Injury Patterns Associated with E-Scooter Accidents in a Major City

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Author Disclosures

- None

Background

- Electronic driven scooters (E-scooters) have become widely available and have become a frequent means of pedestrian transportation
- There are no driver requirements or rules specific to this transportation technology
  - E-scooters can travel up to 25 mph!
- There is insufficient data on the morbidity and mortality associated with E-scooter related accidents

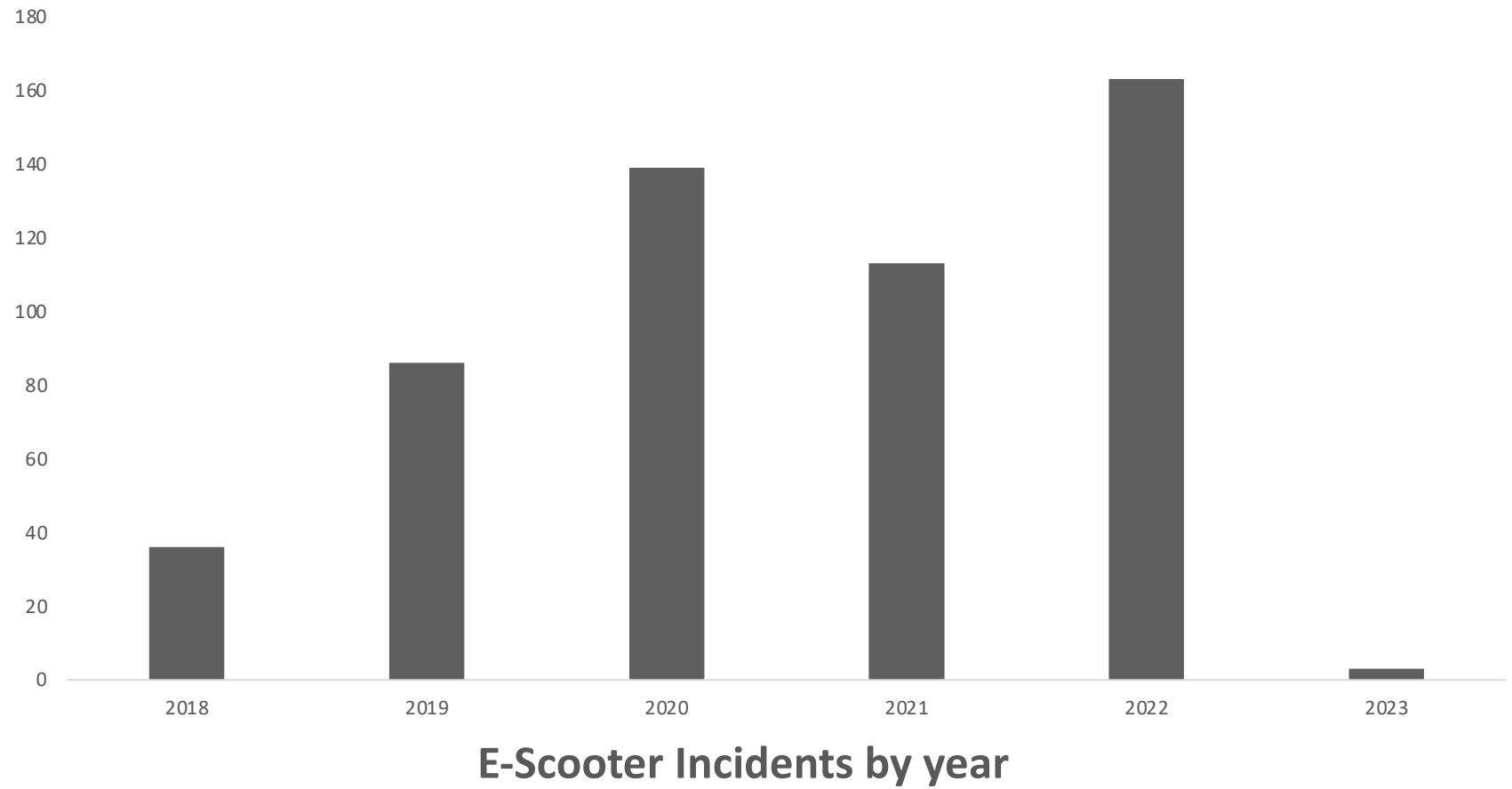
Purpose

- To assess the types, frequency and severity of E-Scooter related injuries seen at a public hospital system in a major urban area

