

Evaluation Resources

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This document was developed by the SMART Program Office, through the assistance of Anna Solow-Collins (The Volpe Center) and Dr. Susan Shaheen (University of California, Berkeley)

This Evaluation Resources document is designed to assist grant recipients in planning and executing robust evaluations that enable them to fulfill the SMART Grant Program reporting requirements established in the Bipartisan Infrastructure Law. These resources are not exhaustive, but are intended to provide a starting point for grantees of all types to draw from as they develop their Evaluation Plans and Implementation Reports. Not all resources will apply to all grantees. This document contains a list of recommended evaluation resources, including links and descriptions. The resources are organized as follows:

- General Evaluation Resources
 - *Performance Measurement Guidance for the RAISE Discretionary Grant Program, 2023*
 - *Understanding How Cities Can Link Smart Mobility Priorities Through Data, 2018*
 - *Transportation Performance Management (TPM) Toolbox, 2016*
 - *Cost-Effective Performance Measures for Travel Time Delay, Variation, and Reliability, 2008*
 - *Performance Measurement Tool Box and Reporting System for Research Programs and Projects, 2008*
- Technology-Specific Evaluation Resources
 - *ITS Deployment Evaluation, 2024*
 - *Synthesis Report: Findings and Lessons Learned from the Independent Evaluation of the Mobility on Demand (MOD) Sandbox Demonstrations, 2023*
 - *Automated Traffic Signal Performance Measures, Methods, and Assumptions Manual, 2022*
 - *Evaluation Methods and Techniques, Advanced Transportation and Congestion Management Technologies Deployment Program, 2019*
 - *WSDOT's Handbook for Corridor Capacity Evaluation, 2014*
- Evaluation Resources by Program Benefit Area
 - Safety and Reliability
 - *Traffic Incident Management Knowledgebase, 2024*
 - *Guidance: FHWA Procedure for Safety Performance Measure Computation and State Target Achievement Assessment, 2019*
 - *Evaluation of Transit Bus Turn Warning Systems for Pedestrians and Cyclists, 2015*
 - *Safety pilot model deployment: lessons learned and recommendations for future connected vehicle activities, 2015*

- *Best Practices in Work Zone Assessment, Data Collection, And Performance Evaluation, 2010*
- Resiliency
 - *Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation Discretionary Program Metrics, 2024*
- Equity and Access
 - *Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transportation Planning, 2024*
 - *Interim Implementation Guidance for the Justice40 Initiative, 2021*
 - *Mobility Performance Metrics (MPM) For Integrated Mobility and Beyond, 2020*
 - *Transport Access Manual: A Guide for Measuring Connection between People and Places, 2020*
 - *Development and Application of an Integrated Health Impacts Assessment Tool for the Sacramento Region, 2017*
 - *Tools for Measuring Accessibility in an Equity Framework, 2015*
- Climate
 - *CMAQ Emissions Calculator Toolkit, 2024*
 - *MOtor Vehicle Emission Simulator (MOVES), 2024*
- Partnerships
 - *Evaluation of Public Private Partnership in Infrastructure, Evaluation of Public Private Partnership in Infrastructure Projects, 2021*
- Workforce Development
 - *Workforce Innovation and Opportunity Act (WIOA) Performance Indicators and Measures, 2018*
- Evaluation Resources on Other Topics
 - Benefit-Cost Analysis
 - *Benefit-Cost Analysis Guidance for Discretionary Grant Programs, 2024*
 - *The California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C), 2024*
 - *Transportation Cost and Benefit Analysis Techniques, Estimates and Implications [Second Edition], 2016*
 - *Tool for Operations Benefit Cost Analysis (TOPS-BC), 2012*
 - *Benefit-Cost Analysis, 2010*

SMART Grant Program Overview

The program benefit areas are:

- 1) **Safety and reliability:** Improve the safety of systems for pedestrians, bicyclists, and the broader traveling public. Improve emergency response.
- 2) **Resiliency:** Increase the reliability and resiliency of the transportation system, including cybersecurity and resiliency to climate change effects.
- 3) **Equity and access:** Connect or expand access for underserved or disadvantaged populations. Improve access to jobs, education, and essential services.
- 4) **Climate:** Reduce congestion and/or air pollution, including greenhouse gases. Improve energy efficiency.
- 5) **Partnerships:** Contribute to economic competitiveness and incentivize private sector investments or partnerships, including technical and financial commitments on the proposed solution. Demonstrate committed leadership and capacity from the applicant, partners, and community.
- 6) **Integration:** Improve integration of systems and promote connectivity of infrastructure, connected vehicles, pedestrians, bicyclists, and the broader traveling public.
- 7) **Workforce development:** Promote a skilled and inclusive workforce through training and education programs and activities.

