

Seattle Department of Transportation

SAFE ROUTES TO SCHOOL

2016-2021 Youth Safety Report



Seattle
Department of
Transportation

SUMMARY



Between 2016 and 2021 there have been **no fatalities** of youth under 18 walking or biking in Seattle.



24 youth have been seriously injured while walking, biking, or rolling within the same time period, which is about **4** youth per year on average.



2018 and 2020 had the highest number of serious injury collisions, with **8** youth each year getting hit while walking or biking.



Youth under 18 make up **15%** of Seattle's population (2020 census data).



Most of the collisions involved youth pedestrians, with 19 out of 24 total crashes, or **80%**, occurring when a driver struck a walking youth.



Nearly all of the youth seriously injured on bicycles or scooters were not wearing helmets.



High school aged youth made up **over half** of the total serious injury collisions.



Nearly **90%** of the crashes were on arterial streets. $\frac{1}{4}$ were in a school crosswalk.



Only **1** crash was in a school crosswalk on a school day, which shows us the importance of increasing safety for youth citywide.

INTRODUCTION

In 2015, Seattle launched [Vision Zero](#), our plan to end traffic deaths and serious injuries on city streets by 2030. To achieve this goal, we are working across departments and in partnership with others to improve the safety of people of all ages throughout our city streets.

SDOT aims to move toward a more proactive approach to transportation safety. [The Safe System approach](#), recently embraced by the Federal Highway Administration and the US Department of Transportation, provides a framework for achieving Vision Zero, based on six key principles and five main strategy areas (Figure 1).



FIGURE 1

The principles reaffirm our belief that death and serious injury is unacceptable and preventable, that humans make mistakes and are vulnerable, and that we must design a transportation system that accounts for that so that when a crash occurs, it will not end in death or injury.

Critical to the Safe System approach is the idea that safety is proactive and that stewards of the right of way hold great responsibility for designing and managing streets with slower vehicle speeds, centering the safety of the most vulnerable.

We use the term “vulnerable traveler” throughout this document to mean people walking, rolling (using a wheelchair or wheeled mobility device), and biking. Vulnerability also comes with age, ability, and size, which makes it particularly relevant to a discussion of the safety of young people.

Safe Routes to School (SRTS) is a national movement to make it easier and safer for students to walk and bike to school. Our goal is for all of Seattle youth to start and end their day with the benefits of walking and biking to school, including having fun, arriving at school on time for breakfast and ready to learn, strengthening their connections to their communities, improving physical and mental health, and finishing their school day with additional time outdoors.

In the fall of 2015, SDOT’s [SRTS program](#) launched its first [5 Year Action Plan](#), which laid out a combination of strategies to improve safety and to get more students walking and bicycling to school. In 2021 we continued that work with our [second Action Plan](#) which includes 50 actions across the 7 E’s: Equity, Environment, Education, Empowerment, Encouragement, Engineering, and Evaluation.

This report examines the safety of walking and biking for Seattle’s youth by reviewing youth bicycle and pedestrian serious injury and fatal collisions from 2016 to 2021, which is the latest year for which we have a complete dataset.

COLLISION ANALYSIS

Data

This analysis evaluates police traffic collision reports of youth 17 and under who were seriously injured while walking or biking. This includes collisions involving non-motorized scooters, electric bicycles, and electric scooters. In each case, the child was injured by a crash with a vehicle. The data does not include collisions without a police report.

The police reports do not capture the racial identities of the youth involved in the collisions, so we aren't able to fully understand how these crashes impact communities of color. However, we know that half of the collisions occurred in areas with the highest disadvantage, according to the [Race and Social Equity Index](#). The areas of highest disadvantage are identified based on race, ethnicity, socioeconomic and health disadvantages, and several other related demographics.

The term "youth" may typically describe a middle school to high school aged person, but for the purposes of this report, the term "youth" refers to anyone under the age of eighteen. The youngest person seriously injured while walking or biking during this time was seven years old, but the majority of injuries were experienced by high school aged youth.

When and Where were Youth Hit by Drivers?

From 2016 to 2021, there were no fatalities involving youth under 18 while walking or biking in Seattle.

There were 24 youth bicycle, scooter, pedestrian, electric bike or electric scooter serious injury collisions, for an average of 4 crashes per year.

