SHRP 2 Naturalistic Driving Study

SHRP 2 Tuesdays Webinar Series
March 11, 2014

Today's Panelists and Moderator

- Jon Hankey, *Virginia Tech Transportation Institute (VTTI)*
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- Suzie Lee, *VTTI*
  SLee@vtti.vt.edu

- Mike Mollenhauer, *VTTI*
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- Monique Evans, *Federal Highway Administration (FHWA)*
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- Kenneth Campbell, *Transportation Research Board*
  KCampbell@nas.edu

Upcoming SHRP 2 Tuesdays Webinars

March 25: Real-Time Smoothness Measurements on Portland Cement Concrete Pavements During Construction (R06E)

April 1: SHRP 2 Community Visioning and Performance Measurement Products (C08 and C02)

April 8: Roadway Information Data from the SHRP 2 Naturalistic Driving Study (S04A and S04B)

April 22: Nondestructive Testing Methods for Mapping Defects Behind or Within Tunnel Linings (R06G)

Learn about future webinars at

www.TRB.org/SHRP2/webinars

Links

InSight website (direct data access, information):
https://insight.shrp2nds.us/

TRB SHRP 2 Safety website (publications, fact sheets):
http://www.trb.org/StrategicHighwayResearchProgram2SHRP2/
Public/Pages/Safety_153.aspx

Combined analysis contract Phase 1 summary reports:

Short version: http://www.trb.org/Main/Blurbs/169021.aspx

Longer version: http://www.trb.org/Main/Blurbs/168727.aspx

Implementation Assistance website:
http://www.fhwa.dot.gov/goshrp2/ImplementationAssistance/FAQ

SHRP 2 Naturalistic Driving Study (NDS):
Goals and Design
Data Availability, Access, and Use

TRB's SHRP 2 Tuesdays Webinar

March 11, 2014

U.S. Department of Transportation
Federal Highway Administration

Virginia Tech
TRANSPORTATION INSTITUTE

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TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Introduction

- Ken Campbell

  SHRP 2 Safety Chief Program Officer

In the next hour

- Introduction: Ken Campbell, SHRP 2

- NDS overview: Jon Hankey, VTTI
  - NDS goals, study design
  - NDS data and data enhancements
  - Uses of naturalistic driving data

- Accessing and using NDS data
  - Suzie Lee, VTTI: InDepth – access to full data set
  - Mike Mollenhauer, VTTI: InSight – access to public website

- NDS data schedule and plans: Ken Campbell

- FHWA's implementation activities for the NDS: Monique Evans

What Is SHRP 2?

– $232 million, federally funded research program to address critical transportation challenges

- Making highways safer
- Fixing deteriorating infrastructure
- Reducing congestion
- Collaborative planning for new roads

– Managed by TRB of the National Academies

– Collaborative effort of TRB, AASHTO, and FHWA

– Originally operated from 2006 to 2013 – extended to March 2015

– Aims to advance innovative ways to plan, renew, operate, and improve safety on the Nation's highways

Four SHRP 2 Research Areas

Safety: to prevent or reduce the severity of highway crashes by understanding driving behavior.

Renewal: to renew aging infrastructure through rapid design and construction methods that minimize disruption and produce long-lived facilities.

Capacity: to integrate mobility, economic, environmental, and community needs into the planning and design of new highway capacity.

Reliability: to provide reliable travel times by preventing and reducing non-recurring congestion.

SHRP 2 Safety Program Objective

Fact: drivers cause or contribute to over 90% of crashes

Study goal: Improve traffic safety by obtaining objective information on driver behavior and driver interaction with the vehicle and the roadway

- **Build the Naturalistic Driving Study (NDS) and Roadway (RID) databases**:
  3,900 vehicle-years and 12,500 roadway centerline miles

- **Make the data accessible**: full data to qualified researchers, de-identified data to general public

- **Use the data**: study key safety issues that can't be studied with other databases
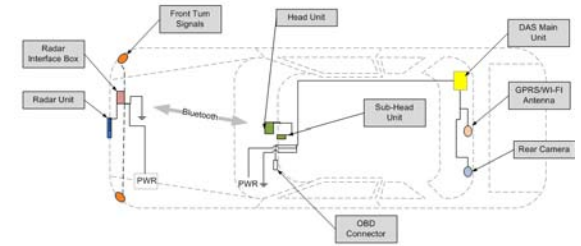
NDS Overview

- Jon Hankey

  Senior Associate Director for Research and Development, VTTI

NDS Overview

- Jon Hankey

  Senior Associate Director for Research and Development, VTTI

Naturalistic Driving Studies

- Instrument volunteer drivers vehicles and continuously data while they go about their normal activities. Why?...
  - What do drivers really do? Speeding, tailgating, cell phone, alcohol …
  - What were they doing just before they crashed?
    - Usual crash studies can only guess.
    - We can see fraction of second by second what happened.
    - What were other possible causal factors
  - How does the roadway, vehicle and environment impact driving?
- Several previous smaller naturalistic driving studies
  - 100-car: Northern Virginia, one year, 100 vehicle-years, 10 years old and still being used
- SHRP 2 Naturalistic Driving Study: 40 times larger, national scale
  - SHRP 2 data will be used for 20 years or more

NDS Example Data From InSight Website (not an actual participant)

NDS Study Design

- Largest Naturalistic Driving Study Ever Undertaken
  - 3,147 drivers, all age/gender groups.
  - 3,958 data years; 5 M trip files; 49.7 M vehicle miles
  - 3 years of data collection
    - Most participants 1 to 2 years
  - Vehicle Types: All light vehicles
    - Passenger Cars
    - Minivans
    - SUVs
    - Pickup Trucks
  - Six data collection sites
- Integration w/ detailed roadway information

Seattle, WA

Buffalo, NY

State College, PA

Bloomington, IN

Durham, NC

Tampa, FL

Naturalistic Driving Study Data Overview

- Driver demographics, assessments
- Vehicle descriptors

TRIP DATA
- Multiple Videos
- Machine Vision
  - Lane Tracker
- Accelerometer Data (3 axis)
- Rate Sensors (3 axis)
- GPS
  - Latitude, Longitude, Elevation, Time, Velocity
- Forward Radar
  - X and Y positions
  - X and Y Velocities
- Cell Phone Records
  - Beginning and end of all cell phone conversations on major carriers
- Passive Alcohol Sensor

- Illuminance sensor
- Incident push button
  - Audio (only on incident push button)
- Turn signals
- Vehicle network data
  - Accelerator
  - Brake pedal activation
  - ABS
  - Gear position
  - Steering wheel angle
  - Speed
  - Horn
  - Seat Belt Information
  - Airbag deployment
  - Many more variables…

Roadway (RID) Data Overview

- New data: collected at highway speed, about 12,500 centerline miles (both directions)

    – focus on data needed for lane departure and intersections

    – curvature location, length, radius; grade; cross-slope; lane number, width, type; shoulder type (width if paved); all MUTCD signs; medians; barriers; rumble strips; lighting; intersection location, number of approaches, and control type; videolog

- Existing data from ESRI and state inventory: any available roadway information – varies by site

