

1 **A Vision for Transportation Safety:**
2 ***A Framework for Identifying Best Practice Strategies to Advance Vision Zero***

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1 **ABSTRACT**

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3 In this article we present the Traffic Safety Best Practices Matrix, a tool to help United States cities
4 identify the landscape of strategies being used domestically and internationally to advance *Vision Zero*, as
5 pioneered by Sweden. Many cities across the United States have expressed an interest in *Vision Zero* with
6 a growing number passing policies calling for the elimination of traffic-related fatalities over the next
7 decade. Despite the increase in interest, little guidance exists around what *Vision Zero* is and what actions
8 could be implemented to help realize zero deaths. The Matrix, which culls together the results of an
9 extensive examination of the measures that cities and countries are pursuing to reduce traffic-related
10 fatalities and improve safety, attempts to bridge this gap by presenting a framework that cities can use to
11 identify effective strategies, benchmark their efforts relative to other jurisdictions, and reach out to
12 cities/countries pursuing *Vision Zero* policies for additional information. We offer an analysis of the
13 Matrix, focusing on three categories: measures with 1) widespread adoption, 2) limited implementation,
14 and 3) minimal utilization. We discuss how these findings can inform next steps for *Vision Zero*
15 implementation, with a focus on implications for U.S. cities. The main recommendations are to develop
16 mechanisms that institutionalize *Vision Zero* across sectors, focus education on supporting changes in
17 organizational practices and policy reform, improve collaboration across all levels of government, explore
18 technology that meets the unique needs of cities, and create data systems that facilitate accountability and
19 encourage public participation.

20 **Keywords:** Safety, *Vision Zero*, Safe System approach, pedestrian, bicycle

1 INTRODUCTION

2
3 *Vision Zero* is a road safety policy that aims to achieve a transportation system in which there are zero
4 fatalities or serious injuries for all modes of transportation. Adopted by Sweden in 1997, the safety
5 platform attempts to create a “safe system” by taking an ethical approach to road safety (1). *Vision Zero* is
6 widely accepted as an innovative road safety policy and is noted for its departure from the traditional road
7 safety paradigm with regard to its charge that the road safety problem to be addressed is the shortcomings
8 in the design of the transportation system, assertion that transportation system designers are responsible
9 for road safety, call for road users to demand safety, insistence that the ultimate objective of road safety is
10 zero deaths (2).

11 Many cities across the United States have expressed an interest in *Vision Zero*. As of July 2015,
12 nine cities—San Francisco, San Jose, San Mateo, San Diego, Seattle, Portland, New York, Washington
13 DC, and Boston—have passed a *Vision Zero* policy, calling for the elimination of traffic-related fatalities
14 and in some cases serious injuries over the next ten years. Despite the increase in interest, little guidance
15 exists for local transportation planners, policymakers, public health practitioners, police and others
16 working as part of this effort around what *Vision Zero* is and what actions could be implemented to help
17 realize zero deaths. This paper aims to bridge this gap by presenting a tool, the Traffic Safety Best
18 Practices Matrix, to help cities identify the landscape of strategies being used domestically and
19 internationally to advance *Vision Zero*. The Matrix culls together the results of an extensive examination
20 of the measures that cities and countries are pursuing to reduce traffic-related fatalities and serious
21 injuries.

22 By identifying the landscape of strategies being used by cities pursuing *Vision Zero*, and
23 specifying strategy efficacy as currently known, the Matrix presents a framework for strategy
24 identification and evaluation, as well as opportunity benchmarking. Our analysis of the Matrix focuses on
25 three categories, measures with 1) widespread adoption, 2) limited implementation, and 3) minimal
26 utilization, and we offer findings that can inform next steps for *Vision Zero* implementation. While the
27 potential for *Vision Zero* to reduce fatalities and serious injuries is significant based on Sweden’s
28 experience (3), there is currently a knowledge gap with respect to specific implementation measures
29 utilized to advance the policy. We anticipate the Matrix, in addition to the analysis presented in this paper,
30 will help cities, especially those considering adopting the policy, develop comprehensive strategies,
31 benchmark their efforts, and reach out to other jurisdictions pursuing *Vision Zero* for additional
32 information.

34 A CALL FOR A SAFE SYSTEMS APPROACH TO SAFETY: WHAT IS VISION ZERO?

35
36 *Vision Zero* is based on two premises: 1) people make mistakes and 2) there is a critical limit beyond
37 which survival and recovery from an injury are not possible (4). *Vision Zero* does not assume that
38 collisions will not happen—people make mistakes no matter how well-educated and compliant in obeying
39 traffic laws (5). Rather, the focus for road safety analysis and planning is on eliminating the *risk* of
40 chronic health impairment or death caused by a collision (4). To do so, *Vision Zero* focuses on decreasing
41 the likelihood that crashes will result in serious injury or death by designing the transportation system in a
42 way that ensures road users can tolerate the kinetic energies produced by the collision. It is kinetic energy
43 that kills and injures the road user – not the collision. The level of physical force the human body can

1 tolerate thus forms the basic parameter in the design of the transportation system, the core around which
2 all safety interventions are to be based (4, 6).

3 One of the main implications of this is that traffic speeds should be reduced to prevent injuries
4 (7). If the impact of crash energy is to be kept below the critical limit, speeds must be lowered and set
5 according to the safety of the road and roadside (4). Vulnerable road users, including pedestrians, have a
6 10% chance of surviving if hit by vehicles traveling at speeds above 45mph, but this rises to 90% at
7 speeds of 17mph (8). Speed management underpins nearly every consideration in *Vision Zero* (5).

8 While *Vision Zero* places a strong emphasis on reducing speeds, it does so in the context of the
9 road system in its entirety – referred to as a “Safe System” approach to road safety (4, 5). The approach
10 encourages countermeasures that address the three key elements of the road system—roads and roadsides,
11 vehicles and speed—because the interaction of these elements determines physical force and thus trauma
12 levels in a crash (4). Considering the inputs in isolation ignores the power of their interactions. To prevent
13 collisions, the whole system must be considered and all its parts strengthened (5): if one part fails, the
14 other parts must be able to offer protection. Core activities are supported by a range of countermeasures
15 (such as education, regulation, and enforcement) that encourage alert and compliant behavior on the part
16 of road users (9).

17 *Vision Zero* alters the view on responsibility for road safety. In the United States, responsibility
18 has been placed on the individual road user: bad drivers, careless bicyclists, distracted pedestrians are the
19 causes of collisions; perfecting human behaviors through licensing, testing, education, training and
20 publicity are the appropriate solutions (6, 7). Under the *Vision Zero* framework, actions and
21 responsibilities are attributed to the “system designers” who include engineers, public health
22 professionals, policymakers and law enforcement (4, 10). It remains the responsibility of individuals to
23 abide by laws and regulations, i.e. to follow the rules for using the transportation system set by the system
24 designers. If fatalities do still occur or if the rules are not followed, the burden is placed back on the
25 system designers to take further measures (1).

26 Although *Vision Zero* is closely associated with Sweden’s efforts, the Safe System approach on
27 which it is based has also provided the foundation for the Netherlands’ *Sustainable Safety* policy, as well
28 as the safety platform of Australia, New Zealand, Denmark, Iceland, Norway and London (5). *Vision Zero*
29 and *Sustainable Safety* represent the longest and most well-established Safe System approaches (9). In the
30 United States, state governments are required to develop Strategic Highway Safety Plans that detail the
31 state’s approach to reducing traffic injuries. Since the early 2000s, many states have framed this work as
32 “Towards Zero Deaths,” an approach that traces its roots to *Vision Zero* (11). In 2014, the Federal Highway
33 Administration published “Toward Zero Deaths: A National Strategy for Highway Safety,” which
34 similarly frames safety as a systems approach (12).

35 36 **METHODS**

37
38 To provide guidance for U.S. cities as they seek to implement *Vision Zero*, we researched the measures
39 that cities in the U.S. and cities and countries abroad, are, as of May 2015, pursuing to reduce pedestrian,
40 bicycle and/or traffic-related injuries and fatalities. The data is compiled into the Traffic Safety Best
41 Practice Matrix.

42 The safety strategies of eleven U.S. cities and three countries were reviewed for the Matrix: San
43 Francisco, San Jose, San Mateo, Los Angeles, Seattle, Portland, Chicago, New York, Washington DC,
44 and Boston, Sweden, the Netherlands, London and Australia. The U.S. cities included in the Matrix were

1 the early adopters or early considerers of *Vision Zero*, either by cities or DOTs. Sweden and the
2 Netherlands are international leaders in road safety. Australia was selected because it was one of the first
3 countries to follow Sweden in adopting the Safe Systems approach and London because it is a large city
4 that also subscribes to a systems approach to road safety (9,13). These locations were also selected
5 because information about their safety platforms is widely available online and in English. While
6 Norway, Finland, Iceland and Denmark have all adopted *Vision Zero* or *Vision Zero* like policies, these
7 countries were not included in the review because their safety documents were not readily available (5).

8 The Matrix is divided into nine categories: 1. Supportive Infrastructure/ Planning; 2. Engineering;
9 3. Education; 4. Enforcement; 5. Monitoring, Analysis, and Evaluation; 6. Policy; 7. Large Vehicles; 8.
10 Vehicle Technology; and 9. Taxi Services/Transportation Network Company (TNC). Countries and cities
11 received a "✓" for a measure if it was referred to in one of their safety documents, defined as their city's
12 safety resource webpage, safety action plan, or bicycle or pedestrian strategy, as either in practice or a
13 priority/ planned/ in process. Cities and countries received an "NA" for measures if implementation was
14 not feasible. For example, New York City received an "NA" for "Align state level Towards Zero Death
15 efforts with local level *Vision Zero* policy" (6.9) because their state did not adopt Toward Zero Deaths. A
16 total of 106 measures are included in the Matrix. There is no hierarchy to the Matrix; rather, measures are
17 listed alphabetically within subsections. The Matrix is not exhaustive but attempts to provide a full scope
18 of the safety measures being used by cities/ countries. The Matrix review did not take into account
19 prioritization of the measures, scale of implementation (e.g., one intersection vs. routine strategic
20 implementation) or funding.

