

*Task Force on Arterial Health (ADD55T)*  
*Edward Christopher, Chair*

*Subcommittee on Health and Transportation (ADD50(1))*  
*Edward Christopher, Carolyn McAndrews, Michael Widener, Co-Chairs*

## **Public Health and Transportation**

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\*“The views expressed here are those of the authors only and do not represent any official position of the National Cancer Institute or National Institutes of Health.”

## **THE EARLY BEGINNINGS**

This article is written from the perspectives of the Transportation Research Board (TRB) Joint Subcommittee on Health and Transportation (2011–present) and the TRB Task Force on Arterials and Public (ADD55T, 2015–2019).

Historically, the focus of transportation was on learning how to engineer and build the nation’s transportation systems, finance them, and enhance their efficiency. When the National Advisory Board on Highway Research was formed in 1920, improving transportation infrastructure was a much greater priority than any unforeseen and complex public health outcomes.

At this time, the transportation field was not yet ready for a comprehensive approach to planning and development, especially one that included a broad public health perspective. Many of the drivers for such a comprehensive approach only became apparent with trends in population growth and urbanization that arose after World War II. Thus, the transportation field became ready for a more comprehensive approach to health as it started

**Public Health** refers to the science and art of preventing disease, prolonging life and promoting health through organized efforts and informed choices of society, organizations, public and private, communities and individuals. It is what we as a society do collectively to assure the conditions in which people can be healthy. There is strong and growing evidence that ‘healthy’ public policy must include consideration of domains that are not traditionally associated with health but whose influences have health consequences (e.g., education, business, housing, and transportation).

<http://www.nationalacademies.org/hmd/~media/Files/Report%20Files/2002/The-Future-of-the-Publics-Health-in-the-21st-Century/Future%20of%20Publics%20Health%202002%20Report%20Brief.pdf> [Accessed Jan, 18, 2019]

to explore how urban and suburban form impacted our daily lives. While this environmental awareness was developing, demand continued for the conversion of farmland into sprawling suburbs supporting a dream of prosperity driven by cars and a booming corporate America. At the same time, the nation continued to struggle with social injustice, poverty, and racism. In one respect we were starting to embrace ways in which the environment could impact the health and welfare people yet we were conflicted on how our lifestyles adapted to it. The transportation community was starting to be concerned about the health and welfare of our people. While our concern for the public's health is not new, its evolution into our everyday thinking, our organizations and institutions continue to grow and assert itself.

When the National Academies of Science's (NAS) Institute of Medicine (IOM) was created in 1970<sup>1</sup>, the Highway Research Board (formerly the National Advisory Board on Highway Research and subsequently today's TRB) had already existed for 50 years. Some of the stated reasons for the original creation of the IOM included working with sister academies and the NAS on identified health problems and aiding the government and the public in making optimal public policy choices.<sup>2</sup> Over time, this aligned with the original purpose of TRB and its predecessors to provide for the exchange of information and research results about highway technology.<sup>3</sup>

Much has changed with both institutions and the sectors they represent over the past 50 years. Many of these changes have produced increasingly more collaborative endeavors. At the same time the country worked on the design and construction of the national highway system, the U.S. Surgeon General formed an Advisory Committee on Urban Health Affairs. In its landmark report it noted: "the transportation network, and housing patterns constitute major determinants of the overall patterns of growth and development in urban and metropolitan areas... The design and engineering of these determinants must be aimed at meeting the needs of future populations... and at introducing health concerns into all community activities."<sup>4</sup> This was 1967.

During this same period of the mid-20<sup>th</sup> century, the American Public Health Association (encouraging cycling)<sup>5</sup>, the American Society of Landscape Architects (safe, multi-modal transportation corridors)<sup>6</sup>, and the Institute of Transportation Engineers (speed controls based on adjacent land uses)<sup>7</sup> were all beginning to issue policy statements calling for actions designed to protect vulnerable road users and produce healthier community designs. When the Highway Research Board was officially renamed the Transportation Research Board in 1974, its scope was broadened to include all modes of transportation, increasing its relevance to a wide variety of health determinants.<sup>8</sup> Over the next half century of their shared existence, the transportation

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<sup>1</sup> Institute of Medicine 1998. [To Improve Human Health: A History of the Institute of Medicine](https://doi.org/10.17226/6382). Washington, DC: The National Academies Press. <https://doi.org/10.17226/6382>. [Accessed Jan, 18, 2019]

<sup>2</sup> Page, I. H. (1988). A current look at the rationale of the Institute of Medicine of the National Academy of Sciences. *JAMA*, 260(14), 2102-2104.

