

DOI: 10.5281/zenodo.11425235

# GUIDELINES ON THE INTEGRATING COOPERATION FOR ROAD SAFETY MANAGEMENT FOR CHILDREN AND YOUTH IN THE PROVINCIAL POLICE REGION 7 OF THAILAND

Dhanapat Pakachaivisitha<sup>1</sup>, Jaruporn Nupangtha<sup>2,3\*</sup> and Meechai Sicharoen<sup>4</sup>

<sup>1</sup>Expert (Research), Office of Silpakorn University Academic Services, Silpakorn University. Ph.D.  
E-mail: dhanapatpk@gmail.com, ORCID ID: <https://orcid.org/0009-0003-4470-3090>

<sup>2</sup>Office of Research Administration, Chiang Mai University, Thailand.

<sup>3</sup>Department of Geography, Faculty of Social Science, Chiang Mai University, Thailand.  
E-mail: jaruporn.nu@cmu.ac.th, ORCID ID: <https://orcid.org/0009-0006-3593-5406>

<sup>4</sup>Faculty of Police Science, Royal Police Cadet Academy, Thailand.  
E-mail: meechai48329@gmail.com, ORCID ID: <https://orcid.org/0009-0008-3283-5519>

Received: 10/10/2025  
Accepted: 10/11/2025

Corresponding Author: Jaruporn Nupangtha  
(jaruporn.nu@cmu.ac.th)

## ABSTRACT

*Road accidents among children and youth remain a critical challenge in Thailand, particularly in areas where motorcycles are the main mode of transport. This study aims to develop guidelines for integrated cooperation in road safety management under Provincial Police Region 7. A qualitative approach was employed using document reviews, in-depth interviews, focus group discussions, and participatory workshops with stakeholders from police, education, local authorities, public health, and civil society. Thematic and SWOT analyses were applied to synthesize strategies. Findings highlight the progress of community-based collaboration but reveal gaps in youth participation, systematic data integration, and digital technology use. To address these issues, the study proposes three strategic directions: (1) strengthening multi-stakeholder collaboration and youth leadership; (2) promoting motorcycle safety culture through education and campaigns; and (3) leveraging digital innovation via a centralized database and the Safe Road Save Youth application. The framework demonstrates potential for scaling nationally and contributes to Sustainable Development Goal (SDG) 3.6 by reducing road traffic injuries and fatalities among youth.*

---

**KEYWORDS:** Road Safety, Children and Youth, Motorcycles, Digital Innovation, Collaborative Governance.

---

## 1. INTRODUCTION

Road accidents among children and youth are a significant problem that challenges the social sustainability and well-being of Thailand, especially in regions where motorcycles are the main mode of transport for the youth. This problem was highlighted in a report by the World Health Organization (2018), which stated that road traffic accidents are the leading cause of death among young people aged 5-29 years, with an increasing trend in middle and low income countries, including Thailand.

In the area of Provincial Police Region 7 that covers 8 provinces in the central and western parts of Thailand, the situation of road accidents among children and youth remains critical, with significant risk factors including unsafe driving behaviors such as not wearing helmets, lacking a driver's license, speeding, or violating traffic rules. In the past, there was still a lack of systematic integration between key stakeholders such as the police, schools, local government agencies, parents, children and youth resulting in the management and prevention of accidents in this target group not being fully effective (Sicharoen et al., 2024).

Recent research emphasizes the critical role of youth engagement in road safety decision-making processes. Bohdidi et al. (2024) demonstrated through a descriptive statistical analysis of youth survey data in Morocco that meaningful youth participation enhances the effectiveness of road safety strategies, with 97.8% of surveyed youth recognizing road safety as a national priority. This finding aligns with Von Beesten and Bresges (2022), who examined the effectiveness of school-based road safety prevention programs and found that youth-centered approaches significantly improve safety awareness and behavioral outcomes. These studies underscore the importance of transitioning youth from passive recipients to active leaders in road safety initiatives, a principle that forms the foundation of participatory governance models. In the Asian context, where motorcycles dominate youth transportation, Wu et al. (2021) analyzed population-based data to assess the effects of road safety education on motorcycle violations and accidents among novice riders in Taiwan. Their findings revealed that comprehensive education programs significantly reduced violation rates and accident occurrences, particularly when coupled with enforcement mechanisms. Building on this, Torbaghan et al. (2022) conducted a systematic review highlighting the transformative potential of emerging digital technologies—including mobile

applications, centralized databases, and real-time monitoring systems—for improving road safety management. Similarly, Sezgin and Lin (2019) identified technology-based interventions as effective tools for safe driving training among adolescents, demonstrating that digital solutions enhance engagement and learning outcomes when appropriately designed for youth populations.

