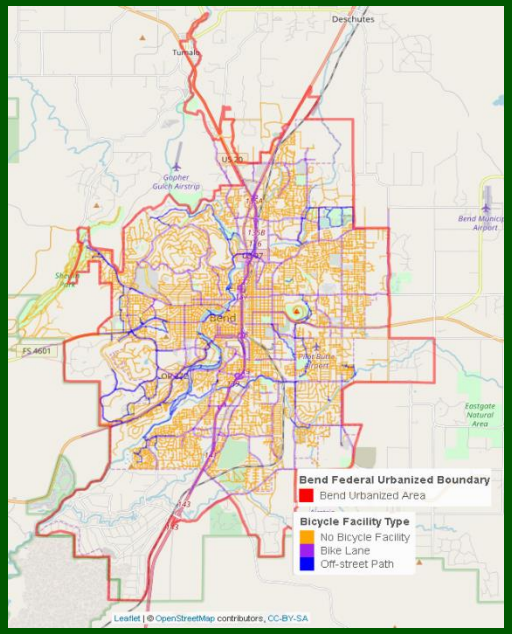
Oregon Department of Transportation



2019 SORA Summer Networking Mixer

Oregon Department of Transportation Research Program

My Background

Experience
Montana Native
Masters in Urban Studies (PSU)
Planner, Modeler, Data Scientist, Child Wrangler
“Let Knowledge Serve the City”

Agenda

Agenda
ODOT Research Program
Bicycle & Pedestrian Activity Research
Other Recent Publications
Discussion & Questions

Oregon DOT Research Program Overview

Research Program
- 11 staff (8 coordinators)
- 8 topic areas
- Technology Transfer Program

Funding Sources
- Federal Highway Administration (FHWA) Statewide Planning & Research (SPR)
- University Transportation Centers (TREC, PacTrans)
- Federal Sources (NHTSA, STIC, DOE)

FHWA SPR Program
- Primary Resource
- Around $1.5 million per year in projects
- Most states focus on pavement and structures research

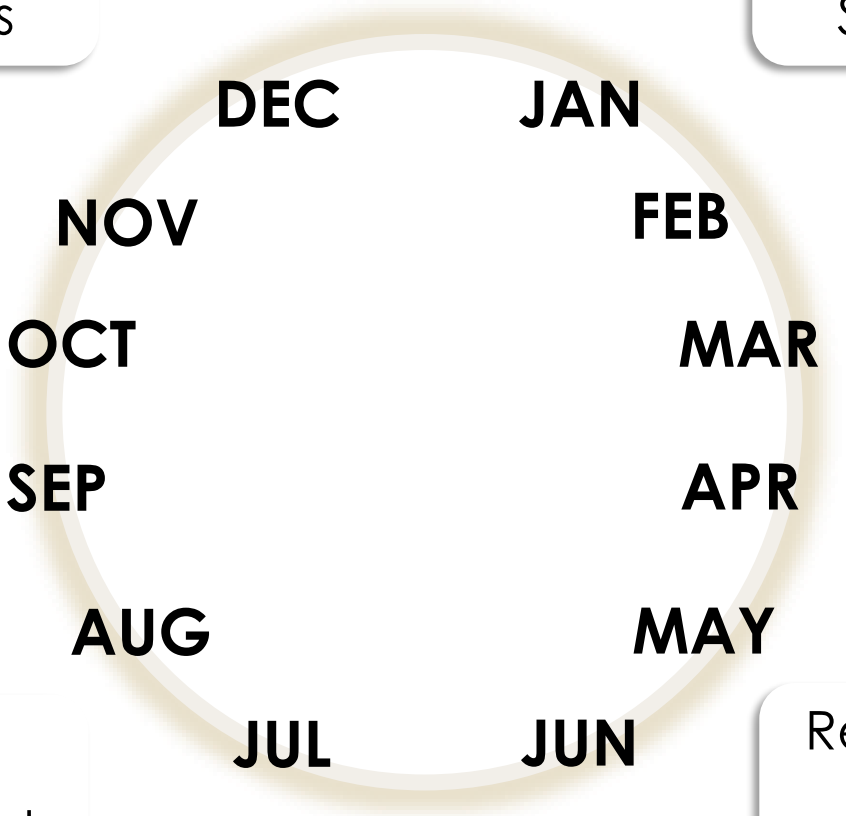
Research is novel

Research is uncertain

Research is structured

Research creates solutions

ODOT Research Project Selection Timetable



Expert Task Groups Review

Stage 1 Problem Statements

Stage 2 Problem Statements

New Problem Statements **Due 11/15**

Research Advisory Committee Review

Set Strategic Priorities

Develop Scope of Work

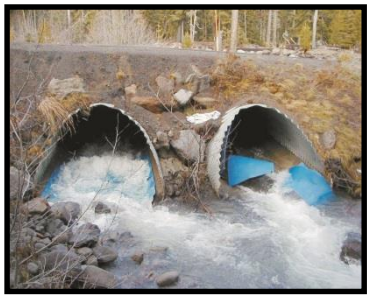
Topic Area Priorities Revised

Recruit Technical Advisory Committee (TAC)

