NFRMPO Vision Zero Policy

Technical Advisory Committee (TAC)

North Front Range Metropolitan Planning Organization

May 20, 2020

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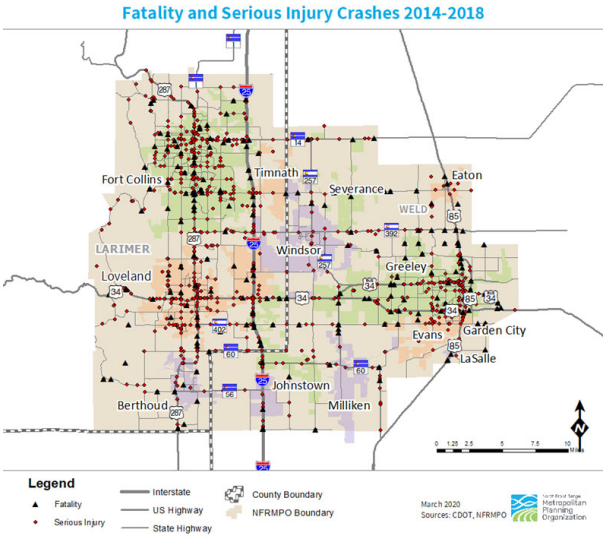
NFRMPO Vision Zero Policy Discussion

North Front Range Metropolitan Planning Organization

- **April TAC Discussion**
  - **How to address behavioral causes for crashes.**
  - **How to address rural crashes.**



Behavioral Causes

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- Vision Zero Approach
  - Five E's
    - Engineering, Enforcement, Evaluation, Education, Encouragement
  - Multidisciplinary
    - System designers, law enforcement, education professionals, etc.

Behavioral Causes

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"People will make mistakes; we will not solve the road safety problem by improving road users. Even without deliberately taking risks people make mistakes" – [Vision Zero Network]

Behavioral Causes

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Traditional Approach vs. Vision Zero

Traditional Approach	Vision Zero
Traffic deaths are **INEVITABLE**	Traffic deaths are **PREVENTABLE**
PERFECT human behavior	Integrate **HUMAN FAILING** in approach
Prevent **COLLISIONS**	Prevent **FATAL AND SEVERE CRASHES**
INDIVIDUAL responsibility	**SYSTEMS** approach
Saving lives is **EXPENSIVE**	Saving lives is **NOT EXPENSIVE**

https://visionzeronetwork.org/about/what-is-vision-zero/

Safe Systems Approach

	Traditional	Safe System
What is the Problem?	Crashes	Fatalities and serious injuries
What causes the Problem?	Human Factors (speeding, drunk driving, drowsy driving, etc.)	Humans make mistakes Humans are fragile
Who is ultimately responsible?	Individual road users	System designers
What is the major planning approach?	Incremental approach to reduce the problem	Systematic approach to build a safe road system
What is the appropriate goal?	Optimum number of fatalities and serious injuries	Zero fatalities and serious injuries

https://visionzeronetwork.org/safe-systems-the-foundation-of-vision-zero/

Behavioral Causes

- What is a Safe System?
  - Adapt the structure and function of the transportation system to the complexities of human behavior.
  - Manage the kinetic energy transferred among road users.
  - Treat road user safety as the foundation of all system interventions.
  - Foster the creation of a shared vision and coordinated action.

Rural Crashes

- Present unique challenges compared to urban areas
- Not a one size fits all approach
- Local Road Safety Plans (LSRP)

Rural Crashes

- **Local Road Safety Plans (LSRP)**
  - **Identified in the *2020-2023 Colorado Strategic Transportation Safety Plan (STSP).***
  - **Bring together local stakeholders.**
  - **Identifies specific and localized safety improvements.**
  - **Determines how improvements will be prioritized, implemented, monitored, and updated.**

https://www.fhwa.dot.gov/publications/research/safety/08067/

Policy Statements

- **The NFRMPO acknowledges the importance of setting data driven targets for safety as the federal requirement for performance-based planning and programming.**
- **The NFRMPO recognizes there is a strong desire in the region to set more aspirational goals regarding road safety and there is no acceptable number of deaths and serious injuries on the road network.**

Policy Statements

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- **To work towards eliminating serious injuries and deaths by:**
  - **Prioritizing safety in future MPO calls for projects;**
  - **Analyzing CDOT crash data to help member communities make more informed decisions for safety related projects;**
  - **Integrating safety in future planning initiatives (Environmental Justice Plan, Active Transportation Plan, etc.);**
  - **When possible, provide region specific data to compare to statewide data;**
  - **Identify crash types which are most prevalent in the region as well as best practices to mitigate those specific crash types.**

Why Invest in Active Transportation?