- Supplemental data: traffic, weather; work zones; crashes; roadway improvements; laws

SHRP 2 Naturalistic Driving Study and
Roadway Information Databases Linked so that which
5M trips are driven on which roads are known

NDS

Data

Linked

RID

(GIS)
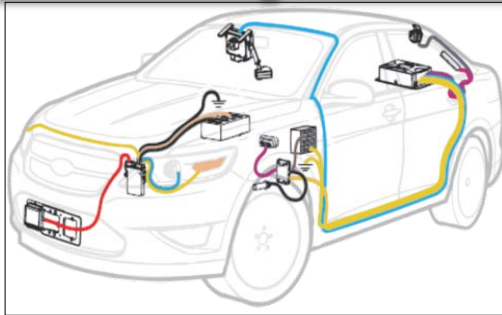
3,147 participants
3,958 vehicle-years
5 million trips

Passenger cars, vans,
    SUVs, pickups
Data recorded continuously
    on each trip
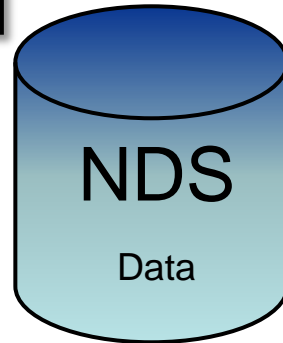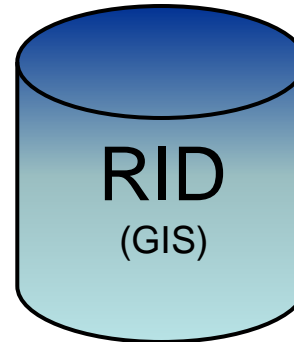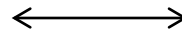
New data collected
- 12,500 centerline miles
- Consistent across six sites

Acquired data (DOTs, others)
- 200,000 centerline miles
- Roadway, Weather, Traffic ...

NDS Data Characteristics

- Size: the dataset is huge
  - 2 petabytes
  - "Give me the whole raw data file" isn't possible

- Complexity: different data types
  - Categorical data constant over a trip: driver age, vehicle type
  - Sampled data: collected at original resolution (once a trip up to 640 Hz during a crash): speed, acceleration, GPS position, radar, vehicle network information
  - Video data from 4 cameras
    - Automated reduction: lane tracker
    - Other automated techniques being funded now
    - Manual reduction: possible for other items for specific analyses

- Privacy considerations: personally-identifying data (PII)
  - Actual drivers being monitored during every time they are driving their vehicle

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Video Example with parametric data
(Near Crash)

Data Enhancements: How to Eat a Couple Petabyte Elephant

- InSight Website Data
  - Easily access to information chunks
  - Provides InSight into the data for researchers doing more In-Depth analyses
- Trip summary dataset
- Crashes, near-crashes and baseline files
- Linked NDS and RID data
- Reduced datasets designed for a research question topic areas (none planned currently but easily added)
  - Older and younger driver left turns at intersection
- Custom datasets for answering specific research questions
  - S08 contractors as examples

Crashes, Near-Crashes, Baseline Files

- Crashes: expect 700, varying severity
  - Most researchers want to examine crashes
- Near-crashes: "almost" crash but for sudden maneuver; 7,000
  - Crash surrogates; how did driver avoid a crash
- Baseline: randomly selected across all vehicles; 30,000
  - Denominator for risk calculations; measure overall prevalence
- Epoch files for each
  - 30-second data segments (20 before, 10 after; only 20 for baseline)
  - Includes most data
  - Manual eye-glance coding
- Event files for each
  - Categorical data coded from last 6 seconds of "before" data (driver distraction)
  - Manual video reduction; data dictionary on website

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InSight Website Data

- Data de-identified; no PII; fairly easy to access
- Drivers Assessments
- Vehicle information
- Trip Summary Data
- **Data from crashes, near-crashes, baseline**
  - Includes video and data viewer (under development)
  - Similar to Near Crash shown earlier
- Interface to the RID and NDS linking (under development)

Example: Analyses Using Crash Data from Previous VTTI Studies

- From VTTI naturalistic driving studies

  – 100-car

  – Heavy truck

- Compare crash and near-crash risk of various distractions

- Use odds ratios: odds of a crash or near-crash with and without distracting activity

  – Odds above 1: increased risk

  – Odds below 1: reduced

Non-Driving-Task Related Relative Crash/Near Crash Risk Estimates (Odds Ratio)

Passenger Interaction 0.5

Drinking 1.0

Eating 1.6

Dialing Hand-Held Device 2.8

Applying Make-Up 3.1

Adjust Radio 0.6

Talk/Listen Hand-Held 1.3

Handling CD 2.3

Reading 3.4

Talk/ Listen to Hands Free Phone 0.4

Adjust Instrument Panel 1.3

Read Book, Paperwork, Newspaper, etc. 4.0

Interact Occupant/s 0.4

Look Outside of Vehicle 0.5

Check Speedometer 0.3

Talk/Listen to CB 0.6

Reach for Object in Vehicle 3.1

Personal Grooming 4.5

0   1   2   3   4   5

Light Vehicle Data
Heavy Truck Data
Heavy Truck Driving-Related

SHRP 2 S08 Analysis Contracts

Each using a custom dataset to analyze InDepth

Phase 1: Proof-of-concept analysis

- 11 months, Feb. 2012 – Jan. 2013
- 4 awards
- 3 contractors selected for Phase 2

Phase 2: Full analysis

- Spring 2013 – July 2014
- 3 awards

Combined Phase 1 summary reports

Short version: http://www.trb.org/Main/Blurbs/169021.aspx
Longer version: http://www.trb.org/Main/Blurbs/168727.aspx

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CTRE: Driver Behavior and Safety on Curves

- Research questions:
  - How do distraction and other driver characteristics affect curve negotiation on rural 2-lane 55 mph curves?
  - What is the relationship between speed, lateral positioning, and crash risk?
  - What roadway cues and countermeasures are the most effective in driver attention and response?

- Applications:
  - Use and placement of roadway features such as signs, rumble strips, chevrons

MRIGlobal: Offset Left-Turn Lanes

- Research questions:
  - Do offset left-turn lanes affect turn behavior and gap acceptance?
  - What effect does the presence of a vehicle in the opposing left-turn lane have on turn behavior and gap acceptance?

- Applications:
  - Use and design of offset left-turn lanes

SAFER: Inattention-Risk Function for Lead Vehicle Crashes

- Research question:
  - How does driver inattention, as observed through measures of single glance (inopportune glance, single long glance) and glance history (intensity, duration), influence the risk of crash severity in Lead Vehicle Stopped, Lead Vehicle Decelerating, and Lead Vehicle Moving at Lower Constant Speed pre-crash scenarios?