21 The Matrix also includes a category that indicates the efficacy of a measure, defined as capacity
22 to reduce injury, both directly (i.e. collision reduction factor) or indirectly (i.e. through the creation of the
23 institutions, structures, and political will that drive or create frameworks for changes in system design.)
24 Measures were given a designation of Proven (P), Recommended (R), or Unknown (U), as described in
25 Table 1. This methodology was used by Washington State in their 2013 Washington State Strategic
26 Highway Safety Plan (14), which is a Target Zero plan. We chose this plan as our model not only because
27 of the rigor it applied to the efficacy assessments, but also because we felt that it was a potential strength
28 for there to be consistency in efficacy methodology among plans related to *Vision Zero*. Like Washington
29 State, we relied on three main sources to make the designations; if an action was not found in one of these
30 primary sources we surveyed the academic literature as well as other countermeasure reference
31 documents. For the supplemental sources, designations were given based on the outcomes, quality and
32 breadth of the evaluation. A list of these sources can be found in Table 3 (pages 16-24).

33

1 **TABLE 1 Efficacy Definitions and Criteria (14)**
 2

Strategy Effectiveness	Definition	Countermeasures that Work (CTW)- (7th Edition, 2013)	NCHRP 500 Report	Crash Modification Factors (CMF) Clearinghouse
Proven (P)	Proven to be effective based on several evaluations with consistent results	***** Demonstrated to be effective by several high quality evaluations with consistent results	Proven (P) - Those strategies that have been used in one or more locations and for which properly designed evaluations have been conducted which show them to be effective.	***** = 14 quality points
Recommended (R)	Generally accepted to be effective based on evaluations or other sources	**** Demonstrated to be effective in certain situations OR *** Likely to be effective based on balance of evidence from high-quality evaluations or other sources	Tried (T) - Those strategies that have been implemented in a number of locations, and may even be accepted as standards or standard approaches, but for which there have not been found valid evaluations.	**** = 11-13 quality points *** = 7-10 quality points
Unknown (U)	Lower quality rating; limited evaluation or evidence; experimental; outcomes inconsistent and inconclusive between studies	** Effectiveness still undetermined; different methods of implementing this countermeasure produce different results OR *Limited or no high-quality evaluation evidence	Experimental (E) - Those strategies representing ideas that have been suggested, with at least one agency considering them sufficiently promising to try them as an experiment in at least one location.	** = 3-6 quality points

3
 4 To support accuracy, each city and country that was included in the Matrix reviewed their entries.
 5 Cities designated a reviewer, typically their Vision Zero lead or safety expert. Reviews took place May-
 6 July 2015 and eleven of twelve cities/ countries initially included in the analysis participated. Reviewers
 7 were contacted via email and were sent a copy of the Matrix that included data for their jurisdiction only
 8 with a column titled “review” and a column titled “comments” as well as a letter that explained the
 9 purpose of the project. Reviewers were instructed to indicate if a measure erroneously received a
 10 checkmark (i.e. their city was not in fact pursuing or considering the measure) by placing an "X" in the
 11 review column and to indicate if a measure was missing a checkmark (i.e. their city was in fact pursuing
 12 or considering the measure) by placing a “√” in the review column; to indicate that a measure was

1 accurate, reviewers were asked to leave the review column blank. The Matrix was then revised to reflect
2 reviewer feedback.

3 The majority of reviewers corrected some measures and expressed either an eagerness to use the
4 Matrix to further their efforts or were neutral towards the exercise. One region initially identified is not
5 represented in the Matrix as the primary contact opted to not participate due to too much variation
6 between cities to make an assessment at a regional level; the region was thus removed from the Matrix.

7 8 **RESULTS**

9
10 The Traffic Safety Best Practices Matrix (Table 2) lists measures cities in the United States and cities and
11 countries abroad are pursuing as of May 2015 to reduce pedestrian, bicycle and/or traffic-related injuries
12 and fatalities; also included for each measure are efficacy designations based on existing evidence. Table
13 3 (pages 16- 24) provides a list of the sources used for the review.

14 **TABLE 2 Traffic Safety Best Practices Matrix**

Traffic Safety Best Practices

	SF	NYC	Chicago	Portland	Seattle	DC	Boston	LA	Sweden	Netherlands	London	Efficacy
	Domestic							International				
1. Supportive infrastructure/ Planning												
1.1 Safety Action Plan (Vision Zero)/ Strategy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, LIT
1.2 Vision Zero Policy (or VZ like policy)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, LIT
1.3 Vision Zero Steering Committee	✓	✓		✓	✓	✓	✓	✓		✓	✓	R, LIT
2. Engineering												
2.1 Informative signage												
a. Advisory/cautionary signs (e.g. "State Law: Stop for Pedestrians"; "High Bicycle Activity Zone")	✓		✓	✓	✓	✓					✓	R, LIT
b. Dynamic message signs with safety messaging	✓	✓			✓	✓		✓	✓	✓	✓	R, LIT
c. Remove unnecessary and/or confusing signage				✓	✓	✓			✓	✓	✓	R, NCHRP
d. Speed indicator signs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, NCHRP
2.2 Perform engineering reviews at all traffic fatality and high collision locations and at scenes of crashes	✓	✓	✓		✓		✓		✓	✓	✓	R, LIT
2.3 Restrictions on street access												
a. Pedestrian only streets		✓		✓		✓	✓			✓	✓	R, NCHRP
b. Restrict car access in the city center	✓								✓	✓	✓	R, LIT
2.4 Shared-space area for cars, bicyclists and pedestrians	✓		✓	✓			✓		✓	✓	✓	R, LIT
2.5 Signal hardware additions												
a. Bicycle signals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, NCHRP
b. Pedestrian countdown signals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P, LIT
c. Hawk signal				✓		✓						R, CMF
d. Protected turns (turn pockets & signal phasing)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, CMF
e. Puffin Crossing				✓	✓	✓	✓				✓	R, CMF
f. Rapid flash beacons	✓		✓	✓	✓	✓	✓	✓				R, CMF
2.6 Signal hardware uses												
a. Leading bike interval	✓	✓	✓		✓	✓			✓	✓	✓	R, NCHRP
b. Leading pedestrian interval	✓	✓	✓	✓	✓	✓	✓	✓		✓		R, CMF
c. Pedestrian scrambles (exclusive pedestrian phase)	✓	✓			✓	✓	✓	✓			✓	U, CMF
2.7 Slow Zones												
a. Arterial slow zones	✓	✓	✓	✓	✓				✓	✓	✓	U
b. Senior slow/safety zones	✓	✓					✓					P, LIT
c. Slow zones around schools/ local streets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P, LIT
2.8 Road design												
a. Advance stop or yield lines	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	R, LIT
b. Enhanced sharrow markings	✓	✓	✓	✓			✓					R, LIT
c. High visibility crosswalk (continental crosswalk)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P, LIT
d. Increase street lighting to improve visibility in high crash locations	✓	✓	✓	✓	✓	✓	✓	✓			✓	R, CMF
e. Lane narrowing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, NCHRP
f. Pedestrian refuge islands and medians	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, NCHRP
g. Separated bike lanes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, CMF
h. Restrict parking near intersections (aka "daylighting")	✓	✓	✓			✓				✓	✓	P, LIT
i. Road diet	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	P, CTW
j. Roundabouts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P, NCHRP
k. Speed humps, chicanes, diagonal parking, bulb outs, raised crosswalks (general traffic calming measures)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P, NCHRP
3. Education												
3.1 Bike and safety/crosswalk ambassadors	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	U, CTW
3.2 Educate state level organizations on city actions and Vision Zero commitments to broaden understanding of Vision Zero's impact on pedestrian/bike/traffic fatalities and injuries	✓	✓	✓	✓		NA	✓	✓	✓	✓	✓	R, LIT
3.3 Engage with community based organizations and advocates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, LIT
3.4 Helmet focused education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	U, CTW
3.5 Mass media/communication education campaign focused on pedestrian awareness, bike safety, and/or speeding	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	R, NCHRP
3.6 Measures to increase the conspicuousness of bicyclists (e.g. promotion of reflector vests, lights, etc.)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, CTW
3.7 Outreach to schools to educate students on bike/pedestrian/traffic safety	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, CTW
3.8 Targeted education/outreach to high priority areas	✓	✓	✓	✓	✓	✓	✓	✓			✓	R, NCHRP
3.9 Train city staff on Vision Zero safety priorities	✓	✓	✓	✓	✓	✓	✓	✓			✓	R, NCHRP
3.10 Trainings for senior citizens on walking and biking	✓	✓	✓			✓				✓		R, LIT
3.11 Update officer trainings to reflect new safety priorities and regularly conduct trainings	✓	✓	✓	✓	✓	✓	✓	✓			✓	R, NCHRP
3.12 Website dedicated to bike/pedestrian/traffic safety issues and concerns	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, LIT
4. Enforcement												
4.1 Automated enforcement												
a. Block the box camera						✓					✓	U
b. Failure-to-yield crosswalk camera						✓				✓		U
c. Illegal turn camera												U
d. Oversize vehicle camera						✓					✓	U
e. Point to point camera												P, LIT
f. Red light camera	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P, NCHRP
g. Speed camera	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P, CTW
4.2 Convene regular meetings of transportation leaders and the police department to review traffic safety performance and determine strategies for improvement	✓	✓	✓		✓		✓		✓		✓	R, LIT
4.3 DUI checkpoints	✓	✓	✓			✓		✓			✓	P, NCHRP
4.4 High visibility enforcement	✓	✓	✓	✓	✓	✓	✓	✓			✓	P, NCHRP
4.5 Increase enforcement against dangerous moving violations (speeding, failing to yield to pedestrians, signal violations, improper turns/illegal turns, phoning/texting while driving)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, CTW
4.6 Investigate crashes that result in fatalities as well as crashes that result in critical injuries	✓	✓	✓		✓				✓	✓		R, LIT
4.7 Random breath testing									✓	✓		P, LIT
4.8 Update technology that assists with capturing crash data and/or speed detection	✓	✓						✓			✓	R, LIT
5. Monitoring, Analysis, and Evaluation												
5.1 Comparative data system linking social and environment factors with injury data	✓	✓					✓	✓			✓	P, LIT
5.2 Continual, proactive monitoring and feedback gathering from the community on their safety issues and concerns	✓	✓	✓		✓		✓			✓	✓	R, LIT
5.3 Engage in public health surveillance on traffic-related hospitalizations and fatalities	✓	✓	✓		✓		✓		✓	✓	✓	P, LIT
5.4 Independent review/audit of safety program									✓	✓	✓	R, LIT
5.5 Interagency sharing of collision and other key data	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, LIT
5.6 Publish city-wide collision report	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, LIT
5.7 Routine evaluation of effectiveness of traffic safety interventions	✓	✓			✓				✓	✓	✓	R, LIT
5.8 Website with relevant safety data collected in a timely manner	✓	✓			✓				✓		✓	R, LIT

