Turning Big Data into Useful Data

- Speaker:
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#WeTheStates

Turning Big Data Into Useful Data

Ariel Gold, U.S. Department of Transportation

37,133

5,977

799

270

Big Data =

Volume, Variety, Velocity

(?)

Big Data =


1
2
3
Simple, Open Specification
Broadly Adopted
Saves Lives

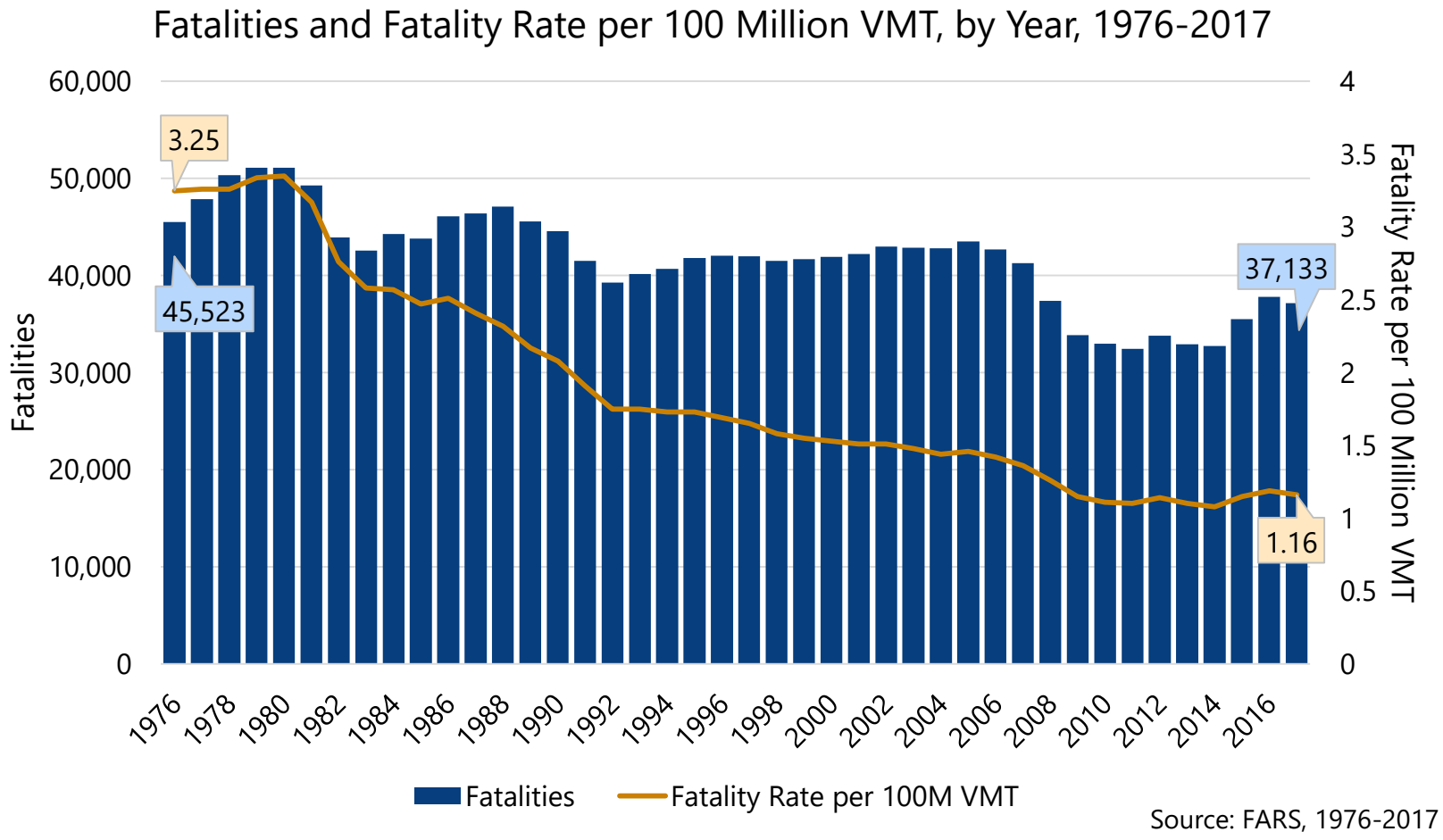
Systemic Safety Approach: Strategies

Improve the collection, management, and integration of **data**

Identify risks that contribute to fatalities and serious injuries

Collaborate with stakeholders to foster changes to the transportation ecosystem

The Problem



Source: FARS, 1976-2017

Safety Data Initiative (SDI)