The technology categories are:

- 1) Coordinated automation
- 2) Connected vehicles
- 3) Intelligent sensor-based infrastructure
- 4) Systems integration
- 5) Commerce delivery and logistics
- 6) Innovative aviation technology
- 7) Smart grid
- 8) Smart technology traffic signals

General Evaluation Resources

1. *Performance Measurement Guidance for the RAISE Discretionary Grant Program, 2023*

Authors: US Department of Transportation

<https://www.transportation.gov/RAISEgrants/performance>

Abstract:

Each RAISE capital grant recipient must collect and report to the USDOT information on the project's performance based on measures the USDOT identifies related to program objectives. The program objectives are to produce a positive local or regional impact in the areas of safety, environmental sustainability, quality of life, mobility and community connectivity, economic competitiveness and opportunity, state of good repair, partnership, and innovation. This document provides consistency and guidance across the Operating Administrations and grant recipients to develop, measure, and report appropriate project performance measures

2. *Understanding How Cities Can Link Smart Mobility Priorities Through Data, 2018*

Authors: Susan Shaheen, PhD, Elliot Martin, PhD, Mikaela Hoffman-Stapleton, and Peter Slowik

<https://escholarship.org/uc/item/7303t6sw>

Abstract:

This white paper presents a generalized evaluation framework that can be used for assessing project impacts within the context of transportation-related city projects. In support of this framework, we discuss a selection of metrics and data sources that are needed to evaluate the performance of smart city innovations. We first present a collection of projects and applications from near-term smart city concepts or actual pilot projects underway (i.e., Smart City Challenge, Federal Transit Administration (FTA) Mobility on Demand (MOD) Sandbox, and other pilot projects operating in the regions of Los Angeles, Portland, and San Francisco). These projects are identified and explained in Section 2 of this report. Using these projects as the basis for hypothetical case studies, we present selected metrics that would be necessary to evaluate and monitor the performance of such innovations over time. We then identify the data needs to compute those metrics and further highlight the gaps in known data resources that should be covered to enable their computation. The objective of this effort is to help guide future city planners, policy makers, and practitioners in understanding the design of key metrics and data needs at the outset of a project to better facilitate the establishment of rigorous and thoughtful data collection requirements.

Key metrics/data include: 1) safety (e.g., crash rates), 2) transportation (e.g., VMT, parking use, mode share, trip distance, travel time), 3) social equity (e.g., demographic distribution of areas served), 4) environment (e.g., fuel efficiency, emissions per mile), 5) congestion (e.g., average speed between origin and destination, distribution of VMT per hour).

Data sources are discussed including: 1) crash records (e.g., SWITRS statewide data set in California), 2) vehicle activity data (e.g., from pilot vehicles), 3) public transit ridership data (e.g., National Transit Database), 4) parking data (regional/local sources), 5) survey data (e.g., pilot), 6) trip data (e.g., via an app), 7) US EPA (fuel economy data available on website), 8) VMT (e.g., Highway Performance Measurement System, Annual Average Daily Traffic Count), 9) traffic sensor data (highway and city level data), and 10) usage data (e.g., pilot data typically automated).

3. *Transportation Performance Management (TPM) Toolbox, 2016*

Authors: US Federal Highway Administration

<https://www.tpmtools.org/>

Abstract:

The TPM Implementation Guidebook provides clear practical actionable steps that state DOT leadership, management, and staff can implement to enhance performance management practices. The TPM Resources Library also contains best practices, precedents, and other helpful resources.

The Guidebook includes six components:

Component 01. Strategic Direction: The establishment of an agency's focus through well-defined goals and objectives, enabling assessment of the agency's progress toward meeting goals and objectives by specifying a set of aligned performance measures. The Strategic Direction is the foundation upon which all transportation performance management rests.

Component 02. Target Setting: The use of baseline data, information on possible strategies, resource constraints, and forecasting tools to collaboratively establish a quantifiable level of performance the agency wants to achieve within a specific time frame. Targets make the link between investment decisions and performance expectations transparent across all stakeholders.