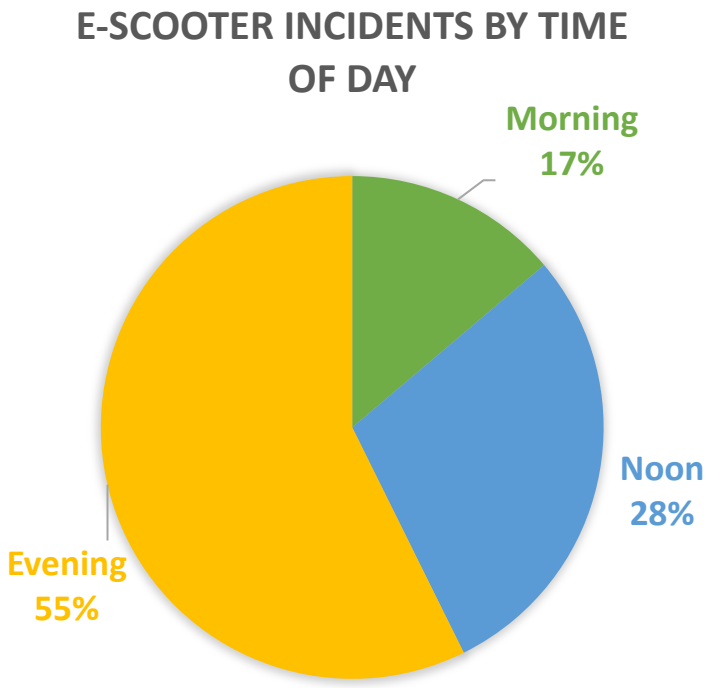
Methods

- Over 500 ED visits at a major urban hospital network relating to E-Scooter accidents were reviewed
- Demographic data, accident type, resources used, injury patterns, and dispositions were recorded
- This data was analyzed using chi-square, exact binomial and sample t-tests for any significant differences amongst groups

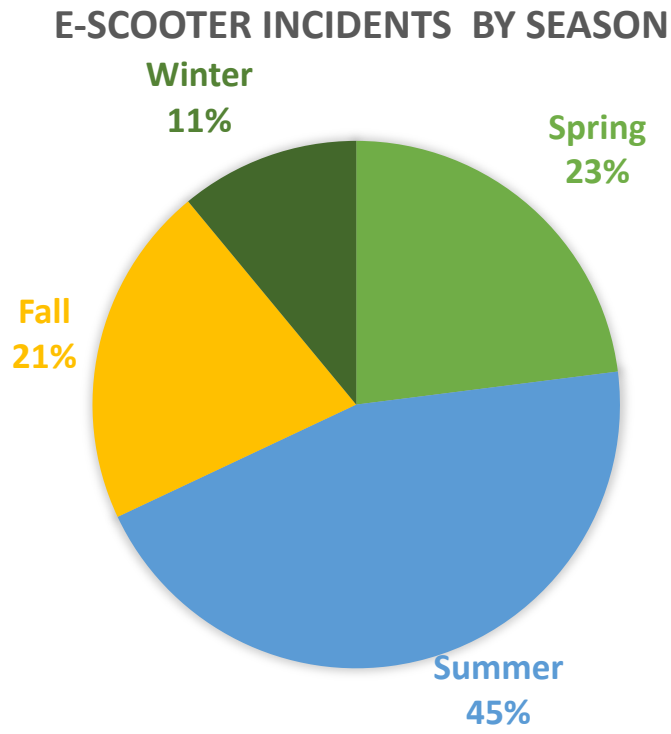
Results:
E-Scooter incidents demonstrate an increasing annual trend



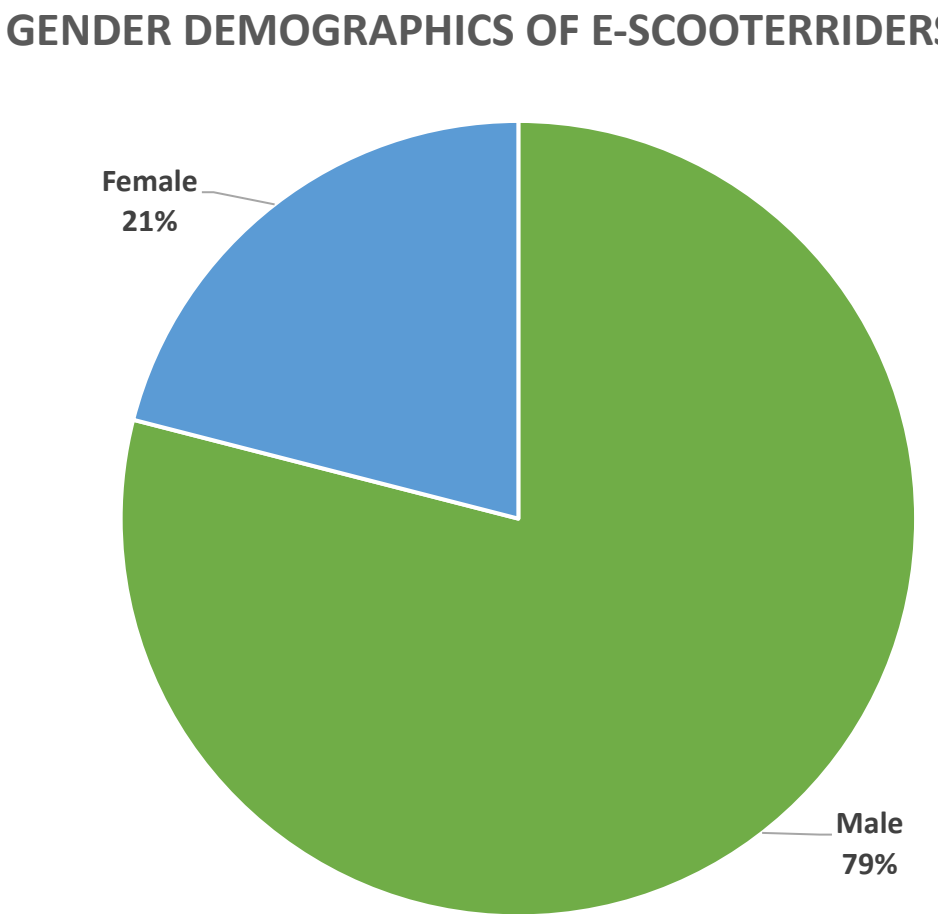
E-Scooter Incidents
More common at Night and in Summer