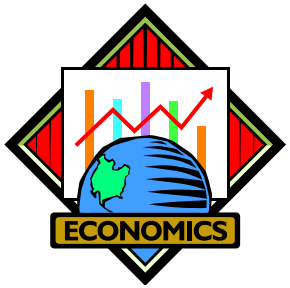
Start New Projects

Oregon DOT Research Program
Submitting Ideas

Expert Task Groups for Research Ideas

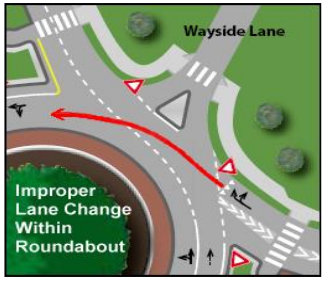


GHE – Geo/Hydro/Enviro



PEA – Policy, Economic Analysis

ST – Structures



TraSHFac – Traffic Safety & Human Factors

AST – Active and Sustainable, Transportation

CPM – Construction, Pavement & Materials

MO – Maintenance & Ops

EI – Emerging Issues

Sample of Recent Publications

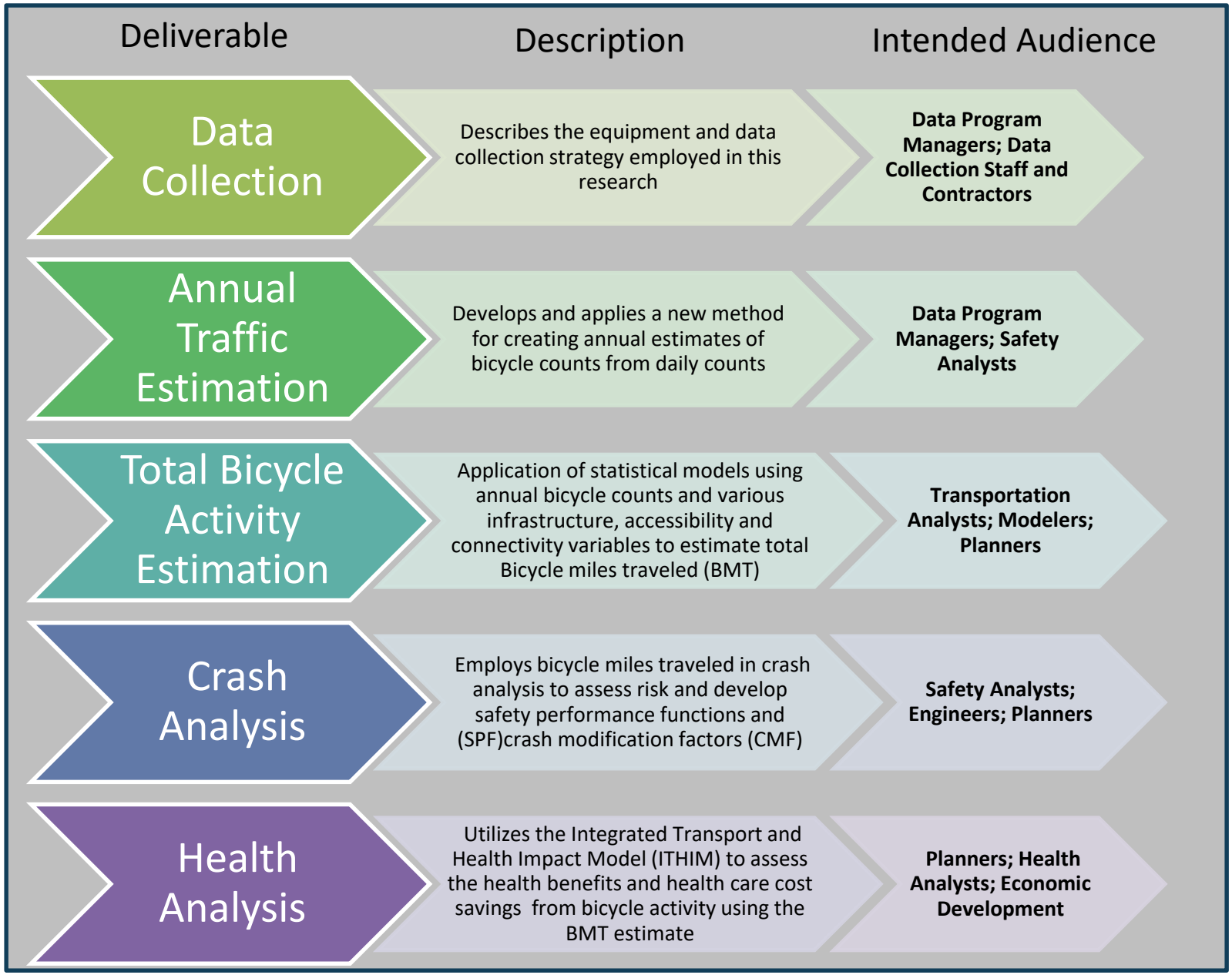
- Driving Distraction due to Drones
- Improved Safety and Efficiency of Protected/Permitted Right-Turns in Oregon
- A Method to Estimate Annual Average Daily Traffic for Minor Facilities for MAP-21 Reporting and Statewide Safety Analysis
- Bicycle Count Data: What is it Good for? A Study of Bicycle Travel Activity in Central Lane Metropolitan Planning Organization
- Enhancing Landslide Inventorying, Lidar Hazard Assessment and Asset Management
- Statewide Data Standards to Support Current and Future Strategic Public Transit Investment

