Oregon Pedestrian and Bicycle Safety Implementation Plan

September 24, 2013

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Outline

- Project goals and objectives
- Project status
- Crash trends and analysis
- Systemic methodology
- Countermeasures
- Implementation Plan
- Summary and next steps

Project Goals and Objectives

- Reduce **fatalities and severe injuries** resulting from pedestrian and bicycle crashes
- Data-**informed** approach
- Systemic improvements
  - Low-cost
  - Statewide, jurisdictionally blind
  - Evaluates system using defined criteria
  - Acknowledges crashes alone are not always sufficient to establish prioritization

Project Goals and Objectives

- Set framework for the future
  - Establish a repeatable process
  - Develop a toolbox of countermeasures
  - Identify opportunities for improvement (e.g., additional data needs)
- Develop potential sites for funding
  - $4 million Pedestrian/Bike safety funding in 2017 for all roads

Project Scope and Progress

- Project Review and Research
  - Literature review, crash data analysis, countermeasure review
  - Complete, full reports available on website
- Implementation Framework Development
  - Draft method selected, framework established
- Stakeholder Input
  - Website active, local agency outreach completed, and full-day stakeholder meeting conducted July 24, 2013
- Bicycle and Pedestrian Implementation Plan
  - Network screening
  - Evaluation and project prioritization
  - Draft and final plan

Literature Review Findings

- Performance Measures
  - Number of injury and fatality crashes
- Screening Methods
  - Risk-based approach promoted by FHWA
- Countermeasures and Improvement Strategies
  - "Toolbox" approach increasingly common

Project Limitations

- Limited crash data
  - Lack of strong trends
- Limited low-cost countermeasure options
- Inconsistent inventory data across jurisdictional boundaries
  - State
  - Non-state (City, County, MPO)
  - METRO

Crash Analysis Findings - Statewide Reported Pedestrian Crashes (2007-2011)

Total: 3505
Severe: 752 (21% of total)

State Highways
Total: 658 (19%)
Severe: 211 (**28%**)

Intersection
Total: 338 (10%)
Severe: 70 (9%)

Segment
Total: 320 (9%)
Severe: 139 (18%)

Non-State Highways
Total: 1052 (30%)
Severe: 222 (**30%**)

Intersection
Total: 520 (15%)
Severe: 77 (10%)

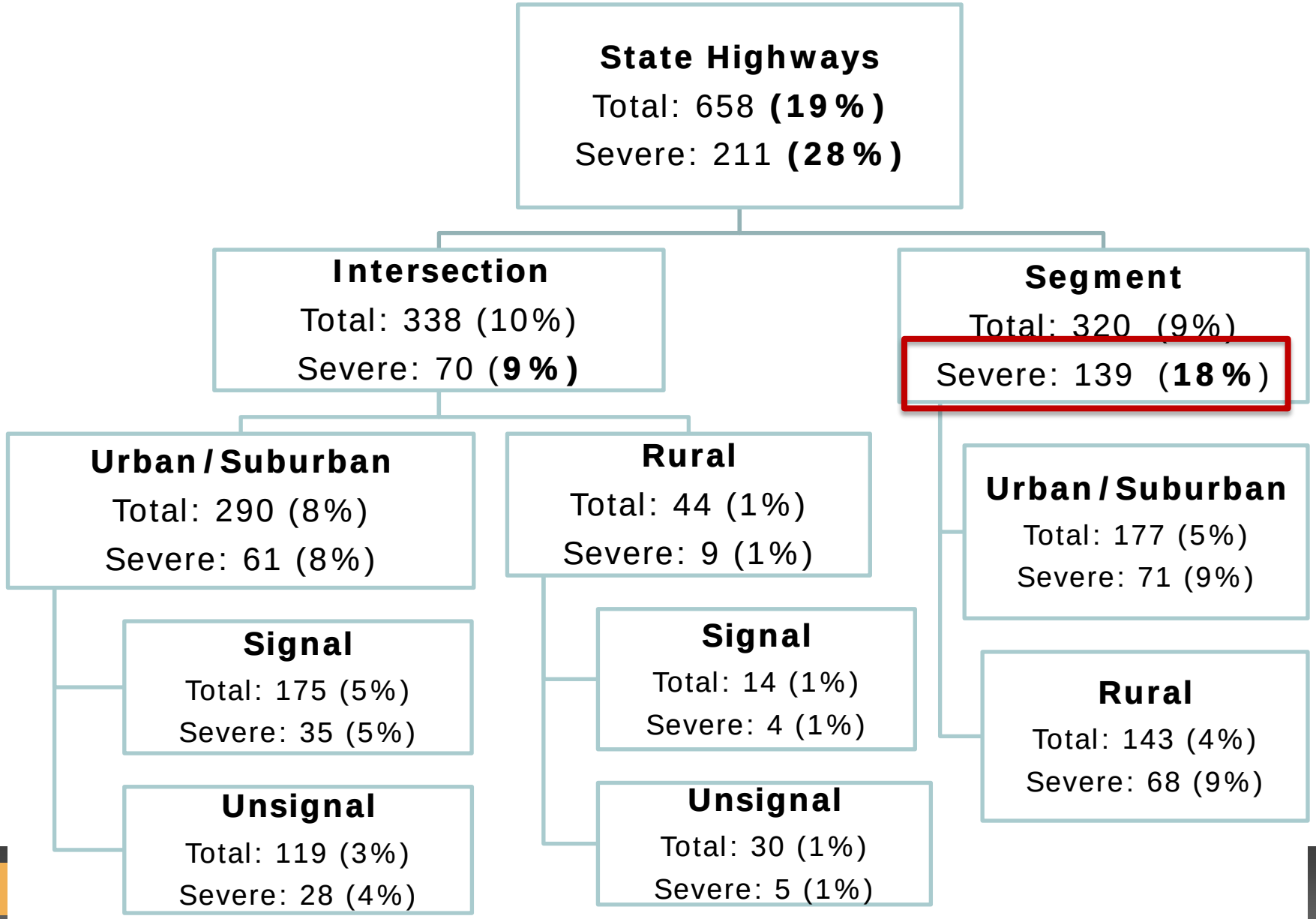
Segment
Total: 532 (15%)
Severe: 145 (19%)

