

# Gunshot injuries treated at hospitals without trauma units



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May 2015

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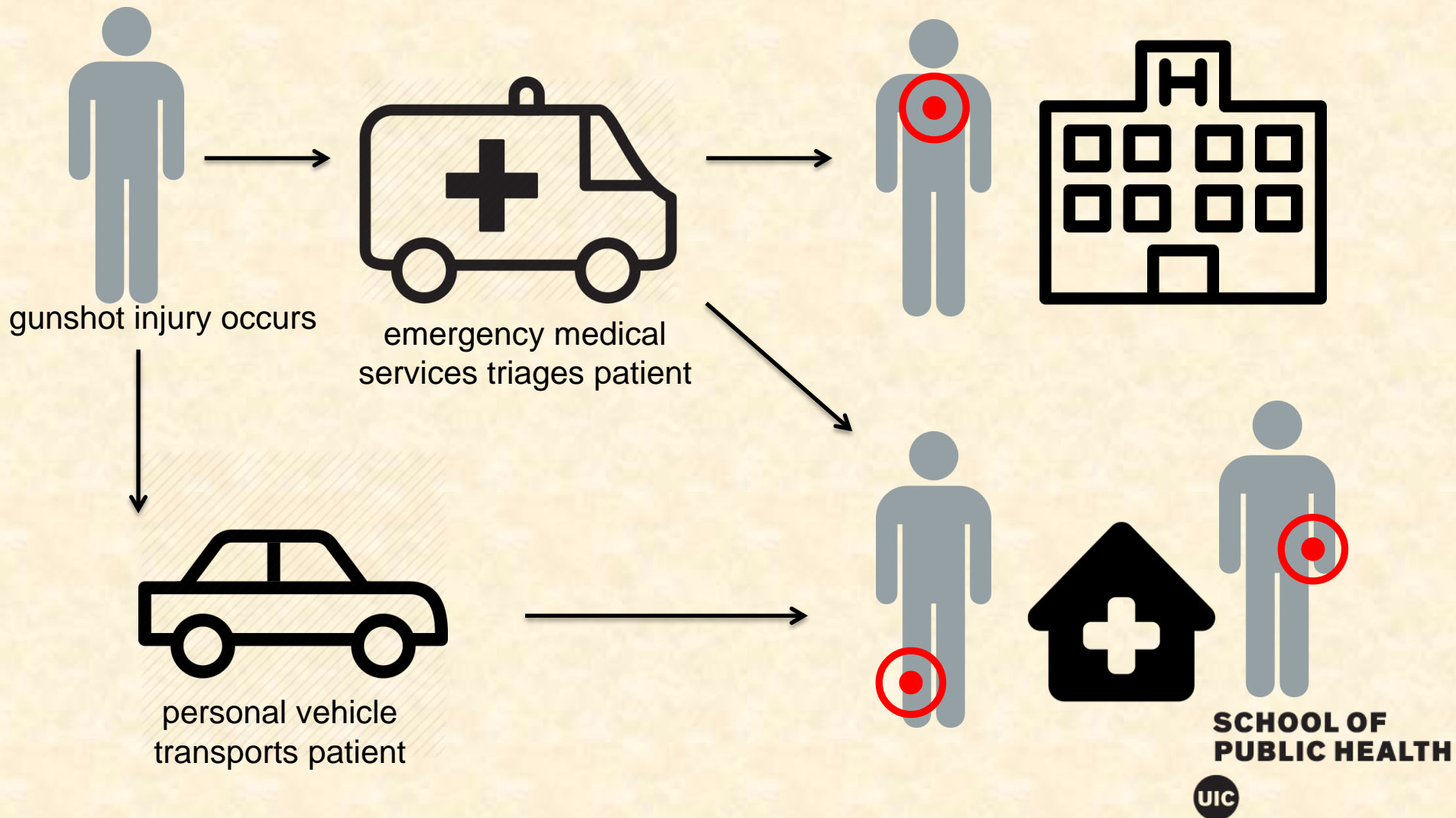
2121 W Taylor, Rm 117, MC 922

[www.illinoisinjuryprevention.org](http://www.illinoisinjuryprevention.org)

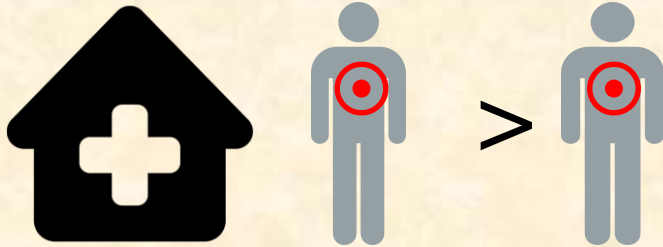
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# Hypothesis