International research supports the idea that sustainable road safety requires integrated collaboration across sectors in policy design, prevention measures, data collection, and community and youth engagement (Blum & Liberman, 2004; Kennedy et al., 2022). Such integration aligns with the System Theory concept, which views the reduction of road accidents as a result of interactions between people, vehicles, infrastructure, laws, and social culture (Haddon, 1980). Additionally, the study by Buliung et al. (2013) highlights the effectiveness of proactive community and school involvement models in both policy measure creation and behavior changing.

The complexity of road safety challenges necessitates integrated multi-stakeholder approaches. Goel et al. (2024) presented an evidence and gap map of road safety interventions, revealing that successful programs consistently involve collaboration across governmental agencies, educational institutions, civil society organizations, and communities. Bachani et al. (2025) further emphasized the critical role of research and data in achieving the targets of the UN Decade of Action for Road Safety (2021-2030), advocating for implementation research that bridges the gap between policy formulation and practical execution. Hyder et al. (2012) examined a 10-country program addressing implementation gaps in global road safety, identifying key features of effective responses including stakeholder coordination, community engagement, and continuous monitoring mechanisms. These studies collectively support the need for systemic approaches that integrate data-driven decision-making with collaborative governance structures, forming the conceptual framework for the present study in Provincial Police Region 7 of Thailand.

For Thailand, despite the Road Safety Master Plan 2022-2027 and provincial-level implementation guidelines, the policy changing into actual operations still faces limitations on data linkage, youth participation as leaders in using technology for monitoring (Thailand Development Research Institute [TDRI], 2021).

Latest research of Padgett (2020) also suggests

that the development of a central database and digital innovation system plays an important role in effectively tracking, analyzing, and evaluating. In this context, the development of road safety management strategies for children and youth in the Provincial Police Region 7 area is an important case study to drive “integration of cooperation” from policy level to actual practice by presenting a participatory approach for all sectors, using data and innovations as important tools as well as enhancing the role of children and youth in being the ownership of the problems and being the leaders on the changing based on specific context of the area.

Therefore, this study focuses on presenting a strategic framework that integrates collaboration from all sectors in managing safe roads for children and youth with a database and innovation serving as key driving mechanisms that will lead to accidents reduction and the establishment of a long-term safe road culture.

## 2. MATERIALS AND METHODS

This study used a qualitative research methodology focusing on participatory processes and the integration of cooperation among relevant stakeholders in developing a safe road management strategy for children and youth in the Provincial Police Region 7 area. **The research process consisted of three main steps** stakeholder selection, data collection, and strategy synthesis.

**Stakeholder Selection**—Select Key informants through purposive sampling from various sectors involved in road safety management. The first group consisted of 107 informants including police officers from Provincial Police Region 7 and various provincial police with more than 5 years of field experience, representatives from government agencies such as Provincial transport officer, Highway department, Provincial public health offices, Local administrative organizations, government and private hospitals, academics and expert teachers, community leaders, rescue workers, and youth with experience in road safety activities. This group participated in the workshop for brainstorming, analyze the factors of success, challenges, obstacles, opportunities for networking, and present operational guidelines suitable for local context.

The second important group of informants consisted of 28 participants who were invited to join focus group meetings and in-depth interviews to extract lessons of good practices and analyze the guidelines of safe road management in urban areas

(Nakhon Pathom and Samut Sakhon provinces) and semi-urban and semi-rural areas (Phetchaburi and Suphan Buri provinces).

This group consisted of provincial police officers, representatives of agencies that play role in road safety (such as the Office of the Health Promotion Fund), and the academic experts.

Data collection was conducted through various methods including document review of relevant plans and projects, in-depth interviews, focus group discussions, and organizing participatory workshops using semi-structured questions to allow stakeholders to reflect on issues and needs, provide suggestions, and jointly set goals for the comprehensive formulation of strategies, data obtained will be recorded and categorized according to the key content.