Portland METRO
Total: 1795 (51%)
Severe: 319 (**42%**)

Intersection
Total: 1098 (31%)
Severe: 137 (18%)

Segment
Total: 697 (20%)
Severe: 182 (24%)

Statewide Reported Pedestrian Crashes (2007-2011)



Crash Analysis Findings - Statewide Reported Bicycle Crashes (2007-2011)

Total: 4124
Severe: 363 (9% of total)

State Highways
Total: 607 (**15**%)
Severe: 64 (**18**%)

Intersection
Total: 402 (10%)
Severe: 37 (10%)

Segment
Total: 205 (5%)
Severe: 27 (7%)

Non-State Highways
Total: 1423 (35%)
Severe: **127** (35%)

Intersection
Total: 849 (21%)
Severe: 66 (18%)

Segment
Total: 574 (14%)
Severe: 61 (17%)

Portland METRO
Total: 2094 (51%)
Severe: 172 (**47**%)

Intersection
Total: 1460 (35%)
Severe: 118 (33%)

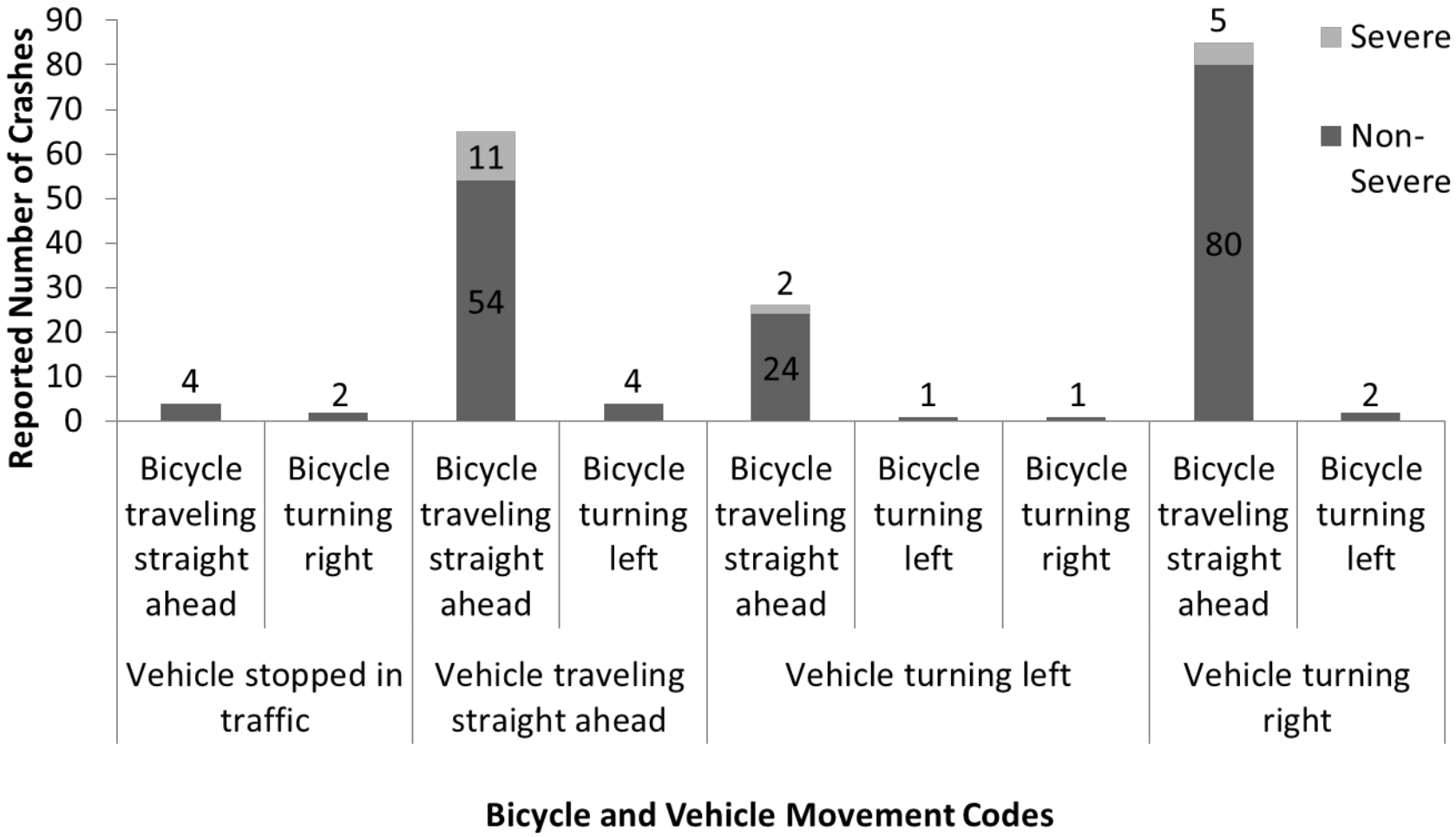
Segment
Total: 634 (15%)
Severe: 54 (15%)

Crash Analysis Findings
Bicycle – Vehicle Movement

Reported Crashes at **Signalized Intersections** within the Portland **METRO** Area (2007-2011)