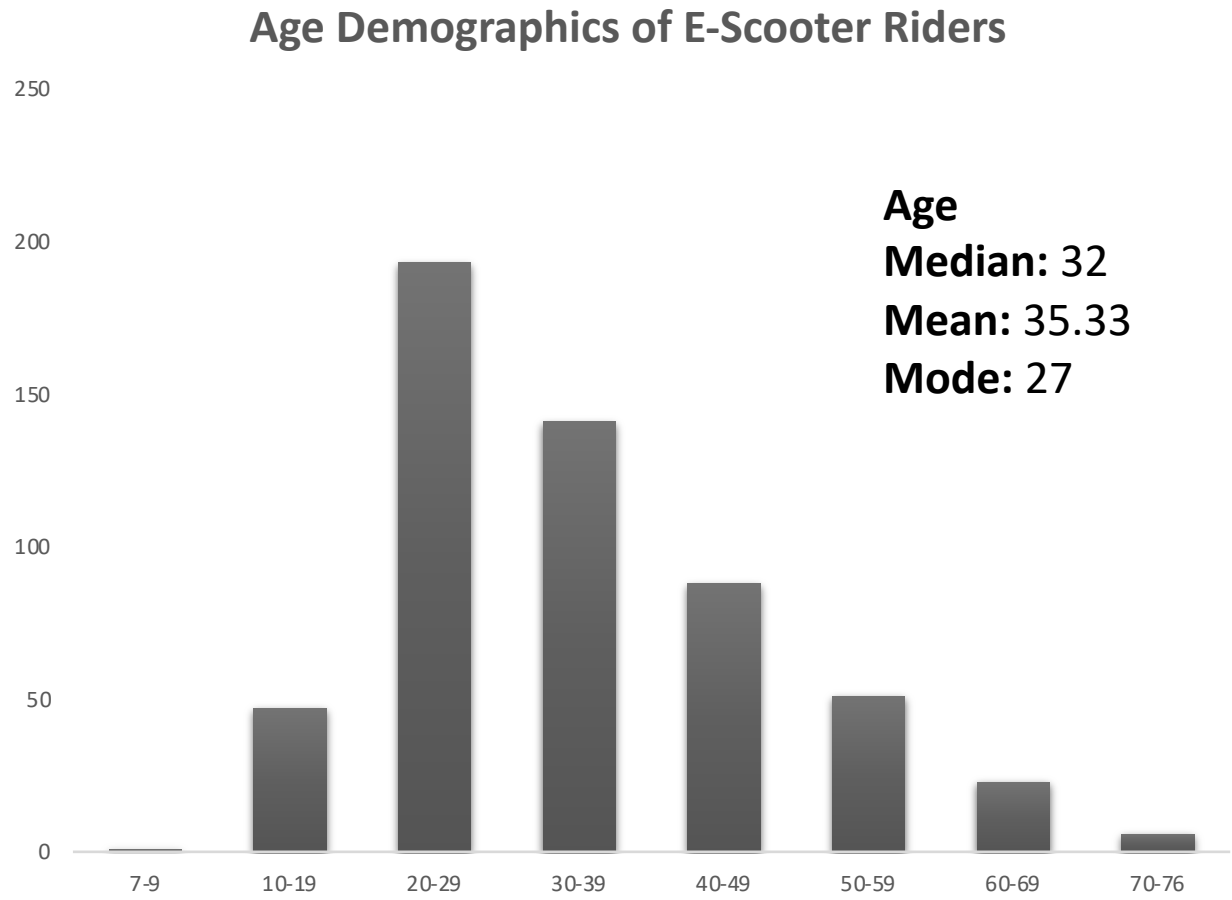


Morning: 6-11:59 AM
Noon: 12-5:59 PM
Evening: 6 PM – 6 AM



E-Scooter Incidents
More common in Males and people 20-29 years-old





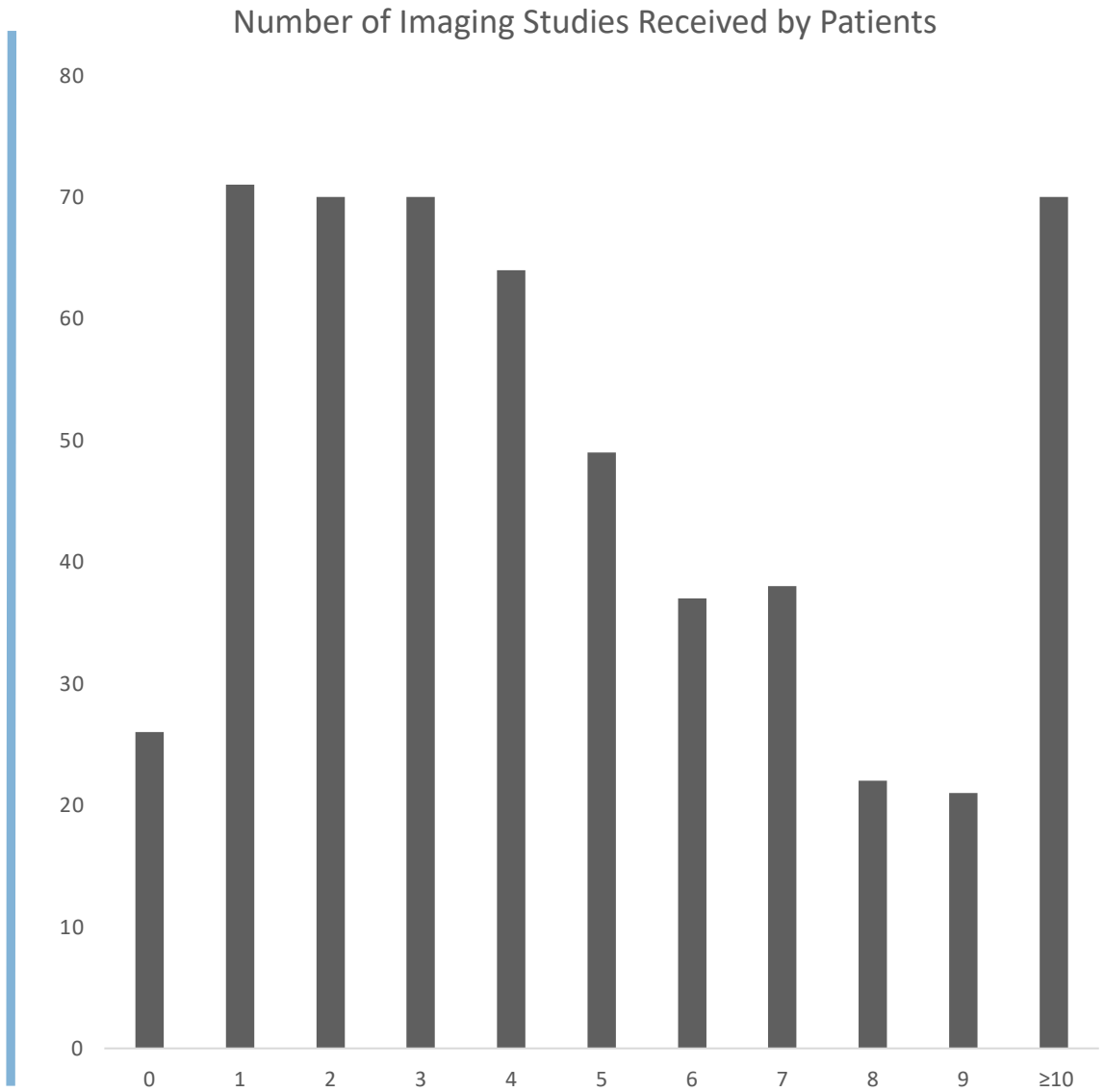
P-Value <0.0001 (Chi-square)

Results

- Day of the week has no correlation with E-Scooter incidents
- Falls and collisions were both a significantly more common mechanism of injury in E-Scooter incidents than pedestrian struck (49% Collision, 47% Fall, 4% Pedestrian)
  - Younger patients were more likely to suffer from a collision
  - Older patients were more likely to suffer from a fall
- 81% of scooter riders were not wearing helmets

