PBIC Webinar

Countermeasure Cost: Putting a price on pedestrian and bicycle infrastructure

Mike Griffith, FHWA

Shari Schaftlein, FHWA

Debbie Lou, UCSD

Charlie Zegeer, UNC HSRC

Bryan Poole, UNC HSRC

January 22, 2014, 2 pm

Today's Presentation

- **Introduction and housekeeping**
- **Audio issues?**
  Dial into the phone line instead of using "mic & speakers"
- **PBIC Trainings and Webinars**
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- **Questions at the end**

PBIC Webinar

Costs for Pedestrian and Bicycle Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public

Shari Schaftlein
Director, Office of Human Environment
FHWA

Acknowledgements

- University of North Carolina Highway Safety Research Center
- Pedestrian and Bicycle Information Center
- Robert Wood Johnson Foundation (through its Active Living Research program)

Policy Framework

- Draft USDOT Strategic Plan (2014)
- Draft FHWA's PY-15 Strategic Implementation Plan (2014)
- Bicycle and Pedestrian Facility Design Flexibility Memorandum (2013)
- Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations (2010)
- Administration direction

Connected Pedestrian and Bicycle "Networks"

- Comfortable and safe conditions walking and bicycling along and across roads
- Improved access to destinations such as transit stations and schools
- Seamless transitions between different facilities
- Addressing the needs of the full range of users

Safety Focus

- Leadership Priority
  - Between 2011 and 2012, the number of pedestrian fatalities and injuries increased by 6.4% and 10% respectively
  - Between 2011 and 2012, the number of bicycle fatalities and injuries increased by 6.5% and 2.1% respectively

Ongoing and Planned Areas of Focus

- Performance based practical design
- Performance measures
- Lifecycle cost
- Streamlining
- Sustainability

www.pedbikeimages.org / Laura Sandt

Sample Supporting and Related Programmatic Initiatives

- Pedestrian and bicycle performance measures
- Cycle Track Planning and Design research project
- Pedestrian and bicycle facility design flexibility resources
- Capturing opportunities as part of routine resurfacing programs
- Proven safety countermeasures

Why is this Resource Important?

- Enables informed decision-making and budgeting
- Facilitates discussion of design trade-offs and prioritization
- Establishes a baseline upon which to build
- Promotes investment in infrastructure that fosters livability

Discussion Questions

- How do you typically use pedestrian and bicycle cost estimates in your day-to-day work and do you plan to incorporate this report's findings in those efforts?

- Do the cost estimates cited generally reflect your experience at the project level?

- Are there specific cost items, not included in this report, for which you would like cost estimates?

Discussion Questions

- Is there any other information or guidance that would be especially helpful in the process of planning, designing, and implementing pedestrian and bicycle networks?

- How often will practitioners need and expect updates to this product?

PBIC Webinar

Mike Griffith

Director for Office of Safety Technology
Federal Highway Administration

Active Living Research

Building the Evidence to Prevent Childhood Obesity and Support Active Communities

Walking and Biking for Health

Debbie Lou, Ph.D.