Bicycle & Pedestrian Activity Research
Background

Problems	Objectives
No traffic count data for people walking & biking	Develop data collection program
Lack of exposure data limits safety analysis	Quantify bike/ped activity
Absence of bicycle activity measures limits our ability to quantify health benefits	Estimate crash risk to help prioritize investments
	Develop measures of public health benefits

Publication:

Bicycle Count Data: What is it Good for?



Data Collection
Traffic Counting Equipment

SLAB detector at Colorado Avenue in Bend MPO

On-street Inductive Loop Detector at Galveston Ave. in Bend MPO

Multiple detectors at Butler Market in Bend MPO

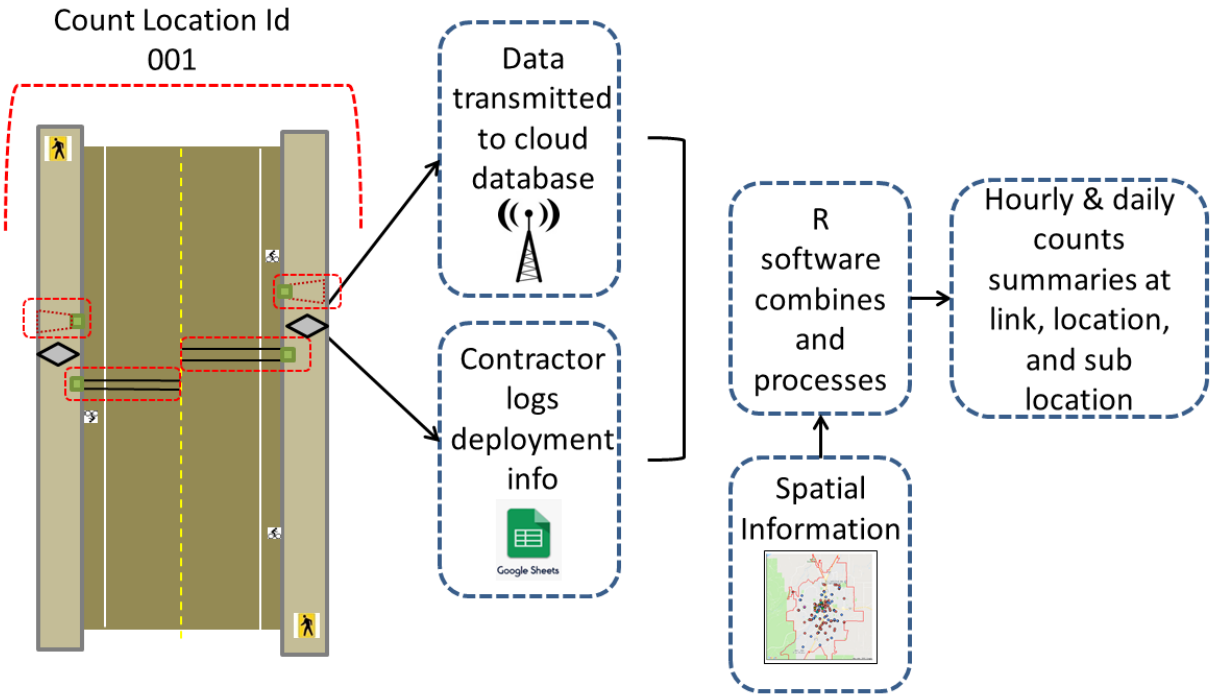
Separated Inductive Loop Detector at Franklin Avenue in Bend MPO