The strategy synthesis process used content analysis and thematic analysis by grouping issues obtained from meetings and interviews into main categories and comparing these data with related documents, policies, and theories to achieve academic completeness and to be in line with local context. Moreover, a SWOT Analysis is conducted to assess the strengths, weaknesses, opportunities, and threats of operations in the area leading to the formulation of a vision, goals, key strategies, and suitable driving mechanisms.

Throughout the process, importance provided to the youth participation, in terms of providing suggestions for activity design and participating in decision-making at each step so that the resulting strategies can truly respond to the needs and context of the target groups. Key outcome of this research is a strategic framework to integrate the cooperation in managing safety roads for children and youth in the Provincial Police Region 7 area that can be applied and expanded to other areas accordingly.

## 3. RESULTS

### 3.1. Strategic Environmental and SWOT Analysis

The study results indicated strategic context of road safety management for children and youth in the area of the Provincial Police Region 7 by conducting an environmental analysis (SWOT Analysis), found that the network partners in the area have important strengths, such as having a master plan and a Road Safety Directorate Center mechanism integrating information between agencies at both the provincial and district levels, instilling discipline and safety knowledge from young children to schools, and implementing operations at the community level that continuously

promote cooperation. Nevertheless, there are still limitations in the lack of specific action plans for children and youth who ride motorcycles as well as the participation of target groups and the technology using in management that is not comprehensive and in-depth.

Important opportunities supporting the success of the strategic plan include the decentralization way to local areas, the advancement of information technology that facilitates the creation of a centralized data platform, the opening up of participation from educational institutions, private sector and communities, as well as the driving force from civil society in creating a safety culture. However, major obstacles are risky behavior of new drivers, the influence of technology that leads to distractions, cultural attitudes, and a lack of awareness of some certain groups of people.

### 3.2. Strategic Plan Implementation Results

Strategic plans on managing the road safety for children and youth in the area of Provincial Police Region 7 have main objectives to promote the country's main goal to reduce road fatality rate of less than 12 people per 100,000 population by 2027, to support the goals of the provincial road safety action plan, and to create a culture of safe road use especially reducing the injury and death rate of children and youth when using motorcycles, consisting of 3 strategic aspect;

- 1) The integration of networks and the participation that aims to enhance the role of youth and educational institutions as leaders in managing safety roads, the establishment of committees in schools and the organization of activities to develop the potential of traffic volunteers.
- 2) Creating safety culture through enhancing skills, knowledge, and values for safe driving, campaigns and creative media designed by youth, applying school-level measures according to the context of problems in each area.
- 3) **Promoting the innovation and data mechanisms** by developing and expanding the use of the Safe Road Save Youth application to collect, analyze, and utilize behavioral data for planning, monitoring, and evaluation at all levels by focusing on integrating data from key agencies such as the Royal Thai Police, the Ministry of Transport, the Ministry of Public Health, and local organizations. This implementation has resulted in an efficient and flexible management system that can be adapted to provincial and institutional levels, enabling the identification of risk points, the setting of area-specific measures, and the continuous assessment of empirical outcomes.

*Table 1: Strategy 1: Integrating Cooperation among Network Partners to Reduce Fatality and Serious Injuries of Children and Youth Using Motorcycles.*

Strategy 1 Integrating cooperation among network partners to reduce fatality and serious injuries of children and youth using motorcycles		
Strategy	Operational guidelines	Target
1. Strengthen youth leadership in road safety	1.1 Establish road safety committees in schools 1.2 Recruit more student traffic volunteers 1.3 Create platforms linking school committees with provincial/district centers 1.4 Encourage youth creativity in road safety campaigns	
2. Enhance local participation and decentralization	2.1 Community participation in risk assessment 2.2 Develop community-specific road safety plans 2.3 Organize provincial forums to expand models 2.4 Promote parents as safety role models	1. Promote cooperation among stakeholders to ensure safe environments for youth 2. Develop sustainable transport systems 3. Set up monitoring and evaluation mechanisms (quarterly/mid-term)
3. Public-Private cooperation	3.1 Engage local businesses/private sector to support initiatives with funding or resources	
4. Create road safety management models	4.1 Document lessons learned and prototypes 4.2 Expand network integration models	
5. Monitoring and evaluation	5.1 Use Safe Road Save Youth app for data reporting 5.2 Establish supervision guidelines at all levels 5.3 Annual review and meeting to assess outcomes	

