

FOTs, A Light Vehicle Perspective

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Passenger Vehicle FOTs

- **The FOT as a research tool**
 - **FOTs with data acquisition systems have been conducted for upwards of 20 years**
 - **U.S., Europe, Japan**
 - **Navigation systems**
 - **Intelligent speed adaptation (ISA)**
 - **Driver assistance and crash warning systems**
 - **A “reasonably well established” technique**
 - **But ripe for improvement/adaptation**

Passenger Vehicle FOTs

- **The general approach:**
 1. **Equip a vehicle with a new technology,**
 - A research vehicle or the subject's vehicle
 2. **Driver uses it “naturalistically”,**
 3. **Evaluate driving performance, utilization, and acceptance.**
- **FOTs are looking for changes in behavior**
 - It is the objective
 - Typically you include a baseline period

U.S. DOT Field Operational Tests Conducted by UMTRI

Light Vehicles – ACC

ICC FOT

131K mi, 108 drivers

Heavy Trucks - Rollover

RSA

480K mi, 23 drivers

Light Vehicles – Forward Crash/ACC

ACAS FOT

110K mi, 96 drivers

Light Vehicles– Lane Departure/Curve Speed

RDCW FOT

137K mi, 78 drivers

Light Vehicles & Heavy Trucks – Multiple Systems

IVBSS

Est. 750K mi
150+ drivers



RDCW FOT (UMTRI/Visteon)



ACAS FOT (GM/Delphi/UMTRI)

1990

2010

Naturalistic vs. FOT

- The general approach to conducting the two is similar
 - The general nature of the data is similar
 - In both instances you are trying to understand driver behavior
- Naturalistic is not simply a technique
 - An attribute, or quality, of the data
 - FOT data can have many naturalistic qualities
- How far removed from “natural” is it?
 - Any observation could alter behavior

Why Do We Need FOTs

- Need to understand how, or if, new technologies affect driver behavior
- Fundamental premise is that behavior will be affected by the new technology
 - Crashes reduced
 - Travel patterns change
 - Speed limits observed

What Do Behavioral Changes Mean Relative to “Naturalistic” Driving Studies?

- **FOTs will never go away completely**
 - There will always be a need to understand how news systems influence driver behavior
 - The need to model that behavior
- **Naturalistic driving data will always need to be supplemented by FOT data**
 - Why? Because driver behavior is affected by new technologies, as well as changing social and economic influences

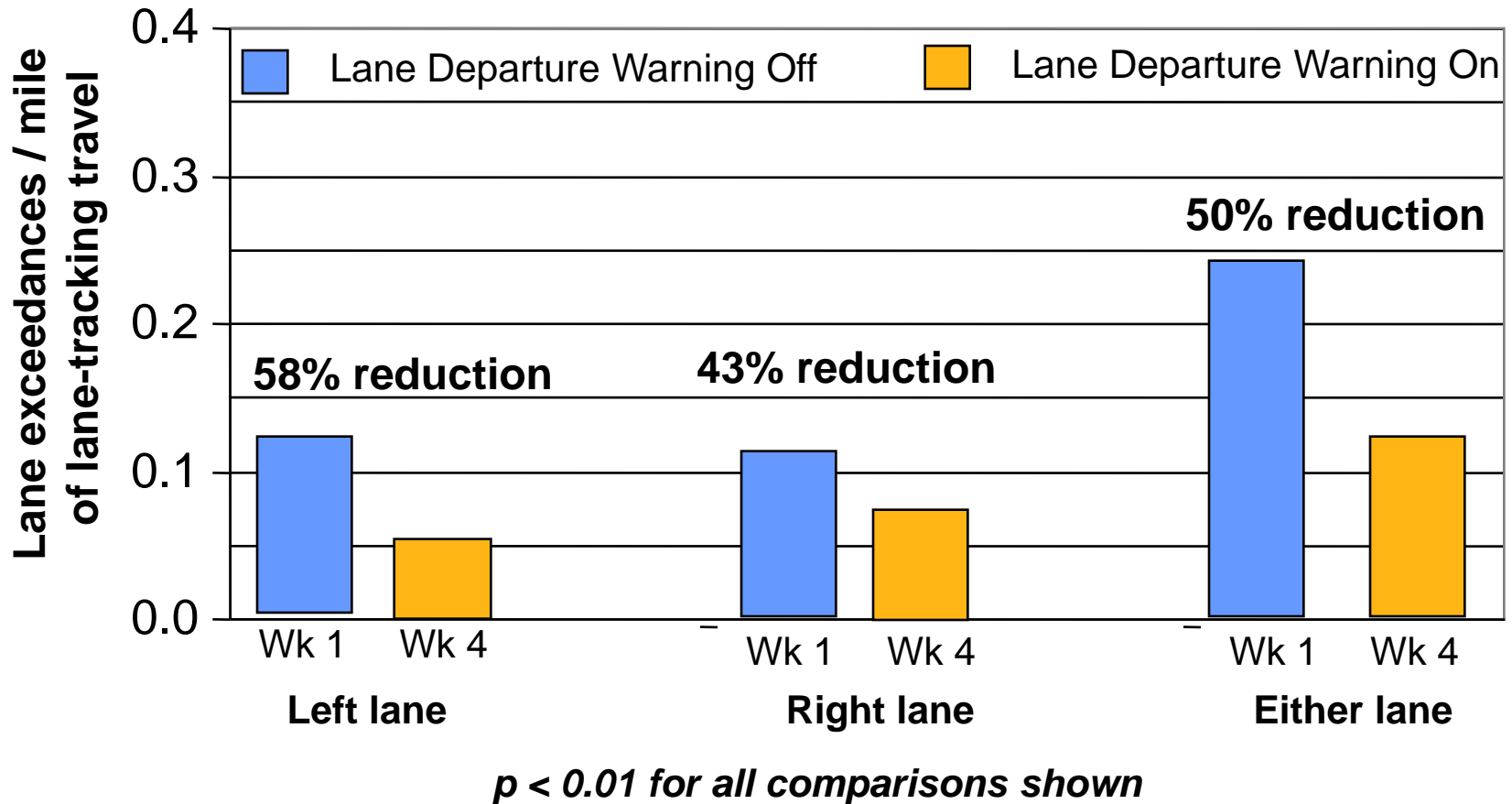
Warning System Example

- Lane departure warning (LDW) reduces lane excursions by 50%
 - This is a behavioral change on the part of the driver
- If you simply run an LDW algorithm through naturalistic driving data, you miss the behavioral change
 - The impact on warning rate, and maybe the crash rate
- You have to model the behavioral impact!

It's a Symbiotic Relationship

- **FOTs benefit from naturalistic data**
 - Examining driver errors in naturalistic data
 - Initially examination of new technologies using naturalistic data
- **Naturalistic studies benefit from FOTs**
 - Guidance in vehicle/driver sampling
 - Technological advances made by FOTs

Fewer Lane Departures with LDW



Increased Turn Signal Use

- Lane Departure Warning Off
- Lane Departure Warning On