Data Collection Processing and Compilation & Compilation

Data Collection

Automated data flow and processing

- Devices all transmit data through cell phone connection
- Portable device information maintained in Google Sheets
- Custom R software written to combine, process, clean and summarize



Modeling total bicycle activity

Total Activity Modeling

$$Y_i \sim NegBinom(\mu_i)$$
$$\log(\mu_i) = \boldsymbol{\beta_i X_i}$$

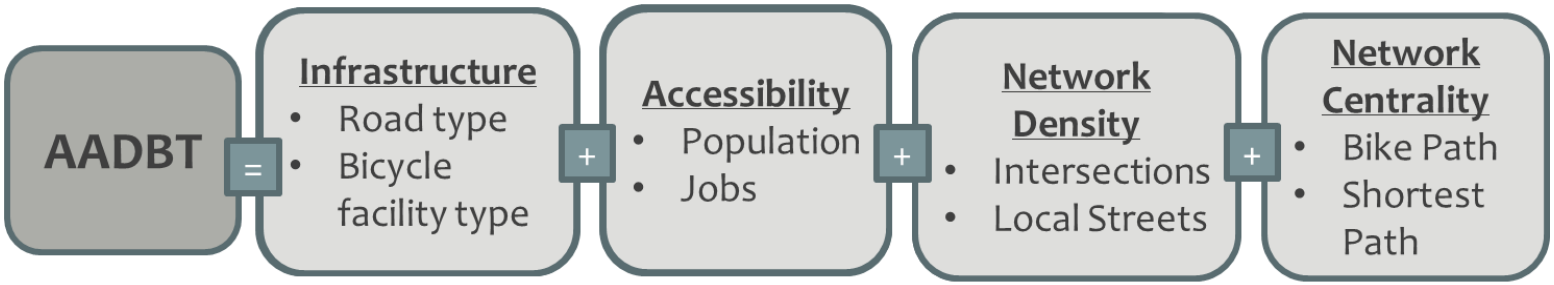
Where:

Y_i = AADBT bicycle traffic volume at site *i*

$\boldsymbol{\beta_i}$ = Vector of parameters for count site *i* including *street* and *bicycle facility*, *accessibility*, *network density*, and *network centrality*

