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# The Safety Network/ Le Réseau-Sécurité

CARSP•ACPSER
Canadian Association of Road Safety Professionals
L'Association canadienne des professionnels de la sécurité routière

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## IN THIS ISSUE

# Editorial

**By Pamela Fuselli**
Chief Editor, CARSP Safety Network Newsletter (SNN)
Parachute

The first edition of the 2018 Safety Network Newsletter (SNN) focuses on the issue of equity in road safety. The idea for this topic came from a few of the SNN Editorial Committee members who attended the 2017 NYC Vision Zero Conference and heard several speakers address this issue.

Articles in this edition cover equity from a variety of angles including

- the built environment and enforcement in low-income neighbourhoods,
- older adults, the importance of belt positioning due to the fact that the chest area is much more vulnerable to life-threatening injuries,
- pedestrians who have more precise knowledge about, and a greater stake in addressing, road safety issues than the people walking our streets every day,
- a new traffic safety paradigm which recognizes *exposure* as a risk factor
- the fair and impartial allocation of resources for bicycle transportation infrastructure based on the needs of the population, and
- the introduction of autonomous vehicles (connected and automated vehicles) that have the potential to achieve unprecedented safety gains for all road users, including those who are most vulnerable but will require timely, thoughtful and strategic regulation.

Paul Steely White, executive director of Transportation Alternatives in the US, wrote our feature article and he looks at the positive and negative impacts of engineering, the importance of data in identifying areas for change and track the differences when good engineering is achieved. He points to the fact that "for low-income New Yorkers who are more likely to live on dangerously designed streets, that difference is even starker" and calls for continued advocacy and political leadership to speed up the implementation and tracking the differences.

There is a new section for the 2018 series, the inclusion in each SNN edition of a profile of members of the Editorial Committee.

I hope you find this SNN edition valuable and thought-provoking.

# Éditorial

**Par Pamela Fuselli**
Éditrice en chef,
Le Bulletiin Officiel de l'Association Canadienne des Professionals de la Sécurité Routière

Cette première édition pour 2018 se concentre sur la question de l'équité en sécurité routière. Cette idée est venue suite à la suggestion de quelques membres du comité de rédaction ayant assisté à la conférence NYC Vision Zero 2017 où plusieurs intervenants ont abordé cette question.

Les articles de cette édition couvrent l'équité sous différents angles, y compris :

- l'environnement bâti et l'application de la loi dans les quartiers à faible revenu,
- les adultes plus âgés, l'importance du positionnement de la ceinture en raison du fait que la région de la poitrine est beaucoup plus vulnérable aux blessures potentiellement mortelles,
- les piétons utilisateurs du réseau qui ont des connaissances plus précises sur les questions de sécurité routière et qui ont davantage intérêt à résoudre les problématiques des rues qu'ils utilisent chaque jour,
- un nouveau paradigme de la sécurité routière reconnaissant *l'exposition* comme facteur de risque
- l'allocation équitable et impartiale des ressources pour l'infrastructure de transport de bicyclettes en fonction des besoins de la population,
- l'introduction de voitures autonomes capables de réaliser des gains en terme de sécurité sans précédent pour tous les usagers de la route, y compris ceux qui sont les plus vulnérables mais qui auront besoin d'une réglementation opportune, réfléchie et stratégique.

Paul Steely White, directeur exécutif de Transportation Alternatives aux États-Unis, est l'auteur de notre article de fond et il s'intéresse aux impacts positifs et négatifs de l'ingénierie, à l'importance des données pour identifier les changements et suivre les différences. Il souligne le fait que pour les New-Yorkais à faible revenu qui sont plus susceptibles de vivre dans des rues dangereusement conçues, cette différence est encore plus marquée et appelle à poursuivre le plaidoyer et le leadership politique pour accélérer la mise en œuvre de politique en sécurité routière et suivre les différences.

Il y a une nouvelle section pour la série 2018, l'inclusion dans chaque édition Le Bulletiin Officiel de l'Association Canadienne des Professionals de la Sécurité Routière d'un profil des membres du Comité de rédaction.

# Engineering in the Time of Traffic Deaths

**By Paul Steely White**
*Paul Steely White is the executive director of Transportation Alternatives, a member-driven organization that was founded in 1973 to reclaim New York City from the automobile and promote bicycling, walking and public transit as the best transportation alternatives.*

**Abstract**
Thanks to the growing Vision Zero movement, policy makers are beginning to understand how preventable these deaths really are. Recent project experience and research has shown that the most effective way to achieve prevention is not via education or enforcement, but to reengineer streets.

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Before modern water and wastewater engineering practices became standard, cholera was an unfortunate fact of urban life. Once the preventive power of safely designed water and sewage systems became evident, it was not long before governments were making massive investments to upgrade streets, pipes and sewers. In 1849, 14,000 Londoners died of cholera; by 1890 it was all but eradicated.

Worldwide, 1.3 million human beings died on streets and roadways last year. Thanks to the growing Vision Zero movement, policy makers are beginning to understand how preventable these deaths really are. Recent project experience and research has shown that the most effective way to achieve prevention is not via education or enforcement, but to reengineer streets.

It is difficult to overstate the deadly legacy of highway engineering principles inappropriately applied to urban streets. New York City's Queens Boulevard-- with Its wide car lanes, narrow pedestrian walkways, zero bicycle space and cars-first traffic signal timing-- was the site of multiple traffic deaths per year, earning its moniker as the "Boulevard of Death". During one eight-year period, 1993 - 2000, 72 New Yorkers died trying to cross it.

Since Its redesign two years ago, zero pedestrians have died on Queens Boulevard. The engineering overhaul entailed dozens of design improvements, but in sum they amount to tightened geometries so that drivers do not have as much expansive space to speed and take fast turns, expanded protected bicycle and pedestrian space and changed traffic signal timing to discourage speeding and encourage walking. All of this makes for a modern, safe arterial street with strong pro-pedestrian design features that send motorists a message more powerfully than any billboard could: this is pedestrian and bicycle space and you must slow down share the road with them. Thanks to rigorous analysis of crash data on Queens Boulevard and other locations, the difference between a dangerous street and a safely engineered street is now becoming much clearer. For low income New Yorkers who are more likely to live on dangerously designed streets, that difference is even starker.

If governments are not compelled by the prospect of saving hundreds of lives and righting historic injustices, perhaps they will be compelled by liability. Just last year, the State Supreme Court found the City of New York liable for the death of a child who was biking on a street that the court found to be dangerous by city design. Some legal scholars are calling it a pivotal, precedent-setting case that could spur more street safety upgrades as cities seek to avoid massive tort payouts.

We are not yet to the point where governments are ready to undertake the massive public safety investment required to upgrade thousands of miles of urban streets. Yet, with growing awareness of the preventive power of safely designed streets, that day may be near. With strong activism, advocacy and bold political leadership, we can hasten that day's arrival.