Active Living Research

UC San Diego

PBIC Webinar

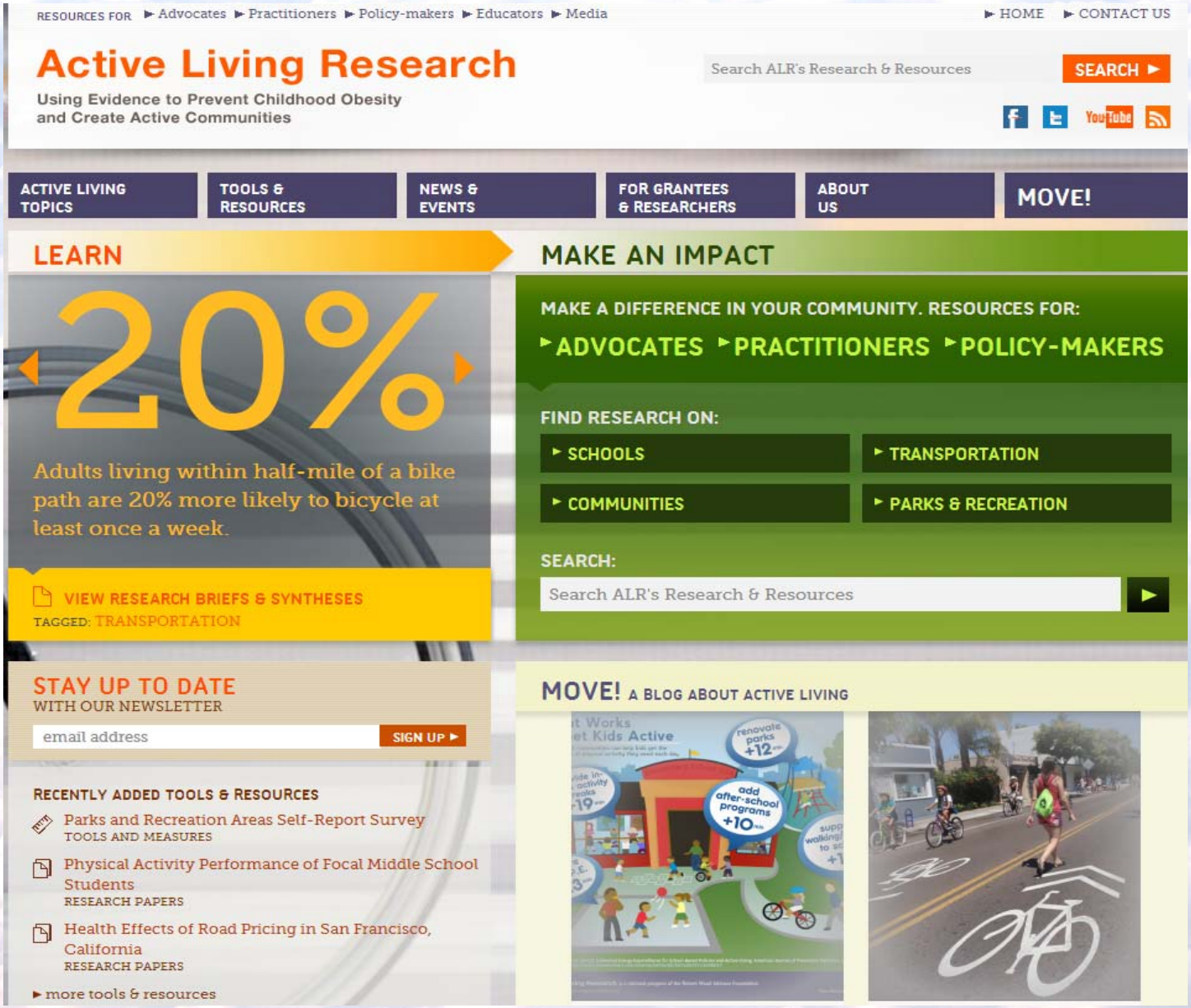
January 22, 2014

Topics

1. What is Active Living Research (ALR)?

2. Physical Activity and Obesity: Adults and Youth

3. Active Transportation and Health



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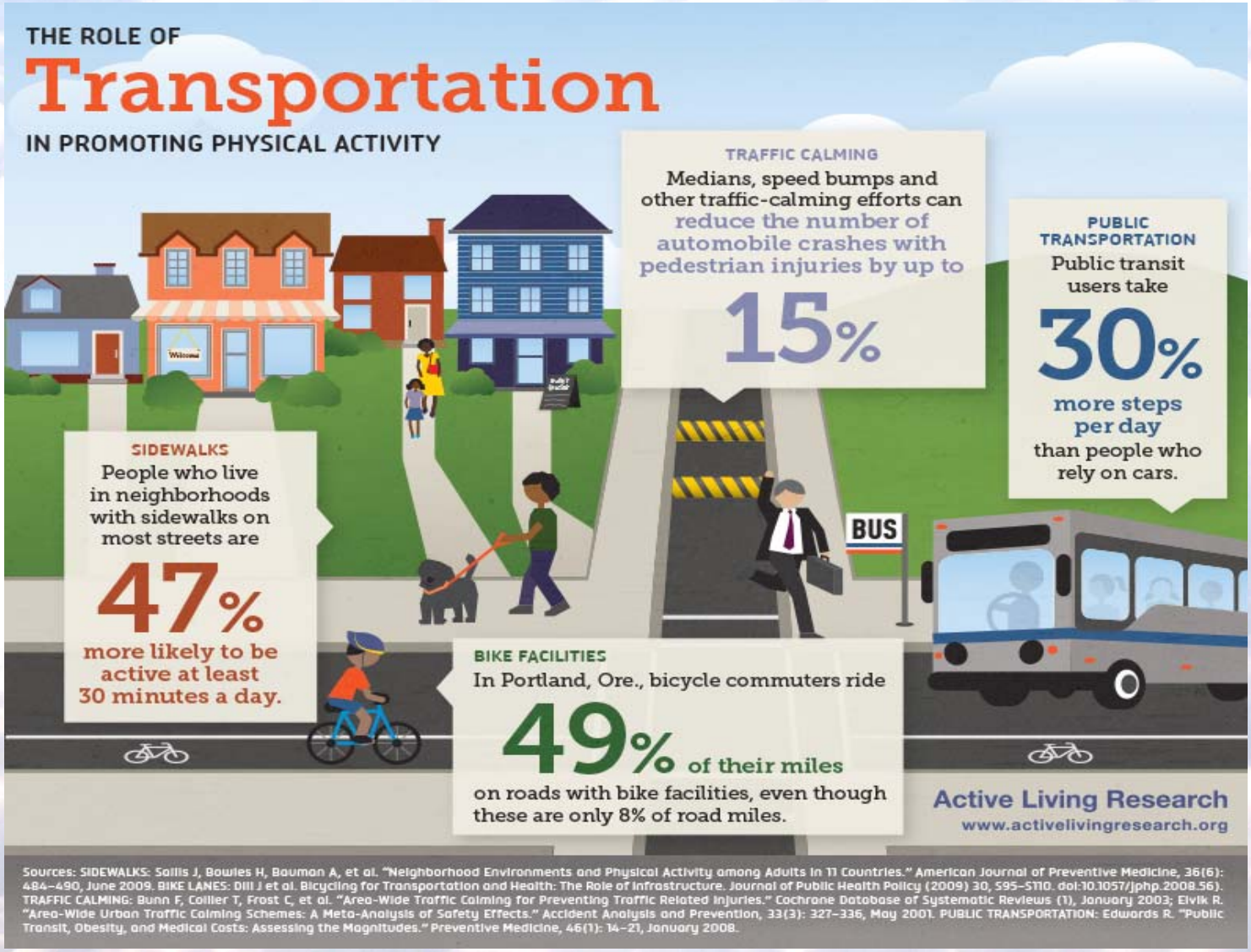
Infographics



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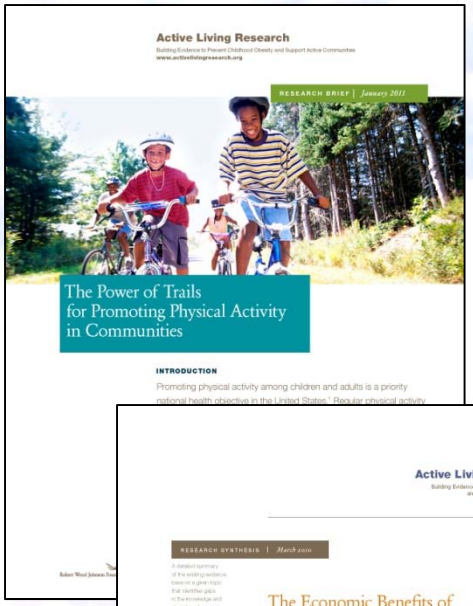
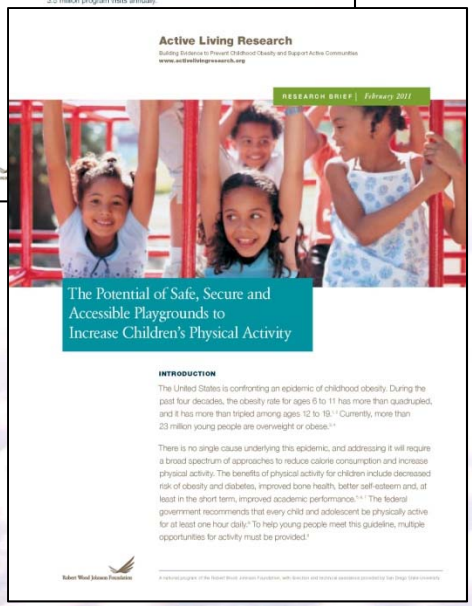
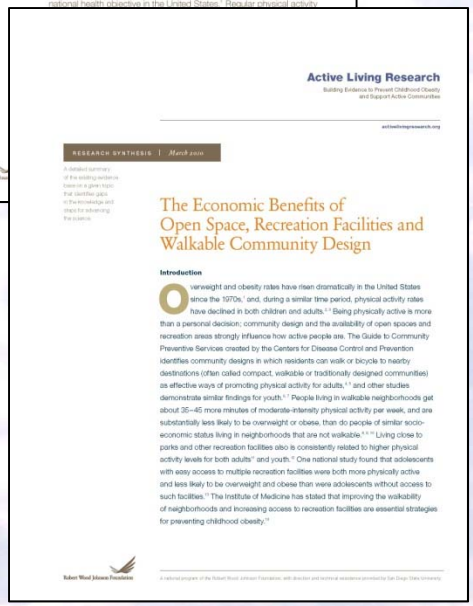
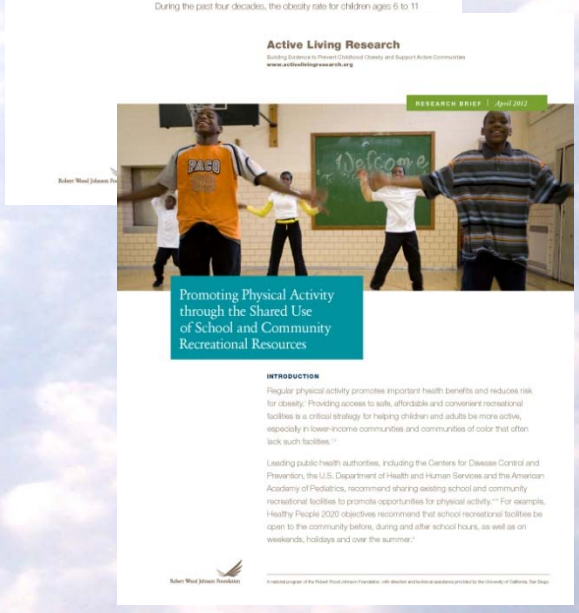
ALR Research Briefs & Syntheses