<sup>3</sup> <http://www.trb.org/AboutTRB/AboutTRB.aspx> [Accessed Jan, 18, 2019]

<sup>4</sup> U.S. Public Health Service. 1967. [Securing Health in Our Urban Future. A Report \[of the Barr Committee\] to the Surgeon General](#). Washington, D.C.: U.S. Government Printing Office. [Accessed [Accessed Jan. 18, 2019]

<sup>5</sup> <https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/15/15/14/encouraging-the-safe-use-of-bicycles> [Accessed 1/18/2019]

<sup>6</sup> [https://www.asla.org/uploadedFiles/CMS/Government\\_Affairs/Public\\_Policies/Transportation.pdf](https://www.asla.org/uploadedFiles/CMS/Government_Affairs/Public_Policies/Transportation.pdf) [Accessed Jan. 18, 2019]

<sup>7</sup> <https://www.ite.org/pub/?id=e1bba044%2D2354%2Dd714%2D513e%2D9e190fb4754b> [Accessed Jan. 18, 2019]

<sup>8</sup> Byrd, L. G. (1996). [Transportation Research Board 1920-1995: The First Seventy-Five Years](#). The Highway Research Board. *TR News-Transportation Research Board*, (182), 5-20. [Accessed Jan. 18, 2019]

and health sections of the National Academies—as well as the broader sectors they represented—experienced a new outlook from one of preventing negative outcomes (a health protection model) to a more inclusive perspective seeking the proactive pursuit of positive outcomes like active community environments (a health promotion model). In addition, our understanding about the transportation-related determinants of health expanded greatly. Tables 1 and 2 further illustrate the significant impact that this interdisciplinary scientific evolution began to have on both fields in the 1980s when the first interrelated articles were published in the *Transportation Research Record* and similar health journals such as *Public Health Reports* that would eventually be cited hundreds of times or more.

The collected effort and results listed in Tables 1 and 2 has had a significant and lasting impact on the practice of both transportation and public health, as demonstrated by the following guidance and recommendations from recent years:

### **Community Preventive Services Task Force**

- [Physical Activity: Built Environment Approaches Combining Transportation System Interventions with Land Use and Environmental Design](#) (2016) - The Community Preventive Services Task Force (CPSTF) recommends built environment strategies that combine one or more interventions to improve pedestrian or bicycle transportation systems with one or more land use and environmental design interventions to increase physical activity. Intervention approaches must be designed to enhance opportunities for active transportation, leisure-time physical activity, or both.
- [Physical Activity: Interventions to Increase Active Travel to School](#) (2018) - The Community Preventive Services Task Force (CPSTF) recommends interventions to increase active travel to school based on evidence they increase walking among students and reduce risks for traffic-related injury. Active travel to school interventions (called Safe Routes to School in the U.S.) make it easier for children and adolescents to commute to school actively (e.g., walking or biking). Active travel to school interventions must include one or more of the following components: 1) Engineering; 2) Education; 3) Encouragement; and 4) Enforcement.

### **National Physical Activity Plan Alliance**

- [2016 U.S. National Physical Activity Plan](#) (2016) - The Plan is a comprehensive set of policies, programs, and initiatives designed to increase physical activity in all segments of the U.S. population. Equitable design of communities and transportation systems can make walking and biking both safe and enjoyable, provide housing that is conducive to healthy lifestyles with affordable transportation options, and offer ample space for active recreation. The Transportation, Land Use and Community Design Sector of the National Physical Activity Plan has developed strategies that focus on: 1) integrating active design principles into the community planning process, 2) changing zoning laws to favor mixed use developments that encourage physical activity, 3) advocating for funding and policies that increase active transportation, 4) investing in data collection to inform policy, and 5) implementing initiatives to encourage and reward more active transportation.