	SF	NYC	Chicago	Portland	Seattle	DC	Boston	L.A.	Sweden	Netherlands	London	Efficacy
	Domestic								International			
6. Policy												
<i>Local</i>												
6.1 Measures to reduce traffic volumes									✓		✓	R, LIT
a. Congestion pricing									✓		✓	R, LIT
6.2 Crosscutting measures to reduce car dependence/ improve transit /promote walking and biking												U
a. Implement Complete Streets policy	✓		✓	✓	✓	✓	✓	✓		✓	✓	U
b. Transportation Demand Management Program	✓	✓	✓	✓	✓	✓	✓	✓			✓	U
6.3 Mandatory helmet law (18+)					✓							R, CTW
6.4 No right turn on red (city-wide)		✓				✓			✓	✓	✓	R, NCHRP
6.5 Pre-pay for morning parking to discourage drinking and driving					✓							R, LIT
6.6 Restrict deliveries to off peak hours to remove trucks from the busiest streets to improve road safety and ease congestion	✓	✓								✓	✓	R, LIT
6.7 Policies targeted at protecting vulnerable users												
a. Classify traffic-related incidents as collisions and not accidents	✓	✓	✓	✓			✓				✓	U
b. Illegal to harass (threaten verbally or physically) a vulnerable user	✓	✓	✓	✓				✓				U, LIT
6.8 Target safety improvements to school areas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	R, LIT
<i>State</i>												
6.9 Align state level Towards Zero Death policy with local level Vision Zero policy	✓	NA			✓	✓			NA	NA	NA	U
6.10 State policies targeted at collision reduction												
a. Change DMV point penalty structure so that dangerous offenses are punished with the most severe point values		✓							NA	NA	NA	U, CTW
b. Increase penalties for driving with a suspended license		✓	✓						NA	NA	NA	R, CTW
c. Increase penalties for leaving the scene of a crash		✓	✓						NA	NA	NA	R, CTW
6.11 State level policies targeted at protecting vulnerable users												
a. Increase consequences (fines, tickets, jail time) for careless driving (e.g. injuring a pedestrian/bicyclist, failing to stop and give right of way to pedestrians in crosswalks, etc.)		✓	✓			✓				✓		U, CTW
b. Mandatory for cars to give at least three feet of clearance when passing a bicycle in the same lane (aka "three-foot rule")	✓		✓			✓		✓				U, LIT
c. Ticket and fine motorists who open a door into the path of other traffic, including bicycles and pedestrians (aka "dooring")	✓	✓	✓	✓	✓	✓	✓	✓			✓	U
d. Vulnerable User law		✓	✓	✓	✓		✓			✓		U, LIT
6.12 Variable speed limits via signage		✓							✓	✓	✓	R, NCHRP
<i>Federal</i>												
6.13 Identify opportunities to advance Vision Zero policies, practices and projects in federal programs with US DOT and Congress	✓	✓	✓						NA	NA	NA	U
6.14 Lower alcohol limit									✓	✓		P, LIT
7. Large Vehicles												
7.1 Heavy Goods/ Large Vehicle Task Force to suggest safety improvements and monitor regulations	✓	✓				✓				✓	✓	R, LIT
7.2 Install blind spot mirrors at the most hazardous intersections to help large vehicle drivers better see bicyclists									✓	✓	✓	U
7.3 Large vehicle driver education on bike/pedestrian safety	✓	✓	✓						✓		✓	R, NCHRP
7.4 Outfit large vehicles with front and side mirrors to improve visibility	✓	✓	✓			✓				✓	✓	P, LIT
7.5 Outfit large vehicles with rear wheel and side guards	✓	✓				✓	✓			✓	✓	P, LIT
8. Vehicle Technology												
8.1 Alcohol interlocks in government and commercial fleets									✓	✓		P, NCHRP
8.2 Driver awareness systems to alert the driver to the presence of pedestrians near the vehicle (e.g. cameras, sensors)		✓							✓		✓	R, CMF
8.3 Intelligent speed adaption technologies that alert or slow the vehicle if traveling over the speed limit									✓	✓	✓	P, LIT
8.4 Lane departure warning assistance									✓	✓		R, CMF
8.5 Partner with industry groups and vehicle manufacturers to further the use of technology to achieve safety aims	✓	✓							✓	✓	✓	R, LIT
9. Taxi Services/Transportation Network Company												
9.1 Automatic meter shut-off in taxis that speed												U
9.2 Black box data recorders in taxis	✓	✓							✓			U, LIT
9.3 Increase late-night taxi stand zones					✓						✓	R, LIT
9.4 Issue tickets to taxi drivers identified by red light cameras		✓	✓	✓					✓		✓	R, CTW
9.5 TNC regulations (training, devices, safety equipment)	✓		✓	✓	✓							U
9.6 Update taxi education to reflect safety priorities	✓	✓	✓	✓							✓	R, NCHRP
9.7 Window stickers warning passengers to not open their door into passing bicyclist	✓	✓	✓	✓		✓	✓				✓	R, CTW

KEY	✓ = Planned/A Priority/ In Process/ In Practice	NA= Not applicable	P = Proven R = Recommended U = Unknown	CTW = Countermeasures that Work NCHRP = NCHRP 500 Report CMF = Crash Modification Factors Clearinghouse LIT = Literature
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1 DISCUSSION

2
3 Big cities across the United States, in adopting *Vision Zero*, are leading efforts to reframe the way in
4 which traffic safety is viewed and managed. While this effort is commendable, and speaks to the role of
5 cities as catalysts for change, cities are doing so without much guidance as to what *Vision Zero* is and
6 what actions could be implemented to reach zero deaths. The Traffic Safety Best Practices Matrix
7 attempts to bridge this gap by presenting a framework for cities to understand and identify potential
8 strategies for *Vision Zero* implementation. The discussion details the ways in which the Matrix can assist
9 jurisdictions in identifying the range of tools available to them to reduce severe and fatal collisions and
10 further the *Vision Zero* movement. The discussion also includes an analysis of the matrix throughout
11 which we offer recommendations for implementation that are supported by lessons learned from *Vision*
12 *Zero* implementation abroad, as well as insights from other fields.

13 Uses of the Matrix

14 *Strategy Identification*

15
16
17 In order to move the needle on *Vision Zero* further and faster, cities need to understand the *Vision Zero*
18 landscape and be able to share best practices in real time. The Matrix can help cities understand the range
19 of levers available to advance the safety platform. The measures listed in the Matrix, organized by
20 categories, can help cities understand the breadth of strategies available while also providing a structure
21 for strategy organization. This aspect of the Matrix can be especially useful for cities considering
22 implementing the policy.

23 This is not to suggest that there is only one way to implement *Vision Zero*. Sweden and the
24 Netherlands, for example, have the longest and most well-established Safe System approach yet they
25 differ in how they articulate the safety platform. Sweden's *Vision Zero* has focused on issues of rural
26 transportation safety, whereas the Netherlands on pedestrian and bicycle safety in urban areas (15). Both
27 have achieved great success in their efforts (16). That being said, Sweden, as it is the "birthplace" of
28 *Vision Zero*, is looked to as providing the blueprint for *Vision Zero* implementation. Nonetheless it is
29 inevitable—and appropriate as informed by analysis of safety issues and crash patterns in specific
30 jurisdictions—that the safety measures advanced in the U.S. will deviate from those of Sweden (and the
31 Netherlands, and other counties that have for some time pursued a systems approach to road safety).

32 Adaptation and implementation of *Vision Zero* in the U.S. should be mindful of the core principle
33 of *Vision Zero*: to reduce severe and fatal injuries and shield the human body from excessive force, speed
34 must be managed. This can best be achieved by lowering speeds and redesigning streets to support low
35 speeds (4).

36 *Efficacy Assessment and Future Research Needs*

37
38
39 The Matrix, by identifying the known efficacy of measures, can help cities select evidence-based
40 measures to assist them in their efforts to reach zero. However, as *Vision Zero* is so new to the U.S.
41 context, many measures have yet to be evaluated (or evaluated consistently), and thus may yet prove to be
42 effective. Several of these measures are concentrated in the policy section. For example, the change in
43 classification of traffic-related incidents as collisions and not accidents (6.7a;U) is a recent linguistic shift

1 and its impact on road safety has yet been studied. Strategies that promote walking, biking and transit
2 (6.2a&b; U;U;) have the potential to impact safety dependent on the extent to which they include changes
3 in system design that have proven safety benefits (i.e. to ensure increases in active transportation are not
4 accompanied by increases in severe and fatal injury), beyond encouraging mode shift.

5 This does not mean these and other “Unknown” measures should not be pursued per se; rather if
6 practitioners pursue a “U,” they should seek to also include an evaluation component as part of the
7 project. Researchers should consider measures designated “U” as opportunities for future research. The
8 adoption of *Vision Zero* by U.S. cities is in many ways a natural experiment, with notable variation in
9 how U.S. cities are adopting and implementing the platform. We anticipate that there should be ample
10 opportunities for researchers to evaluate the efficacy of individual measures that currently lack sufficient
11 evaluation—as well as evaluation opportunities for the synergistic impacts of implementing multiple
12 safety measures, consistent with the Safe Systems approach.

13 *Benchmarking*

14
15 The Matrix can also be used as a means for cities to benchmark efforts to advance *Vision Zero*. Cities can
16 examine the Matrix to consider what additional measures other cities are implementing as a means to set
17 realistic goals for improvement or identify opportunities for new partnerships to help advance the *Vision*
18 *Zero* goal.