Imaging Evaluation

- Overall, the mean # of imaging studies was 5.1, the median was 4, and the range was 0-31
- 70 patients required repeat imaging
  - Mean 2.5 images
- However, 13% (70/537) of patients received 10 or more studies
  - These patients were more likely to be seriously injured (p-value <.0001) and admitted (p-value <.0001)
- 33% (175/537) of imaging studies were abnormal



Imaging Studies - Analysis

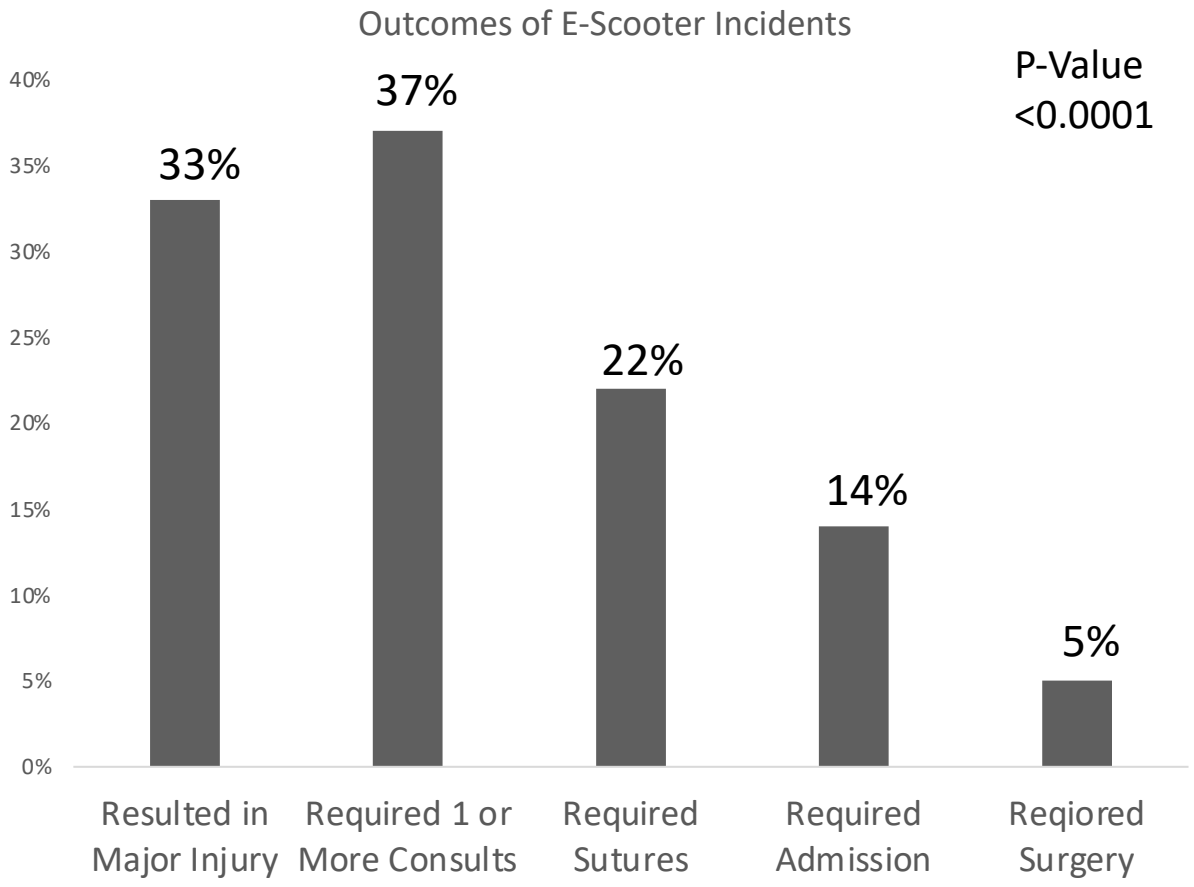
CT Type	N=959
Neuro	669
Body	236
Extremities	54