$\boldsymbol{X_i}$ = Vector of observed covariates for count site *i*

Negative Binomial Regression Specification

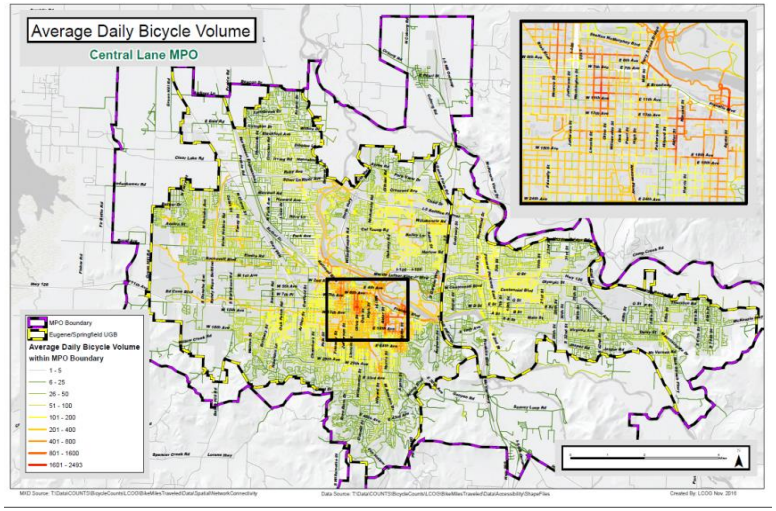


Simplified Description

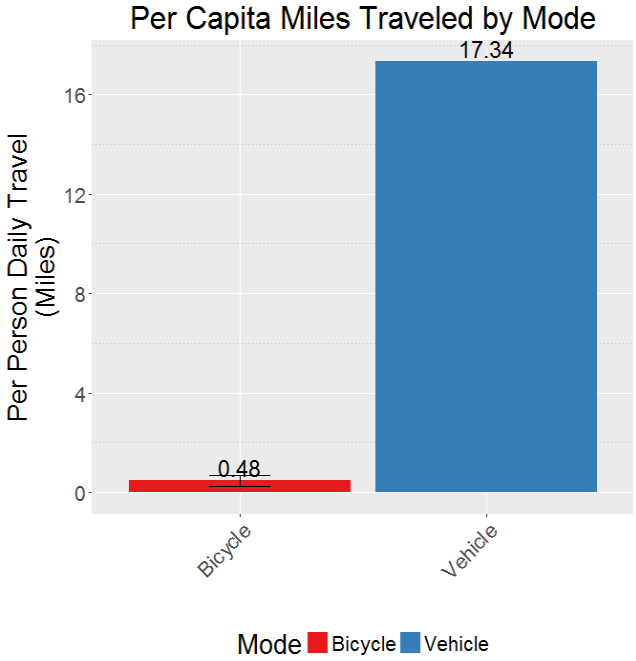
Modeling total bicycle activity

What does 44 million Bike Miles of Travel?

