

Transit Cooperative Research Program

Fiscal Year 2020

May 2020

Announcement of TCRP Synthesis Topics

The Transit Cooperative Research Program (TCRP) undertakes research and other technical activities in response to the needs of the public transportation industry on a variety of problems involving operations, service configuration, engineering, maintenance, human resources, administration, policy, and planning. The TCRP is a partnership of the Federal Transit Administration (FTA); the National Academies of Sciences, Engineering, and Medicine, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a non-profit educational and research organization established by the American Public Transportation Association (APTA). The TCRP Oversight and Project Selection (TOPS) Commission, the governing board for the program, recently selected Synthesis projects for the Fiscal Year 2020 program. This announcement is to inform the research community of these projects and to solicit project panel nominations and consultants' letters of interest.

TCRP synthesis reports on various practices, making recommendations where appropriate. Each document is a compendium of the best knowledge available on measures found to be successful in resolving specific problems. To develop these syntheses in a comprehensive manner and to ensure inclusion of significant knowledge, TRB hires a consultant with expertise in the topic area to gather and analyze available information assembled from numerous sources including a large number of transit agencies, and write a summary report. A panel of experts in the subject area is established to guide the researcher and to review the synthesis report. For each topic, the project objectives are (1) to locate and assemble documented information; (2) to learn what practice has been used for solving or alleviating problems; (3) to identify all ongoing research; (4) to learn what problems remain largely unsolved; and (5) to organize, evaluate, and document the useful information that is acquired.

Nominations of others and self-nominations for panel members should be submitted online from the TRB website by June 30, 2020, at the MyTRB portal at this link: [Online Panel Nominations](#)

You will be asked to login to MyTRB. If you do not already have an account, you will be asked to quickly create one using your email and a password. To ensure proper consideration of nominations, please provide all of the information requested. A current resume is necessary to determine relevant knowledge and experience.

Communication to determine an individual's interest and availability in serving will be made from this office only after we have matched available expertise (e.g., knowledge and experience as presented in the resume) with that required by the nature of the project.

TCRP is also looking for consultants to perform as synthesis principal investigators. To formally express interest in authoring a topic, a two-page cover letter and professional resume or CV is required. Fixed fee is \$45,000. Please submit letters of interest to the [Letters of Interest Submission Portal](#).

A cover letter and resume or CV should provide a panel of topic experts with a concise idea of your knowledge of the topic and a list of work accomplished in the subject area. **The deadline for letters of interest is August 27, 2020.** Topic panel meetings are anticipated during September and October 2020. During the meetings, scopes of work will be finalized and principal investigators chosen.

Transit Cooperative Research Program Synthesis Topics in the Fiscal Year 2020 Program
(Titles are [HOTLINKS](#))

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Synthesis Topic SA-51
Transit Safety Risk Assessment Methodologies

TCRP Staff: Mariela Garcia-Colberg

The Federal Transit Administration (FTA) published a final rule for Public Transportation Agency Safety Plans under 49 CFR 673. This final rule requires States and certain operators of public transportation systems that receive Federal financial assistance under 49 U.S.C. Chapter 53 to develop Public Transportation Agency Safety Plans based on the Safety Management System approach. Operators of public transportation systems will be required to implement the safety plans. The development and implementation of safety plans will help ensure that public transportation systems are safe nationwide.

The adoption of a Safety Management System (SMS) foundational approach across all new safety rules, regulations, and accompanying technical guidance documents calls for a need to research new and innovative state-of-the-practice methodologies for developing robust and consistent safety risk assessment methodologies for improving transit industry safety (See 49 CFR 673). While the industry has relied on the Military Standard 882 frequency versus a severity risk matrix approach, there are now more advanced methodologies - such as exposure rate models and the European-based Common Safety Method - that warrant consideration.

This synthesis will identify the use of new transit safety risk assessment approaches and methodologies, including international models. A benchmark of safety risk assessment methodologies currently used by other transportation modes shall also be highlighted. Case studies would be used to present the applicability and effectiveness of these new methodologies.

The synthesis would document enhanced, more effective safety risk assessment models consistent with overall SMS industry approach. New methodologies may also help address current issues such as lack of consistency and awareness in conducting effective safety risk assessments across a diverse spectrum of transit agencies.

Information Sources:

- Military Standard 882: <https://www.system-safety.org/Documents/MIL-STD-882E.pdf>.
- European Common Safety Method: https://www.era.europa.eu/activities/common-safety-methods_en and <https://www.rsb.co.uk/rgs/standards/GEGN8646%20Iss%201.pdf>.