- Applications:
  - Design or regulation of in-vehicle equipment requiring drivers to look away from the road

Accessing and Using NDS Data - InDepth

- Suzie Lee

    Director of Research Compliance and Data Access, VTTI

Human Subjects Research

- Human subjects research is governed by international consensus and federal law

- The SHRP 2 NDS used human subject volunteers

- NDS data collection:
  - Oversight and approvals from Virginia Tech Institutional Review Board, NAS IRB, and 4 other IRBs
  - Approvals covered subject's knowledge of what is being collected; security of data collection, transmission, storage; protection from subpoena
  - "… you are consenting to other research uses …"
  - Future research use of data for up to 30 years

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PII and InDepth Access

- Both identifying and non-identifying data collected

  - Personally identifying information (PII) is highly protected under federal law and the participant agreements (consent forms)

  - Includes face video, GPS traces, other items

- Non-identifying data can be more freely shared (e.g., InSight website)

  - Full access (qualified researcher) requires proof of IRB training

  - IRB training has several options; minimal time commitment; ensures degree of familiarity with human subject regulations

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PII and InDepth Access

- For PII, other "qualified researchers" will be given access under data sharing agreement and IRB review/approval

  – At least the same level of security as provided for in CF

  – Face video de-identified if used for conference, media, education; no name or identifying location information with video

- PII must be viewed/coded in a secure data enclave

  – Under supervision

  – No copying or removing of PII

  – Enclave should be separate from other data reduction and analysis areas

  – Other hardware, software, and policy protections

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InDepth Access Process

1. Explore InSight website
   a. Take IRB training
   b. Become a qualified researcher
   c. Become familiar with variable and data dictionaries
2. Begin conversation with data steward
   a. Scope and cost considerations
   b. Feasibility of analysis and availability of appropriate data
3. Develop a detailed data specification in collaboration with data steward
4. Obtain IRB approval for the project from your home institution
   a. In some cases the IRB will decide it is exempt (an IRB, not a PI, decision)

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InDepth Access Process

5. Work with data steward to develop a data sharing agreement (DSA)

   a. Project description (with reference to data specification)

   b. Project personnel

   c. Proof of IRB training for each person

   d. Proof of IRB approval or exemption

   e. Agree to conditions protecting PII

   f. Agree not to share the data with others (each InDepth analysis project requires separate IRB approval)

6. Work with data steward to:

   a. Obtain specialized non-identifying dataset or

   b. Schedule time in the secure data enclave

Accessing and Using NDS Data - InSight

- Mike Mollenhauer

  Research Scientist, VTTI

Accessing and Using NDS Data - InSight

- Mike Mollenhauer

  Research Scientist, VTTI

Goals for the InSight Website

- Operate a public facing website to support data dissemination from the SHRP 2 naturalistic driving study (NDS) project
    - Background information about the SHRP 2 NDS method and program
    - Interact with SHRP 2 NDS data and data administrators
    - Explore and query collected data based on research criteria
    - A means to disseminate *some* data collected during the NDS

Data Produced During the NDS

Participant Assessments

- Demographic Questionnaire
- Driving History
- Driving Knowledge
- Medical Conditions and Meds
- ADHD Screening
- Risk Perception
- Frequency of Risky Behavior
- Sensation Seeking Behavior
- Sleep Habits
- Visual, Physical, and Cognitive Test Results
- Exit Interview

Vehicle Information

- Make, Model, Year, Body Style
- Vehicle Condition
- Safety and Entertainment Systems

Continuous Data

- Face, Forward, Rear, and Instrument Panel Video
- Vehicle Network Data
- Accelerometers/Gyros, Forward RADAR, GPS
- Additional Sensor Data

Trip Summary Data

- Characterization of Trip Content
- Start Time and Duration of Trip
- Min, Max, Mean Sensor Data
- Time and Distance Driven at Various Speeds, Headways
- Vehicle Systems Usage

Event Data

- Crashes, Near Crashes, Baselines
- 30s Events With Classifications
- Post-Crash Interviews
- Other Crash Data

Cell Phone Records

- Subset of participant drivers
- Call time and duration
- Call type (text, call, pic, etc)

Roadway Data

- Matching trip GPS to roadway database
- Roadway classifications
- Other roadway data

3

User Access Levels on InSight

Guest User

-Background information pages
-Data dictionaries and descriptions
-Aggregated data
-Sample data

User registration
-Email address, name, affiliation
-Agree to terms of use

Registered User

-Guest user access, plus…
-User forum access

Apply for status
-Complete IRB training
  (free online course)
-Upload training certificate

Qualified Researcher

-Registered user access, plus…
-Access to all dataset records
-Data query functionality
-Event viewing capability
-Customized data export (future)

4

What Can Users Do With the Website?

- Review data collection procedures and project background

  How was this data collected?

- Explore data inventory, data dictionaries, and download sample data

  What variables are collected and how are they defined?

- Query for how many drivers, vehicles, or trips exist in the database that match various research criteria

  How much data is available that matches my research criteria?

- Review crash, near crash, and baseline events identified and classified during the study

  What were the details and context of the event?

Example Use of Website

- A researcher wants to explore younger driver issues and has questions about how NDS data could be applied

- Some questions to consider

  - How many younger drivers participated?

  - How much data was collected from them?

  - What kinds of data are available through InSight? InDepth?

  - How many trips are available from younger drivers with higher sensation seeking tendencies?

InSight Data Access Website

SHRP 2 Naturalistic Driving Study

Learn More About SHRP2 NDS...

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SHRP2 STRATEGIC HIGHWAY RESEARCH PROGRAM

VirginiaTech TRANSPORTATION INSTITUTE

Already Registered?

Username (email)

Password

Sign In

☐ Remember me · Forgot Password?

Need an Account?

You must register to gain access to the available data.

About User Access Levels

Register Now

What Is Available on This Website

Information describing the 3,400+ drivers and vehicles that participated in the naturalistic driving study.

SHRP 2 NDS status information including data collection and processing progress.

Background information about the project and data being collected.

300,000+ Trip summary records that describe individual trips recorded during the study.

30,000+ Crash, near crash, and baseline driving events. (Coming Soon!)

Discussion forums for questions about the project and available data.

What You Can Do on This Website

View Background information about the SHRP 2 NDS.

View detailed data collected from driver assessments, vehicles, trip summaries, and critical driving events.

Query the database of detailed data, create cross tabulations, and assess NDS database content.

InSight
SHRP 2 NDS

Data   Forums   Background

👤 Michael Mollenhauer ▾

Welcome to InSight

InSight provides access to data collected during the SHRP 2 Naturalistic Driving Study (NDS).

What's Available on This Website

Driver Descriptions and Assessments
Summary graphs and detailed records of driver assessments are provided addressing driver demographic background, physical, psychological, and medical condition.

Summary of Continuous Naturalistic Data Collected
Graphs and detailed records describe data collection progress and characteristics of trips collected during the study.

Vehicle Descriptions
Summary graphs and detailed records describe the types of vehicles involved in the study.

Custom Query Capability
Build custom queries to search for records matching criteria that span multiple datasets.

Naturalistic Driving Study Background Information
Access an overview of the SHRP 2 Naturalistic Driving Study project, data collection procedures, data dictionaries, and sample data.

Access to SHRP 2 NDS Forums
Join a community of SHRP 2 NDS Forum members to discuss available data, website functionality, and related topics.

What's New

9/10/2013 - New data released! New data include the Barkley's Quick Screen results and over 45,000 trip summaries.

7/8/2013 - SHRP 2 InSight forum website is now available for technical support and general discussion.