### **U.S. Department of Health and Human Services**

- [Centers for Disease Control and Prevention Transportation and Health Recommendations](#) (2010) - the Centers for Disease Control and Prevention (CDC) has identified

transportation policies that can have profound positive impact on health. CDC supports strategies that can provide a balanced portfolio of transportation choices that supports health and reduces health care costs. Transportation policy can: Reduce injuries associated with motor vehicle crashes; encourage healthy community design; promote safe and convenient opportunities for physical activity by supporting active transportation infrastructure; reduce human exposure to air pollution and adverse health impacts associated with these pollutants; and ensure that all people have access to safe, healthy, convenient, and affordable transportation

- [Centers for Disease Control and Prevention High 5 Initiative](#) (2018) - The Health Impact in 5 Years (HI-5) initiative highlights non-clinical, community-wide approaches that have evidence reporting 1) positive health impacts, 2) results within five years, and 3) cost effectiveness and/or cost savings over the lifetime of the population or earlier. Three of these are related to the transportation sector: [Safe Routes to Schools](#), [Clean Diesel Bus Fleet](#), and [Public Transportation Expansion or Implementation](#).
- [Physical Activity Guidelines for Americans, 2<sup>nd</sup> Edition](#) (2018) - This new edition of the Physical Activity Guidelines for Americans is grounded in the most current scientific evidence and informed by the recommendations of the 2018 Physical Activity Guidelines Advisory Committee. Implementing population-level approaches to improve physical activity requires collaboration across sectors of society at local, state, and national levels. The Transportation, Land Use, and Community Design sector, in particular, plays a lead role in designing and implementing options that provide areas for safe walking, bicycling, and wheelchair mobility. Community planners and designers can implement design principles to create communities with activity-friendly routes to everyday destinations for people of all ages and abilities.

#### **U.S. Department of Transportation**

- [Federal Highway Administration Proven Countermeasures](#) (2017) - The FHWA has identified and is promoting widespread use of a set of 20 Proven Safety Countermeasures that can offer significant, measurable impacts as part of any agency's data-driven, systemic approach to improving safety. Each countermeasure addresses intersections, roadway departures, or pedestrian/bicyclist facilities—along with crosscutting strategies that address all three safety focus areas.
- [National Highway Traffic Safety Administration Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices](#) (2017) - This guide is designed to assist State Highway Safety Offices (SHSOs) in selecting effective, science-based traffic safety countermeasures for major highway safety problem areas. It has attempted to include countermeasures that have the most evidence of effectiveness as well as those that are used most regularly by SHSOs.

#### **U.S. Surgeon General**

- [Step It Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities](#) (2015) - The Call to Action is applicable to the health of people at all ages and stages of life. It recognizes that everyone should have access to spaces and places that make it safe and easy for us to walk or wheelchair roll—whether in urban, suburban, or rural settings. This means that the people who design our cities and neighborhoods

should include well-maintained sidewalks, pedestrian-friendly streets, access to public transit, adequate lighting, and desirable destinations that are close to home.

These U.S.-based guidelines and recommendations have their parallel research and programmatic activities worldwide. For example, the UK has recently released guidelines on walking, cycling, physical activity and the environment, emphasizing the role of travel planning and policy as contributors to health. Recent research reviews also illustrate global attention to health and transportation (Litman 2013<sup>9</sup>; Gotschi et al 2018<sup>10</sup>). TRB plays a critical role in convening researches from around the world focusing on transportation and health.

