



Safe Routes
to School
National
Partnership

SAFE ROUTES TO SCHOOL

BY THE NUMBERS

Using Data to Foster Walking and Biking to School

118457	94%	71536	451634
614751	86%	148534	10495
345714	85%	51405	7174
85713	72%	50187	61234
14574	90%	84651	4348
374561	96%	47568	7456
409677	64%	162345	7123
216345	85%	45018	7612
	76%		





ACKNOWLEDGEMENTS

AUTHORS

Michelle Lieberman
Sara Zimmerman

CONTRIBUTOR

Marisa Jones

We would like to thank the many people who assisted in the development of this resource. In particular, we would like to acknowledge participants in the stakeholder meeting convened by the American Public Health Association in October 2015. Information from the meeting was used to help identify needs for accessible data, explore possible future innovations and strategies that would make data more accessible, and to frame this report.

Erin Barbaro, *Community Commons*
Mighty Fine, *American Public Health Association*
Christy Kwan, *Alliance for Biking & Walking*
Seth LaJeunesse, *National Center for Safe Routes to School*
Megan McClaire, *Advancement Project*
Shawn McIntosh, *American Public Health Association*

Surili Patel, *American Public Health Association*
Fionnuala Quinn, *Bureau of Good Roads*
Kate Robb, *American Public Health Association*
Lorine Spencer, *Centers for Disease Control and Prevention*
Ian Thomas, *America Walks*
Sara Zimmerman, *Safe Routes to School National Partnership*

Published June 2016.

This publication was made possible through a contract between the American Public Health Association and the Safe Routes to School National Partnership, funded through cooperative agreement 1U380T000131 between the Centers for Disease Control and Prevention and the American Public Health Association. The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the American Public Health Association.



TABLE OF CONTENTS

Section I	
Introduction	page 2
About This Report	page 3
Section II	
Setting the Stage: Why Data Matters for Safe Routes to School	page 5
What is Safe Routes to School?	page 5
Why Do We Need Accessible Data?	page 6
Making Data Usable: A Key Component.	page 7
Section III	
Exploring Data At All Levels	page 9
Informing National and State Level Decision Making	page 9
Informing Safe Routes to School Program-Wide Decision Making.	page 11
Informing School-Level Decision Making	page 13
Informing Land Use and Transportation Decision Making	page 15
Section IV	
A Look At Current Data Usage in Safe Routes to School	page 18
Data Collection Methods	page 18
Data Collection and Usage Challenges	page 20
Section V	
Making Data More Accessible: Roles and Strategies	page 21
Opening Up Access: The Role of Government	page 21
The Role of Research: Universities, Research Centers and Large Organizations.	page 26
New Tools and Data: Collaboration with the Private Sector	page 29
Local Data Collection and Use: Community Organizations and Grassroots Efforts	page 30
Section VI	
Addressing Challenges with Data Accessibility	page 31
Quality Management	page 31
Ethics, Security, and Privacy	page 31
Ownership	page 33
Developing Organizational Guidelines and Policies	page 33
Section VII	
Conclusion	page 34

SECTION I

INTRODUCTION

Numbers and statistics matter for making sure kids are able to safely walk to and from school. They supply the perspective that helps us understand the larger context of our work. Are the pictures and stories of healthy, active kids in our communities rare or common? Are our programs reaching all kids or just a few, and are there racial or economic disparities in reach? Which elements of our initiatives are really making a difference? We need numbers to answer these questions and structure programs and policies to help all kids be active.

We are in a time of rapid change when it comes to the realm of possibility for using numbers and statistics to understand and improve health and safety. New and advancing technologies like high-speed computers, smartphones, digitizers, mobile apps, and remotely operated cameras and counters are allowing more data to be collected today than ever before. Technology is improving our capacity

to store and analyze data, merge data from different sources, and disseminate information out to communities.

As we are able to achieve more with numbers, these changes have sparked interest in making data more open and accessible to the public. Advocacy groups, software developers and programmers, and community members have rallied around making data accessible in arenas ranging from public transit to healthcare. When given access, these groups have produced innovative solutions to challenges experienced in the community, such as apps that tell people when the next bus will arrive or when the bikes at a given bike share station are likely to become unavailable.

Data has always played an important role in developing and implementing successful Safe Routes to School initiatives – programs and projects that improve safety and encourage children to walk and bicycle to



Open data is a two-way process. Governments publish the data and society enriches and uses the data. It is, therefore, essential to encourage participation and engagement among multiple stakeholders.

–National League of Cities¹

school. A key requirement of the original federal Safe Routes to School program was evaluation of Safe Routes to School programs, a practice aimed at assessing whether approaches are more or less successful, which relies heavily on data. But in many communities, evaluation has been only done when required, not as a matter of practice. Little exploration of evaluation is especially common for



small cities and towns, as well as small community organizations that often face technical and financial barriers to accessing and using data.

Since the federal Safe Routes to School program began providing dedicated funding for initiatives to support safe walking and bicycling to school more than 10 years ago, the Safe Routes to School movement has amassed a considerable store of data that can and does inform our efforts. However, there is much more that can be done with this data, as well as with other data not routinely captured, and there are new ways to support communities that have not been able to use data before. This report explores how we can harness the possibilities to use data to advance Safe Routes to School and support healthier kids.

ABOUT THIS REPORT

This report provides a primer for Safe Routes to School professionals on how data can be accessed and used in walking and bicycling to school programs and initiatives. In addition, the report is intended to assist government agencies, universities and researchers, private corporations, and other organizations in understanding how they can better support safe walking and bicycling and active communities by making their data more accessible and usable.

Section I introduces this topic. The report begins in earnest in **Section II: Setting the Stage: Why Data Matter for Safe Routes to School**, with an overview of what Safe Routes to School initiatives are and an exploration of why accessible and usable data are important for these efforts. In **Section III: Exploring Data At All Levels**, we describe the types of data that are used or can be used for Safe Routes to School, and delve into how data

can be used to inform and support active travel to school. **Section IV: A Look At Current Data Usage in Safe Routes to School** describes how data has been collected and used historically and the challenges around current data practices. **Section V: How Do We Make Data More Accessible? Roles and Strategies** discusses the role that various groups – government, universities and research centers, the private sector, and community organizations and grassroots efforts – play in data accessibility. This section includes information on different sources of data as well as examples of how communities have accessed and used data. **Section VI: Addressing Challenges with Data Accessibility** explores the challenges with increased data accessibility and sets out strategies and best practices to address the challenges. Finally, in **Section VII: Conclusion**, we explore considerations for future improvements in data accessibility to support Safe Routes to School initiatives.

A FRAMEWORK FOR GIS AND SAFE ROUTES TO SCHOOL: IMPROVING DATA COLLECTION, ACCESS AND USAGE

In 2013, the National Partnership brought together 15 experts from various GIS-related fields to discuss needs and opportunities around GIS and Safe Routes to School. The meeting explored existing datasets and information that was not being collected, how the general public can create and access data, existing tools and technology and what is needed to improve data connectivity and mapping, and how GIS could be better utilized in Safe Routes to School and other active transportation initiatives. This convening resulted in a report, [*A Framework for GIS and Safe Routes to School: Improving Data Collection, Access and Usage*](#), that discusses the need for a national database to house data related to Safe Routes to School and active transportation.

The convening produced a number of additional findings and recommendations, including a list of the Top 10 GIS Datasets for local communities to collect to support Safe Routes to School, a need for protocols related to data collection, uniform data collection tools, and the benefit of having tools that allow community members to collect and provide data using mobile devices. The report also identified open data and open source tools as important components for collecting and disseminating data to communities.



OPEN DATA Data with the highest level of accessibility is often referred to as open data. Open data is data that can be freely used, re-used and redistributed by anyone.² To further define open data, the nonprofit Open Knowledge International summarizes these important characteristics:

Availability and Access The data must be available as a whole and at no more than a reasonable reproduction cost, preferably by downloading over the internet. The data must also be available in a convenient and modifiable form.

Re-use and Redistribution The data must be provided under terms that permit re-use and redistribution, including the intermixing with other datasets.

Universal Participation Everyone must be able to use, re-use and redistribute - there should be no discrimination against fields of endeavor or against persons or groups.³

OPEN SOURCE Open source software is software that can be freely accessed, used, changed, and shared (in modified or unmodified form) by anyone. Open source software is made by many people, and distributed under licenses that comply with the [Open Source Definition](#). The internationally recognized Open Source Definition provides ten criteria that must be met for any software or software license to be labeled “Open Source software.”⁴

BIG DATA Big data is a term for data sets that are so large and complex that traditional data processing applications are inadequate.⁵ The concept gained momentum in the early 2000s when industry analyst Doug Laney articulated the definition of big data as the three Vs:

Volume Organizations collect data from a variety of sources, including business transactions, social media and information from sensor or machine-to-machine data. New technologies help organizations store extremely large amounts of data.

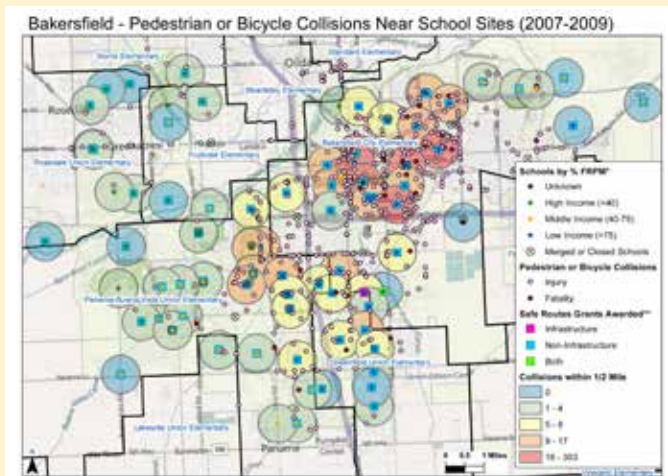
Velocity Data comes in at a high speed and must be dealt with in a timely manner. Data collectors like RFID tags, sensors, and smart metering are driving the need to deal with data in near-real time.

Variety Data comes in many formats – from structured, numeric data in traditional databases to unstructured text documents, email, video, audio, and financial transactions.

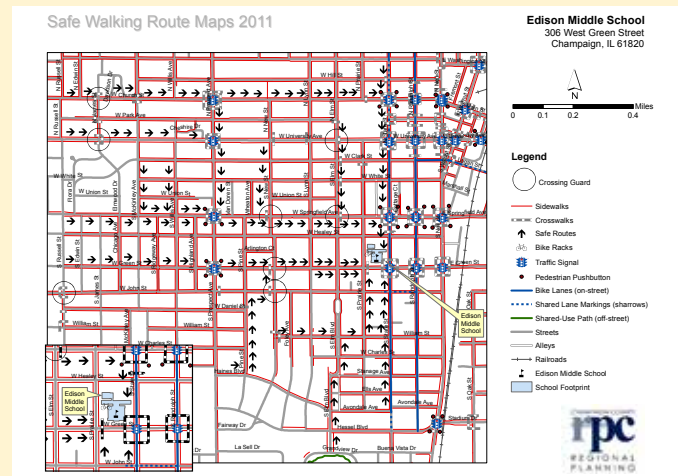
GEOGRAPHIC INFORMATION SYSTEMS (GIS)

GIS is a mapping tool that can store, manage, analyze, and display locational data in a way that allows the user to see trends, patterns, and a picture of their community that words, graphs, and tables cannot communicate as well. By creating a visual display on a map, GIS can show relationships between information previously thought to be unrelated.