Purpose

This document lists various findings on the observed and potential benefits of investing in active transportation (bicycle and pedestrian) infrastructure. It can be used as a conversation starter or supplement to help communities recognize and successfully navigate the complexities of justifying active transportation investments. It can be referenced early in the decision making process and shared with other technical staff and decision makers. For a project to be successful, it must fit the local context. This document is not meant to broadly prescribe specific design elements to a complex transportation network; rather, it underscores the value that thoughtfully planned, designed, and implemented active transportation infrastructure can bring to a community.

The benefits listed are drawn from various case studies, surveys, research, and other initiatives at various geographic scales. Several of the benefits are quantified specifically to Colorado. All links are clickable for further exploration of the following topic areas:

- **Health**
- **Safety**
- **Equity**
- **Air Quality and Climate**
- **Economy**
- **Congestion**
- **Community Resiliency**

Health

- Walking is the most common form of physical activity; community and street scale designs that improve walking and bicycling infrastructure lead to increases in physical activity rates (Center for Disease Control, 2015)
- It is estimated that obesity costs the U.S. healthcare system $147 billion a year; improvements that promote walking and bicycling may help to reduce that cost by improving rates of obesity and obesity-related diseases like heart disease, stroke, type 2 diabetes, and certain types of cancer (Center for Disease Control, 2015; more CDC Obesity info)
- “Health benefits such as reduced pedestrian and cyclist injury, increased physical activity, decreased obesity, and increased social connectivity are associated with safe, attractive, and accessible transportation systems that prioritize active transportation” (BC Centre for Disease Control, 2017).
- The Community Preventive Services Task Force is a group of public health and prevention experts appointed by the director of the Centers for Disease Control (CDC). These experts recommend changes to the built environment that combine improvements in the transportation system (street connectivity, sidewalk and trail infrastructure, bicycle infrastructure, and public transit infrastructure and access) with land use changes (mixed land uses, access to parks and recreation facilities) to make physical activity easier and more accessible to Americans.
    - Why is physical activity so important? Less than half of American adults and only 3 of 10 high school students get the recommended daily amounts of physical activity (CDC 2014). Regular physical activity is important for health because it helps control weight, reduces risk of cardiovascular (heart) disease, reduces risk for type 2 diabetes, reduces

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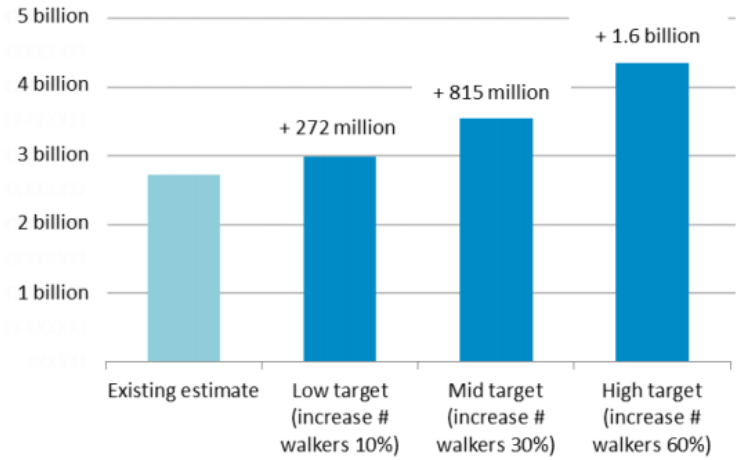
risk of some cancers, strengthens bones and muscles, and improves mental health and mood (CDC, 2015).
    - From a comprehensive review of evidence, CPSTF found that physical activity increased among residents in a community with new or improved projects or policies that combined transportation with land use and design components. Built environment improvements were associated with higher levels of using active modes (walking, bicycling, and using transit) for transportation and recreation (CPSTF, 2017).
- To promote physical activity, the Centers for Disease Control (CDC) encourages communities to support health using approaches like implementing Complete Street Policies, updating comprehensive/master plans, aligning zoning to influence community designs, and promoting safe routes for all ages and abilities to access destinations. (CDC)
- Bicycling is a relatively low-impact aerobic means of exercise (American Council on Exercise, 2012 via Bicycle Colorado, 2020).
- Physical activity has been shown to improve learning in children and bicycle commuting is linked to higher levels of mental health in commuters compared with their colleagues commuting by car (CityLab, 2012 and State Smart Transportation Initiative, 2020 via Bicycle Colorado, 2020).
- According to the 2016 report, 2016 Economic and Health Benefits of Bicycling and Walking:
    - A 10 percent increase in bicycling and walking in Colorado would prevent an additional 30-40 deaths per year and lead to $258-$387M in additional annual health savings to the state. A 30 percent increase could equal up to $2 billion in additional health savings.
        - Bicycling currently contributes $511M in health benefits to the State of Colorado annually and prevents an estimated 50 deaths

Estimated mean annual health benefits from walking



Source: BBC Research & Consulting and Alta Planning and Design from WHO HEAT walking output.