7/7/2013 - Query page expanded to include an initial crosstab table configuration tool.

View More...

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InSight
SHRP 2 NDS

Data   Forums   Background

👤 Michael Mollenhauer ▾

Build a Query or Select a Data Category to View

Vehicles

View a collection of information about vehicles that were used to collect data in the SHRP 2 NDS.
- Vehicle types (car, truck, van, etc.)
- Vehicle ages and condition
- Amount of data collected per vehicle
- Quantities of vehicles installed
- Vehicle technologies and equipment

View...

Trips

View a collection of information about trips collected and processed during the SHRP 2 NDS. Summary records can be used to screen for trips containing specific characteristics.
- Summary measures describing trips
- Trip length, duration, start time, stop time
- Min, Max, Mean for speed, acceleration
- Trip summary record table

View...

Query Builder

Build and execute customized queries across multiple data tables, create cross tabulations, and view results.
- Select variables and conditions
- Submit query, assess results
- Build cross tabulations

View...

Drivers

View a collection of information about drivers that participated in the SHRP 2 NDS.
- Quantities of drivers
- Amount of data collected per driver
- Driver demographics and driving history
- Driver physical and psychological state
- Driver participation experience

View...

Crashes

View a collection of information about crash, near crash, and baseline events captured during SHRP 2 NDS.
- Crashes by severity
- Detailed crash assessment records
- Crash event viewer

View...

InSight
SHRP 2 NDS

Data   Forums   Background

👤 Michael Mollenhauer ▾

Data / Driver Data Selection

Driver Data Selection

Click ⌄ to show, or ⌃ to hide, additional information about each data item.

Expand All   Collapse All   Reset

Search... ?

⌃ How many drivers have participated in the study?

    ⌄ **Drivers by Age Group**   View Graph   info

    ⌄ **Drivers by Age Group and Gender**   View Graph   info

    ⌄ **Drivers Active and Completed**   View Graph   info

⌄ How much data has been collected from drivers, processed, and made available on this website?

⌄ What are the demographic traits and driving history of participating drivers?

⌄ What is the physical and psychological condition of participating drivers?

⌄ What medical conditions and medications did driver report actually experiencing during the study?

⌄ What was the driver's participation experience during the study?

Data / Driver Data Selection / Drivers by Age Group

Close Graph

Drivers by Age Group info

Legend
(Click color to hide/show)
■ All Sites

Data Collection Site Location

All Sites

Bar chart titled with y-axis "Number of Drivers" (0 to 700) and x-axis "Age Group" with categories: 16-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99.

https://insight.shrp2nds.us/data/category/drivers#/list

InSight
SHRP 2 NDS

Data   Forums   Background

👤 Michael Mollenhauer ▾

Data / Driver Data Selection

Driver Data Selection

Click ⌄ to show, or ⌃ to hide, additional information about each data item.

Expand All   Collapse All   Reset

Search... ⑦

⌄ How many drivers have participated in the study?

⌃ How much data has been collected from drivers, processed, and made available on this website?

⌄ Data Collected by Driver Age Group   View Graph   info

⌄ Data Collected by Driver Gender   View Graph   info

⌄ What are the demographic traits and driving history of participating drivers?

⌄ What is the physical and psychological condition of participating drivers?

⌄ What medical conditions and medications did driver report actually experiencing during the study?

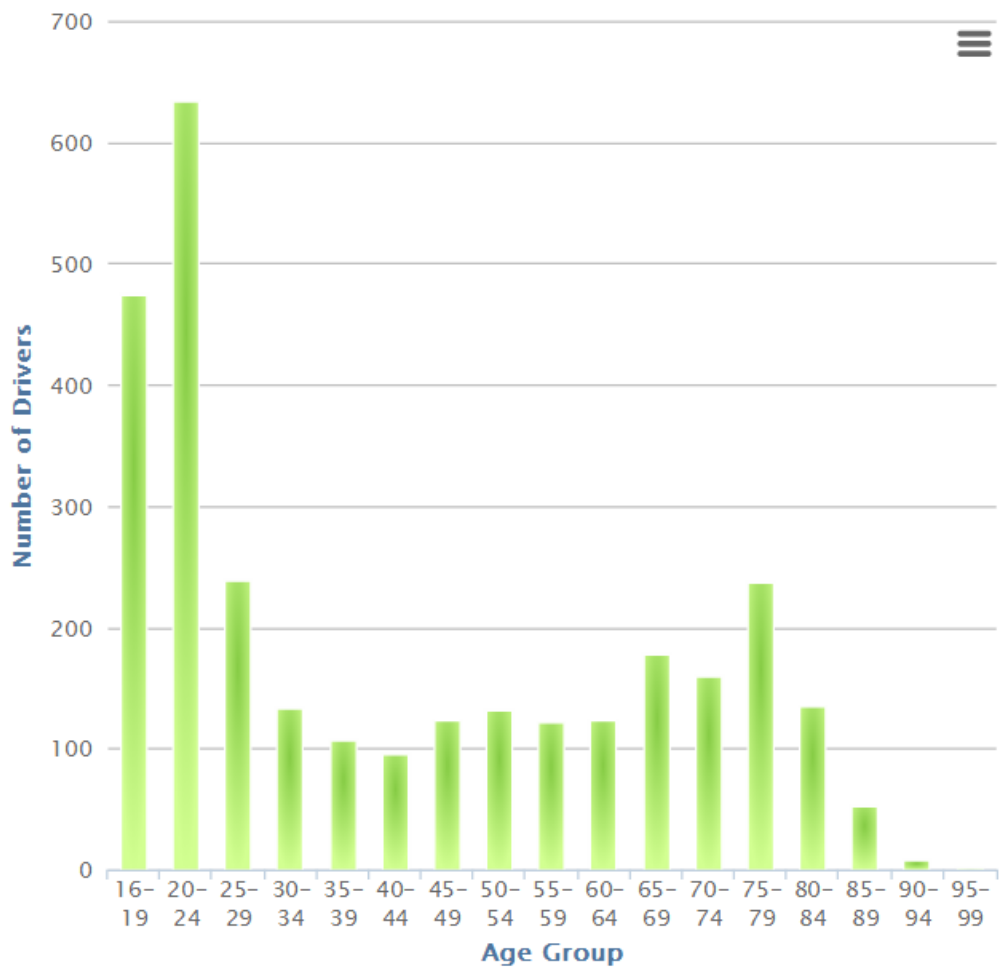⌄ What was the driver's participation experience during the study?