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1. Non-trauma centers are treating gunshot wounds



2. Non-trauma centers will transfer patients who meet trauma center criteria



3. Gunshot wounds treated at the non-trauma center will have worse outcomes

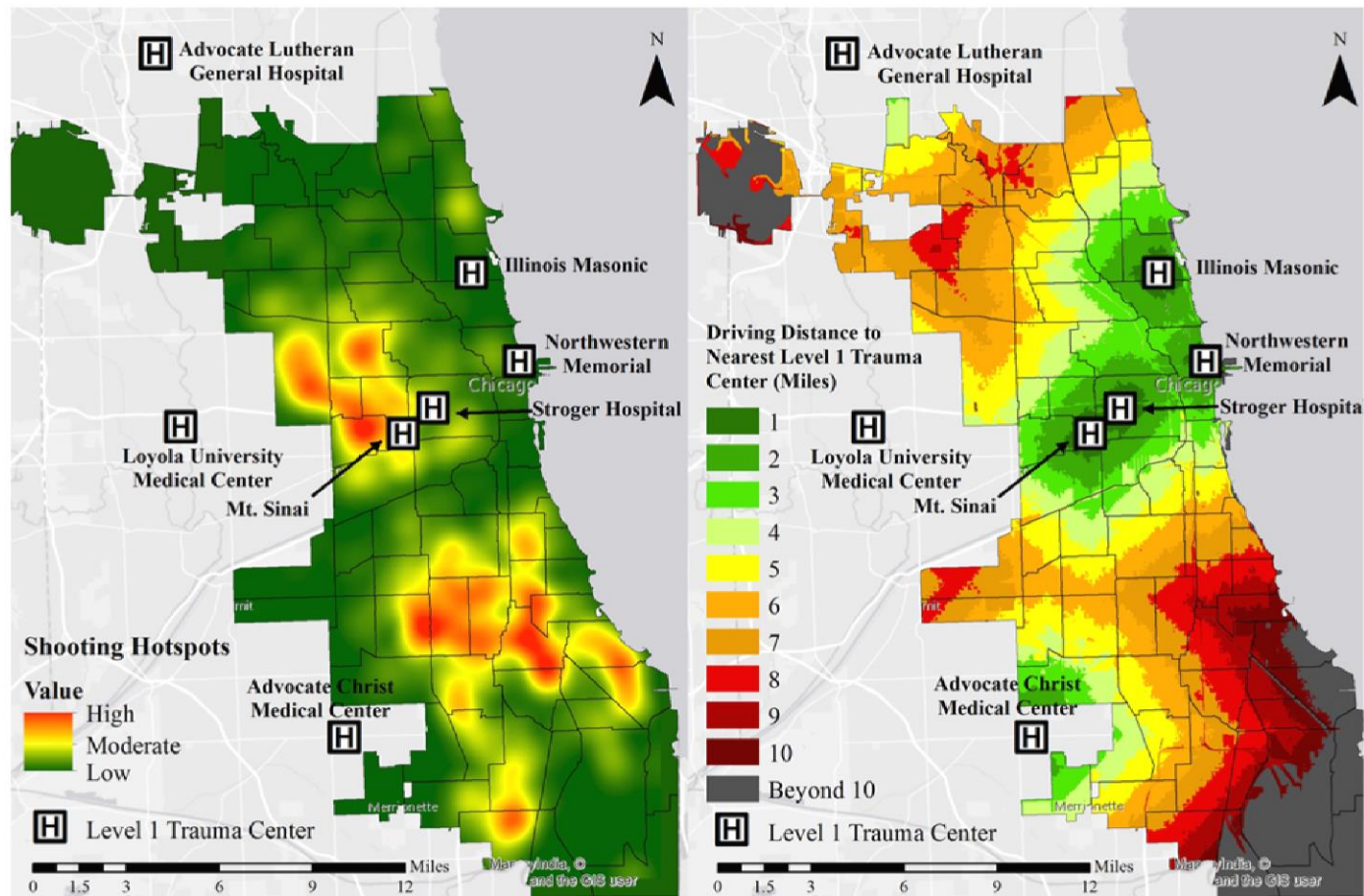
# Background

- Trauma centers
  - Decrease mortality (MacKenzie et al, 2006)
  - Better because of staff experience (Nathens et al., 2001; Haas et al., 2009)
  - Transfers = direct admissions (Rivara et al., 2008; Hill et al. 2011)
- Firearm-related injury research is conducted using Trauma Registry data
- Pre-hospital transport
  - Police transport for penetrating trauma: similar outcomes (Branas et al., 1995; Band et al., 2011)
  - Self transport for trauma: similar outcomes (Cornwell et al., 2000)
  - Self transport for gunshot wounds: 12.6%, decreased mortality (Zafar et al., 2014)
- Non-trauma centers seeing trauma
  - Up to 1/3 of all trauma patients (ISS>15) (Nathens et al., 2004)
  - Under-triage by EMS – 14% of the time for “injury” criteria (Ma et al. 1999), because the trauma center is too far away (Doumouras et al., 2002)

