Alabama’s Safety Performance Measures Target Setting

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Jennifer Atkinson, Leidos
Workshop Agenda

9:00 – 9:30  Welcome and Introductions
9:30 – 9:45  Training Video Recap/React Q & A
9:45 – 11:30 Performance Based Safety Target Setting
11:30 – 12:45 Lunch
12:45 – 2:00 State Safety Target Setting Methods
2:00 – 2:15 Break
2:15 – 3:30 MPO and State Safety Target Setting Coordination
3:30 – 4:15 Next Steps in Safety Target Setting by State and MPOs
4:15 – 4:30 Wrap up and Conclusion
Welcome & Introductions

introduce
yourself
Target Setting Framework
Purpose

• List commonly used methods for setting safety targets
• Define evidence-based targets
• List steps of evidence-based target setting process
• Apply process to set evidence-based targets
5 Safety Performance Measures

- Number of Fatalities
- Rate of Fatalities
- Number of Serious Injuries
- Rate of Serious Injuries
- Number of Non-motorized Fatalities plus Serious Injuries
Types of Target Setting

• Evidence-Based Target Setting
  – Estimate of achievements for a specific set of investments, policies, and strategies
  – Achievable
  – Relatively short timeframe (5 to 10 years)

• Aspirational or Vision-Based Target Setting
  – Long-term vision for future performance
  – Vision for zero fatalities (Vision Zero, TZD, Target Zero)
Benefits of Evidence-Based Targets

• Promote accountability for specific planning efforts
• Support considerations of investment tradeoffs across different program areas
• Based on data and research
Example: Halve Fatalities by 2030

Reduce fatalities by 50% from 67 in 2010 to 33 by 2030

<table>
<thead>
<tr>
<th>Years</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>81</td>
</tr>
<tr>
<td>2003</td>
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<td>2005</td>
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<td>2027</td>
<td>53</td>
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<tr>
<td>2029</td>
<td>52</td>
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</table>
Factors Affecting Target Setting Process

Internal Factors
versus
External Factors
Factors Affecting Target Setting Process

- Span of control/agency jurisdiction
- Performance-based resource allocation history/evolution of state-of-the-practice
- Financial resources
- Technical resources/planning and forecasting capability
- Timeframe
- Political influence
- Legislative influence
- Organizational structure
- Internal support/culture
Safety Target Setting Framework

Step 1

Where are we now?

Estimate existing trend

Step 2

What external factors will impact our target?

Adjust trend for expected external/exogenous factors

Step 3

What is the impact of improvements?

Estimate target based on forecasted fatality reduction from safety plans
Evidence-Based Target Setting

Step 1

Where are we now?
Estimate existing trend
Trend Analysis Methods

Fatalities


Fatalities

200 180 160 140 120 100 80 60 40 20 0
Trend Analysis Methods

![Graph showing trend analysis with linear fit (Fatalities)](image)

- **Fatalities**
- **Linear (Fatalities)**

R² = 0.6869
Trend Analysis Methods

R² = 0.6869
### Trend Analysis Methods

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>185</td>
</tr>
<tr>
<td>2009</td>
<td>175</td>
</tr>
<tr>
<td>2010</td>
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<td>2011</td>
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<td>2012</td>
<td>117</td>
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<tr>
<td>2013</td>
<td>135</td>
</tr>
<tr>
<td>2014</td>
<td>145</td>
</tr>
<tr>
<td>2015</td>
<td>124</td>
</tr>
</tbody>
</table>

![Graph showing trendline with R² = 0.6869](image)

**Format Trendline**

- **Trendline Options**
  - Trend/Regression Type: Linear, Exponential, Logarithmic, Polynomial, Power, Moving Average
  - Order: 2
  - Trendline Name: Automatic: Linear (Fatalities)
- **Forecast**
  - Forward: 4.0 periods
  - Backward: 0.0 periods
  - Set Intercept: 0.0
  - Display Equation on chart: ✔
  - Display R-squared value on chart: ✔

**Note:**
- The graph shows a linear trend with the equation: Fatalities = m * Year + b, where m and b are determined by the linear regression analysis.
- The R² value of 0.6869 indicates a moderate fit of the linear model to the data.
Trend Analysis Methods

R² = 0.7252

Fatalities

R² = 0.7252

Fatalities

Log. (Fatalities)
Trend Analysis Methods

Exponential Smoothing

Fatalities

- Fatalities


0 20 40 60 80 100 120 140 160 180 200

Fatalities
Trend Analysis Methods

Exponential Smoothing

Graph showing the trend of Fatalities from 2009 to 2019 with a linear forecast line.
Trend Analysis Methods

