Safer Streets: Prioritizing Intersections for Improvements

July 16, 2018
Problem

- 4 people killed in crashes while cycling in April 2018
- 160 walkers & 14 cyclists killed in 2016 & 2017
- Distribution across geography & demographics
Purpose

• Improve safety for all road users through systemic change
• “address non-motorized safety issues and help communities create safer, better connected bicycling and walking networks”
   (U.S. DOT Safer People, Safer Streets Initiative)
• Identify needs and locations based on objective criteria
• Prioritize safety improvements and maintenance for the most vulnerable road users (pedestrians and cyclists)
Question

What are the 10 most dangerous intersections for people walking or biking in Houston?
Local Planning & Academic Research

• Local Planning/Engineering
  • Pedestrian & Bicyclist Special District Studies, Houston-Galveston Area Council (H-GAC)
  • Top Ten Intersections for Phase 2 (Ongoing), City of Houston PWE
  • And others

• Academic Research
  • Identification of High Pedestrian Crash Locations (March 2018), Federal Highway Administration (FHWA)
  • Synthesis of Methods for Estimating Pedestrian and Bicyclist Exposure to Risk at Areawide Levels and on Specific Transportation Facilities (January 2017), FHWA
  • And many others
Equitable Crash-based Baseline Method

- Use crashes to systematically identify dangerous intersections
  - Identify crash locations *(TxDOT CRIS)*
  - Weight crash impacts by severity *(USDOT value of statistical life)*
  - Identify intersections *(OpenStreetMap, January Advisors help)*
  - Sum crash impacts within 150’ of each intersection
  - Rank order intersections

- Ascertain context and demographic characteristics
- Compare list to other prioritized lists of intersections
12,707 Crashes Impacting a Pedestrian or Bicyclist in Harris County

Source
TxDOT Crash Records Information System (CRIS) from January 1, 2013 to December 31, 2017 as accessed and analyzed by LINK Houston on June 7, 2018.
**People Injured or Killed in a Crash in Harris County, 2013-2017**

**12,707**  
The number of pedestrians or bicyclists impacted in a crash from 2013 to 2017—about 7 crashes each day.

**618 killed**  
618 killed  
- 562 Pedestrians  
- 56 Bicyclists

**1,634 seriously injured**  
1,634 seriously injured  
- 1,316 Pedestrians  
- 318 Bicyclists

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percentage</th>
<th>Gender</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>83%</td>
<td>Female</td>
<td>41%</td>
</tr>
<tr>
<td>Female</td>
<td>17%</td>
<td>Male</td>
<td>59%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Percentage</th>
<th>Race/Ethnicity</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>White</td>
<td>39%</td>
<td>Black</td>
<td>34%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>27%</td>
<td>Hispanic</td>
<td>31%</td>
</tr>
<tr>
<td>Black</td>
<td>29%</td>
<td>White</td>
<td>28%</td>
</tr>
<tr>
<td>Asian</td>
<td>4%</td>
<td>Asian</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage</th>
<th>Age</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 or under</td>
<td>23%</td>
<td>17 or under</td>
<td>18%</td>
</tr>
<tr>
<td>18 to 64</td>
<td>72%</td>
<td>18 to 64</td>
<td>74%</td>
</tr>
<tr>
<td>65 or more</td>
<td>5%</td>
<td>65 or more</td>
<td>9%</td>
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</tbody>
</table>

Learn More: [www.linkhouston.org](http://www.linkhouston.org)  
See a Map: [https://arcg.is/1C0eum](https://arcg.is/1C0eum)

Data source: Texas Department of Transportation Crash Records Information System. Maps created using ArcGIS Online.
Crashes Weighted by Value of Prevention

**Note**
LINKHouston used the U.S. Department of Transportation’s 2016 Value of Statistical Life (i.e., value of preventing a fatality or injury on a U.S. roadway) to weight each crash based on severity. The value of preventing a roadway fatality is estimated to be $9.6m. LINK Houston found that Harris County experienced about $6.76bn in ped/bike impacts over the five year period.
57,610 Houston Intersection Points

Source
Based on OpenStreetMap data analyzed by Jeff Reichman of January Advisors at the request of LINK Houston.
Top Ten Priority Intersections for Safer Streets for Pedestrians & Cyclists

Large black bullseyes mark the top ten most dangerous intersections.