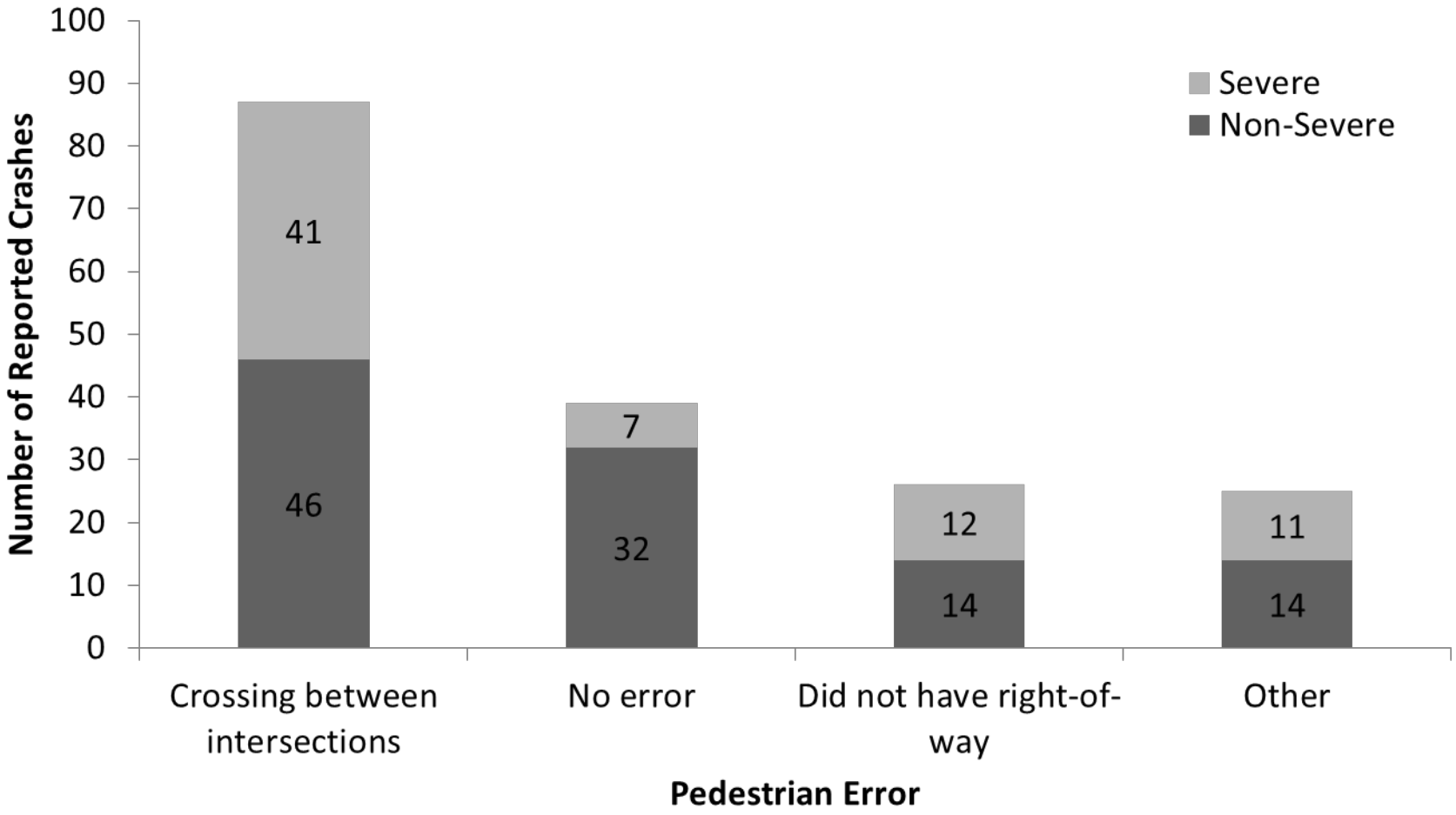
Crash Analysis Findings
Bicycle – Vehicle Movement

Reported Crashes at **Signalized Intersections** in **Urban Areas** on **State Highways (2007-2011)**



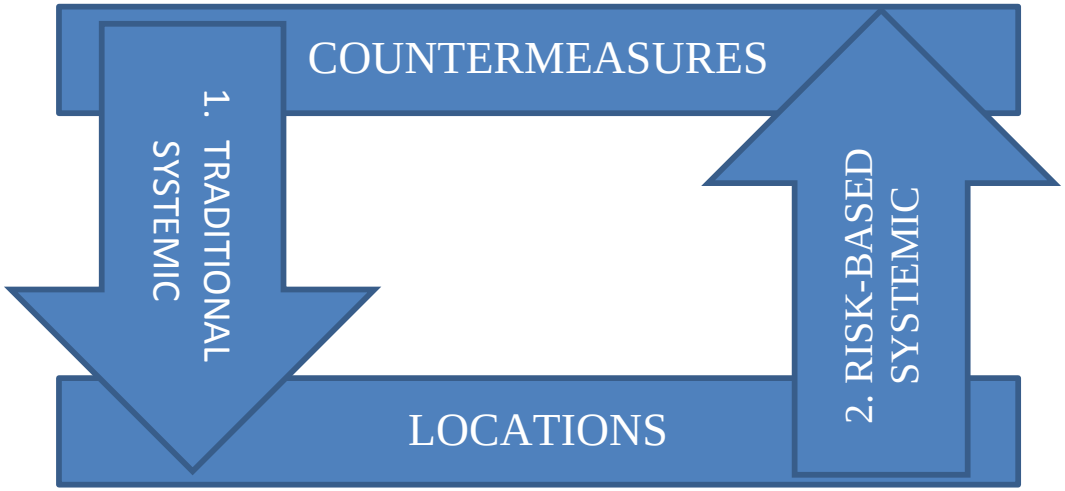
Crash Analysis Findings
Pedestrian – Reported Error

Reported Crashes on **Urban Segments** on **State Highways (2007-2011)**



Overview of Systemic Methods

- Two systemic methods proposed to compliment each other
  1. Traditional
     1. Identify low-cost countermeasures that are proven effective
     2. Broad implementation of countermeasures on high-crash corridors
  2. Risk-based
     1. Identify locations with factors that increase the risk of pedestrian or bike crashes
     2. Suggest range of countermeasures at locations with highest risk
     3. Implementing agency reviews sites, selects countermeasure from list



