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A No-Crash Course in Vision Zero Data

Anamaria Perez
Portland (Or.). Bureau of Transportation

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A No-Crash Course in Vision Zero Data

Anamaria Perez | Vision Zero Data Analyst | PBOT
TREC Friday Transportation Seminar Series | April 24, 2020
Outline

• Quick Vision Zero 101
• Vision Zero Action Plan 2016
• Data-Driven vs Data-Informed
• Data Limitations
• Current Vision Zero Projects
• Summary and Closing
Vision Zero Portland

The City of Portland’s commitment to eliminating traffic deaths and serious injuries.

June 2015
Portland City Council unanimously passed a resolution committing Portland to Vision Zero

December 2016
Portland City Council unanimously adopted the Vision Zero Action Plan
Vision Zero Action Plan

• Big picture of how Vision Zero would be implemented in Portland

• Answers why, what, where, how, and who

• Foundation for the work we are doing today

• Today we will focus on the what and where
High Crash Network
Motor Vehicle High Crash Network

**MOTOR VEHICLE HIGH CRASH NETWORK**

Top roads on which people driving vehicles are killed or seriously injured

- SE Division St
- SE Powell Blvd
- Columbia Blvd
- NE Glisan St
- Burnside
- SE Stark St
- Lombard St
- Sandy Blvd
- NE Halsey St
- Marine Dr
- SE Foster Rd
- 82nd Ave
- SE Holgate Blvd
- Broadway
- Fremont St
- SW Barbur Blvd
- Killingsworth St
- 122nd Ave
- NE Airport Way
- SW Beaverton Hillsdale Hwy

- = Death
- = Serious Injury

= Low-income communities & communities of color

VISION ZERO

PBOT
Pedestrian High Crash Network
Bicycle High Crash Network

BICYCLE HIGH CRASH NETWORK
TOP ROADS ON WHICH PEOPLE RIDING BICYCLES ARE KILLED OR INJURED

- BROADWAY
- SE DIVISION ST
- BURNSIDE
- SE POWELL BLVD
- SE HAWTHORNE BLVD
- 82ND AVE
- NE MLK JR BLVD
- 122ND AVE
- SE STARK ST
- N INTERSTATE AVE
- SE HOLGATE BLVD
- SE FOSTER RD
- LOMBARD ST
- SW CAPITOL HWY
- SE 7TH AVE
- FREMONT ST
- SANDY BLVD
- NE GLISAN ST
- KILLINGSWORTH ST
- SW TERWILLIGER BLVD

= DEATH
= SERIOUS INJURY
= ALL OTHER INJURIES

= LOW-INCOME COMMUNITIES & COMMUNITIES OF COLOR
Contributing Factors in Deadly Crashes

- STREET DESIGN
- SPEED
- IMPAIRMENT
- DANGEROUS BEHAVIORS
Citywide or Network
Corridor or Segment
Intersection
Data-Driven vs Data-Informed

*Data-driven* decision making accepts data as the only input. Data is seen as the ultimate truth.

*Data-informed* decision making accepts data as a guiding input that supports further discussion.
Data-Informed Thinking

What is the question we are actually trying to answer?

Can the data we are using help to answer the question? Be skeptical!

If the data can be helpful, what else do we need to consider?
Data-Informed Thinking

What is the question you are actually trying to answer?

Translating a statement into a research question.

What am I really being asked to explore?

What is the desired outcome?
Data-Informed Thinking

Can the data we are using help to understand the question?

Does this data directly answer my research question?

If this is the only data I have available, what are its limitations?

What do I need to interpret?
How should I prepare my analysis?
Data-Informed Thinking

If this data can be helpful, what else do we need to consider?

Knowing the limitations of the dataset, can we fill in gaps with other data sources?

How would this data best be communicated to the intended audience?

Is there outside information that helps to explain why the data looks this way?
Data Limitations

No dataset is perfect for all of your needs.

Consider:
- Time frame
- Location and Geography
- Completeness
- Structure
- Size
- Accessibility
- Validation
- Representativeness
How Crash Data at PBOT Works

- Fatal crashes as they occur from Portland Police Bureau
- ODOT crash data
- Reported crashes only
- Crashes that involved a motor vehicle
- Coded to intersections
Crash Data Limitations

- Lag in obtaining official dataset
- Limited to primarily one dataset
- Reported crashes only – underrepresentation of crashes
- “Close calls” are not captured (risk factor)
- Some variables are not reliably measured, such as distraction and phone use
Warning:
The following slides show images of vehicles involved in traffic crashes.
How these crashes would show up in ODOT crash data

- Property damage only
- Sideswipe crash into parked car
- Two motor vehicles involved
- Speed not a factor
- Impairment not a factor
- On High Crash Corridor

- 1 death of a motor vehicle occupant
- Rear-end crash
- Two motor vehicles involved
- Speed not a factor
- Impairment not a factor
- Not on High Crash Corridor
What is the question you want to answer?

- Sharing crash history with the public
- Make an informed decision
- Measure performance
- Evaluate a project
Think about the audience...
Audience

What is the right material for each audience?