Youth Walking and Rolling Serious Injuries

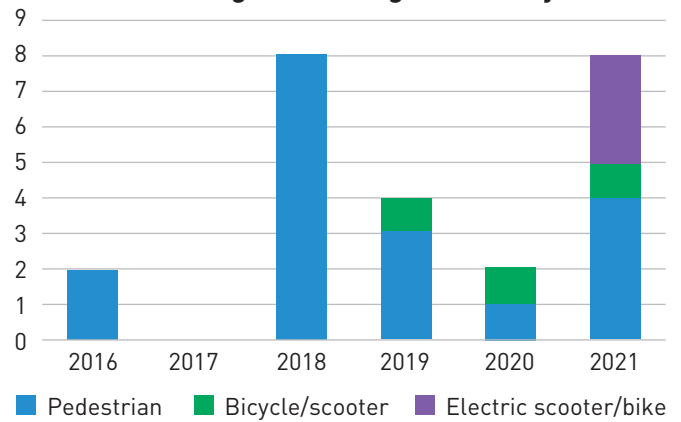


FIGURE 2

Seattle Serious Injuries and Fatalities, all ages

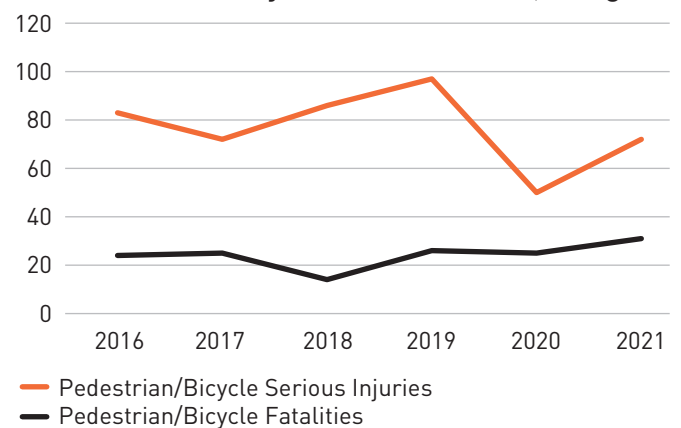


FIGURE 3

2018 and 2021 experienced the most collisions with 8 recorded crashes in each of those years.

Most of the collisions involved pedestrians, with 19 out of 24 total crashes, or 80%, occurring when a driver struck a walking youth. Seattle sees more kids on foot than on bike, and that is reflected in the crash data as well.

In every crash involving a bicycle, electric scooter, or electric bike, youth were not wearing helmets.