Almost Half of Scooter Riders (49%) received both an XRAY and CT Scan

E-Fast: 29%
XR: 87%
CT: 58%

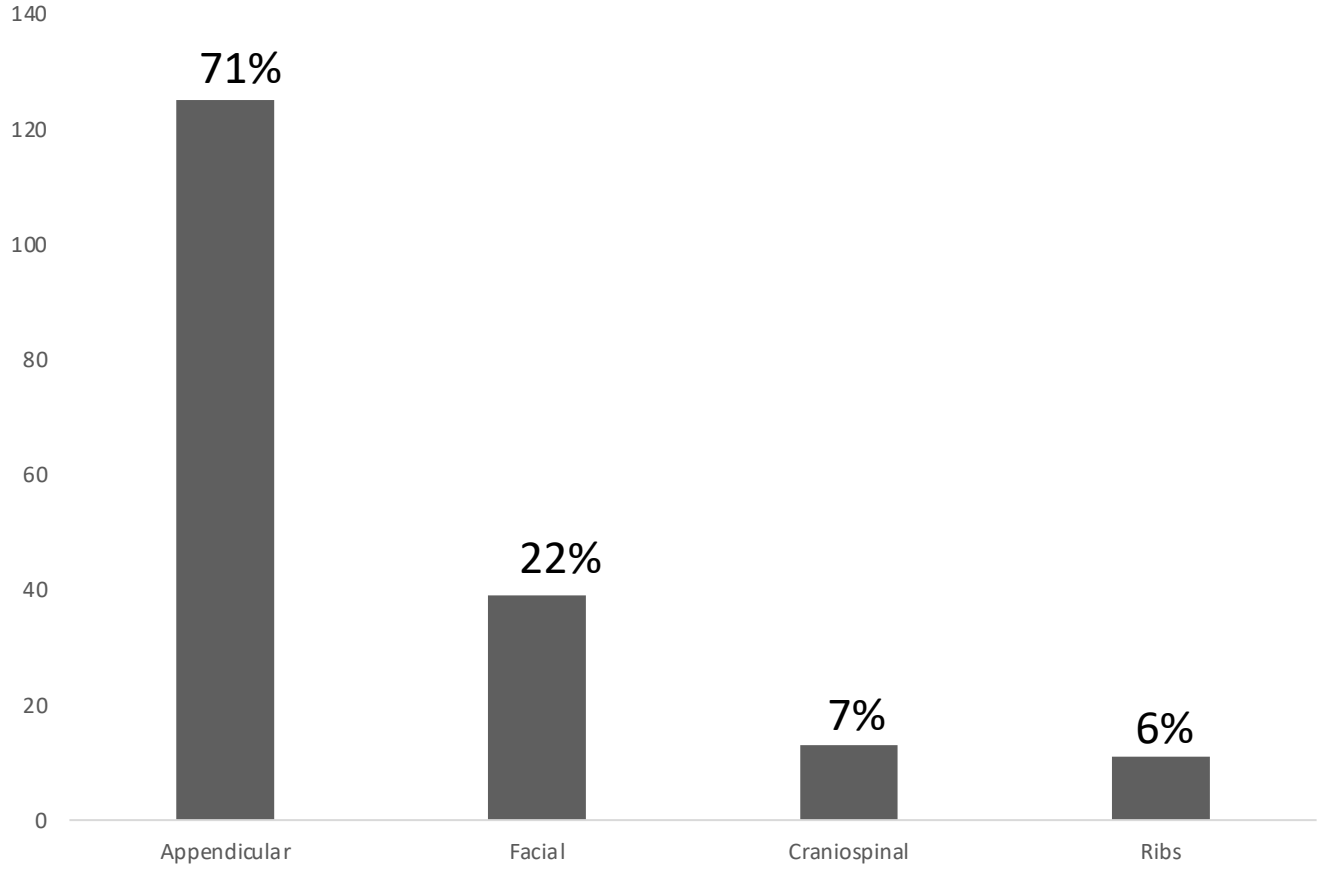
Neuroradiology CT examinations accounted for the majority of CT studies

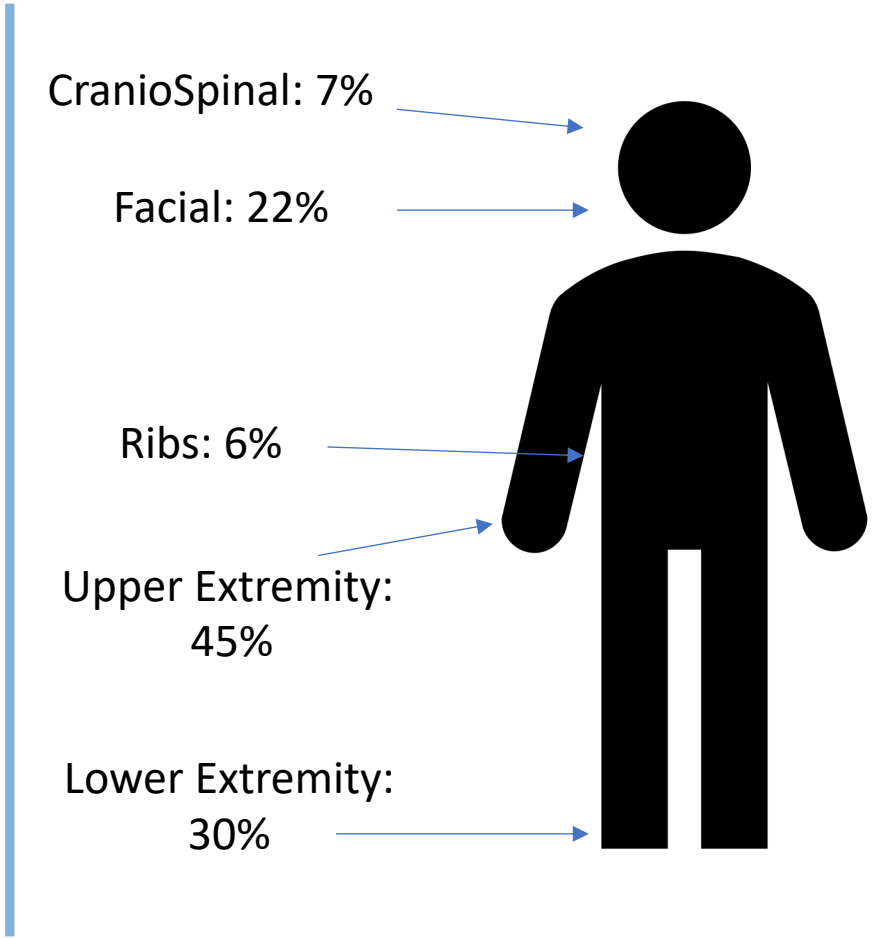
E-Scooter accidents often result in major injury and require significant hospital resources