- Launched in 2018
- Surface transportation focused
- Intended to build upon and enhance current safety efforts related to data, analysis, and policymaking

- Cross-cutting, collaborative effort:
  - Office of the Secretary of Transportation (OST)
    - Policy Office
    - Office of the Chief Information Officer
    - Bureau of Transportation Statistics
  - Federal Highway Administration (FHWA)
  - National Highway Traffic Safety Administration (NHTSA)
  - Other surface operating administrations (OAs)

Focus Areas

Integrate existing DOT data and new "big data" sources

Use advanced data analytics to provide **predictive insights** into safety risks

Create **data visualizations** to help policymakers arrive at solutions

Pilot Projects

- Since launch, the SDI has conducted pilot projects to:
  - Identify **safety challenges**
  - Experiment with solutions that can **save lives**
  - Improve the way information is conveyed for use by **safety practitioners**
  - Leverage the latest **advancements in data science**, as well as **new and emerging data** coming from the private sector

SDI Beta Safety Tools Developed

Pedestrian Fatality Risk Map

Safety Applications of Waze Data

- Highway patrol context
- Local Vision Zero planning context

Solving for Safety Visualization Challenge Tools

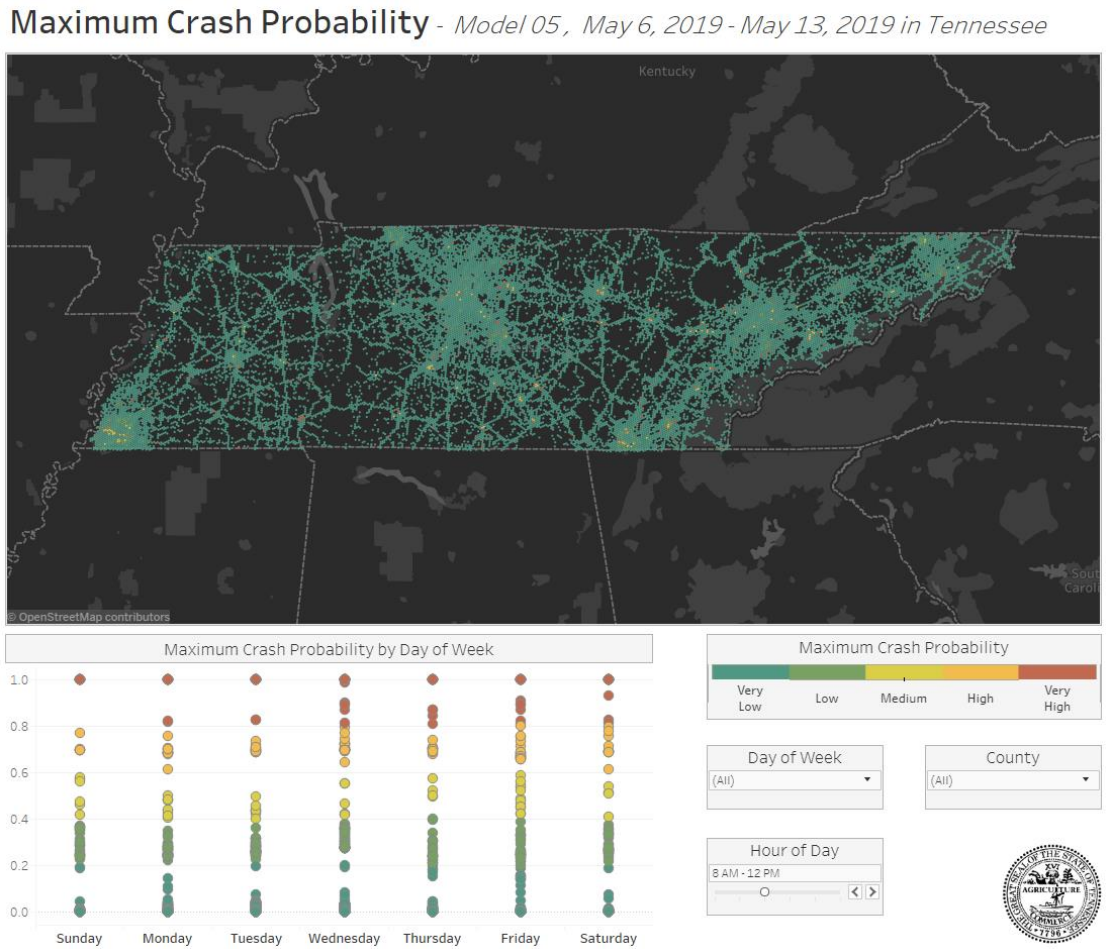
Fatality Analysis Reporting System (FARS) Visualizations