Youth Serious Injury Collisions 2016-2021

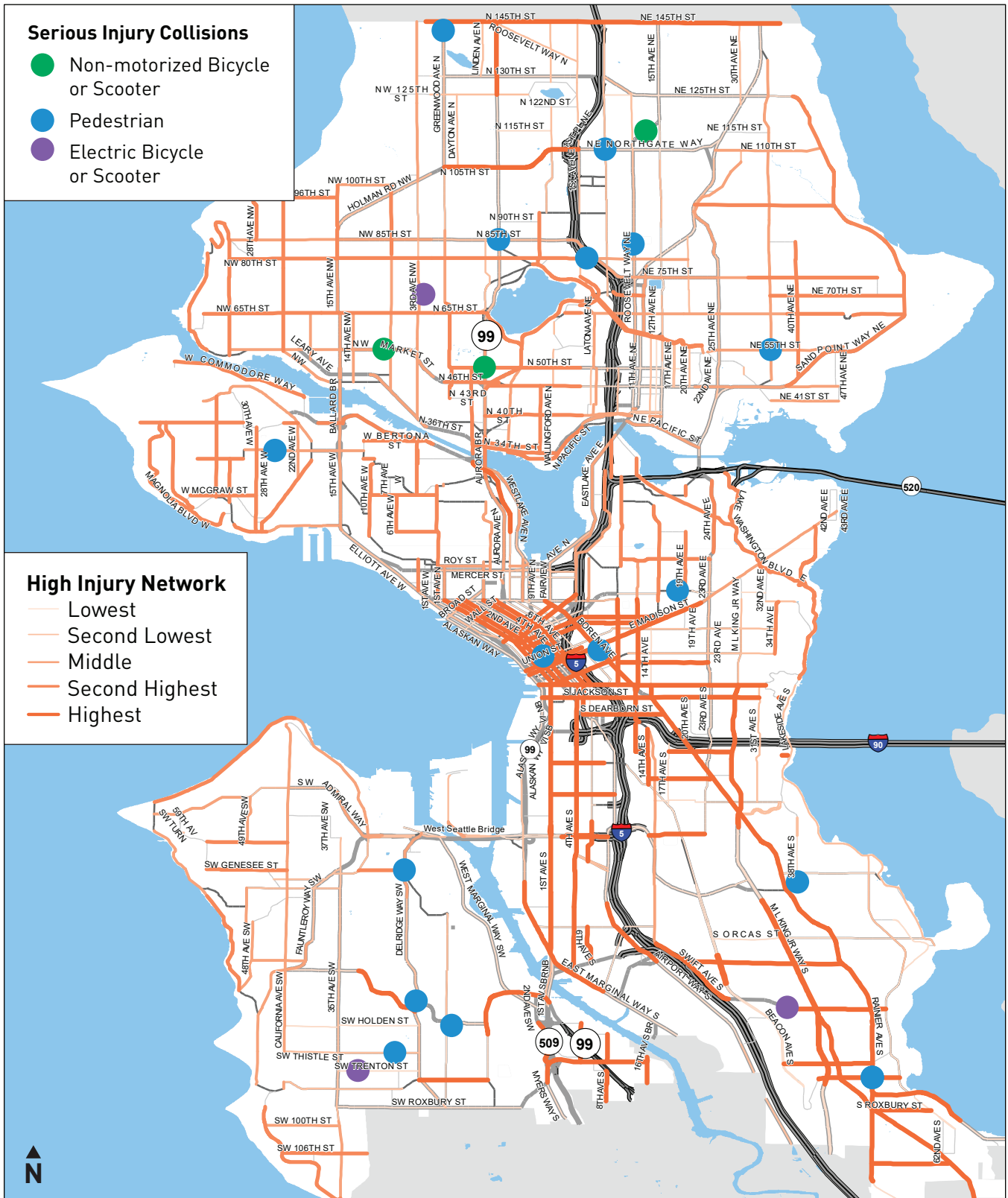


FIGURE 4

Youth Collisions and Race and Social Equity

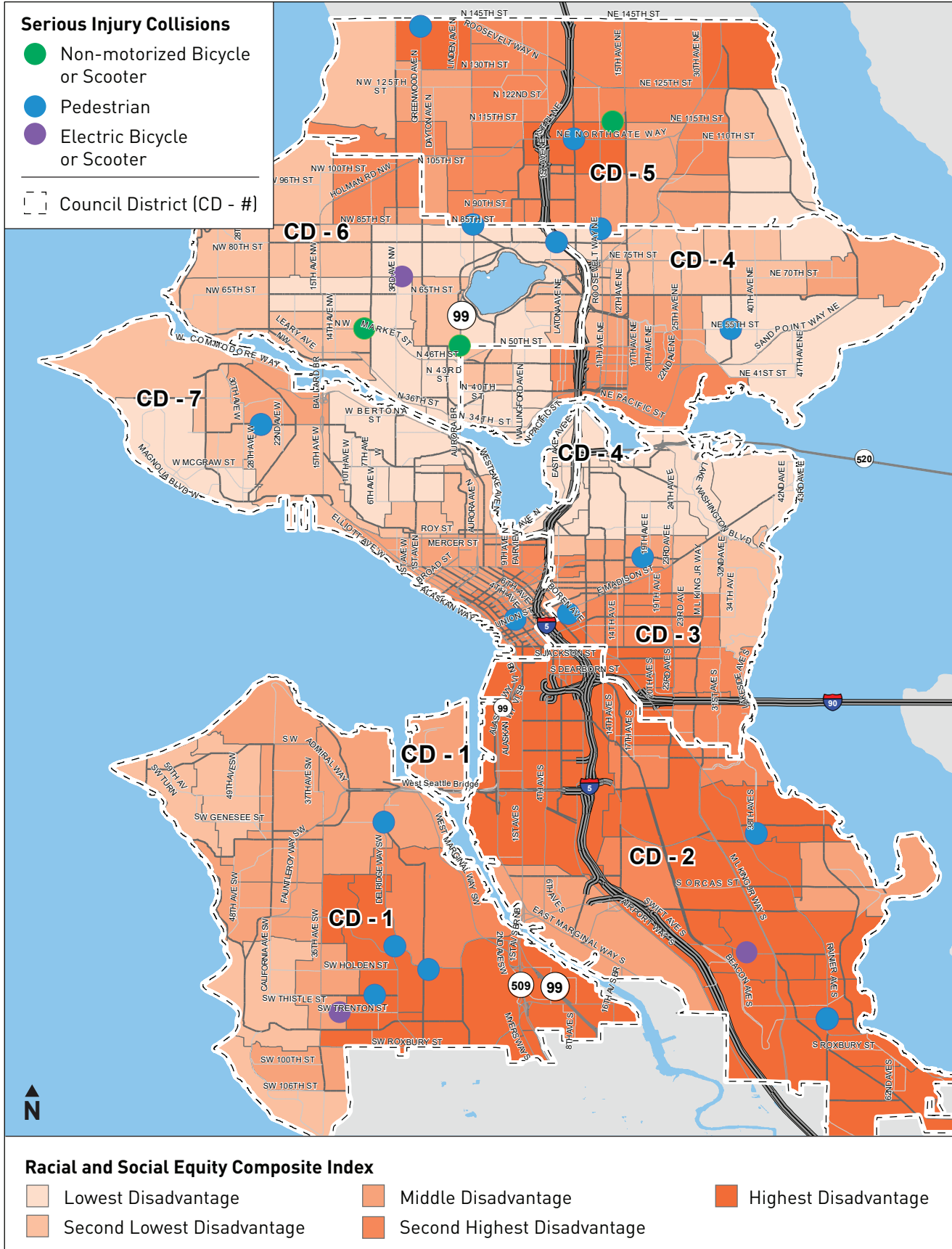


FIGURE 5

The rates of pedestrian and bicyclist serious injuries of all people traveling in Seattle peaked in 2019 and dropped in 2020. In 2021, the rates of serious injury collisions increased across all ages. Within the same six-year period, the rate of adult pedestrian and bicycle fatalities has been fairly consistent, averaging 25 people killed per year.

Orange lines indicate the city’s High Injury Network based on the history of serious injury and fatal crashes and the City’s Race and Social Equity Index. The boldest lines are the highest priority streets to redesign for safety.

The above map (Figure 4) shows the location where each serious injury collision occurred. More than three fourths of them occurred within the City’s High Injury Network of streets. The High Injury Network is based on a 5-year history of serious injury and fatal crashes, as well as the City’s Race and Social Equity Index. The darker, thicker lines are the highest priorities to redesign for safety.

By overlaying the collision locations on the Race and Social Equity Index map (Figure 5), we can see that **50% of collisions occurred within or on the border of the highest 20% of disadvantaged tracts across the city.** Areas with the highest disadvantage are based on data relating to race, ethnicity, socioeconomic and health disadvantages, the sub-index of Race, English Language Learners and Origins Index, and other related demographics. This illustrates that there is a race and social equity element to the safety of youth walking and biking in Seattle.