# L'ingénierie au temps des décès routiers

**Par Paul Steely White**
*Paul Steely White est le directeur exécutif de Transportation Alternatives, une organisation dirigée par ses membres qui fut fondée en 1973 avec pour objectif de diminuer l'emprise de l'automobile dans la ville de New York et de promouvoir le vélo, la marche et le transport en commun comme les meilleures alternatives de transport*.

**Résumé**
Grâce à l'essor du mouvement Vision Zéro, les décideurs politiques commencent à comprendre à quel point les décès routiers sont évitables. Les récentes expériences de projet et la recherche ont montré que le moyen le plus efficace pour faire de la prévention n'est pas par l'éducation ou l'application de la loi, mais bien par la réingénierie des rues.

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Avant que les pratiques modernes d'ingénierie de l'eau et des eaux usées ne deviennent la norme, le choléra était un malheureux fait de la vie urbaine. Une fois que l'impact sur le plan de la prévention des systèmes d'eau et d'égouts conçus de façon sécuritaire est devenu évident, il ne fallut pas longtemps avant que les gouvernements investissent massivement pour améliorer les rues, les canalisations et les égouts. Alors qu'en 1849, 14 000 Londoniens sont morts du choléra, en 1890 tout était éradiqué.

L'année dernière, dans le monde entier, 1,3 million d'êtres humains sont décédés dans des accidents de la route. Grâce à l'essor du mouvement Vision Zéro, les décideurs politiques commencent à comprendre à quel point les décès routiers sont évitables. Les récentes expériences de projet et la recherche ont montré que le moyen le plus efficace pour faire de la prévention n'est pas par l'éducation ou l'application de la loi, mais bien par la réingénierie des rues.

Il est difficile d'exagérer l'héritage mortel des principes de l'ingénierie des routes appliqués de façon inappropriée aux rues urbaines. À New York, le boulevard Queens avec ses larges voies destinées à la circulation automobile, ses trottoirs étroits, l'inexistence d'espace réservé aux vélos et ses feux de circulation réglés en fonction des voitures, a été annuellement le théâtre de nombreux accidents de la route, au point d'être surnommé le « boulevard de la mort ». Sur une période de huit ans, de 1993 à 2000, 72 New-Yorkais sont morts en essayant de le traverser.

Depuis qu'il a fait l'objet d'une réfection il y a deux ans, aucun piéton n'est mort sur le boulevard Queens. La révision complète de l'ingénierie a nécessité des dizaines d'améliorations de conception mais, en définitive, cela se traduit par des géométries plus serrées afin que les conducteurs n'aient pas assez d'espace pour accélérer et prendre des virages rapides, par de plus grands espaces protégés destinés aux cyclistes et aux piétons et par des changements dans la synchronisation des feux de circulation afin de décourager les excès de vitesse et favoriser la marche. Tout cela pour en faire une rue artérielle moderne et sûre, avec des caractéristiques de conception résolument en faveur des piétons, qui envoient aux automobilistes un message plus puissant que n'importe quel panneau publicitaire pourrait le faire : il s'agit d'un espace piétonnier et cyclable et vous devez ralentir et partager la route avec eux.

Grâce à une analyse rigoureuse des données de collisions survenues sur le boulevard Queens ainsi qu'à d'autres endroits, la différence entre une rue dangereuse et une rue aménagée de façon sécuritaire devient de plus en plus claire. Pour les New-Yorkais à faible revenu qui sont plus susceptibles de vivre dans

des rues dangereusement conçues, cette différence est encore plus marquée.

Si les gouvernements ne sont pas contraints par la perspective de sauver des centaines de vies et de corriger des injustices historiques, ils seront peut-être contraints par leur responsabilité. L'an dernier, la Cour suprême de l'État a jugé la ville de New York responsable de la mort d'un enfant qui faisait du vélo dans une rue, rue que la Cour a estimé dangereuse en raison de sa conception par la ville. Certains juristes en parlent comme d'un cas de figure déterminant qui pourrait inciter les villes à améliorer la sécurité de leurs rues alors qu'elles cherchent à éviter les paiements massifs liés à des délits civils.
Nous n'en sommes pas encore au point où les gouvernements sont prêts à entreprendre l'énorme investissement de sécurité publique nécessaire pour améliorer des milliers de kilomètres de rues urbaines. Pourtant, avec la prise de conscience croissante du rôle préventif que peuvent jouer des rues conçues de façon sécuritaire, ce jour est peut-être plus proche qu'on ne le pense. Avec un activisme fort, un plaidoyer et un leadership politique audacieux, nous pouvons accélérer l'arrivée de ce jour.

# The Need to Better Control Shoulder Belt Routing in Frontal-Crash Testing

**By Dainius Dalmotas**

*Dainius Dalmotas is a mechanical engineer who worked in the Road Safety and Motor Vehicle Regulation Directorate of Transport Canada, retiring as the Chief of Crashworthiness Research in 2005. He currently runs a consulting organization providing services to governments and industry.*

**Résumé**

Les protocoles actuels pour tester les collisions frontales permettent de régler l'ancrage de la ceinture de sécurité à la plus haute position disponible. Ceci fait en sorte que la ceinture n'est pas placée au centre du sternum et qu'elle s'éloigne du potentiomètre qui mesure la déformation de la poitrine. Conséquemment, la mesure de la compression de la poitrine est diminuée et les manufacturiers peuvent respecter la norme plus facilement et produire de meilleures cotes de sécurité dans les documents d'information livrés aux consommateurs. Cependant, la compression exercée sur la poitrine est plus élevée dans les collisions réelles, ce qui occasionne des blessures plus sévères et cette situation est préoccupante pour la sécurité des personnes plus âgées.

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In North America, frontal-crash protection is increasingly being driven by New Car Assessment Programmes (NCAP) sponsored by both the US National Highway Traffic Safety Administration (NHTSA) and the Insurance Institute for Highway Safety (IIHS). Starting with vehicle model year 2011, NHTSA introduced several changes to the nature and structure of the star-rating scheme used in NCAP. In the context of assessing chest injury risk in frontal crashes, the more significant changes included: substituting chest deflection in place of chest acceleration; and, substituting a Hybrid III 5$^{th}$ percentile female dummy for the 50$^{th}$ percentile male dummy in the right front seating position. Also, from the standpoint of advancing chest protection for elderly occupants, the changes had the drawback that the selected chest injury risk functions were expressed specifically in terms of risk to a 35-year-old occupant.

Numerous studies have shown that the chest area is much more vulnerable to life threatening injuries in the older population. In order to reflect the fact that chest injury risk for the elderly is four to five times that of younger occupants, Digges et al. (1) proposed a "Silver Rating" for NCAP. The suggested rating uses chest injury risk functions based on the higher vulnerability of the elderly to chest injuries, and the consequent higher risk of death associated with these injuries.

With the increased weighting of injuries to the chest relative to other body regions in the Silver Rating scheme, the accuracy of the chest injury estimates becomes critically important. In current NCAP tests, chest compression is measured by a single chest deflection gauge at the centerline of the sternum of the dummy. The location of the shoulder belt, and hence the degree of chest loading measured by the deflection gauge, are highly dependent on the adjustment of the upper anchorage (D-ring).