Component 03. Performance-Based Planning: The use of agency goals and objectives and performance trends to drive the development of strategies and priorities in the long-range transportation plan and other performance-based plans and processes. The resulting planning documents become the blueprint for how an agency intends to achieve its desired performance outcomes.

Component 04. Performance-Based Programming: The use of strategies and priorities to guide the allocation of resources to projects that are selected to achieve goals, objectives, and targets. Performance-based programming establishes clear linkages between investments made and expected performance outputs and outcomes.

Component 05. Monitoring and Adjustment: A set of processes used to track and evaluate actions taken and outcomes achieved, thereby establishing a feedback loop to refine planning, programming, and target setting decisions. It involves using performance data to obtain key insights into the effectiveness of decisions and identifying where adjustments need to be made in order to improve performance.

Component 06. Reporting and Communication: The products, techniques, and processes used to communicate performance information to different audiences for maximum impact. Reporting is an important element for increasing accountability and transparency to external stakeholders and for explaining internally how transportation performance management is driving a data-driven approach to decision making.

4. *Cost-Effective Performance Measures for Travel Time Delay, Variation, and Reliability, 2008*

Authors: National Cooperative Highway Research Program, Transportation Research Board, National Academies of Sciences, Engineering, and Medicine

<https://nap.nationalacademies.org/catalog/14167/cost-effective-performance-measures-for-travel-time-delay-variation-and-reliability>

Abstract:

This guidebook recommends methods to estimate, predict, measure, and report travel time, delay, and reliability performance data. The approach is applicable to highway traffic as well as for transit and freight vehicles. The recommended performance measures balance the needs of system users and decision makers to prioritize understandable and relevant information. The guidebook also discusses various data collection methods, analysis approaches, and applications for evaluation.

5. *Performance Measurement Tool Box and Reporting System for Research Programs and Projects, 2008*

Authors: National Cooperative Highway Research Program, Transportation Research Board, National Academies of Sciences, Engineering, and Medicine

<https://www.trb.org/Publications/Blurbs/159957.aspx>

Abstract:

This report discusses performance measures for research projects and tools to assist practitioners. Resources include guidance, tutorials, lists of resources, a catalog of example research benefit estimations, and automated work sheets. Additional functionalities include historical performance information storage and the capability to generate performance reports from database information.

Technology-Specific Evaluation Resources

1. *ITS Deployment Evaluation, 2024*

Authors: Intelligent Transportation Systems Joint Program Office

<https://www.itskrs.its.dot.gov/>

Abstract:

The Intelligent Transportation Systems (ITS) Deployment Evaluation Program provides resources on benefit data, cost data, deployment statistics, decision support, and success strategies. Entries include summaries of ITS evaluations, sample unit costs, case studies, lessons learned, survey results.

2. *Synthesis Report: Findings and Lessons Learned from the Independent Evaluation of the Mobility on Demand (MOD) Sandbox Demonstrations, 2023*

Authors: Elliot Martin, Ph.D., Adam Cohen, Susan Shaheen, Ph.D., and Les Brown

<https://www.transit.dot.gov/sites/fta.dot.gov/files/2023-02/FTA-Report-No-0242.pdf>

Abstract:

The Federal Transit Administration (FTA)'s Mobility on Demand (MOD) Sandbox effort developed around a vision of a multimodal, integrated, automated, accessible, and connected transportation system in which personalized mobility is a key feature. FTA selected 11 MOD Sandbox Demonstration projects that tested strategies intended to advance the MOD vision. An independent evaluation (IE) is required by Federal public transportation law (49 U.S.C. § 5312(e)(4)) for demonstration projects receiving FTA Public Transportation Innovation funding.

This report provides a synthesis of findings from the 11 MOD Sandbox Demonstrations IE. The report provides an overview of the IE methodology and evaluation framework employed for developing test procedures and conducting the evaluations. Cross-cutting findings from the data analysis on user impacts and systems operations are explored alongside a variety of institutional factors that influenced project development and outcomes (data sharing, public/private partnerships, characteristics of service provision, cost effectiveness, marketing of services). Considerations for future mobility innovation demonstration programs gathered through interviews with project partners are also included. Finally, site-specific summaries of findings from each of the 11 evaluations are shared in an appendix. Together, the report provides transportation practitioners with an overview of the impacts of the MOD Sandbox program and individual demonstration projects and provides insights for the planning, procurement, operations, and evaluation of technology-enabled mobility initiatives.