The majority of collisions occurred within Districts 1, 2, and 6.

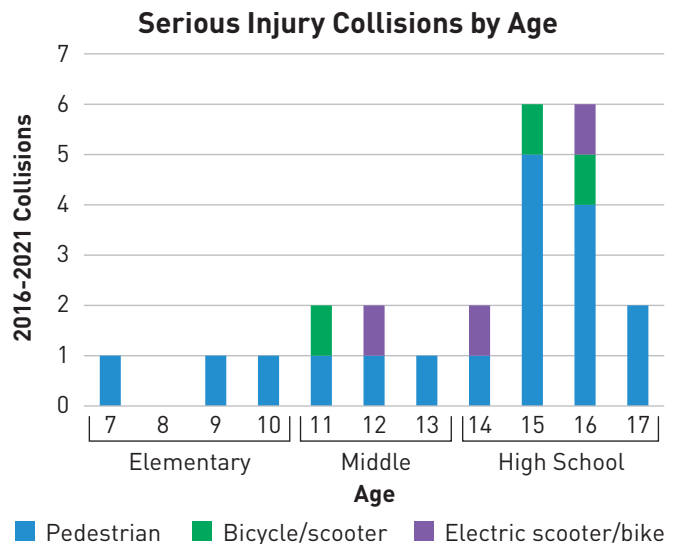


FIGURE 6

The majority of youth involved in serious injury bicycle and pedestrian collisions during this time period were high school age.

Age

Five were middle school age and three were elementary school age. Fifteen and sixteen-year-olds made up over half of the total crashes.

Gender

Serious injury collisions among youth occurred at exactly the same rate for boys as girls, with 12 boys and 12 girls seriously injured between the years of 2016 and 2021.

Relation to School Travel

Slightly more than half of these collisions happened on a school day (Figure 7). One quarter happened within a school crosswalk, but only one collision occurred on a school day within a school crosswalk. School crosswalks are enhanced with fluorescent signage alerting drivers of the 20 mph speed limit within a school zone and a figure of school kids crossing with an arrow indicating the marked crosswalk.

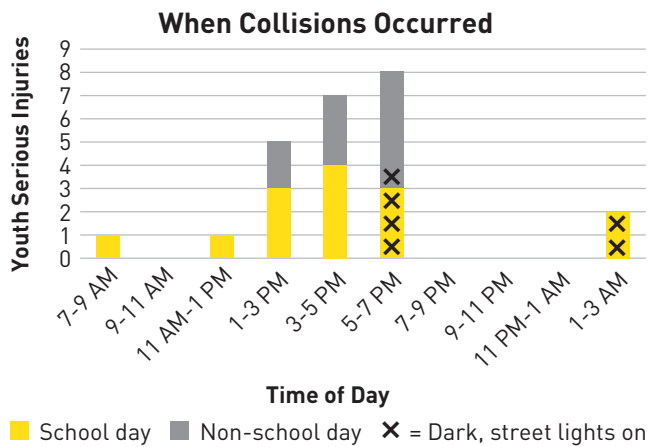


FIGURE 7

The majority of collisions happened between the hours of 1PM and 7PM.

Twenty-two out of the twenty-four total youth serious injury collisions happened on arterial streets.

Street Type

Half of these arterial collisions occurred on multi-lane arterials. Arterial streets are central routes that move higher volumes of traffic through the city and connect to other main routes or destinations. In Seattle, streets are classified as arterials when they serve as **principal routes**, which provide industrial access and connect urban centers, as well as **minor or collector routes**, which function as neighborhood corridors and provide minor industrial access. Arterials typically allow for higher speeds, but SDOT recently lowered most arterial speed limits to 25 mph. Non-arterial streets are smaller sized routes providing local access at slower speeds (20mph speed limit).

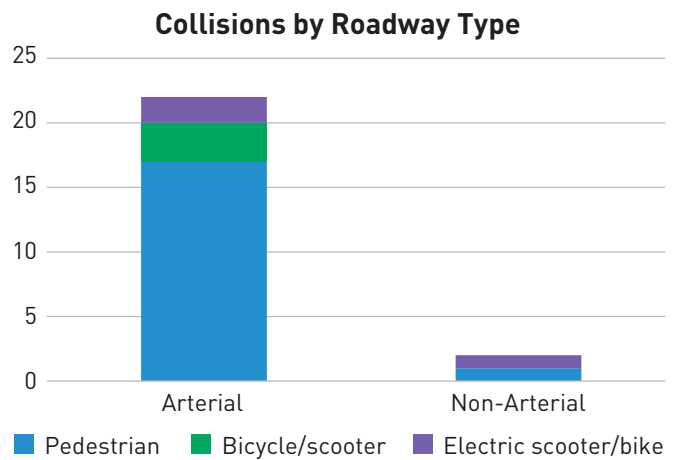


FIGURE 8

Intersection vs Midblock

Nearly three quarters of these crashes happened at intersections—ten at fully signalized intersections, two at pedestrian half signal intersections, one at a marked crosswalk with no other improvements, and five at unmarked crosswalks. One-quarter of all crashes occurred mid-block not at a legal crossing. There were no youth serious injury collisions at marked crosswalks with median islands or Rectangular Rapid Flashing Beacons.

Why were Youth Hit by Drivers?