CROWDSOURCING The practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliers.⁶ Crowdsourcing that contributes to scientific research is called citizen science.⁷



UC Berkeley SafeTREC



Champaign County Regional Planning Commission

SECTION II

SETTING THE STAGE: WHY DATA MATTERS FOR SAFE ROUTES TO SCHOOL

The goal of this report is to understand how we can better use data to improve safety and health for children in light of the need to adapt and evolve with today's rapidly changing data landscape. But to accomplish this goal, we need to understand why data matters for Safe Routes to School efforts. This section begins with an overview of what Safe Routes to School initiatives are, and then discusses why it is important to have data be both accessible and usable.



WHAT IS SAFE ROUTES TO SCHOOL?

Safe Routes to School initiatives aim to make it safe, convenient, and fun for children and youth to regularly bicycle and walk to and from school. In 1969, almost half of all students walked or bicycled to school, and 87 percent of kids who lived within a mile of school walked or bicycled. In contrast, fewer than one in six students walk or bicycle to school today. These changes have been deeply detrimental to the health and safety of students, and have increased traffic congestion and air pollution near schools. The Safe Routes to School movement includes parents and kids, as well as public health, active transportation, education, and environmental stakeholders, who work to increase the number of students walking

and bicycling to school and address the lack of safe conditions for walking and bicycling. To date, more than 17,400 schools and 6.8 million children nationally have benefited from Safe Routes to School projects and programs.⁸

At the local level – in individual schools, school districts, cities, and counties – Safe Routes to School practitioners run education and encouragement programs with families and schools and push for strong municipal and district policies to support safe walking and bicycling. Towns and counties support Safe Routes to School by prioritizing funding for bike lanes, sidewalks, and other changes that make streets safer for children biking and walking. The most successful Safe Routes to School programs incorporate the Six E's: evaluation, education, encouragement, engineering, enforcement, and equity.

At the regional and state level, Safe Routes to School practitioners ensure that existing funding for Safe Routes to School is prioritized for communities with the greatest need and most significant safety concerns, that there is adequate support for planning and running Safe Routes to School initiatives, that existing funding is in fact spent, and that additional funding is identified and directed toward safe streets for children. At the federal level, Safe Routes to School allies maintain a steady voice in support of Safe Routes to School, focusing on ensuring funding in the federal transportation bill, on advocating for transportation and health policies that promote Safe Routes to School, and on supporting agency initiatives that provide policy guidance and technical assistance to local communities.

WHY DO WE NEED ACCESSIBLE DATA?

Data provides us with an understanding of what is really happening on the ground. That means that data matters deeply to our ability to make our communities healthier and more equitable places for kids and adults.

But prior to open data portals and other proactive methods for getting data into the community's hands, public access to information was often very limited, and data was only made available to the public after a public records request, if at all. While much government information is required to be made available to the public under the federal Freedom of Information Act (FOIA) and state and local open records laws, these laws place the responsibility upon the public to

request information, through what can be a cumbersome, expensive, time-consuming, and frequently futile process.¹⁰

As a result, today's embrace by many governmental agencies of making data far more accessible has broad implications. As we discuss in detail in Section III: Exploring Data at All Levels, Safe Routes to School practices benefit from increased access to data at each level of government.

For decision makers, when data is more accessible, it provides the tools necessary to make informed decisions, allowing improved, evidence-based prioritization of new walking and biking infrastructure or Safe Routes to School programming needs. For community members and advocates, accessible data means the ability to directly institute better programs and initiatives on the ground. Data also allows

community members to better participate in the decision-making process, promoting awareness of the issues, advocating for desired outcomes, and holding decision makers accountable.

Data is also important for strong funding proposals. Safe Routes to School projects and programs must usually compete with other initiatives and amongst themselves for funding. In the absence of funding to support all projects and programs proposed, funders often make decisions based on data. In the past, programs with the ability to use data to paint the picture of local conditions and needs have fared better than those programs with fewer resources to access information. Making data more accessible can help support equitable access to funding.

THE SIX E'S OF SAFE ROUTES TO SCHOOL

Research shows that comprehensive Safe Routes to School initiatives are more effective at increasing physical activity and reducing injuries for children.⁹ A comprehensive approach requires embedding Safe Routes to School into many aspects of a community. The Six E's of Safe Routes to School are a convenient way to describe the key components of a comprehensive, integrated approach. The Six E's of Safe Routes to School include:

EDUCATION Teaching students and community members about the broad range of transportation choices, providing them with the skills to walk and bicycle, and educating them about how to be safe from traffic, crime, and other threats while using different methods of transportation.

ENCOURAGEMENT Using events and activities to promote walking, bicycling, public transportation, and being physically active.

ENGINEERING Creating physical improvements to the streetscape and built environment that make walking and bicycling more comfortable and convenient, and that also decrease the risk of injury from motor vehicles or people, increasing street safety.

ENFORCEMENT Partnering with local law enforcement to address traffic and crime concerns in the neighborhood around the school and along school routes.

EVALUATION Assessing which approaches are more or less successful, ensuring that a program or initiative is decreasing health disparities and increasing equity, and identifying unintended consequences or opportunities to improve the effectiveness of an approach for a given community.

EQUITY Ensuring that Safe Routes to School initiatives are benefiting all demographic groups, with particular attention to ensuring safe, healthy, and fair outcomes for low-income communities, communities of color, and others.





MAKING DATA USABLE: A KEY COMPONENT

One of the premises behind making data more accessible is that community members will be able to view, understand, and use the data for their own needs. But for data to be useful for planning, funding proposals, and implementation of Safe Routes to School initiatives, the data needs to be comprehensible – easy to understand and use. Many barriers to comprehensibility can exist for those who want to use and understand data – lack of economic resources, lack of technological knowledge, lack of internet access, and language barriers. These challenges can pose a more substantial barrier for some groups than others, and may create significant impediments for groups such as senior citizens, communities of color, rural residents, those with limited English proficiency, low-income individuals, and those with low (or even moderate) levels of education. Moreover, some practitioners who have the theoretical capacity to manipulate data simply might not be able to devote the time or resources to developing the expertise needed to understand or analyze the data.

As a result, making data useable for everyone requires providing different things to different groups. Releasing unmodified open data through a portal is highly beneficial for those with the skills, expertise, and time to use it, such as GIS analysts or researchers. Unmodified data enables those with expertise to extract the most information, test the data, and best manipulate it to answer the specific

questions at hand. For those with the expertise and resources to use unmodified data, interoperability – the ability of different information technology systems and software applications to communicate, exchange data, and allow use of the information that has been exchanged¹¹ – can be very helpful. Interoperability enables users to generate more useful maps and tools. Use of standardized data formats helps developers and researchers work with data from different agencies and systems. For example, General Bikeshare Feed Specification (GBFS) is a format that standardizes bikeshare trip data, allowing researchers to make comparisons and gain understandings from different bikeshare systems.

For most Safe Routes to School practitioners, advocates, and community members, the data needs to be presented in a way that they can easily understand without the need for expensive software or technical skills. For some community members, data will not be understandable unless it is released in a highly processed or distilled form. Community members with the resources, skills, and time to do their own analyses might want to obtain data in a lightly processed form, so that they can answer specific questions or merge the data with other datasets.

For many community members, maps can facilitate better understanding of data. Maps provide an accessible way of viewing data, understanding its connection to place, and identifying what should be done. Maps enable the viewer to see patterns for themselves, and to make a connection between a place, an issue, and

a potential outcome. Maps can make a compelling visual case for where a project or program should take place, or where improvements should be prioritized. They tell a story. Converting geography-based data into maps can greatly increase usability and should usually be done whenever possible.

Mobile applications (apps) have enabled a wide range of community members to contribute to, access, and use data by simplifying how information is collected and disseminated. Because they are designed to be used on-the-go and viewed on a small smartphone or tablet screen, apps inherently distill data and information to be understood quickly and without much explanation. Data and information that was previously provided in the form of elaborate text and charts is presented in a more user-friendly manner. Apps have also increased the ability of community members to collect and provide data without special knowledge, by having an interface that is easy to understand and navigate.

The type of data needed and the ways in which data can shape Safe Routes to School varies by geographic level. Useful data at the school level is different from what is useful when looking at the national landscape. Much of this has to do with which decisions are being made at which level. To assist in developing a deeper understanding of the needs, opportunities, and challenges for data and Safe Routes to School, the following section describes the different types of decisions that are made at each level and which data is useful for decision making at these levels.

NEW JERSEY WALKING SCHOOL BUS APP

Greater Mercer Transportation Management Association (TMA), which coordinates a regional Safe Routes to School program in New Jersey, recently launched the [New Jersey Walking School Bus App](#). The app helps parents find walking school buses that already exist in their area and sign up for the route. Parents can also start their own group if there is not one in their area. The app is free and also includes a messaging function to let all of the parents know when the walking school bus has arrived at school. The app also calculates the miles walked, calories burned, and reduction in CO2 emissions for the individual, group and school. Only parents with a verified child enrolled in the school can participate, in order to address privacy concerns.



WALKSCOPE

[WALKscope](#) is a mobile tool developed by WalkDenver and PlaceMatters for collecting data related to sidewalks, intersections, and pedestrian counts in the Denver metro area. It invites residents and other community members to help create an inventory of pedestrian infrastructure, identify gaps, and build the case for improvements. WALKscope can be used on a smartphone, tablet, or computer.



CASE STUDY

Community Commons

[Community Commons](#) is an online mapping tool that enables lay users with little technical experience to create maps of specific geographic regions with thousands of data layers at their fingertips. With its user-friendly interface, the Commons enables lay users to immediately access data without first having to learn a new mapping technology.

Community Commons brings together data from across sectors. Among the thousands of data layers are a number that are relevant to active transportation and Safe Routes to School advocates. Examples include location of schools and food retailers, Walk Score, pedestrian road network density, location of transit stops and

stations, pedestrian motor vehicle crash mortality, and commute mode, which can all be overlaid with demographic data about a specific community.

