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CULTURE-BUILDING AND BEHAVIOR-CHANGE STRATEGIES FOR THE REDUCTION OF VEHICLE MILES TRAVELED

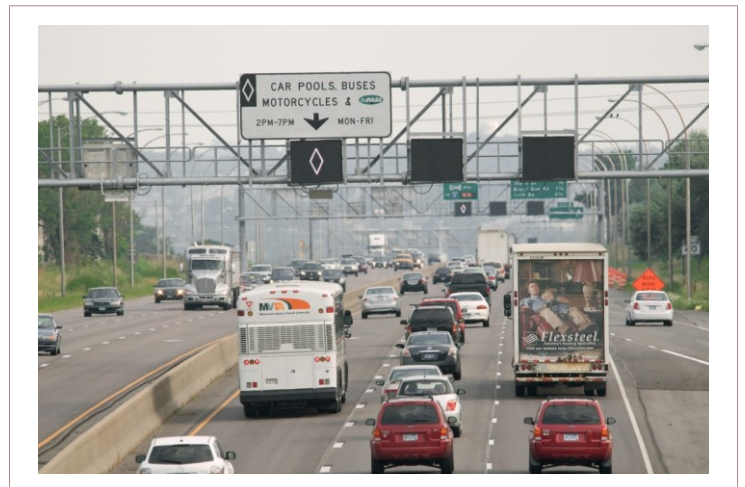
Prepared by Toole Design

Zoe Turner-Yovanovitch

Stefanie Brodie

Mitzi Alex

This report presents the findings of a research study to identify transferrable lessons from behavior-change and culture-building models that could help inform state efforts to reduce vehicle miles traveled (VMT) by 20 percent by 2050. It includes a literature review of academic and public agency documents as well as interviews and focus groups. This project demonstrates that the similarities between transportation- and non-transportation-focused behavior-change methods can provide important lessons for application of strategies to support the reduction of VMT in Minnesota, providing MnDOT and partners across the state many opportunities to achieve reductions in VMT.



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Technical Advisory Panel

Kristina Heggedal, Future Mobility Planner,
MnDOT, Sustainability and Public Health

Brent Rusco, Research and Library Manager,
MnDOT, Research and Innovation

Alexandra de Alcuaz, Senior Planner,
MnDOT, Transportation System Management

Stephanie Castellanos, Public Engagement
Coordinator, MnDOT, District 3

Kelly Corbin, Safe Routes to School Planner,
MnDOT, Transit and Active Transportation

Mindy Granley, Sustainability Officer,
City of Duluth

Gloria Jeff, Livability Director,
MnDOT, Metro District

Nathan Lassila, Sr. Market Research Coordinator,
MnDOT, Communications and Public Engagement

Nick Lemmer, Communications & Engagement
Coordinator, City of Rochester, Public Transit

Tara Olds, Director,
MnDOT, Connected and Automated Vehicles

Sam Parker, Planning Director,
MnDOT, District 7

Sarah Petersen, (former) Artist in Residence [2023]
MnDOT, Office of Sustainability and Public Health

Micaela Kranz, Marketing and Communications
Manager, MnDOT, Research and Innovation

Mary Safgren, Planning Director,
MnDOT, District 4

Jimmy Shoemaker, Senior City Planner
City of Saint Paul

Emma Struss, Environmental Sustainability
Coordinator, City of Bloomington

Nissa Tupper, Transportation and Public Health
Planning Director, MnDOT, Sustainability and Public
Health

Matthew Upgren, Project Manager,
MnDOT, District 2

William Van Koevering, Toward Zero Deaths
Coordinator, MnDOT, District 2

The purpose of this TRS is to serve as a synthesis of pertinent completed research to be used for further study and evaluation by MnDOT. This TRS does not represent the conclusions of either the authors or MnDOT.

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Introduction

Vehicle miles traveled (VMT) can measure travel behavior – specifically how much people drive in their personal vehicles. Minnesota’s Statewide Multimodal Transportation Plan (SMTP) includes a target to reduce VMT because reducing the need to drive alone helps build safer, healthier, and thriving communities. We can reduce VMT by shortening trips, shifting trips, and consolidating trips. Shortening trips relies on development patterns that promote infill development so that destinations – homes, jobs, schools, and errands – are closer together. Shifting trips requires providing travel options like walking, biking, and transit that are just as convenient as driving, and shortening trips first makes them easier to shift. Finally, consolidating trips can be as easy as people in the same household carpooling instead of driving separately, but it can also mean combining multiple trips into one. There are several things that local and state governments can do to help reduce VMT, but at the end of the day, travel decisions are personal for each individual and household.

Driving is the most common way Minnesotans travel, and it often feels automatic for people to choose to drive if they own or have access to a personal vehicle, even if walking, biking, or transit options are available and convenient. Achieving Minnesota’s targets will rely on travelers changing some of their travel behavior, but culture-building and behavior-change initiatives are often met with challenges, some of which include:

- Gaining dedication of adequate and/or sustained resources
- Developing political will and gaining support for regulatory or programmatic changes
- Addressing actions or issues that people do not see as a risk or concern (e.g., radon)
- Being patient; culture change is a long game, and it may take time to see a return on investment
- Some change requires untangling historic practices and messaging

MnDOT’s Transportation Research Synthesis project, *Culture-Building and Behavior-Change Strategies for the Reduction of VMT*, was initiated to identify factors and strategies that drive behavior and culture change toward mode shift from automobiles. The findings from a literature review and focus group interviews with practitioners will help inform communication, market research, and engagement efforts to advance toward the VMT reduction target. This research synthesis presents strategies that support behavior change in other industries, such as health, as well as within transportation to identify transferrable lessons that offer insight into successful approaches that could inform efforts to reduce VMT.

Summary of Project Findings

Successful behavior-change strategies were collected through this research using literature review and focus groups to highlight key lessons learned in recycling, public health, and transportation behavior change.

Where possible, **behavior-change models** and theories were referenced, such as the health belief model and the theory of planned behavior. These models propose different strategies for different situations to influence attitudes and promote adherence to encouraged behaviors, suggesting transferability of some strategies to VMT reduction. Of the behavior-change models and theories reviewed in this report, the health belief model was the most successful in predicting behavior change. This model asserts that a person’s belief about their health risks and the usefulness of mitigation measures will impact their actions. For example, an individual’s belief that quitting smoking reduces one’s risk for cancer or that wearing a helmet reduces the risk of traumatic brain injury will influence both initial and sustained behavioral shifts.

Incentivizing behavior change was studied in various strategies, as well as in mode shift case studies. The literature review concludes that **successful behavior-change efforts in various domains often combined multiple approaches and considered contextual factors**. Strategies like non-negative messaging, educational investments, and targeting school-aged children were generally successful. Programs facilitated by employers and policies regulated by governing bodies were more effective in promoting behavior change than decentralized and unmonitored efforts.

The review indicates that while financial incentives alone (in the form of fines or rewards) can increase participation in programs such as recycling and roadway speed adherence, but they exhibit better results when combined with supportive infrastructure and policy. In the specific context of VMT reduction, financial incentives alone were not effective in creating sustained behavior change and showed better results when paired with disincentives. Supportive infrastructure such as bike lanes, resource accessibility (e.g., free helmets), and the convenience of alternative modes of transportation, are also critical factors in enabling mode shift.

Although the literature suggests improved responses from interventions based on behavior models and theories, this research found that behavior-change models were not consistently useful in predicting or influencing behavior change. Agencies use various methods to shift behaviors, and these methods can be generally grouped into the categories discussed below.