The importance of controlling belt positioning in frontal belted testing with restrained Hybrid III dummies has been noted by several researchers. Significant reductions in measured chest compression, of the order of 34%, have been determined as belt placement moved away from the shoulder region and onto the neck.

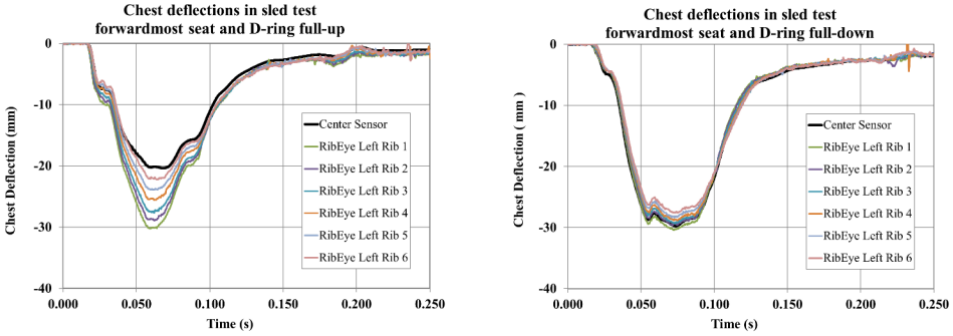
The location of the upper anchorage is not prescribed by the regulation on frontal crash testing, nor in the protocol for NCAP testing. Instead, the vehicle manufacturer is allowed to specify which adjusted position of the seat belt D-ring is to be used in crash tests. As a result, over 90% of frontal belted tests are currently being conducted with the D-ring in the uppermost position, even though it is readily evident that the belt is then located in close proximity to the neck (see Figure 1). In the case of regulated frontal tests, this position generates the greatest compliance margin. And, in the case of NCAP tests, it affords a means of greatly reducing the measured chest deflection to produce the highest chest deflection star component rating. Thus, while the belt configuration benefits manufacturers, it does not produce a meaningful assessment of chest injury risk. Consequently, the test does not serve as an instrument of promoting enhanced occupant safety.


***Figure 1. Shoulder belt routing of small female passenger dummy in an NCAP test***

In order to highlight the importance of chest deflection measurements in relation to shoulder belt placement, the author and his colleagues constructed a test buck using the same vehicle that was the subject of the above-noted NCAP tests. The test buck was mounted on a sled and used in multiple test runs. The study quantified the variations in measured chest deflection as belt placement was changed as a function of D-ring location. Both a standard chest potentiometer and a supplementary multi-point chest deflection measurement (RibEye) system were used in the tests.

Tests were conducted using a 5$^{th}$ percentile female Hybrid III dummy, in the right front seating position with the seat fully forward. Chest deflections observed in the test series are depicted in Figure 2 for both the full-up and full-down D-ring positions.

***Figure 2. Chest deflection comparison for sled tests***




In the official NCAP test, the D-ring was in the full-up position. Consequently, the shoulder belt was routed high, touching the dummy's neck (Figure 1). The measured chest compression on the right front passenger was only 11.8 mm. The extremely low value measured on the central potentiometer in the NCAP test is consistent with the pattern of chest deflection observed in the sled test with the D-ring in the full-up position.

Note that, in the sled tests, the rib deflections across the chest vary considerably, ranging between 20 and 30 mm (Figure 2, left), when the D-ring is in the full-up position and the shoulder belt is moved away from the sternum. In contrast, the loading to the region is much more consistent, at about 30 mm (Figure 2, right) when the D-ring is in the full-down position and the shoulder belt is positioned more appropriately over the shoulder and across the sternum.

The deflection recorded in NCAP can be seen to considerably understate the degree to which the chest was actually compressed, as indicated by the deflections observed with the RibEye assembly. The chest compression of 11.8 mm, as measured in the NCAP test, would be associated with a very low risk of serious (AIS 3+) injury. In particular, this risk would be determined as just 0.6%, using the NCAP rating risk function (based on an occupant age of 35 years).

In order to complement the current series of sled tests, a full-scale frontal-crash test was conducted by IIHS. A 5$^{th}$ percentile female Hybrid III dummy was placed in the right front seat of the subject vehicle, and the seat-belt's D-ring adjusted to the full-down position. The measured chest compression on the dummy in this test was 34.5 mm, corresponding to a 15% risk of AIS 3+ injury (also based on an occupant age of 35 years).

The increase in injury risk resulting from belt placement becomes even greater when considering elderly occupants. Prasad et al. (2) constructed an injury risk function for older females based on chest compression measurements for the 5$^{th}$ percentile female dummy. For an elderly female, an 11.8 mm chest deflection would be associated with a 0.6% risk of AIS 3+ chest injury, whereas 34.5 mm of chest deflection would produce a 44.7% risk of chest injury.

Clearly, shoulder belt position, as defined by the adjusted location of the upper anchorage, strongly affects the assessed risk of chest injury. Moreover, this is particularly the case for the elderly, who have much less tolerance to injury than their younger counterparts and are, therefore,

at a greater risk of serious injury or death. This highlights the need for a seat-belt positioning procedure based on dummy landmarks rather than the current system that uses vehicle-specific locations. Such changes would ensure more controlled and consistent belt location relative to the chest

deflection potentiometer and provide more appropriate chest injury risk assessment. While this would be beneficial for all motor vehicle occupants, it would be particularly advantageous for the elderly who currently form a large and growing proportion of the occupant population.

While NCAP programmes have been found to be effective in advancing vehicle safety, they are most efficient at doing so if the safety ratings are based on meaningful metrics which are accurately measured. In the case of frontal chest injury assessment, this goal is not being presently achieved due to the lack of an effective belt positioning procedure. What, in reality constitutes a 2-Star rated vehicle in terms of frontal crash performance, can be made to appear as a 4-Star vehicle by simply

manipulating the location of the seat belt through adjusting the position of the D-ring. The challenge is to ensure that the test protocols which assign a 4-Star or 5-Star rating actually reflect occupant restraint designs which afford 4-Star or 5-Star performance in the field.

Given the integrated nature of the automotive industry in North America, responsibility for maintaining the technical quality of regulations and associated testing requirements is shared by both Transport Canada and NHTSA which, in theory, is addressed through the Canada-United States Regulatory Cooperation Council (RCC). For reasons which are difficult to understand, the necessity of addressing proper belt deployment procedures in both regulated and NCAP tests continues to be ignored.

**References**

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# Investigating Human Factors through Pedestrians' Eyes

**By Geoffrey Battista**
*Geoffrey Battista is a PhD candidate at McGill University (finishing spring 2018), researching how pedestrian planning can be made more socially inclusive."*

**Résumé**
Les comportements des piétons dépendent de plusieurs facteurs—bâtis, sociaux et personnels—dont beaucoup ne sont pas enregistrés par les mesures systématiques. Le présent article décrit une étude récente examinant ces facteurs à travers les yeux des résidents afin de souligner leur importance dans la programmation des interventions de sécurité pour les piétons.