Contributing Factors of Collisions

Two-thirds (or 16) of the total collisions occurred when youth traveled outside prescribed crossing conditions. In twelve of those cases, youth either crossed midblock into traffic or crossed against a signal at a signalized intersection. Three crashes occurred when bicyclists and an electric scooter rider failed to stop at a stop sign and rode into traffic. The remaining collision occurred when a youth riding an electric bike at high speed through a non-arterial intersection did not yield the right of way to a vehicle.

The remaining third (or eight) of the crashes occurred due to driver misconduct or faulty judgement; two were adults who drove under the influence of alcohol and hit youth walking. The remaining six were drivers who failed to stop and hit youth pedestrians in the following circumstances:

1. Crossing a neighborhood greenway with a pedestrian signal.
2. Two youth were hit crossing in an unmarked crosswalk. In one case the driver went around a stopped bus into the oncoming lane. In the other case, the driver went straight through an intersection and struck two pedestrians, one of whom was an adult and died on impact.

3. Crossing in a marked school crosswalk with school zone signage. The driver assumed the youth would yield to the driver.
4. Two youth were hit crossing at a fully signalized intersection. The driver pulled forward to turn right on red.

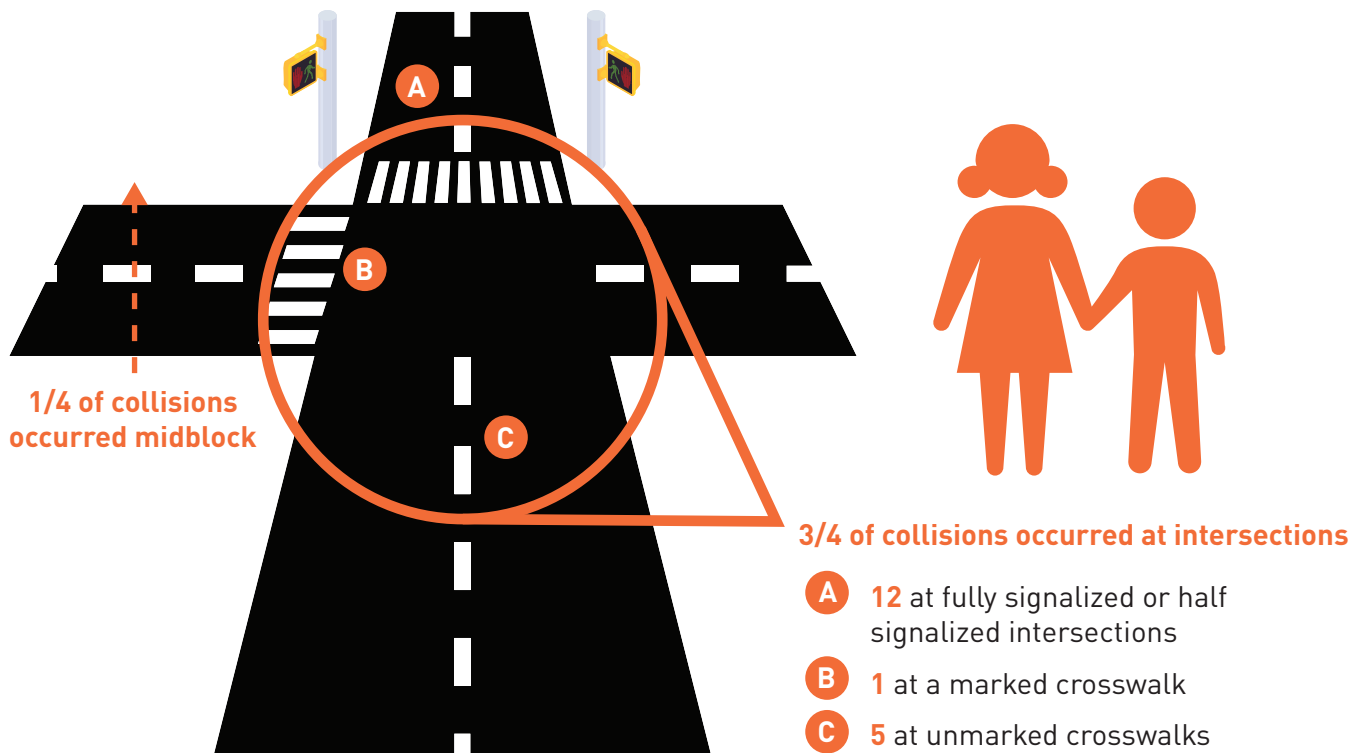


FIGURE 9

KEY FINDINGS AND NEXT STEPS



Walking and biking to school in Seattle is generally safe

Any youth seriously injured while walking or biking is unacceptable. On any given day around 30% of Seattle public school kids, or roughly 16,000 students, may be on the street walking or biking to school. Over the past six years there have been no youth killed on our streets while walking or biking. On average, four young people are seriously injured per year. The rate of youth being seriously injured while walking or biking in Seattle is low.

For comparison, traffic collisions are a leading cause of death for children nationally. In Los Angeles between 2009 and 2013, more than 700 young (under 22) crash victims were killed or severely injured while biking or walking, averaging one victim every three days, or 175 young people per year. In Philadelphia, between 2014 and 2018, an average of 20 children were killed or seriously injured while walking each year. Other cities have reported fewer injuries. Portland, OR experienced no youth fatalities between 2016 and 2020 and only 11 youth were seriously injured walking or biking during that time. Seattle's number of youth injured while walking or biking is relatively low, but Portland's numbers show us that it's possible to decrease this even further.