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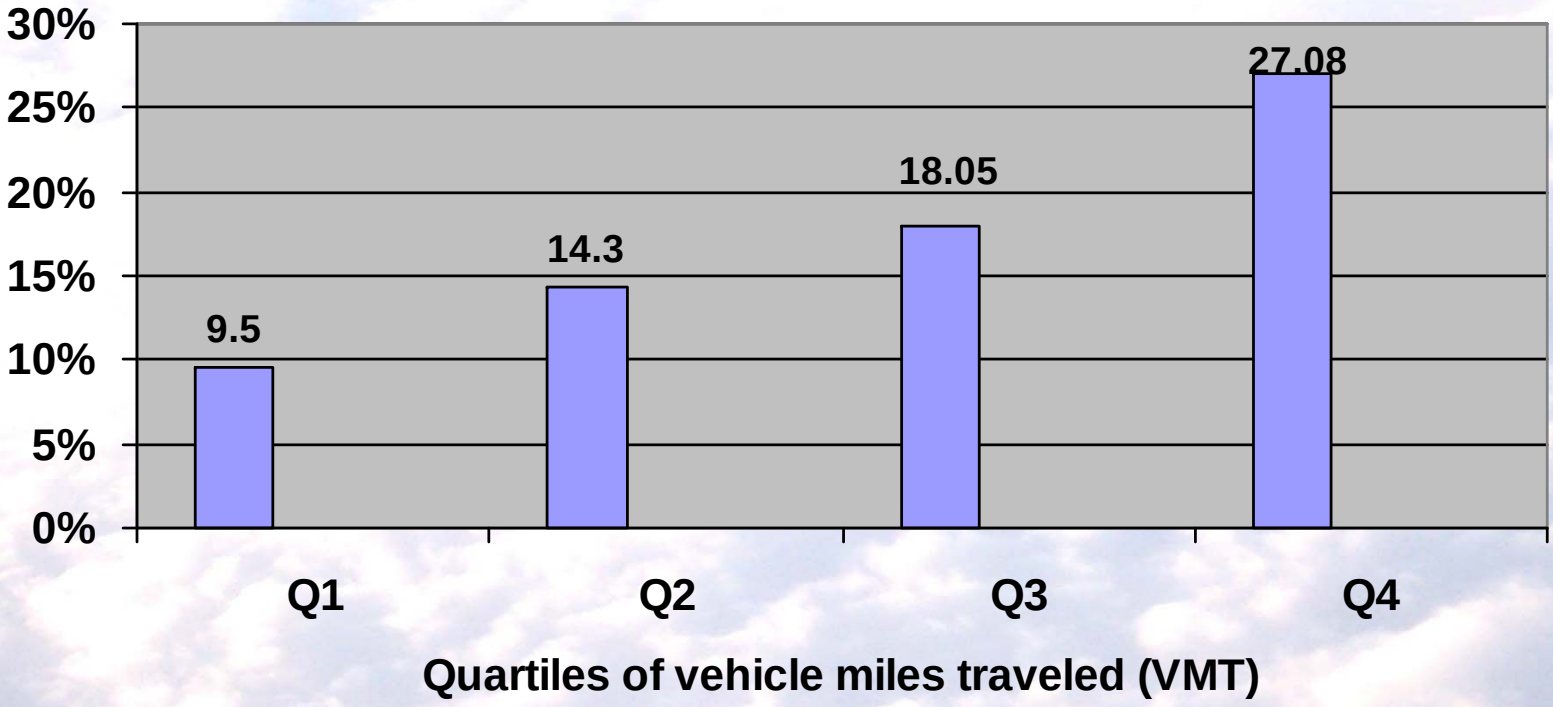
Physical (In)Activity among Adults

Driving and Obesity Risk

The more miles a person travels by vehicle, the more likely they are to be obese



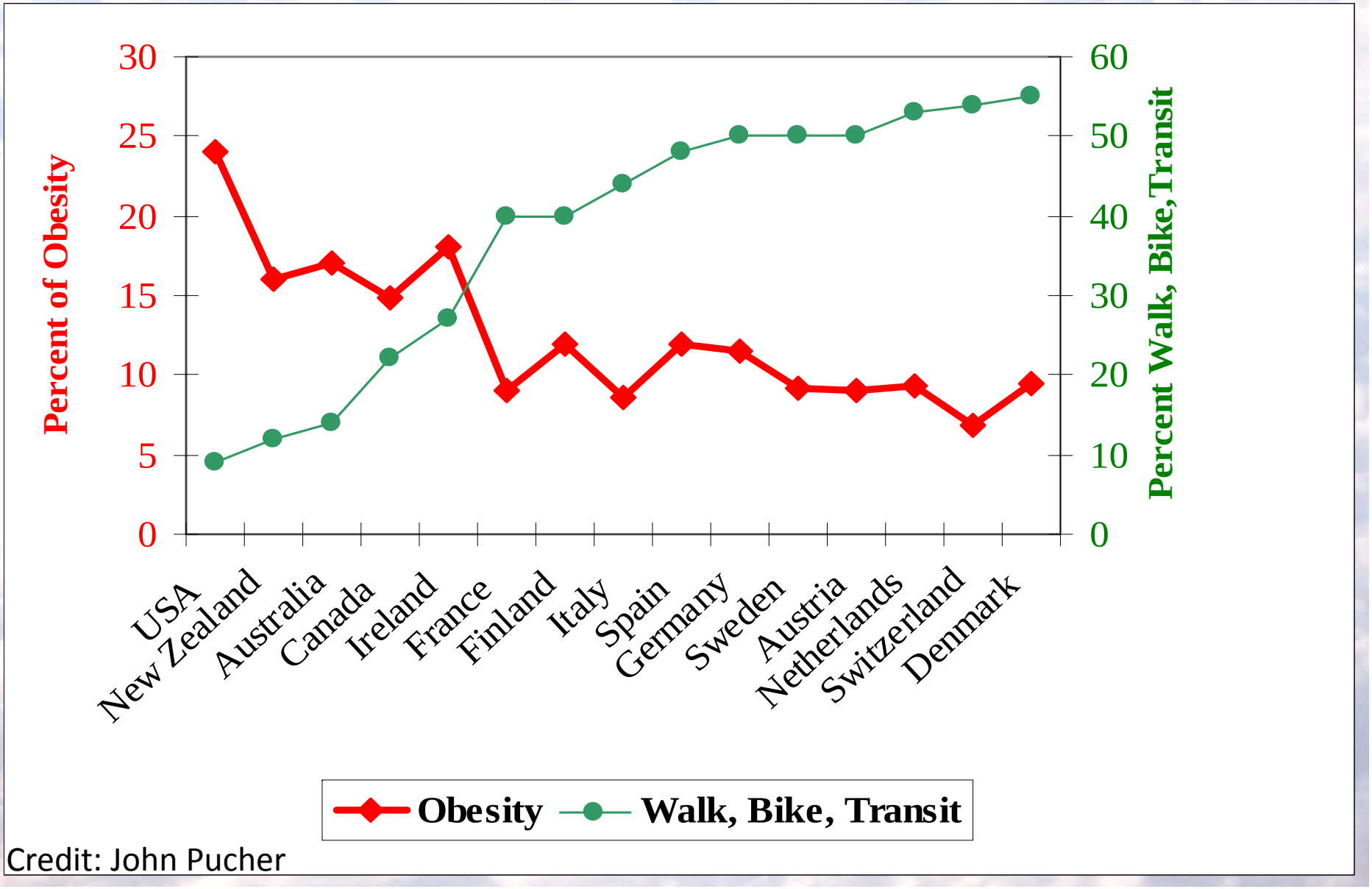
Lopez Zetina 2006

Active Transportation and Health

% of adults who commute by walking & cycling correlated with:	Correlation
% meeting physical activity recommendations	.72**
% obese	-.45**
% diabetic	-.66**

Pucher J. et al. Walking and Cycling to Health: A Comparative Analysis of City, State, and International Data. Am J Public Health. 2010 October; 100(10): 1986–1992.