In 2016, the division of the National Academies of Sciences, Engineering, and Medicine that focuses on health and medicine was renamed the Health and Medicine Division (HMD) instead of using the name Institute of Medicine (IOM). This new name builds on the heritage of the IOM's work in medicine while emphasizing its ***increased focus on a wider range of health matters and determinants – facilitating more collaborative and interdisciplinary approaches*** to the most pressing challenges facing the nation and the world.<sup>11</sup> In addition, the current National Academy of Medicine Strategic Plan for 2018-2023 calls for seeking “***new approaches that transcend disciplines*** and converge different types of expertise to advance health and health equity; foster the future generation of health scientists and practitioners; and identify and incorporate innovative technologies and tools to build future leadership capacity [and] build[ing] future field capacity by transcending disciplines, ***leveraging the convergence of emerging scientific areas, and working with new sectors in innovative ways.***”<sup>12</sup>

## SPECIFIC TO TRB

The TRB Joint Subcommittee on Health and Transportation (<http://www.trbhealth.org/> [Accessed Jan. 18, 2019]) was created in 2011 to identify, advance and publish research and information to expand and improve current understanding and evaluation of the health impacts of federal, state, regional and local transportation policies, procedures and actions. The scope of this Subcommittee includes a wide array of topics designed to cover diverse impacts and issues related to health, with attention given to vulnerable populations. Topics include, but are not limited to: sustainable and active transportation modes (e.g., walking, biking, transit), mobility, accessibility, safety, freight and aviation impacts to health, transportation-related air pollution and noise impacts, social cohesion, other social, physical and mental health impacts, the distribution of those health impacts in the population (based on factors including such as income, race and ethnicity, sex, age, and English proficiency), and the use of health impact assessments and other health metrics and indicators to advance the consideration of health impacts in transportation decision-making. The Subcommittee considers approaches to maximizing health benefits and addressing potential adverse impacts of transportation planning and policy decisions through engineering and design solutions.

The Subcommittee has four sponsoring committees that have common interests with the field:

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<sup>9</sup> Annual Review of Public Health, Vol. 34:217-233 (Volume publication date March 2013), <https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-031912-114502> [Accessed Jan. 18, 2019]

<sup>10</sup> Gotschi, T., de Nazelle, A., Brand, C., Gerike, R., & PASTA Consortium. (2017). Towards a comprehensive conceptual framework of active travel behavior: A review and synthesis of published frameworks. *Current environmental health reports*, 4(3), 286-295.

<sup>11</sup> <http://www.nationalacademies.org/hmd/About-HMD/Division-Name.aspx> [Accessed Jan. 18, 2019]

<sup>12</sup> <https://nam.edu/wp-content/uploads/2017/10/National-Academy-of-Medicine-2018-2023-Strategic-Plan.pdf> [Accessed Jan. 18, 2019]



- Environmental Justice in Transportation (ADD50)
- Transportation and Sustainability (ADD40)
- Travel Behavior and Values (ADB10)
- Urban Data and Information Systems (ABJ30)

The Subcommittee fulfills its mission by serving as a focal point for transportation issues and their health impacts, both positive and negative. It reviews and publishes research, sponsors paper calls, develops research proposals, contributes to the knowledge base, and uses a variety of communication methods to gather and disseminate information and advance the emerging field of health and transportation. This Subcommittee brings together multiple disciplines to advance its mission and scope. These disciplines include members who are engineers, public health professionals, planners, epidemiologists, economists, advocates, elected officials, and academics, just to name a few.

### **Structure, Membership, and Friends**

The Subcommittee has had continuity in leadership since its inception with two co-chairs, one with a strong background in transportation planning and the other with a strong background in public health. Shortly after the Subcommittee was founded, it put into place a leadership team that continues to the present with 16 members. The two co-chairs are assisted by a secretary, a research needs team, a communications team, and a paper review team. The leadership team guides the direction and efforts of the Subcommittee and works actively throughout the year. The Subcommittee provides a listserv with over 400 subscribers as of January 2019; subscribers are considered friends of the Subcommittee.

### **Communications**

The Subcommittee operates across silos and disciplines. As a result, communication with its friends and members is of key importance. In addition to the listserv, the Subcommittee uses social media tools and has active accounts on Twitter, LinkedIn, and Facebook. The Subcommittee also has an active website (<http://www.trbhealth.org/> [Accessed Jan. 18, 2019]) and a logo. The Subcommittee published a newsletter from 2012 through 2014 (7 issues), but after the retirement of the person responsible for it, the co-chairs determined that the listserv and social media were meeting the Subcommittee's communication needs.