Youth walk and bike everywhere

Youth travel within our city in non-school crosswalks and on non-school days. Of all the serious injury collisions that occurred between 2016-2021, only one of these crashes was in a school crosswalk on a school day. It is imperative that we treat all crossings throughout the city as though youth are using them, because they are. It is a benefit to child safety when SDOT makes pedestrian and bicycle improvements throughout the city. SDOT is committed to protecting people walking, rolling, and biking everywhere by reducing speeds citywide, prioritizing sidewalk and crosswalk improvements, installing all ages and abilities bike facilities that connect to schools and other important destinations for youth, and by designing streets to protect our most vulnerable travelers.



People make mistakes

We can expect people of all ages to make errors in judgement while walking and biking. Young people are particularly vulnerable to making mistakes because their

developing brains haven't yet equipped them with the motor skills and judgement necessary to reliably make safe decisions when crossing

the street. Navigating a busy street involves the perceptual ability to identify gaps in traffic that allow for a safe crossing, and also requires the motor skills to step into the street quickly after a vehicle has passed to correctly time a crossing between cars. The prefrontal cortex, the part of the brain responsible for cognitive functioning to assess the risks involved in crossing the street, doesn't fully develop until a person is in their mid-twenties, well into adulthood. Streets need to be redesigned so that when people of all ages invariably make mistakes the consequences will not include death or serious injury.

Speed matters

The data show we are not seeing significant numbers of youth pedestrian and bicyclist serious injury crashes on our non-arterial street network. This may be attributed to the slower 20 mph speed limit on non-arterial streets as well as street characteristics that minimize vehicle speeds. Additionally, non-arterial streets see fewer people driving on them, which reduces the opportunities for conflict with kids walking and biking.

A person hit by a driver going 20 mph has a 90% chance of survival, whereas a person hit by a driver going 30 mph has a 50% chance of survival. In

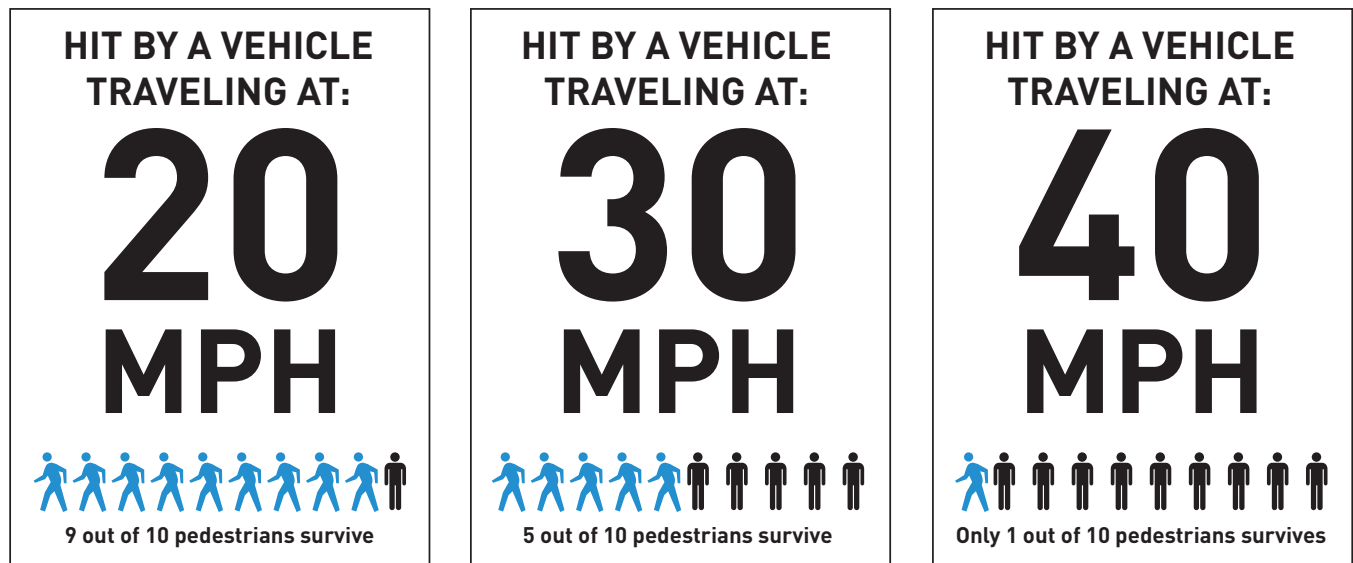


FIGURE 10. Nine out of 10 people walking survive when hit by a vehicle traveling at 20 MPH, but only five do when hit at 30 MPH and only one when hit at 40 MPH. US DOT NHSTA (1999)

recognition of the importance of vehicle speed in crash survival, SDOT has lowered speed limits on more than 90% of City of Seattle arterial streets in Seattle as of 2021. To significantly and consistently reduce vehicle speeds, SDOT will need to redesign the street characteristics of many arterials throughout the city.