The strength of Community Commons lies in helping a community or individual make the case for where interventions should take place and why. Rather than providing granular data on crash locations and traffic volume, the Commons enables users to understand the context in which policy recommendations and interventions are made. The Priority Intervention Tool maps key social determinants of health – income and educational attainment – to create maps of “Vulnerable Population Footprints,” intended to capture areas where efforts will have

the greatest impact. The Vulnerable Populations Footprints present visual representations of communities at risk of health disparities, and can be useful for active transportation advocates seeking to make the case linking health data and active transportation planning and policies. For active transportation advocates, Community Commons helps provide additional context regarding where interventions can be most effective using an equity lens. With Community Commons, users can easily see the larger context of the communities they are working in through a snapshot of community income, educational attainment, and race and ethnicity.

SECTION III

EXPLORING DATA AT ALL LEVELS

Walking and bicycling to school is something that happens at the geographic level of a neighborhood and an individual school. But, as Safe Routes to School practitioners know well, although walking and bicycling to school is something that happens at the geographic level of a neighborhood and an individual school, the factors that encourage or discourage walking, and the factors that make it safe or unsafe, are influenced at the school, district, town, state, and national level. We discuss the types of data that are relevant at each one of these levels to improve the safety and convenience of walking or bicycling to school and how they can do so.



photo courtesy Andrew Yun on Flickr

INFORMING NATIONAL AND STATE LEVEL DECISION MAKING

At the national level, data that allow an understanding of big picture trends in walking and biking for different age groups and the hazards and benefits of those activities can be key to showing need for funding and for programs that support Safe Routes to School and active communities. Nationally representative data that show unmet need is also highly relevant. Being able to show such patterns on a state-by-state or region-by-region basis can be important in influencing decision makers who may represent specific areas.

Data collected and shared by local programs can be key to influencing future funding for Safe Routes to School at the state and

national levels. Evaluations of programs help policymakers decide whether and how to continue Safe Routes to School funding and programs. Data also help with understanding equity impacts and assist in painting the picture of local needs in a state or nationwide context.

At the state level, data help prioritize what geographic areas and types of projects receive available state and federal funding. States can use data to develop strategic plans to support and promote safe walking and bicycling to school, and can allocate limited funding based upon the disparate needs revealed by data. States can require the submission of specific data in determining the award of competitive funds for Safe Routes to School and other active transportation projects, and can weight that data to reflect the priorities and needs within the state.

CASE STUDY

County Health Rankings & Roadmaps

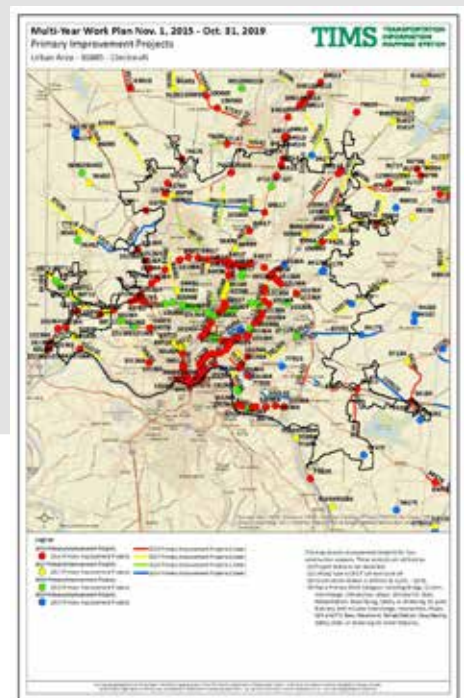
[The County Health Rankings & Roadmaps](#) program is a collaboration between the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. The Rankings use data related to quality of life, health behaviors, clinical care, socio-economic factors, and the physical environment, and include indicators such as high school graduation, obesity, smoking, unemployment, access to healthy foods, the quality of air and water, income, and teen births. The program ranks each county within a state and provides a snapshot of how counties are doing. A key feature is checkboxes that highlight areas where each county is strong, and where it is weaker and might want to focus efforts.

The Rankings are often used by public health departments to understand local conditions and identify different needs in different geographic areas. They can be helpful in making the case to prioritize programs and improvements in certain counties within a state or increasing awareness and support within a county. For example, San Bernardino County ranked 50th out of 56 counties in California in 2011, highlighting significant public health challenges. The county health department saw the County Health Rankings as an opportunity to strengthen its health improvement initiatives and persuade policymakers of the need for change. “The County Health Rankings are a terrific tool for us

to take to policymakers because we can show that the status quo isn’t sufficient,” said Evelyn Trevino, program coordinator for San Bernardino County Healthy Communities. “It motivates support and action. We use it to get the message out.”¹³ The health department stepped up its program and engaged cities in implementing a Healthy City program that changed zoning policies to allow community gardens and farmers markets to flourish, improved Safe Routes to Schools and campus vending machine standards, and established after-school programs, walking clubs and cooking classes for local residents.

OHIO DEPARTMENT OF TRANSPORTATION’S TIMS

The Ohio Department of Transportation’s [Transportation Information Management System \(TIMS\)](#) is a web-mapping portal that contains information about Ohio’s transportation system. TIMS hosts maps that include things like priority snow routes, environmental information, and traffic counts and shares this information with the public. TIMS compiles a large amount of information from across the Department of Transportation and other government agencies into a single location, to help enable better decision making and transportation planning processes for Ohio.



INFORMING SAFE ROUTES TO SCHOOL PROGRAM-WIDE DECISION MAKING

Safe Routes to School programs are often coordinated across multiple schools at the school district, city, or county level. Much of the decision making at the program-wide level is around general encouragement approaches to Safe Routes to School, prioritizing efforts and improvements, and making land use and transportation decisions that affect multiple schools.

Data can be helpful in getting a program like this started by showing which types of Safe Routes to School projects and programs are effective in which situations. This kind of information may allow a community to get its program off the ground in the most successful and effective manner, by learning from what others have done before.

Strategy Selection

Where students live, the distances they travel, and the environments they travel in can help programs determine generally which Safe Routes to School approaches might be most realistic and successful. A program provider or task force typically develops materials, resources, and strategies that are then tailored to the specific school. For example, understanding that many of the schools within a program have students who live too far to walk or bicycle can lead to the development of a school district-wide process to establish a remote drop off program. In such a program, locations for student drop off are identified. Parents drive students or students ride the school bus to that location, part of the way to school, and then students walk the rest of the way. Data can inform the Safe Routes to School program that a remote drop off program might be beneficial, and can also assist the program in determining safe and appropriate locations for the drop off, as well as whether school buses need to be part of the drop off program or not.

Funding Priorities

Funding for Safe Routes to School is generally limited. As a result, not all the improvements or programs desired can be implemented at once. Data can help decision makers decide which infrastructure improvements are made first, where crossing guard requests are approved, and which schools are prioritized for education and encouragement programs. The data used to prioritize schools can vary and is often based on local planning objectives and the community's vision, but can include measures related to safety, equity, and potential program reach (how many students are likely to be affected). When data are lacking, decision making often suffers as a consequence. For example, many communities place crossing guards based upon historical decisions or a first-come-first-served basis, rather than maximizing the safety benefits by ensuring that the more dangerous crossings or those with the most student use receive crossing guards.



CASE STUDY

Denver Safe Routes to School Prioritization Matrix

In Denver, Colorado, data from the elementary and middle schools helped the Safe Routes to School program prioritize which schools would benefit from Safe Routes to School programming first. The program developed a prioritization matrix that included the percentage of students who could potentially walk to school based on how far they lived from the school, the percentage of students

eligible for the free and reduced lunch program, and the number of pedestrian-involved collisions around the school. These criteria helped prioritize schools that had safety concerns, low-income students who often lacked other transportation options, and areas that had the greatest potential for increased walking to school.

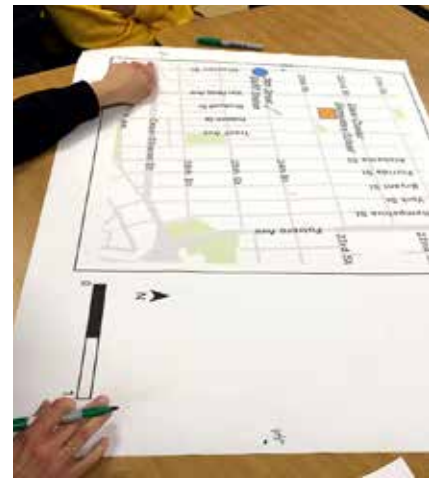


CASE STUDY

Using Data and Maps for Safe Routes to School in San Francisco

Student enrollment data has made planning Safe Routes to School programs in San Francisco, California, easier and more effective.¹⁴ The San Francisco Unified School District's Sustainability Department, in partnership with UC Berkeley, has been tracking enrollment and travel patterns for students. The Safe Routes to School program was able to obtain de-identified student enrollment data and then used free online tools – Google fusion tables and Google maps – to create heat maps showing where students live in proximity to

the schools. The maps helped show that students are often traveling long distances to get to school and identified the need to focus on providing walking and bicycling options. This has been invaluable in helping the program identify remote drop off locations and walking routes for students. Parents have also used the maps in workshops to understand where students live. This allows the parents to delve into other assets and barriers to walking and bicycling, where in previous workshops much time was spent just marking where they live.



Safe Routes to Cesar Chavez Elementary

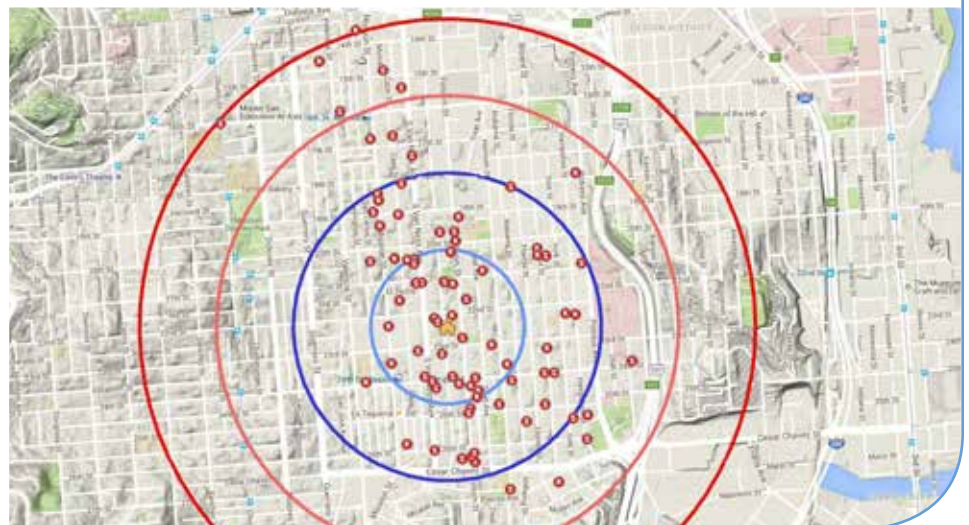
Cesar Chavez families (grade)
● 5th grade
● kindergarten

Distance from school (in miles)
Cesar Chavez Elementary School
● 0.25 miles
● 0.50 miles
● 0.75 miles
● 1 mile

De-identified enrollment map

SY 2015-2016

<http://sfsaferoutes.org>



WHAT INFORMATION WOULD BE USEFUL FOR SAFE ROUTES TO SCHOOL DECISION MAKING?