Total Activity Modeling



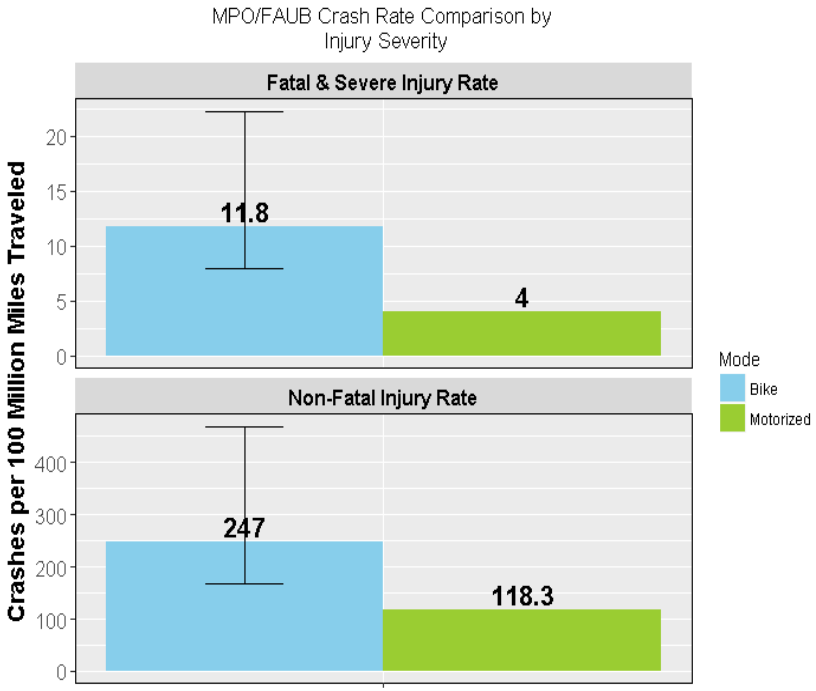
Bicycle volume assigned to network



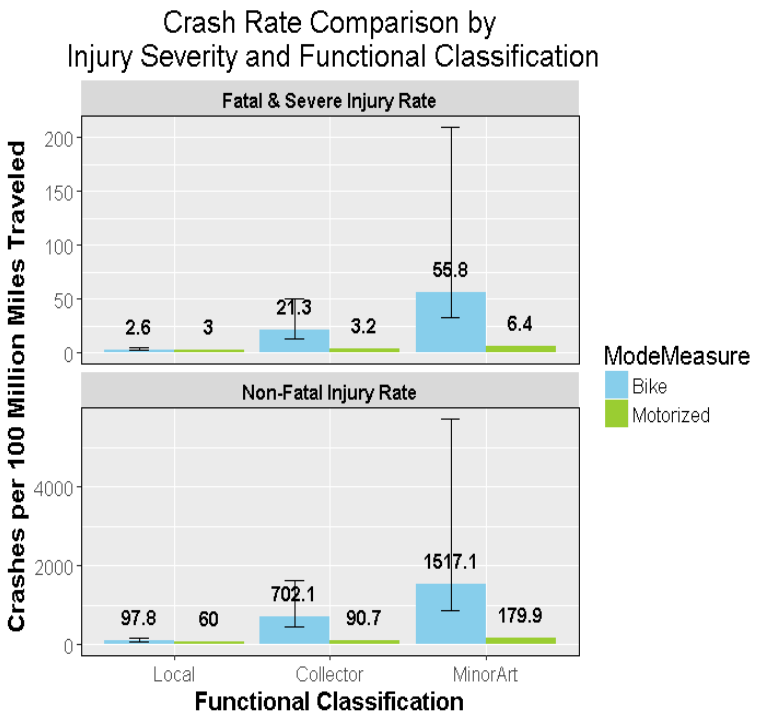
Per capita travel by mode

Crash Analysis

Crash Analysis



Aggregate crash rate comparison

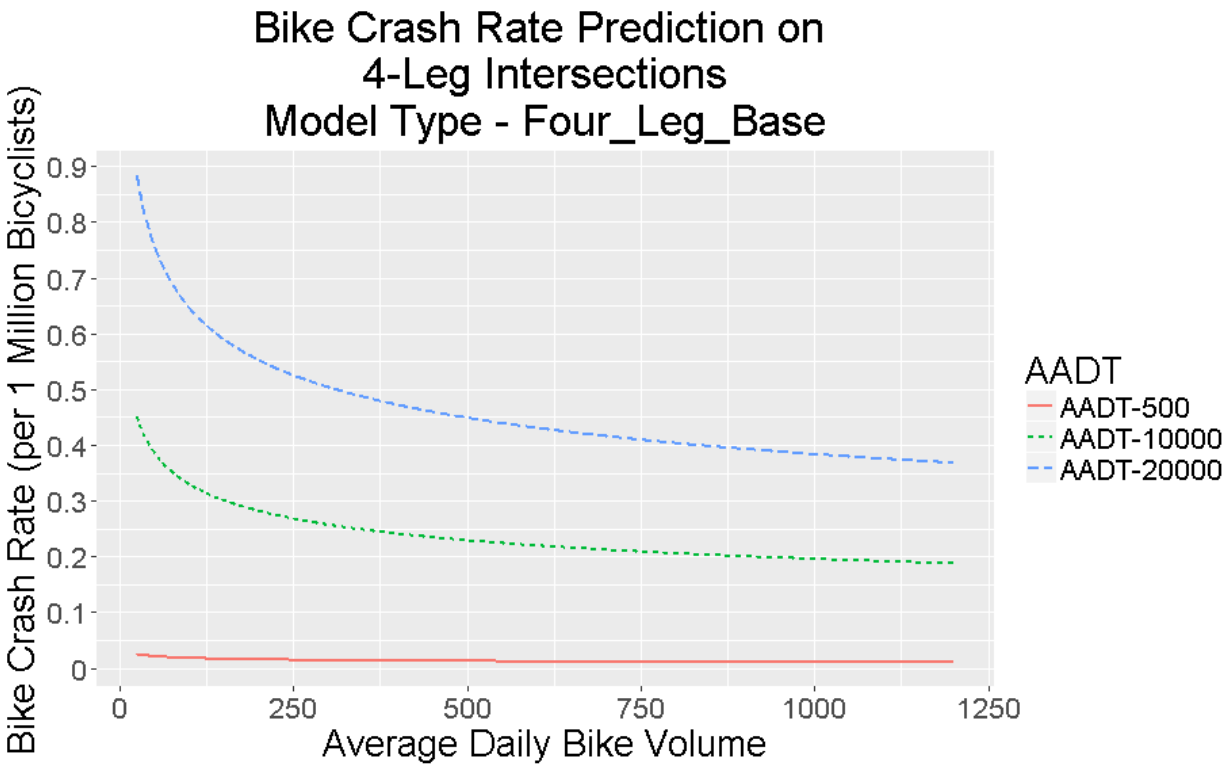


Crash rate by functional classification

Crash Analysis

Crash Analysis

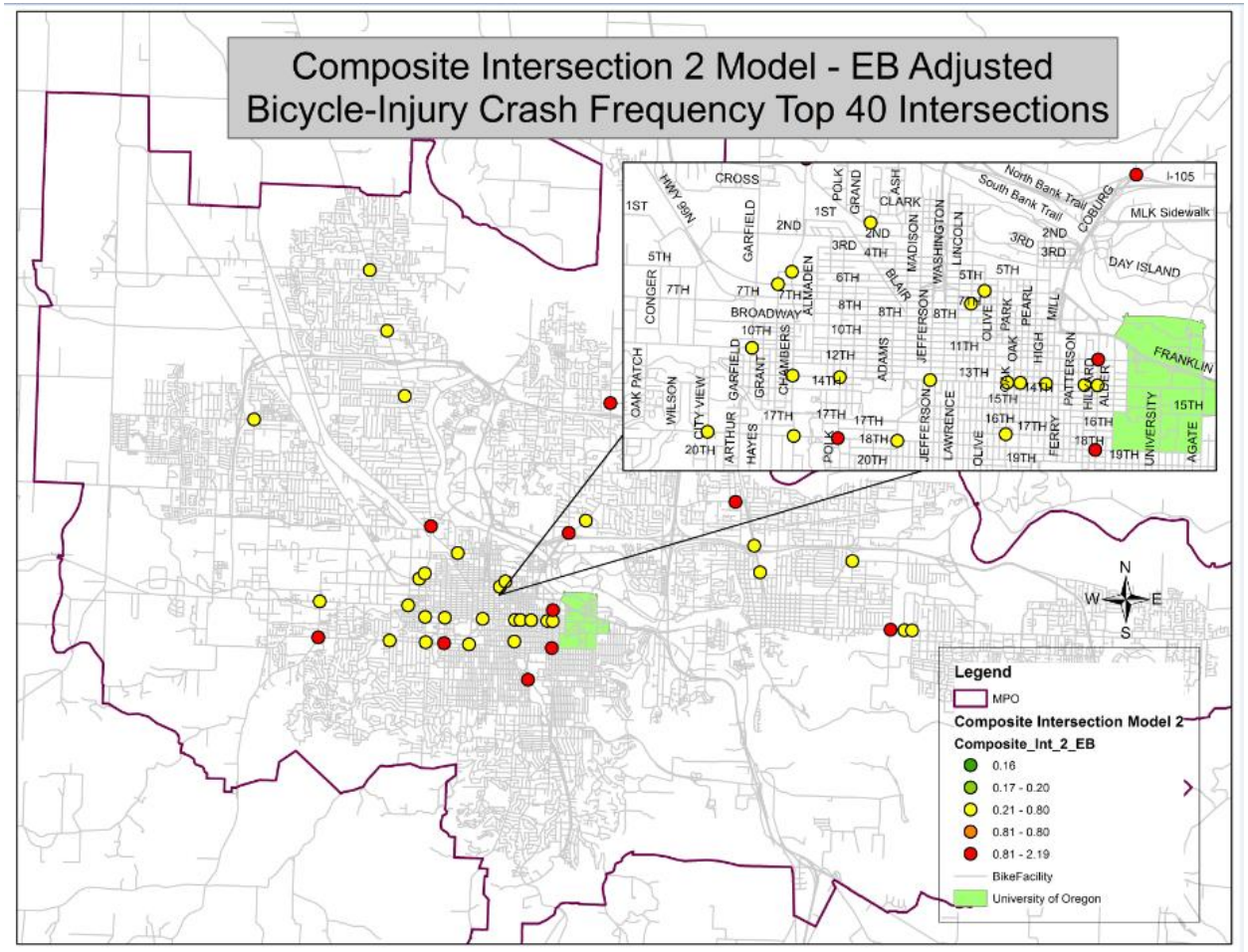
- Safety performance functions needed for truly understanding safety