# Background

## Chicago, IL Shooting Hotspots and Level 1 Trauma Centers in 2013

Alex Williams



Sources: City of Chicago GIS, 2010; TigerLine, 2010; Chicago Police Department, 2013; ESRI, 2013; Illinois Department of Public Health, 2014

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# Methods

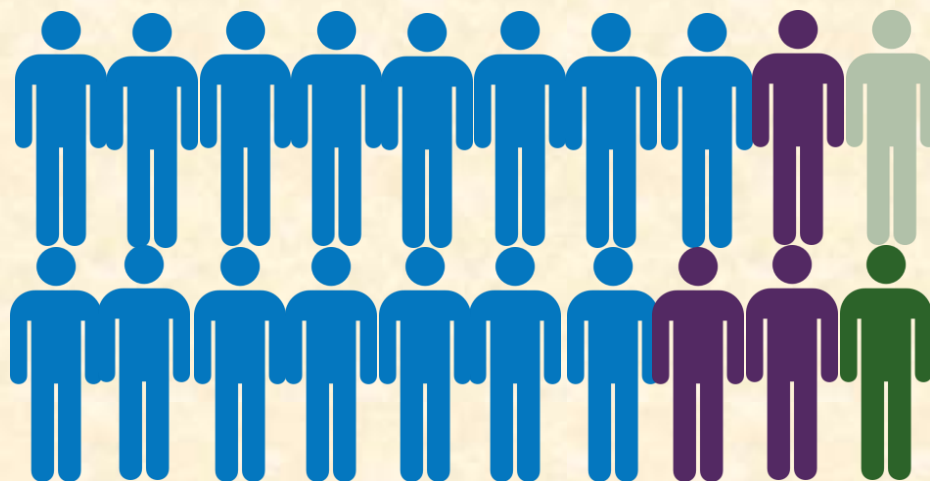
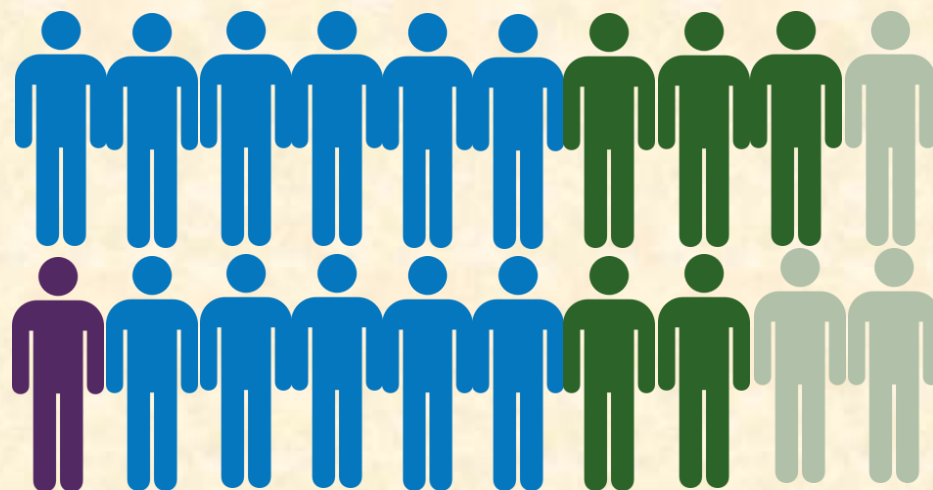
- Retrospective analysis (2009-2013)
- Illinois Inpatient and Outpatient Hospital Databases
- ALL firearm-related injuries (accidents, suicides, assault, legal intervention, undetermined)
- **Split into groups based on site of initial treatment:  
non-trauma center vs. trauma center**
- Linked Dataset
- SAS Enterprise 5.1
  - Table analysis on categorical variables
  - Summary statistics on continuous variables
  - Multivariable Model: ‘Meeting Anatomic Triage Criteria’ to predict in-hospital mortality
- MapUSA GIS software to map by residential zip codes