Key metrics include: 1) transit ridership, 2) single occupancy vehicle VMT, 3) shared ride VMT, 4) vehicle occupancy, 5) travel times, 6) transit travel wait times, 7) travel time flexibility, 8) accessibility for persons with disabilities, 9) transit system operating and capital costs, 10) parking use, 11) accessibility for disadvantaged populations, 12) user satisfaction, and 13) access to destinations.

Quantitative data sources are discussed including: 1) user surveys (to collect/assess VMT/GHG reductions, vehicle holdings, modal shifts, demographics); 2) transit data (i.e., ridership, revenue, fuel use, subsidized fares); 3) vehicle activity data (i.e., origin-destination pairs, travel times/distances, fuel usage); and 4) collision medical data.

Qualitative data sources are discussed including: 1) user survey data (i.e., satisfaction, attitudes/perceptions, preferences); 2) lessons learned; 3) best practices; and 4) policies and regulations.

3. *Automated Traffic Signal Performance Measures, Methods, and Assumptions Manual, 2022*

Authors: Utah Department of Transportation

https://udottraffic.utah.gov/ATSPM/Images/ATSPM_Methods_and_Assumptions_4.3.pdf

Abstract:

This report summarizes UDOT's approach to evaluating automated traffic signal performance. This document describes the methodology and assumptions used to create measures and graphics in the open-source code used in the Automated Traffic Signal Performance Measures (ATSPM) website. For each measure, this report discusses the data requirements and the algorithm, and each process is documented in step format.

4. *Evaluation Methods and Techniques, Advanced Transportation and Congestion Management Technologies Deployment Program, 2019*

Authors: US Federal Highway Administration

<https://ops.fhwa.dot.gov/publications/fhwahop19053/fhwahop19053.pdf>

Abstract:

The Fixing America's Surface Transportation Act or "FAST Act" established the Advanced Transportation Congestion Management Technologies Deployment (ATCMTD) Program to make competitive grants for the deployment of advanced transportation technologies. The legislation also mandates reporting requirements for the grantees, including data on the benefits (e.g., safety, mobility, environmental, etc.), costs, and effectiveness of the technology deployments, as well as lessons learned and recommendations for future deployment strategies. This Evaluation Methods and Techniques document is designed to assist grantees in designing and executing robust evaluations that fulfill their reporting requirements. It offers an overview on evaluation, including best practices related to designing and executing an evaluation. It also discusses methods and analytic techniques, including best practices on benefit-cost analysis, survey and interview methods, and emissions and energy measurement. Additionally, this document provides technology-specific guidance on evaluating Adaptive Signal Control, Connected Vehicles and Automated Vehicles. Finally, it seeks to provide grantees with a recommended set of performance measures that address the FAST Act reporting requirements.

5. *WSDOT's Handbook for Corridor Capacity Evaluation, 2014*

Authors: Washington State Department of Transportation

https://wsdot.wa.gov/publications/fulltext/graynotebook/CCR14_methodology.pdf

Abstract:

The Washington State Department of Transportation (WSDOT) provides annual Corridor Capacity Reports. This performance analysis includes congestion measurements and methods to communicate how capacity management results have evolved. WSDOT has created this methodology document to help users navigate their multimodal analysis of transportation system performance.

Evaluation Resources by Program Benefit Area

Safety and Reliability

1. *Traffic Incident Management Knowledgebase, 2024*

Authors: US Federal Highway Administration

<https://ops.fhwa.dot.gov/tim/preparedness/tim/knowledgebase/index.htm>

Abstract:

This Knowledgebase began as a tool to house online reference materials that furnished transportation and public safety professionals with knowledge and tools they need to conduct TIM incident-specific performance measurements. However, FHWA captured so much great information while meeting with jurisdictions' transportation and public safety mid-level managers, decision makers and practitioners during its TIM Workshops and SHRP2 TIM Responder Train-the-Trainer initiatives, that the Knowledgebase necessarily expanded to accommodate great tools and information. As a result, the TI&EM team expanded this KMS, building upon the performance measurement foundation to include other documents and models graciously provided by other States, local and regional jurisdictions and functional disciplines. The visitor will find documents and tools that range from policy, safe/quick clearance legislation, training, traffic management center operations and TIM, TIM Committee formation and operations, TIM resources, Public Outreach and other TIM functions. FHWA looks to TIM program managers, TIM Committee members, TIM practitioners either independently or through the National TIM Network to collect and provide more good practices and lessons learned inputs, documents and tools that will aid jurisdictions implement strong TIM programs and operations in their localities. Users can conveniently search and browse the KMS to find information they need today, as provided by other TIM professionals around the Nation.