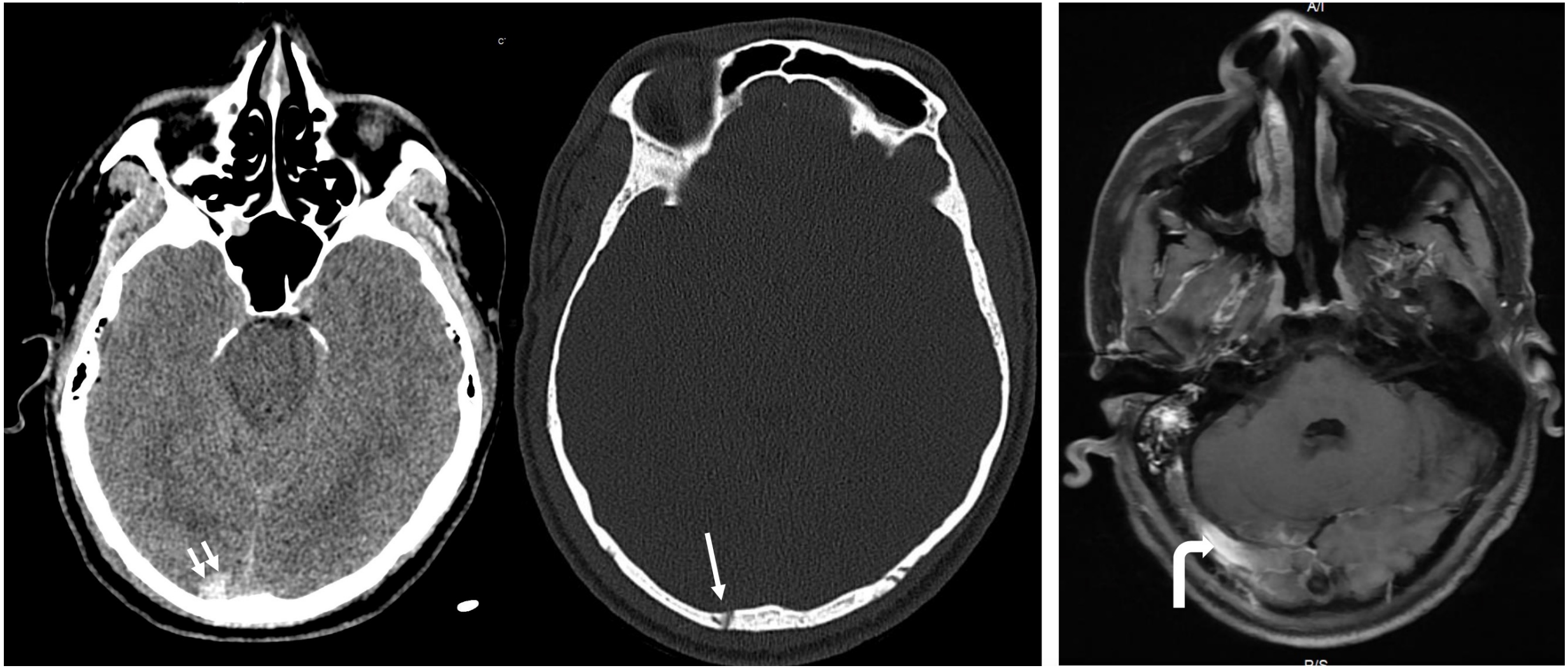
- 33% of E-Scooter incidents required a trauma code activation
  - 77% were a Level-2 trauma
- 33% E-Scooter accidents resulted in major injury, including 1 death
- 37% required additional consultative services