This is an overview of important types of data for communities to have. This data can be collected for the areas around schools or community-wide, depending on the extent of the project or plan. For individual schools, data related to walking and bicycling is typically collected for an area within one half to one mile around the schools.

INFRASTRUCTURE FOR WALKING

- Sidewalks - locations and conditions
- Off-street paths and trails - locations and conditions
- Width of sidewalk/path
- Maintenance
- Number of driveways and other breaks in the sidewalks
- Buffers (landscaping, parking) between sidewalk/ path and cars
- Streetscape
- Lighting
- Block length

INFRASTRUCTURE FOR BICYCLING

- Bike lane locations and types
- Bike route (signage only) locations
- Off-street path and trail locations and conditions
- Buffer (landscaping, parking) and protected bike lane locations
- Locations and types of signs
- Bike parking locations and types

INTERSECTIONS AND STREET CROSSINGS

- Signal and stop sign locations
- Crosswalk locations and types
- Crossing guard locations
- Mid-block crossing locations, signage and striping
- Medians

LAND USE AND ENVIRONMENT

- Land uses around schools
- Locations of parks, libraries, community centers, and other common destinations for youth
- Topography
- Air quality
- Tobacco retailers and unhealthy food outlets

OTHER TRANSPORTATION

- Speed limits and actual vehicle speeds
- Road classification
- Street width and lane configuration
- Average daily traffic (ADT) counts
- Crash data for collisions involving pedestrians and bicyclists (might include location, time of day, weather conditions, cause of collision, and injury or fatality data)
- Public transit routes and stops

SCHOOL FACILITIES AND ENVIRONMENT

- School locations and attendance boundaries
- Pick up/drop off locations
- Bus loading and unloading locations
- School bus routes and stops
- Locations of implemented Safe Routes to School projects and programs

BEHAVIORS

- Number of students walking and bicycling to school
- Number of community members walking and bicycling (pedestrian and bicycle counts)
- Attendance data
- Crime data

DEMOGRAPHICS AND COMMUNITY AND SCHOOL CHARACTERISTICS

- Household income
- Poverty level
- Race and ethnicity
- Educational attainment
- Employment rates
- Car ownership
- Health/health disparities data (asthma rates, obesity, diabetes, other chronic diseases)

INFORMING SCHOOL-LEVEL DECISION MAKING

For school-level decision making, data can be used to identify underlying problems and to determine strategies to address the problems, to set reasonable expectations regarding what Safe Routes to School can accomplish, to identify changes to improve existing programs once they are underway, and to determine if a program is having the desired results.

Program Development

Programs developed at the school level often focus on education and encouragement: educating students and drivers about safety, and encouraging students to walk and bicycle. Data helps explain the local school context and develop these programs.

Data helps practitioners understand where students walk or bicycle and how to ensure their safety or determine what kind of support they need along the way. Information about neighborhood conditions such as crime rates and locations, infrastructure gaps, scary dogs,

and other barriers helps understand the on-the-ground experiences that students walking and bicycling to school might have. Programs can be tailored to address these specific local contexts. Data regarding where students live, together with recommended routes, helps programs place corner captains (adults who are stationed at various points to keep an eye out), recruit businesses to be safe havens where students can stop if they feel they are in danger, and plan walking school bus routes where adults walk with a group of students along a pre-determined, scheduled route to school, picking up other students along the way.

An important factor in tailoring a Safe Routes to School program to a local school is picking strategies that are appropriate. Without some basic information, such as where students live, certain strategies might be ineffective and can dissuade communities from pursuing other strategies. For example, in the San Francisco case study above, without the data and maps that showed students were traveling long distances to get to school, the program might have focused on improvements adjacent to the school campuses instead of the addressing the largest barrier – distance.

Route Maps

Many communities prepare and distribute “Safe Routes to School” or “Suggested Routes to School” maps to students and parents to help them understand possible routes for getting to school by walking and bicycling and to encourage students to walk or bicycle on the same routes together. Information about the surrounding neighborhood can help schools recommend walking and bicycling routes that are short and avoid high-speed or high-volume streets, other physical dangers such as railroads, and areas with high levels of crime or other specific neighborhood dangers. To

take it a step further, this information can be layered with data to recommend routes that avoid other unhealthy exposures such as tobacco retailers and unhealthy food outlets to create Safe and Healthy Routes to School.

Program Evaluation

Finally, gathering baseline data and conducting follow up evaluation can be used to analyze the effectiveness of specific local programs and projects. This helps make the case for continued support of things that are working, and helps identify things that could be done better. Before and after evaluation studies tell us if walking and bicycling increases at a school after a Safe Routes to School project or program is implemented, help us understand the reasons why or why not, and guide any changes needed to improve outcomes. Looking at the number and location of crashes involving people walking or bicycling helps us understand if a specific Safe Routes to School infrastructure project is indeed making conditions safer, and if it is, the data help build the case to fund and install similar projects. Without the data to show the conditions and behaviors before and after projects and programs, it would be difficult to justify the importance of Safe Routes to School initiatives.

GOOGLE MAPS FOR SAFE ROUTES TO SCHOOL IN SOLANO COUNTY

The [Safe Routes to School program in Solano County, California](#) is using Google Maps to show parents and students the best routes to take to school. Parents can type in their address or nearest intersection, pick their school, and see the suggested routes for walking or biking. If there is a local walking school bus program, the walking school bus routes are shown. Users can also draw in new suggested routes to or comment on concerns along existing routes.



NATIONAL CENTER'S EVALUATION AND PRIORITIZATION GUIDES

The National Center for Safe Routes to School has developed a number of guides and tools for communities to evaluate the impacts of their Safe Routes to School programs and use data to prioritize improvements to achieve local objectives.

Methods for Estimating the Environmental Health Impacts of SRTS Programs

[This report](#) reviews the relationship between environmental health and school travel and describes how to estimate the environmental health impacts of school travel through calculating vehicle emissions.

Safety-Based Prioritization of Schools for Safe Routes to School Infrastructure Projects: A Process for Transportation Professionals

[This report](#) details a process to help transportation professionals identify schools within a city, county, or school district that merit additional review for specific pedestrian infrastructure improvements based on safety considerations. This process creates a prioritized list of schools without carrying out a comprehensive field review and extensive data collection for every school site. Once the highest-priority schools are identified, a field review of these schools is performed to identify specific safety issues and infrastructure improvements.

INFORMING LAND USE AND TRANSPORTATION DECISION MAKING

In addition to Safe Routes to School projects and programs, broader decisions about land use and transportation infrastructure also affect students' ability to walk and bicycle, and can be informed by data. Information about where students live and how they travel to and from school can help improve decision making around school siting and community-wide transportation networks.

School Siting

Siting of new schools and school closures can affect students' ability to walk and bicycle to school by changing distances between school and home. School districts generally operate independently from the cities and counties where they are located. School districts determine what their facility needs are, where schools are located, and how they are designed. Over time, some school districts have chosen to increase the size of schools and locate them on the fringes of communities for a variety of reasons, often influenced by lower land costs and economies of scale in having larger consolidated facilities, and sometimes influenced by state legal requirements related to minimum sizes of

sites. Locating schools far from students' residences is often paired with closures of neighborhood-based schools. One of the negative consequences of this type of school siting is increasing the distances between school and home so much that students are not able to walk or bicycle to school and must be driven by car or bus, resulting in increased traffic congestion and eliminating an opportunity for physical activity. Data on where students live in relation to school, the potential or actual changes in how students get to and from school, equity impacts, burden on families, and measurements of increased congestion, pollution, and other unintended consequences can help school districts make smarter decisions about school siting.



photo courtesy Brad Davis AICP on Flickr

CASE STUDY

Smart School Siting Tool

The EPA's [Smart School Siting Tool](#) is one tool to assist communities in assembling and assessing available data to assist in making better school siting decisions. It includes two Excel workbooks that help communities make school siting decisions based on data. The Assessment & Planning Workbook helps a community

understand how well its school siting process is coordinated with land use and other community planning processes. The Site Comparison Workbook helps a community evaluate and compare candidate sites for a proposed school, which could be a new or renovated school.



Transportation Planning

Communities can also use data to consider schools and students when planning for broader transportation networks; for example, when developing a citywide bicycle master plan or transportation chapter of a comprehensive plan. While school facilities are planned for by school districts, the roads and surrounding zoning are the responsibility of the local city or county. Data on where students are living in relation to schools, which routes they are likely to take, and what types of roads and paths are desired can help cities and counties account for these priorities in their master and comprehensive plans. Students and their families make up a large portion of communities, but access to safe and convenient options for walking and bicycling to school also benefits neighbors. Using data on the current and projected conditions helps improve transportation for everyone.

CASE STUDY

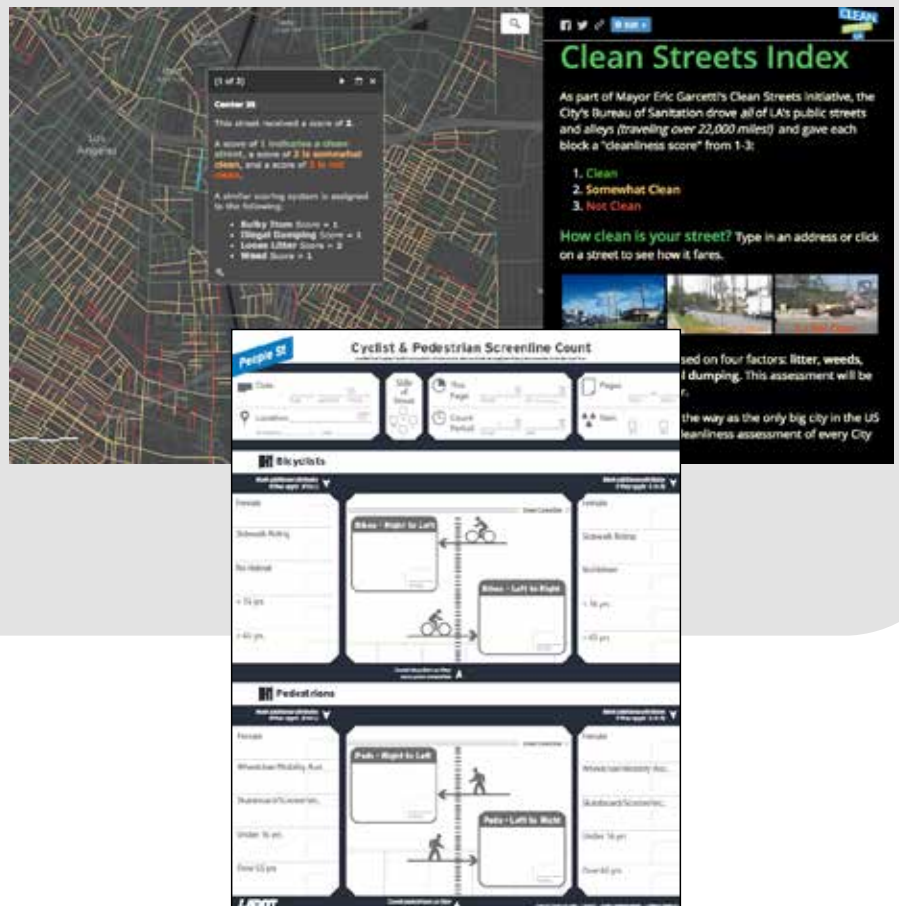
Safe Routes to School and Greenway Spurs in Seattle

Seattle's Safe Routes to School program, located in the city department of transportation, is beginning to proactively build safe routes that will radiate out from each school. Using demographic data, they are prioritizing equity in their planning and implementation. The program is coordinating its efforts with the Seattle Neighborhood Greenways project, which is working to build neighborhood greenways (low-stress street networks for family bicycling, strolling, and outdoor enjoyment) that run near schools. Using data and analyses to identify greenways that are within a few blocks of schools, Seattle is creating greenway spurs, which create traffic calming and safe routes from the school to the greenway.