- Pedestrians
- Speeding-related crashes

Visit www.transportation.gov/SafetyDataInitiative for more details

Safety Applications of Waze Data

- First phase developed a rapid indicator of police-reportable traffic crashes
- Second phase consists of two case studies to develop Waze safety applications using Waze data:
  - Tennessee State Highway Patrol
  - City of Bellevue, Washington

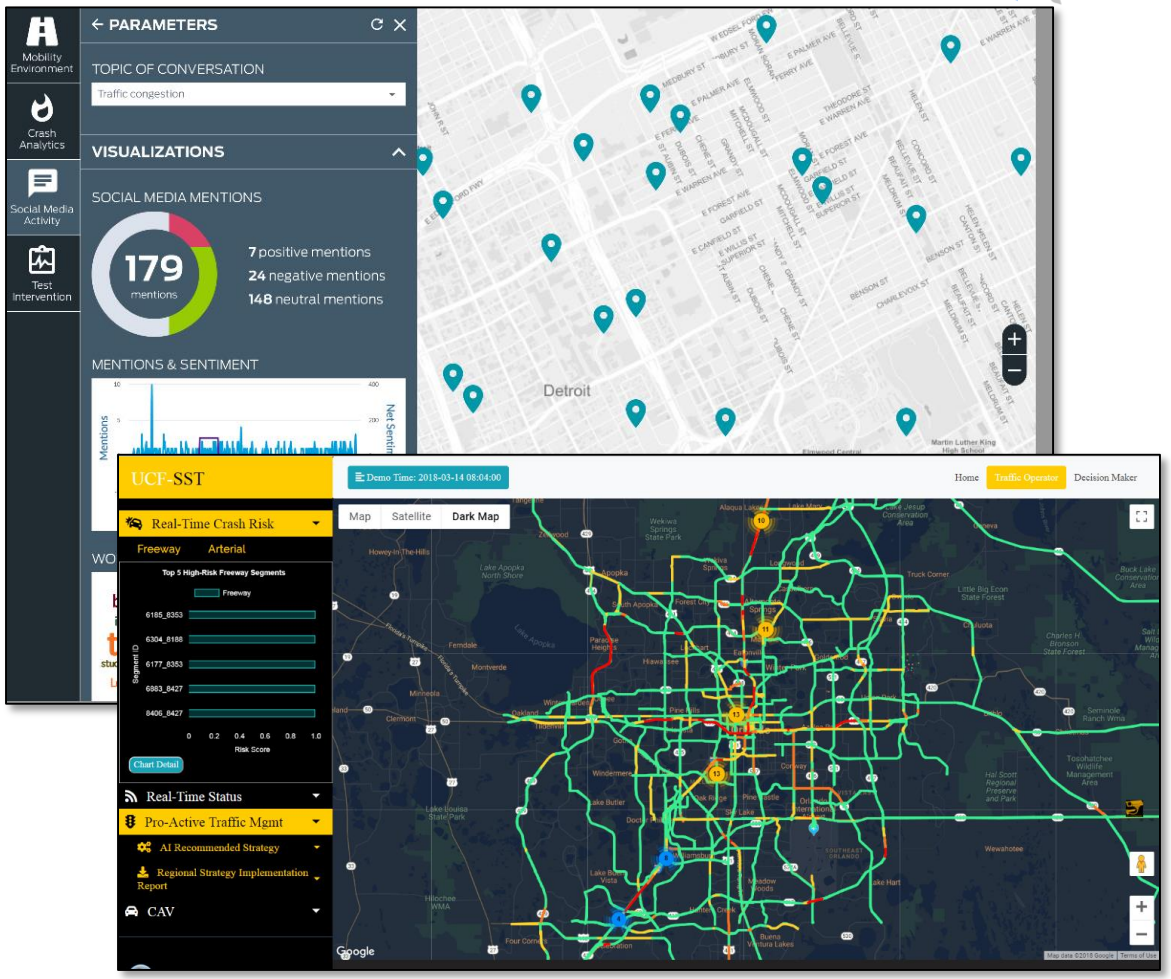


Safety Applications of Waze Data

- Assessed the potential of crowd-sourced Waze data for safety applications
- Findings:
    - Since it is crowd-sourced data the signal varied:
        - Stronger in urban than rural areas
        - Stronger during day vs. night
        - Stronger on higher functional classification roads (interstates) vs. local roads
    - The Waze data complemented other data sets such as weather to understand crashes over space and time
- Report from the first phase: https://rosap.ntl.bts.gov/view/dot/37256

Solving for Safety Visualization Challenge

Multistage, **$350,000 competition** to develop visualization-powered analytical tools to reduce serious crashes to address specific focus areas



Lessons Learned

- There is a **wealth of data outside of the federal government** that are not fully leveraged
- Private sector data could **help the Department understand** what is happening on the nation's roadways
- Persistent safety issues can be further illuminated through **new data to contextualize** safety risk

Analytic Agenda Overview

- The Department deliberated internally over four topic areas that presented opportunities to **enhance our understanding** of ongoing safety issues **with data**:
  - Pedestrian and Bicyclist Safety
  - Non-Fatal Injury Crashes
  - Intersections
  - Precursors to Crashes
- The Department convened stakeholders to help identify the **most pressing and persistent** safety research questions across these topics
- The input informed the SDI's **analytic agenda**

