Systematic Safety:
The Principles Behind Europe’s
Vision Zero
We Have a Huge Traffic Safety Problem

Boston
2-3 EMS responses per day to pedestrian or bike crash
15 deaths per year

US
35,000 deaths per year
Deaths and Injuries Aren’t the Only Measure of Unsaftety

Vulnerable users are shut out

- Children walking to school has fallen from 50% (1960) to 10%
- Bicycling is limited to a hardy few

Source: People for Bikes
Where it’s safe, people will ride

Bicycle use (km / person / year)

Cyclist deaths per billion km ridden
If we’d improved as Netherlands did, we’d be saving 20,000 lives per year.
Traffic Safety Programs

- Netherlands: Sustainable Safety (1997)
- US Cities: Vision Zero
Europe’s Vision Zero: 
What Are the Values?

Value # 1: **Safe Mobility is a Civil Right**

Meanwhile, the nearest crossing is 0.3 miles away!

8 ft wide platform makes this bus stop “accessible”, per ADA
Value # 2: The road system owner is responsible for ensuring road safety

*If our road system were treated like any other industry, it would be shut down immediately for gross safety violations*

2011: Mother found guilty of *vehicular homicide* for crossing this street with her son.

1788 Austell Road, Marietta, Georgia (Google Maps)
Value # 3: Traffic safety programs must be proactive, eliminating safety risks before they cause serious injury or death.

Reacting to historic crashes: necessary, but not sufficient

Data collection and analysis: valuable, but no excuse to delay action

A Tremont Street intersection treated after a pedestrian was injured. What about the other intersections just like it?
Why Do Traffic Injuries Happen?

• Humans are vulnerable
  – Clear implications for *speed* and for *separation*

• Humans make mistakes
  – A system that is safe only as long as people don’t make mistakes isn’t a safe system
  – Implications for roadway design

• This leads to 5 principles of Systematic Safety that underlie Vision Zero in Netherlands
Principles of Systematic Safety

1. Speed control and separation
2. Functional harmony
3. Predictability and Simplicity
4. Forgivingness and Restrictiveness
5. State awareness
A Policy / Action Plan for Boston for implementing Systematic Safety

1. Speed control
2. Road diets
3. Separation and recognizability for bikes
4. Safe crossings
5. Long term policies for reducing auto use
Action Plan #1: Speed Control

a. Target speed policy

<table>
<thead>
<tr>
<th>Road type</th>
<th>Target Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local streets</td>
<td>20 mph</td>
</tr>
<tr>
<td>Other streets with closely pedestrian crossings</td>
<td>25 mph</td>
</tr>
</tbody>
</table>

Different from a speed limit
b. Treatments to achieve speed targets

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<thead>
<tr>
<th>Road type</th>
<th>Target Speed</th>
<th>Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local streets</td>
<td>20 mph</td>
<td>Speed humps, STOP signs, chicanes*, neighborhood traffic circles</td>
</tr>
<tr>
<td>1+1 lane streets</td>
<td>25 mph</td>
<td>Crossing islands with a chicane* effect</td>
</tr>
<tr>
<td>Multi-lane streets</td>
<td>25 or 30 mph</td>
<td>Traffic signal timing that limits speeding opportunities</td>
</tr>
</tbody>
</table>

*Chicane = obstructions that force drivers to turn / slalom
Speed control treatment for 1+1 lane roads: crossing islands with a chicane effect
Speed control for 1+1 lane roads

Dudley Street, Roxbury (Google Maps)
Kraneweg, Groningen, Netherlands
Bus stop
Treating Dudley Street with crossing island chicanes
- Safer street
- Safer crossings
- Lose a few parking spaces

Intersection to intersection: 345 ft
Island to island: 200 ft
c. Implementation – Budget & Staffing

“Neighborhood Slow Streets,” a pilot program, was budgeted for 2 small neighborhoods in 2016

What pace of implementation will the City support?
Action Plan #2: Road Diets

• Convert 2+2 lanes to 1+1 lanes, with turn pockets so that turning vehicles don’t block a lane

• Smaller *is* better
  – Speed control
  – Safer crossings
  – Create space for bike lanes

• Promoted nationwide by FHWA
Road Diet: candidate streets

1. Tremont St, South End
2. Beacon St, Back Bay
3. Mass. Ave., Newmarket (Melnea Cass to Columbia Rd)
4. Southampton Street, Newmarket (Melnea Cass to I-93 ramps)
5. Cambridge Street, Beacon Hill
6. Cummins Highway
7. Washington Street, West Roxbury
8. Morton Street south of Gallivan Blvd
9. Centre Street, West Roxbury
10. Martin Luther King Blvd
11. Malcomb X Blvd
12. Day Blvd (DCR)
13. Truman Parkway / Brush Hill Rd (partly in Milton) (DCR)
Action Plan #3: Separation and Recognizability for Bikes

a. A policy on preferred form of separation

<table>
<thead>
<tr>
<th>Road type</th>
<th>Preferred separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multilane roads and greenway routes</td>
<td>Separate bike path</td>
</tr>
<tr>
<td>1 + 1 lane roads</td>
<td>bike lane OK except in commercial areas where parking pressure is strong, where a separate bike path is preferred</td>
</tr>
<tr>
<td>Unlaned roads with ADT &lt; 3000</td>
<td>Mixed traffic</td>
</tr>
<tr>
<td>Unlaned roads with ADT &gt; 3000</td>
<td>Advisory lanes</td>
</tr>
</tbody>
</table>
b. Engineering innovation

- Advisory bike lanes for minor collectors
  - Walworth St (Roslindale)
  - Perkins St (JP)
  - Parker St (near Wentworth)
b. Engineering innovation

• Contraflow
  – With a marked contraflow lane
  – Without

Brookline, MA
c. Recognizability: Colored bike lanes
Action Plan #4: Safe Crossings

a. Policy on unsignalized crossings
   – Never cross more than 2 through lanes at a time
   – Prefer crossing 1 lane at a time
   – Zebra striping
   – Treatments to improve compliance
     • Beacons
     • Raised crossings
     • In-street yield signs
b. Raised crossings for cycle tracks at unsignalized intersections (Western Ave., Cambridge)

c. Signal timing policies for improving pedestrian and bicycle safety
   – No permitted lefts on multilane roads
   – Preference to short cycles (less priority to coordination)
   – Avoid forcing peds to make multi-stage crossings
Action Plan #5: Long term policies for reducing vehicle dependence

• Rational parking pricing
  – current pilot program in Back Bay and Seaport

• Better transit
  – Transit priority treatments

• Transit-oriented development
Changing the Culture

• In the Netherlands, “Sustainable Safety” has taken over transportation planning and engineering

• It’s worth it!