        - Walking currently contributes $2.7B in health benefits to the State of Colorado annually and prevents an estimated 285 deaths

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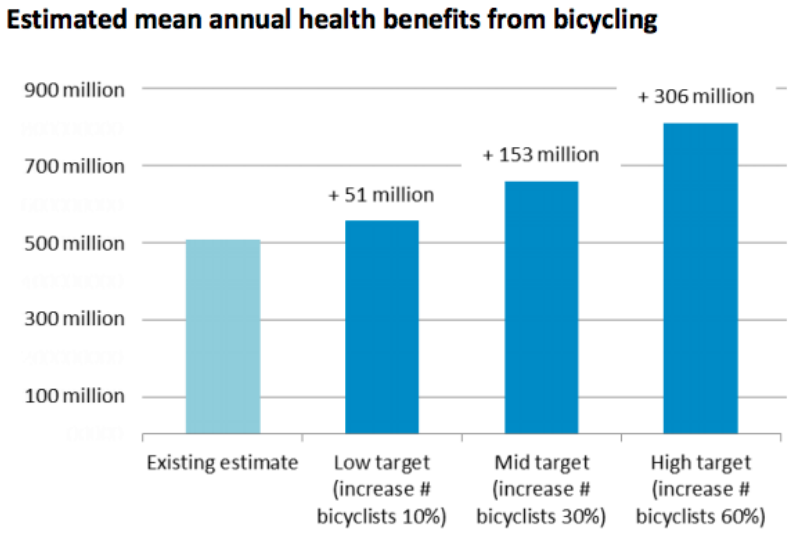

Source: BBC Research & Consulting and Alta Planning and Design from WHO HEAT bicycling output.

- Further Exploration:
  - Does the Built Environment Influence Physical Activity?: Examining the Evidence (Transportation Research Board [TRB], 2005)
  - Data on Health Community Design, (Center for Disease Control [CDC], 2015)
  - Promoting Health Equity: A Resource to Help Communities Address Social Determinants of Health (CDC, 2008)

Safety

- Pedestrian fatalities are 17% of all traffic fatalities in 2019 and pedestrian fatalities have increased by 50% in the past 10 years (Governor's Highways Safety Association [GHSA], 2017).
- Improvements such a road diets, defined as removing travel lanes from a roadway and utilizing the space for other uses and travel modes, can lead to fewer and less severe bicycle and pedestrian crashes. This is due to pedestrians spending less time crossing travel lanes, bicyclists having new or better dedicated facilities, and vehicle speeds being reduced. The Federal Highway Administration (FHWA) suggests roads under 20,000 vehicles per day (vpd) may be good road diet candidates. Other studies suggest a maximum of 24,000 vpd for consideration (Road Diet Informational Guide, FHWA 2014).
- Lower speeds limits, design that discourages high speeds, and/or physical separation between vehicle traffic and bicyclists or pedestrians lower the risk of serious injury or death:

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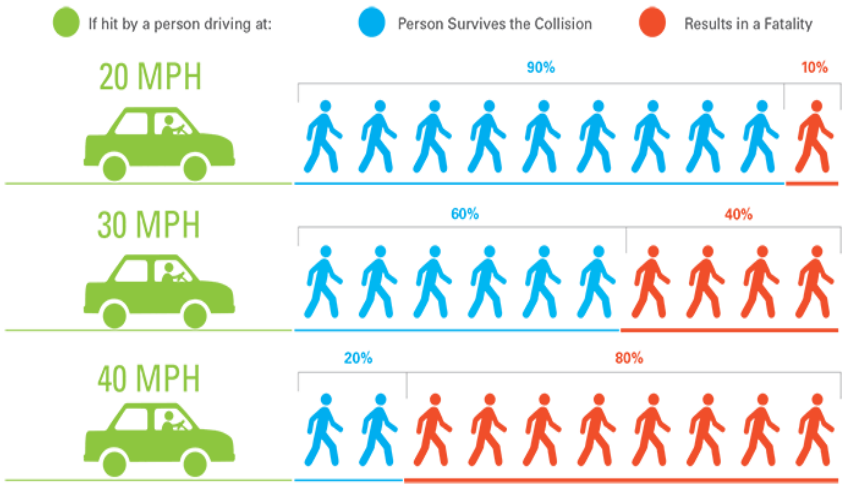
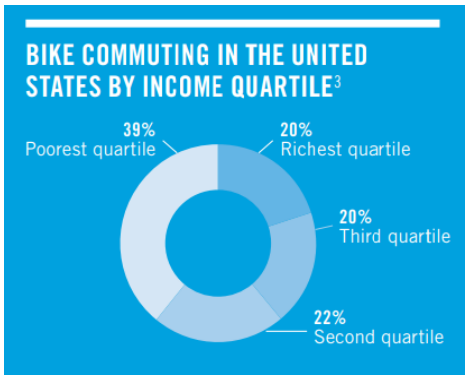