L.A. GEOHUB

The City of Los Angeles, California, partnered with ESRI, the developer of ArcGIS mapping software, to unite data from more than 20 city departments into one platform, the [LA GeoHub](#). In addition to location-based data, such as proposed resurfacing projects, crime reporting and investigation, and more than 500 other publicly available maps, LA GeoHub makes a concerted effort to engage the public in planning for and understanding future transportation projects. A multi-agency initiative called [People Street](#) uses data from the LA GeoHub to collaborate with community partners to identify, implement, and evaluate low-cost, high-impact mobility projects, such as parklets, plazas, and bike corrals.

People Street, run by LADOT in partnership with the City of Los Angeles Departments of Public Works and City Planning, the Office of Mayor Eric Garcetti, and the Los Angeles County Metropolitan Transportation Authority, provides, among other things, a public online map that enables community partners to identify and prioritize locations where parklets, plazas, and bike corrals would complement and enhance existing and planned active transportation infrastructure. People Street aims to display data in a user-friendly way that enables community members to see the potential for active transportation. It provides a platform for showing that these projects are not isolated projects; instead, they fit into a larger active transportation landscape.



CASE STUDY

Snow Plowing in Arlington County

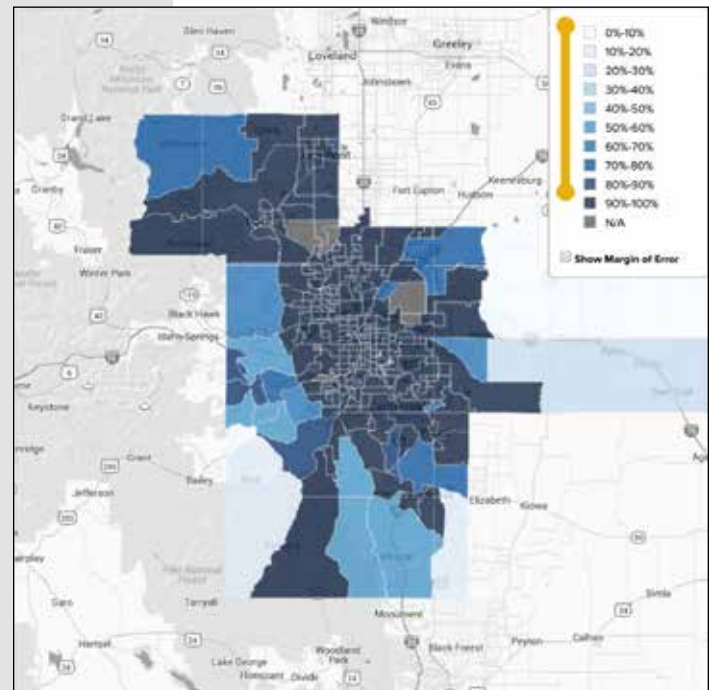
Local advocates have used data to change snow clearing policies in Arlington County, Virginia. Originally, officials thought that people would not bicycle in the winter, so the county did not spend money to remove the snow from bicycle paths. With the installation of automated counters along the bike paths, something different was revealed. The counters were able to capture information about exactly when and under what conditions people were and were not using the paths. Integrating weather

data with the counter data showed that people actually did bicycle when it snowed – but only when the paths were cleared.¹⁵ It was not the winter weather conditions that deterred people from bicycling, but the lack of a clear path. The information collected by the counters was used to advocate for snow clearing on the paths.¹⁶ Recognizing the need, the county changed its policy, and now clears the snow from the bicycle paths in the winter.¹⁷



THE DATA INITIATIVE

The Data Initiative (a project of the Piton Foundation at Gary Community Investments) maintains [Community Facts](#), a free online tool that provides neighborhood-level data in the Denver region. This tool is unique in that it provides information for neighborhoods within the region, when often the information is only available at county or other larger scales. The Data Initiative focuses on analyzing and addressing community issues facing low-income families and communities. Community Facts includes information about housing, education, food access, employment, and other indicators. Neighborhood summaries help community members understand what is going on right in the area around them and can help them make the case for necessary investment or attention around local priorities.



SECTION IV

A LOOK AT CURRENT DATA USAGE IN SAFE ROUTES TO SCHOOL

Thanks to the early inclusion of evaluation as a key practice in the federal Safe Routes to School program, Safe Routes to School initiatives have done more data collection than many programs and initiatives. However, despite the fact that evaluation is routinely identified as one of the Six E's of Safe Routes to School and generally encouraged as a best practice, data collection for Safe Routes to School has historically been piecemeal and inconsistent across programs. Inconsistent data collection has hampered efforts to inform decisions and program planning, as well as to evaluate outcomes. This section describes the current typical data collection methods, and the challenges faced by our current use of data.

TYPICAL DATA COLLECTION METHODS

As recognized by the Pedestrian and Bicycle Information Center, there are five ways that Safe Routes to School programs commonly collect information: tallies/counts, surveys, observations and audits, interviews, and extraction from existing data sources.¹⁸

Programs use tally forms to gather information about how students travel to and from school, often using the student travel tally forms developed by the National Center for Safe Routes to School. Students are asked in class to say how they traveled to and from school on specific dates. An alternative method of getting a snapshot of student travel behavior is

conducting counts in which staff, students, or volunteers count the number of students arriving or leaving school by different modes of travel (walking, bicycling, bus, private vehicle, etc.).

Paper or online surveys are commonly used to gather information about modes of travel, perceptions and attitudes about walking and bicycling, and a whole host of other things that might help programs understand what is or is not working, or what the needs are for a particular school. Surveys can be directed at students, parents, school staff, or administrators. The National Center for Safe Routes to School has developed a parent survey that includes questions exploring what affects parents' decisions to let children walk or bicycle to school and parents' perceptions



of safety related to walking or bicycling to school. Modified and unmodified forms of this survey are often used by Safe Routes to School programs. Unfortunately, the response rate to the parent surveys is often low, creating barriers for planning Safe Routes to School programs that address parent concerns.

Observations and audits help assess walking and bicycling safety issues at a school and in the neighborhoods around those schools. These approaches can include observing children as they walk or bicycle to school to assess skills, dangers, how they cross streets, and types of interactions with vehicles. Observations and audits help identify environmental barriers to walking and bicycling, as well as concerns with the behaviors of students

THE MICROSCALE AUDIT OF PEDESTRIAN STREETSCAPES (MAPS)

and adults who are walking, bicycling, and driving. There are many existing tools available, such as walkability and bikeability checklists and instructions for conducting a walk or bicycle audit.¹⁹ The tools range from those designed for use by the general public to detailed, technical audits intended for transportation professionals. Some are paper-based and others are electronic (online, mobile apps). Audits are often used as ways to identify infrastructure gaps and barriers and may be done by groups of people that include a range of stakeholders from parents to city engineering staff. While observations and audits are often very helpful in bringing to light infrastructure gaps, unsafe behaviors, and areas of community concern, they are frequently not systematic in providing detailed information about the physical environment, including the current state of sidewalks and streets, because data collection can be inconsistent and might focus on only certain parts of the community.

Interviews are used less frequently, but provide more detailed insight into perceptions and experiences. This approach can include interviewing people one-on-one or in groups. Interviews often include many of the same questions as those asked in surveys, but can allow for more in-depth answers. In addition, interviews often allow for open dialogue with the data collector and interviewees might raise important matters that are not covered by preset questions. Interviews can be more time consuming than the surveys.

Finally, Safe Routes to School programs extract data from existing resources. Programs often use secondary data that includes information about pedestrian and bicycle crashes from local or state injury prevention programs, hospitals, or law enforcement agencies; health data from the public health department; or other data gathered as part of another planning process, for example a citywide bicycle master plan. Such data can be accessed in raw form or through studies. The availability and use of secondary data varies widely based on the individual community.

[The Microscale Audit of Pedestrian Streetscapes \(MAPS\)](#), developed by Active Living Research, is used to collect data on the pedestrian environment and walkability in neighborhoods. The tool looks at details about streets, sidewalks, intersections, and design characteristics (e.g., road crossing features, presence of trees, bicycle lanes, curbs), as well as characteristics of the social environment (e.g., stray dogs, graffiti, trash). Unlike many walk audits, the tool focuses on indicators that research shows have a strong correlation with walkability and actual walking and bicycling by children and adults. The tool provides an overall walkability rating as well.

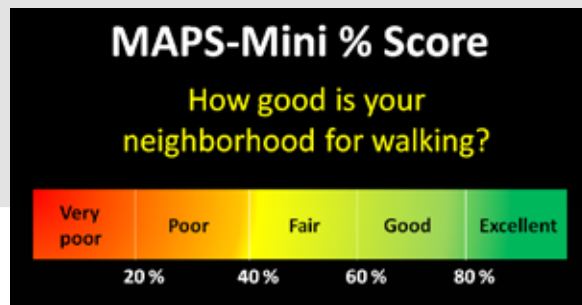
There are three versions of the MAPS tool, each with varying degrees of complexity and intended users:

MAPS-Full: 120-item audit tool, intended for researcher use

MAPS-Abbreviated: 60-item audit tool, intended for researcher and advanced practitioner use

MAPS-Mini: 15-item audit tool, intended for practitioner, advocacy, and community member use

The MAPS-Mini tool is a good tool to use with parents, kids, and other community stakeholders during walk audits around schools and in neighborhoods.