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I have read many conference papers during my doctorate, but perhaps none more memorable than "Smile and Behavior: New Evaluation Method for Pedestrian Environment" (1). In this study, Japanese researchers videotaped urban spaces and, using facial assessment software and complementary methods, determine that pedestrians smile more often when navigating high-quality walking facilities. When compared to inputting the microscopic properties of pedestrians and their environment into modelling software or, for the nth time, examining post-hoc collision outcomes to determine physical and human factors reducing road safety, measuring the corners of a smile is a blissfully simple indicator for practitioners to gauge circumstances on the ground. Expressions, emotions, and accompanying testimonies succinctly capture a wealth of circumstances mediating pedestrians' engagement with space: physical facilities, social norms, personal abilities, and even past experiences shaping one's behaviour or sense of place.

We at the McGill Urban Lab struck out to examine these underlying themes in a SSHRC-funded study whose results have been published as "Stores and Mores: Toward Socializing Walkability" in the Journal of Transport Geography (2). We recruited thirty residents from a dense and diverse Montréal neighbourhood to discuss their walking routines using a two-step process: a sedentary interview at a location of their choosing, followed by a participant-led walking interview recorded with a chest-mounted video camera. We grounded the interview transcripts and supporting multimedia in space using a specially-tailored geographic information system, revealing a multitude of assessments for the stores, streets, and intersections throughout the neighbourhood. When distilled into a common framework ("socialized walkability"), these data suggest strong associations between pedestrians' behaviour and social and personal factors not registered by contemporary environmental assessments.

Consider the neighbourhood's only pedestrian scramble, i.e., a signal sequence allowing pedestrians to cross from any direction once every cycle. Although lauded by long-time residents for addressing traffic issues, its uniqueness means users will often cross when the parallel light is green—the norm throughout the city—only to realize they are in the path of turning traffic. Law enforcement further stake out the intersection to ticket pedestrians caught off guard by the signal sequence, entrapping those whose behaviour is grounded in municipal norms while simultaneously promoting safer behaviour among other roadway users. These factors, along with others registered within our framework, denote an infrastructurally-

sound intersection whose non-built attributes profoundly mediate traffic safety.

What lessons can road safety practitioners glean simultaneously soliciting residents' perceptions of built and social factors shaping their travel behaviour, practitioners can yield high-resolution insights with which to more effectively intervene according to community context. It facilitates the weighing of alternatives in program appraisal, e.g., whether behaviour can be more effectively managed through engineering or enforcement, while drawing from participatory planning to foster awareness—even enthusiasm—for the planning issues at from our study? by simultaneously soliciting residents' perceptions of built and social factors shaping their travel behaviour, practitioners can yield high-resolution insights with which to more effectively intervene according to community context. It facilitates the weighing of alternatives in program appraisal, e.g., whether behaviour can be more effectively managed through engineering or enforcement, while drawing from participatory planning to foster awareness—even enthusiasm—for the planning issues at hand. So, while top-down modelling has its place, there is no one with a more precise knowledge about, and a greater stake in addressing, road safety issues than the people walking our streets every day.

**References**

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(2) Battista, G. A., and K. Manaugh. Stores and Mores: Toward Socializing Walkability. Journal of Transport Geography, 2018.

# A New Traffic Safety Paradigm

**By Todd Litman**

*Todd Litman is founder and executive director of the Victoria Transport Policy Institute, an independent research organization dedicated to developing innovative solutions to transport problems. His work helps expand the range of impacts and options considered in transportation decision-making, improve evaluation methods, and make specialized technical concepts accessible to a larger audience. His research is used worldwide in transport planning and policy analysis.*

**Résumé**
Des recherches récentes améliorent notre compréhension des facteurs qui ont une incidence sur les risques routiers et aident à identifier de nouvelles stratégies de sécurité routière. Un nouveau paradigme reconnaît le niveau d'exposition au risque routier comme un facteur à considérer et, conséquemment, soutient les stratégies visant la réduction des déplacements en véhicule telles qu'une planification plus multimodale, des prix de transport économiques, des politiques de développement de type « croissance intelligente » (Smart Growth) ainsi que d'autres stratégies de gestion de la demande en transport (GDT). Lorsque tous les impacts sont pris en compte, ces nouvelles stratégies constituent souvent le moyen le plus efficace et équitable d'accroître la sécurité routière.

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During the last century traffic safety programs significantly reduced traffic casualty rates per unit of travel. However, these gains were partly offset by increased vehicle travel, resulting in smaller declines in casualty rates per capita. In the last decade, distance-based crash rates plateaued, causing traffic deaths to increase with vehicle travel growth. This indicates that current traffic safety strategies are becoming less effective, so new approaches are needed to achieve ambitious safety goals, such as Target Zero.

New research improves our understanding of traffic risks and potential safety strategies. Total casualties are the product of distance-based crash rates and total vehicle travel. Policies that increase vehicle travel, such as urban roadway expansions and dispersed development, tend to increase traffic casualties, while vehicle travel reduction strategies can increase safety, in addition to other benefits.

The new paradigm recognizes that all travel imposes risks; additional crashes result from policies and planning practices that stimulate vehicle travel; and the safety benefits provided by vehicle travel reduction strategies as more multimodal planning, efficient transport pricing, Smart Growth development policies, and Transportation Demand Management (TDM) programs.

Many of these strategies provide significant co-benefits, besides increased safety. For example, more efficient transport pricing helps reduce congestion and pollution emissions, and can generate new revenues to finance pedestrian, bicycling and public transit service improvements. More compact development and more multimodal transport planning tend to increase transportation affordability, improve mobility options for non-drivers, and increase public fitness and health, and so are particularly beneficial to physically and economically disadvantaged people who want non-automobile travel options. When all impacts are considered, these new strategies are often the most efficient and equitable way to increase traffic safety.