Walking, Biking, and Transit and Obesity Rates

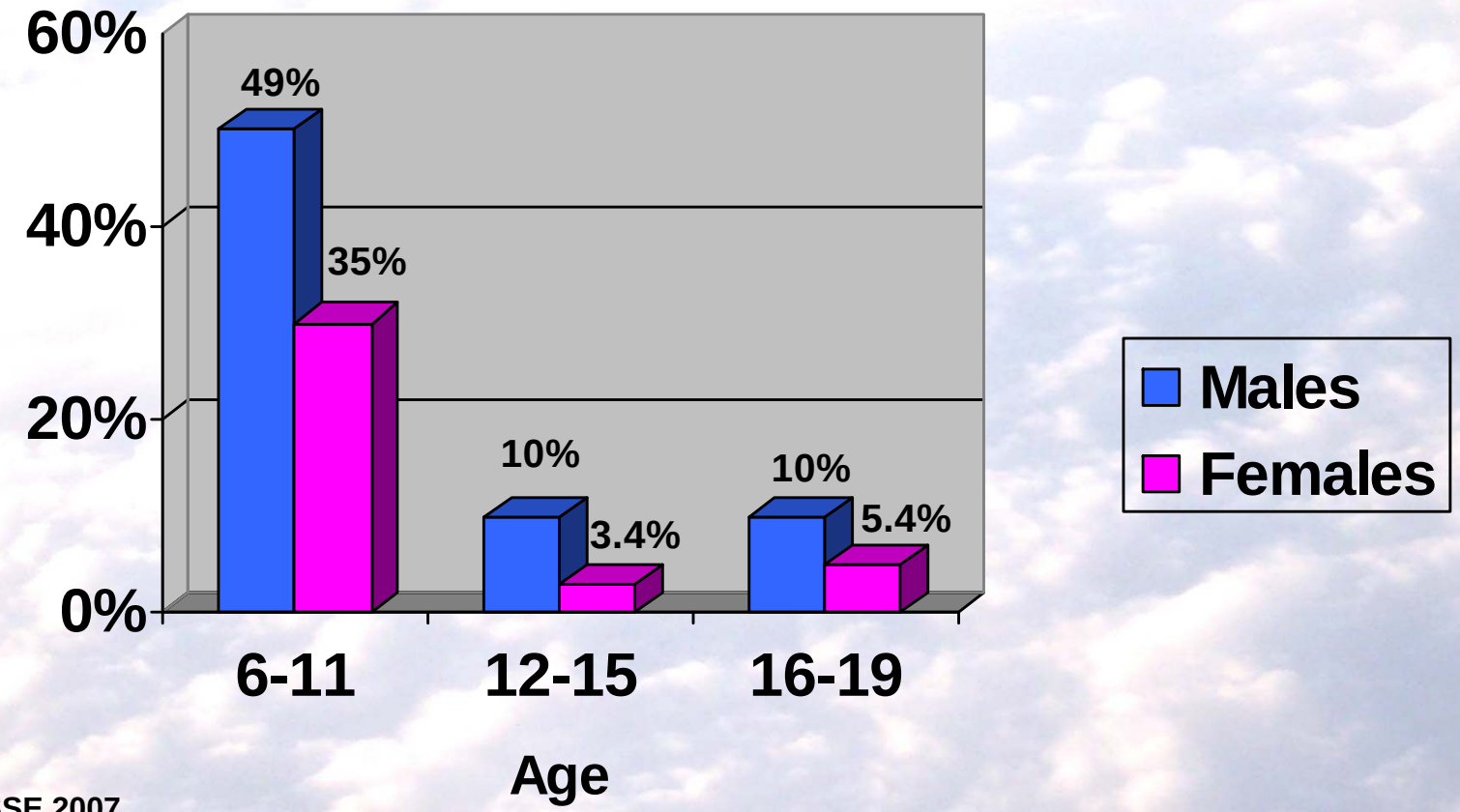


Credit: John Pucher

Children and Youth

Youth Physical Activity

Percentage of youth ages 6-19 meeting 60 min/day physical activity guidelines.
Based on accelerometers. NHANES 2003-4



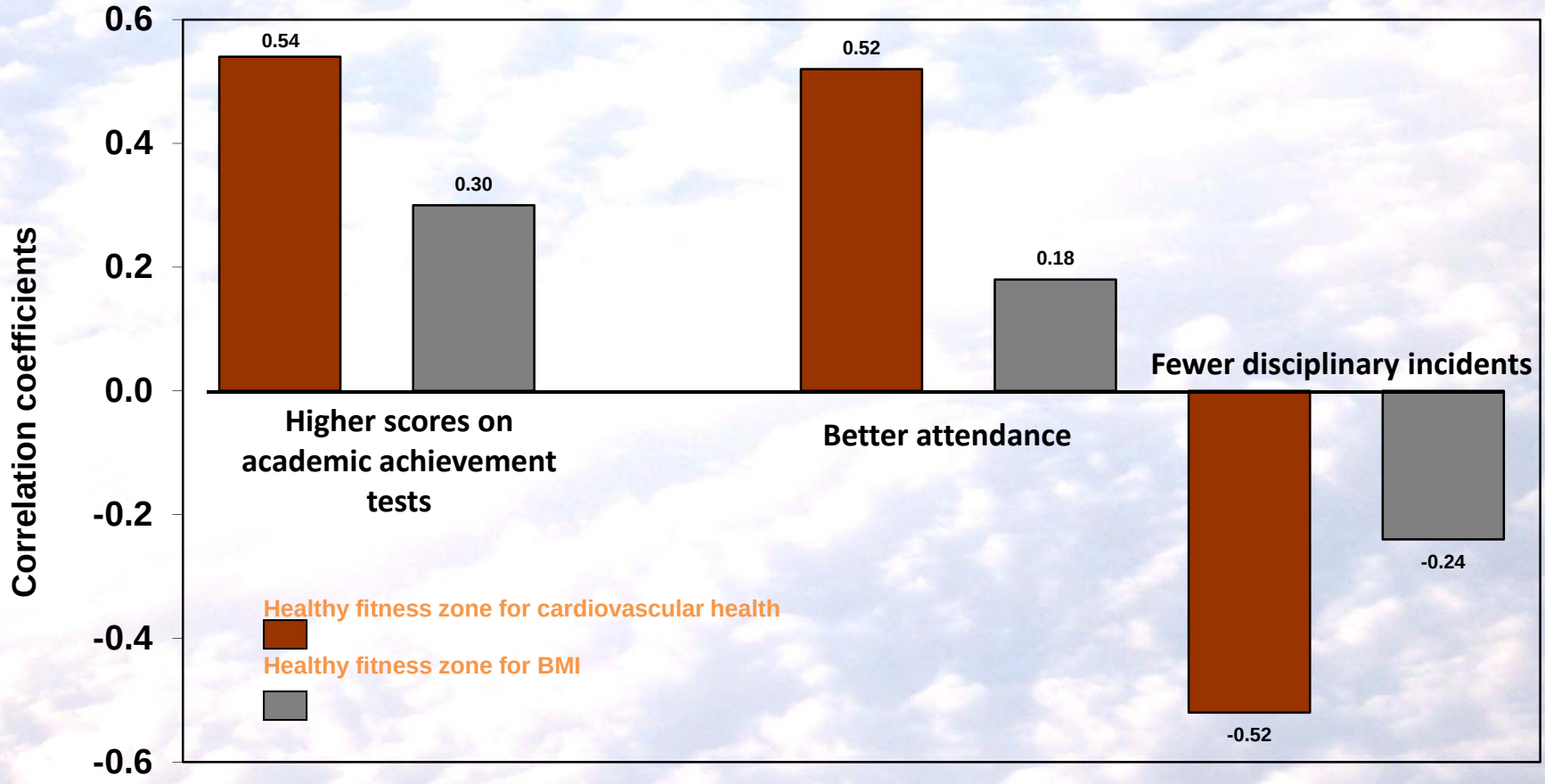
Troiano, MSSE 2007

Being Active is Good for Body and Mind

- **Physical Benefits**
  - Better fitness & muscle strength
  - Stronger bones
  - Less body fat
  - Improved lipid (cholesterol) levels
  - Improved glucose metabolism
- **Mental/cognitive benefits**
  - Better brain functioning
  - Better performance in school
  - Better test results
  - Better attention in class
  - Reduced anxiety & depression