19 *Discussion among Cities*

20
21 Cities can also use the Matrix to facilitate peer city exchange. The Matrix allows cities to become aware
22 of the measures their peers are implementing. As such, cities will know whom to engage to find out more
23 information and to determine if a measure is appropriate for their city.

24 **Analysis of the Traffic Safety Best Practices Matrix**

25
26 We analyzed the Matrix and arranged our observations by the themes that emerged: measures with 1)
27 widespread adoption, 2) limited implementation, and 3) minimal utilization. In the analysis that follows,
28 we discuss how these findings can inform next steps for *Vision Zero* implementation, with a focus on
29 implications for U.S. cities. We note in the discussion the location of the measure on the Matrix as well as
30 the efficacy designation.

31 *Widespread Adoption*

32
33 There are several sections and individual lines in the Matrix where we see a clustering of checkmarks,
34 which suggests widespread adoption of the measure(s) among the cities included in this analysis,
35 including implementation or plans for adoption. We define “clustering” for a section or line as having
36 more than 70% of the boxes checked.

37 The Engineering section (Section 2) is an area of the Matrix where we see significant clustering
38 of checkmarks, which suggests that this area has received considerable attention from the cities and
39 countries included in the review and that many of the countermeasures are well-utilized. The engineering
40 countermeasures focus on reducing speeds and range from reducing speeds limits on local streets and near
41 schools and senior centers, and on arterials (2.7a-c;U,P,P); installing electronic signage that indicates

1 speed (2.1d; R); and geometric changes, in particular pedestrian refuge islands (2.8f; R; 17); roundabouts
2 (2.8j; P; 17) and speed humps (2.8k; P, 18). Many of these measures impact road design, which is a
3 critical way to modify speeds to make roads inherently safe (19). Engineering measures not well-used or
4 selectively used include puffin crossings (2.5e; R), senior slow zones (2.7b; P) and, in the U.S.
5 specifically, restrictions on street access (2.3a and b; R;R) and roundabouts (2.8j; P). Some of these
6 measures are particularly innovative, some may necessitate significant construction and some may require
7 enhanced political and/or community support. These factors, among others, could explain their paucity in
8 uptake. Cities leading on these efforts could be sought after for additional information.

9 Education (Section 3) is another section where most peer cities/counties have implemented
10 multiple measures. The main exception in this section is Sweden, as it is only location included in the
11 review not utilizing mass media/ communication education (3.5; R). This is fitting with how Sweden
12 conceptualized *Vision Zero*: education was considered capable of maintaining *existing* safety levels, but
13 unlikely to generate the significant future improvement needed to achieve the paradigm's ambitious goals
14 (5). Indeed, focusing on educating the road user is antithetical to the idea that grounds *Vision Zero*:
15 individuals make mistakes no matter how well-educated (1). Under Sweden's *Vision Zero*, road users are
16 responsible for following the rules, but this expectation runs parallel to system designers' efforts at
17 continually making the road system safer (10). Sweden does not emphasize "education" per se, but
18 "creating more respect" for the rules of the road, in particular with regard to speed limits, seat belt use,
19 and intoxicated driving (6), a nuanced but important distinction. Education around road safety in the
20 traditional sense was never emphasized in Sweden because their planning focus, since the 1960s, was to
21 alter the built environment, by placing restriction on cars, to achieve safety. In essence, the road has
22 provided the education (7).

23 It is not surprising that education is a well-utilized tool for *Vision Zero* implementation in the
24 U.S. given that education and enforcement have since the 1960s assumed a primary role in safety
25 promotion—equally aligned with the other "E," engineering. Yet these tools have been used in an
26 environment where, unlike Sweden, the dominance of the car was never challenged so as to make streets
27 inherently safe (7). Now many U.S. cities are focusing more on changes to the built environment to
28 achieve safety. It will be interesting to see how the emphasis on education shifts over time as *Vision Zero*
29 is implemented, particularly if U.S. implementation maintains Sweden's focus on system design. U.S.
30 cities could approach this transition as an opportunity to consider an alternative approach to education,
31 advanced by the field of public health, which would be to take a socio-ecological approach to education
32 efforts and focus not only on enhancing individual skills, but on how education can support changes in
33 organizational practices and policy reform (20). This approach seems more aligned with *Vision Zero*
34 principles.

35 Another area of widespread adoption is Supportive Infrastructure/ Planning (Section 1), an area
36 that the research suggests is fundamental to successful *Vision Zero* implementation. Here, again, Sweden
37 is the exception in that it does not utilize a *Vision Zero* Task Force or Steering Committee (1.3; R). In this
38 case, this absence suggests less a fundamental difference in approach (as with education) and instead a
39 limitation in implementation (7). While multi-sectorial thinking informed the development of *Vision Zero*
40 in Sweden, this collaboration did not continue into the implementation phase. Lack of cooperation and
41 consultation among sectors were acknowledged as reasons why Sweden failed to reach its 2007 target of a
42 50% reduction in traffic-related deaths from 1997 (21). Since then Sweden has set up structures for
43 collaboration: six times a year representatives from municipalities, the police, occupational health, vehicle
44 industry and insurance companies meet with representatives from the Swedish Transport Administration

1 and Agency to discuss safety efforts. Stakeholders are also engaged at the annual “Result Conferences”
2 where an analysis of road safety performance indicators (such as speed compliance and seat belt use) is
3 presented (3). In addition, representatives from different sectors come together to analyze crash data.
4 What appears to be lacking are ongoing, daily, working relationships across sectors (7). McAndrews (7)
5 argues that public health, police, vehicle manufactures, and safety specialists have been left out of *Vision*
6 *Zero* and that *Vision Zero* has concentrated responsibility in the transportation sector. U.S. cities can learn
7 from this shortcoming and concentrate on developing mechanisms that support the institutionalize *Vision*
8 *Zero* in existing institutions beyond the transportation sector, including public health, police and other key
9 implementation partners.

10 *Vision Zero* is an example of Health in All Policies (HiAP), an approach to policymaking that has
11 struggled since forming in the 1980s to engage across sectors and whose experience further demonstrates
12 how lacking institutions can undermine even best intentions at collaboration. HiAP calls for incorporating
13 health considerations into decision-making structures across sectors and policy areas (22). Like *Vision*
14 *Zero*, HiAP has as its origins in Europe and is a non-traditional approach: HiAP requires leadership and
15 resources from outside public health and the formation of new structures and processes that align agency
16 missions and identify shared agendas to advance health in non-health sectors (23, 24). Yet HiAP has
17 struggled because it has had difficulty creating a foundation to support its intersectoral work. HiAP
18 experts argue that the “how” of shared governance—the infrastructures, tools, instruments and processes
19 that facilitate intersectoral partnerships—is not well understood, and that, until it is, it will be difficult to
20 overcome the typical, silo-ed approach to government work (25). The experience of HiAP suggests the
21 salience of investing the resources, time and personnel necessary to develop productive intersectoral
22 collaborations. Done well, *Vision Zero* cities could emerge as a model for HiAP efforts.

23 *Limited Implementation*

24
25 Some measures are being utilized by only a few U.S. cities and only a few of the international
26 cities/countries included in the review. We defined “select” as having, for a section or line, between 40
27 and 69% of the boxes checked.

28 As can be seen in the Matrix, cities are not seeking opportunities for collaboration across all
29 levels of government even though positioning on traffic safety policy in U.S. at the Federal, state and
30 local level is more aligned than not. Only a select group of cities are educating state level organizations
31 on their city’s *Vision Zero* commitment (3.2; R), engaging with their state level Toward Zero Deaths
32 (TZD) policy (6.9; U) and/or seeking opportunities to advance their efforts at the Federal level (6.13; U).
33 All the U.S. cities included in the review, with the exception of New York City, have at their state level a
34 TZD policy. Seattle stands out in that they drafted their *Vision Zero* strategy to be in-line with their state’s
35 *Target Zero* plan (Jim Curtin, unpublished data). TZD is an effective strategy: a 2012 evaluation of the
36 TZD programs in Idaho, Minnesota, Utah, and Washington found that fatality rates decreased faster in
37 these states than in states without TZD programs (11). Efforts at the Federal level also have as their focus
38 the elimination of traffic fatalities, and their recently published strategy aims to provide direction for both
39 federal and state level TZD efforts (12).

40 It is noteworthy that the Federal, state and local levels of government share the vision of
41 eliminating traffic fatalities and are all developing strategies that trace their roots to *Vision Zero* and the
42 Safe Systems approach. While the space governed by each agency is different (highway as opposed to
43 local roads, for example), at the very least, this alignment of goals suggests an opportunity for

1 collaboration to advance and strengthen traffic safety efforts and address challenges that lie at the
2 intersection of Federal, state and local jurisdictions. What can cities learn from successful TZD efforts?
3 What do city level *Vision Zero* efforts have to offer state and federal TZD efforts? Where do these efforts
4 meet and diverge? How can these policies be aligned and strengthened? These are all questions that cities
5 can consider and pursue as they implement *Vision Zero* and the answers will help practitioners and
6 researchers better understand if/how this collaboration is effective.

7 8 *Minimal Utilization*

9
10 Many measures are being implemented by less than 40% of the cities/countries included in the review.
11 This suggests that there are quite a few areas where U.S. cities could consider placing additional emphasis
12 as they further efforts to implement *Vision Zero*.

13 Vehicle technology (Section 8) is the section with the fewest boxes checked by the peer
14 cities/counties; as such it represents an area of great opportunity for U.S. cities. Only New York City and
15 San Francisco indicated that are considering partnerships with industry groups and vehicle manufactures
16 (8.5; R) as part of their approach to *Vision Zero*. The four technologies highlighted in the Matrix, alcohol
17 interlocks (8.1; P), driver awareness systems (8.2; R), intelligent speed adaptation (8.3; P), and lane
18 departure warning assistance (8.4; R), all have proven safety benefits (27-29). Vehicle safety, achieved
19 through advances in vehicle technology, is a strong focuses of *Vision Zero* in Sweden, but this is not
20 surprising given that representatives from the automobile industry and experts on motor vehicle design
21 were involved in the conceptualization of the safety philosophy (7).