Source: Institute of Transportation Engineers, 2015.

Equity



Source: PeopleForBikes

- The percent of people 16-24 with a driver's license peaked in 1983 and is now at its lowest rate since 1963. (Protected Bike Lanes Mean Business, PeopleForBike, 2014)
- According to PeopleForBikes, people of color are more likely to:
    - Ride bicycles (for recreation or transportation)
    - Be regular riders
    - Want to bike more than they currently do
    - Say protected bike lanes would make them ride more
- People in the lowest income quartile are more likely to commute by bike (Building Equity, PeopleForBikes 2015).
- The New Majority: Pedaling Towards Equity, League of American Bicyclists 2013
    - Compared to White bicyclists, the fatality rate for bicyclists is 23 percent higher for Hispanic bicyclists and 30 percent higher for African American bicyclists.
    - Families with an annual income below $50,000 spend 30 percent of their income on transportation, on average. Average annual operating costs:
        - Bike = $308
        - Car = $8,200
- Shift the "3 Es" from Engineering, Education, and Enforcement to Ethics, Equity, and Empathy (How to Place Equity at the Center of Our Work, ITE Journal February 2020, page 37-41)
- "An equity approach is critical for creating transportation systems that meet the needs of all people. Transportation equity should pursue equal outcomes/options. Transportation equity should balance the distribution of benefits and burdens tied to transportation improvements. This

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approach should allocate resources based on the need to correct existing differences and also works to remove the effects of past discrimination." (Equity-Oriented Performance Measures in Transportation Planning, PAS Memo - March/April 2020, American Planning Association [APA])

Air Quality and Climate

- Replacing two vehicle trips each week by walking, riding a bike or taking public transportation can keep 14 pounds of ozone-causing emissions out of our air each year (Regional Air Quality Council, 2019).
- Bicyclists and pedestrians are often exposed to less air pollution than occupants of motor vehicles due to less time spent directly behind vehicles and taking less congested roads, on average (Monitoring Ambient Air, University of Leeds, 2018).
- Six percent of total urban miles traveled are by bike/e-bike. If this grew to 14 percent by 2050, there would be an 11 percent reduction in carbon emissions worldwide (A Global High Shift Scenario, Institute for Transportation and Development Policy, 2015).
- Average grams of CO2 emitted per mile per driver/passenger:
    - Car = 169g
    - Bus = 63g
    - Bike = 10g (due to typical additional caloric intake of bike commuters)
    - Source: European Cyclists Federation, 2013 via Our Streets MPLS, 2018

Economy

- Several studies have found those who bike or walk to or through business districts spend more money in the local economy and are more likely to shop than those who drive
    - People who arrive to a business on bike spend less per visit but visit more often, resulting in more money spent each month (Protected Bike Lanes Mean Business, PeopleForBikes, 2014).
        - By Bike: $10.66/trip, $75.66/month
        - By Car: $13.70/trip, $61.03/month
        - Other sources with similar findings
            - Biking, On-Street Parking, and Business - Clean Air Partnership, 2009
            - Business Cycles: Catering to the Bicycling Market - Clifton, Morrissey, and Ritter, 2012
            - Measuring the Street - NYCDOT, 2012
- For every dollar spent to build new separated bike lanes, cities could save as much as $24 thanks to lower health care costs and less pollution and traffic. (The Societal Costs and Benefits of Commuter Bicycling: Simulating the Effects of Specific Policies Using System Dynamics Modeling, MacMillan, Connor, Witten, Kearns, Rees, Woodward, 2014)