# Results



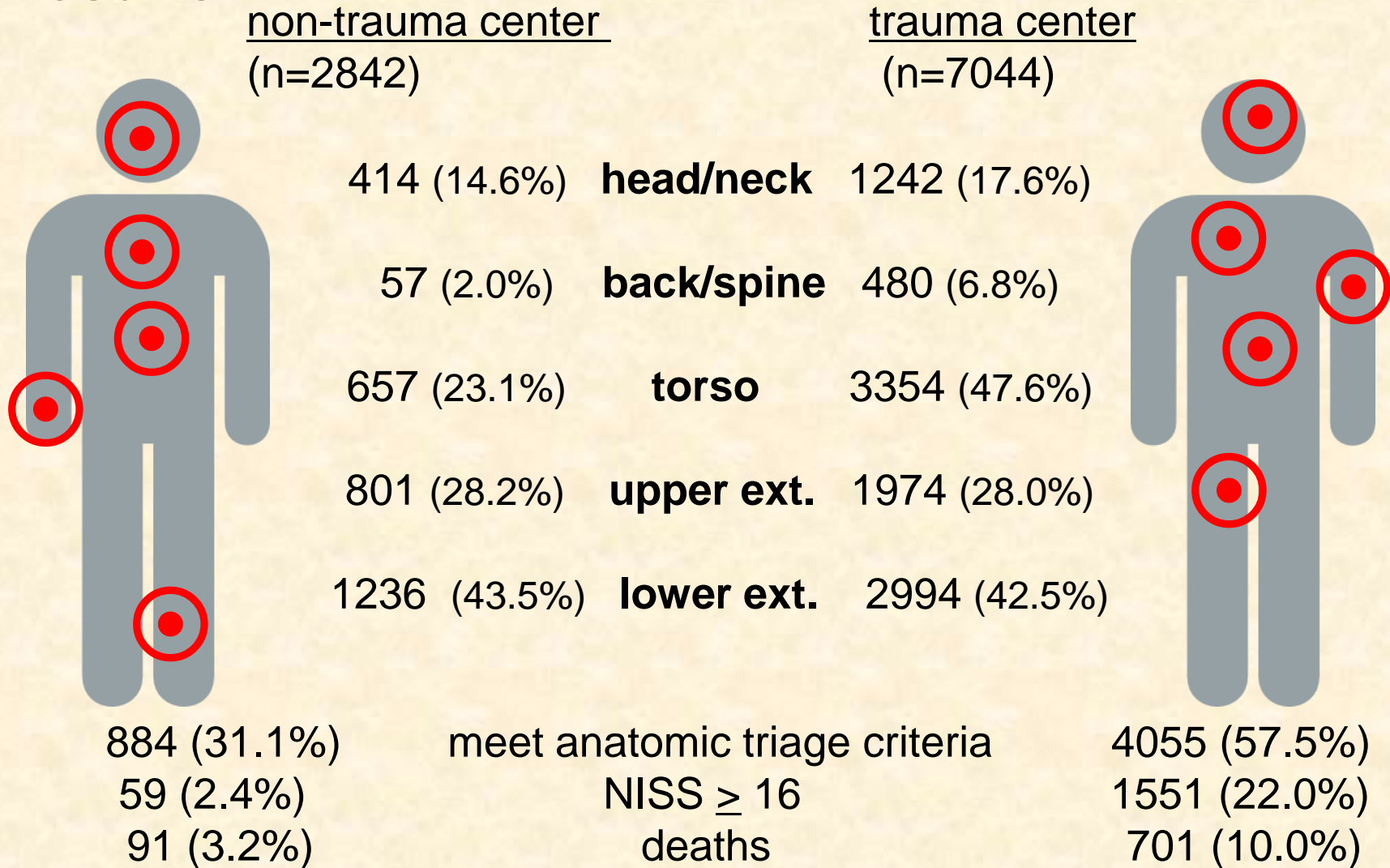
males : females

<15yo : 15-24yo : 25-34yo : >35yo



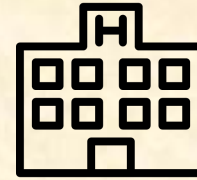
black : hispanic : white : other

# Results





# Results



Home

Long-term  
care

AMA

Hospital

Another  
institution

Non-trauma  
(n=2842)

1984  
(69.8%)

35  
(1.2%)

55  
(1.9%)

519  
(18.3%)

88  
(3.1%)

Trauma  
(n=7044)

5784  
(82.1%)