Synthesis Topic SA-52

Assessing Equity and Identifying Impacts Associated with Bus Network Redesign

TCRP Staff: Mariela Garcia-Colberg

Total and per-capita public transit ridership in the US have been in decline after a recent peak in the mid-2010s. The causes of this decline are numerous: relatively low gas prices, easily available automobile loans, the advent of ride hailing companies, urban forms hostile to walking and bicycling, and job growth beyond the jurisdiction of transit agencies, among others. Highlighting public transit's susceptibility to external factors, the worldwide COVID-19 outbreak is pushing transit ridership further downward. Such widespread and rapid ridership changes require creative solutions and direct action--notwithstanding global public health crises--and anticipating an eventual return to normalcy; individual transit agencies can make operational decisions to encourage ridership.

Agencies across the country are realizing that a frequent bus network can support sustained ridership growth. Many agencies are undertaking "bus network redesigns" to focus resources in a manner that increases ridership and improves efficiency. Relying on the fact that bus routes can be shifted with relative ease and frequencies ramped up as needed, these efforts reallocate service from more peripheral areas to others where land use and demographic fundamentals indicate high ridership potential. Using redesigns and related changes, locations as diverse as Phoenix, Houston, Seattle, and Austin have recently seen ridership increases in the midst of national declines. The common denominator in each of these areas is the understanding that public transit level of service matters even in the face of broader macroeconomic trends that do not favor transit ridership.

However, despite obvious success in growing ridership, the equity and justice impacts of bus network redesigns are poorly understood and often contentious. A recent research effort focused on bus network redesigns, TCRP Synthesis 140, addressed a host of general issues related to redesigns, but did not engage deeply with equity-related questions. Instead, the report limited its equity investigation to the basic federally required processes, noting that Title VI analyses were the favored method for assessing impacts on people of color and low-income people.

But, Title VI analyses often rely on census data to understand who would be affected by a service change, even though ridership data often show different results. Title VI analyses can also be conducted in many different ways, including via methods that may minimize evidence of negative outcomes for Title VI protected populations. Because of this, there is little standardization across transit agencies when evaluating the impacts of their network redesigns.

This TCRP synthesis will document the current practice of how transit agencies are assessing and addressing the equity impacts of bus network redesigns, including and beyond Title VI analyses. Information gathered will include an inventory of all available equity-related documents produced by agencies that have undertaken bus network redesigns in the US.

Information will be gathered by a literature review, a survey on a broad range of North American transit agencies, and a minimum of 5 case examples that will gather information on the state-of-the-practice, emphasizing lessons learned, challenges and successes. The needs for future research should also be discussed.

The products of the synthesis will serve as a resource to inform transit agencies considering bus network redesigns of strategies to understand the true impacts of major service changes on the communities that they serve.

Information Sources:

- TCRP Synthesis 140: Comprehensive Bus Network Redesigns. 2019.
- Jinhyung Lee, Harvey J. Miller. “Measuring the impacts of new public transit services on space-time accessibility: An analysis of transit system redesign and new bus rapid transit in Columbus, Ohio, USA.” *Applied Geography* 93, 2018, pp. 47-63.

Synthesis Topic SA-53
BRT Current State of Practice

TCRP Staff: Mariela Garcia-Colberg

Bus Rapid Transit (BRT) continues to interest transit agencies in the United States. In 2003 TCRP published Report 90 Bus Rapid Transit and in 2007 TCRP provided an update in its Report 118 “Bus Rapid Transit Practitioner’s Guide”. A number of new BRT projects have been implemented since 2007 and early deployment BRTs have further evolved. Both TCRP Report 90 and 118 provided useful information for agencies considering BRT solutions. However, the information in these reports is now more than 14 years old. Since then, agencies have struggled with the ridership and operations benefits associated with investment in: exclusive BRT lanes and turning restrictions; minimum service frequencies; integration with local bus service, and other routes in the corridor; basic versus “high end” stations; level boarding platforms; upgraded fare collection systems; and branding. ITS and Big Data advances have also been made that might benefit BRT implementation. With 13 more years of operating experience, stronger information on these struggling issues is now available. Documenting all the challenges, benefits, and new lessons learned would be helpful to nascent BRT projects.

This TCRP synthesis will document the current practice of transit systems regarding the planning, design, construction and operations of BRT. The focus would be on ridership experience, willingness (or unwillingness) of the public to embrace new BRT corridors, issues with network expansions, costs and lessons learned.

Information will be gathered by literature review and a survey of selected geographically diverse, large, medium and small transit agencies. At least five to seven case examples representing different experiences that agencies have with BRT will be produced. The final report will also document gaps in knowledge and research needs.

The product of the research is envisioned to inform transit decision-makers as they make decisions about BRT in their communities.

Information Sources:

- TCRP Report 90 Bus Rapid Transit, 2003.
- TCRP report 118 BRT Practitioners Guide, 2007.