2. *Guidance: FHWA Procedure for Safety Performance Measure Computation and State Target Achievement Assessment, 2019*

Authors: US Federal Highway Administration

https://www.fhwa.dot.gov/tpm/guidance/safety_performance.pdf

Abstract:

Safety Performance Management (Safety PM) is part of the overall Transportation Performance Management (TPM) program, which the Federal Highway Administration (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 is codified under Title 23 of the Code of Federal Regulations (CFR), part 490, subpart B. The regulation establishes national safety performance requirements for the purposes of carrying out the Highway Safety Improvement Program (HSIP) and to assess fatalities and serious injuries on all public roads. Therefore, the purpose of this document is to provide the data sources and calculations for the safety performance measures that FHWA will use when determining whether a State DOT has met or made significant progress towards meeting their safety performance targets. This document is guidance only and does not create any requirements other than those stipulated in statute or regulations.

3. *Evaluation of Transit Bus Turn Warning Systems for Pedestrians and Cyclists, 2015*

Authors: US Federal Transit Administration

https://www.transit.dot.gov/sites/fta.dot.gov/files/FTA_Report_No._0084.pdf

Abstract:

As part of a cooperative agreement with the Federal Transit Administration (FTA), the Tri-County Metropolitan Transportation District of Oregon (TriMet) conducted a demonstration test of three commercially-available pedestrian turn warning systems for transit buses. A total of 45 buses were equipped with the turn warning systems (15 buses with each of the 3 systems) for a period of 7 months (March–September 2014). A robust evaluation of the systems was conducted, including surveys and focus groups with bus operators and the general public, a video-based analysis of pedestrian behaviors, interviews with TriMet personnel, and a benefit-cost analysis. In addition to the turn warning systems, a unique crosswalk warning sign was deployed and tested at one intersection in downtown Portland. This report documents the findings from the test and evaluation.

4. *Safety pilot model deployment: lessons learned and recommendations for future connected vehicle activities, 2015*

Authors: US Department of Transportation, Intelligent Transportation Systems Joint Program Office

<https://rosap.ntl.bts.gov/view/dot/4361>

Abstract:

The Connected Vehicle Safety Pilot was a research program that demonstrated the readiness of DSRC-based connected vehicle safety applications for nationwide deployment. The vision of the Connected Vehicle Safety Pilot Program was to test connected vehicle safety applications, based on vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications systems using dedicated short-range communications (DSRC) technology, in real-world driving scenarios in order to determine their effectiveness at reducing crashes and to ensure that the devices were safe and did not unnecessarily distract motorists or cause unintended consequences.

The Connected Vehicle Safety Pilot was part of a major scientific research program run jointly by the U.S. Department of Transportation (USDOT) and its research and development partners in private industry. This research initiative was a multi-modal effort led by the Intelligent Transportation Systems Joint Program Office (ITS JPO) and the National Highway Traffic Safety Administration (NHTSA), with research support from several agencies, including Federal Highway Administration (FHWA), Federal Motor Carrier Safety Administration (FMCSA), and Federal Transit Administration (FTA). This one-year, real-world deployment was launched in August 2012 in Ann Arbor, Michigan. The deployment utilized connected vehicle technology in over 2,800 vehicles and at 29 infrastructure sites at a total cost of over \$50 million dollars in order to test the effectiveness of the connected vehicle crash avoidance systems. Overall, the Safety Pilot Program was a major success and has led the USDOT to initiate rulemaking that would propose to create a new Federal Motor Vehicle Safety Standard (FMVSS) to require V2V communication capability for all light vehicles and to create minimum performance requirements for V2V devices and messages.