- **Financial incentive-based strategies** were explored across recycling and waste reduction and transportation and presented mixed results. Consistent, smaller value rewards were successful in garnering immediate participation and sustaining behavior change in participants. Innovative reward structures and gamification of the reward system showed positive results for recycling and waste reduction. On the other hand, financial incentives such as reduced transit fares were not in themselves successful in causing mode shift. Strategies need to be paired with systemic or cultural support pillars for them to be effective.
- **Media campaigns and communications strategies** are discussed in both the literature review and focus groups. The focus groups recommend “joyous” messaging based on past success and the results from the literature review generally agree. There are a few instances in which targeted “ridicule” messaging has been shown to be effective in transportation-related campaigns, but positive narratives are generally recommended. In addition to tone, narrative topics focusing on financials (“pocketbook issues”), civic pride, and competition were successful.
- In all strategies discussed in this report, **efforts with multiple pillars of support** (such as policy, physical and social infrastructure, work-based programs, education and awareness campaigns, and cultural shifts) are more successful than single-category strategies. For example, physical infrastructure support is relevant in recycling and waste reduction efforts (recycling and compost bins) as well as transportation-related efforts (micromobility devices and accessible helmets) to enable the new behavior. Similarly, social and cultural shifts are also shown to support smoking cessation and other public health initiatives by encouraging the new behavior.
- **Targeting the correct audience at the correct time** is an important factor to the success of any strategy. The focus groups recommend finding participants who are ready to change their behavior, whether due to newly acquired tools or information, changing social or logistic circumstances, or a shift in attitude (including “fresh starts” that align with new fiscal, school, or calendar years). Results from the literature review also recommend targeting audiences more likely to engage, such as students, schools, retirees, businesses, health officials, and large institutions. For community members not ready to participate, results from the literature review show that maintaining sustained and consistent long-term timelines and funding for strategies can produce successful outcomes.

Some of the initiatives discussed in the focus groups have longer histories and demonstrated success over time; progress can be slow, and people may not be very receptive early on. Over time the culture and personal choice for a behavior became second nature. Cultural and social norms of yesterday shifted and resulted in new norms today (e.g., recycling, reduced smoking and prohibition of indoor smoking, use of safety restraints/seatbelts). Other initiatives represented in the focus groups (access to healthy food, physical activity, active transportation) are less mature with a shorter history and have not shown distinct cultural changes, but behavior changes are in progress. In both cases, the feedback from the focus group participants was insightful.

The methods identified through this research address key areas of consideration for implementing behavior-change initiatives including:

- Access and ease
- Education, awareness, messaging/engagement, and communications
- Programs and partners
- Equity, equitable access, and trust
- Rules, policy, and enforcement
- Resources and funding

This research found that successful methods share some common features.

- **Systemic support structures**, either directly or indirectly through affiliate or independent programs, are critical for strategies to achieve and sustain culture-building and behavior-change initiatives. They provide social and material value via education, training, awareness marketing, policy, products, and infrastructure that removes barriers and creates a sense of community, safety, and support.
- **Communications** for campaigns need to be tailored to the audience and delivered through a variety of channels, which must include trusted sources relevant to different communities. Communications should use credible messengers, tailor messages to target audiences, and apply specific strategies. Universally, successful approaches include some of the following: endorsements from popular figures (celebrities or characters), long-term consistency, opportunities for participant communication and feedback, direct communication, digital tools for education, and innovative rewards.
- A crucial step in changing behavior is to establish awareness of a risk that needs to be mitigated. The nature of the risk can vary based on the populations that the campaign focuses on, so strategic communication to and with **target groups** is required.
- Successful strategies include **government interventions** and resources and may include regulation, policy, and enforcement. Non-profit and volunteer organizations are important partners to support government interventions. These entities not only engage and empower communities, but also advocate and build political will for government action and provide social supports and culturally appropriate interventions.
- Campaigns for behavior change often include identifying and addressing some measures of **cost**. These may be financial incentives and impacts, or personal cost related to time, health, safety, or social acceptance.

Research Methodology

The project consisted of two main phases spanning about six months, including an initial Technical Advisory Panel (TAP) meeting to gather feedback and recommendations on resources and interviews. The first phase involved a review of both grey literature (e.g., websites, reports) and academic literature (e.g., journal articles)

on behavior- and culture-building models applied by government and agency-led strategies and initiatives. It explores behavior change around VMT reduction strategies, but also includes transferrable lessons from sustainability and public health initiatives. It begins with an overview of scientific behavior-change models applied in social, psychological, and physical medicine disciplines as a basis for the examples found in practice. It then discusses several successful strategies that are outside of transportation, related to transportation, or specific to VMT reduction.

The second phase involved interviews with national and local experts from various sectors including public health, health care, and environmental protection, as well as transportation. The organizations interviewed and represented in the focus groups spoke about programs aimed at improving human and environmental health, preventing disease, or avoiding injury or death for individuals and communities. The initiatives they employed used different strategies to engage in culture building and behavior change, including targeting participants who are ready to change, ensuring their messaging was joyous and accurate, and including or installing relevant infrastructure. The focus groups provide insight into the types of initiatives, campaigns, and tactics used, the challenges and successes experienced, what motivated change, equity considerations, and general context. Organizations were selected from literature review case studies, survey respondents, and recommendations from the TAP.

Literature Review

The literature review for this project offers an extensive analysis of behavior-change models and initiatives, encompassing a range of literature sources, from academic articles to grey literature like reports and websites. It focuses on behavior change in the context of VMT reduction but also extracts broader lessons from sustainability and public health initiatives. The review investigates the approaches and methods employed in these strategies, revealing patterns of success and areas where certain methods might fall short. By studying these successes and shortcomings, the review lays a foundation for crafting more effective and impactful strategies in the future.

This section of the report describes the literature review process and presents the key findings, including behavior-change models and case studies of successful behavior-change strategies.

Literature Search

Resources for the literature review were found using a keyword-based search query within the Google Scholar and TRB's Transport Research International Documentation (TRID) databases as well as within news and other non-academic article searches. In an effort to diversify the review, search terms deliberately looked for past examples of state-led behavior-change initiatives outside of the transportation sector. For example, the below query seeks literature about altered behavior related to several subject areas:

behavior* AND (modification OR change OR intervention) AND (recycling OR smoking OR speeding OR cars)

Additionally, the research team pursued literature directly related to mode shift:

"mode change" OR "mode shift" AND ("social marketing" OR campaign)

Other search terms used in the review include:

- (organization OR agency OR city OR municipality OR government)

- culture shift
- (attitude OR perception)
- ("VMT" OR "miles")
- reduc* AND (walk OR bik* OR carpool OR driv*)

Behavior-change Models

Understanding human behavior and the context that behaviors happen within is a foundational element of any behavioral research endeavor. Behavior theories and behavior-change models provide a system of categorizing, analyzing, and describing behavior. The choice of which mode one uses to complete a trip is a behavior that has long been studied and behavior-change models can provide more insight and frameworks for understanding this choice.

Behavior and social science research suggest that interventions grounded in an explicit theoretical foundation are more effective than those without a theoretical base, and that there are greater effects if strategies blend multiple theories and concepts (Glanz & Bishop, 2010). In this way, theories can help researchers understand individuals' decisions about driving and provide a foundation for developing interventions that could effectively encourage mode shift. These theories can also be used to identify performance measures for evaluating the successes of behavioral interventions and barriers to desired outcomes.

Table 1 provides an overview of the behavior-change models from the National Institute of Health's Introductory Social and Behavioral Science Training Materials (Glanz, 2016). These are some of the most common behaviors change models used to understand why individuals choose to do what they do and how to most effectively influence behavior to promote healthy and sustainable behaviors.