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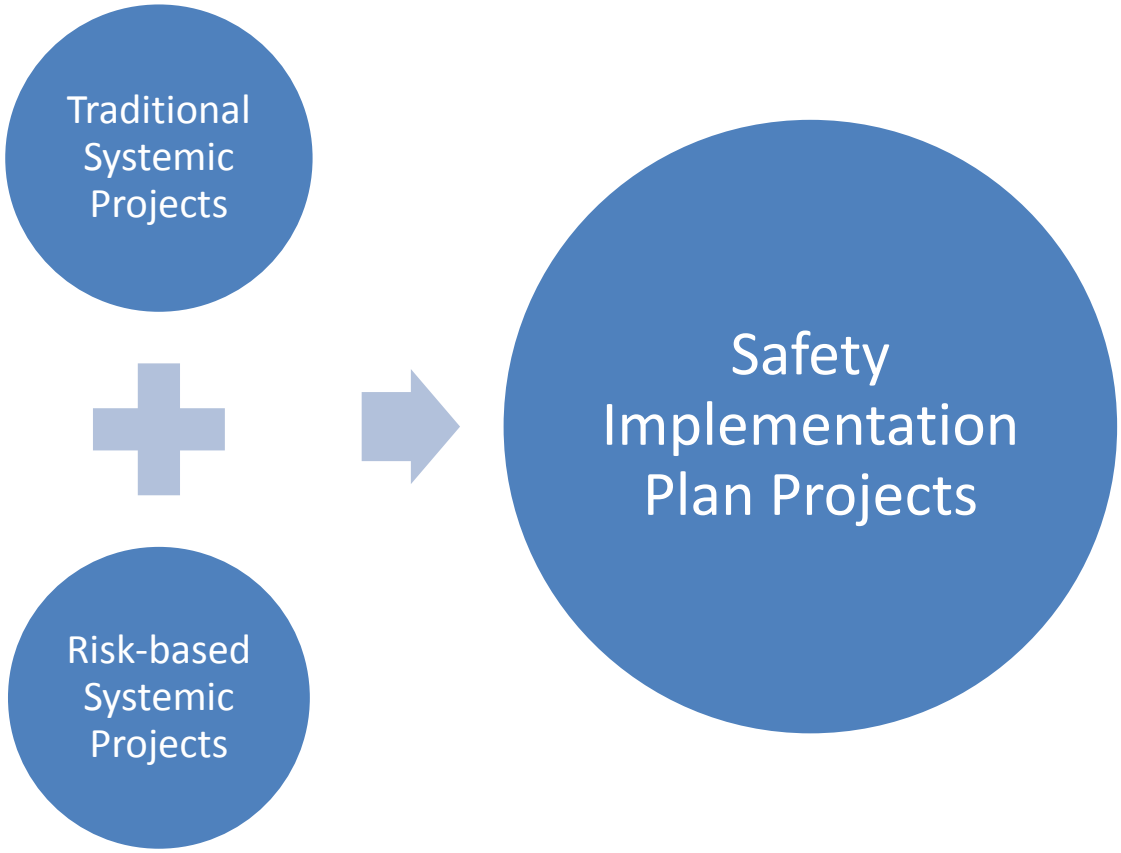
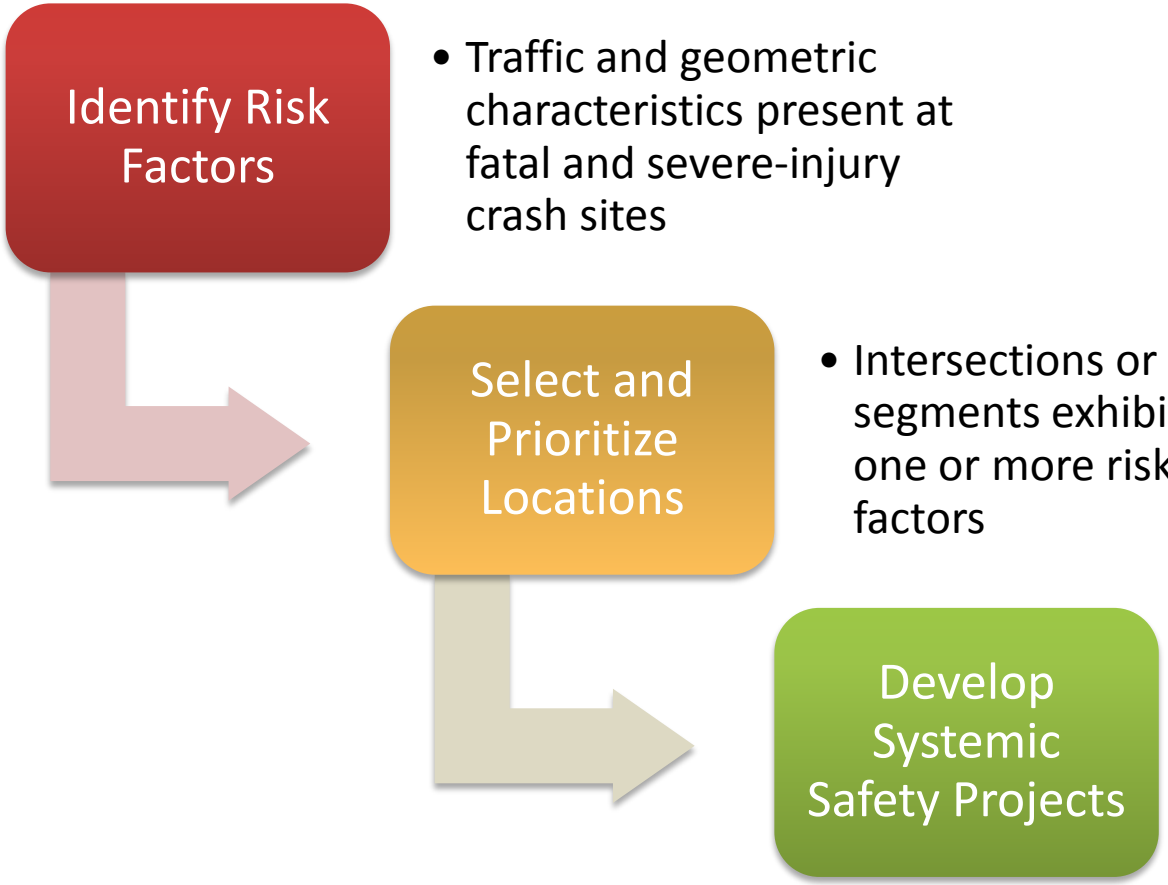