Although there are recommended data collection methods, there is no standard required data collection method for Safe Routes to School programs across the country. Many states and other funders do require pre- and post-project evaluation using the student travel tally forms and parent surveys developed by the National Center for Safe Routes to School, but this requirement only applies to the programs

receiving funds, and it is rare that schools or programs continue to conduct tallies or surveys on a regular basis. Forty-six states required some level of data collection requirement for grantees under the federal Safe Routes to School program, but there were no specific federal requirements for how and when data should be collected so there was no consistency or standardization in the data.²⁰

CURRENT DATA COLLECTION AND USAGE CHALLENGES

Overall, data collection is left up to the individual Safe Routes to School programs and, as a result, is piecemeal across the country. Obtaining and using data, whether it is for program planning or program evaluation, can be limited. Safe Routes to School programs often lack resources to collect and use data. Programs are often volunteer-run, led by teachers who are tasked with Safe Routes to School activities in addition to their other responsibilities, or on limited budgets. Other times, the data has been collected by another entity like a school district or city, but that entity does not allow access to the data or it is not in a form that can be readily used by a Safe Routes to School program.

Many communities have done assessments of their built environment conditions, but because there is not a central place to store data at the national level, this information is “stuck” at the local level. This leads to minimal data sharing and a lack of consistency in data collection on a national scale. As a result, it is difficult to demonstrate the cumulative impact of Safe Routes to School successes across the country and to make the case that bicycling and walking is under-resourced throughout the nation.

On the other hand, there is extensive data that is collected through national surveys like the National Household Travel Survey (NHTS) or the Youth Risk Behavior Surveillance System (YRBSS). National averages on the proportion of children walking and biking to school are available from the NHTS. This information helps paint the picture nationally, but is not representative at the local level and often does not include specific questions that point to local conditions or needs related to Safe Routes to School. Researchers looking at Safe Routes to School on the national level note that practitioners and local communities planning and implementing Safe Routes to School programs need more accessible information on how specific interventions could change travel at their school.²¹ Studies that have



provided regional (multi-state) and urban versus rural rates of students walking and bicycling show that they can vary significantly from the overall national rates. While this regional information is helpful, state, county or local level information would be even more beneficial.

The Federal Safe Routes to School Program Evaluation Plan developed in 2011 to guide the evaluation of the Safe Routes to School program under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) noted that “moving data collection from voluntary to required is critical to create a uniform, sufficient data set that will support credible evaluation of the [Safe Routes to School] program.”²² The plan highlighted the importance of providing funding for evaluation in budgets at the local, state and federal level as well as the importance of systems to reduce the burden of reporting on the local programs. The plan called for a standardized online database to facilitate data entry, as well as analyses and report generation at the state and local level similar to that which already exists for the student tally and parent survey database at the National Center for Safe Routes to School, but for expanded data sets such as information about project implementation.

NATIONAL CENTER'S DATA COLLECTION SYSTEM

Perhaps the only centralized data collection system for Safe Routes to School programs has been developed and maintained by the [National Center for Safe Routes to School](#). The system was originally developed to help track and evaluate Safe Routes to School projects and programs that were being funded by federal Safe Routes to School funds under the 2005 transportation bill, SAFETEA-LU. Schools and programs can enter in results of their student tallies and parent surveys, generate reports based on those tallies and surveys, and analyze trends over time if data is collected at multiple points. There are more than 13,000 schools or programs that have used the system. The data is also used by the states and the National Center for Safe Routes to School to analyze and report on the performance of Safe Routes to School at the state and national levels.

While any school or program can enter and view their own data, there are different levels of access for aggregated data and the information is not available to the general public without permission. Local programs can only access the data they have entered themselves and each state Safe Routes to School coordinator can only access their own states' data. In order for specific programs to obtain data from other programs, one must receive permission from the state Safe Routes to School coordinator.

SECTION V

MAKING DATA MORE ACCESSIBLE: ROLES AND STRATEGIES

We know that data can be made more accessible, ensuring that Safe Routes to School efforts are more successful in their goals – but how? In this section, we explore the roles that different groups, including government agencies, universities and research centers, the private sector, and community organizations and other local groups, can play in providing data and making it accessible. Inspiring work is happening in each of these sectors to allow data to support positive changes. We set out examples and case studies of work by these groups around data accessibility, highlighting the tremendous potential for Safe Routes to School initiatives from making data more accessible.



photo courtesy Bri Weldon on Flickr

OPENING UP ACCESS: THE ROLE OF GOVERNMENT

Government plays an essential role in making data more open and accessible for public use and innovation. Federal, state, and local governments all collect and maintain data on a wide range of topics from demographic data to capital improvement expenditure records to information on the locations and quality of public facilities. The White House accelerated the process of making federal data more readily available in 2013 with the launch of its Open Government Initiative and the data.gov website.²³ Many states and cities rapidly followed suit, publicly releasing some of their data,

developing policies around open data, allocating money for open data initiatives, and working with outside organizations and community members to identify and share information. Note that, at the same time that some government agencies are providing broad access to data, others are keeping data highly restricted. For example, some police departments are reluctant to release data on police use of force or racial profiling.²⁴ Government agencies often house data, including much of the information described in Section III: Exploring Data At All Levels, that can assist active school travel initiatives. Making this data available to the community and practitioners is a good first step in increasing accessibility. But

community members and practitioners also need training and funding to be able to use, analyze, and interpret the data and translate it into action. Government agencies should take steps to provide training or funding for these efforts, and should provide analysis, charts and maps that go beyond just the raw data.

The federal government in particular is working to make data from research more accessible. This includes information from larger scale studies on physical activity, walkability, bikeability, and other topics that could inform and benefit local Safe Routes to School efforts. In February 2013, the White House Office of Science and Technology Policy released a memo titled, “Increasing Access to the Results

THE SUNLIGHT FOUNDATION

The [Sunlight Foundation](#), a national nonprofit organization that is working to increase government transparency and accountability, has provided grant funding and assistance to initiatives to open data at all levels of government. The Sunlight Foundation has created [guidance](#) for government agencies to promote open data.²⁵ The Sunlight Foundation's guidelines include what data should be public, how to make data public, and how to implement open data policies.

of Federally Funded Scientific Research.” The goal is to make the results of federally funded scientific research available to and useful for the public, industry, and the scientific community. Such results include peer-reviewed publications and digital data.” The National Academies of Sciences, Engineering, and Medicine’s Transportation Research Board is developing guidance and activities to assist state DOTs, other public agencies, and transportation research organizations in efficiently and effectively ensuring access to the results of federally funded transportation-related research.²⁶

Across the country, cities are beginning to recognize that making government agency data public offers many benefits. At a time when trust in government is at historic lows, making data available to the public fosters transparency, which is necessary for trust in government.²⁷ It increases the public’s perception of government accountability and has the power to improve the efficiency and efficacy of government programs.²⁸ Cities have also recognized that the brain power of the public can be harnessed to identify solutions to some of the most challenging social issues faced by cities. To cultivate

this civic innovation, cities are developing platforms that make data publicly available in the form of datasets, maps, shapefiles, and more. City open data sites, like [Open Data Philly](#) from the City of Philadelphia, often provide municipal government agency data, such as the location of bike racks, subway entrances, and multi-use trails. A unique feature of Open Data Philly is that, in addition to municipal data, the platform hosts data from non-profit organizations, universities, and businesses, which provides a more robust portrait of trends and information about the city.

Some cities take civic innovation a step further, hosting hackathons and app development challenges to motivate the public to use data for social good. As part of New York City’s Vision Zero action plan, the city will “publish crash and safety data on a regular basis in

user-friendly format(s)” and New York City Police Department “will meet with relevant stakeholders to determine how best to make its data available to the public.” New York City Police Department has released crash and safety data, now available via the [NYC Open Data website](#). In 2014, as part of the city’s NYC Big Apps competition, a civic tech initiative that “challenges developers, designers, and entrepreneurs to create functioning, marketable technology tools that help solve pressing civic challenges,” Mayor Bill de Blasio issued a challenge to utilize open data to develop data visualizations and an app that supports the implementation and realization of Vision Zero. While an app has not yet been developed, residents and advocates can now view data on crashes, street design, speed limits, and more at [Vision Zero View](#), a website that draws upon these data released by city agencies.

CASE STUDY

Transportation and Health Tool

[The Transportation and Health Tool](#) (THT) was developed by the US Department of Transportation (USDOT) and the CDC to provide easy access to data that practitioners can use to examine the health impacts of transportation systems. The tool provides data on a set of transportation and public health indicators for each U.S. state and metropolitan area that describe how the transportation environment affects safety, active transportation, air quality, and connectivity to destinations. In addition to data on 14 indicators, the tool provides information on evidence-based policies, strategies, and interventions can be used to address health.



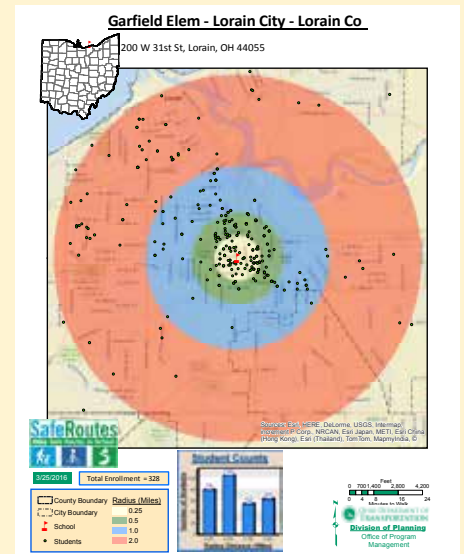
EXAMPLES OF ACCESSIBLE DATA MAINTAINED BY GOVERNMENT AGENCIES

The following federal agency sites allow the public to view and/or download data that might be of interest for Safe Routes to School and active transportation initiatives.

- [American FactFinder](#) (US Census Bureau)
- [Behavioral Risk Factor Surveillance System](#) (Centers for Disease Control and Prevention)
- [Map of Administration Community Initiatives](#) (The White House)
- [National Household Travel Survey](#) (Federal Highway Administration)
- [Data.gov](#) (Federal open data portal for a wide range of topics)
- [Youth Risk Behavior Surveillance System](#) (Centers for Disease Control and Prevention)

Examples of state or local data that are relevant to Safe Routes to School and can be accessible include:

- **Crash data:** Often maintained by the state department of transportation or state or local law enforcement, crash data can be used for project prioritization and funding applications.
- **Infrastructure inventories:** These can include locations and characteristics of sidewalks, bike lanes, and signage and are often maintained by the local public works/engineering department or regional transportation commission. Currently, this data is inconsistently gathered and accessibility and usefulness varies from place to place.
- **Student residence proximity mapping:** Location of student addresses in relation to the school is sometimes available from school districts or state departments. For example, in Ohio, the state department of transportation creates the student residential heat maps at the request of local schools participating in a Safe Routes to School planning process.