**Exponential Smoothing**

Fatalities

- Fatalities
- Linear Forecast
- Exponential Smoothing


<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
<th>Linear Forecast</th>
<th>Exponential Smoothing</th>
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</thead>
<tbody>
<tr>
<td>2009</td>
<td>180</td>
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<tr>
<td>2010</td>
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<td>2017</td>
<td>100</td>
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<tr>
<td>2018</td>
<td>90</td>
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<td></td>
</tr>
<tr>
<td>2019</td>
<td>80</td>
<td></td>
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</tr>
</tbody>
</table>

Fatalities decrease over the years, with a slight increase in 2013 and 2015.
Evidence-Based Target Setting

Step 2

What external factors will impact our target?
Adjust trend for expected demographic and socioeconomic changes
Adjust Target Using Exogenous Factors

![Graph showing the relationship between Millions of Vehicle Miles of Travel and Fatalities. The graph includes a trend line and scattered data points. The x-axis represents Fatalities ranging from 0 to 3500, and the y-axis represents Millions of Vehicle Miles of Travel ranging from 0 to 3500.](image-url)
Total U.S. Population Projection

Source: U.S. Census.
National Projection of Population

Age 16-24

Source: U.S. Census.
Adjust Target Based on Exogenous Factors

National Fatalities per 100,000 Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Age 16-24</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>30.94816059</td>
<td>15.91</td>
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<tr>
<td>2007</td>
<td>27.93970933</td>
<td>14.66</td>
</tr>
<tr>
<td>2015</td>
<td>16.88151157</td>
<td>10.39</td>
</tr>
</tbody>
</table>
Adjust Target Based on Exogenous Factors

Example

Considerations:
- Young/older driver age cohort expected to increase
- VMT forecast to grow; consistent relationship with fatalities

Estimated using Excel trend function

Adjusted target


0 200 400 600 800 1,000 1,200 1,400

1,200 1,000 800 675 575
Evidence-Based Target Setting

**Step 3**

*What is the impact of improvements?*

Estimate target based on forecasted fatality reduction from safety plans.
Adjust Target Using Countermeasure Impact Data

- **Safety Analysis Tools**
  - Interactive Highway Safety Design Model (IHSDM)
  - Safety Analyst
  - Highway Safety Improvement Program Manual
  - Highway Safety Manual
  - Crash Modification Factors Clearinghouse

Countermeasures That Work
Adjust Target Using Resource Allocation Data

In the image, there are two main sections: "Investment" and "Safety Problem".

**Investment**
- EA 1
- Engineering
- Education
- Enforcement
- Emergency Response

**Safety Problem**
- EA 1
- # Fatalities
- # Serious Injuries

There are arrows indicating the relationship between the Investment and Safety Problem sections.

The text mentions:
- Adjust Target Using Resource Allocation Data
- Safety Problem
- # Fatalities
- # Serious Injuries
- Investment
- % safety spending vs. % of fatalities/serious injuries

The image contains various icons and numbers, including 31.
SHSP Target Setting Methods

• What methods does your State use?
• What data are important to consider?
• Merit in replicating for HSIP, HSP, and MPO goals?
Target Achievement

● Best Practices
  – Integrate Target into Communications
  – Institutionalize Safety Targets
  – Practice Substantive Safety
Target Setting Coordination
5 Safety Performance Measures

- Number of Fatalities
- Rate of Fatalities
- Number of Serious Injuries
- Rate of Serious Injuries
- Number of Non-motorized Fatalities plus Serious Injuries
Aligning Safety Targets in a State

SHSP Measurable Objectives

HSP Measures and Targets

Annual Targets Must be Identical

HSIP Measures and Targets
Coordination Cycle for 2018 Targets

**Target Setting Coordination**
- By Spring, begin engaging DOT, SHSO, and MPO stakeholders
- Set targets for CY 2018

**Target Approval**
- By June, secure CY 2018 target approval from DOT/SHSO leadership

2017
- **July 1**
  - SHSO submits HSP to NHTSA including 3 identical safety targets

2018
- **August 31**
  - State DOT submits HSIP Annual Report to FHWA, including safety targets
- **By February 27**
  - MPOs establish safety targets

2019 - 2020
- **December 2019**
  - Data available to evaluate targets
- **March 2020**
  - States notified whether they met or made significant progress toward CY 2018 targets
• Ensure annual safety targets are identical in reporting documents
  HSP – due **July 1**
  HSIP– due **August 31**
Coordinating Safety Targets Between State DOT and SHSO