In addition, the Subcommittee prepares a detailed report for the Annual Meeting providing information on the accomplishments made during the previous year, Subcommittee events at the Annual Meeting, and future initiatives. These reports are also used to inform partners of the Subcommittee's activities and ensure they align with the Subcommittee's strategic plan. Copies of the annual reports are provided on the Subcommittee's website (<http://www.trbhealth.org/> [Accessed Jan. 18, 2019]).

### **Research Efforts—Calls for Research Papers**

The Subcommittee annually issues at least one call for papers for the TRB Annual Meeting. In 2014, the Subcommittee also developed a special call for posters and developed its own review and selection process for that call. In 2017, the Subcommittee participated in five paper calls. The foci of the past and current paper calls include:

- Any and all aspects of the connections between health and transportation (2012)
- Aspects of the connections between health and transportation (2013)

- Using transportation and travel analysis/models in coordination with public health analysis/models (2014)
- Creative use of data in transportation and public health planning (2014)
- Enhancing the use of transportation and land use modelling tools in examining health outcomes (2016)
- Impact of freight on public health (2017)
- Equity in transportation: theory, methods and practices (2017)
- Transportation and environmental health governance (2017)
- Critical issues associated with arterials (major roads) and public health (2017)
- Data, methods, and models to integrate transportation and public health (2017)
- Influence of rural geography and transportation on health (2018)
- Expanding and improving our understanding and evaluation of the relationship between public health and transportation (2018)
- Expanding and improving our knowledge of methods, data, tools, and models that help enhance integration of public health and transportation (2019)

The annual January meeting of the Subcommittee routinely draws 100 to 120 interested persons, with good representation from both the transportation and public health fields. It receives between 25 and 35 papers for review annually and develops podium sessions, workshops, and cross-cutting group sessions.

The following three projects are among the Subcommittee's accomplishments. A longer list of contributions is posted on its website at <http://www.trbhealth.org> [Accessed Jan. 18, 2019].

- Publication of a Special Issue of *TR News* on Public Health and Transportation in September-October 2015. Although unplanned, the release of this special issue coincided with the TRB Executive Committee's focus on health at the annual meeting.
- Survey of TRB Committees. In preparation of a TAC Cross-Cutting session in 2013, the Subcommittee surveyed 179 TRB Committees about their interest in topics at the intersection of public health and transportation; 61 committees expressed a direct interest in public health.
- Establishing a Task Force on Arterials and Public Health. In 2015, the TRB Technical Activities Council approved the Subcommittee's proposal to establish a Task Force on Arterials and Public Health to inform the planning, design and operation of arterials while considering public health.

### **Arterials and Public Health Task Force (ADD55T), 2015 to 2019**

In January 2015, the TRB Technical Activities Council approved a Task Force on Arterials and Public Health, which aimed to inform the planning, design, and operation of arterials considering public health. To accomplish its mission, the Task Force set out to develop a framework for future research in the area. The framework consisted of seven case areas covering topics that could help identify research needs for arterials and public health. The case approach was used to place the research needs in a practical context. Each case introduction provided background information to explain why the issue was important and helped set the stage for the research questions raised around each case. In all, over 250 research topics, questions, concerns and other

gaps in our knowledge base were included. These questions are presented in a TRB Circular to help interested persons select topics for further research<sup>13</sup>.

Besides the seven case areas, five overarching themes were identified:

- Equity: Health equity means that everyone has a fair and just opportunity to be healthier.
- Institutional structures: When all the right people are together at the table, they will make good decisions.
- Metrics: Highway metrics have historically prioritized Level of Service and moving vehicles swiftly. Could a Health Level of Service reframe the role of highways and advance health?
- Models: The analytical capacity for bringing health considerations in transportation forward is in its infancy. Advancement requires investment in interdisciplinary research.
- Tradeoffs: How can arterials be designed to advance the health and welfare of the people traveling on and living near the roadway?

This Circular offers several points upon which the fields of transportation and health can build. In addition to the many research questions raised, a key area where transportation and health professionals could begin discussions is where the disciplines diverged in their focus on how to design arterials. The major contrast is between transportation's access management paradigm for designing arterials (move more vehicles more efficiently) and public health's complete streets paradigm (improve safe and efficient movement of pedestrians, bicyclists, and transit users).