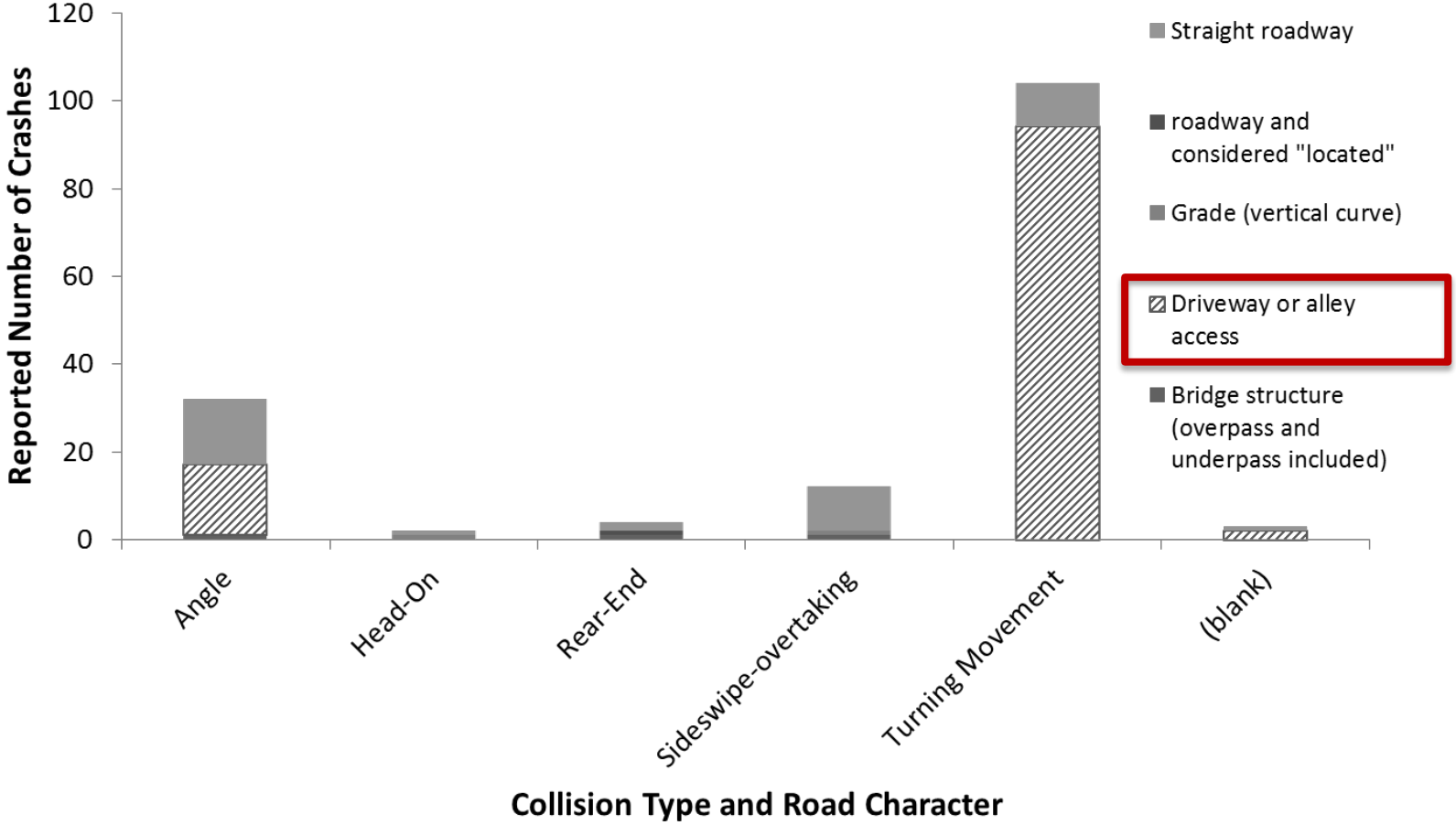
Overview of Risk-Based Systemic Method



- Traffic and geometric characteristics present at fatal and severe-injury crash sites
- Intersections or segments exhibiting one or more risk factors
- Apply counter-measures to address risk factors at specific locations