The table on the following page summarizes examples of new paradigm safety strategies :

**New Paradigm Safety Strategies**

| Strategy | Traffic Safety Impacts | Crash Rate Reductions |
|---|---|---|
| **Shorter Term (less than three years)** | | |
| Transit service improvements (more routes, frequency, etc.). | Reduces vehicle travel directly, and often leverage additional reductions. | Each 1% transit ridership gain typically reduces traffic casualties 1% or more. |
| HOV and bus traffic priority | Reduces automobile travel and encourages transit and ridesharing. | Can reduce affected traveler's crash rates 10-30%, and total rates 1-5%. |
| Active transport improvements (better sidewalks, crosswalks, bikelane, etc.). | Reduces walking and bicycling crash rates, and total per capita crash rates. | Comprehensive active transport improvements can reduce resident's total crash casualty rates 5-10%. |
| Expanded carsharing services | Reduces crashes by reducing car ownership. | Reduce total crashes 0.3-3%, with larger reductions in denser areas. |
| Raise fuel taxes to fully finance roadway costs, or as a carbon tax. | Reduces total vehicle travel and traffic speeds. | A 50¢ per gallon tax should reduce crash casualty rates 4-12%. |
| Efficient parking pricing (motorists pay directly for using parking spaces). | Charging motorists directly for parking typically reduces affected trips 10-30% and may reduce vehicle ownership. | Each 10% increase in the portion of parking that is efficiently priced reduces crash casualties 1-3%. |
| Congestion pricing (road tolls that increase under congested conditions) | Reduces crashes by reducing automobile use, particularly in large cities. | Reduces affected are crash casualty rates 15-30%, with smaller reductions in nearby areas. |
| Distance-based vehicle insurance and registration fees. | Reduces vehicle use, especially higher risk driving. | Reduces affected vehicles' crashes by 10-20%. |
| Commute trip reduction programs. | Typically reduces affected commute trips 5-30% and may cause some vehicle ownership reductions. | Can reduce affected commuters' crashes casualty rates 5-30% and total crashes 0.5-3%. |
| Mobility management marketing. | Encourages travellers to use non-auto modes. | Can reduce affected households' crashes 5-10% and total crashes 3-6%. |
| **Longer Term (more than three years)** | | |
| More comprehensive and multimodal planning | Supports more multimodal transport planning and considers safety impacts. | Can lead to large vehicle travel and crash reductions. |

| Strategy | Traffic Safety Impacts | Crash Rate Reductions |
|---|---|---|
| More connected and complete streets. | Reduces crash frequency and severity by reducing vehicle travel, improving non-auto modes and reducing traffic speeds. | Can reduce local crash casualty rates 10-30%. |
| Reduced parking requirements | Reduces crashes by reducing vehicle ownership and use. | Can reduce affected area's crash casualty rates 5-15%. |
| Urban rail and Bus Rapid Transit | Reduces crashes by reducing vehicle ownership and use, and traffic speeds. | Can reduce crash rates 30-60% in affected areas and 10-30% region-wide |
| Smart Growth and Transit Oriented Development | Reduces crash frequency and severity by reducing vehicle travel, improving non-auto modes and reducing traffic speeds. | Can reduce crash casualty rates 30-60% in affected areas and 10-30% region-wide |

*New paradigm safety strategies reduce total vehicle travel and traffic speeds.*

This article summarizes research from, *A New Traffic Safety Paradigm*, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/ntsp.pdf.

# Equity in the Transportation System – A bridge we can cross together as a profession

**By Ryan Martinson, M.Eng., P.Eng.**

*Ryan is an Associatat at Stantec and a leader in the active and sustainable transportation field and is passionate about making places for people. Because of his approach to mobility issues and his understanding of how these concepts apply in real situations, Ryan has been invited to share his expertise with many communities, municipalities, and professional organizations.*

**Résumé**

Que vous soyez un décideur, un concepteur ou un professionnel de la sécurité routière, l'équité est importante pour la distribution et la conception des infrastructures. Cet article se concentre sur les infrastructures cyclistes, y compris l'équité dans le contexte de l'usager de la route pour lequel on conçoit. Des suggestions sont fournies afin qu'une personne, un organisme, une profession ou le public puissent y réfléchir, en incorporant l'idée d'équité dans le système de transport.

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Equity. It's a word that kind of sounds like equality, but there must be a difference… and why should we care about it?

According to the Oxford English Dictionary, equity is defined as: "the quality of being fair and impartial" whereas equality is "the state of being equal". For the purpose of this article (not to belittle the unending debates between philosophers on the different 'camps' of morality) equity is also about the fair and impartial allocation of resources based on the needs of the population, not just the equal sharing of resources across the population.

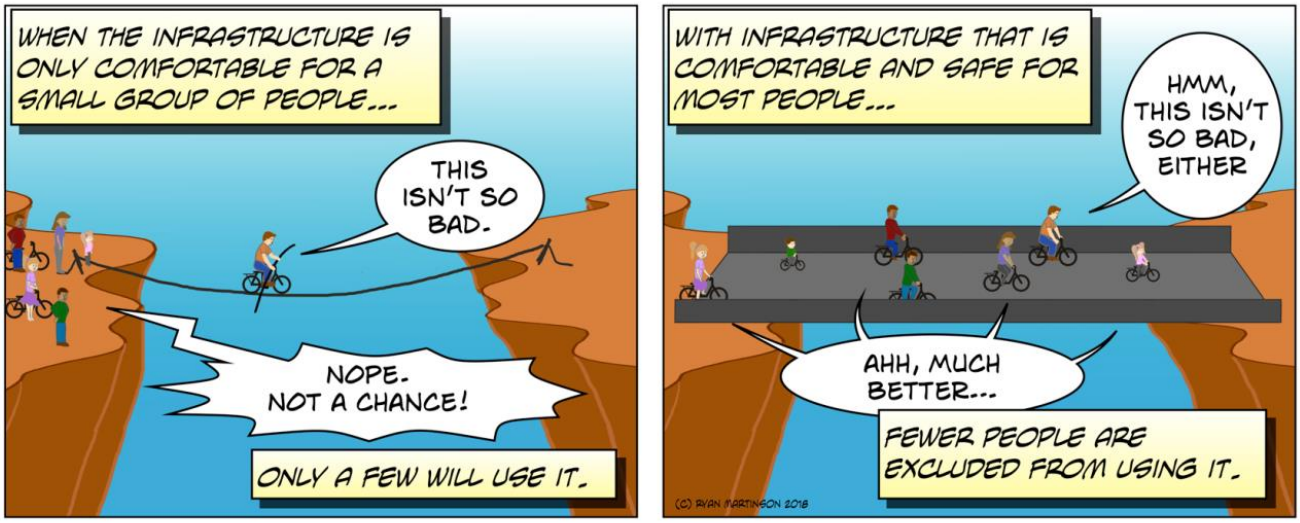
So where does this come into play for transportation professionals? Whether you are a policy maker, designer, or a road safety professional, equity is important when considering the allocation and design of infrastructure. To help make this tricky topic tangible, let's look at bicycle infrastructure.

Much of the work that is done on equity in the bicycle transportation system is around the access to a network (geographic equity) or the characteristics of the population that the facilities or programs serve (sociodemographic equity) (1). In particular, this could be looking at how networks are planned and prioritized with due consideration of income, ethnicity, age, access to transportation options, or special mobility requirements (e.g. mobility aids). This type of analysis tends to focus on the funding of infrastructure and if the allocation of the infrastructure is fair, impartial, and provides services in the areas that may need it the most.

Other areas of equity that can be considered are at the individual human level. These could include the make-up of the professions, firms or agencies that are designing the infrastructure (e.g. gender, diversity and inclusivity, cultural and ethnic backgrounds), or the make-up and privilege of the people making decisions about resource allocation. Inequity in these areas is a systemic issue that exists in our education systems, professional practice, and society. Like all complex problems, many people need to work together to change the processes and practices that are creating these biases.