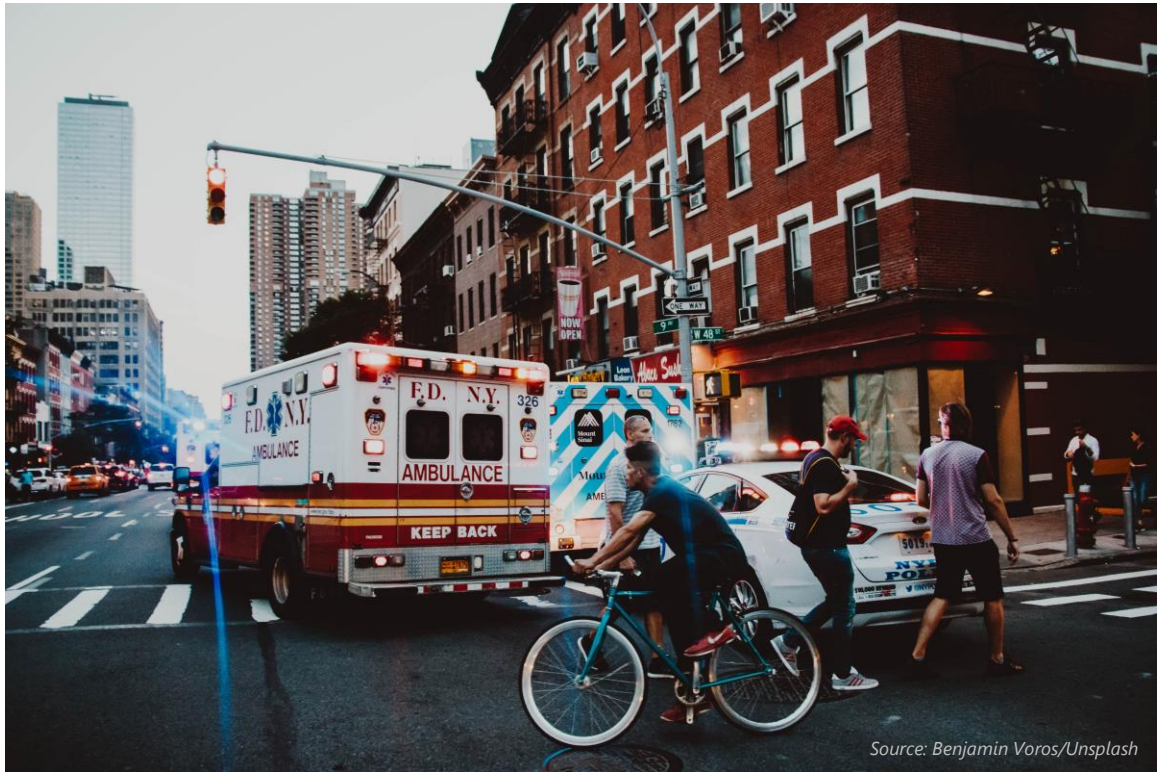
Pedestrian and Bicyclist Safety

- Fatality and serious injury locations
- Crash causes
- Modeling pedestrian and bicyclist exposure
- Risk identification

Source: Jorge Alcala/Unsplash

Non-Fatal Injury Crashes

- Data linkages to identify risk factors and patterns of risk
- Non-fatal injuries locations as a potential predictive indicator of fatal crashes



Source: Benjamin Voros/Unsplash

Intersections

- Intersection design features
- Safety conflict reduction
- Data linkages to inform countermeasures and safety insights

Source: John Matychuk/Unsplash

Precursors to Crashes

- Crash precursor risk signals
- Crash scenario characteristics and related patterns
- Understand baseline, normal-state-of-driving
- New data sources

Source: Alexandre Boucher/Unsplash

Anticipated Opportunities

Conducting Innovative, Applied Research to Gain New Roadway Safety Insights and Tools

- Interested in demonstration projects that explicitly use and incorporate **new data sources to answer the SDI analytic agenda problem statements**
- Intend to assess the **utility, fitness for purpose, and limitations** of new data to address the problem statements
- **Flexibility** in addressing the problem statements

State and Local Government Use of Roadway Safety Tools for Policy and Decision Making

- Intend to issue a notice of a **one-time funding opportunity**
- Plan to partner with **state and local governments**, along with their supporting partners
- These partnerships may seek to **develop, refine, and implement safety tools** as use cases that address a specific roadway safety problem through funding for technical assistance and peer exchanges

Turning Big Data Into Useful Data

- Assemble the right team
- Know what (big) problem(s) you're trying to solve
- Know your customer
- Embrace agile thinking
- Embrace (open source) collaboration
- Foster a data-driven culture
- Pick something, get started

Feedback and Further Questions

www.transportation.gov/SafetyDataInitiative

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