These benefits are achieved regardless of obesity level

Physical Fitness, Fatness & Academic Achievement

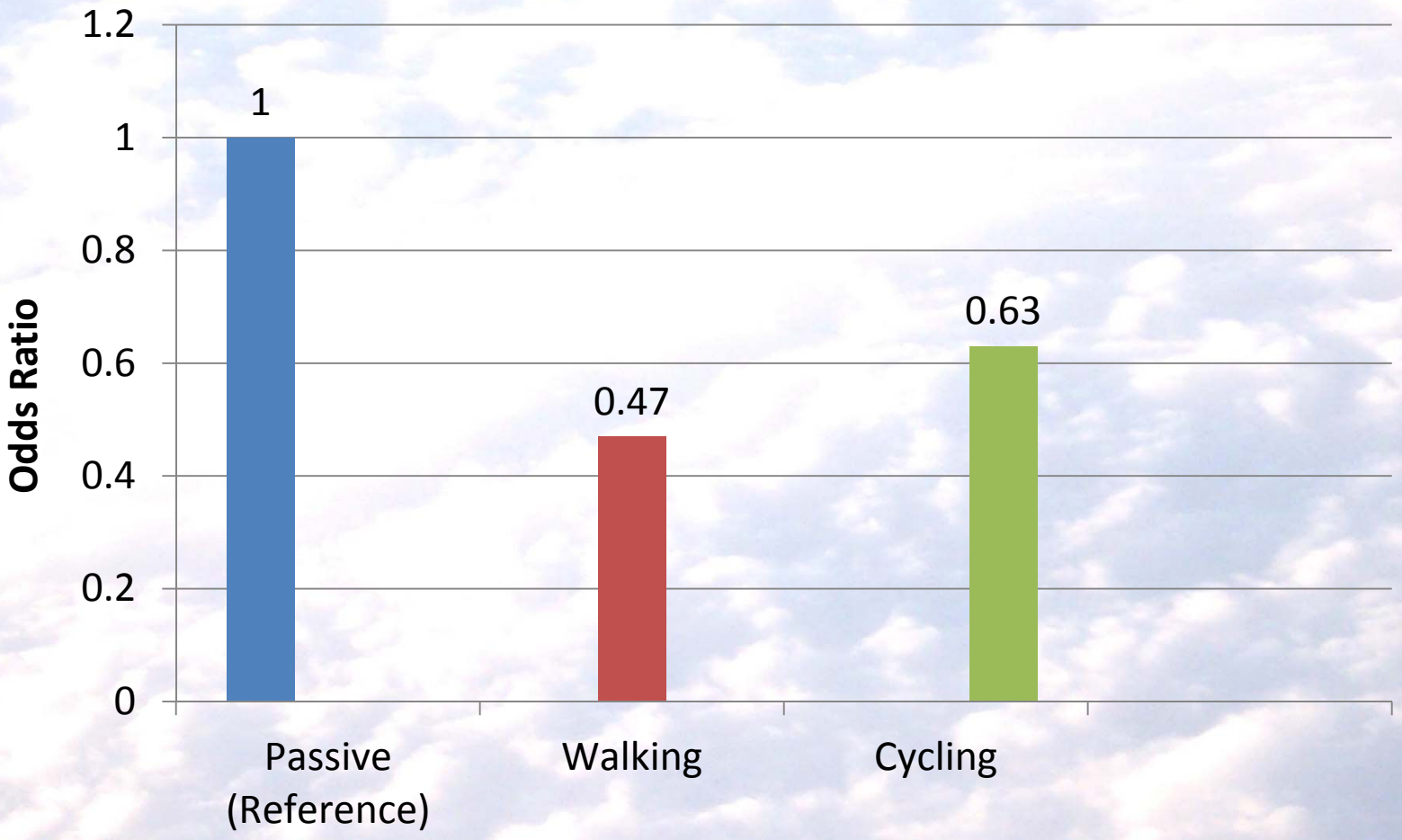


Student fitness* and BMI levels correlate with academic test performance, attendance and disciplinary incidents

*Measured by FITNESSGRAM® tests based on walking or running and adjusted for age and gender

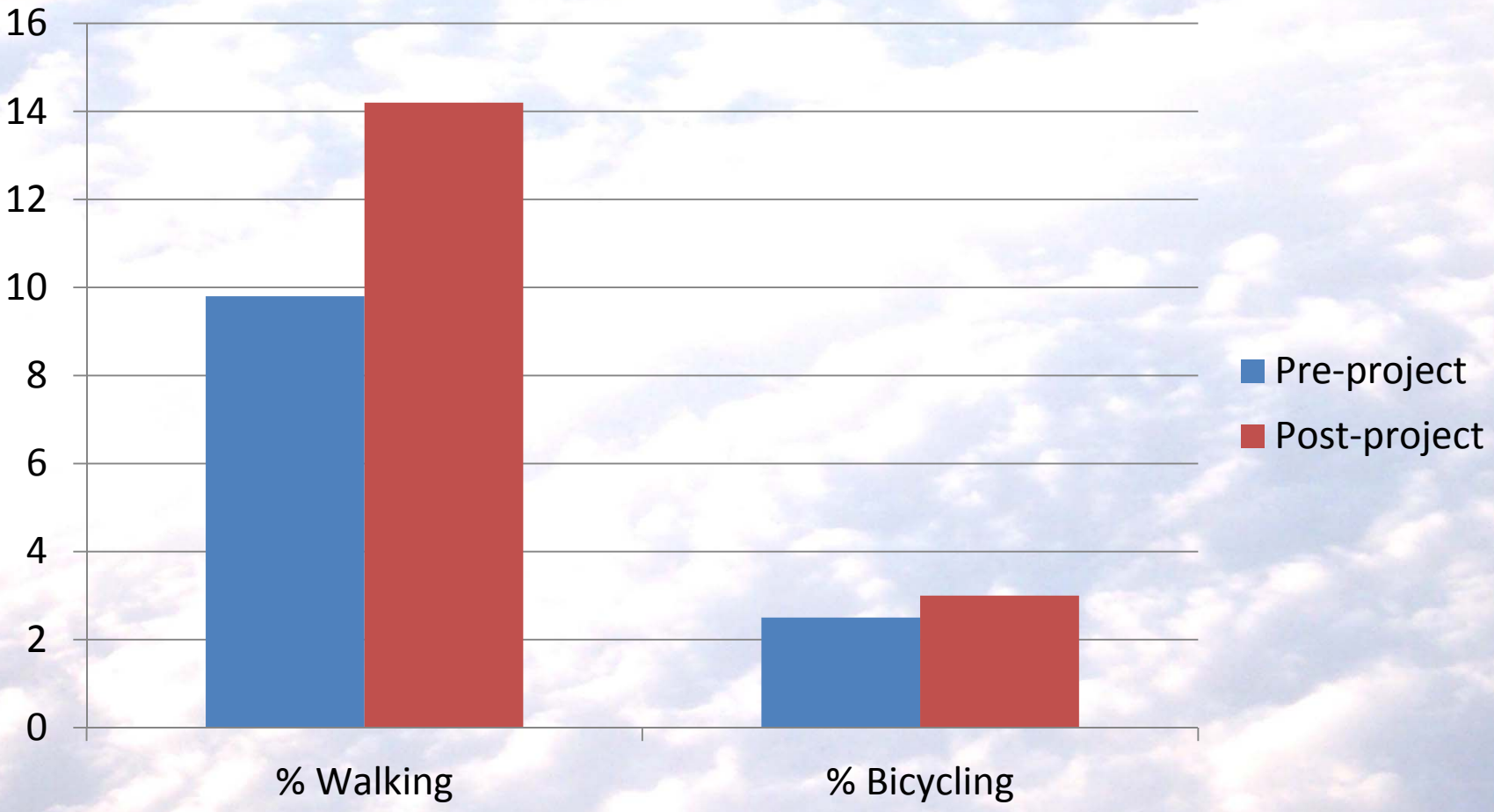
Bassett D. et al. AJPM 2013

Walking and Biking to School and Risk of Overweight



Østergaard L. et al. Cycling to School Is Associated With Lower BMI and Lower Odds of Being Overweight or Obese in a Large Population-Based Study of Danish Adolescents. *Journal of Physical Activity and Health* 2012, 9: 617-625.

Improving Sidewalks and Crosswalks to Increase Walking and Biking



Stewart, O. et al. (2014). Multistate Evaluation of Safe Routes to School Programs. American Journal of Health Promotion: January/February 2014, Vol. 28, No. sp3, pp. S89-S96.

Less of this…….

More of this….