Table 1. Behavior-change Models

Theory or Model	Description	Application
The Health Belief Model (HBM)	<p>The HBM theorizes that people's beliefs about whether they are at risk for a disease or health problem, and their perceptions of the benefits of taking action to avoid it, influence their readiness to act.</p> <p>This theory states that people's readiness to act is influenced by their belief that they are at risk of a health issue or disease, as well as their perceptions of the advantage of taking action to prevent such health issue.</p>	<p>This model is often applied in situations where there is a health concern that is prevention related as well as asymptomatic. In these situations, belief is as important as symptoms and can help with detecting health issues, like cancer, sooner. An example of this model is an education program for bike safety the demonstrates risks and teaches safe riding practices reinforcing that participants can ride.</p>
The Transtheoretical Model/Stages of Change (TTM)	<p>Longer term, more permanent health behavior changes result from multiple actions and adaptations over time. Different people will be at different stages of attempting to change. The stages of change are:</p> <ul style="list-style-type: none"> • Precontemplation – no recognition of need to change • Contemplation – considering changing • Preparation – planning to change • Action – incorporating new behaviors <p>Maintenance – ongoing practice of new behaviors</p>	<p>This model is used to understand why people at high risk of illness may not be in the action stage of incorporating new behavior. This model has been useful in explaining and predicting behaviors including smoking, physical activity, and eating habits.</p>

Theory or Model	Description	Application
Social Cognitive Theory (SCT)	This theory uses a three-pronged dynamic composed of personal factors, environmental factors, and behavior to better understand how the three interact. This theory posits that people can learn improved health behaviors by observing the actions of others and the consequences of such actions.	Elements of the SCT include goal setting and self-monitoring, both of which have been especially useful aspects of effective behavioral interventions. This theory synthesizes aspects from cognitive, behavior, and emotional models of behavior change, making it applicable to counseling interventions for illness prevention. Physical exercise promotion programs that emphasize self-regulation and self-efficacy are examples of this model.
The Social Ecological Model	This model aids in understanding factors that impact behavior and provides direction for developing programs through social contexts. This model looks at levels of influence and asserts that behaviors shape and are shaped by one's social context.	As obesity rates in the United States rise, greater focus is being directed toward understanding and making improvements towards health benefits in communities such as reducing unhealthy food choices. The Social Ecological Model has been used to identify interventions for this topic at the individual, interpersonal, organizational, and societal levels.
Theory of Planned Behavior	This theory assumes that people act rationally, based on attitudes, norms, and perceived control of their behavior. Though these are not actively considered in the decision-making process, they typically are the background driving the decision-making process.	This theory is often implemented to understand health behaviors, health interventions, and medication adherence. For example, if someone has an illness and is asymptomatic, influences such as attitude and norms may influence whether they continue the medication. The theory is also used in the business realm to test consumer intentions. An example of application of this model is an awareness strategy for the safety benefits of seat belt use such as the one studied by T.C. Emniyet Genel Müdürlüğü in 1999.
Nudge Theory	This theory suggests that subtle changes in the way choices are presented can significantly influence decision-making. Rather than enforcing regulations or offering direct incentives, it focuses on altering the environment to guide individuals toward positive behaviors. Nudge theory aligns with the idea that small changes in the context can lead to significant shifts in behavior.	This theory has applications in various areas, including health. For instance, placing healthier food options at eye level in a cafeteria can nudge people towards making healthier food choices.

The focus of the review was not to scrutinize the landscape of behavior change but to extract practical insights and actionable lessons that can significantly inform behavior-change strategies across diverse domains. A fundamental theme throughout the review is the importance of understanding human behavior and the context within which behaviors occur. The behavior models discussed offer a systematic approach to categorizing, analyzing, and comprehending human behavior that can then be leveraged into impacting an individuals' decision-making processes, especially when it comes to choices like selecting a mode of transportation for a trip.

Successful Behavior-change Strategies

In this section, we will present examples of behavior-change strategies in recycling and waste reduction, and public health efforts, such as smoking cessation. Government and public programs play a crucial role in promoting healthy habits and addressing behavioral risk factors that contribute to both communal and individual harms, such as pollution, ill-health, and premature death. General lessons can be taken from these successful strategies and applied to transportation.

Recycling and Waste Reduction

Awareness Strategies

Even without offering direct financial incentive programs, strategies aiming to induce behavior change find that focusing on “pocket-book issues” was a successful method. A food waste reduction campaign in Columbus, Ohio used this narrative and saw a reduction in food waste volume by 21 percent. Similar campaigns in Toronto and Britain have resulted in significant waste reduction percentages of 30 percent and 18 percent, respectively (Shain, 2023).

Successful campaigns maintain the quality, clarity, and accessibility of messaging throughout the elements related to the campaigns. For recycling programs this looks like publishing easy-to-find and specific information on what can and cannot be recycled, ensuring drop-off centers and receptacles are clearly marked, and advertising consistently with positive and persuasive language. Positive messaging is more successful than “guilt” campaigns when attracting new users (Environmental Protection Agency, 2016) and may appeal to community members’ civic pride, cost savings, job creation, or sense of competition. Information should be published in multiple languages, supported by illustrations, and can initially target audiences more likely to engage, such as students, schools, retirees, businesses, health officials, and large institutions (C40 Cities Climate Leadership Group, 2023).

Consumer-Targeted Incentive Programs

Financial incentive programs, both in the form of rewards and fees, have shown promise in increasing recycling rates, improving waste separation accuracy, and reducing waste among residential users (Plastic Smart Cities, 2023). Typical programs include pay-as-you-throw (PAYT) and deposit refund schemes, which encourage individuals and businesses to recycle and reuse more. A pilot program in Catalonia, Spain layered on a token-based raffle and lottery element to gamify the recycling platform, RECICLOS, for registered users. The program included direct communication with citizens through a webapp along with feedback after collecting and registering the recycled material, which significantly increased waste separation accuracy. Although only 10 percent of the targeted population registered for the program, it was effective in positively influencing recycling frequency and correctness among those that participated. The pilot program concluded that raffles that gamify discounts and prizes increase the perceived benefit expected from users when compared to larger prize lotteries with lower odds or a smaller, equally distributed discount. The results demonstrate that varied and innovative incentive schemes can influence outcomes of community-wide behavior-change programs (Gibovic & Bikfalvi, 2021).

In cases in the U.S. where residents move from a state with deposit laws to a state with less or no financial incentive or returns for recycling, their recycling participation decreases. This is more substantial than the impact of residents moving to a state with less stringent recycling laws (Viscusi et al., 2019). This suggests that financial incentives are effective in increasing recycling, however, strong laws have a longer lasting effect on behaviors.

Supportive Policy and Culture Updates

To achieve long-lasting behavior change, strategies must be supported by policies, infrastructure, and culture that is aligned in goals and methods. In San Francisco, policies and municipal practices that support recycling include maximizing the number of accepted materials and designing the waste collection system to clearly favor recycled and compostable waste types (Brigham, 2018). Other policies to encourage recycling may include enforcement efforts such as enforcing proper waste separation for commercial, industrial, and/or residential waste generators, bans or taxes on single-use and non-recyclable items, and “Extended Producer Responsibility” policies in which producers are forced to take back consumer goods after their useful life has ended (C40 Cities Climate Leadership Group, 2023).

Program design that garners operator and market buy-in to a specific goal can be essential in behavior-change schemes. In the case of recycling, making separate collection convenient and cost-effective, offering single-provider contracts, implementing incentives for increased recovery, and maximizing potential revenue are appealing operational components to haulers, sorters, owners, and other stakeholders responsible for the recycling process (C40 Cities Climate Leadership Group, 2023).

Adjusting cultural norms to support seemingly unrelated behavior changes is a nuanced and crucial component of a successful strategy. One often cited example is the Japanese Ministry of the Environment’s 2005 “Coolbiz” initiative in which the definition of appropriate workplace attire was expanded to include short sleeves and looser fitting garments as a supporting mechanism to expand the range of indoor air temperatures (Hampton & Adams, 2018). The shift from formal attire, further encouraged by the new line of professional clothing by major brand Uniqlo and the Prime Minister’s appearance wearing short-sleeved shirts without a necktie, enabled indoor temperatures to be warmer, ultimately reducing the energy used to cool office buildings in warm months. This case study is an example of multi-elemental policy and culture updating in support of large-scale progressive goals.

Public Health Initiatives

Media Campaigns – Smoking Cessation

Media campaigns are one of the most common approaches to smoking cessation initiatives. California's Tobacco Education and Media Campaign is one of the largest anti-smoking media campaigns organized at the state level (Liu & Tan, 2009). This campaign targeted a wide range of audiences including adult smokers, pregnant women, ethnic minorities, and children starting in 1990.