22 In the United States, vehicle safety is pursued at the Federal level by NHSTA; cities have not
23 historically been designated actors in this space (26). As vehicle safety is NHSTA's domain, cities may be
24 unsure how they fit, or if they should become involved at all. Cities do have jurisdiction over their bus
25 fleet and may consider ways to use technology to improve the safety of their buses. For example, London
26 is piloting intelligent speed adaptation, an innovative technology that ensures that vehicles cannot exceed
27 speed limits, on their buses (30). Perhaps the answer for U.S. cities is to not involve themselves in vehicle
28 safety outright, but to consider ways in which private sector partnerships and/or technology in general can
29 help them eliminate fatalities and serious injuries from their roads. Such an approach is consistent with
30 *Vision Zero's* emphasis on systems thinking. A good example of this is New York City's ask to Google to
31 change its directions to discourage left turns (31).

32 Automated enforcement (4.1a-g; U; P), actively pursued in the U.S. by Washington DC, is area
33 where checkmarks are scant. This suggests that automated enforcement is not only a key area for pursuit,
34 but, in addition, an area apt for peer-city information sharing. Automated enforcement is a highly
35 effective tool for speed reduction (32). DC utilizes five different types of automated cameras whereas the
36 other U.S. cities only employ red light or transit only cameras if they do so at all. Many cities checked the
37 box for speed cameras (4.1g; P), but for most of the cities, this is something they are planning should they
38 be able to get jurisdiction from their state. Other reasons that that could explain why some U.S. cities are
39 pursuing efforts while others are not are timing, funding and staffing needs.

40 Publishing a website with relevant safety data (5.8; R)—another area on the matrix where
41 checkmarks are lacking—is a means through which cities could help achieve *Vision Zero's* core principle
42 that road users “demand” safety improvements—a responsibility that implies that public participation in
43 transportation decision making is central to achieving *Vision Zero* (7). A website that clearly articulates
44 the number of severe and fatal injuries, project delivery status and relevant enforcement citation data, in

1 addition to other key indicators, can facilitate transparency and accountability thereby assisting the public
2 in monitoring progress towards zero and allowing cities to achieve this key aim of the safety philosophy.
3 To ensure this outcome, it is imperative that the information on the website be presented in such a way it
4 can be easily interpreted by a lay audience and that analysis be provided where needed. In addition, staff
5 responsible for the website should be responsive to the needs of the public for additions or clarifications.
6 Public participation and accountability for *Vision Zero* initiatives was not adequately captured by the
7 Matrix review, but is an important component for consideration as *Vision Zero* is implemented across
8 U.S. cities, given the political will required to change the status quo with respect to some of the identified
9 strategies (e.g., automated speed enforcement) as well as findings that severe and fatal injuries are often
10 concentrated in areas that are disproportionately low-income, communities of color, and home to
11 residents including seniors and people with disabilities reliant on walking or public transit (33).

12 Additionally, routine evaluation of the effectiveness of traffic safety initiatives (5.7; R), while
13 standard practice in the international regions reviewed, was notably absent among U.S. cities.
14 Institutionalizing evaluation of the effectiveness of these measures will help ensure that resources are
15 used most efficiently, and can help inform the state of the practice. However, doing so requires the
16 prioritization of funding and staff resources to ensure that robust evaluation can be planned, implemented
17 and shared to inform local practice. The development of comprehensive surveillance systems (5.4;R) is
18 strongly supportive of this effort, as well as the overall data-driven approach to *Vision Zero*.

19 20 **LIMITATIONS**

21
22 The Matrix can be a useful tool for strategy identification, benchmarking, and facilitating discussion
23 among jurisdictions implementing *Vision Zero*. However, the Matrix is a macro level effort and should be
24 approached as a screening tool. To develop targeted, efficient, evidence-based strategies, cities should
25 consider analysis of crash types, priority locations for investments based on severe/fatal crash densities
26 and/or predictive factors, funding, staff needs, and other area-specific issues.

27 There are two limitations specific to the Matrix. First, comparing cities to countries has the
28 potential to obscure the analysis. However, as *Vision Zero* (and its iterations) in Sweden, the Netherlands,
29 and Australia is a country-level effort, we felt that it was appropriate to look at the country as a whole.
30 We further felt it was appropriate because these countries have led on implementing systems approaches
31 to traffic safety and we did not want to miss out on their insights and lessons. Moreover, we had great
32 difficulty finding sufficient city-specific information that would allow us to analyze an individual city in
33 these countries. Second, the cities/countries included in the review elected whom they wanted to review
34 the Matrix and we are unaware of the extent to which they sought corroboration from other members of
35 their staff. We proceeded with the assumption that the checkmarks were accurate, but acknowledge that
36 this is a limitation.

37 38 **CONCLUSION AND RECOMMENDATIONS**

39
40 In this article we present the Traffic Safety Best Practices Matrix, a tool to help cities identify the
41 landscape of strategies being used domestically and internationally to advance *Vision Zero*. There are
42 four ways cities implementing *Vision Zero* can utilize the tool: to 1) identify the range of levers available
43 to advance *Vision Zero*; 2) understand the currently known efficacy of the strategies and identify
44 opportunities for future research; 3) benchmark efforts to advance *Vision Zero*; and 4) engage in peer

1 exchange. Through an analysis of the Matrix, which was supported by lessons learned from *Vision Zero*
 2 implementation abroad, as well as insights from other fields, we identified measures with widespread
 3 adoption, limited implementation and minimal utilization.

4 Based on the matrix analysis, lessons learned from *Vision Zero* implementation abroad, as well as
 5 insights from other fields, the authors identified the following recommendations as next steps for *Vision*
 6 *Zero* implementation in cities in the U.S.

- 7
- 8 1. Develop mechanisms that institutionalize *Vision Zero* in existing institutions needed for its
 9 implementation that extend beyond the transportation sector.
- 10 2. Consider approaching education more in line with Sweden where the focus is on creating
 11 “respect” for the rules of the road that are being emphasized through system design, e.g. slow
 12 speeds. Focus education efforts on how education can support the changes in organizational
 13 practices and policy reform that allow for changes in system design.
- 14 3. Seek opportunities to engage with state and federal leaders on *Vision Zero* efforts.
- 15 4. Explore technology advances that address the unique safety needs of cities.
- 16 5. Pursue automated speed enforcement and other camera technologies that have proven safety
 17 benefits.
- 18 6. Facilitate accountability by creating web-based, publicly-accessible spatial data systems that
 19 monitor, analyze and report fatalities and severe injuries and associated factors, as well as
 20 benchmarks on policy progress, to help constituents realize the magnitude and distribution of
 21 transportation injuries and create the collective consciousness needed to achieve the policy’s
 22 aims.

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24

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 26 Matrix and for her review of this paper. In addition, the authors would like to thank San Francisco staff
 27 and community stakeholders who provided direction for the creation of the Matrix, and everyone from the
 28 representative jurisdictions who reviewed the Matrix for accuracy.

29 TABLE 3 Matrix Sources

DOCUMENT	LINK
<i>San Francisco</i>	
San Francisco Pedestrian Strategy	http://archives.sfmta.com/cms/rpedmast/documents/1-29-13PedestrianStrategy.pdf
SFMTA Bicycle Strategy	https://www.sfmta.com/sites/default/files/BicycleStrategyFinal_0.pdf
<i>Vision Zero</i> San Francisco: Two-Year Action Strategy	http://visionzerosf.org/about/two-year-action-strategy/
Walk First	http://walkfirst.sfplanning.org/
<i>New York</i>	
<i>Vision Zero</i> Action Plan	http://www.nyc.gov/html/visionzero/pdf/nyc-vision-zero-action-plan.pdf
NYC Pedestrian Safety Study and Action Plan	http://www.nyc.gov/html/dot/downloads/pdf/nyc_ped_safety_study_action_plan.pdf
Truck Side Guards	http://www.nyc.gov/html/dcas/downloads/pdf/fleet/nyc_fleet_newsletter_05_16_2014.pdf ; http://www.volpe.dot.gov/news/engineers-passion-pedestrian-and-bike-safety-leads-partnership-with-nyc

Chicago	
Chicago Forward: Department of Transportation Action Agenda	http://www.cityofchicago.org/dam/city/depts/cdot/Admin/ChicagoForwardCDOTActionAgenda.pdf
Chicago Forward: Department of Transportation Action Agenda 2013 Update	http://www.cityofchicago.org/content/dam/city/depts/cdot/ChicagoForward/ChicagoForwardUpdate2013_web-lo.pdf
Chicago Pedestrian Plan	http://chicagopedestrianplan.org/pedestrian-plan/
Chicago Streets For Cycling Plan 2020	http://www.cityofchicago.org/content/dam/city/depts/cdot/bike/general/ChicagoStreetsforCycling2020.pdf
Portland	
Portland Bicycle Plan For 2030	http://www.portlandoregon.gov/transportation/article/289122
Portland Bicycle Plan For 2030: One Year Progress Report	http://www.portlandoregon.gov/transportation/article/345419
Real Solutions to Traffic Safety Problems	https://www.portlandoregon.gov/transportation/article/299189
Traffic Safety Resources	https://www.portlandoregon.gov/transportation/55303
<i>Vision Zero</i>	https://www.portlandoregon.gov/transportation/article/518952
Seattle	
2012 Action Agenda: Laying the Groundwork	http://www.seattle.gov/transportation/docs/SDOTActionAgenda2812.pdf
Action Agenda: 2013 Progress Report	http://www.seattle.gov/transportation/docs/SDOTActionAgenda2812/ProgressReport_2013-01.pdf
Pedestrian Master Plan: Implementation Overview	http://www.seattle.gov/transportation/pedestrian_masterplan/pmp_implementation.htm
<i>Vision Zero: Seattle's Plan To End Traffic Deaths And Serious Injuries By 2030</i>	http://www.seattle.gov/visionzero
Washington, DC	
DDOT: Safety Programs Overview	http://ddot.dc.gov/page/safety-programs
District of Columbia Bicycle Master Plan	http://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/bicycle_master_plan_2005_final_document_0.pdf
District of Columbia Pedestrian Master Plan	http://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/pedestrianmasterplan_2009.pdf
District of Columbia Strategic Highway Safety Plan	http://www.ddot-hso.com/ddot/hso/documents/Publications/SHSP/2014/DDOT%20SHSP%20-%20October%202014.pdf
"Towards Zero Deaths" Website	http://www.towardzerodeathsdcc.com/
Boston	
Access Boston 2000 - 2010: Boston's Citywide Transportation Plan	http://www.cityofboston.gov/transportation/accessboston/default.asp
Boston Bicycle Plan	http://www.cityofboston.gov/transportation/accessboston/pdfs/bicycle_plan.pdf
Boston Bike Network Plan	http://www.cityofboston.gov/images_documents/Boston%20Bike%20Network%20Plan%20Fall%202013_FINAL_tcm3-40525.pdf
Boston Bikes	http://www.cityofboston.gov/bikes/
Boston Cyclist Safety Report	http://www.cityofboston.gov/images_documents/Crash%20Report%20013%20FINAL%20reduced%20_tcm3-38304.pdf
City of Boston- Transportation Pedestrian Safety Guidelines For Residential Streets	http://www.cityofboston.gov/transportation/accessboston/pdfs/pedestrian_safety_guidelines.pdf
Update on Safety Efforts in Boston	http://www.bostonglobe.com/metro/2013/03/18/boston-launches-traffic-safety-initiative-along-busy-commonwealth-