Note
Pink circles indicate the weighted value of preventing pedestrian and bicyclist crashes that occurred from 2013 to 2017 within 150’ of each intersection.
Houston’s Safer Streets Priority Intersections for People Walking & Biking

July 12, 2018 Version
Safer Streets Priority Intersections for People Walking & Biking

Neighborhood ............... Sharpstown
# of crashes .................. 7 (6 walking, 1 biking) 1 ped death
Value of prevention .......... $12.9m
# population in tract a ....... 6,768 48201432902
% HHs in poverty a .......... 29%
% HHs with no vehicle a .... 17%
# jobs in proximity b ......... 536
# schools within ¼-mile c .... 3
# transit stops adjacent d ... 4 (764 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
**Safer Streets Priority Intersections for People Walking & Biking**

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Greater Greenspoint</th>
</tr>
</thead>
<tbody>
<tr>
<td># of crashes</td>
<td>6 (4 walking, 2 biking) <strong>1 ped death</strong></td>
</tr>
<tr>
<td>Value of prevention</td>
<td>$13.0m</td>
</tr>
<tr>
<td># population in tract</td>
<td>7,462</td>
</tr>
<tr>
<td>% HHs in poverty</td>
<td>52%</td>
</tr>
<tr>
<td>% HHs with no vehicle</td>
<td>10%</td>
</tr>
<tr>
<td># jobs in proximity</td>
<td>271</td>
</tr>
<tr>
<td># schools within ¼-mile</td>
<td>3</td>
</tr>
<tr>
<td># transit stops adjacent</td>
<td>3 (224 weekday boardings/alightings)</td>
</tr>
</tbody>
</table>

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets Priority Intersections for People Walking & Biking

Neighborhood: Alief
# of crashes: 8 (8 walking, 0 biking) 1 ped death
Value of prevention: $13.0m
# population in tract: 2,780
% HHs in poverty: 36%
% HHs with no vehicle: 10%
# jobs in proximity: 720
# schools within ¼-mile: 3
# transit stops adjacent: 4 (150 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets Priority Intersections for People Walking & Biking

Greater Fondren Southwest
12 (11 walking, 1 biking) 1 ped death

Value of prevention 
$14.3m

# population in tract 
5,142

% HHs in poverty 
20%

% HHs with no vehicle 
14%

# jobs in proximity 
791

# schools within ¼-mile 
2

# transit stops adjacent 
3 (504 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
### Safer Streets Priority Intersections for People Walking & Biking

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>AstroDome Area/Greater OST/Macgregor</th>
</tr>
</thead>
<tbody>
<tr>
<td># of crashes</td>
<td>2 (2 walking, 0 biking) 2 ped deaths</td>
</tr>
<tr>
<td>Value of prevention</td>
<td>$14.4m</td>
</tr>
<tr>
<td># population in tract</td>
<td>2,447 4820131700</td>
</tr>
<tr>
<td>% HHs in poverty</td>
<td>18%</td>
</tr>
<tr>
<td>% HHs with no vehicle</td>
<td>16%</td>
</tr>
<tr>
<td># jobs in proximity</td>
<td>194</td>
</tr>
<tr>
<td># schools within ¼-mile</td>
<td>0</td>
</tr>
<tr>
<td># transit stops adjacent</td>
<td>2 (63 weekday boardings/alightings)</td>
</tr>
</tbody>
</table>

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets Priority Intersections for People Walking & Biking

Neighborhood: Gulfton/Mid West/Sharpstown

- # of crashes: 5 (3 walking, 2 biking) 1 ped / 1 bike death
- Value of prevention: $14.6m
- # population in tract: 5,019
- % HHs in poverty: 33%
- % HHs with no vehicle: 20%
- # jobs in proximity: 431
- # schools within ¼-mile: 1
- # transit stops adjacent: 1 (269 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets Priority Intersections for People Walking & Biking

Neighborhood: Spring Branch West
# of crashes: 4 (4 walking, 0 biking) 1 ped death
Value of prevention: $14.7m
# population in tract: 4,324
% HHs in poverty: 38%
% HHs with no vehicle: 10%
# jobs in proximity: 431
# schools within ¼-mile: 2
# transit stops adjacent: 2 (303 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets Priority Intersections for People Walking & Biking