An empirical study evaluated how the California anti-smoking media campaign changes individual smoking behavior (Liu & Tan, 2009). Data was collected through a series of surveys conducted in 1996, 1999, and 2002 that captured self-reported exposure to the campaign’s advertising.

The evaluation was specifically focused on changes in:

- Adult smoking participation
- Adolescent smoking initiation
- Exiting smokers’ intentions to quit smoking
- Youth intentions to start smoking.

The results showed, counterintuitively, that individuals exposed to anti-smoking media are more likely to smoke by 7.3 percent. However, the measure of exposure may be non-random; in other words, there may be

unobserved biases that correlated with individual smoking propensity. Generally, the study also found that smokers are more likely to respond to anti-smoking media by changing their behavior. When evaluating the data at an individual level, the findings suggest that smokers who are exposed to anti-smoking media campaigns have a 3.6 percent higher likelihood to attempt to quit smoking or consider quitting in the future. After controlling the unobserved individual biases, the estimates strengthen the argument for media campaigns. The study came to similar findings for adolescent propensity to start smoking (Liu & Tan, 2009).

The study concluded that the California anti-smoking media campaign is a successful tobacco control program that reduces smoking prevalence, encourages more attempts to quit among adult smokers, and discourages initiating intentions among adolescents. California's media campaign has also decreased adult smoking by encouraging smoking control policies, such as establishing tobacco-free workplaces. The study also found that teenagers who are exposed to adults who smoke, whether parental figures or teachers, have more positive attitudes towards smoking, and have a higher likely to initiate a smoking habit. This finding supports the general understanding that what teens observe influences attitudes and behaviors (Liu & Tan, 2009).

Employer-Based Strategies – Smoking Cessation

For employers, smoking cessation is an investment in the health of their employees and employers may incentivize their employees to quit smoking. For employees, employer-led strategies are an opportunity to quit smoking with a greater support or an incentive structure provided.

The Society for Human Resource Management (SHRM) identified key elements and specific examples of employer incentives (Sammer, 2018). They emphasized that any smoking cessation program should be crafted so that it manages the physical, emotional, and psychological aspects of quitting smoking. The program examples typically either give employees financial credit for quitting or, more rarely, a penalty for smoking.

For one program, employees earn an insurance premium reduction when they meet certain health-related goals. Tobacco usage is more heavily weighted than the other metrics, and non-smokers get a \$10 discount each paycheck. Other aspects of the program include annual biometric screenings and personal coaching, which most of the organization's employees (about 80 percent) use these offerings. These aspects offer a personal and individualized program with one-on-one accountability and coaching on a regular basis (Sammer, 2018).

The most successful programs highlighted by SHRM utilize digital tools to facilitate education, coaching, and meetings with peers who are trying to quit. They also recommend measuring the success of such a program using a benefit-cost analysis – the cost of providing the program compared to how many employees report quitting after participating. Other suggested benefit metrics include productivity and absenteeism from frequent smoking breaks (Sammer, 2018).

Structural and Circumstantial Considerations for Effective Population Targeting

To effectively address health risk factors such as smoking, alcohol consumption, unhealthy diets, and low physical activity, it is important that local governments and agencies working on behavioral change strategies also consider the structural drivers that influence the degree of potential health impacts and impact health outcomes. Factors like biological attributes, population size and structure, and wealth disparities need to be considered. Moreover, adjustable circumstances that can drive effects, such as technological developments, product exposure, social influences, and attitudes, can also influence behavior (Anderson, 2017). By implementing positive and negative incentives, governments can influence these circumstantial drivers and encourage healthier behaviors.

As an example, ClubSafe, a harm minimization program launched in New South Wales in 2000, aimed to promote responsible gambling practices, reduce problem gambling, and raise awareness of support programs (Stead, et al., 2009). The initiative was able to take advantage of legislature that required gambling halls to comply with the *Responsible Conduct of Gambling* legislative requirements and it was therefore able to implement wide-spread and low-cost signage and training. The program, however, missed the most at-risk population members who typically partake in gambling activities outside of registered clubs. By focusing on the gambling halls, The ClubSafe initiative traded depth of impact for breadth of implementation; it was successful in changing the way people think about their behavior, even if it did not changed behavior (Stead, et al., 2009).

Multiple Approaches and Extended Timelines

Health incentives include policies like reduction of exposure, regulation of the private sector, research and development, resource allocation for advice and treatment, direct incentives on individual behavior, and management of co-benefits and adverse side effects. Enforceable or regulated policies are essential to strategy success as seen in New South Wales. The ClubSafe responsible gambling practices program implemented both legally required and optional components, however, most of the unregulated measures were not implemented, ultimately reducing the program's efficacy (Stead, et al., 2009).

Ownership of an incentive program by the community as a whole fosters collective responsibility and facilitates behavior change. By reframing the problem, entities can engage the public and challenge existing norms. For instance, leveraging high-profile celebrity endorsements as a means to normalize and destigmatize conversation around gender identities and LGBTQ youth issues (Stead, et al., 2009). The Trevor Project, one such organization, makes information and support for LGBTQ youth highly accessible through the helpline, which receives 12,000 annual calls (Stead, et al., 2009).

A review of successful initiatives identifies long-term commitment as necessary to create sustainable change (Stead, et al., 2009). For example, changing social norms around smoking or promoting condom use requires continuous efforts over several decades. Additionally, any successful changes around deep-rooted generational behaviors may disappear after a program ends or funding runs out on a strategy. Consistent and extended advocacy is also needed to push legislative action and lay cultural groundwork for sustained behavior change. As a result, leaders of the strategy should be organizationally and financially stable.

Transportation Related Strategies

Behavior-change strategies have also been used successfully to increase safe transportation behaviors such as using seatbelts and bicycle helmets and reducing driving speed.

Seat belt use

In Turkey, a study was conducted in 1999 on 277 students to better understand behavior related to seat belt use. Although the benefits of wearing a seatbelt are widely known, seatbelt use in Turkey was limited – 71 percent of drivers on rural roads use their seat belts, and only 21 percent of drivers use their seat belts on urban roads. Despite being dated, the study leverages both the theory of planned behavior and health belief model. The main purpose was to explain self-reported seat belt use among front seat passengers with the two behavioral models, and to compare the models' predictive power and applicability to the data collected for the study. The students completed a questionnaire that included demographic information and the TPB and HBM factors related to seat belt use. Most of the sample consisted of young university students who are not representative of the general population of front seat passengers, which creates a non-representative sample and a limitation of the study (Şimşekoğlu & Lajunen, 2008).

Theory of Planned Behavior (TPB)

Although the basic TPB model aligned with the data collected, the extended TPB model that included anticipated regret, moral norm, and habit showed a poor fit to the data. The decrease in the model's fit with the additional three factors may indicate that the factors are not relevant reasons for using a seat belt among Turkish passengers.

Within the basic model, feelings and impressions of seatbelt use and subjective norms amongst one's friends and family were significant indicators of intentions to use a seat belt on both urban and rural roads. The study observed that behavioral control was not a significant predictor of either intention to use seat belt or self-reported seat belt use on urban and rural roads. Additionally, the intention to use a seat belt was not a significant predictor of self-reported seat belt use. By weighing the risk and costs, an individual decides whether to use a seat belt or not when initiating a trip. Since seat belt use is always an effective way for reducing one's injury risk, this calculation should always lead to seatbelt use. This contradiction and the ill fit of the extended model suggest seat belt campaigns and interventions should aim at enforcing habitual seat belt use.

Health Belief Model (HBM)

The fit of the HBM to the seatbelt use data for both urban and rural roads was unacceptably poor, however there is some alignment of the results and the general study's conclusions. Within the model, perceived benefits of using a seat belt were significant predictors of self-reported seat belt use on both urban and rural roads. Perceived barriers of using a seat belt, such as difficulty of use, was the strongest predictor of self-reported seat belt use on urban roads but not a significant predictor of self-reported seat belt use on rural roads.