Synthesis Topic SB-33
Uses of Social Media in Public Transportation

TCRP Staff: Mariela Garcia-Colberg

During the past twenty years, social media has provided transit agencies with an unparalleled opportunity to connect with their customers. Because of that, TCRP commissioned Synthesis 99 Uses of Social Media in Public Transportation which was published in 2012. This document is one of the most downloaded Synthesis on the TCRP Synthesis library.

This synthesis topic will update Synthesis 99 and will again explore the use of social media among transit agencies as well as document innovative practices in the United States and Canada. The objective of the study is to analyze the way that transit agencies connect with their customer through the use of social media. It will also synthesize the reason why agencies use social media including:

- Timely updates and Crisis Information—Social media enable agencies to share real-time service information and advisories with their customers.
- Public information— Transit agencies use social media to provide the public with information about services, fares, and long-range planning projects.
- Citizen engagement—Transit agencies are taking advantage of the interactive aspects of social media to connect with their customers in an informal way and to collect feedback from riders.
- Employee recognition—Social networking can be an effective tool for recognizing current workers and recruiting new employees.
- Transit Advocacy—Use as a means of increasing transit ridership

Information will be gathered through a literature review, an online survey of transit agencies, and at least 5 case examples that highlight innovative practices used by transit systems. A discussion of gaps of information and suggestions for future research shall also be included in the report.

Information Sources:

- TCRP Synthesis 99 Uses of Social Media in Public Transportation.

Synthesis Topic SB-34

Coordination of Public Transit Services and Investments with Affordable Housing Policies

TCRP Staff: Mariela Garcia-Colberg

Public transit serves many societal objectives. Among these, one of the most important is to provide mobility options to disadvantaged populations, including economically disadvantaged and those without access to automobiles.

There has always been recognition among transit planners and researchers of the importance of coordinating transportation, transit, and land use planning. This typically involves trying to increase densities and encouraging mixed land uses near higher capacity transit services, through Transit Oriented Development (TOD) or Joint Development projects.

However, in the last ten years, there has been an increased sensitivity concerning the equity implications of transit services and investments, and in parallel a growing recognition by researchers of the urban dynamics leading to increased gentrification in cities and to the suburbanization of poverty. As city cores become more vibrant and offer more services they become more attractive, in particular to higher income population segments that can bid up land value and rents, which in turn forces lower income populations out of traditional neighborhoods towards suburban locations. It turns out that accessibility to high capacity transit is one of the features that makes locations more attractive, resulting in the sad irony that transit investments end up, as a result of the above dynamic, not serving as well as was envisioned those that would be most likely benefit from the transit investments. A growing number of researchers have highlighted the combined dynamic of urban gentrification and suburbanization of poverty (Hulchanski), and of the transit / affordable housing dilemma (Lownes, Kramer).

At the same time there has been much emphasis on understanding and addressing the equity implications of transit, as exemplified by an increased focus on Title VI of the Civil Rights Act of 1964 that protects people from discrimination in programs and activities receiving federal financial assistance, and these have been articulated in related federal mandates. As a result of this increased focus, there has been considerable research on equity and accessibility measures, as well as practical guidance on how to assess the equity implications of transit decisions and investments.

However, there has been little systematic practical guidance for transit agencies and their external partners, to identify approaches and practical tools that could be used to coordinate transit (in terms of both investments and services) and affordable housing policies. The organizational challenges are considerable since transit is primarily organized on a regional basis, while housing policies are municipal, and planners for each tend to work in independent silos. When major new transit investments (e.g., for subways or Light Rail Transit) are being planned, there are often efforts to develop secondary area plans around transit stations to encourage TOD, and in some cases these provide for inclusive zoning requirements as well.

However, efforts to coordinate existing transit services and affordable housing policies are disparate, local and ad-hoc in nature.

The goal of this Synthesis is to identify the potential mechanisms (both policies and programs) to coordinate public transit (both services and capital investments) with local affordable housing policies, and synthesize the current state-of-the-practice of transit systems that coordinate public transit services and capital investments with local affordable housing policies.

Information will be gathered by a literature review, a survey of transit agencies, and a minimum of 5 case examples that will gather information on the state-of-the-practice, emphasizing lessons learned, challenges, and successes. The needs for future research should also be discussed.

Information Sources:

- Hulchanski, D., The Three Cities within Toronto: Income Polarization among Toronto's Neighbourhoods, 1970 — 2000, <http://www.urbancentre.utoronto.ca/pdfs/curp/trnr/Three-Cities-Within-Toronto-2010-Final.pdf>.
- Lownes, N. et al., Investigating the Linkage between Transit Access to Services and Affordable Housing Availability, <https://cammse.uncc.edu/sites/cammse.uncc.edu/files/media/CAMMSE-UNCC-2018-UTC-Project-Information-10-Lownes.pdf>.