ACTIVE DESIGN

Thank you!

Email:

Dlou@ucsd.edu

Resources:

www.activelivingresearch.org

PBIC Webinar

Costs for Pedestrian and Bicyclist Infrastructure Improvements

Presented by:

Charlie Zegeer, UNC Highway Safety Research Center

Bryan Poole, UNC Highway Safety Research Center

January 22, 2014

Introduction

Purpose

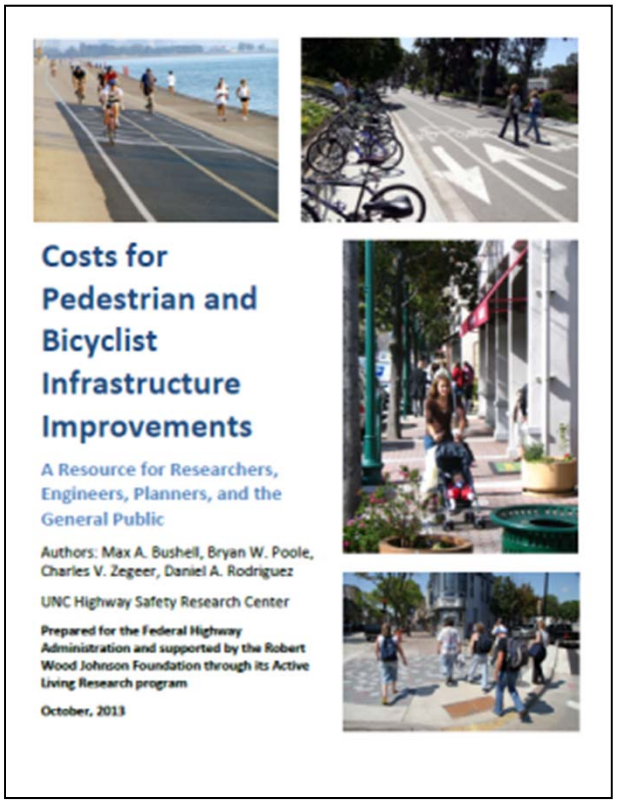
- To develop information on pedestrian and bicycle facilities, in order to encourage more and safer trips by foot and bike

Authors

- Researchers at the UNC Highway Safety Research Center in collaboration with the Federal Highway Administration and Active Living Research through the University of California, San Diego

Full Document Available Online

- Visit http://www.pedbikeinfo.org/costpaper to download the paper and complete table of cost information



Why Is This Needed?

Lack of Cost Information

- No accurate estimates for bicycle and pedestrian facilities existed previously in one resource
- This made it difficult for municipalities, engineers, and planners to compare pedestrian and bicycle infrastructure options
- With a better understanding of such costs, there can be more efficient use of funding

How Were Costs Compiled?

Sources

- Bid-letting sheets from State DOT websites
- Bid Express, a transportation bidding website
- Targeted internet searches

Database Generated

- Name of facility, description/specifics, total cost and unit cost, sample size, range of costs, year, revised cost with inflation, unit, maintenance cost, state name, and source
- Interviews with DOT officials that confirmed the range of costs acquired were reasonable and included installation cost

How Were Costs Compiled?

Outliers Eliminated

- Extreme outlier costs removed – generally those greater or less than two standard deviations from the mean cost
- Other costs removed if they were incomplete (i.e. the cost of the unit without the cost of installation)

Organized Into Tables

- Facilities with four or more entries were put into tables displaying the median and average costs, the minimum and maximum costs, the unit and number of sources
- Facilities with less than four entries are noted in the report, but not included in the table

Results

- 1,747 total costs were recorded
- 73 facilities represented in table
- Broad Geographic Scope
  - 40 U.S. States represented
  - 5 States with more than 100 entries: Ohio, California, Minnesota, Massachusetts and Wisconsin
- Costs are estimates
  - Costs will vary based on site conditions, scale, contractor, etc.

Summary of Costs

Cost – Bicycle Facilities

Bicycle Parking

- Includes both racks and lockers
- Racks usually constructed out of metal, to which bicycles can be securely locked
- Bicycle lockers securely store a single bicycle

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Bicycle Locker	$2,140	$2,090	$1,280	$2,680	Each	4 (5)
Bicycle Rack	$540	$660	$64	$3,610	Each	19 (21)

Cost – Bicycle Facilities

Bicycle Lanes/Routes

- Designated travel lanes for bicyclists
- Signed bike routes direct bicyclists to safer facilities

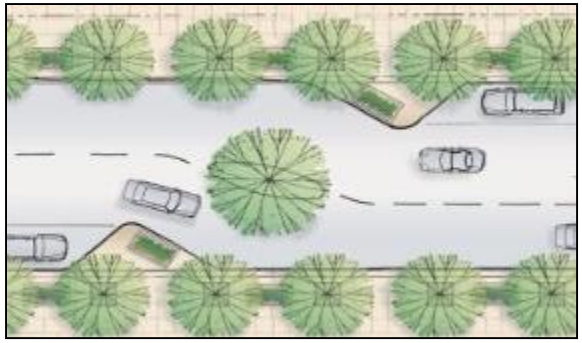
Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Bicycle Lane	$89,470	$133,170	$5,360	$536,680	Mile	6 (6)
Signed Bicycle Route	$27,240	$25,070	$5,360	$64,330	Mile	3 (6)

Cost – Traffic Calming

Chicanes

- Concrete islands that offset traffic
- Create a horizontal diversion of traffic to reduce vehicle speed
- Can be landscaped



Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Chicane	$8,050	$9,960	$2,140	$25,730	Each/Per Offset	8 (9)

Cost – Traffic Calming

Curb Extensions

- Also called chokers or bulb-outs
- Extend the sidewalk or curb line into the parking lane, creating a pinch point
- Created by bringing both curbs in, or more dramatically widening one side at a midblock location
- Can also be used at intersections for a gateway effect

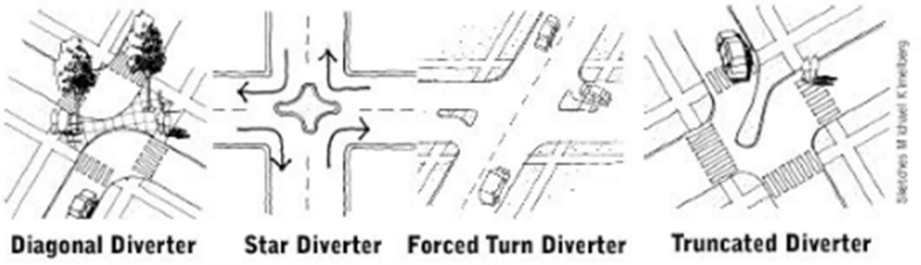
Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Curb Extension/ Choker/ Bulb-Out	$10,150	$13,000	$1,070	$41,170	Each	19 (28)

Cost – Traffic Calming

Diverters

- Island at an intersection preventing certain through and/or turning movements
- Can be placed across both lanes of traffic as a full diverter or across one lane of traffic as a semi-diverter
- Four primary types : diagonal, star, forced turn, and truncated



Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Diverter	$22,790	$26,040	$10,000	$51,460	Each	5 (6)
Partial/Semi Diverter	$15,000	$15,060	$5,000	$35,000	Each	3 (4)

Cost – Traffic Calming

Median Island

- Placed in the center of the street at intersections or midblock crossings
- Helps protect crossing pedestrians from motor vehicles
- Allows pedestrians to deal with only one direction of traffic at a time, and wait for traffic gaps

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Median Island	$10,460	$13,520	$2,140	$41,170	Each	17 (19)
Median Island	$9.80	$10	$2.28	$26	Square Foot	6 (15)

Cost – Traffic Calming

Median

- Raised islands that separate opposing streams of traffic and limit turning
- Typically narrower than islands
- Facilitate pedestrian crossings, improve pedestrian visibility, slow vehicle speeds, and provide space for lighting and landscaping

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Median	$6.00	$7.26	$1.86	$44	Square Foot	9 (30)