• Talking points - numbers
• Simplified visualizations
• Spreadsheet to be used for further analysis
Current Vision Zero Projects

1. High Crash Network Segmentation
   – Looking closer at each corridor

2. Automated Enforcement camera locations
   – How do we select locations?

3. COVID-19 reporting
   – Getting creative with new sources of data
   – Apples to oranges
High Crash Network Segmentation

- Range of corridor lengths: 2mi – 13 mi
- Analyze in ¼ mi segments
- Internal audiences want to know, where should the next projects go?
- How are crashes distributed along each High Crash Corridor?
High Crash Network Segmentation

Where should we do the next safety project on the High Crash Network?

Which segments on each High Crash Corridor have a higher frequency of crashes in the last 5 years?
High Crash Network Segmentation

- ¼ mi segments
- 5 variables:
  - All crashes
  - Pedestrian Crashes – all levels of injury severity
  - Bicycle Crashes – all levels of injury severity
  - Motor Vehicle – Fatal and serious injury only
  - Vision Zero Focus
Vision Zero Focus Crashes

<table>
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<th>Travel Mode</th>
<th>Deaths</th>
<th>Serious Injuries</th>
<th>Moderate Injuries</th>
<th>Minor Injuries</th>
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<td>Pedestrian</td>
<td>X</td>
<td>X</td>
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</table>
High Crash Network Segmentation

All Crashes on SE Division Street High Crash Corridor
High Crash Network Segmentation

Pedestrian Crashes on SE Division Street High Crash Corridor
High Crash Network Segmentation

Bicycle Crashes on SE Division Street High Crash Corridor
High Crash Network Segmentation

Fatal and Serious Injury Motor Vehicle Crashes on SE Division Street

High Crash Corridor
High Crash Network Segmentation

Vision Zero Focus Crashes on SE Division Street High Crash Corridor
High Crash Network Segmentation

Vision Zero Focus Crashes on SE Division Street High Crash Corridor
High Crash Network Segmentation

• Using existing data, we were able to create an easy-to-use visualization for each corridor

• Analyzing the High Crash Network in smaller segments shows more detail

• Can be used as a map for planners for future projects
Automated Enforcement

In Portland there are...

- Red light cameras: 10 at 9 locations
- Fixed speed cameras: 8 at 4 locations
- Mobile speed vans
Automated Enforcement

• Can be controversial

• Con: take photos of driver – privacy
• Pro: significant safety benefits and reduces potential for racial profiling
Automated Enforcement – Red Light Cameras

Limited number of new locations

— Consider

• Geographic distribution and equity
• Crash histories
• Locations of known safety concern
Red Light Cameras

Where should we put new red light cameras?

If we had a limited number of new red light cameras to place across the city, where would there be the greatest safety benefit?
Red Light Cameras

Available crash data has information on crashes as a result of red light running.

Intersections are small locations, need to increase sample size

- Also a better measure of a behavior, rather than severity alone.
Red Light Cameras

Limitation: this dataset only represents *crashes* where a driver ran a red light, not *every* time a driver ran a red light.

Other data sources? Possibly.

Equity: Consider geographic distribution of potential cameras to avoid over-enforcing in an area.
Red Light Camera Location Selection Process

- Identify signalized intersections with high frequencies of red-light-running crashes
- Rank intersections by number of occurrences
- Create a list of top 100 / 1800
- Compare to High Crash Intersection list
- After review, reduce list again to top 50
Red Light Camera Location Selection Process

Now that I’ve made all these lists...

... now what?

Does this tell us where the Red Light Cameras should be placed?
Approaching Vehicle Direction
Approaching Vehicle Direction
Approaching Vehicle Direction
Approaching Vehicle Direction
Red Light Crashes - Couplet Example
## Red Light Crashes - Couplet Example

<table>
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<th>Intersection</th>
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<th>From South</th>
<th>From West</th>
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Red Light Crashes - Couplet Example
Red Light Camera Approach Direction Analysis

• Made complex topic into something understandable

• Too many data points can be overwhelming

• Using visualizations was more effective at getting the point across
COVID-19

Adapted from CDC / The Economist
COVID-19

What’s going on in terms of safety in Portland?

Is the number of traffic crashes on Portland streets increasing or decreasing in response to statewide stay-at-home measures?
COVID-19

Usual data source is not yet available for Spring 2020

Contact partners for potential data sources

Limitations: only calls where Portland Fire & Rescue (PF&R) responded, injury severity information
COVID-19

New PF&R data is not directly comparable to usual ODOT dataset

Have to start from the ground up:
new definitions
different variables
different grouping
Portland Fire & Rescue Calls to Crashes

Weekly Response Calls to Crashes

Weekly Average = 87
COVID-19

• Responses to traffic crashes are below average

• March 2020 had consecutive weekly decreases in response calls to crashes

• After 6 weeks, crash responses seem to have plateaued
Summary

• Vision Zero Portland uses data to inform a number of projects for different purposes and audiences.

• There is room for constant improvement and opportunities to develop new methods.

• Data alone does not make decisions, data alone does not make policy, data alone is not what will achieve Vision Zero.
Closing

Always be at least 3\% smarter than the machine.

- Anamaria’s high school pre-calc teacher
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Anamaria Perez

anamaria.perez@portlandoregon.gov

visionzeroportland.com