This study concludes that that the TRB model is a better fit to predict seat belt use among Turkish passengers. Subjective norms, attitude towards seatbelt use, and perceived benefits were all factors that notably influenced the decision to wear a seatbelt for the studied population.

Helmet Use

Donations and Education

As a part of the 2020 helmet awareness campaign in China, three major donations of equipment took place:

- 1.1 million helmets were donated by companies nationwide through more than 15,000 public events.
- Over 75,000 public-access helmets were provided at traffic safety counselling points around schools and in rural areas before March 2021.
- Implementation of more than 50,000 public-access e-bikes that were equipped with smart helmets that must be worn before the e-bike is unlocked (Ning P, 2022).

The awareness campaign also included an educational component with both in-person and online methods to inform the public of helmet use, correct helmet use, helmet use as legislative or policy requirements, the enforcement plan for helmet use, and fines for non-compliance. Additionally, the campaign deployed on-site motorist-counselling programs, particularly focused on delivery riders, with the intention to persuade e-bike riders and motorcyclists to wear helmets (Ning P, 2022).

A film-based before-and-after study was conducted to evaluate the effectiveness of the national helmet promotion campaign. This study found a sixfold increase in helmet wearing after implementation of the national road safety campaign, suggesting that it was a highly successful intervention. However, it is noteworthy that the

effectiveness of the campaign may be reduced in rural areas and smaller cities where there is limited access to relevant resources compared to larger cities (Ning P, 2022).

After the campaign, it was estimated the highest percentage of helmet wearing was among delivery riders (88.8%) and lowest among traditional cyclists (3.8%). The study authors estimated the lowest percentage of correct helmet wearing for three-wheeled motorcyclists (58.8%). The study recommended editing the campaign to target traditional cyclists to increase helmet wearing, specifically correct helmet wearing, as well as adding education and legislation around the correct placement and use of helmet chinstraps in the future (Ning P, 2022).

Youth Awareness and Education

In West Berkshire, a community-based program was led by the hospital starting in 1992. Although this campaign is dated, it points to several successful tactics. The initiative encouraged helmet usage for bicyclists of all ages by leveraging school assemblies and gearing information towards specific age groups to garner interest. Educational demonstrations were given on the dangers of not wearing a helmet, including real-life scenarios of children who suffered head injuries and demonstrations using an egg and a small helmet to illustrate the purpose of wearing a helmet. This elucidates risks and can also be a fear-based motivation for helmet use (Lee et al., 2000).

The campaign also utilized information channels and promotional events to spread awareness of how to properly wear a helmet. Importantly, the campaign provided a low-cost helmet purchase scheme to make helmets more accessible to those of lower incomes (Lee et al., 2000).

Independent samples of 500 teenagers from each group completed a self-administered questionnaire at the beginning of the campaign and at end of each year during the three-year study period. This study found:

- In the test group, there was an increase in the number of 11–15-year-olds reporting that they “always” wore a helmet while cycling—from 11% in 1992 to 31% in 1997
- In the control city there was a smaller, non-significant increase in use, from 9% to 15%. (Lee et al., 2000)

Speed Adherence and Safe Driving

Ridicule Messaging

Two case studies examined the effects of modifying speeding behavior through everyday realism, social unacceptability, and ridicule. The campaigns, Fools Speed in Scotland and Speeding – No One Thinks Big of You in Australia consulted advertising, psychology, and consumer research experts to move away from graphic imagery and fear appeal (as many traditional campaigns have relied upon). The Fools Speed campaign targeted the general adult population in Scotland, with a specific emphasis on 25-44-year-old middle-class male drivers, to depict everyday driving scenarios to encourage self-reflection and recognition among drivers. The Speeding – No One Thinks Big of You campaign in Australia aimed to make speeding socially unacceptable, particularly among young male drivers, by employing a community approach that featured ridicule and humor to challenge the notion that speeding enhances desirability (Stead et al., 2009). The goal of the campaigns, primarily distributed by advertisements, was to create a sense of social unacceptability around speeding. They were successful in generating negative attitudes towards speeding and self-reported changes in driving behavior (if not recorded speeding behavior). Both campaigns showed the value of non-fear-based approaches in road safety campaigns, although the Speeding – No One Thinks Big of You campaign discussed possible backlash to the campaign by people who felt personally attacked by the advertisements (Stead et al., 2009).

Alerting vs. Incentivizing

Financial incentives, combined with surveillance and real-time feedback (with technology-based interventions), have been shown to bring about significant improvements in driving safety and a reduction in traffic violations. One study in Michigan tested an alerting system and a monetary incentive system aimed at reducing speeding by more than 5 mph above the posted speed limit. The results showed that the incentive system resulted in substantial reductions in speeding, while the feedback system led to modest changes. When drivers experienced both the feedback and incentive systems the reductions in speeding were similar to those found in the incentive-only condition, demonstrating the relative futility of the alerting method (Reagan, 2013). Another study of professional bus drivers in Israel came to a similar conclusion: The results indicated that financial incentives were effective in encouraging safe driving behavior (reduction in speeding, tailgating, and frequent lane changing without signaling) with small yet probable rewards showing indications of being more effective than large but uncertain ones (Elias, 2021). Groups receiving financial incentives in both studies continued improvement in behavior during the period immediately after the experiment. Of all methods tested, including surveillance, rewards (monetary compensation), and real-time feedback, financial incentives were the most successful in garnering immediate and sustained behavior change.

Literature Review Recommendations

The literature review resulted in the following list of most important key components to successful outcomes. Combining multiple approaches in behavior-change efforts was revealed to induce sustained change. For example, VMT reduction financial incentives alone were not effective in creating sustained behavior change but they showed better results when paired with disincentives and supportive infrastructure. The key take-aways from the literature review include:

- Align policies with strategy goals and ensuring they are regulated
- Make educational investments to support behavior change
- Implement programmatic and physical systemic changes to support behavior change
- Ensure affordability, access to and convenience of resources
- Maintain sustained and consistent long-term timelines and funding for strategies
- Directly communicate with participants to offer feedback, information, and support
- Account for equity factors to strategically support different groups

Focus Groups and Interviews

Organizations engage in culture-building or behavior-change initiatives for a variety of reasons. The organizations interviewed and represented in the focus groups spoke about programs aimed at improving human and environmental health, preventing disease, or avoiding injury or death for individuals and communities. The initiatives they employed used different strategies to engage in culture building and behavior change, including communications and media campaigns to raise awareness of risks and opportunities, easy and low-cost access to supports and/or tools (radon tests, curbside recycling, insurance sponsored tobacco cessation), advocacy, policy changes, and enforcement activities. The focus groups provide insight into the types of initiatives, strategies, and tactics used, the challenges and successes experienced, what motivated change, equity considerations, and general context around the initiatives.

This section of the report presents the focus group participants and process and the key findings from the focus group conversations, including recommendations from the participants.

Focus Group Participants

The focus groups included professionals from public agencies, private firms, not-for-profit organizations, and advocacy groups and represented various types of initiatives across several topic areas. Representatives were interviewed via video meetings.

Table 2. Focus Group Participation: Topic and Agency Type

Topic Areas	Public Agency	Private/ Business	Advocacy
Waste Reduction	x		
Radon in Homes	x		
Toward Zero Deaths	x		
Health, Physical Activity, and Food	x		
Transportation Advocacy			x
Disease Prevention and Tobacco		x	
Social Marketing, Applied Research		x	

State efforts to reduce smoking, regulate where smoking is/is not allowed, and to support smoking cessation offer particularly useful lessons, since these efforts included working in an environment historically shaped by the tobacco industry and private market messaging, promotion, and influence over a long period of time. In a similar way, the State effort to reduce VMT will include working in an environment that has been shaped by large industries, including oil and automobile. A significant difference, however, is that surface transportation infrastructure has largely been the result of public policy and funding, and public decision-making continues to shape access and ease of using different travel modes. This study was unable to convene a focus group on smoking cessation but recommends continuing to explore lessons that can be learned from these efforts.