Neighborhood ........................................... Eldridge West Oaks/Briar Forest
# of crashes ........................................... 11 (9 walking, 2 biking) 1 ped death
Value of prevention ................................. $17.2m
# population in tract ................................. 8,936 48201452000
% HHs in poverty ..................................... 16%
% HHs with no vehicle ............................... 5%
# jobs in proximity ................................. 726
# schools within ¼-mile ......................... 1
# transit stops adjacent ....................... 4 (371 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets Priority Intersections for People Walking & Biking

Neighborhood: Sharpstown

- # of crashes: 11 (10 walking, 1 biking), 1 ped death
- Value of prevention: $18.5m
- # population in tract: 5,967 (48201433003)
- % HHs in poverty: 52%
- % HHs with no vehicle: 23%
- # jobs in proximity: 409
- # schools within ¼-mile: 2
- # transit stops adjacent: 2 (268 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets Priority Intersections for People Walking & Biking

Neighborhood: Downtown (near Midtown)
# of crashes: 13 (11 walking, 2 biking) 2 ped deaths
Value of prevention: $25.1m
# population in tract: 4,621
% HHs in poverty: 18%
% HHs with no vehicle: 17%
# jobs in proximity: 2,206
# schools within ¼-mile: 0
# transit stops adjacent: 1 (53 weekday boardings/alightings)

Sources: A. H-GAC Demographic Data Explorer, B. H-GAC Activity-Connectivity Explorer, C. Google Maps, D. Houston METRO
Safer Streets for People Walking & Biking

Priority Intersections

**LINK Houston Crash-based**
1. Fannin & Pierce
2. Ranchoester & Bellaire
3. Westheimer & S Dairy Ashford
4. Long Point & Gessner
5. Westpark Dr & U.S. 59 South
6. Old Spanish Trail & 288 South
7. Fondren & West Bellfort
8. Bissonnet & Wilcrest
9. West & Airline
10. Bellaire & S Gessner

**BikeHouston Members**
1. Sunset & Main & Fannin*
2. Shepherd & Allen Pkwy & Kirby
3. Taylor & Spring & MKT Trl
4. 11th St & Nicholson
5. West 610 & Woodway & Arbor. Trl
6. Houston & Spring & MKT Trl*
7. Hawthorne & Spur 529 & Holman
8. Patterson & Washington
9. Waugh/Heights & Memorial
10. Weslayan & Westpark/US 59
11. Morningside & Bellaire

**COH PWE Phase 2 Draft**
1. Patton & Irvington
2. Renwick & Dashwood
3. Renwick & Elm
4. 11th & Nicholson
5. White Oak & Heights Trail
6. Crawford & Hermann
7. Hawthorne & Bagby
8. Eldridge & Rincon
9. Eldridge & Whittington
10. Townwood & Orem

* Project already in progress

Additional refinements needed...
And could include a variety of unbiased data (Census, roadway class, etc) or neighborhood specific data (i.e., Complete Communities, EEDC Built Environment Report, Rice Kinder Gulfton Near-Miss Study, etc).
Safer Streets for People Walking & Biking

Next Steps

Using the priority intersections...

• Create an investigation task force
  • COH: PWE, PD, HPD
  • Other Stakeholders: METRO, Harris County, TxDOT, Mgt. Districts, etc
• Establish investigation protocol and countermeasure matrix
  (Leverage tools created by FHWA or peer cities)
• Investigate intersections and make recommendations for infrastructure, enforcement, and education improvements
• Implement recommendations
• Document lessons learned applicable at other intersections and along travel corridors
Questions / Discussion

Webmap: [https://arcg.is/1C0eum](https://arcg.is/1C0eum)
Small Area Methodology Example with 3-1-1 Comparison
Crashes Impacting Pedestrians or Bicyclists
Crashes Weighted
Houston Intersection Points
Intersections Weighted by Crashes within 150’
Relevant 3-1-1 Service Requests per Intersection

Note
LINKHouston analyzed 2013-2017 3-1-1 data from the City of Houston.