OPEN DATA AND CAPITAL BIKESHARE

From the beginning, the Capital Bikeshare (Washington, DC) program has been required to provide quarterly system data on its website, including details of every bikeshare trip, station status, and responses to member surveys.²⁹ Using these publicly available data, individuals with tech expertise and a penchant for active transportation have developed a large number of websites, apps, and tools that improve the user experience for Capital Bikeshare users, including:

CaBi Range, which enables users to see all stations they can bike to within 30 minutes of one another (30 minutes is the limit of free time per bike share trip)

CaBi Tracker, which provides real-time status updates of stations, how many bikes they have, how long they've been empty for, and how many bikes are in use, among other things

CaBi Stations, which allows users to suggest new locations for bike share stations

The Capital Bikeshare program manager, Kim Lucas, says the digital maps produced by interested individuals showing bikeshare trips have helped her see trends that she was not able to see on her own. "We get interesting analysis for free," Lucas said. "It's great to see what another set of eyes has seen when they see your data."



Collaboration Around Data in Birmingham, Alabama

An important component of a successful Safe Routes to School Program is educating parents and schools about the safest ways for students to walk and bike to school. In Birmingham, AL, the United Way of Central Alabama (UWCA), which runs the region's Safe Routes to School Program, used data coordination and collection to improve upon their region's process for developing and distributing walking maps.

The UWCA sought to shift away from hand-drawn walking maps, which were time and labor intensive for the City of Birmingham's Traffic Engineering department and impractical for schools to distribute and families to use. As UWCA embarked upon digitizing these maps, it realized there was an opportunity to utilize new technology (tablets) and mapping software (ArcGIS online application) to improve the quality and utility of the safe walking maps and improve efficiency of their development. UWCA convened three relevant City of Birmingham departments (Traffic Engineering, Information Management Services, and GIS) to coordinate existing data, infrastructure, and resources.

UWCA provided tablets and ArcGIS online subscriptions, and facilitated connections between the city departments to share data that each department had previously collected. The Department of Traffic Engineering utilized the tablets equipped with GIS to collect data within a two-mile radius of 27 Birmingham elementary schools. They collected new data on the location of bicycle and pedestrian infrastructure, crosswalks, crossing signals, school crossing guards, all-way stops, and school and pedestrian signage, which had not previously been collected or reflected in safe walking route maps. Overlaid with existing data on sidewalks and school enrollment, these new data layers have been used to create digital versions of safe walking maps. The new maps are preferred by



schools and parents alike and can be maintained in real time, reducing delays in updating the maps in response to changes in conditions.

Now, the City of Birmingham's elementary schools all have improved walking maps for students and families to use. With the time saved making digital maps using tablets and ArcGIS online, the Department of Traffic Engineering can routinely collect data relevant to bicycle and pedestrian infrastructure, incorporate these data

into regular maintenance schedules, and make data-driven infrastructure investment decisions. This process has opened new lines of communications for the Safe Routes to School program, fostered collaboration by bringing together three city departments to work on Safe Routes to School non-infrastructure projects, and supported strides toward a more equitable built environment, with data showing areas with the greatest need for bicycle and pedestrian infrastructure.



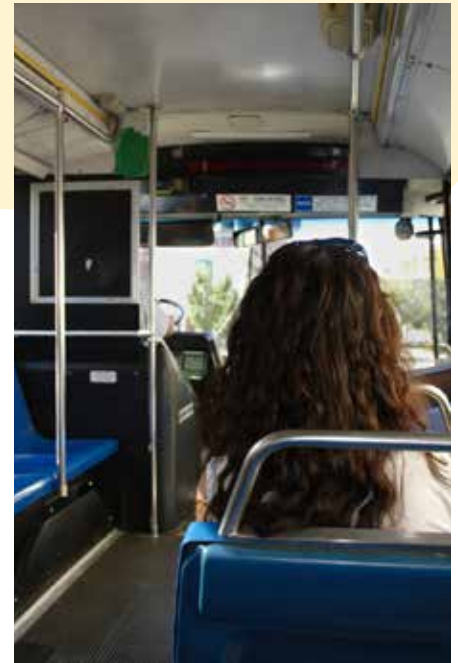
DATA ACCESSIBILITY IN PUBLIC TRANSIT

Public transit is a sector that has embraced open data and found many benefits from doing so. Data-driven initiatives in public transit provide insight on the sources of data that are already available and are being accessed by communities. These sources and methods can be beneficial for Safe Routes to School.

Public transit agencies have been collecting and analyzing data for many years as part of their internal systems to maintain and improve service.

More recently, public transit agencies have been opening their data through online portals and engaging with other sectors through newsletters, forums, and events like hackathons. In a national survey, transit agencies described the following top five overall benefits of open data: increased awareness of services; empowering customers; encouraging innovation outside of the agency; improving the perception of the agency (e.g., openness/transparency); and providing opportunities for private businesses.³¹

Open data has resulted in the development of a number of free mobile applications that provide real-time and static transit information. These apps are often developed by private individuals or businesses and are a great benefit to transit users. The transit agencies alone would not have the capacity to develop the apps.



CIVIC HACKING AND HACKATHONS

When we think of hacking, many people think of a negative thing – some software or technology expert who breaks into a database and uses information for malice. However, civic hacking is the opposite, and can be welcome and beneficial. Civic hacking involves citizens, software developers, and entrepreneurs using publicly released data, code, and technology to solve challenges in our communities. It is often done by people with technical expertise who are interested in a topic and are willing to analyze data and create new uses for it without getting paid by the government or the people who are going to benefit from the end result. There has been huge surge in interest in civic hacking. There are meetups of civic hackers and websites and blogs devoted to showcasing their work.

Government agencies, universities, and businesses have begun sponsoring hackathons where participants work intensively over a day or other short time to build mobile apps, websites, and data visualizations using open data to address a specific challenge or topic. Part work event, part social gathering, these hackathons are very popular and draw large crowds. For example, USDOT and Uber co-sponsored a hackathon where participants used data to build new innovations for Baltimore and Washington, DC, residents. The hackathon included a contest and the winning team developed a tool to help residents find affordable rental housing that looked at cost of rental payments, paired with commute time and travel to work costs.³⁰

MOBILITY LAB

Mobility Lab is an international think tank based in Arlington County, Virginia, and is one of the prominent groups in the Washington DC metro area working on making transportation data accessible and useable by community members. Mobility Lab is funded by Arlington County Commuter Services, the U.S. Department of Transportation, the Virginia Department of Transportation, and the Virginia Department of Rail and Public Transportation. While one of their primary goals is to measure the impacts of transportation demand management services in Arlington County, Mobility Lab has also provided information that helps other communities with their active transportation initiatives and has supported or sponsored numerous initiatives to make data more accessible and encourage community engagement with the data.



THE ROLE OF RESEARCH: UNIVERSITIES, RESEARCH CENTERS AND LARGE ORGANIZATIONS

Universities, independent research centers and large organizations are often involved with data collection or analysis as part of research initiatives. This data might be part of a project or program directly related to Safe Routes to School, or might be from another initiative. Many researchers are also interested in how they can harness or increase the consistency of data collection efforts on the ground to generate more data for their analyses. There are a number of universities and researchers across the nation who are working to make their data

more accessible to community members or are working with community members or smaller organizations to develop mapping and other tools to share their information. In addition, in contrast to traditional publication approaches in which the public could not review research articles without paying hefty fees, more research is being shared through journal articles that are available to the public free of charge through sites such as the Public Library of Science (PLOS), the US National Library of Medicine's Pub Med, and other online public access journals. These open access sites are making research more available to community members who might otherwise have only been aware of and able to access information when it made news headlines.

EQUITY ATLASES

An equity atlas is a report that consists of a number of maps that show the relationships between different determinants of health and well-being and the geography of a region. Equity atlases are most often prepared at the regional scale, but can be used at other scales, from city to national, as well. Content varies depending on who is preparing the equity atlas and what the intended uses are. Some components typically included in equity atlases are:

- **Demographics:** population density, populations of color, household composition, income levels
- **Jobs and Economics:** job centers, employment density, transit access to jobs
- **Education:** graduation rates, school achievement levels, higher education facilities
- **Health:** air quality, fresh food access, food deserts, parks and open space

Equity atlases allow us to assess which neighborhoods are rich in resources and where there are gaps in goods and services. They take abstract numbers from sources like

the Census Bureau and turn them into a visual where we can more easily understand our communities and ensure that we are considering numerous interrelated aspects when making or advocating for decisions. Equity atlases can be especially useful when trying to understand transportation access, relationships between housing, jobs, and transportation, and needs for public and private investment to improve equity. And equity atlases are great resources for those who want to understand their communities, but might not have access to the data and tools to do so.

Equity atlases have been developed for:

- **National Equity Atlas:** www.nationalequityatlas.org
- **Denver:** www.denverregionalequityatlas.org
- **Los Angeles:** www.losangelesequityatlas.org
- **Portland:** www.equityatlas.org
- **Atlanta:** www.atlantaequityatlas.com
- **New York:** www.prattcenter.net/research/transportation-equity-atlas

WEBCAMS AND CROWDSOURCING

Webcams and crowdsourcing have helped gather data about active transportation. In one study, researchers used the [Archive of Many Outdoor Scenes](#) (AMOS), which has collected over 225 million images of outdoor environments from publicly available webcams and a custom web crawler (like a custom search engine) that captures webcam images with a time stamp. Researchers next turned to the [Amazon Mechanical Turk](#) (MTurk) website, where people marked each pedestrian, bicyclist, and vehicle in the photographs. The site paid MTurk workers a minimal amount for each image marked. The information was used to demonstrate mode shift in certain locations after interventions were made in Washington, DC.³²

DIVERSITYDATAKIDS.ORG

The [Diversitydatakids.org](#) project is based at the Institute for Child, Youth and Family Policy at Brandeis University. The online portal allows users to query the database of child wellbeing and policy indicators by topic, by geographic area (national, state, county, metropolitan area, city, or school district) and by race/ethnicity and to create customizable profile reports, ranking reports, and thematic maps for specific geographical areas. Users can also explore maps of child-focused opportunity indices for neighborhoods in the 100 largest metropolitan areas and overlay the child population by race/ethnicity on these contextual maps of neighborhood opportunity. Diversitydatakids.org is unique in that it has a focus on race and ethnicity – all of the data and analyses are presented by race/ethnicity, and when possible, also by socioeconomic status and immigrant status. It also includes equity-focused indicators of known structural factors that influence disparities in opportunities for healthy child development. For example, it looks at the level of school segregation across metropolitan areas, large cities, and large school districts, and provides a child-focused neighborhood opportunity index for each neighborhood in the 100 largest metropolitan areas.



LOCAL DATA INTERMEDIARIES

Local data intermediaries are organizations or collaborations that work on data access, processing, and usability. They have the technical expertise to gather and translate data into meaningful information for the local community. Data intermediaries are often housed in university research centers or non-profit organizations, but collaborate with multiple partners representing the local community's interests.

The National Neighborhood Indicators Partnership, a peer learning network of local organizations that share a mission to improve low-income neighborhoods by empowering local stakeholders to use data in planning, policymaking, and community building, has developed a [Guide to Starting a Local Data Intermediary](#).