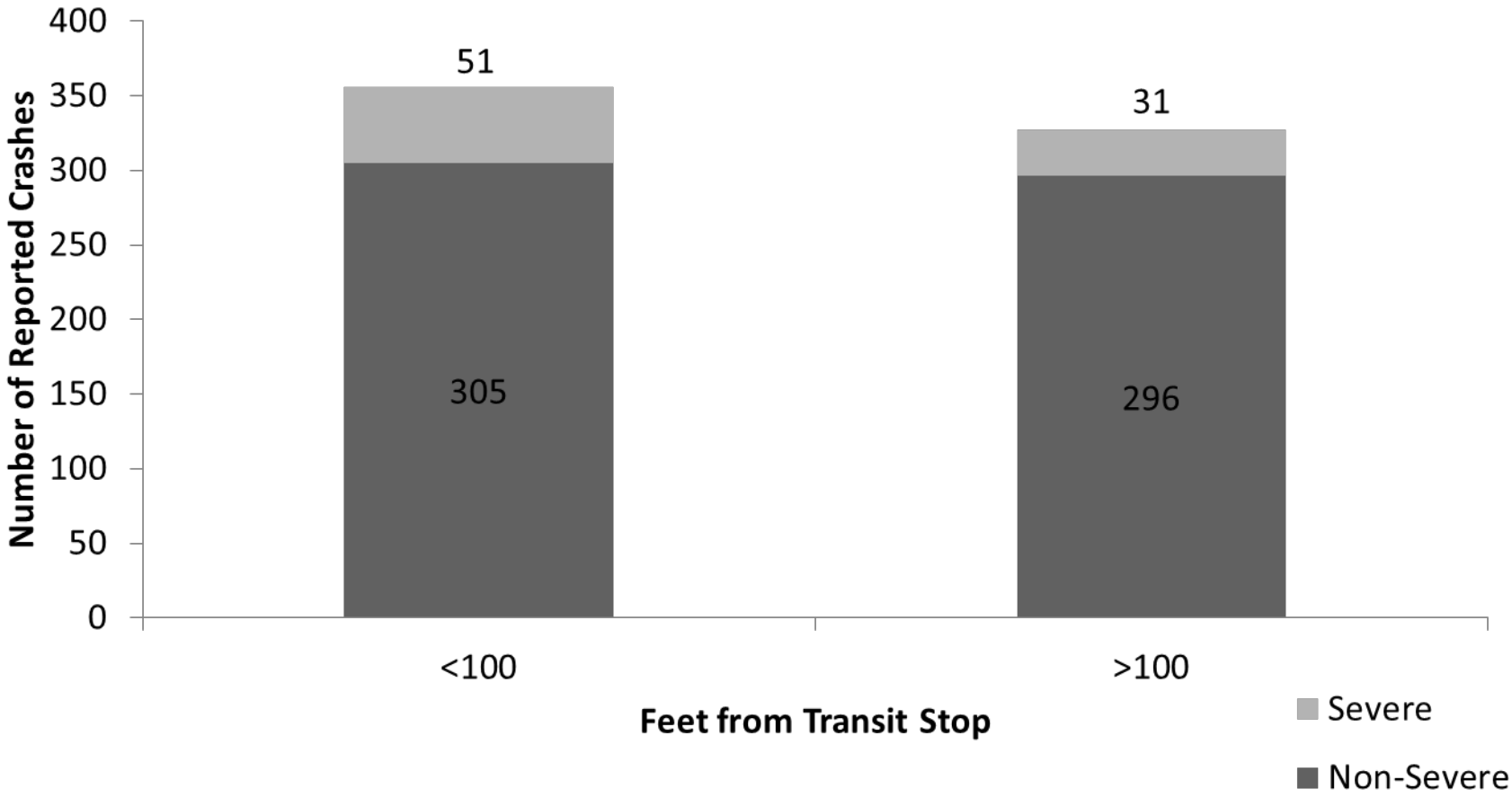
Identify Risk Factors
Bicycle – Collision Type and Road Character

- Informed through data analysis
  - Reported bike crashes by Collision Type and Road Character on State Highway Segments in Urban Areas (2007-2011)



Identify Risk Factors
Pedestrian – Proximity to Transit Stop

Reported Pedestrian Crashes at **Urban Signalized** Intersections near Transit Stops in the **Portland METRO** area (2007-2011)



Risk Factors – Pedestrians

Roadway Type	Area	Potential Pedestrian Risk Factors
State, Non-State, **Intersection**	Urban/ Suburban	• Four-legged signalized intersections with permitted or protected/permitted left-turn phases
State, **Intersection**	Rural	• Intersections with approach speed limits at or above 45 mph and no sidewalks
METRO, **Intersection**	Urban/ Suburban	• Intersections within METRO that have collector or arterial roadways with four-lanes on at least one approach
		• Signalized intersections within 100' of transit stop
State, **Segment**	Urban/ Suburban	• Signal spacing on unlit streets
		• Signal spacing greater than x/mile and two-lane or four-lane cross-section
		• No sidewalk and posted speed equal to or greater than 45 mph
State, **Segment**	Rural	• Number of liquor establishments within X feet
		• Streets in areas with pedestrian-centered land use that lack street lights and have speeds above 40 mph