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https://insight.shrp2nds.us/data/category/drivers#/graph/3

InSight
SHRP 2 NDS

Data　　Forums　　Background

👤 Michael Mollenhauer ▾

Data / Driver Data Selection / Data Collected by Driver Age Group

Close Graph

Data Collected by Driver Age Group [info]

Legend
(Click color to hide/show)
🟩 All Sites

Mileage (y-axis): 6M, 5M, 4M, 3M, 2M, 1M, 0M

Age Group (x-axis): 16–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69, 70–74, 75–79, 80–84, 85–89, 90–94, 95–99

Age Group
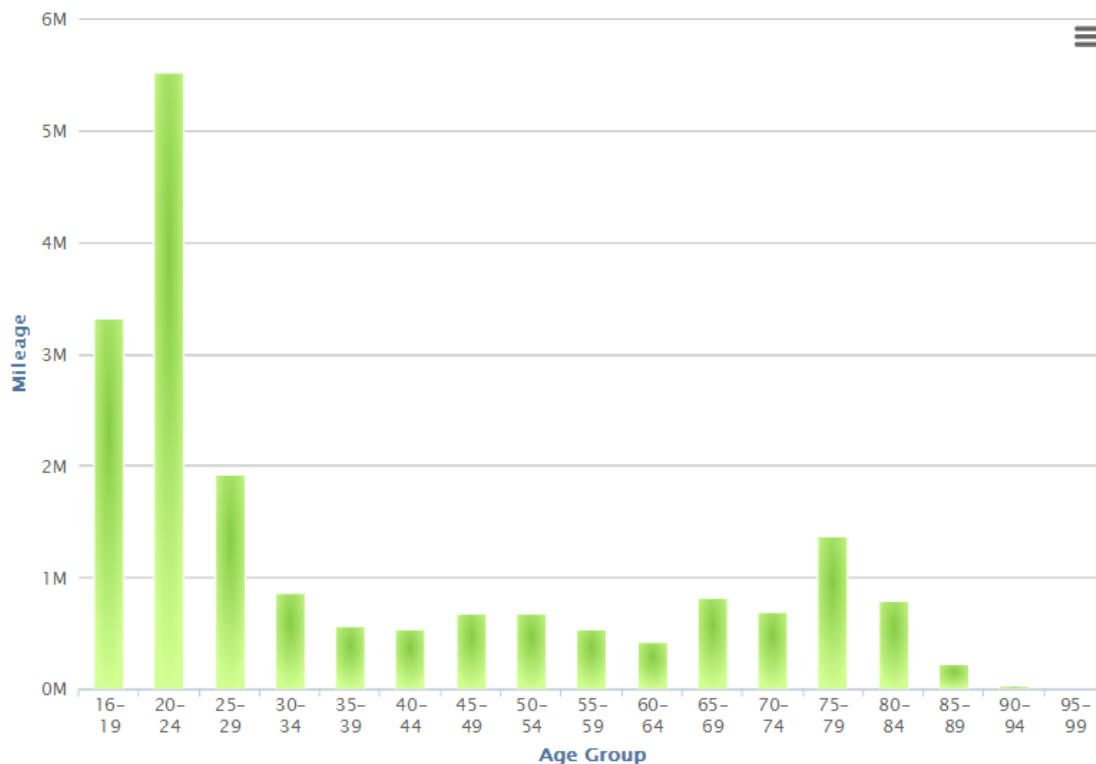
Data Collection Site Location

All Sites ▾

Metric

Mileage ▾

Mileage
Hours
Trips

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InSight
SHRP 2 NDS

Data   Forums   Background

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Driver Data Selection

Click ⌄ to show, or ⌃ to hide, additional information about each data item.

Expand All   Collapse All   Reset

Search... ?

⌄ How many drivers have participated in the study?

⌄ How much data has been collected from drivers, processed, and made available on this website?

⌄ What are the demographic traits and driving history of participating drivers?

⌃ What is the physical and psychological condition of participating drivers?

⌄ Medical Conditions & Medications   View Table   info

⌄ Barkley's Quick Screen   View Table   info

⌄ Driving Knowledge   View Table   info

⌄ Perception of Risk   View Table   info

⌄ Risky Behavior   View Table   info

⌄ Sensation Seeking   View Table   info

⌄ JAMAR Hand Strength   View Table   info

⌄ Modified Manchester Driver Behavior   info

⌄ Driver Vision Testing Results   View Table   info

⌄ Sleep Questionnaire   View Table   info

⌄ Visual and Cognitive Testing Results   info

⌄ What medical conditions and medications did driver report actually experiencing during the study?

⌄ What was the driver's participation experience during the study?

InSight
SHRP 2 NDS

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👤 Michael Mollenhauer ▾

Build a Query or Select a Data Category to View

Vehicles

View a collection of information about vehicles that were used to collect data in the SHRP 2 NDS.
- Vehicle types (car, truck, van, etc.)
- Vehicle ages and condition
- Amount of data collected per vehicle
- Quantities of vehicles installed
- Vehicle technologies and equipment

View...

Trips

View a collection of information about trips collected and processed during the SHRP 2 NDS. Summary records can be used to screen for trips containing specific characteristics.
- Summary measures describing trips
- Trip length, duration, start time, stop time
- Min, Max, Mean for speed, acceleration
- Trip summary record table

View...

Query Builder

Build and execute customized queries across multiple data tables, create cross tabulations, and view results.
- Select variables and conditions
- Submit query, assess results
- Build cross tabulations

View...

Drivers

View a collection of information about drivers that participated in the SHRP 2 NDS.
- Quantities of drivers
- Amount of data collected per driver
- Driver demographics and driving history
- Driver physical and psychological state
- Driver participation experience

View...

Crashes

View a collection of information about crash, near crash, and baseline events captured during SHRP 2 NDS.
- Crashes by severity
- Detailed crash assessment records
- Crash event viewer

View...

InSight
SHRP 2 NDS

Data   Forums   Background

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Data / Trip Data Selection

Trip Data Selection

Click ❤ to show, or ⬆ to hide, additional information about each data item.

Expand All   Collapse All   Reset

Search...   ❓

⬆ What are the characteristics of each trip collected and processed?

❤ **Trip Summary Table**   View Table   info

❤ **Time Series Data Dictionary**   info

⬇ How much data has been collected based on when the trip was started?

⬇ How did maximum deceleration and speed vary by trip, vehicle classification, gender, and age group?

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Trip Summary Table Data Dictionary Information

Back | Search... | Printer Friendly Version | Close

About this Data

Background

Protection of Personally Identifying Information

Conversions

Coordinates

Version History

Variables

Trip ID	Trip Start UTC Hour of Day	Trip Start UTC Month
Trip End UTC Hour of Day	Trip Start Local Time Hour of Day	Trip Start Month Local
Trip End Local Time Hour of Day	Trip Day of Week	Trip Day Number in Study
Trip Duration	Trip Distance	Trip Centroid Latitude
Trip Centroid Longitude	Trip Origin Altitude	Trip Destination Altitude
Max Speed	Mean Speed	Time Moving
Time Not Moving	Maximum Acceleration	Maximum Deceleration
Maximum Lateral Acceleration	Minimum Lateral Acceleration	Maximum Turn Rate
Minimum Turn Rate	Number of Longitudinal Accels > Threshold	Number of Longitudinal Decels > Threshold

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Trip Summary Table Data Dictionary Information

Back   [Search...]   Printer Friendly Version   [Close]

Number of Longitudinal Decels > Threshold Details

Variable Name:	Number of Longitudinal Decels > Threshold
Description:	Number of longitudinal decelerations > 0.4 g sustained for at least 1200 milliseconds
Variable Type:	Integer
Source:	n/a
Metric Units:	n
Standard Units:	n
Availability:	Accessible through InSight Website
Notes:	n/a

Example (cont'd)

- It appears that there is considerable NDS data available from younger drivers

- Some additional questions to investigate:

  - How many drivers in the younger age groups had at least one trip or more with a large longitudinal deceleration? How many trips does that account for?