While the work of the Task Force was completed in 2019, the Subcommittee hopes that TRB and others will realize the importance of asserting health considerations into the arterial roadway paradigm and move the ideas and concepts raised in this Circular forward.

## THE FUTURE

Diverse organizations in transportation and public health including TRB, ITE<sup>14</sup>, APHA<sup>15</sup>, IPATH<sup>16</sup>, as well as an academic community spanning multiple disciplines are promoting a focus on the intersections between transportation infrastructure, transportation behavior and their joint influences on human health and the built, natural and social environment. These activities suggest an intense interest in advancing both strong evidence for best practices contributing to integration of transportation and health goals and specific and accessible guidance for transportation practitioners. Additionally, health researchers need guidance on research questions that are framed and formulated so as to contribute to transportation research and practice.

The 2016-2019 TRB Arterials task force pioneered a place inside TRB where individuals who were concerned about transportation and health issues gathered to discuss areas of common interest. This interest went beyond silos such as air quality, traffic safety, environmental justice, active transportation, access to services, workforce well-being, the spread of infectious disease, equity, healthy arterials, and system management but instead looked across these issues

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<sup>13</sup> Transportation Research Board Circular E-C239. *Arterial roadways research needs and concerns: informing the planning, design, and operation of arterial roadways considering public health*. 2019. <http://onlinepubs.trb.org/onlinepubs/circulars/ec239.pdf> [Accessed Jan. 18, 2019]

<sup>14</sup> Institute of Transportation Engineers, <https://www.ite.org/technical-resources/topics/transportation-and-health/> [Accessed April 23, 2019]

<sup>15</sup> American Public Health Association, <https://www.apha.org/topics-and-issues/transportation> [Accessed April 23, 2019]

<sup>16</sup> International Professional Association for Transport & Health, <https://www.tphlink.com/ipath.html> [Accessed April 23, 2019]



comprehensively using the arterial roadways as the thread to stitch this quilt together. One important feature of the taskforce was that its topic area attracted participation of a diverse mix of transportation, planning, environmental, public health and design practitioners and researchers. Efforts like these that identify TRB activities to bring together such multidisciplinary teams could contribute to the continued vitality of the TRB community.

In light of these considerations, we call for a deep and focused discussion on how best to advance the integration of health and transportation research and practice. Considering the history and emergence of public health as a legitimate transportation concern with many research questions, the nation's transportation research structure needs to increase the prominence of this subject area. Elevating the Subcommittee to a full standing committee is seen as a first step in moving the cross-cutting nature of health forward, even greater efforts could be made to enhance the integration of transportation and health goals. This vision entails the creation of a new structural arrangement for TRB. It would be a world that would bring health and transportation together at the highest level. The structure envisioned is a joint Health and Medicine Division (HMD) and TRB Committee Round Table focused on Health and Transportation. It would organizationally bridge the two divisions and function in both worlds. It would operate inside HMD as a more traditional roundtable but would also have the same status of a standing committee within the TRB structure.

The future direction of where the nexus of health and transportation evolves to next is of importance to all of us. The evolving threads presented in this article keep pointing to a growing realization that a health and transportation focus naturally engenders attention to at least seven main linkages between transportation planning programs policy and health outcomes. These linkages focus attention on safety, active transportation, air pollution, cancer, diabetes, health equity, access (to goods, services and healthcare) and community cohesion. Fulfilling the promise of the health and transportation nexus is critically dependent on advancing each of these dimensions.