Risk Factors - Pedestrians

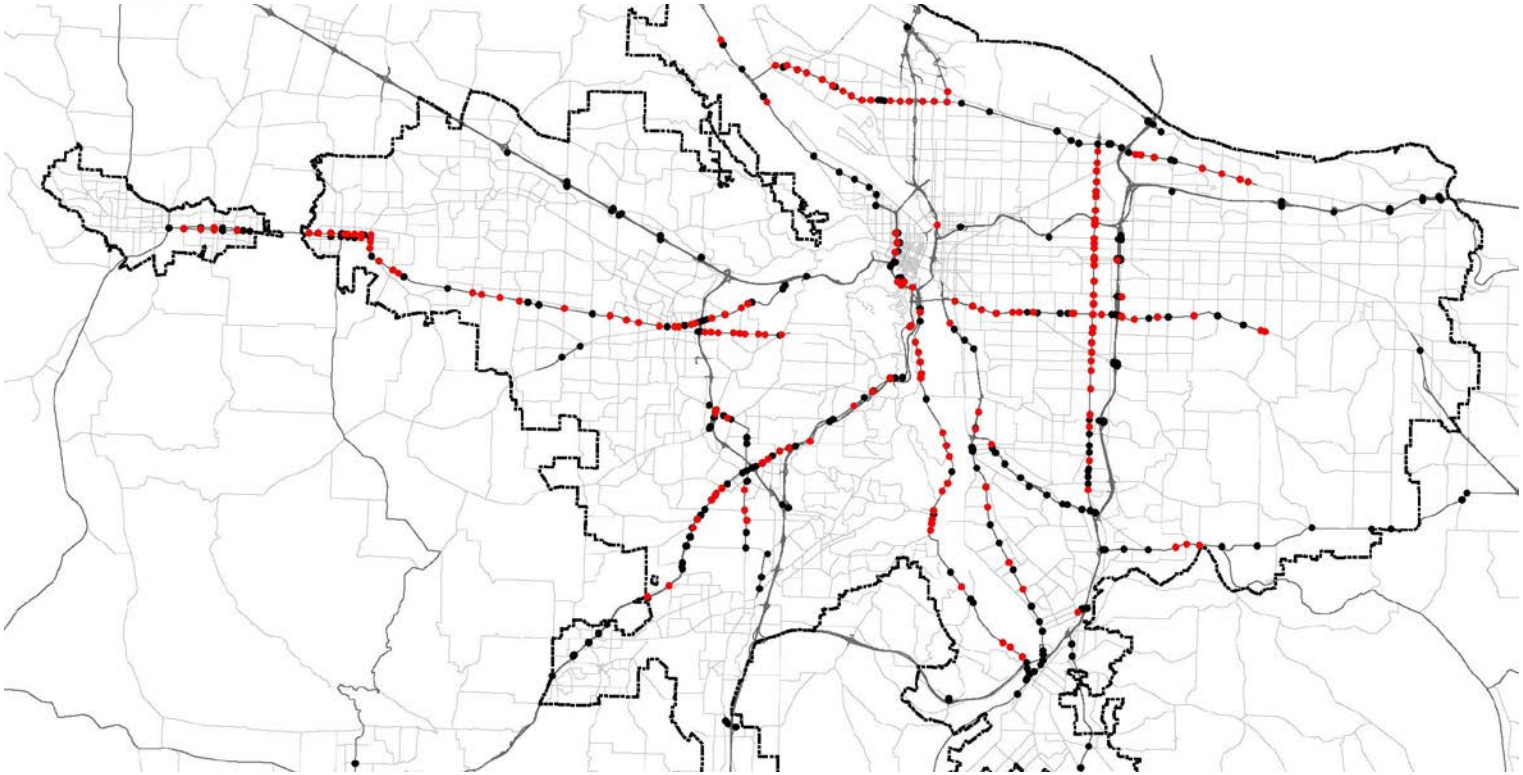
- Due to data limitations pedestrian risk factors limited to:
  - Presence of transit stop
    - Signalized intersections
    - All others (segments)
  - Number of travel lanes along segments
  - Posted speed along segments
  - Distance between signals or enhanced crossings (to extent that data is available)
  - Average Daily Traffic volume

Risk Factors - Bicycle

- Due to data limitations bicycle crash risk factors limited to:
  - Proportion of driveways per mile
  - Number of lanes on major street at intersection
  - Undivided 2- or 4-lane roadways in urban areas
  - Bicycle facility on at least one approach at intersection

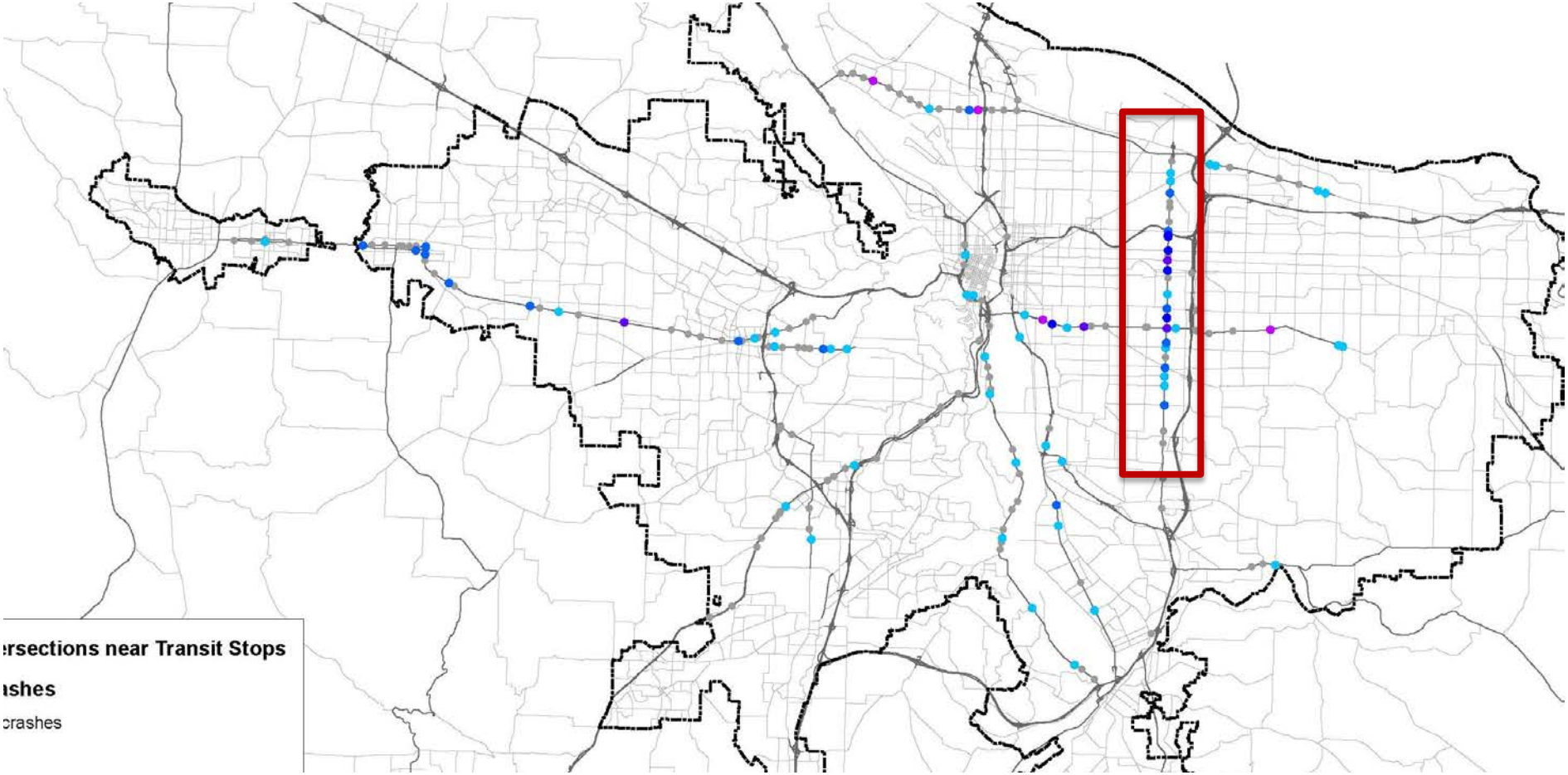
Risk-based Network Screening

- Limited application to state highways in urban area
- Red dots: signalized intersections within 100 feet of transit stop
- Black dots: signalized intersections