  - Did many of the younger drivers score higher on their sensation seeking assessment? How many trips are available from those that did?

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Build a Query or Select a Data Category to View

Vehicles

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View...

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SHRP 2 NDS

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Data / Query Builder

1. Add Variables ⑦   [Search...]

- ⌄ Vehicle Variables
- ⌄ Trip Summary Variables
- ⌃ Participant Variables
  - ⌃ Driver Demographic Questionnaire
    - ⌄ Participant ID
    - ⌄ Gender
    - ⌃ Age Group

      Select all | **Select none**

      - ☑ 16-19
      - ☑ 20-24
      - ☑ 25-29
      - ☑ 30-34
      - ☑ 35-39
      - ☑ 40-44
      - ☑ 45-49
      - ☑ 50-54
      - ☑ 55-59
      - ☑ 60-64
      - ☑ 65-69
      - ☑ 70-74

2. Verify the Query ⑦

> ✕
> **Age Group:** 16-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99, NULL (no value)

> ✕
> **Number of Longitudinal Decels > Threshold:** greater than or equal to 1

> ✕
> **All SSS Total Score values included.**

3. Submit the Query   [Submit Query]

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SHRP 2 NDS

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Data / Query Builder / Results

Query Results

Back to Query Builder

View the results of the last query submitted and choose a means to display them.

Records Matching Query ⓘ

24,458 Total linked records match query criteria representing:

| Vehicles: 698 | Drivers: 697 | Trips: 24,458 | Events: |

Data Display Options ⓘ

Cross Tabulation | Graph | Records

Data Options

Columns:	Age Group ▾
Rows:	Number of Longitudinal Decels > Threshold ▾
Data To Count:	Trips ▾

Update Cross Tab

Display Options 🖨

Display as: ⦿ N   ◯ %

☑ Show Nulls
☑ Show Title

Trips by Number of Longitudinal Decels > Threshold and Age Group

Age Group

Number of Longitudinal Decels >	16-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	NULL (no value)	Total
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	7036	7065	2198	875	569	402	425	575	342	532	897	349	1345	825	407	0	0	10	23861

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SHRP 2 NDS

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Data Options

Columns:	Age Group ▾	
Rows:	Number of Longitudinal Decels > Threshold ▾	
Data To Count:	Trips ▾	

Update Cross Tab

Display Options

Display as: ◉ N ◯ %

☑ Show Nulls
☑ Show Title

Trips by Number of Longitudinal Decels > Threshold and Age Group

Age Group

	16-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	NULL (no value)	Total
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	7036	7065	2198	875	569	402	425	575	342	532	897	349	1345	825	407	9	0	10	23861
2	201	137	64	19	3	7	8	10	9	6	10	11	13	18	23	0	0	0	539
3	21	12	6	2	0	1	1	0	0	0	1	0	1	1	2	0	0	0	48
4	2	2	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	7
5	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>= 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NULL (no value)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7261	7217	2269	896	572	410	434	585	351	538	908	360	1359	846	433	9	0	10	24458

Number of Longitudinal Decels > Threshold

InSight
SHRP 2 NDS

Data   Forums   Background
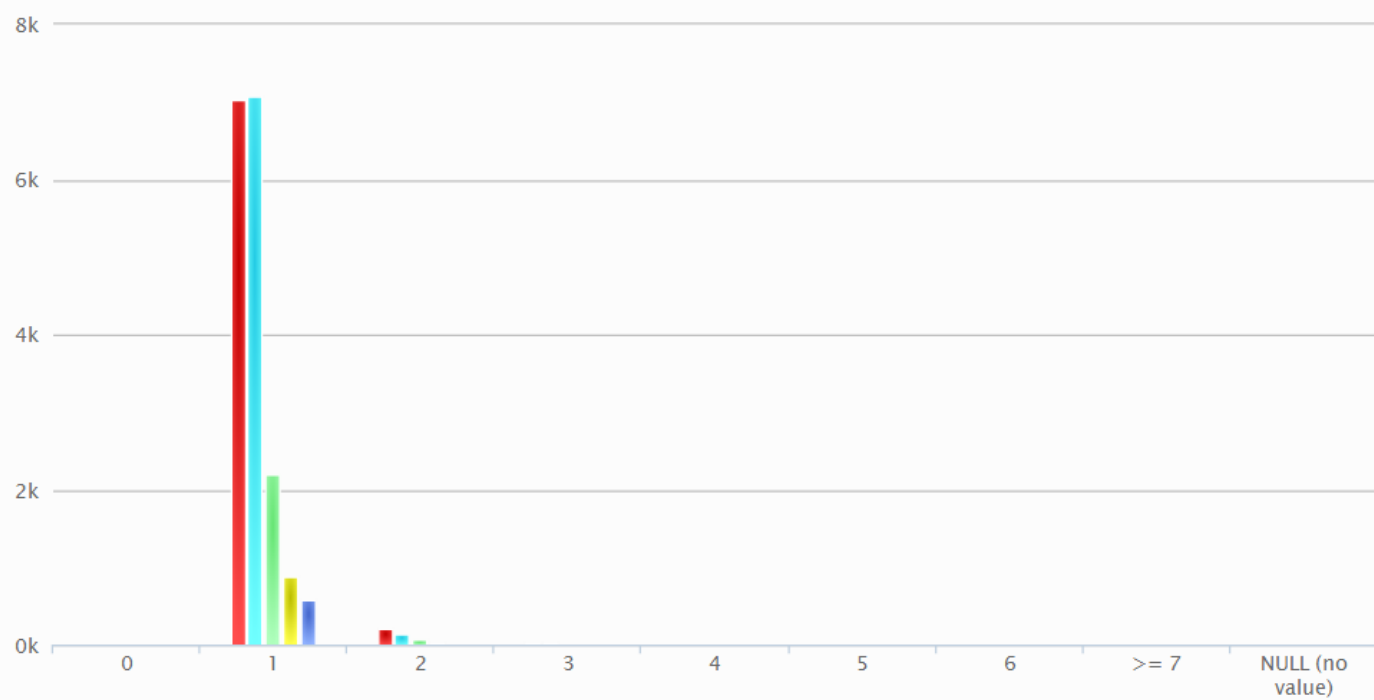
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Update Graph

○ Stacked

Trips by Age Group and Number of Longitudinal Decels > Threshold

Legend
(Click color to hide/show)
- 🟥 16–19
- 🟦 20–24
- 🟩 25–29
- 🟨 30–34
- 🟦 35–39
- ⬜ 40–44
- ⬜ 45–49
- ⬜ 50–54
- ⬜ 55–59
- ⬜ 60–64
- ⬜ 65–69
- ⬜ 70–74
- ⬜ 75–79
- ⬜ 80–84
- ⬜ 85–89
- ⬜ 90–94
- ⬜ 95–99
- ⬜ NULL (no value)