Each entity interviewed was asked questions on initiatives, equity, context, and outcomes. For example, all participants were asked “Does your organization have any active initiatives that include culture building or behavior change?” as an initial query to understand what type of programs they were implementing. Equity is a key factor in identifying affected populations, targeting messaging, and generating successful outcomes where they are most needed and/or can have the biggest impact. Contextual questions, such as “Have you/your organization included a pilot program, or trial run before launching an initiative?” help to frame questions about results, such as “Can you think of key messages that resonated and helped build interest for people to try to change?” Having a full picture of the outcomes and what led to them gives clearer insight to how successful strategies were and why.

Focus Group Recommendations

The focus group participants shared lessons they learned, and recommendations based on their experiences. They provided general recommendations and some that related specifically to education and marketing campaigns, pilot initiatives, incentive programs, and policies and regulations. The specific recommendations are included in the Synthesis below. Participants also shared the following suggestions to influence behavior and reduce VMT based on their experience.

- Changing driving habits is difficult, but not impossible. Consider those that are ready to make the change (pre-contemplation readiness). Readiness to change leads to being more receptive to the change. Safe Routes to School can be a place to start. It provides a base of people who want their kids to walk or bike and see the benefits of active transportation.
- Where people live matters. Consider what kind of trips people can shift based on their location.
- Evaluate effectiveness of interventions using metrics that are appropriate for the level of intervention. In order to measure progress toward long-term goals, consider metrics that can capture short-term progress as well. For example, to measure the effectiveness of a health intervention, metrics on diabetes rates would not be useful immediately after the intervention because they reflect long-term impacts. Instead, evaluating metrics that indicate progress and are likely to support reduced diabetes rates in the long term, such as increases in frequency of healthy behaviors like walking or biking, would be more appropriate.
- Use joyful messages. Telling people that they must change does not resonate. Consider the target audience to convey joyful messages. Take advantage of new investments in active transportation, like trails, sidewalks, or transit services and leverage interest in new and ongoing projects to encourage desired behaviors.
- Wayfinding with messaging on travel time is helpful. It allows people to set their expectations. When people only drive, they may not realize how close their destination is.
- Good infrastructure is imperative. It should be safe, pleasant, and purposeful.
- Take advantage of a “fresh-start effect” to promote healthy behaviors at the start of the year/month/school year, and layer in a campaign at the beginning of that time period.
- Consider who is a credible messenger to your target audience. Look to cultural groups and community organizations to identify shared priorities and build relationships so that they can help share the message and inform/educate people.
- Work with public relations and marketing firms to understand trends.

Synthesis

Taking the findings from the literature review and the focus groups together, we identified key areas for consideration in developing a behavior-change program. They include:

- Access and ease
- Education, awareness, messaging/engagement, and communications
- Programs and partners
- Equity, equitable access, and trust
- Rules, policy, and enforcement
- Resources and funding

The case studies and the experiences of industry professionals revealed recommendations for addressing these key areas based on examples and experiences in recognizable strategies, including recycling/waste reduction, use of safety restraints/seatbelts and helmets, reduced exposure to and use of tobacco, discouraging speeding and unsafe driving, increased physical activity and access to healthy foods.

Systemic Support Structures

Systemic support structures, either directly or indirectly through affiliate or independent programs, are critical infrastructure for strategies to achieve and sustain culture-building and behavior-change initiatives. They

provide social and material value via education, training, awareness marketing, policy, products, and infrastructure that removes barriers and creates a sense of community, safety, and support.

The focus groups demonstrated the power of systemic support to strategies in multiple areas: recycling and waste reduction, vehicle safety, and tobacco use. In some cases, education and awareness efforts and/or changing and increasing access to a program were supported by local partners, non-profit organizations, or trusted messengers. Participation by partners that supported engaging youth in addition to adults have also been included as components of the overall initiatives. Policy changes discussed in the literature review that were shown to be a major factor in successful strategy outcomes include:

- State-mandated waste plans,
- Car safety restraint laws,
- Indoor smoking restrictions
- Programs such as those supported by the Minnesota GreenCorps and M.A.D.D.; organizations that provide low cost or free child car seats, and those that provide low cost or free access to Quit programs.

Where longer running initiatives, policies, and programming have been in place, the impact of these supports and shifts in cultural norms have been more evident. Physical support systems, such as curbside recycling pick-up and low-cost child car seats, are also a part of a supportive system for behavior change. Finally, funding support is a significant part of ongoing efforts for behavior change and was noted in several focus groups as a challenge to maintain.

The literature review found that systemic services and programs that align with strategy goals foster behavior change. Educational programs, employer-facilitated policies, and government regulations (when enforced) consistently drive change across various groups by enhancing behavioral shifts and creating cultural norms towards changed behavior. In addition to programmatic support, tangible infrastructure resources to support changed behavior, such as pathways and bike parking in the case of active transportation mode shift, empowers behavior change. Fundamental to the efficacy of these resources is their access and convenience, which is why equipment giveaways and community input to resource development can increase change. Socially, a communal sense of responsibility, generated by culture shifts and formalized state-endorsed systems, promotes behavior change.

Specific Recommendations:

- Include policies, systems, and environmental change in initiatives; messaging alone is less effective.
- Engage public and local partner agency participation. Private and non-profit organizations can engage in advocacy, messaging, connecting with equity communities, and/or providing access to goods or services.
- Free or low-cost products can be either offered directly to the public or distributed to community organizations who can help distribute them to individuals.
- Create a culture where the desired behaviors are normative.
- Increase accessibility of materials and/or goods that support the goal. For example, availability to healthy foods in neighborhoods without full-service grocery can be increased by adding products in convenience stores, having farmers markets, or creating community gardens.

Communications

The focus groups revealed that communications for campaigns need to be tailored to the audience and delivered through a variety of channels, which must include trusted sources relevant to different communities. The focus groups reported that effective engagement and communication campaigns involve a positive and joyful approach, leveraging new investments, highlighting health benefits, using credible messengers, and aligning with fresh-start opportunities. This was heard in multiple focus groups, including sessions on waste reduction, chronic disease prevention, public safety and behavior change professionals. The findings of the literature review affirm that within awareness and information campaigns positive narratives are usually more effective; but both positive messaging and negative narratives such as ridicule, have shown success. Positive or non-negative messaging is recommended, and ridicule messaging requires careful strategy and consumer feedback review. The literature review found that the most successful narratives were developed by market professionals and were pushed to specific targeted audiences. Additionally, finance-focused narratives and messaging that emphasizes local values, like civic pride and job creation, received more attention and action. Universally successful approaches include some of the following: endorsements from popular figures (celebrities or characters), long-term consistency, opportunities for participant communication and feedback, direct communication, digital tools for education, and innovative rewards.

Both focus groups and the literature highlight using credible messengers, tailoring messages to target audiences, and the need for specific campaigns. The focus groups emphasized compensating partner organizations and participants in outreach and engagement efforts, especially when there are barriers to participation, and providing childcare during events to expand the capacity for engagement. The literature review concentrates on finance-focused narratives and gamified incentives for program participation, unlike the focus group feedback. Still, both resources note the value of paying users for their participation, although via different avenues. Communication helps build trust but takes time, particularly in cases of cultural or systemic distrust. Neglecting the need for trust in engagement activities and inadequate investment in relationship building can produce ineffective efforts.

Finally, the focus groups recommend increasing access to resources by partnering with trusted cultural and local organizations that help understand barriers, distribute information, and provide services. Additionally, offering online self-paced information and resources accommodates those with limited time for scheduled events.

Specific Recommendations:

- Make information available online in a self-paced format for audiences who may not have time to attend meetings or scheduled events.
- Frame and reframe the topic to resonate with different people and different values.
- Messaging needs to be culturally appropriate and delivered in different languages. Vary messaging to resonate with different values and motivators for change.
- Partners are critical to reaching communities where there may be cultural, language, or systemic trust issues. Partnering with cultural and local organizations who have established relationships within communities is effective for understanding potential barriers, delivering and translating information, and distributing products or services.
- Effectiveness depends on the audience and social diffusion strategies. Be in the community and have community members influence each other (e.g., partnerships with churches). Building trust can be difficult and can take a lot of time.