Given the magnitude of this program and the positive outcomes generated, the Volpe National Transportation Systems Center conducted a study sponsored by the ITS JPO to gather observations and insights from the Safety Pilot Model Deployment. This report represents an analysis of activities across all stages of the Safety Pilot Model Deployment including scoping, acquisitions, planning, execution, and evaluation. The analysis aimed to identify specific accomplishments, effective activities and strategies, activities or areas needing additional effort, unintended outcomes, and any limitations and obstacles encountered throughout the Model Deployment. It also assessed the roles of organizations and the interactions among these organizations in the project. Findings were used to develop recommendations for use in future deployments of connected vehicle technology. Information for this analysis was gathered from a combination of over 70 participant interviews and a review of program documentation. It is anticipated that findings from this study will be valuable to future USDOT research programs and early adopters of connected vehicle technology.

5. *Best Practices in Work Zone Assessment, Data Collection, And Performance Evaluation, 2010*

Authors: National Cooperative Highway Research Program, Transportation Research Board, National Academies of Sciences, Engineering, and Medicine

https://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A_08-04.pdf

Abstract:

The purpose of the scan was to investigate best practices in work zone assessment, data collection, and performance measurement, and how these practices are being used to ensure safety and minimize congestion in work zones.

Resiliency

1. *Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation Discretionary Program Metrics, 2024*

Authors: US Federal Highway Administration

<https://www.federalregister.gov/documents/2024/03/21/2024-05934/promoting-resilient-operations-for-transformative-efficient-and-cost-saving-transportation>

Abstract:

The FHWA is establishing performance metrics for the purpose of evaluating the effectiveness and impacts of projects under the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Discretionary Grant Program. The vision of the PROTECT Discretionary Grant Program is to fund projects that address the climate crisis by improving the resilience of the surface transportation system, including highways, public transportation, ports, and intercity passenger rail. This document presents the program objectives and performance measures that FHWA is proposing to use to assess the effectiveness and impact of projects in fulfilling this purpose.

Equity and Access

2. *Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transportation Planning, 2024*

Authors: Todd Litman, Victoria Transport Policy Institute

<https://www.vtpi.org/equity.pdf>

Abstract:

Equity refers to the fairness with which impacts (benefits and costs) are distributed. Transportation planning decisions can have large and diverse equity impacts. Evaluating these can be challenging because there are several types of equity and impacts to consider, and various ways to measure them. Horizontal equity assumes that people with similar needs and abilities should be treated equally; vertical equity assumes that disadvantaged groups should receive a greater share of resources. Social justice addresses structural inequities such as racism

and sexism. This report provides guidance for transportation equity analysis. It describes various perspectives and impacts, and practical ways to incorporate transportation equity goals into policy and planning analysis.

3. *Interim Implementation Guidance for the Justice40 Initiative, 2021*

Authors: Shalandia D. Young, Brenda Mallory, Gina McCarthy

<https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf>

Abstract:

This interim guidance includes a set of actions required of agencies that manage covered Justice40 programs. These actions include identifying the benefits of covered programs, determining how covered programs distribute benefits, and calculating and reporting on reaching the 40-percent goal of the Justice40 Initiative. This interim guidance provides implementation direction to an initial set of covered programs under the Justice40 Initiative. Topics include:

- Interim Definition of Disadvantaged Communities
- Covered Programs
- Examples of Benefits of Covered Programs
- Calculating Benefits
- Reporting
- Pilot to Maximize Benefits to Disadvantaged Communities

4. *Mobility Performance Metrics (MPM) For Integrated Mobility and Beyond, 2020*

Authors: US Federal Transit Administration

<https://www.transit.dot.gov/research-innovation/mobility-performance-metrics-integrated-mobility-and-beyond-report-0152>

Abstract:

This report presents traveler-centric mobility performance strategies and metrics and the approach for the development of those metrics for use as supplemental measures to assess how well an integrated public/private mobility system meets the needs of individual travelers, how well the system performs while meeting overall travel demand, and what the system's impact is locally and nationally. By measuring transportation performance from the traveler's perspective, agencies and operators can be incentivized to improve service based on what matters most to travelers. The report identifies a large set of potential measures that align with Federal Transit Administration (FTA) goals as well as goals of the Mobility on Demand (MOD) Sandbox Projects. It then presents a comprehensive evaluation process using applicability and feasibility criteria that were used to cull the potential performance measures to a smaller more appropriate set of performance measures. The reports discusses possible data sources and data integration strategies for the application of the new mobility performance measures.