Risk-based Network Screening

- Dots: signalized intersections within 100 feet of transit stop



Identify Risk Factors → Select and Prioritize Locations → Develop Systemic Safety Projects

Site Prioritization

- Risk-based
  - Segments will be scored based on number of risk factors present at each site.
    - Some risk factors may carry higher point value than others
  - Consecutive segments with high scores will be aggregated into corridor projects
  - Segments with highest score will be prioritized

- Traditional
  - Identify corridors with highest frequency of severe-injury and fatal crashes
  - 4-6 effective countermeasures will be applied broadly on high-priority corridors
    - Example: pedestrian countdown signals and signal phasing modifications at all intersections within corridor

Risk-based Site Prioritization Example

Highway Name	Hwy #	Begin MP	End MP	Fatal of Severe Injury	Score
Boston Harbor	1	1.1	1.2	Yes	6.0
Delphi	2	212.1	212.2	No	5.5
Morris	3	155.5	155.6	Yes	5.0

Risk-based Systemic Countermeasures – Pedestrian

Location	Reference Population	Traffic Control	Potential Countermeasures

Intersection	All (Urban/Suburban, Rural, METRO)	Signal	• Signal timing modifications
			  ○ Leading pedestrian interval
			  ○ Modify left-turn phasing
			  ○ Install countdown signals
			• Vehicle turning movement restrictions
			• Lighting
			• Right-turn channelization island

		Unsignalized	• Enhanced crossing treatments (see SPR 721) • Pedestrian refuge islands or median • Supplemental signs and markings • Speed reduction treatments
Segment	Urban/Suburban	--	• Enhanced midblock crossing treatments (see SPR 721) • Corridor lighting • Pedestrian refuge islands or median • Sidewalks • Road diet
	Rural	--	• Sidewalks • Road diet • Speed reduction treatments • Rural/suburban transition zone treatments

Identify Risk Factors → Select and Prioritize Locations → Develop Systemic Safety Projects

Risk-based Systemic Countermeasures – Bicycle

Location	Reference Population	Traffic Control	Potential Countermeasures
Intersection	Urban/Suburban	Signal	• Bike signals • Bike detection • Signal timing modifications • Vehicle turning movement restrictions • Lighting • Pavement markings
	Urban/Suburban	Unsignalized	• Longitudinal bike stencil • Reduce curb radii • Vehicle turning movement restrictions • Lighting • Skip striping • Improved bicycle lanes
	Rural	Signal	• Pavement markings • Bike detection • Signal timing modifications • Vehicle turning movement restrictions • Lighting
	Rural	Unsignalized	• Improved bicycle lanes • Parallel routes • Bicycle boulevards • Skip striping • Reduce curb radii

Risk-based Systemic Countermeasures – Bicycle

Location	Reference Population	Traffic Control	Potential Countermeasures
Segment	Urban/Suburban	--	• Access control • Longitudinal bike stencil at conflict points • Restrict on-street parking • Dynamic warning signs • Wider bike lanes/shoulder • Bicycle route signage • Cycle tracks • Mixed-use paths
	Rural	--	• Access control • Longitudinal bike stencil at conflict points • Wider bike lanes/shoulder • Bicycle route signage • Mixed-use paths

Traditional Systemic Countermeasures

- Countermeasures to be applied broadly
- Tentative list includes:
  - Pedestrian crossing enhancements
    - Intersection: countdown signals, signal modifications, medians, illumination, etc.
    - Midblock: medians, beacons, illumination, etc.
  - Pavement markings
    - Bike stencils or colored pavement to indicate conflict points between turning vehicles and bicycles
  - Road diet*
  - Corridor access management*

Identify Risk Factors → Select and Prioritize Locations → Develop Systemic Safety Projects

Implementation Plan Content

- Plan Direction/Outcome
  - Identify sites with highest potential to reduce severe-injury and fatal crashes
  - Risk-based:
    - List of segments/intersections with greatest risk
    - Defined list of countermeasure options
    - Estimate of average cost of countermeasures/site
  - Traditional:
    - Limited number of countermeasures to be applied at many locations
    - List of top segments/corridors with highest frequency of severe-injury and fatal crashes
  - Establish percentile of risk-based systemic projects and traditional systemic projects that can be funded in 2017-2019 STIP funding cycle

Implementation Plan Content

What will local agencies or ODOT Regions be required to do?

- Local agencies identify and propose candidate corridors with defined set of risk factors
- Region staff prioritize candidate corridors
- Funding allocation split between state/local roads based on distribution of severe-injury and fatal crash locations

Next Steps

- General project tasks
  - Conduct network screening on state network
  - Prepare guidance for obtaining local agency input on non-state facilities
  - Develop countermeasure toolbox
  - Develop project lists
  - Document in Implementation Plan
- When will project recommendations be ready?
- How can stakeholders provide input?
  - Website http://workshops.kaiproject.com/workshops/8-oregon-bicycle-and-pedestrian-safety-implementation-plan
  - Contact project team
    - Doug Bish, ODOT – douglas.w.bish@odot.state.or.us
    - Casey Bergh, Kittelson – cbergh@kittelson.com