Responsibility is shared

One of the key principles of the Safe Systems Approach is that responsibility for safety is shared by us all; elected officials, planners, traffic engineers, and roadway users of every mode. We all need to take responsibility for the safety of our streets, but that responsibility is not shared equally, especially when it comes to vulnerable travelers like kids. While it is important to ensure that young people are equipped with sufficient traffic safety education, youth cannot be expected to bear full responsibility for their own safety. Young people have the right to be protected from death or injury while walking or biking, so it is the role of adults traveling on our streets to take on additional responsibility to keep our youth safe. Safety education remains a crucial tool to help kids safely navigate our roadways and SDOT supports this work through our Let's Go program detailed below.



Electric bicycles and scooters

The market research firm NPD group found that from 2019 to 2020 the sales of electric bicycles grew by 145% with current sales showing a continuing upward trend. There has been a proliferation of electric bicycles on Seattle's streets including permitted free-floating electrified bicycle and scooter share options. Seattle's free-floating bicycle share program has been operating since 2017 and scooter share was deployed in 2020. Bicycle and scooter share companies legally require users to attest that they are at least 18 years old, but younger youth are not prevented from accessing them. There

may be nothing more inherently dangerous about an electric bicycle or scooter, but it may be easier to achieve higher speeds that put users at a greater risk for injury. Additionally, riders may put themselves at greater risk by operating a scooter with more than one rider or by not wearing a helmet. In a 2021 survey of Seattle scooter and bike share riders, 30% of scooter share riders said they wore a helmet some of the time or more; 38% of bike share riders said they wore a helmet some of the time or more. According to a 2018 bike study in Seattle, 91% of riders of private bikes wore helmets, but only 20% of bike share riders wore helmets. Electric bicycles and scooters help expand non-vehicle mobility options, but we don't yet know how they impact safety, especially among youth riders.

Safety education - Let's Go Further

Since 2015, the Safe Routes to School program has funded the [Let's Go program](#) at Seattle Public Schools (SPS), which provides walking and biking safety education to every 3rd, 4th, and 5th grade SPS student. Redesigning streets to provide a safer environment for vulnerable travelers may be the primary approach toward making streets safe, but safety education still provides an important role. Students can be educated to make more informed decisions when walking or biking such as how to assess vehicle speeds, how to judge safe gaps in traffic, and how to determine the safest place to cross the street.

The majority of pedestrian and bicycle crashes occurred when youth made decisions to travel in ways that put them at risk.

Every youth collision involving bicycles or electric scooters in Seattle between 2016 and 2021, included youth who were not wearing helmets.



In early 2022, the King County Board of Health repealed a countywide all ages helmet law due to racist and discriminatory enforcement of law, with citations being disproportionately given to Black, Indigenous, and People of Color. The Board of Health supports the usage of helmets as an important safety measure, but repealed the racist law that unfairly targeted BIPOC and homeless cyclists. The National Transportation Safety Board asserts that helmets reduce the likelihood of serious head injury by about 60% and notes that there is low helmet use among youth bicyclists. Education can reinforce the importance of helmet use. SDOT is also partnering with community-based organizations and with shared micromobility vendors to distribute free helmets to people of all ages who may not otherwise be able to access or afford a helmet.

Most of the serious injury collisions between 2016 and 2021 involved youth who were high school aged, well beyond the age of the elementary students receiving “Let’s Go” safety education and training. The findings within this report will inform the curriculum of Let’s Go Further, which expands the program to every 6th, 7th, and 8th grade student. Six consecutive years of walking and biking safety education for every public-school student will provide the foundational knowledge they need to make safe decisions as they gain independence from adult supervision and move on to high school and beyond. Given the percentage of high school aged youth involved in serious injury crashes, we should also consider how we can reinforce traffic safety education through the high school years. Like people of all ages, we should expect that young people will occasionally make errors in judgement while biking or walking, so in addition to providing excellent educational programming to Seattle youth, streets need to be redesigned in such a way that mistakes will not result in serious injury or death.

IMPROVING OUR CITY STREETS

Through the Levy to Move Seattle, the SRTS program will have made an improvement for every public school in Seattle by the end of 2024. As of September 2022, we have made 163 improvements at public and private schools across the city. These engineering projects include new sidewalks and walkways, crossing improvements like crossing beacons and pedestrian signals, and speed humps and other traffic calming techniques that benefit community members walking and biking around school neighborhoods. In the spring of 2021, we launched the [School Streets program](#) which limits vehicles on streets next to schools to prioritize kids walking and biking to school.

Youth pedestrians and cyclists are protected wherever investments are made to improve sidewalks, crosswalks, bike facilities, and shared

streets. In the commitment to eliminate all fatalities and serious injuries, SDOT works to make our streets safer through many programs in addition to Safe Routes to School, including [Vision Zero](#), [New Sidewalks](#), [Crossing Improvements](#), [Home Zones](#), [Neighborhood Greenways](#), and more. SRTS will continue partnering with these programs to improve major corridors and signalized intersections near schools through our Vision Zero program, make non-arterial streets in neighborhoods around schools more comfortable for walking and biking through the Neighborhood Greenway, Stay Healthy Streets, and Home Zone programs, build new sidewalks and walkways through our New Sidewalks program, and improve crossings of busy streets through the Pedestrian Crossings and Neighborhood Greenway programs.