• Ensure key members of State DOT and SHSO teams work together with input from both engineering and behavioral programs throughout the process

• Outline process and prepare a schedule
  – Conduct coordination meetings in the spring before HSP and HSIP Annual report deadlines
  – Target must be decided in time for HSP submission
Coordination of Safety Targets Between State DOT and MPOs

• Ensure MPOs are engaged in State target setting discussions
• Ensure mechanisms are in place for State DOT to share crash data with MPOs and provide support on interpretation
• Account for how MPO safety trends compare to State trends
• Identify how MPO transportation program can contribute to safety improvements and target achievement
MPO Safety Target Requirements

• MPOs establish targets for each of the five measures within 180 days after the State DOT reports targets.

• MPOs have two options when setting targets for each measure:
  – Establish a numerical target for each performance measure specific to the MPO planning area.
  – Agree to support the State DOT target.
Safety Target Coordination Process

1. Review Crash Trends
2. Define Target Setting Method
3. Review Scenarios
4. Select Targets
5. Secure Approval of Targets
Safety Target Coordination Process

1. Review Crash Trends

• Review historical crash data trends
• Discuss data considerations that affect understanding of trends
• Consider success of achieving previous targets
Safety Target Coordination Process

2. Define Target Setting Method

- Flexibility to use any data-driven methodology to set targets
- Test several technical approaches to setting targets
- All stakeholders should understand and agree on the method
Safety Target Coordination Process

3. Review Scenarios

• Determine if there are external factors or improvements that will impact the target
• Test different potential scenarios
• Evaluate scenarios using known data
Safety Target Coordination Process

4. Select Targets

• Reach consensus on method and assumptions for the preferred scenario

• All stakeholders agree upon final targets that are realistic and data-driven
Safety Target Coordination Process

5. Secure Approval of Targets

• Agreement on common safety targets
• Approval of targets signifies State leaders’ commitment to safety
  – DOT leadership
  – SHSO leadership
  – MPO Policy Boards
Forums for Coordination

• Strategic Highway Safety Plan Collaboration Structures
  – Technical Committee
  – Executive Committee
• Performance-Based Planning and Programming (PBPP) Collaboration Structures
• Highway Safety Plan Development Structures
• Traffic Safety Summits
Resources

• Agenda Items for Meetings on Safety Target Setting Collaboration
• Checklist of Safety Target Development

CHECKLIST FOR SAFETY TARGET DEVELOPMENT

☐ Identify who will lead data analysis (e.g., statistician, data analyst in SHSO, State DOT staff in charge of crash database, member of traffic records coordinating committee).

☐ Define mutually agreeable method for MPOs to report targets to State, or express support of State targets.

☐ If MPOs support the State targets, define how State will review MPO support of safety by through planning and programming.

☐ Compile fatality, injury and VMT data.

☐ Identify all stakeholders who need to be involved in target setting process.
Safety Target Coordination Report

http://safety.fhwa.dot.gov/hsip/spm/

Safety Performance Management (Safety PM)

Safety Performance Management (Safety PM) is part of the overall Transportation Performance Management (TPM) program, which FHWA defines as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. The Safety PM Final Rule supports the HSIP, as it establishes safety performance measure requirements for the purpose of carrying out the HSIP and to assess fatalities and serious injuries on all public roads.

The Safety PM Final Rule establishes five performance measures at the five-year rolling averages for: (1) Number of Fatalities, (2) Rate of Fatalities per 100 million Vehicle Miles Travelled (VMT), (3) Number of Serious Injuries, (4) Rate of Serious Injuries per 100 million VMT, and (5) Number of Non-motorized Fatalities and Non-motorized Serious Injuries. The Safety PM Final Rule also establishes the process for State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) to establish and report their safety targets, and the process that FHWA will use to assess whether State DOTs have met or made significant progress toward meeting their safety targets. The Safety PM Final Rule also establishes a common national definition for serious injuries.

Below are helpful resources to support safety target setting as required by the Safety PM Final Rule.

Fact Sheets
- Safety Performance Measures Fact Sheet
- Met or Made Significant Progress Fact Sheet
- MPO Safety Performance Measures Fact Sheet NEW!!

Supplemental Materials
- State Serious Injury Conversion Tables NEW!!
- 2010-2019 HSIP Safety Performance Targets Timeline NEW!!
- Safety Performance Measures Resources and Support NEW!!
- Technical Guidance for Support Local Corridor HSIP of VMT Based Safety Performance Targets

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U.S. Department of Transportation
Federal Highway Administration
Questions?

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