**Table 2: Strategy 2: Creating a Culture for a Safe Motorcycle Riding.**

Strategy 2 Creating a culture for a safe motorcycle riding		
Strategy	Operational guidelines	Target
1. Promote awareness and discipline	1.1 Enhance knowledge and practices of traffic rules	<p>1. Country's main goal is to have a road fatality rate of less than 12 people per 100,000 population by 2027</p> <p>2. The goal of reducing the number of fatalities and serious injuries among motorcycle users by the year 2027</p> <p>(1) Nakhon Pathom 150 people  (2) Suphan Buri 99 people  (3) Ratchaburi 93 people  (4) Kanchanaburi 80 people  (5) Samut Sakhon 113 people  (6) Samut Songkhram 11 people  (7) Phetchaburi 45 people  (8) Prachuap Khiri Khan 54 people</p> <p>3. The goal on reducing the number of deaths and serious injuries among youth by 2027</p> <p>(1) Nakhon Pathom 52 people  (2) Suphan Buri 27 people  (3) Ratchaburi 18 people  (4) Kanchanaburi 29 people  (5) Samut Sakhon 40 people  (6) Samut Songkhram 3 people  (7) Phetchaburi 12 people  (8) Prachuap Khiri Khan 14 people</p>
2. Reduce risky behaviors (especially youth riders)	2.1 Provide safe driving skill training 2.2 Organize provincial student bus projects 2.3 Implement institutional-level safety measures	
3. Learning Innovation (Road Safety Curriculum in Educational Institutions)	3.1 Develop road safety curriculum 3.2 Integrate into school programs 3.3 Expand early childhood centers as safety models	
4. Promote widespread and continuous public relations on motorcycle safety	4.1 Youth-led media and social campaigns 4.2 Promote campaigns at school level; create values such as before 15 don't drive/prevent before you get knocked out/cool people don't drive recklessly	

**Table 3: Strategy 3: Promoting Innovation and Mechanisms to Manage Road Safety for Children and Youth from the Information.**

Strategy 3 Promoting innovation and mechanisms to manage road safety for children and youth from the information		
Strategy	Operational guidelines	Target
1. Improving management efficiency with data mechanisms	1.1 Expand and develop the Safe Road Save Youth application 1.2 Establish a centralized accident database (statistics, trends, patterns) 1.3 Create data-sharing frameworks among agencies and technology partners 1.4 Promote app access and training at all levels 1.5 Apply database for in-depth analysis and policy measures 1.6 Biannual monitoring and evaluation of app use and outcomes	1. Developing innovative mechanisms to drive road safety management for children and youth that support the participation of all sectors through knowledge, technology, databases, laws and regulations
2. Research and Development	2.1 Conduct research on youth-specific road challenges 2.2 Support community-based participatory research with local leaders and mentors	2. Reducing fatality and serious injuries among children and youth from motorcycle riding
3. Enforcement of Laws and Regulations	3.1 Strengthen enforcement of existing motorcycle-related laws for children and youth 3.2 Assess and amend regulations where needed 3.3 Promote social measures at community level 3.4 Develop school-level regulations focusing on incentives and evaluation	

### 3.3. Systemic Outcomes and Policy Integration

The integration of data and driving processes at all levels create a comprehensive ecosystem for road

safety management, particularly through the establishment of a centralized behavioral and accident database that plays an important role in

integrating data from various sectors, supporting the in-depth analysis and set precise and sustainable area policies, the monitoring and evaluation mechanism is systematically designed from provincial/local committee meetings, using applications to track quarterly and annual indicators, transferring plans to sub-agencies, and reporting results to the public, leading to clear targets such as reducing road fatality rate to less than 12 people per 100,000 population by 2027, and significantly reduction of death number and serious injuries among children and youth in each province.

### 3.4. Policy Recommendations

The strategic plan results 0tlk,ki5 created changes in various dimensions, whether it be the development of youth leadership skills, the integration of in-depth data across sectors, the creation of cooperation mechanisms and the adaptation of measures to suit the local context, reflecting the transition from silo work system into joint management with effective exchange of information and resources.