However, there is another consideration for equity that may not be as apparent. This is around the idea of the Design User or answering the question: Who are we designing for?

One example of this was discussed in a study by Garrard et. al. (2) which showed that "consistent with gender differences in risk aversion, female commuter cyclists preferred to use routes with maximum separation from motorized traffic". The study went on to say that bicycle infrastructure "that provides a high degree of separation from motor traffic is likely to be important for increasing transportation cycling amongst under-represented population groups such as women." Yet, the design treatments that we had been using on many of our streets (barring the very busy arterials) have narrow bike lanes with only visual (paint) separation, and require people to share lanes with motor vehicles, or make turns at intersections 'like vehicles'. These requirements were only deemed suitable for a small population of our society.




With new national guidance released in 2017 by the Transportation Association of Canada in the Geometric Design Guide for Canadian Roads, together with a suite of new design guides based on current research and best practices (e.g. various publications of the National Association of City Transportation Officials, the Institute of Transportation Engineers' Protected Bikeways Practitioners Guide), a strong user-based approach has now been articulated and adopted. This approach now focuses on the person, not the machine, travelling on the street. With this explicitly described in Canada's design guides, comfort and safety of all users have an even stronger consideration in the identification and design of appropriate bicycle facilities in our streets.

To serve as a jumping off point for future change, the following table shows some of the ways that an individual, agency, profession, or the public can think about and act on the idea of equity in our transportation system.

| Individual | Profession |
|---|---|
| Empathy exercises (spend a day in a wheelchair, experience sight loss or hearing loss through sensitivity training)<br>Understand and implement best practice design that is based on current research and design thinking | Continue to adopt design practices that have been proven to increase the comfort and safety of the design user.<br>Take action to remove systemic barriers that may exist which limit certain groups of people from participating in the profession |
| **Agency** | **Public** |
| Plan and prioritize infrastructure and policies that are sensitive to disparities between various populations and the needs that may differ across the area<br>Design and construct infrastructure that will be comfortable and safe for the entire population<br>Be cognizant of the diversity within the agency and disparities that may exist in the ranks of the designers and the decision-makers | Demand we have equity as one of the pillars for how we plan, prioritize, design, and build the places we live, work, play, learn, and travel through.<br>Demand we have a human-centered design approach<br>Demand to be involved in the planning and design process. Every voice is important to be heard and considered by the people making decisions about priorities and designs |

*Author's note: I write this from a place of privilege. In our society and in our world, there are many people who do not have the opportunities that I have. This article is only to outline areas that could be changed to be more inclusive based on my exploration of them through inquiry and empathy.*

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# Road Safety and Equity in a New Mobility Era: the challenge ahead

**By Jason Neudorf, Alec Knowles, Kitty Chiu**

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*Alec Knowles is a Senior Consultant in the Advisory Services group at WSP. His ongoing work includes policy research for various industries and stakeholders with respect to CAV technology and new mobility, and financial, economic, and service planning analysis for major capital transportation projects.*

*Kitty Chiu is a Transportation Planner in the Urban Mobility group at WSP. Her work focuses around strategic planning and policy development for cities and regions, considering disruptions from trends such as emerging technologies, environmental, and socioeconomic change.*

**Abstract:**
Cet article explore certains avantages et défis potentiels liés à la sécurité routière associés aux véhicules connectés et automatisés. Cinq aspects de cette technologie émergente qui pourraient compromettre les gains en sécurité routière sont discutés: coût des véhicules, différenciation des marques autour de la sécurité, partage des connaissances exclusives pour permettre l'apprentissage de la flotte, étalonnage de l'aversion au risque et allocation de l'espace routier pour les usages motorisés et non motorisés. Une réglementation stratégique et opportune est considérée essentielle pour réaliser le plein potentiel d'amélioration de la sécurité routière grâce cette nouvelle technologie.

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The potential for connected and automated vehicles (CAVs), shared mobility and electric power systems to transform mobility is extraordinary. Arguably the most important benefit that these technologies are poised to deliver is improved road safety.

But "potential" and actually getting there are two different things. At the end of the 19th century, bikes and streetcars were brimming with transformative potential. And while both bikes and streetcars have provided benefits and remained relevant, the widespread adoption of private motor vehicles prevented them from reaching their full potential in Canada. So what are the prospects of achieving the full potential for road safety gains with the mobility revolution currently underway? And better road safety for whom?

The road to better safety outcomes will be fraught with many challenges. Some industry interests and even consumer demands that may be at odds with better safety outcomes include:

**Vehicle cost:** Sensors and time spent honing safety-relevant algorithms both add to the cost of a vehicle. It is not surprising, therefore, that many automakers in the CAV space are trying to get away with fewer sensors. For example, despite the availability and efficacy of infrared sensors, which detect heat and can help distinguish humans and animals from inanimate objects, most CAV prototypes don't have them. Automakers such as Tesla argue that they will be able to offer CAVs without costly LIDAR sensors. This isn't surprising for a company like Tesla, whose business model is based on retailing vehicles directly to price-conscious consumers. Transportation Network Companies (TNCs), who retail rides rather than vehicles, may be more willing to accept a higher vehicle cost for greater reliability and a longer lifecycle. From a road safety perspective, we need to push for ambitious safety performance standards that make use of all available

technology, regardless of whether it adds marginally to the cost of a vehicle.

**Marketability:** Individuals riding in a CAV expect it to do everything possible to protect their safety, and manufacturers are keen to market vehicles that uphold this expectation. But collectively it's in all of our best interests – and much more equitable – for vehicles to be programmed to look out for everyone's safety, not just the safety of vehicle occupants. We're already seeing level-headed regulation emerging that requires AV algorithms to minimize loss of life, and assign an equal value to all humans, regardless of whether they're riding in the vehicle or not. We need to ensure that this regulation is widely adopted, rigorously tested and consistently enforced. Within the AV space there appears to be a growing acknowledgement that safety should not be a brand differentiator. This is similar to the airline industry where airlines don't market their own safety record, and instead demonstrate a reasonable willingness for industry-wide cooperation to improve aviation safety overall.

**Proprietary knowledge:** Perhaps one of the greatest potential safety benefits of AVs involves fleet learning. With human driving, when a collision occurs, perhaps one or two individuals involved pledge to be more attentive; maybe the collision adds to the evidence suggesting a design change; but overall, the learning--if there is any--is minimal and slow. When a CAV gets into a collision, there is the potential for many vehicles to learn and become measurably safer. Given all the sensor data that will be available after a CAV collision, a raft of CAV and road safety experts will be able to simulate what interventions - from sensor configurations to code tweaks to machine learning training data - could have prevented the collision. But what if there's no regulation that requires the manufacturer to share the sensor data or other relevant but commercially sensitive data from the collision? This would be a huge opportunity lost, and industry players need guidance on what their obligations will be to support fleet learning.