- Risk increases as motorized vehicle increases
- Bicycle risk decreases as number of users increases
- Increasing bicycle volume from 25 to 100 per day reduces crash rate by more than 30%



Crash Analysis

Crash Analysis

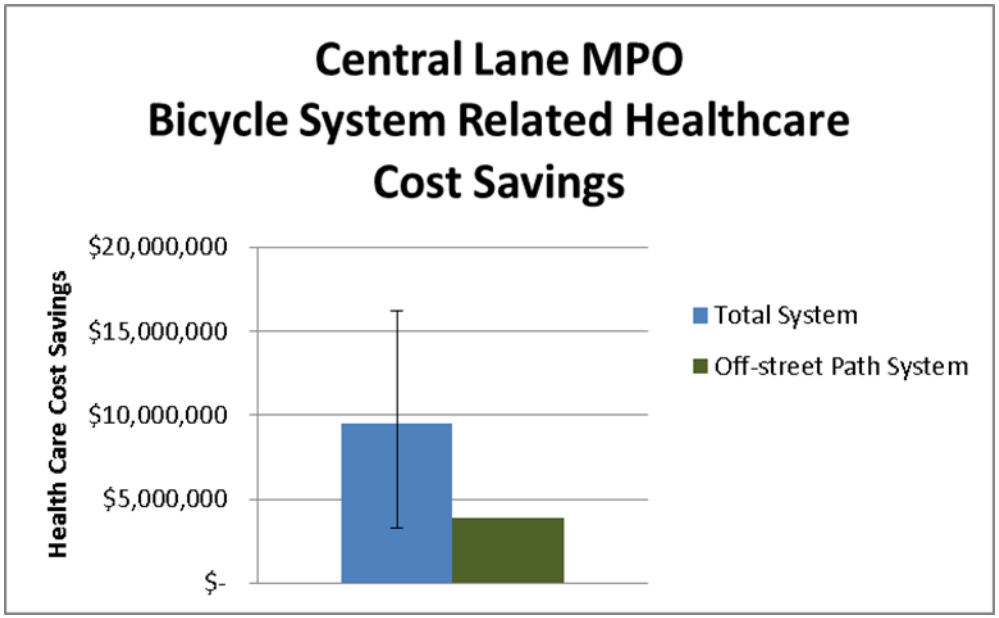
- Novel application of state of the art method
- Proactive safety project planning
- Helpful in ODOT funded safety program and ATNI prioritization
- Other considerations when picking projects