Fracture Location in E-Scooter Accidents

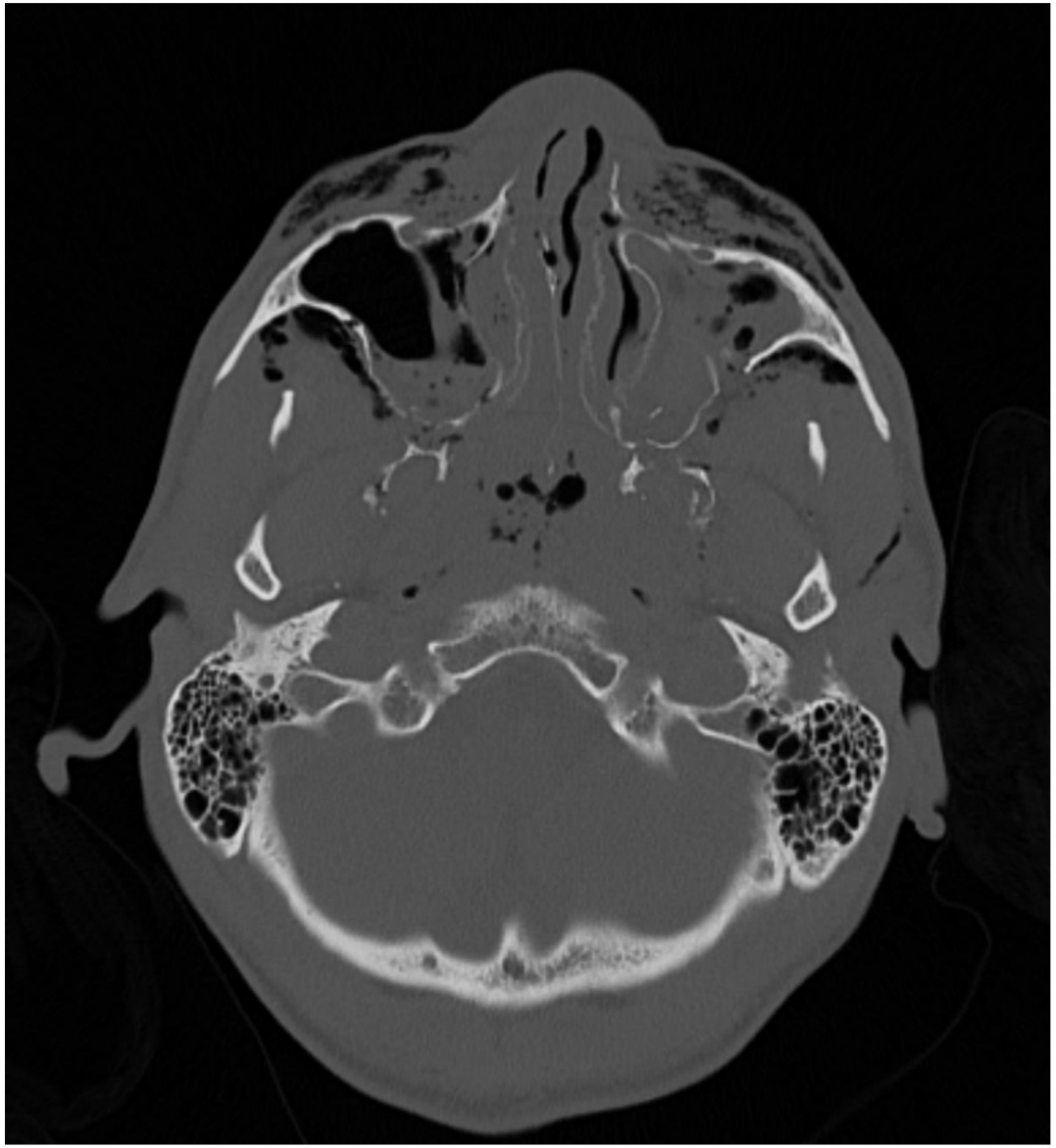




Facial fractures accounted for 22% and craniospinal fractures accounted for 7% of all fractures



40M s/p E-scooter collision with **occipital bone fracture**(arrow) with **focal left occipital hemorrhage** (double arrow) adjacent to superior sagittal sinus and torcula; T1-weighted axial MR image obtained a few days later shows **right transverse sinus thrombosis** (curved arrow)



49M E-scooter collision with **bilateral Lefort fractures**

Discussion

- Scooter accidents are increasing annually and frequently result in major operator-related injuries
  - Extremities
  - Facial
  - Head, spine
- On of the limitations of this study is that it does not account for deaths that occurred within the field

Conclusions

1. E-Scooter use is increasing in urban centers
   - Convenience v necessity
   - Accessibility and affordability
2. E-Scooter accidents are on the rise
   - Associated morbidity is also on the rise
3. Opportunities exist for improving E-scooter safety
   - Training requirements
   - Road safety rules and requirements

References

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Thank you!