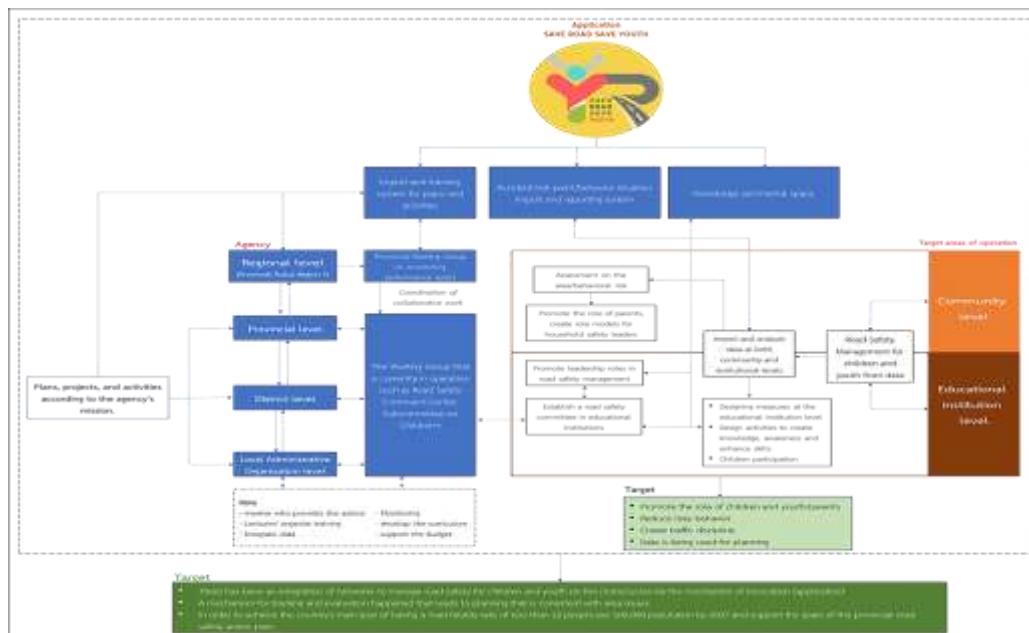


Figure 1: Mechanism in Driving the Strategic Plan for Road Safety Management for Children and Youth in the Area of the Provincial Police Region 7 (Sicharoen et al., 2024).

As such, main policy recommendations include promoting data using and information technology, making the database and central platform the basis of driving policies and measures to enhance youth participation, developing the role of children and youth to be "drivers" not just "recipients" of measures and the expansion of operations in pilot areas that will develop guidelines for the application in other regions of the country by monitoring and evaluating mechanism and measures adjustment based on the situation. It is also necessary to enhance sustainability by assessing and reviewing plans to ensure continuous monitoring and improvement of the guidelines in order to effectively respond to changes in social, technology, and behaviors of the target groups.

## 4. DISCUSSION

The design and driving of 'Safe Roads for

Children and Youth' strategy in the Provincial Police Region 7 area emphasizes Collaborative Governance and the use of data-driven policy is deeply consistent with the concepts and findings from international research on the following issues.

**1) Collaborative Governance and Multi-sectoral Action** Key principle of this strategy is the integration of government agencies, private sector, educational institutions, communities and the public sector in the decision-making, implementation and monitoring and evaluation processes, which reflects the Collaborative Governance concept described by Ansell & Gash (2008) as a process that emphasizes cross-organizational cooperation based on trust, information exchange and having shared goals. The work of Emerson et al. (2012) also emphasizes that this integrated mechanism creates "system capacity" to solve complex public problems such as road safety management that require a variety of structural and

behavioral factors. Additionally, it aligns with the principles of 'Whole-of-Government' and 'Whole-of-Society' which WHO (2023) and Peden *et al.* (2004) have identified as important factors in driving road safety policies in successful countries.

**2) Data-driven Decision Making *vs* Evidence-based Policy** The creating of central database to use "Safe Road Save Youth" application and the use of behavioral data in determining measures are consistent with the concept of Evidence-based Policy (Nutley *et al.*, 2007) which indicates that, driving policies with real data will increase the efficiency of resource allocation, solve local problems, and adjust measures to directly suit the target group.

Haddon's (1980) work on the "Haddon Matrix" and Peden *et al.*'s (2004) in World Report on Road Traffic Injury Prevention suggest that, having a comprehensive database of risk-taking causes and behaviors are a basis to the designing of systemic measures which the Region 7 model has applied in a concrete manner.