Synthesis Topic SG-19

Paratransit Service Delivery Models for Small Systems

TCRP Staff: Mariela Garcia-Colberg

ADA paratransit demand continues to grow while resources are dwindling. Because of this, transit agencies continue to explore models to more effectively meet these growing demands. Small agencies in particular may be finding unique and better ways to adopt “hybrid” service models (such as brokerage service or TNCs) and community-based operations using non-traditional operators.

The objective of this synthesis is to document, for a comprehensive set of service models, the way various elements of the service and contracts are structured to enhance the likelihood of achieving certain results related to cost efficiency, service quality, or the balance of the two that will persist through the entire contract term. The synthesis will provide examples from the industry of what is currently being done.

In particular, this Synthesis will explore paratransit delivery models for small systems (fewer than 50 fixed-route buses and often a dozen or fewer vehicles operating paratransit service). It will document the way various service and contract models are structured to enhance the knowledge base of small agencies.

This synthesis should include a literature review, practice overview of existing service delivery models, and survey of transit agencies which are geographically and structurally diverse, with different service delivery models for ADA and non-ADA paratransit services. A minimum of ten case examples of different transit systems and different service delivery models should be studied. The case studies, as a set, need to reflect the various service models used for ADA and coordinated paratransit systems.

Information Sources:

- TCRP Synthesis of Transit Practice, Issue 31, 1998, Paratransit Contracting and Service Delivery Methods.
- TCRP Report, Issue 121, 2007, Toolkit for Integrating Non-Dedicated Vehicles in Paratransit Service.
- TCRP Report Issue 144, 2011, Sharing the Costs of Human Services Transportation.
- FTA Report No. 0081. 2014, Accessible Transit Services for All.
- National Transit Database (NTD).
- Mobility Management and Coordination of Services Literature.
- TCRP Synthesis on Taxis.

Synthesis Topic SH-21

Transit Fare Capping: Balancing Revenue and Equity Impacts

TCRP Staff: Mariela Garcia-Colberg

Transit agencies in the United States are beginning to experiment with fare caps to ensure that passengers that pay for single rides don't pay more than multiple-ride passes included in their fare structure. A fare cap is a practice in which users are charged according to rides taken over a period of time; a user's combined fares over multiple rides cannot exceed the amount a rider would have paid if they had purchased the optimal period pass based on their usage. Fare capping offers many advantages: greater convenience, transit fairness, and most of all more equitable access to the discounts afforded by those who purchase transit passes.

The practice of fare capping is growing quickly in the United States. In 2017, Portland's TriMet became the first major transit agency in the United States to institute fare capping, although international transit agencies in places like London and Dublin had already demonstrated its success. Other agencies in the U.S. offering fare capping include DART (Dallas), Houston Metro, Interrurban Transit (Grand Rapids), CTtransit (Connecticut), IndyGo (Indianapolis), AC Transit (Oakland), Metrolink (St. Louis), and Miami-Dade Transit. Other agencies are considering fare capping but find that there are limited resources dedicated to this emerging practice. Advocacy groups like TransitCenter and the Tri-State Transportation Campaign are calling for fare capping in large transit markets like New York City and Boston. Because best practices in fare capping are still unclear, transit agencies may have a difficult time weighing fare capping's benefits against its revenue costs or comparing costs against equity issues.

The objective of this synthesis is to document the implementation of fare capping in U.S. transit agencies. Information to be gathered may include the following: How has fare capping impacted rider demand, revenue, and fare payment media? How has capping shifted demand temporally? How do these effects vary according to pass structures and pricing schemes (e.g. daily, weekly, monthly; discounted ride structure)? Has the agency received any feedback from transit riders after the implementation of fare capping?

Information will be gathered by a literature review, a survey of transit agencies, and a minimum of 5 case examples that will gather information on the state-of-the-practice, emphasizing lessons learned, challenges and successes. The needs for future research should also be discussed.

Information Sources:

- AC Transit Press Release: "New Day Pass & Other Fare Policy Changes Coming in July." 1 May 2014.
- "Cap & Ride" TransitCenter. 15 August 2017.
- Chalabianlou, Raza, Adam Lawrence, and Brian Baxter. "A review and assessment of fare capping as a passenger incentive mechanism for Australia and New Zealand." Australasian Transport Research Forum 2015 Proceedings.

- Chu, Alfred, Andre Lomone, and Robert Chapleau. “Evaluating the Impact of Fare Capping and Guaranteed Best Fare Policies.” Presentation at Transit Data Paris, July 2019.
- “Fare Capping: A Formula for Fairer Fares.” TransitCenter. 17 August 2018.
- Schmitt, Angie. “Portland Debuts a Fairer Way to Pay for Transit Fares.” StreetsBlog. 16 August 2017.
- Transportation Research Board. TCRP Report 94: Fare Policies, Structure and Technologies: Update, 2003.