APPENDIX

Serious injury collisions with walking, biking, or rolling youth under 18 in Seattle between 2016-2021

DATE	LOCATION	District	Arterial/ Non- Arterial	High Injury Network	School Day	School Crosswalk	Gender	Age of crash victim	Grade	Intersection or midblock	Traffic control	Victim mode	Action	Helmet use
8/8/2016	Delridge Way SW and SW Genesee St	1	Arterial	Y	N	N	M	15	HS	Intersection	Full signal	Pedestrian	Crossed Against Signal	
11/15/2016	Greenwood Ave N and N 143rd St	5	Arterial	Y	Y	N	M	16	HS	Intersection	Full signal	Pedestrian	Crossed Against Signal	
1/22/2018	15th Ave SW and SW Holden St	1	Arterial	Y	Y	N	F	15	HS	Intersection	Ped signal	Pedestrian	Failure to Yield to Pedestrian	
2/26/2018	3rd Ave between Seneca St and University St	7	Arterial	Y	Y	N	F	16	HS	Midblock		Pedestrian	Not a Legal Crosswalk	
5/16/2018	Rainier Ave S and S Henderson St	2	Arterial	Y	Y	Y	F	14	HS	Intersection	Full signal	Pedestrian	Crossed Against Signal	
8/9/2018	Rainier Ave S and S Henderson St	2	Arterial	Y	N	Y	F	10	ES	Intersection	Full signal	Pedestrian	Crossed Against Signal	
8/9/2018	Rainier Ave S and S Henderson St	2	Arterial	Y	N	Y	F	9	ES	Intersection	Full signal	Pedestrian	Crossed Against Signal	
8/15/2018	Roosevelt Way NE and NE 84th St	4	Arterial	Y	N	Y	F	13	MS	Intersection	Side street stop signs	Pedestrian	Failure to Yield to Pedestrian	
10/1/2018	18th Ave E and E Thomas St	3	Arterial	N	Y	N	F	15	HS	Intersection	Side street stop signs	Pedestrian	Failure to Yield to Pedestrian	
11/13/2018	38th Ave S btwn S Oregon St and S Conover Way	2	Non- arterial	N	Y	N	M	11	MS	Midblock		Pedestrian	Not a Legal Crosswalk	
4/29/2019	SW Thistle St between 25th Ave SW and 26th Ave SW	1	Arterial	Y	Y	N	M	16	HS	Midblock		Pedestrian	Driving Under Influence	
7/14/2019	W Dravus St Between 25th Ave W and 26th Ave W	7	Arterial	Y	N	N	M	7	ES	Midblock		Pedestrian	Driving Under Influence	
8/29/2019	Aurora Ave N and N 50 Upper St	6	Arterial	Y	N	N	M	16	HS	Intersection	Side street stop signs	Bicycle	Failure to Stop at Stop Sign	No
11/28/2019	Delridge Way SW btwn SW Myrtle St and SW Orchard St	1	Arterial	Y	N	N	F	15	HS	Midblock		Pedestrian	Not a Legal Crosswalk	

DATE	LOCATION	District	Arterial/ Non- Arterial	High Injury Network	School Day	School Crosswalk	Gender	Age of crash victim	Grade	Intersection or midblock	Traffic control	Victim mode	Action	Helmet use
2/13/2020	5th Ave NE and NE Northgate Way	5	Arterial	Y	Y	N	M	12	MS	Intersection	Full signal	Pedestrian	Failure to Yield to Pedestrian	
6/12/2020	Pinehurst Way NE and NE 115th St	5	Arterial	N	N	Y	F	11	MS	Intersection	Ped signal	Bicycle	Failure to Stop at Stop Sign	No
1/11/2021	35th Ave NE and NE 55th St	4	Arterial	Y	Y	N	M	17	HS	Intersection	Full signal	Pedestrian	Failure to Yield to Pedestrian	
2/23/2021	NW Market St btwn 8th Ave NW and 9th Ave NW	7	Arterial	Y	Y	N	M	15	HS	Midblock		Scooter, non-motorized	Not a Legal Crosswalk	No data
3/3/2021	Aurora Ave N and N 85th St	6	Arterial	Y	N	N	F	15	HS	Intersection	Full signal	Pedestrian	Crossed Against Signal	
6/2/2021	Holly Park Dr S and S Myrtle Pl	2	Arterial	N	N	N	M	14	HS	Intersection	Full signal	Electric scooter	Crossed Against Signal	No
7/2/2021	31st Ave SW and SW Trenton St	1	Arterial	Y	n	N	F	12	MS	Intersection	Side street stop signs	Electric scooter	Failure to Stop at Stop Sign	No
9/30/2021	Boren Ave and Marion St	3	Arterial	Y	y	N	M	16	HS	Intersection	Full signal	Pedestrian	Crossed Against Signal	
10/25/2021	Cortliss Way N and NE 80th St	6	Arterial	Y	y	N	M	17	HS	Intersection	No intersection control	Pedestrian	Failure to Yield to Pedestrian	
11/3/2021	2nd Ave NW and NW 70th St	6	Non-arterial	N	y	N	F	16	HS	Intersection	No intersection control	Electric bicycle	Failure to Stop	No

<https://link.springer.com/article/10.1007/s10900-018-00599-1>

Most scooter share users [70%] and bike share users [62%] said they never or almost never wear a helmet. (Feb 2022 scooter and bike share safety survey, SDOT + PRR)

FIGURE 11



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