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- According to the 2016 Colorado-specific report, 2016 Economic and Health Benefits of Bicycling and Walking:
    - Bicycling has a $1.1B annual economic impact on the Colorado economy, including $484M from out-of-state visitors (excluding health benefits)
    - Walking has a $497M annual economic impact on the Colorado economy (excluding health benefits)
- Replacing a car trip with a bike trip saves individuals and society $2.73 per mile in costs related to congestion reduction, roadway cost savings, vehicle cost savings, parking cost savings, air pollution reduction, energy conservation, and traffic safety improvements. (Biking, On-Street Parking, and Business - Clean Air Partnership, 2009)
- In the 2020 report, Understanding Economic and Business Impacts of Street Improvements for Bicycle and Pedestrian Mobility: A Multi-City, Multi-Approach Exploration, 14 corridors were analyzed across six cities (Portland, Seattle, San Francisco, Memphis, Minneapolis and Indianapolis). Bicycle and pedestrian infrastructure had either positive or non-significant impacts on the local economy as measured through sales and employment, including:
    - “Bike lanes were installed on Central Avenue in Minneapolis by reducing the width of the travel lane and removing parking lanes. Retail employment increased by 12.64% — significantly higher than the 8.54% increase calculated in the control study area a few blocks away. The same corridor also recorded a dramatic 52.44% increase in food sales, which more than doubled the 22.46% increase in the control area.”
    - “A protected bike lane along Broadway in Seattle that was completed in 2014 was accompanied by a significant 30.78% increase in food service employment compared to 2.49% and 16.17% increases in control areas.”
- “Business owners can fit 10 cyclist customers in a parking space, as opposed to one automobile customer.” (Bicycle Colorado - Benefits of Bicycling in Colorado)
- “70% of real estate agents surveyed use trails as selling points for homes, and over 80% thought that they would make a home easier to sell” (Active Transportation and Real Estate: The Next Frontier, Urban Land Institute, 2016).

Congestion

- According to the Texas A&M Transportation Institute’s (TTI) 2019 Urban Mobility Report:
    - Congestion costs the Fort Collins-Loveland Urbanized Area $119M annually, or $414 and 21 hours of delay per commuter
    - Congestion costs the Greeley Urbanized Area $58M annually, or $485 and 23 hours of delay per commuter.
- The capacity of a single 10-foot lane (or equivalent width) by mode at peak conditions with normal operations:
    - Private Motor Vehicles Only: 600-1,600/hr
    - Mixed Traffic with Frequent Buses: 1,000-2,800/hr
    - Two-Way Protected Cycleway: 7,500/hr
    - Sidewalk: 9,000/hr

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- Source: Transit Street Design Guide, National Association of City Transportation Officials (NACTO), 2016

Community Resiliency

- Infectious Disease Management
  - Bicycling is compatible with social distancing (Bicycle Colorado, 2019). Investing in low-stress bicycle and pedestrian infrastructure allows users to maintain safe physical distance, increasing options commuting, exercise, and other trips in times such as the Spring 2020 COVID-19 outbreak:
  - During the first month of the Spring 2020 COVID-19 Stay-At-Home Order in Colorado the average daily trail counts increased 172% on weekday and 122% on weekends across Northern Colorado compared to the same period in 2019.
  - Built environment attributes such as pedestrian and bicycling facilities are associated with a favorable net effect on infectious diseases

Environmental attribute	Expected net NCD effect	Expected net ID effect
Residential density	+	0
Mixed land use	+	+
Automobile-optimized Transportation system	--	+
Public transportation	+	--
Pedestrian & bicycling Facilities	+	+
Parks, trails, open space	+	+
Open streets programs	+	+

Expected net effects of built environment attributes on non-communicable diseases and infectious diseases.
Notes: + = favorable effect; 0 = no effect; - = unfavorable effect
This table represents a simplification because expected unfavourable effects of density and public transport use on IDs can be mitigated by aggressive public health measures.

  - Moderate physical activity (PA) produces antioxidants that reduce the severity of acute respiratory distress syndrome (ARDS), a serious complication of COVID-19. PA can improve immune response to vaccines by 30-100 percent (James Sallis, Ph.D, Webinar: Walking and Walkability in the Time of COVID-19: New Policies and Practices, America Walks, May 2020.)
- Gas Prices and Bicycling - Bikes Belong, 2008
  - In 2008, when gas prices peaked to $4.11/gallon:
    - Bike commuting increased 15% nationally and 23% in the 31 largest bicycle-friendly cities (BFCs) compared to 2007

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- 73 percent of retailers said they were selling more transportation-related bicycles and 95 percent had customers citing high gas prices as the reason for their purchases
- 15 percent of older adults said they had ridden a bicycle more frequently since gas prices had risen; yet, only 4 in 10 said they thought their neighborhood had adequate bicycle accommodations.