**3) Community Participation and Youth Engagement** This strategy focuses on empowering children, youth, and the communities to be the "Owner of the problems" and "Driver of changing" align with the concepts of "Community-based Road Safety" (Forjuoh, 2016) and "Youth-led Change" (Sleet *et al.*, 2011; Simons-Morton *et al.*, 2012), found that, allowing the youth in the process of decision-making and action processes can reduce risk, increase awareness, and create a long-term safety culture. WHO (2018) also emphasized that any campaign and measures that lack the feedback and ownership of key target groups will not be sustainable and cannot truly create behavioral changing.

**4) Systemic Approach and Ecosystem** The design of a "data and innovation ecosystem" linking policy, practice and community levels are in line with the concept of Systemic Road Safety Management (Wegman & Aarts, 2006; Bliss & Breen, 2009) which emphasized that the success of road accident reduction in the developed countries such as Sweden, the Netherlands and Australia occurred from the creation of governance structures and the information systems that support adaptive and continuous improvement.

**Acknowledgements:** this article is part of the project "Network Collaboration and Innovation in Driving Road-safety Management Guideline on Riding Motorcycle for Youth in Provincial Police Region 7," supported by the Science, Research and Innovation Promotion Fund (SRIP Fund), Road Safety Program 2023.

Having feedback loop between a central database-operating unit-regulatory agency-the public reflected a Learning Organization model (Senge, 1990) that emphasizes continuous learning and adaptation of public service systems.

### 5) Driving national goals and expanding results

The target on reducing road fatality rate to less than 12 per 100,000 population by 2027 is in line with the United Nations Decade of Action for Road Safety (2021–2030) and SDG 3.6 (United Nations, 2015), which indicates that all countries should have a specific strategy for the youth and integrated mechanisms with digital innovation. The pilot implementation in Region 7 and its extension to other regions are consistent with the concept of 'Scaling up good practices' (Peden *et al.*, 2004; WHO, 2023), suggesting that innovations tested and adapted to local readiness will lead to long-term success.

Despite its contributions, this study has certain limitations that should be acknowledged. First, part of the data was derived from self-reported interviews and focus group discussions, which may involve potential biases due to subjective perceptions, selective memory, or social desirability of the participants. Although triangulation with documents and workshops was conducted to minimize such effects, the possibility of bias cannot be entirely ruled out. Second, the strategic framework was developed within the specific context of Provincial Police Region 7, which covers eight provinces in central and western Thailand. Therefore, while the findings provide valuable insights, their generalizability to other regions with different socio-cultural, institutional, or infrastructural conditions may be limited. Future research should test and refine the proposed framework in diverse regional settings to enhance its broader applicability.

This study presents conceptual framework and guidelines to manage road safety for the children and youth using a collaborative governance and data-driven and innovation-led approach resulting in the creation of a road safety ecosystem that meets both local and national needs in a concrete manner which is suitable for further development as a public policy model or good practice for the countries facing similar issues of road accidents among youth.

## REFERENCES

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18(4), 543–571. <https://doi.org/10.1093/jopart/mum032>

Bachani, A. M., Ahsan, H., Karkee, R., Mbugua, L., De Groote, A., & Hyder, A. A. (2025). Time for action: The critical role of research and data in achieving the targets of the second UN Decade of Action for Road Safety. *BMJ Global Health*, 10(4), e017488. <https://doi.org/10.1136/bmjgh-2024-017488>

Bliss, T., & Breen, J. (2009). *Country guidelines for the conduct of road safety management capacity reviews and the specification of lead agency reforms, investment strategies and safe system projects*. World Bank Global Road Safety Facility.

Blum, R. W., & Liberman, A. K. (2004). *International best practices for road safety: Youth and children*. Johns Hopkins Bloomberg School of Public Health.