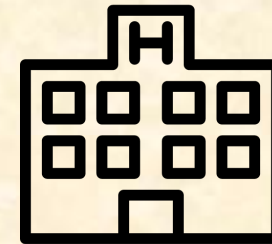
260  
(3.7%)

126  
(1.8%)

102  
(1.2%)

48  
(0.7%)

Of the 519 transfers, could only track 218 to a second hospital in the trauma region (192 to a trauma center)



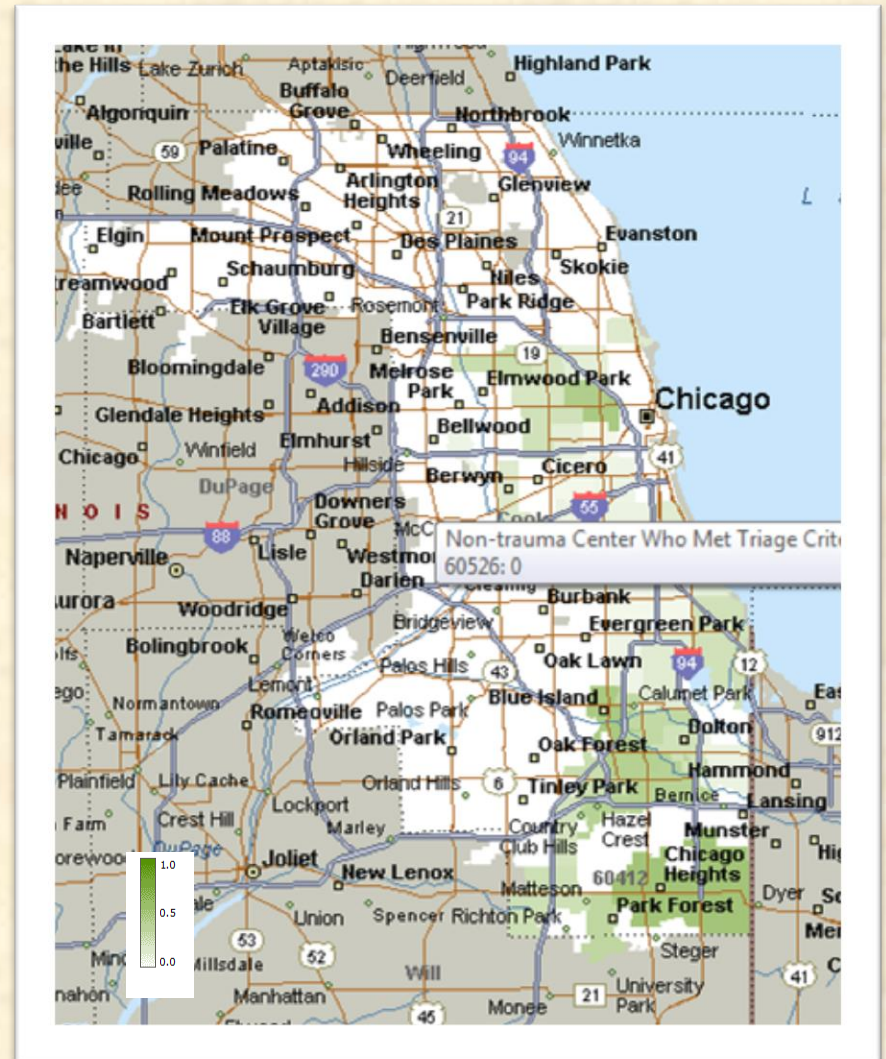
884 meet triage criteria: 66 died (15 after a day) → 92 transferred: 7 died  
 1958 did not meet criteria: 15 died (3 after a day) → 100 transferred: 3 died

# Results

Meet triage criteria:  
# treated at a non-trauma center



Meet triage criteria: proportion  
treated at a non-trauma center



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# Discussion

- Gunshot wounds are not studied at non-trauma centers, but they are being treated there
  - 27.8% of all shooting victims
- Most gunshot wounds treated there were minor, but almost a third (31.1%) met triage criteria
  - self transport vs. EMS under triage
- Meeting triage criteria does not mean you will get transferred
  - being “held onto” or “blocked” or neither
- 81 people died from gunshot wounds at the non-trauma center
  - 18 after a day long stay
  - low NISS

## Limitations

- Retrospective analysis on billing data (not surveillance data)
- Generalizability
- Outcomes difficult to compare because non-trauma center patients had lower severity

# Final Summary

## 1. Self-transport issue

- Geography points to a structural issue
- *Consider* designating a new trauma center

## 2. Some patients need higher level care

- Streamline inter-hospital coordination

## 3. Not just gunshot wounds

- Need for surveillance of non-trauma centers

**Questions?**