InSight
SHRP 2 NDS

Data   Forums   Background

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Y-Axis: Trips ▾

Secondary Axis: ⦿ Grouped   ☐ Show Values
⦿ Stacked

Update Graph

Trips by SSS Total Score and Age Group

Legend
(Click color to hide/show)
- ☐ 0 – 4
- ☐ 5 – 9
- ☐ 10 – 14
- 🟩 15 – 19
- 🟥 20 – 24
- 🟦 25 – 29
- 🟩 30 – 34
- 🟨 >= 35

X-Axis age groups: 16–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69, 70–74, 75–79, 80–84, 85–89, 90–94, 95–99

Y-Axis: 0, 500, 1,000, 1,500, 2,000, 2,500
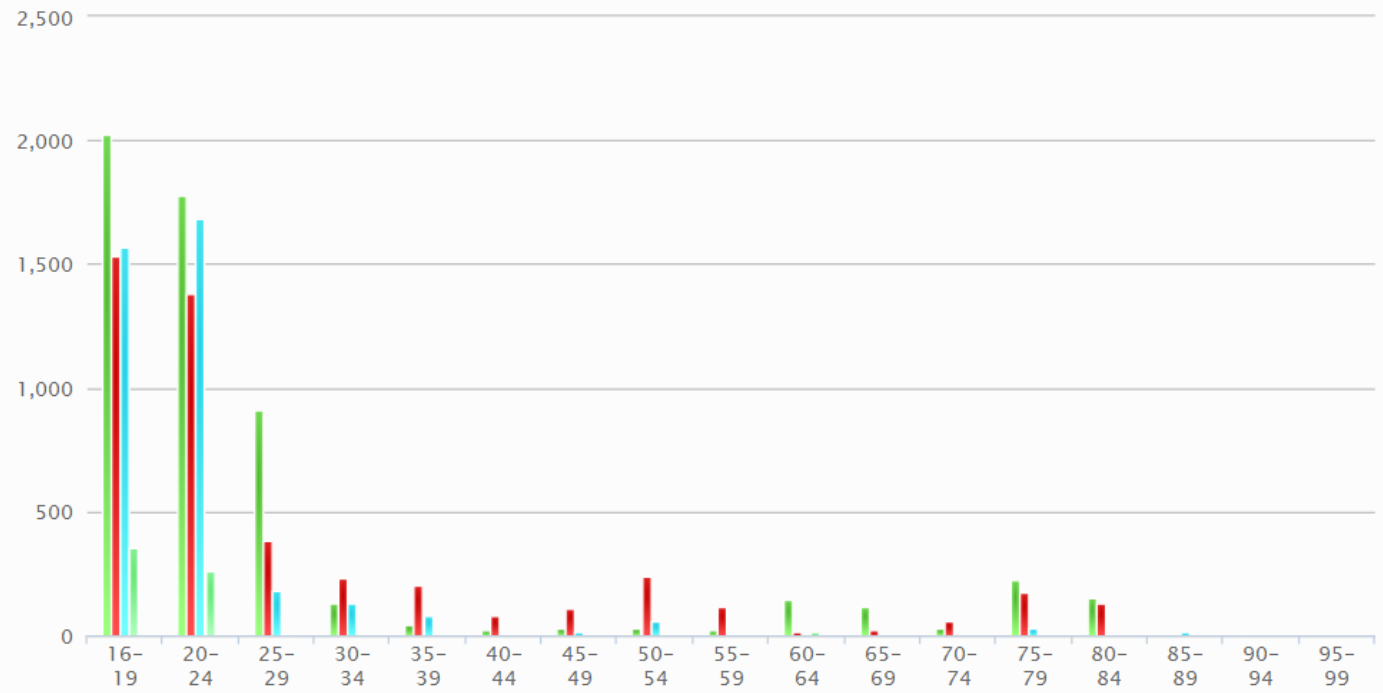
Schedule and Plans

- Ken Campbell

Schedule and Plans

- Ken Campbell

InSight Schedule

- Trip summary files
  - Current: 330,000 trips, not all variables
  - April 2014: update–1M trips
  - Quarterly releases in 2014
  - Dec. 31, 2014: complete
- Crash, near-crash, and baseline event and epoch files
  - April 2014: initial release – at least 100 crashes
  - Quarterly updates: add crashes, near-crashes, baseline
  - December 2014: all crashes, near-crashes, baseline
- Linking the NDS and RID data
  - No interim data
  - Complete December 31, 2014

2015 and Beyond: Phased Approach

Phase 1: up to 5 years, begins 2015

- Test approaches to management, security, support, etc.

- Make data widely available, provide user support
  - General: website, help desk, documentation, tools
  - Individual: consultation, customized data, PII data access
  - Information: training, user groups, symposia

- New Oversight Committee of key stakeholders

- TRB continues to manage

- $25 million available from SHRP 2 implementation funds

- Preparation for Phase 1 will continue throughout 2014

Potential Structure
(pending decisions by the SHRP 2 Safety Oversight committee)

- Single primary data center:
  - House and manage the data
  - Support remote access and analysis centers

- Remote access centers
  - Geographic location and proposed business model likely to be key selection criteria
  - Innovative approaches, partnerships important: available federal funding unlikely to fully subsidize any of the centers
  - The Safety Training and Analysis Center at TFHRC is an example

FHWA's Implementation Activities for the SHRP2 Safety Data

Monique R. Evans, PE

Director, Office of Safety Research & Development FHWA

- Safety Training and Analysis Center (STAC)

- Deployment

  – Implementation Assistance Program Solicitation

  – FHWA STAC Projects

FHWA's Implementation Activities for the SHRP2 Safety Data

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  – Implementation Assistance Program Solicitation

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Safety Training and Analysis Center (STAC)

Why establish a STAC at TFHRC?