**Table 1 – Examples of Peer Reviewed Transportation & Health Literature, 1980–2018**  
(Example citations drawn from a Google Scholar search on 1/20/2019)

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| <p>Dishman, RK, Sallis JF, &amp; Orenstein DR. (1985). <i>The Determinants of Physical Activity and Exercise</i>. Public Health Reports, 100(2), 158. [cited 1,299 times]</p> <p>Handy S. (1996). <i>Urban Form and Pedestrian Choices: Study of Austin Neighborhoods</i>. Transportation Research Record, (1552), 135-144. [cited 435 times]</p> <p>Saelens BE, Sallis JF, &amp; Frank LD. (2003). <i>Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design, and Planning Literatures</i>. Annals of Behavioral Medicine, 25(2), 80-91. [cited 2,142 times]</p> <p>Frank LD, Andresen MA, &amp; Schmid T L. (2004). <i>Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars</i>. American Journal of Preventive Medicine, 27(2), 87-96. [cited 1,763 times]</p> <p>Schlossberg M &amp; Brown N (2004). <i>Comparing Transit-Oriented Development Sites by Walkability Indicator</i>. Transportation Research Record, (1887), 34-42. [cited 151 times]</p> <p>Frank LD, Schmid TL, Sallis JF, et al. (2005). <i>Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ</i>. American Journal of Preventive Medicine, 28(2), 117-125. [cited 1,226 times]</p> <p>Besser LM &amp; Dannenberg AL. (2005). <i>Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations</i>. American Journal of Preventive Medicine, 29(4), 273-280. [cited 614 times]</p> <p>Heath GW, Brownson RC, Kruger J, et al. (2006). <i>The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review</i>. Journal of Physical Activity and Health, 3(S1), S55-S76. [cited 678 times]</p> <p>Saelens BE &amp; Handy SL. (2008). <i>Built Environment Correlates of Walking: A Review</i>. Medicine and Science in Sports and Exercise, 40(7 Suppl), S550. [cited 1,418 times]</p> <p>Pucher J &amp; Buehler R. (2008). <i>Making Cycling Irresistible: Lessons from the Netherlands, Denmark and Germany</i>. Transport Reviews, 28(4), 495-528. [cited 1,233 times]</p> <p>Dannenberg AL, Ricklin A, Ross CL, et al. (2014). <i>Use of Health Impact Assessment for Transportation Planning: Importance of Transportation Agency Involvement in the Process</i>. Transportation Research Record, 2452(1), 71-80. [cited 17 times]</p> <p>Brown V, Diomedi BZ, Moodie M, et al. (2016). <i>A Systematic Review of Economic Analyses of Active Transport Interventions That Include Physical Activity Benefits</i>. Transport Policy, 45, 190-208. [cited 30 times]</p> |
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Sener, IN, Lee, RJ, Elgart, Z (2016). *Potential Health Implications and Health Cost Reductions of Transit-Induced Physical Activity*. *Journal of Transport & Health*, 3(2), 133-140. [cited 18 times]

Whitfield GP, Meehan LA, Maizlish N, Wendel AM (2017). *The Integrated Transport and Health Impact Modeling Tool in Nashville, Tennessee, USA: Implementation steps and lessons learned*. *Journal of Transport and Health* 5:172–181 [cited 12 times]

McAndrews C, Pollack KM, Berrigan D, Dannenberg AL, Christopher EJ (2017). *Understanding and improving arterial roads to support public health and transportation goals*. *American Journal of Public Health*. 107(8):1278-1282. [cited 5 times]

Schoner J, Chapman J, Brookes A, et al. (2018). *Bringing Health into Transportation and Land Use Scenario Planning: Creating a National Public Health Assessment Model (N-PHAM)*. *Journal of Transport & Health*, 10, 401-418. [cited 1 time]

Lee, K, and Sener, IN (2019). *Understanding Potential Exposure of Bicyclists on Roadways to Traffic-Related Air Pollution: Findings from El Paso, Texas, Using Strava Metro Data*. *International Journal of Environmental Research and Public Health*, 16(3), 371. [just published]