Bohdidi, Z., Cherif, E. K., El Azhari, H., Bnoussaad, A., & Babounia, A. (2024). Enhancing road safety decision-making through analysis of youth survey data: A descriptive statistical approach. *Safety*, 10(2), 45. <https://doi.org/10.3390/safety10020045>

Buliung, R. N., Faulkner, G., Beesley, T., & Kennedy, J. (2013). School travel planning: Mobilizing school and community resources to encourage active school transportation. *Journal of School Health*, 81(11), 704–712. <https://doi.org/10.1111/j.1746-1561.2011.00647.x>

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. *Journal of Public Administration Research and Theory*, 22(1), 1–29. <https://doi.org/10.1093/jopart/mur011>

Forjuoh, S. N. (2016). Traffic-related injury prevention interventions for low-income countries. *Injury Control and Safety Promotion*, 10(1–2), 109–118. <https://doi.org/10.1076/icsp.10.1-2.109.14110>

Goel, R., Varghese, M., Tiwari, G., White, H., & Mohan, D. (2024). Effectiveness of road safety interventions: An evidence and gap map. *Campbell Systematic Reviews*, 20(1), e1367. <https://doi.org/10.1002/cl2.1367>

Haddon, W. (1980). Advances in the epidemiology of injuries as a basis for public policy. *Public Health Reports*, 95(5), 411–421.

Hyder, A. A., Allen, K. A., Di Pietro, G., Adriazola, C. A., Sobel, R., Larson, K., & Peden, M. (2012). Addressing the implementation gap in global road safety: Exploring features of an effective response and introducing a 10-country program. *American Journal of Public Health*, 102(6), 1061–1067. <https://doi.org/10.2105/AJPH.2011.300563>

Kennedy, J., Beesley, T., & Faulkner, G. (2022). Multi-sectoral strategies for road safety: Lessons learned from international initiatives. *International Journal of Injury Control and Safety Promotion*, 29(1), 1–9. <https://doi.org/10.1080/17457300.2021.1904563>

Nutley, S. M., Walter, I., & Davies, H. T. O. (2007). *Using evidence: How research can inform public services*. Policy Press.

Padgett, S. (2020). The role of digital innovation in traffic accident prevention: Lessons from global practice. *Transport Reviews*, 40(2), 229–246. <https://doi.org/10.1080/01441647.2019.1676878>

Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A. A., Jarawan, E., & Mathers, C. (2004). *World report on road traffic injury prevention*. World Health Organization.

Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization*. Doubleday.

Sezgin, E., & Lin, S. (2019). Technology-based interventions, assessments, and solutions for safe driving training for adolescents: Rapid review. *JMIR mHealth and uHealth*, 7(1), e11942. <https://doi.org/10.2196/11942>

Sicharoen, M., Pakachaivisitha, D., & Nupangtha, J. (2024). *Network integrations and the innovations in driving management approach for road safety for children and youth towards motorcycle using in the area of Provincial Police Region 7* [Research report]. Faculty of Police Science, Royal Police Cadet Academy, National Research Council of Thailand.

Simons-Morton, B. G., Ouimet, M. C., & Catalano, R. F. (2012). Parenting and the young driver problem. *American Journal of Preventive Medicine*, 43(3), S182–S190. <https://doi.org/10.1016/j.amepre.2012.05.019>

Sleet, D. A., Ballesteros, M. F., & Borse, N. N. (2011). A review of unintentional injuries in adolescents. *Annual Review of Public Health*, 32, 289–309. <https://doi.org/10.1146/annurev-publhealth-031210-101143>

Thailand Development Research Institute. (2021). *Report on the study of road safety strategy 2022–2027*.

Torbaghan, M. E., Sasidharan, M., Reardon, L., & Muchanga-Hvelplund, L. C. W. (2022). Understanding the potential of emerging digital technologies for improving road safety. *Accident Analysis & Prevention*, 166, 106543. <https://doi.org/10.1016/j.aap.2021.106543>

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development* (A/RES/70/1). United Nations.

Wegman, F., & Aarts, L. (2006). *Advancing sustainable safety: National road safety outlook for 2005–2020*. SWOV Institute for Road Safety Research.

World Health Organization. (2018). *Global status report on road safety 2018*.  
<https://www.who.int/publications/i/item/9789241565684>

World Health Organization. (2023). *Decade of action for road safety 2021–2030*.  
<https://www.who.int/initiatives/decade-of-action-for-road-safety-2021-2030>

Wu, C. Y. H., Yeh, W. Y., Kuo, M. Y., Feng, W. H., & Li, S. T. (2021). The effects of road safety education on the occurrence of motorcycle violations and accidents for novice riders: An analysis of population-based data. *Accident Analysis & Prevention*, 164, 106491. <https://doi.org/10.1016/j.aap.2021.106491>