	ave/rpIzq1bJTz8LuxvALu0UJ/story.html
Los Angeles	
2010 Bicycle Plan	http://planning.lacity.org/cwd/gnlpln/transelt/NewBikePlan/Txt/LA%20CITY%20BICYCLE%20PLAN.pdf
Greater Streets For Los Angeles Strategic Plan	http://www.smartgrowthamerica.org/documents/cs/impl/ca-losangeles-dot-strategicplan2014.pdf
LA DOT Bicycle Services	http://bicyclela.org/
LA DOT Safety	http://www.ladot.lacity.org/WhatWeDo/Safety/index.htm
Traffic Study Policies and Procedures	http://ladot.lacity.org/stellent/groups/departments/@ladot_contributor/documents/contributor_web_content/lacityp_026875.pdf
Watch the Road	http://www.watchtheroad.org/
Sweden	
Achieving Traffic Safety Goals in the United States: Lessons From Other Nations	http://onlinepubs.trb.org/onlinepubs/sr/sr300.pdf
An Independent Review of Road Safety in Sweden	http://publikationswebbutik.vv.se/upload/4314/2008_109_an_independent_review_of_road_safety_in_sweden.pdf
International Transport Forum: Road Safety Annual Report 2014	http://www.internationaltransportforum.org/pub/pdf/14IrtadReport.pdf
Management By Objectives For Road Safety Work Stakeholder Collaboration Towards New Interim Targets 2020	http://publikationswebbutik.vv.se/upload/4253/89217_management_by_objectives_for_road_safety_work_stakeholder_collaboration_towards_new_interim_targets_2020_summary.pdf
Urban Mobility Strategy	http://international.stockholm.se/globalassets/ovriga-bilder-och-filer/urban-mobility-strategy.pdf
Netherlands	
Advancing Sustainable Safety: National Road Safety Outlook for 2005-2020	http://www.swov.nl/rapport/dmdv/Advancing_sustainable_safety.pdf
Cycling in the Netherlands	http://www.fietsberaad.nl/library/repository/bestanden/CyclingintheNetherlands2009.pdf
International Transport Forum: Road Safety Annual Report 2014	http://www.internationaltransportforum.org/pub/pdf/14IrtadReport.pdf
Road Safety Strategic Plan: 2008-2020	http://www.fietsberaad.nl/library/repository/bestanden/5a_Philippens_I_CSC2012.pdf
Signalized Intersection Safety in Europe	http://international.fhwa.dot.gov/pubs/pl03020/pl03020.pdf
Sustainable Safety	http://www.fietsberaad.nl/index.cfm?lang=en&section=kennisbank&mode=list&kennisbankPage=Categorisering+en+fietsen+in+verblijfsgebieden
London	
Intelligent Pedestrian Technology	http://www.tfl.gov.uk/info-for/media/press-releases/2014/march/tfl-to-launch-worldleading-trials-of-intelligent-pedestrian-technology-to-make-crossing-the-road-easier-and-safer
The Mayor's Vision For Cycling in London	http://www.tfl.gov.uk/cdn/static/cms/documents/gla-mayors-cycle-vision-2013.pdf
"Lorry Drivers Have No More Excuses When it Comes to Cycling Blind Spots"	http://www.theguardian.com/environment/green-living-blog/2010/aug/02/hgv-lorries-cycling-campaign
Pedestrian Safety Action Plan	http://www.tfl.gov.uk/cdn/static/cms/documents/pedestrian-safety-action-plan.pdf
Plans For New Out-Of-Hours Delivery Trials	http://www.tfl.gov.uk/info-for/media/news-articles/plans-for-new-outofhours-delivery-trials
Puffin Crossing Study	http://www.trl.co.uk/reports-publications/trl-reports/traffic-

	management/report/?reportid=6680
Safe Streets for London: The Road Safety Action Plan for London 2020	https://www.tfl.gov.uk/cdn/static/cms/documents/safe-streets-for-london.pdf
Safer Lorries Scheme	http://www.tfl.gov.uk/info-for/media/press-releases/2014/july/safer-lorries-scheme-consultation
Trial of Roadside Safety Mirrors for Cycle Visibility	https://www.tfl.gov.uk/cdn/static/cms/documents/trial-of-roadside-safety-mirrors-for-cycle-visibility-report.pdf
Supplemental Efficacy Sources	
Section 1: Supportive infrastructure/ Planning	
1.1 Safety Action Plan (Vision Zero)/ Strategy	
Health in All Policies: A Guide for State and Local Governments	Rudolph, L., J. Caplan, K. Ben-Moshe, and L. Dillon. <i>Health in All Policies: A Guide for State and Local Governments</i> . American Public Health Association and Public Health Institute, Washington, DC and Oakland, CA, 2013.
Health in all Policies: Taking Stock of Emerging Practices to Incorporate Health in Decision Making in the United States	Gase L.N., R. Pennotti, and K.D. Smith Health in All Policies: Taking Stock of Emerging Practices to Incorporate Health in Decision Making in the United States. <i>Journal of Public Health Management and Practice</i> , Vol. 19, No. 6, 2013, p. 529–540.
1.2 Vision Zero Policy (or VZ like policy)	
Towards Zero: Ambitious Road Safety Targets and the Safe System Approach.	Organization for Economic Cooperation and Development/ International Transportation Forum. <i>Towards Zero: Ambitious Road Safety Targets and the Safe System Approach</i> . OECD Publishing, Paris, 2008.
The Vision Thing: Actors, Decision-Making and Lock-In Effects in Swedish Road Safety Policy since the 1990s	Andersson, F., and T. Pettersson. <i>The Vision Thing: Actors, Decision-Making, and Lock-In Effects in Swedish Road Safety Policy Since the 1990s</i> . Umeå°, Sweden: Umeå° Universitetet, 2008.
1.3 Vision Zero Steering Committee	
Governance Tools and Framework for Health in All Policies	St-Pierre, L. <i>Governance Tools and Framework for Health in All Policies</i> . National Collaborating Centre for Healthy Public Policy. http://www.ci.richmond.ca.us/DocumentCenter/Home/View/9047 .
Section 2: Engineering	
2.1a Informative Signage: Advisory/cautionary signs (e.g. "State Law: Stop for Pedestrians"; "High Bicycle Activity Zone")	
Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research	Mead, J., C. Zegeer, and M. Bushell. <i>Evaluation of Pedestrian-Related Roadway Measures: A Summary of Available Research</i> . Pedestrian and Bicycle Information Center. April, 2013.
2.1b Informative Signage: Dynamic message signs with safety messaging	
Effectiveness of Safety and Public Service Announcement Messages on Dynamic Message Signs	Federal Highway Administration. <i>Effectiveness of Safety and Public Service Announcement Messages on Dynamic Message Signs</i> . Publication FHWA-HOP-14-015. FHWA, U.S. Department of Transportation, 2014.
2.2 Perform engineering reviews at all traffic fatality and high collision locations and at scenes of crashes	
Highway Safety Improvement Program Manual	Federal Highway Administration. <i>Highway Safety Improvement Program Manual</i> . Publication FHWA-SA-09-029. FHWA, U.S. Department of Transportation, 2010.
Road Safety as a Shared Responsibility and a Public Problem in Swedish Road Safety Policy	McAndrews, C. Road Safety as a Shared Responsibility and a Public Problem in Swedish Road Safety Policy. <i>Science, Technology, & Human Values</i> , Vol. 38, No. 6, 2013, pp. 749-772.
Presentation at Workshop on Independent and Transparent Accident Investigation	Bergfalk, L. Presentation at Workshop on Independent and Transparent Accident Investigation Recommendations, Brussels. 2007. http://erso.swov.nl/safetynet/fixe/WP4/Workshop_3_2007/sn_wp4_Br