**Risk aversion and travel speed:** Every driving decision - for humans and computers alike - is based on the level of risk the driver (or computer) is willing to accept. Just as humans exhibit a broad range of risk aversion, computers can also be calibrated to be more cautious (and slow) or more aggressive (and fast). Determining the sweet spot on this continuum will not be easy, but some portion of automakers, TNCs, and voters will want to see CAVs moving faster. We need to start thinking about how regulators can test CAV algorithms, through simulation and other strategies, to assess their level of risk aversion and set standards particularly as it relates to vulnerable road users.

**Travel demand**: While CAVs may lead to increased road capacity (through shorter headways for instance), they could also make travel more affordable, inducing increased demand for travel outstripping any capacity gains. Instead of easing the pressure on road space and making it easier to widen sidewalks and add bike lanes, CAVs could have the opposite effect. Road pricing and other policy tools are needed to curtail the potential growth in travel demand and allow politicians and transportation planners to be more equitable in allocating road space for pedestrians and other modes of transportation.

With the introduction of AVs, the potential to achieve unprecedented safety gains for all road users, including those who are most vulnerable, is beyond dispute. But this outcome should not be taken for granted. Our best chance at achieving this full potential is with timely, thoughtful and strategic regulation.

# La sécurité des piétons ayant des limitations fonctionnelles

**Par Jean-François Bruneau, Ph.D.**
*Conseiller en sécurité routière et agent de liaison IVADO-CIRRELT,*
*Centre interuniversitaire de recherche sur les réseaux d'entreprise, la logistique et les transports*

Pedestrians with reduced mobility are challenged not only because they have specific conditions, but also by the poor general design of roadway infrastructures. To insure safety, it is necessary to include the needs of all vulnerable users in the earliest phase of every project.

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**Résumé**

Les personnes ayant des limitations fonctionnelles ont une mobilité réduite, d'une part en raison de leur condition, d'autre part parce que l'environnement routier est mal conçu pour les accueillir et intégrer l'ensemble de leurs déplacements. Le principe de la conception universelle sous-tend à la base que les infrastructures doivent être conçues pour inclure les besoins de l'ensemble de la population et non uniquement de celles et ceux qui se portent en parfaite santé physique. Ce principe d'équité, fondamental, est encore absent de nombreuses réalisations, même récentes. L'accessibilité est perçue à tort comme une couche supplémentaire dans les étapes d'un projet, une réflexion que l'on aborde seulement a posteriori, à la fin du processus de conception ou lorsque les utilisateurs se plaignent de l'inaccessibilité d'un lieu.

Pour que les déplacements des piétons à mobilité réduite soient efficaces et sécuritaires, le concepteur doit intégrer, dès la phase initiale de planification, les directives et normes applicables pour l'aménagement des rues et prévoir les dispositifs nécessaires aux besoins des différentes clientèles à mobilité réduite. De plus, comme c'est le cas pour l'ensemble des piétons, les déplacements doivent être abordés sous l'angle des cheminements, sous un angle global plutôt que de façon ponctuelle, comme par exemple à l'échelle du coin de rue.

Sans dresser ici l'inventaire complet des mesures qui existent pour assurer le confort et la sécurité des usagers ayant des limitations fonctionnelles, une consigne globale peut toutefois être formulée. Les besoins des différentes clientèles sont parfois les mêmes, parfois différents, mais il importe d'appliquer les mesures pour accommoder toutes les clientèles, sans en privilégier une au détriment des autres. Cet exercice nécessite souvent des compromis, comme par exemple l'arasement des trottoirs dans les accès universels, qui doit à la fois être praticables en fauteuil et détectable à la canne.

Les défis personnels et les difficultés imposées par l'environnement routier, par la conception inadaptée des rues, font en sorte que très souvent, les choix d'itinéraires des usagers avec des limitations fonctionnelles doivent être modifiés. Certains itinéraires doivent même être évités. Les trottoirs sont parfois à risque de chute, trop étroits et les intersections trop longues à traverser

compte tenu du cycle accordé. Les personnes ayant des limitations fonctionnelles ne peuvent pas toujours aller où elles veulent et des efforts doivent être consentis par les gestionnaires de réseau, notamment en créant davantage de pistes cyclables (utilisées par les usages en fauteuil), en aménageant différemment les trottoirs (plus larges, pentes moins abruptes

et suppression des joints esthétiques) et gérer le phasage des feux et des priorités

de façon plus équitable aux intersections. D'autres mesures peuvent jouer un rôle significatif sur la mobilité de certains individus, tels que des dispositifs permettant d'assurer la navigabilité des cheminements, des mesures de modération de la circulation et de la vitesse aux endroits plus sensibles, là où il y a des concentrations de piétons, afin de favoriser des vitesses compatibles avec la présence d'usagers vulnérables.

En termes de loi, les États-Unis ont instauré l'Americans with Disabilities Act en 1990. En Ontario (2005), la Loi sur l'accessibilité pour les personnes

handicapées de l'Ontario énonce depuis déjà une quinzaine d'années les principes à respecter dans tous les domaines liés aux espaces publics et aux infrastructures de circulation. La loi s'accompagne d'un plan d'action orienté vers 2025, qui comporte des cibles et des objectifs de suivi avec responsabilisation de tous les intervenants. La loi ontarienne est la seule au monde à obliger la formation du personnel en accessibilité. C'est une loi-cadre qui modifie réellement la planification et la réalisation des projets d'infrastructures. Par exemple, la Ville de Toronto ne tiendra plus aucune consultation publique ou vote de riverains leur demandant de choisir s'ils veulent ou non des trottoirs: les trottoirs seront toujours construits. L'ensemble des provinces canadiennes devraient aller en cette direction pour assurer la sécurité des plus vulnérables et leur garantir un accès équitable aux espaces publics, aux biens et services.

# A Ride for Whom: has cycling network expansion reduced inequities in accessibility in Montreal, Canada?

**By Maxime Houde, Philippe Apparicio and Anne-Marie Séguin**

*Maxime Houde is a Mastesr student in urban studies at INRS. Research interests: bicycling, urban appropriation. Philippe Apparicio holds the Canada Research Chair in Environmental Equity and the City – INRS. Anne-Marie Séguin is a Full Professor at INRS with research interests in poverty and social exclusion, segregation, socio-spatial aspects of aging, social urban policy.*

**Résumé**

Il est aujourd'hui largement admis que la présence d'un réseau cyclable favorise l'utilisation du vélo. Récemment, des études ont observé un lien entre la présence d'infrastructures cyclables et la gentrification. Toutefois, peu d'études ont analysé l'accroissement des réseaux cyclables sous l'angle de l'équité environnementale.

L'objectif principal de ce mémoire est de vérifier si l'extension du réseau cyclable des agglomérations de Montréal, Longueuil et de la Ville de Laval sur une période 25 ans (1991 à 2016) a réduit ou renforcé les iniquités en termes d'accessibilité pour les personnes à faible revenu, les immigrants récents, les enfants et les personnes âgées.