5. *Transport Access Manual: A Guide for Measuring Connection between People and Places, 2020*

Authors: David Levinson and David King

<https://ses.library.usyd.edu.au/handle/2123/23733>

Abstract:

This manual is a guide for quantifying and evaluating access for anybody interested in truly understanding how to measure the performance of transport and land use configurations. It contains enough to help transport and planning professionals achieve a more comprehensive look at their city or region than traditional transport analysis allows. It provides a point of entry for interested members of the public as well as practitioners by being organized in a logical and straightforward way.

6. *Development and Application of an Integrated Health Impacts Assessment Tool for the Sacramento Region, 2017*

Authors: Alex Karner, Dana Rowangould, Yizheng Wu, Ofurhe Igbiniedion, and Jonathan London

<https://escholarship.org/uc/item/58q1w9k8>

Abstract:

Plans crafted by metropolitan planning organizations (MPOs) lay out how billions of dollars in transportation investments will be made over a 20 to 30-year time horizon. Federal transportation authorizations require MPOs to identify and track key indicators of system performance (e.g., collision rates, emissions, congestion) to ensure that they are stewarding public funds wisely to meet specific goals related to safety, environmental performance, and congestion mitigation, among other areas. Concerns related to preventing discriminatory impacts of planning activities, motivated by Title VI of the 1964 Civil Rights Act, also compel agencies to assess the impacts of plans on different demographic groups. At the same time, there is a growing desire among transportation planning agencies to develop transportation and land use plans that shift travel behavior away from driving and towards more active travel modes. Research has shown that living in areas where walking and bicycling are convenient leads to greater use of those modes, which can lead to improved health outcomes due to increases in physical activity. But increasing non-motorized travel can also increase active travelers' risk of traffic injury and exposure to air pollution. Analytical tools that assess the tradeoffs between transportation plan alternatives are needed to inform public debate and ensure that gains in some health outcomes are not being undermined by losses elsewhere. Additionally, questions remain about who will benefit from plans that promote increases in active travel. The aim of this project is to investigate the distribution of public health impacts resulting from a regional transportation plan in the six-county Sacramento Area Council of Governments (SACOG) region.

7. *Tools for Measuring Accessibility in an Equity Framework, 2015*

Authors: Chris McCahill and Mary Ebeling, State Smart Transportation Initiative,
University of Wisconsin

https://www.cnu.org/sites/default/files/ssti_transpo_equity.pdf

Abstract:

Cities, planning agencies, and departments of transportation are growing more interested in evaluating the equity impacts of transportation. However, many lack a clear framework or consistent measures for conducting comprehensive equity analyses. This paper presents an equity framework that can serve as a starting point for consistent equity analyses and focuses primarily on one dimension of that framework, accessibility, which is considered the primary function of transportation and therefore the principal dimension.

This paper also highlights several promising new tools for measuring accessibility and offers a critical review of each, based on existing literature and documentation. These tools incorporate multiple travel modes, various destination types, and information about transportation network performance to produce a variety of different metrics at different geographic scales. Despite not all of the tools being fully developed or widely available, the methods and data sources described in this paper demonstrate that it is possible to develop a tool that meets the many various needs of a comprehensive accessibility measure in an equity framework.

Climate

1. *CMAQ Emissions Calculator Toolkit, 2024*

Authors: US Federal Highway Administration

https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/

Abstract:

The Federal Highway Administration (FHWA) Office of Natural Environment developed a series of tools to provide technical support and resources for the implementation of the Congestion Mitigation and Air Quality Improvement (CMAQ) Program.

CMAQ project justification as well as annual reporting require the development of reliable air quality benefit estimates. Realizing that every potential project sponsor may not have the capacity for developing independent air quality benefit estimates, the FHWA has undertaken the initiative of developing a series of spreadsheet based tools to facilitate the calculation of representative air quality benefit data.

2. *MOtor Vehicle Emission Simulator (MOVES), 2024*

Authors: US Environmental Protection Agency

<https://www.epa.gov/moves>

Abstract:

EPA's MOtor Vehicle Emission Simulator (MOVES) is a state-of-the-science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics.

