuries were later hospitalized with 0.2% requiring intensive care. Less than 0.2% of cases where eye injury was listed among the diagnoses resulted in death. Information on the

FIGURE 3.
Rates of Eye Injuries Seen in Emergency Departments, North Carolina Residents, 2014

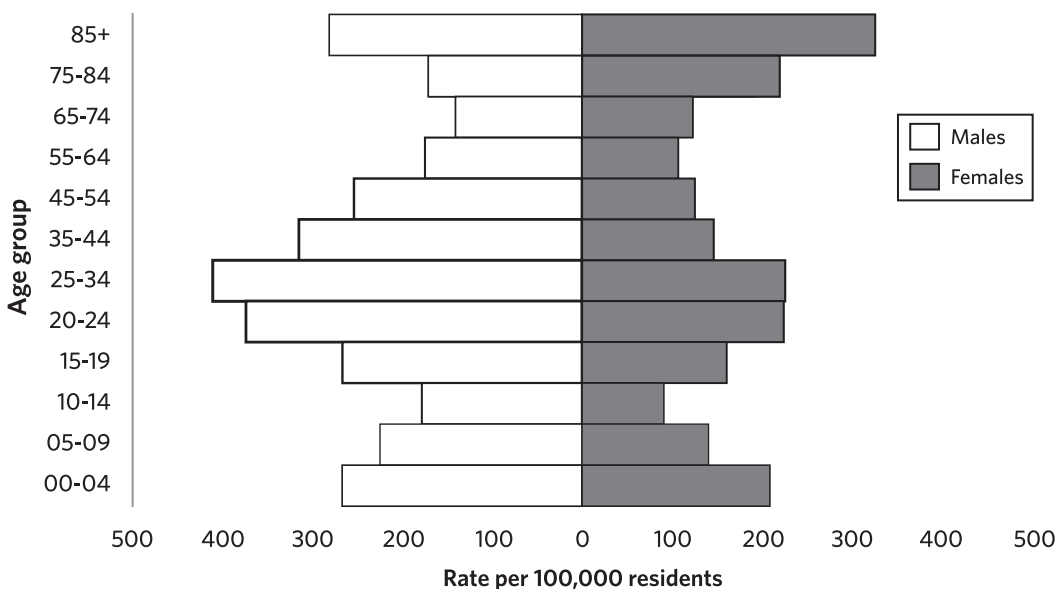
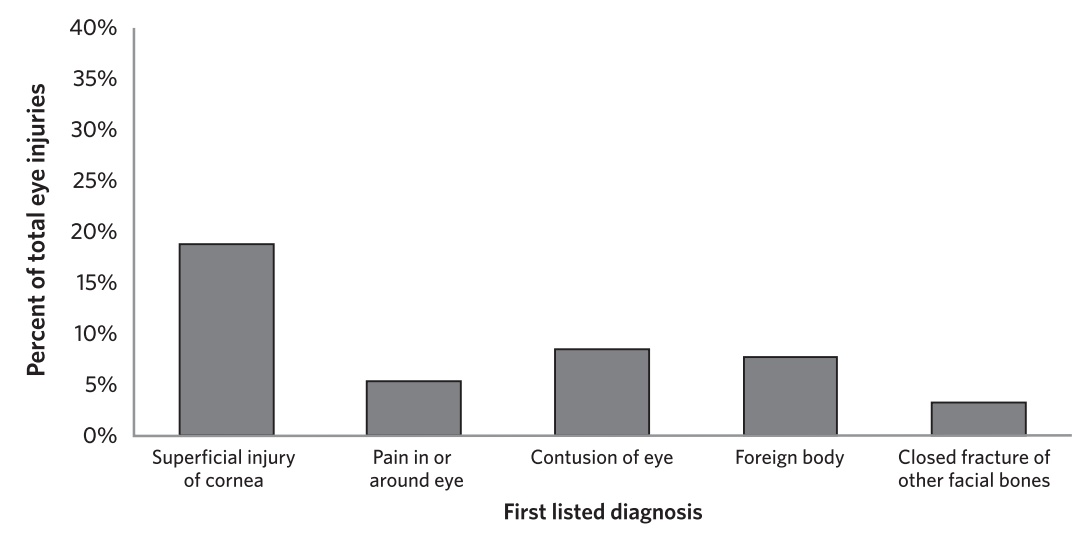


FIGURE 4.
Top 10 First Listed Diagnoses for Eye Injuries Among North Carolina Residents Seen in Emergency Departments, 2014



payment source for the ED visit was available for 93% of eye injury cases. The majority of visits were covered by self-pay (24.9%), an insurance company (22.7%), or Medicaid (21.2%).

Conclusion

Ear and eye injuries are a large contributor to ED admissions among North Carolina residents. Rates reveal differing trends by age and sex for both types of injuries. Eye and ear injuries are more common among males than females but differ in their distribution across age groups, with ear injuries impacting the very young and the elderly, and eye injuries impacting young adults and the elderly. The vast majority of ear and eye injuries admitted to the ED appear to be minor, based on the large percentage of cases that transported themselves to the ED and that did not require further hospitalization or treatment. However, the true severity of these injuries remains unknown, as do the long-term impacts such as medical and work loss costs. Most ear and eye injuries are preventable; however, more information is needed on the circumstances of these injuries to guide prevention efforts. **NCMJ**

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