Cost – Traffic Calming

Raised Crossing

- Essentially a speed table for the entire intersection
- Similar to raised intersection, but only the width of a crosswalk
- Encourages yielding to pedestrians by increasing visibility and forcing slower motorist speeds

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Raised Crosswalk	$7,110	$8,170	$1,290	$30,880	Each	14 (14)
Raised Intersection	$59,160	$50,540	$12,500	$114,150	Each	5 (5)

Cost – Traffic Calming

Roundabout/Traffic Circle

- Range from small mini-circles to large roundabouts
- Costs not detailed enough to differentiate
- Circular intersections designed to eliminate left turns by requiring traffic to exit to the right of the circle
- Can reduce speeds, improve safety, aide traffic flow, and help signify the entrance of a special district or area

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Roundabout/ Traffic Circle	$27,190	$85,370	$5,000	$523,080	Each	11 (14)

Cost – Traffic Calming

Speed Treatments

- Speed humps are paved mounds, 3 to 4 inches-high at their center
- Speed bumps are typically smaller, with a more extreme grade, which forces greater speed reduction but can also impede bicyclists
- Speed tables are very long and broad, or flat-topped, speed humps

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Speed Hump	$2,130	$2,640	$690	$6,860	Each	14 (14)
Speed Bump	$1,670	$1,550	$540	$2,300	Each	4 (4)
Speed Table	$2,090	$2,400	$2,000	$4,180	Each	5 (5)

Cost – Pedestrian Accommodations

Curb Ramp

- Ramps provide access between the sidewalk and roadway for people using wheelchairs, strollers, etc., or who have mobility impairments
- Truncated domes/ detectable warning surfaces provide a distinctive surface pattern, detectable underfoot
- Domes help warn visually impaired of an approaching street and are required for ADA compliance

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Truncated Dome/ Detectable Warning	$37	$42	$6.18	$260	Square Foot	9 (15)
Wheelchair Ramp	$740	$810	$89	$3,600	Each	16 (31)
Wheelchair Ramp	$12	$12	$3.37	$76	Square Foot	10 (43)

Cost – Pedestrian Accommodations

Overpass

- Completely separates pedestrians from vehicular traffic and provides safe pedestrian accommodation over often impassable barriers, such as highways, railways, and natural barriers
- There are many different types of structures and materials available
- Overpasses can range from $1,073,000 to $5,366,000

Cost Information

Infrastructure	Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Overpass	Wooden Bridge	$122,610	$124,670	$91,010	$165,710	Each	1 (8)
Overpass	Pre-Fab Steel Bridge	$191,400	$206,290	$41,850	$653,840	Each	5 (5)

Cost – Pedestrian Accommodations

Fence/Gate

- Helps separate pedestrians and cyclists from roadways and railroad tracks
- Can be used in the construction of pedestrian/bicyclist paths, bridges, and overpasses

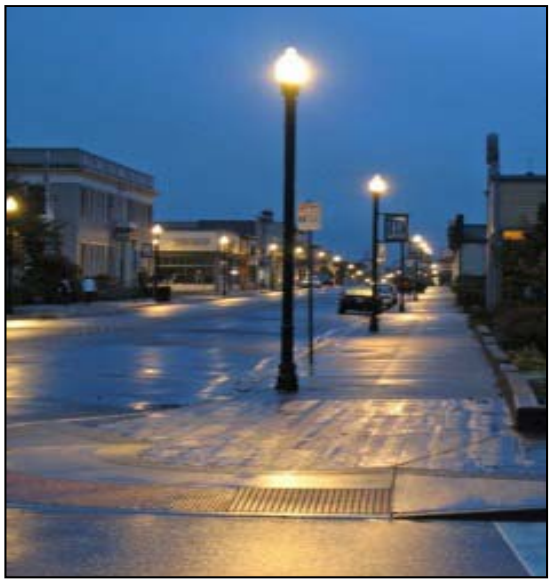
Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Fence	$120	$130	$17	$370	Linear Foot	7 (7)
Gate	$510	$910	$330	$1,710	Each	5 (5)

Cost – Pedestrian Accommodations

Lighting

- Enhances safety of all roadway users at night
- May be at intersections or along walkways
- Pedestrian-scale lighting improves nighttime security and enhances commercial districts



Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Streetlight	$3,600	$4,880	$310	$13,900	Each	12 (17)

Cost – Pedestrian Accommodations

Street Furniture

- Creates buffer between the sidewalk and roadway
- Helps create a more pleasant and attractive environment for pedestrians

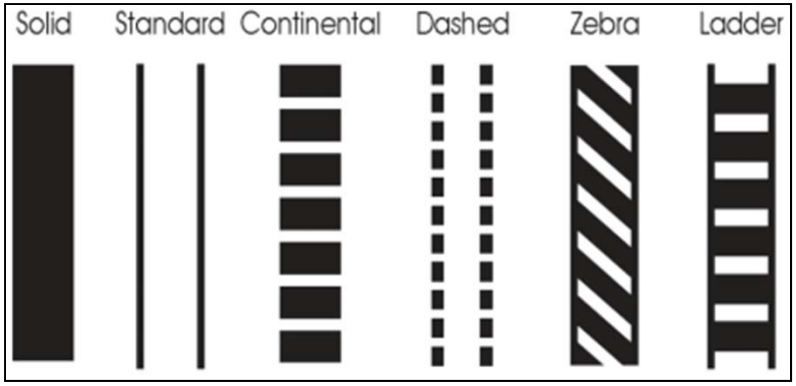
Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Street Trees	$460	$430	$54	$940	Each	7(7)
Bench	$1,660	$1,550	$220	$5,750	Each	15 (17)
Bus Shelter	$11,490	$11,560	$5,230	$41,850	Each	4 (4)
Trash/ Recycling Receptacle	$1,330	$1,420	$310	$3,220	Each	12 (13)

Cost – Pedestrian Crossings/Paths

Crosswalks

- Indicate a legal and preferred crossing for pedestrians
- Installed at intersections or midblock locations
- Wide variety of crosswalk marking patterns, including standard parallel lines and high-visibility types



Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
High Visibility Crosswalk	$3,070	$2,540	$600	$5,710	Each	4(4)
Striped Crosswalk	$340	$770	$110	$2,090	Each	8 (8)
Striped Crosswalk	$5.87	$8.51	$1.03	$26	Linear Foot	12 (48)
Striped Crosswalk	$6.32	$7.38	$1.06	$31	Square Foot	5 (15)

Cost – Pedestrian Crossings/Paths

Sidewalks

- Most basic pedestrian facility
- Materials can consist of concrete, asphalt, brick, or other materials
- Costs may or may not include curb and gutter

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Asphalt Paved Shoulder	$5.81	$5.56	$2.96	$7.65	Square Foot	1 (4)
Asphalt Sidewalk	$16	$35	$6.02	$150	Linear Foot	7 (11)
Brick Sidewalk	$60	$60	$12	$160	Linear Foot	9 (9)
Concrete Paved Shoulder	$6.10	$6.64	$2.79	$58	Square Foot	1 (11)
Concrete Sidewalk	$27	$32	$2.09	$410	Linear Foot	46 (164)
Concrete Sidewalk + Curb	$170	$150	$23	$230	Linear Foot	4 (7)

Cost – Pedestrian Crossings/Paths

Paths

- Multi-use paths are the safest facilities for pedestrians and bicyclists
- Provides mobility options away from the roadway
- Usually at least eight feet wide
- Can be paved or unpaved depending on desired use

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Boardwalk	$1,957,040	$2,219,470	$789,390	$4,288,520	Mile	5 (5)
Multi-Use Trail - Paved	$261,000	$481,140	$64,710	$4,288,520	Mile	11 (42)
Multi-Use Trail - Unpaved	$83,870	$121,390	$29,520	$412,720	Mile	3 (7)

Cost – Pedestrian Crossings/Paths

Curb and Gutter

- Used in conjunction with sidewalks, paths, curb extensions, median islands, etc.
- Cost can vary widely based on the scale of the project and whether the installation is in conjunction with other road treatments