Health Analysis

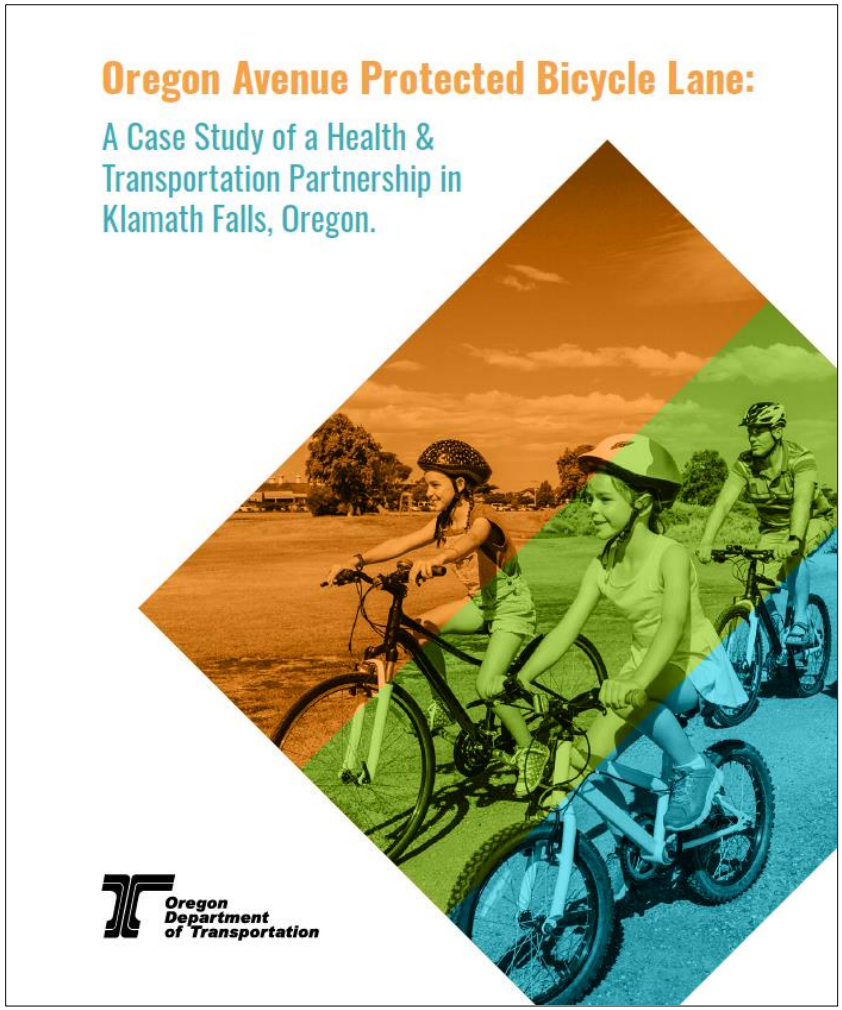
Health Analysis

- Integrated Transport and Health Impact Model (ITHIIM)
- Uses Relative Risk Method
- Calibrated for local burden of disease
- Between $3.3 and $16.2 million in annual health care cost savings



Other Recent Publications: Klamath Falls Protected Bicycle Lane

- Case study of planning process
- Highlighted local partnerships in health and transportation
- Summary of evidence linking active travel and health



Other Recent Publications: Evaluating Streetlight Estimated of Vehicle Traffic in Oregon

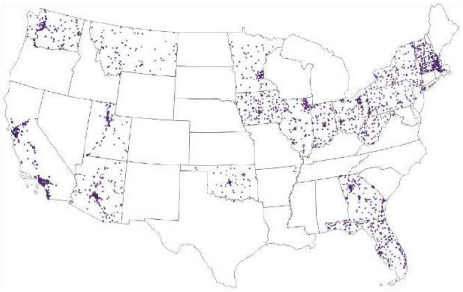
- Explosion of data sources from data firms
- ODOT needs to understand data quality
- Test a data quality framework

Other Recent Publications: Evaluating Streetlight Estimated of Vehicle Traffic in Oregon

Data
- Location-based service (apps)
- GPS navigation data
- Census population
- Vehicle counts data

Methods
- Machine learning using Random Forest

United States Census Bureau



Questions

Questions?

Josh Roll Active and Sustainable Transportation Research Coordinator

Josh.F.Roll@ODOT.state.or.us

Publications Page
https://www.oregon.gov/ODOT/Programs/Pages/Research-Publications.aspx