To accelerate and proliferate use of the data… to improve safety.
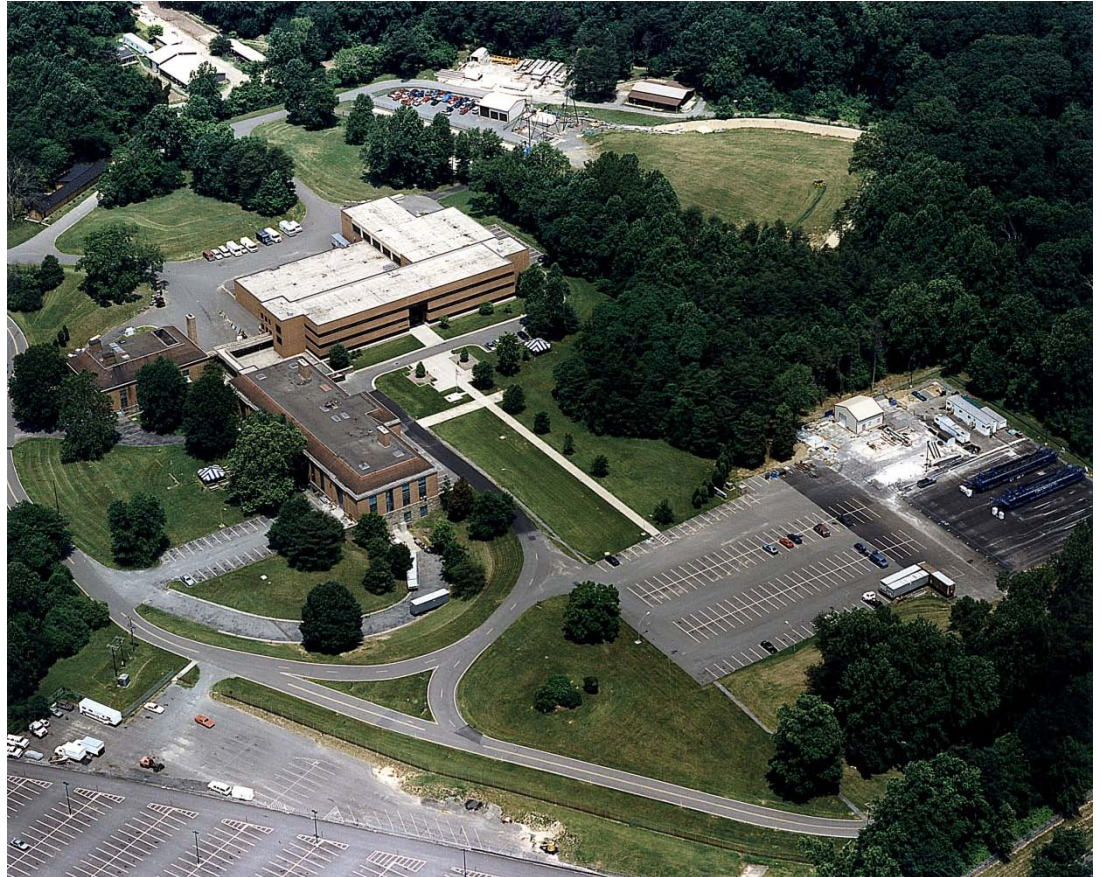
FHWA Turner-Fairbank Highway Research Center (TFHRC)

Safety Training and Analysis Center (STAC)

STAC Service Goals:

- Provide training and technical assistance for State DOTs, to expand their knowledge of the data and its potential uses

- Provide opportunities for graduate students, fellows and post docs to gain experience working with the data

- Support U.S. DOT Research Agenda

Safety Training and Analysis Center (STAC)
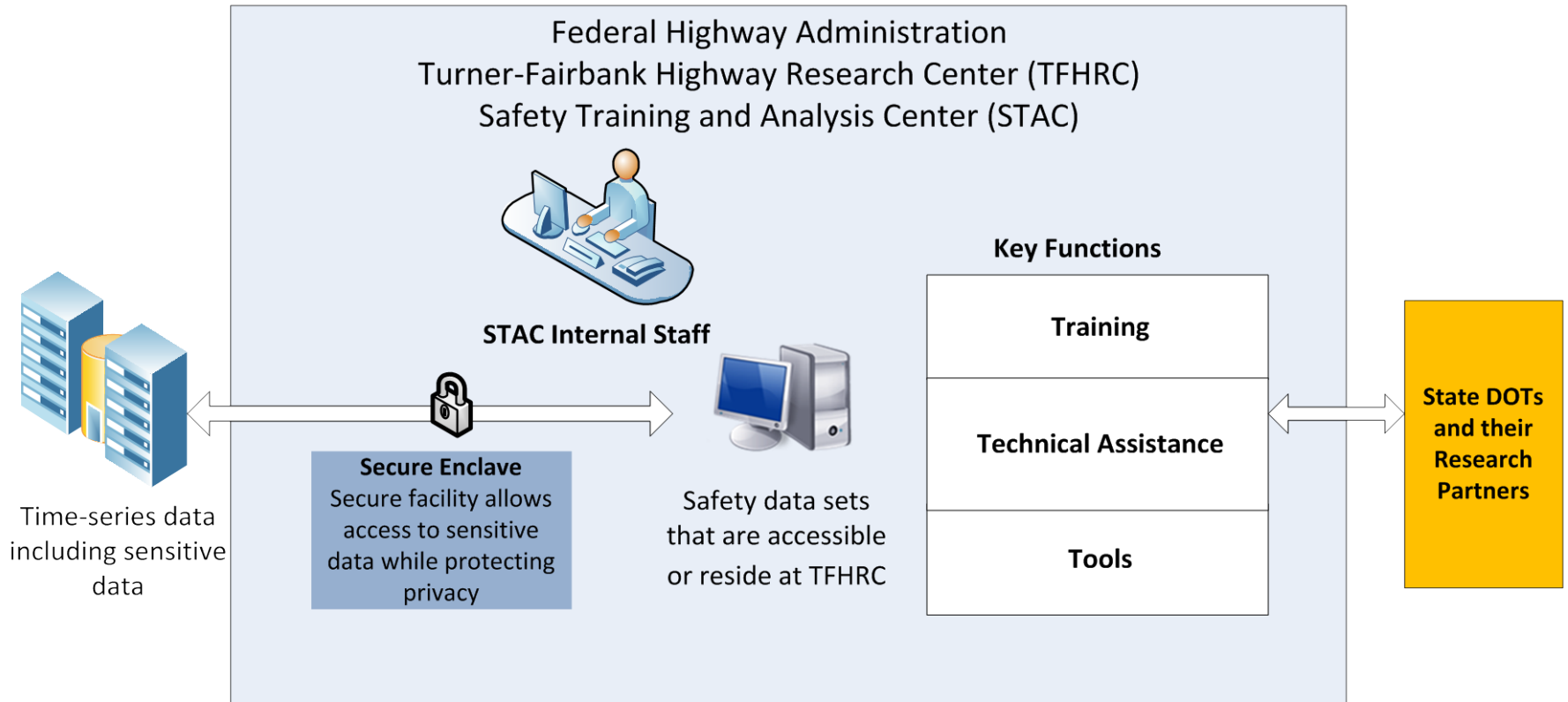
Next Steps for STAC

Fill Two New Staff Positions to Support STAC – Spring 2014

Train STAC support staff – Summer 2014

Work with stakeholders to finalize concept of operations

Late Spring – 2014

STAC open for operation Late Summer – 2014

Solicitations and Deployment

- Research solicitations will be issued

  - through the Implementation Assistance Program (IAP)

  - through FHWA's STAC at TFHRC
    - Establish capacity at the STAC for future dissemination to the State DOTs

IAP Round 4 Timeline

Round 4 solicitation date (6/14) drives TF schedule

- Identify the number and type of research topics

- Application period mid-June to mid-July

- Team selections – end of August

- Defining and negotiating research details - Oct – Nov

- Research begins - December 2014

Questions and Discussion

- Ken Campbell, SHRP 2 Safety Chief Program Officer
  - KCampbell@nas.edu

- InSight website (direct data access, information): https://insight.shrp2nds.us/

- TRB SHRP 2 Safety website (publications, fact sheets): http://www.trb.org/StrategicHighwayResearchProgram2SHRP2/ Public/Pages/Safety_153.aspx

- Combined analysis contract Phase 1 summary reports:
  - Short version: http://www.trb.org/Main/Blurbs/169021.aspx
  - Longer version: http://www.trb.org/Main/Blurbs/168727.aspx