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Curb	$18	$21	$1.05	$110	Linear Foot	16 (68)
Curb and Gutter	$20	$21	$1.05	$120	Linear Foot	16 (108)
Gutter	$23	$23	$10	$78	Linear Foot	4 (4)

Cost – Signals

Flashing Beacon/RRFB

- Used in conjunction with pedestrian crossings to provide an enhanced warning for motorists
- Rectangular rapid flashing beacons (RRFBs) differ by having a rapid strobe-like warning flash, are brighter, and can be specifically aimed

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Flashing Beacon	$5,170	$10,010	$360	$59,100	Each	16 (25)
RRFB	$14,160	$22,250	$4,520	$52,310	Each	3 (4)

Cost – Signals

Pedestrian Hybrid Beacon

- Also known as a High Intensity Activated Crosswalk (HAWK) signal
- Special type of beacon to warn and control vehicles
- Consists of three signal sections, overhead pedestrian crosswalk signs, pedestrian detectors, and countdown pedestrian signal heads

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Pedestrian Hybrid Beacon	$51,460	$57,680	$21,440	$128,660	Each	9 (9)

Cost – Signals

Pedestrian Signal

- Serves important function of guiding and regulating traffic, and reducing conflicts between different road users
- "Signal Face" refers to the signal's front display visible to pedestrians
- "Signal Head" refers to the entire unit

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Audible Pedestrian Signal	$810	$800	$550	$990	Each	4 (4)
Countdown Timer Module	$600	$740	$190	$1,930	Each	14 (18)
Pedestrian Signal	$980	$1,480	$130	$10,000	Each	22 (33)
Signal Face	$490	$430	$130	$800	Each	3 (6)
Signal Head	$570	$550	$100	$1,450	Each	12 (26)

Cost – Speed Trailer

Speed Trailer

- Sign boards that display speed of passing vehicles and provide a warning to the motorist if the speed limit is exceeded
- Can help education and awareness efforts
- Are especially effective when coupled with enforcement efforts

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Speed Trailer	$9,480	$9,510	$7,000	$12,410	Each	6 (6)

Cost – Signs

Signs

- Can provide important information to improve road safety
- Regulatory signs, such as STOP, YIELD, or turn restriction signs such as NO TURN ON RED require compliant driver actions and can be enforced

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Stop/Yield Signs	$220	$300	$210	$560	Each	4 (4)

Cost – Striping and Symbols

Pavement Markings

- Advance stop/yield lines improve pedestrian visibility and encourage drivers to stop back far enough so a pedestrian can see if a second motor vehicle is not stopping
- Island markings and painted curbs/sidewalks alert pedestrians, bicyclists, and drivers of the presence of these items, and can help restrict parking

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Advance Stop/Yield Line	$380	$320	$77	$570	Each	3 (5)
Island Marking	$1.49	$1.94	$0.41	$11	Square Foot	1 (4)
Painted Curb/Sidewalk	$2.57	$3.06	$1.05	$10	Linear Foot	2 (5)

Cost – Striping and Symbols

Pavement Marking Symbols

- "Pedestrian Crossing" symbols notify pedestrians and/or motorists of places where pedestrians cross the street
- "Shared Lane/Bicycle" symbols identify bicycle lanes and/or shared-lanes
- "School Crossing" symbols highlight areas of children and increased pedestrian activity

Cost Information

Description	Median	Average	Minimum	Maximum	Cost Unit	Number of Sources (Observations)
Pedestrian Crossing	$310	$360	$240	$1,240	Each	4 (6)
Shared Lane/Bicycle Marking	$160	$180	$22	$600	Each	15 (39)
School Crossing	$520	$470	$100	$1,150	Each	4 (18)

How Costs Should Be Used

As Estimates, Not Absolutes

- These costs are not exhaustive or comprehensive – only what was available
- Can be a useful starting point to get an estimate of how much certain bicycle and pedestrian facilities would cost
- Can help decision-makers understand the costs involved in sustaining and encouraging pedestrian and bicycle transportation
- The ultimate goal of the database is to encourage construction of facilities for bicycling and walking

Lessons Learned/Gaps

- Costs were found for 73 facilities
- Cost information was not available for all types of facilities
- Some costs were part of a broader transportation project
- Costs can vary due to site conditions, the scale of the project, labor rates, material costs, etc.

Next Steps

- An online search tool is planned that will allow users to find the cost for a specific facility by type, state, etc.
- The cost database will be periodically updated, adjusting for inflation, etc.
- A more extensive update and aggregation of data could be done in the future if funding becomes available

Crash Modification Factors (CMF)

What Is a CMF?

- **A multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site.**

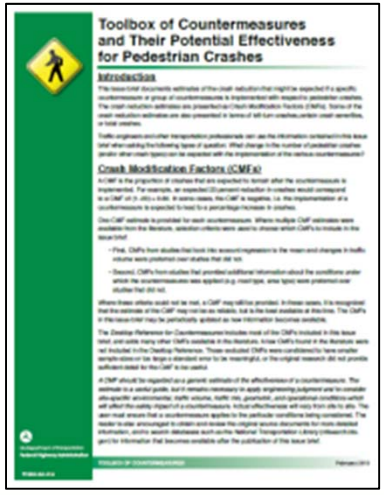
How are CMF's useful?

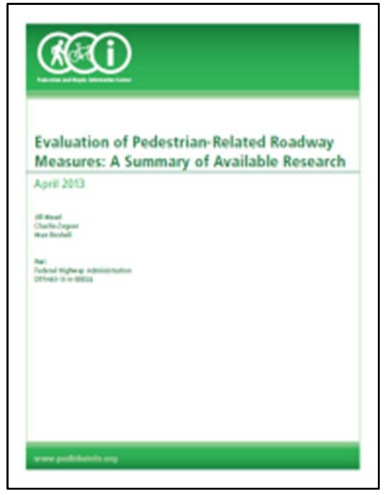
CMFs can be used to:

- **Capture the expected safety gain for a project**
- **Compare safety consequences among various alternatives and locations**
- **Identify cost-effective strategies**
- **Check validity of assumptions in cost-benefit analyses**

Crash Modification Factors (CMF)

- **Sources used to develop CMFs come from published research studies**
- **A CMF Toolbox estimates expected crash reduction after installing pedestrian facilities, available at:**
  http://www.pedbikeinfo.org/collateral/PSAP%20Training/gettraining_references_pedToolboxofCountermeasures2013.pdf
- **For a review of literature related to pedestrian roadway measures, visit:**
  http://katana.hsrc.unc.edu/cms/downloads/PedestrianLitReview_April2013.pdf





PEDSAFE

- For more information on pedestrian and bicycle facilities, as well as implementation strategies and a selection tool, explore the Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE)
- In 2013 PEDSAFE underwent a full revision and update
- Visit the website: www.pedbikesafe.org/PEDSAFE

Thank you!

Archive of webinars can be found at:
http://www.walkinginfo.org/webinars/

- **Downloadable/streaming recording and presentation slides**

Questions?

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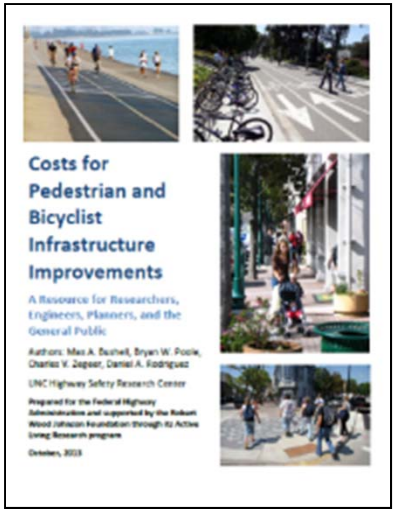

Check out the full cost report, database, and two-page summary report: http://www.pedbikeinfo.org/costpaper

Thank You!

- **Archive at www.pedbikeinfo.org/webinars**
  - Downloadable and streaming recording, transcript, presentation slides
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