Grâce à des cartes d'archives, il a été possible de construire dans les SIG des réseaux cyclables du Grand Montréal pour six années (1991, 1996, 2001, 2006, 2011, 2016). Ensuite, le recours à des données de recensement et des méthodes d'analyse spatiale nous permet de vérifier si les iniquités en termes d'accessibilité au réseau cyclable se sont accentuées ou non durant la période et pour quels groupes.

Les résultats montrent que le réseau cyclable a plus que doublé en 25 ans. Toutefois, on constate que certaines zones sont toujours très mal desservies et que le réseau manque de connectivité. Les individus à faible revenu ont généralement eu une bonne accessibilité sur toute la période d'étude. On observe également, au fil du temps, une forte diminution de l'inaccessibilité pour les immigrants récents et les aînés. Le résultat le plus important est sans aucun doute qu'il y a eu peu ou pas d'amélioration pour les enfants qui se retrouvent en situation d'iniquité.

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In the last few years, we have seen a revival of bicycling in North America and elsewhere in the world. In order to facilitate bicycle travel and to increase cyclists' safety, we have also seen the growth of cycling infrastructures in many North American cities.

Recent research in the United States (Portland and Chicago) and Brazil (Rio de Janeiro and Curitiba) has, however, shown that cycling infrastructures are not equitably distributed in cities, and that this leads to better access for some populations (1, 2).

Is this observation true for the Montreal area? To answer that question, we decided to analyze the development of the cycling network from 1991 to 2016 in considering the spatial distribution of various population

groups defined by age, income, and ethnicity.

This research had two objectives. We first calculated various indicators in order to describe the development of the Montreal's cycling network over a 25-year period (1991 to 2016) from the point of view of its expansion, densification and connectivity, in considering the type of bike paths for the

first dimension. Our second objective was to determine whether the development of the network has led to a reduction or reinforcement of inequities in accessibility for the four population groups studied.

The study area comprises the urban areas of Montreal and Longueuil, and the city of Laval. The cycling network was constructed in ArcGIS using archival maps and open data from the different cities studied. The basic network used is the result of a merger of the various cycling networks in 2016 available in digital form. According to their availability, archival maps from various sources—municipal services and Vélo Québec bike path guidebooks—had to be employed in order to reconstruct the cycling network for each of the six years (1991, 1996, 2001, 2006, 2011 and 2016) corresponding to the Statistics Canada census years.

Our longitudinal approach has enabled us to observe that the cycling network has more then doubled in size during the period under study. However, in looking at the spreading of the network over the study area, we see that certain areas are still very poorly served, and that they would benefit from better connectivity. In terms of accessibility, low-income individuals have generally had a good degree of accessibility, but one that slightly declined toward the end of the period. For their part, recent immigrants have seen their accessibility improve, so that in 2016, we can no longer point to any flagrant inequity. The most important result is clearly that there has been little or no improvement for children, who remain in a situation of inequity. The literature shows that children's safety, mobility and health could benefit from better access to the cycling network (3, 4, 5, 6).

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# Letters to the Editor

Interested in submitting to the Safety Network Newsletter? Consider writing a Letter to the Editor. Any communications received in this regard will be considered for publication if a future issue.

Please send submissions to Pamela Fuselli, Chief Editor, pfuselli@parachutecanada.org.

# lettres à l'éditeur

Si vous souhaitez soumettre un commentaire sur un aspect quelconque du contenu du SNN, vous pouvez le lire sous forme d'articles d'opinion ou de lettres à l'éditeur. Toute communication reçue à cet égard sera considérée pour la publication en cas de publication ultérieure.

Veuillez envoyer vos soumissions à Pamela Fuselli, rédactrice en chef pfuselli@parachutecanada.org.

# Safety Network Newsletter (SNN) Editorial Committee Members

Each edition of the SNN will profile different members of the Editorial Committee. If you are interested in joining the SNN Editorial Committee, please contact Pamela Fuselli, Chief Editor at pfuselli@parachutecanada.org.

**Alan German, BSc PhD MInstP CPhys**

Alan is a research physicist who obtained both his undergraduate and postgraduate degrees from the University of Salford in the United Kingdom. He commenced his career as a Research Associate with the Multi-Disciplinary Accident Research Team at The University of Western Ontario, and retired as the Chief of the Collision Investigation and Research Division of Transport Canada's Road Safety and Motor Vehicle Regulation Directorate.

Alan is a charter member of the Canadian Association of Road Safety Professionals. He is also a Past President and past Executive Director of the association. He developed CARSP's first web site in September 1997, and acted as the association's first Web Master. He is currently a member of CARSP's Editorial Board, a position in which he has served since the board's inception in 2007.

Alan has published extensively in the international road safety literature on various aspects of traffic safety. He was a co-author of the paper "The *Use of Event Data Recorders in the Analysis of Real-World Crashes*" that received the inaugural Dr. Charles H. Miller Award for the best technical paper presented at the 12th. Canadian Multidisciplinary Road Safety Conference.

In 2001 Alan was presented with a U.S. Government Award for Safety Engineering Excellence; in 2006 he was the recipient of a President's Choice Award from the Canadian Association of Technical Accident Investigators and Reconstructionists; and in 2011 he received CARSP's Lifetime Achievement Award

**Daphne Dethier, P.Eng., urb., MSc**

Trained as an engineer and planner, Daphne Dethier, P.Eng., urb., MSc, understands thoroughly the interrelations between transportation and land-use planning. What's more, her international (Belgium, Switzerland, Singapore, California, Canada) and interdisciplinary (urban planning and design, transportation planning and engineering, data visualization) career has provided her with a deep, innovative perspective on mobility issues. Over the past few years, Daphne has specialized in road safety, conducting safety studies of all types across the US and leading Montreal's Vision Zero studies, for which she has brought in WSP's Vision Zero expert Karin Hassner from Sweden. On the Vision Zero topic, the team has connected global experts, hold knowledge sharing seminars in the US, worked on a global handbook, presented at conferences and co-written a technical article.

Besides road safety, Daphne has accumulated mandates in sustainable mobility (active and public transportation), design (complete streets, road diets, roundabouts) and parking management. Beyond technical work, Daphne enjoys coordinating multidisciplinary projects and has led various business development initiatives to foster collaboration within WSP. Thanks to her creativity, she has also won prizes at international data visualization competitions based on transportation data.

## Acknowledgements

This issue of The Safety Network Newsletter was produced through the contributions of the following individuals:

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### NEXT ISSUE

The next issue of The Safety Network Newsletter will explore the issue of drug impairment. If you would like to contribute an article on this topic please contact Pamela Fuselli. Submissions are due May 28, 2018 and should be between 300-500 words plus accompanying photos and graphics.

SUBMISSION CONTACT
Pamela Fuselli at
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### PROCHAIN NUMÉRO

Le prochain numéro du bulletin Le Réseau-sécurité portera sur affaiblissement
. Si vous souhaitez contribuer un article portant sur ce subject contacter Pamela Fuselli. L'échéance pour soumettre un article est le 28 mai 2018 et il doit être d'une lonueur de 300 à 500 mots, plus les images et les graphiques qui l'accompangnent.

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