Recommendations	ussels_WSguest4_SwedishTrafficInspectorate_LB.pdf.
2.3b Restrictions on street access: Restrict car access in the city center	
Green Light for Midtown Evaluation Report	http://www.nyc.gov/html/dot/downloads/pdf/broadway_report_final2010_web.pdf
Vehicle Restrictions: Limiting Automobile Travel at Certain Times and Places	http://www.vtpi.org/tdm/tdm33.htm
2.4 Shared-space area for cars, bicyclists and pedestrians	
Lesson 20: Traffic Calming	U.S. Department of Transportation. <i>Lesson 20: Traffic Calming</i> . July 2006. http://www.fhwa.dot.gov/publications/research/safety/pedbike/05085/pdf/lesson20lo.pdf .
2.5b Signal hardware additions: Pedestrian countdown signal	
2.8h Road design and maintenance: Restrict parking near intersections (aka "daylighting")	
Toolbox of Countermeasures and Their Potential Effectiveness for Pedestrian Crashes	Federal Highway Administration. <i>Toolbox of Countermeasures and their Potential Effectiveness for Pedestrian Crashes</i> . Publication FHWA-SA-014. FHWA, U.S. Department of Transportation, 2013.
2. 7b Slow Zone: Senior slow/safety zones	
2.7c Slow zones around schools/ local streets	
Safe Streets for Seniors	http://www.nyc.gov/html/dot/html/pedestrians/safeseniors.shtml
Neighborhood Slow Zones	http://www.nyc.gov/html/dot/html/motorist/slowzones.shtml
Slow Zones: Their Impact on Mode Choices and Travel Behaviour	O'Fallon, C., and C. Sullivan. <i>Slow Zones: Their Impact on Mode Choices and Travel Behaviour</i> . NZ Transport Agency, Research Report 438, 2011.
2.8a Road design and maintenance: Advance stop or yield lines	
2.8c Road design and maintenance: High Visibility Crosswalk	
Achieving Vision Zero: A Data-Driven Investment Strategy for Eliminating Pedestrian Fatalities on a Citywide Level	Kronenberg, C., Woodard, L., DuBose, B., and Weissman, D. <i>Achieving Vision Zero: A Data-Driven Investment Strategy for Eliminating Pedestrian Fatalities on a Citywide Level</i> . In <i>TRB 94th Annual Meeting Compendium of Papers</i> . 2015.
2.8b Road design and maintenance: Enhanced sharrow marking	
Evaluation of Bicycle-Related Roadway Measures: A Summary of Available Research	Mead, J., A. McGrane, C. Zegeer, and L. Thomas. <i>Evaluation of Bicycle-Related Roadway Measures: A Summary of Available Research</i> . Pedestrian and Bicycle Information Center. February, 2014.
Section 3: Education	
3.2 Educate state level organizations on city actions and Vision Zero commitments to broaden understanding of Vision Zero's impact on pedestrian/bike/traffic fatalities and injuries	
Road Safety as a Shared Responsibility and a Public Problem in Swedish Road Safety Policy	McAndrews, C. <i>Road Safety as a Shared Responsibility and a Public Problem in Swedish Road Safety Policy</i> . <i>Science, Technology, & Human Values</i> , Vol. 38, No. 6, 2013, pp. 749-772.
Health in All Policies: A Guide for State and Local Governments	Rudolph, L., J. Caplan, K. Ben-Moshe, and L. Dillon. <i>Health in All Policies: A Guide for State and Local Governments</i> . American Public Health Association and Public Health Institute, Washington, DC and Oakland, CA, 2013.
3.3 Engage with community based organizations and advocates	
Health in All Policies: A Guide for State and Local Governments.	Rudolph, L., J. Caplan, K. Ben-Moshe, and L. Dillon. <i>Health in All Policies: A Guide for State and Local Governments</i> . American Public Health Association and Public Health Institute, Washington, DC and Oakland, CA, 2013.
3.10 Trainings for senior citizens on walking and biking	
Safe Routes for Seniors: Improving Walkability for Seniors in New York City	Shin-pei, T. <i>Safe Routes for Seniors: Improving Walkability for Seniors in New York City</i> . http://activelivingresearch.org/safe-routes-seniors-improving-walkability-seniors-new-york-city
Evaluation of the Walkable Neighborhoods for Seniors	Hooker, S. P., L.A. Cirill, and A. Geraghty. <i>Evaluation of the Walkable Neighborhoods for Seniors Project in Sacramento County</i> . <i>Health</i>

Project in Sacramento County	<i>Promotion Practice</i> , Vol 10. No. 3, 2011, pp. 402-410.
Section 4: Enforcement	
<i>4.1e Automated Enforcement: Point to Point Camera</i>	
Effects of Average Speed Enforcement on Speed Compliance and Crashes: A Review of the Literature.	Soole, D. W., B.C. Watson, and J.J. Fleiter, J. J. Effects of Average Speed Enforcement on Speed Compliance and Crashes: A Review of the Literature. <i>Accident Analysis & Prevention</i> , Vol. 51, 2013, pp. 46-56.
Austrroads Research Report: REPORT: Point to Point Speed Enforcement	Soole, D.W., J. Fleiter, and B. Watson. Austrroads Research Report: REPORT: Point to Point Speed Enforcement. <i>Centre of Accident Research and Road Safety</i> . Publication AP-R415-12.
<i>4.2 Convene regular meetings of transportation leaders and the police department to review traffic safety performance and determine strategies for improvement</i>	
Road Safety in the Context of Urban Development in Sweden and California	McAndrews, Carolyn. Road Safety in the Context of Urban Development in Sweden and California. <i>UC Berkeley: City & Regional Planning</i> . 2010.
Country Guidelines for the Conduct of Road Safety Management Capacity Reviews and the Specification of Lead Agency Reforms.	Bliss, T., and J. Breen. <i>Country Guidelines for the Conduct of Road Safety Management Capacity Reviews and the Specification of Lead Agency Reforms</i> . The World Bank Global Road Safety Facility, Washington, DC, 2009.
<i>4.6 Investigate crashes that result in fatalities as well as crashes that result in critical injuries</i>	
An Independent Review of Road Safety in Sweden	Breen, J., E. Howard, and T. Bliss, T. <i>Independent Review of Road Safety in Sweden</i> . 2008.
Presentation at Workshop on Independent and Transparent Accident Investigation Recommendations	Bergfalk, L. Presentation at Workshop on Independent and Transparent Accident Investigation Recommendations, Brussels. 2007. http://erso.swov.nl/safetynet/fixd/WP4/Workshop_3_2007/sn_wp4_Brussels_WSgust4_SwedishTrafficInspectorate_LB.pdf .
<i>4.7 Random breath testing</i>	
A National Examination of Random Breath Testing and Alcohol-Related Traffic Crash Rates	Ferris, J., L. Mazerolle, M. King, L. Bates, S. Bennett, and M. Devaney. Random Breath Testing in Queensland and Western Australia: Examination of How the Random Breath Testing Rate Influences Alcohol Related Traffic Crash Rates. <i>Accident Analysis & Prevention</i> , Vol. 60, 2013, pp. 181-188.
Random Breath Testing: A Canadian Perspective	Solomon, R., E. Chamberlain, M. Abdoullaeva, and B. Tinholt, B. Random Breath Testing: A Canadian Perspective. <i>Traffic Injury Prevention</i> , Vol. 12, No. 2, 2011, pp. 111-119.
<i>4.8 Update technology that assists with capturing crash data and/or speed detection</i>	
Data systems: A Road Safety Manual for Decision-Makers and Practitioners	World Health Organization. <i>Data systems: A Road Safety Manual for Decision-Makers and Practitioners</i> . 2010. http://apps.who.int/iris/bitstream/10665/44256/1/9789241598965_eng.pdf
Section 5: Monitoring, Analysis, and Evaluation	
<i>5. 1 Comparative data system linking social and environment factors with injury data</i>	
<i>5.6 Publish city-wide collision report</i>	
Data systems: A Road Safety Manual for Decision-Makers and Practitioners	World Health Organization. <i>Data systems: A Road Safety Manual for Decision-Makers and Practitioners</i> . 2010. http://apps.who.int/iris/bitstream/10665/44256/1/9789241598965_eng.pdf
<i>5. 2 Continual, proactive monitoring and feedback gathering from the community on their safety issues and concerns</i>	
Pedestrian Safety: A Road Safety Manual for Decision-Makers and Practitioners.	World Health Organization. <i>Pedestrian Safety: A Road Safety Manual for Decision-Makers and Practitioners</i> . World Health Organization, Geneva, Switzerland, 2013.
<i>5.3 Engage in public health surveillance on traffic-related hospitalizations and fatalities</i>	
Data systems: A Road Safety	World Health Organization. <i>Data systems: A Road Safety Manual for</i>

Manual for Decision-Makers and Practitioners	<i>Decision-Makers and Practitioners</i> . 2010. http://apps.who.int/iris/bitstream/10665/44256/1/9789241598965_eng.pdf
Review of Swedish Experiences Concerning Analysis of People Injured in Traffic Accidents	Howard, C. and A. Linder. Review of Swedish Experiences Concerning Analysis of People Injured in Traffic Accidents. 2013. https://www.vti.se/en/publications/pdf/review-of-swedish-experiences-concerning-analysis-of-people-injured-in-traffic-accidents.pdf .
5.4 Independent review/audit of safety program	
An Independent Review of Road Safety in Sweden	Breen, J., E. Howard, and T. Bliss, T. <i>Independent Review of Road Safety in Sweden</i> . 2008.
Evaluating the Effectiveness of State Toward Zero Deaths Program	Munnich, L.W., F. Douma, X. Qin, J.D. Thorpe, and K. Wang. <i>Evaluating the Effectiveness of State Toward Zero Deaths Program</i> . Report CTS 12-39T. Center for Excellence in Rural Safety, University of Minnesota, Minneapolis, 2012.
NCHRP Synthesis of Highway Practice 336: Road Safety Audits	Wilson, E. M., and M. E. Lipinski. <i>NCHRP Synthesis of Highway Practice 336: Road Safety Audits</i> . Transportation Research Board of the National Academies, Washington, D.C., 2004
5.5 Interagency sharing of collision and other key data	
Road Safety as a Shared Responsibility and a Public Problem in Swedish Road Safety Policy	McAndrews, C. Road Safety as a Shared Responsibility and a Public Problem in Swedish Road Safety Policy. <i>Science, Technology, & Human Values</i> , Vol. 38, No. 6, 2013, pp. 749-772.
Data systems: A Road Safety Manual for Decision-Makers and Practitioners	World Health Organization. <i>Data systems: A Road Safety Manual for Decision-Makers and Practitioners</i> . 2010. http://apps.who.int/iris/bitstream/10665/44256/1/9789241598965_eng.pdf
5.7 Routine evaluation of effectiveness of traffic safety interventions	
Presentation at Workshop on Independent and Transparent Accident Investigation Recommendations	Bergfalk, L. Presentation at Workshop on Independent and Transparent Accident Investigation Recommendations, Brussels. 2007. http://erso.swov.nl/safetynet/fixd/WP4/Workshop_3_2007/sn_wp4_Brussels_WSguest4_SwedishTrafficInspectorate_LB.pdf .
Road Safety Inspections: Best Practice and Implementation Plan	European Road Safety Observatory. Road Safety Inspections: Best Practice and Implementation Plan. http://ec.europa.eu/transport/wcm/road_safety/erso/knowledge/Content/70_qrst/monitoring_targets.htm .
Policy Instruments for Managing Road Safety on EU-Roads	Laurinavicius, A., L. Jukneviute-Zilinskiene, K. Ratkeviciute, I. Lingyte, L. Cygaite, V. Grigonis, ...A. Varhely. Policy Instruments for Managing Road Safety on EU-Roads. <i>Transport</i> , Vol. 27, No. 4, 2012, pp. 397-404.
5.8 Website with relevant safety data collected in a timely manner	
What Do the Best Government Websites of 2015 Have in Common?	Wood, C., S. Towns, N. Knell, and J. Mulholland. <i>What Do the Best Government Websites of 2015 Have in Common?</i> Government Technology. Sept. 2015. http://www.govtech.com/internet/2015-Best-of-the-Web-Award-Winners-Announced.html .
Using Technology to Promote Transparency in City Government	Pulidindi, J. Using Technology to Promote Transparency in City Government. <i>National League of Cities</i> . 2010.
Section 6: Policy	
6.1 Measures to reduce traffic volumes	
Traffic Accidents and the London Congestion Charge	Green, C. P., J.S. Heywood, and M. Navarro. <i>Traffic Accidents and the London Congestion Charge</i> . Economics Working Paper Series, Lancaster, Lancaster University Management School, 2014.
6.5 Pre-pay for morning parking to discourage drinking and driving	
Overnight Options	Estey, M. Overnight Options. <i>International Parking Institute</i> . Nov. 2015. http://www.parking.org/media/320165/prepaid%20parking%20in%20seattle.pdf .