- Compensate partner organizations and those who participate in engagement activities. It is necessary and can help remove barriers to participation. Offering childcare during events or hosting activities geared towards children can expand the capacity of guardians and caregivers to participate in events.

Target Groups

Both the focus group feedback and the literature review findings agree that a crucial step in taking action is to establish awareness around a risk that needs to be mitigated. This requires strategic communication to and with target groups.

The focus groups suggest that reaching target audiences has been achieved through different communications channels, including commercial advertising, social media, print, and via trusted community and cultural organizations. Messaging that resonates with one individual may not resonate with another. Applying varied messages to address the same topic improves likelihood of identifying different motivators. One focus group participant pointed out the need to know your audience because it is never “everyone,” and suggested using market segmentation and engagement to learn what barriers may prevent participation and identify appropriate strategies.

To reach the intended audience it is essential to consider not only what will be said, but who conveys the message. Cultural groups and community organizations often serve as powerful conduits for communication, bridging the gap between the message and the audience's understanding. These groups have established trust within their communities and people are more likely to engage and act on information when it comes from a source they trust. Moreover, cultural groups and community organizations can provide invaluable insights into the nuances of their community, helping to tailor the message effectively.

Although both the focus groups and the literature review emphasize the importance of identifying credible messengers to effectively convey messages, both present examples partnering with existing institutions to obtain input and act as messengers. Within these institutions, the literature review notes that younger participants are the most likely candidates for sustained behavior change. According to the review, among targeted groups in behavioral change strategies, school-aged children consistently showed the highest and most successful engagement compared to professionals, individuals in settings that promote undesired behaviors, and commuters. Similar groups like school faculty, parents of students, retirees, and institutions may also respond well due to their pre-established commitment. Additional groups, such as community organizations and school-based communities, are mentioned, if not used as examples.

The focus group results offer insights to messaging to different groups that may receive information differently, and this finding is supported by the literature review. Both sources highlight disparities in wealth, biology, and social influence that impact the efficacy of behavior-change strategies. It is important for agencies to consider these factors because they affect certain populations' health and wellness, and limit their exposure to behavior-change efforts. Entities looking to influence behavior change must proactively engage these groups for more successful change, especially when these populations may face greater harm from the status quo.

Specific Recommendations:

- Find partners who are connected to, and trusted by, the different communities. They can suggest a more effective way to engage.
- Understand specific barriers stopping populations from adopting the desired behavior; look at what strategies can be used to overcome barriers or resistance.

- Work with the affected communities to identify their barriers. Develop a bottom-up approach where energy for change comes from the community so they are invested and help drive the change. This includes partnering with trusted messengers.
- Know the priority audience and understand the initiative may not be for everybody. Understand specific barriers stopping people from adopting the desired behavior, and look at what strategies can be used to overcome barriers or resistance.

Government Interventions

According to the focus groups, successful strategies include government interventions and resources that may include regulation, policy, and enforcement. Reducing smoking and exposure to secondhand smoke was a comprehensive strategy with many partners, and impactful policies. It changed the level of exposure to messaging that previously saturated society, reduced access to tobacco, and limited places where tobacco use was acceptable. To support government interventions, non-profit and volunteer organizations are important partners. These entities not only engage and empower communities, but also advocate and build political will for government action, and provide social supports and culturally appropriate interventions.

In both the focus groups and the literature review, policies and enforcement are recognized as vital components of successful behavior-change strategies, but they are approached and discussed in slightly different ways. The focus groups discussed government involvement and partnership with non-profit organizations, and the literature review emphasizes the enforcement of policies as a key driver of success in various strategies.

Enforcement plays a crucial role within strategies to change behavior by ensuring adherence to policies and regulations, which reinforces policies, creates cultural change, and facilitates the normalization of desired behaviors. Effective methods often involve enforcing policies, whether legally required or optional, because this significantly affected the success of strategies. Enforcement can also be seen in awareness campaigns, where education and enforcement plans are used to inform the public, persuade individuals to comply with regulations (e.g., helmet use), and even impose fines for non-compliance.

Specific Recommendations:

- State agencies should create and be involved in policy, promotion, program development, regulation, and enforcement.
- Take caution with best practices. They can sometimes reinforce systems that are not effective and can perpetuate structural racism.
- Mistakes may be made along the way. Acknowledge them, repair damage, and learn from them.
- Testimony from staff, leadership, and partners to the legislature can be effective in shifting behavior.

Cost Considerations

Strategies for behavior change that address public health and safety topics often include identifying and addressing some measure of cost. This was discussed as financial incentives or impacts, and personal cost related to time, health, safety, or social acceptance.

Financial

Financial incentives in the form of fines and rewards have been shown to contribute to successful strategies. In the case of fines, fees, or taxes, the revenue built can be reinvested in related programming and support infrastructure for the initiative. For example, toll-road revenue can help fund non-automobile modes of travel to

encourage active transportation and support transportation demand management programs to reduce congestion on the roadway. Positive incentives may be in the form of rewards, prizes, reduced fares, free equipment, and compensation. The resources for positive incentives come in addition to the costs of creating, enforcing, facilitating, and maintaining policy; and funding programs, informational campaigns, facilities and services that require longer lasting financial investments. For large-scale or sustained programs, the ultimate cost of the initiative can be very high and is noted as an issue by the focus groups. For individuals, independent advocacy groups, and small businesses, the upfront cost of materials, equipment, facilities, staff, or classes may be a barrier to entry. When these costs are too high to feasibly proceed with an initiative, the cost is traded to another entity, such as an agency or community partner, who provides funding for the necessary tools and time.

Health and Safety

All major lifestyle changes will have consequences, both positive and negative. Although the strategies reviewed in this report aim to induce positive outcomes, there is always the risk of unwelcome challenges. In the case of smoking cessation or gambling, removing oneself from an activity where they have created a community may be isolating. For mode switch, travelers with few available biking facilities may encounter higher stress roadway conditions and higher traffic safety risks compared to driving in a car.

Additionally, undergoing the process of changing habits can be mentally and physically taxing. A strategy's messaging approach, if negative or fear-based, can exacerbate stress, anxiety, or other psychological health costs for individuals.

Social and Cultural

For individuals engaging in behavior change and communities adjusting to new social norms surrounding a behavior, the cultural adjustment can be taxing. Updating deeply ingrained activities and challenging psychological barriers can be jarring, divisive, and disturbing, even if ultimately it leads to a positive and healthy change. There may be a real or perceived loss of history, identity, or community when updating behavior against historic norms. Additionally, for individuals interested in changing behavior in unsupportive settings, the social cost, shame, or ridicule of enrolling and continuing in a program or seeking resources may keep them from successfully adopting the new behavior.

Some social and cultural costs are too high to feasibly proceed with an initiative and tradeoffs must be made. This may mean that the overall social message is understated in order to provide discrete access to resources in certain communities, as in the case of stigmatized health conditions like AIDS or depression.

Political

If a behavior change introduces inconvenience or disrupts established routines, individuals may resist the change. For example, if regulations ban a popular product (e.g., tobacco), require additional labor from residents and businesses (e.g., mandatory waste sorting), or implement a new fine to popular behaviors (e.g., tolls on a commuter highway), there may be backlash to the policy. These potential social repercussions may dissuade political action for parties interested in popular approval and can go as far as legal counteraction.

Time and Opportunity

Participants may need to allocate time to engage with support systems, which can be a significant cost for individuals' time budgets. Time, funds, and focus are resource expenditures from both participants and agencies that may be spent elsewhere. When choosing to invest in an initiative, there is often another task, cause, or program that receives less attention or money due to finite resources.

Specific Recommendations:

- Evaluations are not always able to measure the impact. Know and understand your data. Let data point to where disparities are, but do not become mired in overanalyzing the data. Follow up with action.
- Strategies can be very expensive to market.
- Mini-grants must be large enough to accomplish goals and be effective.