Partnerships

1. *Evaluation of Public Private Partnership in Infrastructure, Evaluation of Public Private Partnership in Infrastructure Projects, 2021*

Authors: Karthikeyan Loganathan, Mohammad Najafi, Vinayak Kaushal, and Pius Agyemang

<https://doi.org/10.1061/9780784483602.018>

Abstract:

Public private partnership (PPP) has over the years proven to be a good procurement method for infrastructure projects. This partnership combines the efficiency, expertise, and innovation of the private sector as well as appropriate risk allocation. PPP provides an alternate avenue for capital needed for major engineering projects. The objectives of this paper are to highlight the effectiveness of implementing PPP by looking at past experiences in infrastructure projects, to investigate the conditions under which PPP is appropriate, and to identify the benefits, success, and difficulties of PPP. The results of this paper show that most experts in the infrastructure industry are aware of the effectiveness of PPP but are unable to determine how to maximize its success. This paper further identifies the various factors needed for a successful PPP, such as risk allocation and a good partnering plan for a successful execution of the project.

Workforce Development

1. *Workforce Innovation and Opportunity Act (WIOA) Performance Indicators and Measures, 2018*

Authors: US Department of Labor

<https://www.dol.gov/agencies/eta/performance/performance-indicators>

Abstract:

As stated in TEGL 10-16, Change 2, PM (Program Memorandum) 17-2, and TAC (Technical Assistance Circular) 17-01, section 116 of WIOA establishes *performance accountability indicators and performance reporting requirements* to assess the effectiveness of States and local areas in achieving positive outcomes for individuals served by the workforce development system's six core programs. These six core programs are:

1. Adult
2. Dislocated Worker
3. Youth programs
4. Adult Education and Family Literacy Act (AEFLA) program (Administered by ED)
5. Employment Service program
6. Vocational Rehabilitation (VR) program (Administered by ED)

WIOA requires all States and direct grantees of the Departments to collect and report information on all the participants described in this TEGL.

Evaluation Resources on Other Topics

Benefit-Cost Analysis

1. *Benefit-Cost Analysis Guidance for Discretionary Grant Programs, 2024*

Authors: US Department of Transportation

<https://www.transportation.gov/mission/office-secretary/office-policy/transportation-policy/benefit-cost-analysis-guidance>

Abstract:

This document is intended to provide applicants to USDOT's discretionary grant programs with guidance on completing a benefit-cost analysis (BCA) for submittal as part of their application. The guidance applies to a wide range of surface transportation infrastructure projects in different modes that are eligible under those programs.

2. *The California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C), 2024*

Authors: Caltrans

<https://dot.ca.gov/programs/transportation-planning/division-of-transportation-planning/data-analytics-services/transportation-economics>

Abstract:

Cal-B/C is a suite of Excel workbooks developed by Caltrans's Transportation Economics Branch this is designed to assess the benefits and costs of highway projects. Cal-B/C consists of five modules:

- 1) Cal-B/C Sketch
- 2) Cal-B/C Active Transportation (AT)
- 3) Cal-B/C Park and Ride (PnR)
- 4) Cal-B/C Corridor
- 5) Cal-B/C Intermodal Freight (IF)

3. *Transportation Cost and Benefit Analysis Techniques, Estimates and Implications [Second Edition], 2016*

Authors: Victoria Transport Policy Institute

<https://www.vtpi.org/tca/>

Abstract:

This is a guidebook for quantifying the full costs and benefits of different transportation modes. This document compiles extensive transportation benefit and costing research to be used in planning and policy analysis.

4. *Tool for Operations Benefit Cost Analysis (TOPS-BC), 2012*

Authors: US Federal Highway Administration

<https://ops.fhwa.dot.gov/plan4ops/topsbctool/>

Abstract:

TOPS-BC is a sketch-planning level decision support tool developed by the FHWA Office of Operations. It is intended to provide support and guidance to transportation practitioners in the application of benefit/cost analysis (BCA) for a wide range of Transportation System Management and Operations (TSMO) strategies. The tool was developed based on guidance and input from planning and operations practitioners with the primary purpose to help in screening multiple TSMO strategies and for providing "order of magnitude" BCA estimates.

5. *Benefit-Cost Analysis, 2010*

Authors: Economics and Finance Committee of the Transportation Research Board

<https://sites.google.com/site/benefitcostanalysis/benefit-cost-analysis>

Abstract:

This resource provides step by step guidance on benefit-cost analysis. It explains concepts, describes methodologies, and suggests additional resources. Topics include:

- How to define the problem that the project addresses and set up the analysis
- How to measure and value benefits and costs of transportation projects
- Types of measures and calculation issues
- How to interpret and present the results of benefit-cost analysis
- Sample benefit-cost models and links to model sites
- Case studies of benefit-cost analyses for transportation projects
- Published guidance and references and other websites