Successful Pre-Paid Parking Program Saves Lives	http://sdotblog.seattle.gov/2013/03/18/successful-pre-paid-parking-program-saves-lives/
<i>6.6 Restrict deliveries to off peak hours to remove trucks from the busiest streets to improve road safety and ease congestion</i>	
Delivering a Road Freight Legacy: Working Together for Safer, Greener and More Efficient Deliveries in London	Transport for London. Delivering a Road Freight Legacy: Working Together for Safer, Greener and More Efficient Deliveries in London. 2013. http://content.tfl.gov.uk/delivering-a-road-freight-legacy.pdf .
SWOV Fact Sheet: Blind Spot Crashes	SWOV Institute for Road Safety. SWOV Fact Sheet: Blind Spot Crashes. https://www.swov.nl/rapport/Factsheets/UK/FS_Blind_spot_crashes.pdf
<i>6.7b Policies targeted at protecting vulnerable users: Illegal to harass (threaten verbally or physically) a vulnerable user</i>	
Good Intentions: The Enforcement of Hate Crime Penalty-Enhancement Statutes.	Franklin, K. Good Intentions: The Enforcement of Hate Crime Penalty-Enhancement Statutes. <i>The American Behavioral Scientist</i> , Vol. 46, No. 1, 2002, pp. 154-172.
Improving Road Safety Through Deterrence-Based Initiatives: A Review of Research	Davey, J. D., and J.E. Freeman. Improving Road Safety Through Deterrence-Based Initiatives: A Review of Research. <i>Sultan Qaboos University Medical Journal</i> , Vol. 11, No. 1, 2011, pp. 29-37.
<i>6.8 Target safety improvements to school areas</i>	
Healthy Urban Environments for Children and Young People: A Systematic Review of Intervention Studies	Audrey, S., and H. Batista-Ferrer. Healthy Urban Environments for Children and Young People: A Systematic Review of Intervention Studies. <i>Health & Place</i> , Vol. 36, 2015, pp. 97-117.
Effectiveness of a Safe Routes to School Program in Preventing School-Aged Pedestrian Injury	DiMaggio, C., and L. Guohua. Effectiveness of a Safe Routes to School Program in Preventing School-Aged Pedestrian Injury. <i>Pediatrics</i> , Vol. 131, No. 2, 2013, 290-296.
<i>6.11b State level policies targeted at protecting vulnerable users: Mandatory for cars to give at least three feet of clearance when passing a bicycle in the same lane (aka "three-foot rule")</i>	
Is the Three-Foot Bicycle Passing Law Working in Baltimore, Maryland?	Love, D. C., A. Breaud, S. Burns, J. Margulies, M. Romano, and R. Lawrence. Is the Three-Foot Bicycle Passing Law Working in Baltimore, Maryland? <i>Accident Analysis and Prevention</i> , Vol. 48, 2012, pp. 451-456.
The 3 ft. Law: Lessons Learned from a National Analysis of State Policy and Expert Interviews	Brown, C. The 3 ft. Law: Lessons Learned from a National Analysis of State Policy and Expert Interviews. New Jersey Bicycle and Pedestrian Resource Center. http://njbikeped.org/wp-content/uploads/2013/04/3-Foot-Final-Report-Draft_V7.pdf .
<i>6.11d State level policies targeted at protecting vulnerable users: Vulnerable User Law</i>	
Is it time to Advocate for a Vulnerable Road User Protection Law in New Zealand?	Weiss, H. and A. Ward. Is it time to Advocate for a Vulnerable Road User Protection Law in New Zealand? <i>New Zealand Medical Journal</i> , Vol. 126, No. 1374, 2013, 5-10.
The Deterrent Effect of Increasing Fixed Penalties for Traffic Offences: The Norwegian Experience	Elvik, R., and P. Christensen. The Deterrent Effect of Increasing Fixed Penalties for Traffic Offences: The Norwegian Experience. <i>Journal of Safety Research</i> , Vol. 38, No. 6, 2007, pp. 689-695.
<i>6.14 Lower Alcohol Limit</i>	
Reaching Zero: Actions to Eliminate Alcohol-Impaired Driving	National Transportation Safety Board. 2013. Reaching Zero: Actions to Eliminate Alcohol-Impaired Driving. Safety Report NTSB/SR-13/01. Washington, DC: NTSB.
The Effects of Introducing or Lowering Legal per se Blood Alcohol Limits for Driving: An International Review.	Mann, R. E., S. Macdonald, G. Stoduto, S. Bondy, B. Jonah, and A. Shaikh. The Effects of Introducing or Lowering Legal per se Blood Alcohol Limits for Driving: An International Review. <i>Accident Analysis & Prevention</i> , Vol. 33, No. 5, 2001, pp. 569-583
Section 7: Large Vehicles	
<i>7.1 Heavy Goods/ Large Vehicle Task Force to suggest safety improvements and monitor regulations</i>	

Industrial HGV Task Force Review of First Six Months of Operations	Transport for London. Industrial HGV Task Force Review of First Six Months of Operations. http://democracy.cityoflondon.gov.uk/documents/s37699/Road%20Safety-%20Casualties%20and%20Collisions-%20Appendix.pdf .
<i>7.4 Outfit large vehicles with front and side mirrors to improve visibility</i>	
Truck Mirrors, Fields of View, and Serious Truck Crashes	Blower, D.F. Truck Mirrors, Fields of View, and Serious Truck Crashes. Publication UMTRI-2007-25. Ann Arbor, Michigan: University of Michigan Transportation Research Institute. 2007.
<i>7.5 Outfit large vehicles with rear wheel and side guards</i>	
Truck Sideguards for Vision Zero: Review and Technical Recommendations for Safe Fleet Transition Plan Pilot Deployment	Epstein, A.K., S. Peirce, A. Breck, C. Cooper, and E. Segev. Truck Sideguards for Vision Zero: Review and Technical Recommendations for Safe Fleet Transition Plan Pilot Deployment. USDOT John A. Volpe National Transportation Systems Center. Publication DOT-VNTSC-DCAS-14-01. 2014.
Section 8: Vehicle Technology	
<i>8.3 Intelligent speed adaption technologies that alert or slow the vehicle if traveling over the speed limit</i>	
Is Intelligent Speed Adaptation Ready for Deployment?	Carsten, O. Is Intelligent Speed Adaptation Ready for Deployment? <i>Accident Analysis & Prevention</i> , Vol. 48, 2012, pp. 1-3.
How Much Benefit Does Intelligent Speed Adaptation Deliver: An Analysis of its Potential Contribution to Safety and Environment.	Lai, F., O. Carsten, and F. Tate, F. How Much Benefit Does Intelligent Speed Adaptation Deliver: An Analysis of its Potential Contribution to Safety and Environment. <i>Accident Analysis & Prevention</i> , Vol. 48, 2012, pp. 63-72.
<i>8.5 Partner with industry groups and vehicle manufacturers to further the use of technology to achieve safety aims</i>	
Vision Zero: Adopting a Target of Zero for Road Traffic Fatalities and Serious Injuries	Whitelegg, J., and G. Haq. <i>Vision Zero: Adopting a Target of Zero for Road Traffic Fatalities and Serious Injuries</i> . Stockholm Environment Institute, Stockholm, 2006.
Road Safety: Impact of New Technologies	OECD. Road Safety: Impact of New Technologies. 2003. http://www.internationaltransportforum.org/Pub/pdf/03SRnewTech.pdf
9. Taxi Services/Transportation Network Company	
<i>9.2 Black box data recorders in taxis</i>	
Vehicle Safety Technology Pilot Program	http://www.nyc.gov/html/tlc/html/industry/veh_safety_tech_pilot_program.shtml
Driver Characteristic Using Driving Monitoring Recorder	Ueyama, M. J. Driver Characteristic Using Driving Monitoring Recorder. Proceedings of the 17th International Technical Conference on the Enhanced Safety of Vehicles (ESV) Conference, June 4-7, 2001 in Amsterdam, The Netherlands. National Highway Traffic Safety Administration, Washington, DC. DOT HS 809 220, June 2001.
<i>9.3 Increase late-night taxi stand zones</i>	
Overnight Options	Estey, M. Overnight Options. <i>International Parking Institute</i> . Nov. 2015. http://www.parking.org/media/320165/prepaid%20parking%20in%20seattle.pdf .

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