Comprehensive Approach

The comprehensive strategies outlined in the focus groups and the literature review share an emphasis on the need for multi-faceted approaches in behavior-change initiatives, and both sources stress the importance of considering various components and partners. In the focus groups, culture-building initiatives that require political will, government intervention, and resources are highlighted. Particularly in cases where public health or safety are at stake, interventions from government agencies are considered a critical part of the infrastructure to support change. The literature review and focus groups both underline how government policies enable private entities to advance goals. They showed the significance of partnering with local private entities that can rely on regulated policies to achieve behavior change.

As discussed in the focus groups, culture-building and behavior-change initiatives that aim to shift societal paradigms, establish new norms, and sustain change require more intensive efforts than rule-enforcement initiatives such as, point-source emission standards on stacks for factories or addition of catalytic converters to tailpipes to improve air quality). Successful culture-building and behavior-change initiatives that aim to improve well-being and safety require comprehensive approaches that involve a number of components and partners, and require sustained political will, and government intervention and resources. They often require an infrastructure of policies, systems, and environmental change. Though success hinges on many aspects, there is compelling evidence that government intervention is critical, even to strategies that aim to raise awareness and encourage voluntary action (versus require action).

The literature review concluded that successful behavior-change efforts in various domains often involved combining multiple approaches and considering contextual factors. Strategic messaging to targeted groups; partnering with local institutions, businesses, and employers to implement programs; and creating policies that were regulated by governing bodies were effective in promoting behavior change.

Specific Recommendations:

- “Four major reasons why something doesn’t happen: time, cost, ease, and awareness. Often, time and cost are out of the agencies control, so focus on how to make things easy, how to reduce barriers.”
— Melissa Wenzel, MPCA Built Environment Sustainability Administrator
- Start with the greater framework of social marketing, then apply the strategy for culture change. For example, the Washington Traffic Safety Commission initially focused on the negative aspects of traffic safety and used scare tactics. They then changed their framework and shifted all the messaging to be more positive, creating the umbrella brand "together we get there." They took each behavior and framed a positive strategy around it. (Washington Traffic Safety Commission, 2025)
- When change initiatives involve a need to acquire goods or services, providing low-cost options, or connecting people to programs that offer the needed goods helps with implementation (e.g., providing car seats to encourage child car safety, free or low-cost vaccines to support increased immunization rates, and radon tests).

- Change initiatives have found success when partnering with trusted community members and partner organizations to identify barriers to change and options to overcome them in order to facilitate change. These collaborations are effective because they involve individuals and entities that are already established and respected within the community. Trusted community members have a deeper understanding of local dynamics, and they can facilitate the development of solutions that are contextually relevant and culturally sensitive.
- Public agencies historically have not invested in relationship building with all communities; showing up and listening to impacted communities builds credibility but this must be backed up with actions and follow up.
- It is important to establish trust in the impact of the behavior change; when people trust that the system/action works, they have more incentive to engage in it.

Successful behavior-change efforts in various domains often involved combining multiple approaches and considering contextual factors. Strategies like non-negative messaging, educational investments, and targeting school-aged children were generally successful. Programs facilitated by employers and policies regulated by governing bodies were more effective in promoting behavior change than decentralized and unmonitored efforts. Additionally, theory of behavioral change models, such as the health belief model and the theory of planned behavior, was reflected in different strategies to influence attitudes and promote adherence to the encouraged behaviors, suggesting transferability of similar efforts. For VMT reduction specifically, financial incentives alone were not effective in creating sustained behavior change but they showed better results when paired with disincentives and supportive infrastructure. Physical infrastructure, access to resources, and convenience of alternative modes of transportation played crucial roles in enabling mode shift.

While financial incentives alone, in the form of fines or rewards, can increase participation in programs such as recycling and roadway speed adherence, they exhibit better results when combined with supportive infrastructure and policy. In the specific context of VMT reduction, physical infrastructure (bike lanes), resource accessibility (free helmets), and the convenience of alternative modes of transportation are identified as critical factors in enabling mode shift.

Conclusions and Next Steps

The synthesis of insights from both the focus groups and the literature review reveals valuable lessons for the design of successful behavior-change strategies, and specifically those that MnDOT may be interested in supporting to realize a reduction in per capita VMT. Comprehensive initiatives that aim to shift societal paradigms and establish new norms require sustained funding and political will, government intervention, and the allocation of accessible and convenient resources. A multi-faceted approach is paramount, recognizing that changing behavior necessitates not just messaging and enforcement but comprehensive efforts involving various strategies and partners and systemic support structures for participants. While in transportation, systemic support structures include help in understanding travel options, including new transit routes or bikeways that the state and locals are investing in, it is important that these travel options exist and be of similar convenience to what a traveler's current choice is – which is often driving a personal vehicle.

Communication campaigns should predominantly feature positive messaging, leverage popular figures, maintain sustained long-term timelines, and emphasize financial benefits. Joyful, non-fear-based messaging resonates more effectively with target audiences. Effective engagement efforts include messaging from a mix of channels, such as commercial advertising, social media, print, and trusted community and cultural organizations. Cultural

groups and community organizations can bridge the gap between messages and audience understanding and have proven to be powerful messengers due to their established trust within their communities.

In addition to partnering with and consulting community groups and community members, compensating organizations and individuals plays a crucial role in the success of behavior-change strategies. Compensation helps to remove barriers to participation, increases motivation, broadens the diversity of participating groups, builds trust, and shows respect for and recognizes the contributions from participants and community groups. These benefits support sustained engagement and behavioral change. When compensation is not an option, programs with childcare options, located close to public transit centers, and facilitated during non-work hours can support feasibility of participation for many people.

Programming and policy options are essential components of behavior-change strategies. They provide structure, guidance, and incentives for individuals and communities to adopt new behaviors or modify existing ones. Programs can be led by agencies, local advocacy groups, businesses, and employers but are best supported by policy from governing bodies. Government intervention, even in strategies aiming to encourage voluntary action, plays a critical role in compliance with regulations and setting a cultural standard of behavior. Programming often centers around education and efforts to connect people and institutions with resources to support behavior change. Related examples may include awareness of active commuting incentive programs or new policies permitting bikes on commuter rail lines. Programs may also provide training, counseling, or support systems for participants. Policies can target individuals, with incentives, fees, or mandatory reporting, and address businesses and institutions with subsidies, taxation, license requirements, and regulations. An example of this would be requiring an office building to provide bike racks and showers for active commuters to qualify for an eco-friendly certification, which may open channels of funding for the building.

Strategies should focus on the development of physical infrastructure (like trails, transit options) and making physical changes to support desired behaviors (like bike racks), in addition to programming and policy. Providing easy access, low-cost, and convenient supports for non-automobile modes of transportation is essential. Targeting groups that are more likely to engage, such as school-aged children, school faculty, parents of students, and retirees, along with community centers, advocacy groups, and institutions is a strategic choice. However, agencies must also be aware of structural and circumstantial factors affecting the health and wellness of specific populations and right-size the efforts to higher-risk groups.

To fill gaps in current knowledge, more research is needed to explore nuanced factors specifically affecting behavior change and culture in Minnesota, particularly in a complex, multi-dimensional context that considers different segments of the population and their unique barriers to change. A key topic area of interest for this research is smoking cessation, and further examination of smoking cessation efforts in Minnesota could lead to more valuable insights. MnDOT has led market research studies and annual surveys that provide important insights into people's willingness to change travel behavior and an understanding of the perceived and real barriers that prevent drivers from driving less. Further exploration of these questions through additional engagement with the traveling public is important to be able to apply the findings of this study to a transportation context. In addition, continued assessment of the efficacy of financial incentives and their optimal combination with disincentives and supportive infrastructure for specific strategies should be performed. Finally, evaluating methods to fast-track changes to cultural and social norms that align with strategy goals is a valuable topic for future research. By addressing these gaps, future behavior-change strategies like those employed to help reduce VMT can be better informed, more comprehensive, and ultimately more impactful.

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