**Table 2 – Sampling of Significant TRB Publications, 1968–2019**

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| <p><b>1968–1993</b></p> <p><b><u><a href="#">55: A Decade of Experience</a></u></b> - The National Research Council assembled a committee of 19 individuals with expertise in the various disciplines needed to evaluate the benefits and costs of the 55 mph speed limit and to assess the effectiveness of state laws in inducing compliance.</p> <p><b><u><a href="#">Safety Belts, Airbags, and Child Restraints</a></u></b> - The TRB Executive Committee, in recognition of the changes under way in occupant restraint policy making at the federal and state levels, began a self-initiated pilot study 1) to determine whether a major policy evaluation would be timely and 2) to identify pending and emerging policy issues, review current research, and recommend additional research to answer emerging policy questions.</p> <p><b><u><a href="#">Safety Research for a Changing Highway Environment</a></u></b> - The purpose of this study is to examine how well the highway safety research community is prepared to address the emerging safety problems of a growing population of older drivers and pedestrians, an increasing mix of large trucks and small passenger vehicles, and an aging highway infrastructure.</p>  |
| <p><b>1994–2004</b></p> <p><b><u><a href="#">Bicycles on Buses: Integration of Bicycles and Transit</a></u></b> - Communities across America seeking to reduce reliance on single occupant vehicle (SOV) travel are looking for ways to realize the full potential of integrating bicycle and transit methods of travel. The benefits of bicycle-transit travel in comparison with automobile travel are readily recognized: lower air pollutant emissions, reduced highway congestion, lower capital costs for park-and-ride facilities, and improved neighborhood environments. Information from more than 20 transit agencies, supplemented by site visits and a review of the literature was used to compile this synthesis.</p> <p><b><u><a href="#">Costs of Sprawl</a></u></b> - Urban sprawl is a topic that interests urban planners, economists, environmentalists, sociologists, transportation professionals, policymakers, public officials, academics in many fields, and the general public. TCRP Report 74, which represents the second and final phase of TCRP Project H-10, “The Costs of Sprawl—Revisited,” is the culmination of more than 5 years of research led by Rutgers University. The analyses carried out in this study demonstrate that there both costs and benefits. This report looks very carefully at the many costs and benefits of sprawl and concludes that there is clearly evidence of each.</p> <p><b><u><a href="#">The Relative Risks of School Travel: A National Perspective and Guidance for Local Community Risk Assessment</a></u></b> - The Transportation Equity Act for the 21st Century mandated that the Secretary of Transportation commission the Transportation Research Board (TRB) of the National Research Council (NRC) to examine available crash injury data, along with vehicle design and driver training requirements and routing, operational, and other relevant factors, to study “the safety issues attendant to the transportation of school children to and from school and school-related activities by various transportation modes.” The purpose of this report is to fulfill this mandate by assessing the relative risks of each major mode used for school travel and to provide insights into the potential effects on safety of changes in the distribution of school trips by mode.</p> |
| <p><b>2005–2018</b></p> <p><b><u><a href="#">Does the Built Environment Influence Physical Activity? Examining the Evidence</a></u></b> - the Transportation Research Board (TRB) and the Institute of Medicine (IOM) formed a joint committee consisting of 14 experts to examine the connection between the built environment and the physical activity levels of the U.S. population. The committee found that even though causal</p>  |

connections between the built environment and physical activity levels had not been demonstrated in the literature to date, the available evidence suggested that the built environment can play a facilitating role by providing places and inducements for people to be physically active.

**[Transportation Research Board Circular E-C239. Arterial Roadways Research Needs And Concerns: Informing The Planning, Design, And Operation Of Arterial Roadways Considering Public Health](#)** – The Circular explores the planning, design, and operation of arterials considering public health. This report presents a series of descriptive examples where arterials and health concerns appear in practice and identifies how and where health could be included in TRB's arterial-related research. It also highlights crosscutting issues relevant to the case examples, such as equity and metrics, and offers recommendations for future research.

**[NCHRP Project 20-112: A Research Roadmap for Transportation and Public Health](#)** - this project is developing a 10-year prioritized program of research—a research roadmap—to provide a broad overview of highly relevant research needs at the intersection of transportation and public health in the U.S. The roadmap will also identify research that will provide evidence to support practical and useful information, and implementable tools, for state DOTs and their transportation partners to use to integrate public health considerations at all levels of their agencies' decision-making.

**[NCHRP Project 105: A Guidebook for Communications between Transportation and Public Health Communities](#)** - The purpose of this study is to produce a user-friendly guidebook for state and local transportation professionals, identifying the challenges and best practices for successful communication and collaboration between transportation and public health professionals.

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