SafeTREC's Transportation Injury Mapping System

The [Transportation Injury Mapping System](#) (TIMS) was developed and is maintained by researchers at the Safe Transportation Research and Education Center (SafeTREC) at the University of California, Berkeley to provide data and mapping analysis tools and information for traffic safety related research, policy, and planning.³³ SafeTREC takes crash data from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) and geocodes the data so that the public can see crash maps and more easily understand where crashes resulting in injuries or fatalities occurred, whether people bicycling or walking were involved, and other details reported about the crashes. SWITRS data is publicly accessible, but the data is provided in tabular format and crash locations are provided as GPS coordinates and not on maps. Without the analysis, geocoding, and visualization provided by TIMS, it is very difficult to make sense of the SWITRS data.

For groups working on Safe Routes to School and active transportation in California, TIMS has become the go-to resource for understanding crashes that involve pedestrians and cyclists. The information can be filtered by age of the people involved, time of day, and other characteristics. TIMS

includes a collision diagram feature that allows people to understand the circumstances around the crash. While users must create a login, there is no charge for accessing and using TIMS. TIMS can be used to create collision maps without GIS, but also allows users to download the data in to their own GIS system if desired. TIMS also allows users to overlay land use features, making it easier to understand crash hotspots and patterns near schools and other community destinations.

Currently, there are over 6,000 registered TIMS users. About 20 to 30 percent are from local government agencies, many of which use the TIMS maps in grant applications. Another 20 to 30 percent of the TIMS users are in private consulting, but doing work for local government agencies. The remainder is primarily researchers, with some general community members and organizations as well. Law enforcement also uses TIMS for understanding crash hotspots and for developing targeted enforcement programs. Many communities in California are using TIMS to create maps for use in their Active Transportation Program grant applications and to identify and prioritize needed infrastructure improvements.

Radius	Fatal	Severe Injury	Visible Injury	Complaint of Fear	Pedestrian	Bicycle	Total
<= 1 mi	0	2	20	27	15	34	49
1.0 - 1.5 mi	0	8	78	71	70	88	167
Total	0	10	98	98	85	122	306



One of the primary intents of [WalkScore](#) is to help homebuyers understand the walkability of the neighborhoods they are considering. In fact, WalkScore is owned by Redfin, a company that maps and provides information on homes for sale and rent. WalkScore ranks the walkability of an area on a scale of 0 to 100, based on the availability of amenities such as grocery stores and services nearby and the pedestrian-friendliness of a route. The web tool is free and professionals such as real estate agents can purchase access to special features. WalkScore has developed its own proprietary scoring methodology. WalkScore was not developed to replace walk audits and other primary data collection efforts, but many communities are considering using WalkScore when they do not have their own resources for data collection or evaluation. Studies have shown that WalkScore can be a useful surrogate for scoring developed through extensive modeling and that results may be similar to those yielded by a more in-depth, resource intensive study.³⁴

NEW TOOLS AND DATA: COLLABORATION WITH THE PRIVATE SECTOR

While their role in local Safe Routes to School programs has often been limited to providing donations or volunteer time, businesses, corporations, and private entrepreneurs may have much to offer in data that could support Safe Routes to School efforts.

Companies like Strava, Inc. let individuals record and store their own walking, bicycling, and activity data. Others, like WalkScore, are designed to inform stakeholders like homebuyers. These are all tools that have a profit component – while they provide information to the general public, they were developed



DATAUSA

[DataUSA](#) is a data visualization (mapping tool) started by Deloitte, Datawheel, and Cesar Hidalgo, Professor at the MIT Media Lab and Director of MacroConnections. The tool maps a wide range of public government data, from demographics to vehicle crash fatalities to average travel time. The maps show the data at county, city, metro area, and state levels when available. It also shows “Top 10” and “Bottom 10” locations for the indicators. Profiles of different locations can also be generated by searching for the specific place. This provides a quick and easy way to understand a summary of the information for each place. DataUSA is also open source, so people who know how to use it are able to build in new code. While the topics available through DataUSA are somewhat limited, it provides some very user-friendly snapshots.

and are maintained by companies that generate revenue from their use. Both of these companies have components that are available to people interested in using the data for more analysis as well. Local departments of transportation and planners have been obtaining and using data from companies like Strava and WalkScore and integrating them into online mapping and other tools that can be used by the public.

The private sector is also using their own data or open data from government agencies and other sources to create apps and other tools for the public to use. This could be replicated for Safe Routes to School. One of the great things that has come out of open data is that private individuals and companies are using the data to create tools that are very useful to the public, but that a government agency would never have the resources to produce on its own.

In addition to opportunities to collaborate with the private sector on tools for Safe Routes to School, businesses are collecting data, often massive amounts of data (i.e. big data), as part of their operations. They collect data to understand their customers, streamline their practices, and ultimately improve their revenues. Some of this data includes information related to transportation, either of goods or customers, that could benefit Safe Routes to School when it were made available.

GAMIFICATION AND ACTIVE TRANSPORTATION

Steer Davies Gleave, a transportation consulting firm, has been developing tools to incentivize people to use active transportation. They have developed a Commute Challenge platform that clients can use to engage their audience (employees or other groups) in competing with and against one another and for prizes.

The Commute Challenge platform is a form of gamification, the concept of using online game design techniques – such as incentives, competitions, challenges, and point scoring – within a non-game context.³⁵ The combination of these techniques helps to change the behavior of commuters in a fun and exciting way.

Steer Davies Gleave has found that effective gamification techniques can encourage commuters to switch to alternative transportation modes such as carpooling, public transit or biking and reduce single-occupancy vehicle trips. The company is looking at linking their platform with Strava and other trip/activity tracking apps and tools.

LOCAL DATA COLLECTION AND USE: COMMUNITY ORGANIZATIONS AND GRASSROOTS EFFORTS

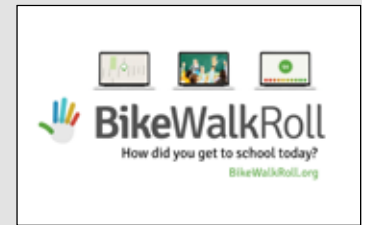
Local community organizations, volunteers, parents, and other community members can both be a resource for data collection and in some areas are already using data and developing tools to help with their Safe Routes to School programs. When it comes to local data collection, local organizations, parents, and even students can help if they are provided the tools like apps or walk audit checklists. Such resources are most useful when they are affordable, evidence-based, easy to use, and can be tailored to local needs or concerns. Local groups can also assist with pedestrian and bicycle counts and other evaluations. Local Safe Routes to School programs are using Google maps to show routes to school for parents and students online. They are also using Google maps and other tools to create heat maps and other visualizations that are informing their programming. Local level data collected by community organizations and community members used to understand and address local conditions and needs and providing more tools to these groups can further increase their participation and effectiveness.

COUNTERPOINT AND BIKEWALKROLL

The [Counterpoint App](#), developed by Green Action Centre in Canada, is a free mobile app that enables community members of all ages and abilities to conduct traffic, bicycle, and pedestrian counts. The interface is very kid-friendly and includes intuitive visuals and sounds. The user sets up in a specific location and uses the app to note when a car, bus, pedestrian, or bicyclist passes by. The app can be set up so that people join in to predetermined counting locations or choose their own. The data collected can be downloaded and summed up for use in planning efforts.

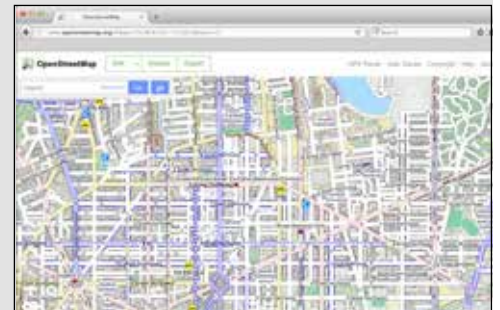


Green Action Centre has also developed [BikeWalkRoll](#) which allows schools and teachers to conduct student travel tallies in the classroom and collect the data using a web application.

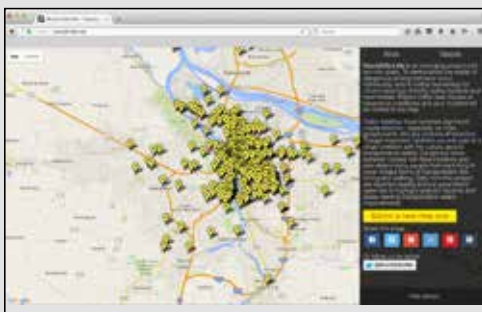


OPEN STREET MAP

[OpenStreetMap](#) is a tool that is open for anyone to update, download, and use. Everything on OpenStreetMap is open data. Much of the information is provided by users who are mapping their local environments. Affiliated with OpenStreetMap is OpenStreetView, where people can upload and download photos of different places that are tagged with their location so they can be found on the map.



NEARLYKILLED.ME



[NearlyKilledMe](#) is a project in Portland, Oregon, that was created by an individual in response to an increase in serious injuries to bike riders in the Portland area in May 2015. Community members are invited to report traffic near-misses or hazardous conditions. These incident reports are added to the map and reports submitted are sent to transportation agencies in the Portland area on a weekly basis.

SECTION VI

ADDRESSING CHALLENGES WITH DATA ACCESSIBILITY

Making data more accessible to the public, and inviting more public collection of data, can come with a variety of concerns. Quality management, privacy and ethical considerations, and ownership are the key concerns that must be wrestled with when making data more accessible. This section describes the challenges and concerns around these, as well as how organizations and agencies have worked to address them.

QUALITY MANAGEMENT

With all data collection, quality of the data is essential to making the data useful. Data users rely on data being accurate, and inaccurate data can result in poor decision making and distrust in future data. Beyond accuracy, consistency in the type of data and the methods of data collection is needed to allow for comparisons to be made over time. Without consistency, it is not possible to see and analyze trends. Concerns revolve around making data more accessible to communities by engaging people directly with collecting and inputting data into the bigger system. This could include uploading information from an app on a smartphone, community members conducting their own inventories of facilities, or using community workshops and events to gather information. When more people are providing data, the quality of the data is often questioned.

How can quality be maintained?

Government agencies have developed policies which include guidelines for data collection, double checking of data, and intermediary processing, where agency staff is responsible for importing and validating data. Policies ensure collection methods are outlined before data collection begins, and also focus on ensuring that data collection methods are consistent and are done in a manner that follows the methods. Specific to Safe Routes to School data collection, providing instructions and input forms or templates along with trainings can help make data collection consistent. Anecdotally, some local agencies have seen data quality and consistency improve through their open data programs, because data collectors are aware that their work will be seen and scrutinized by others and are more conscientious because of it.

ETHICS, SECURITY, AND PRIVACY

Opening up data to the general public generates concerns about privacy rights of individuals, the ethical use of data, and the potential for insufficient security for certain types of data. Privacy concerns can be heightened for Safe Routes to School programs, since data can include sensitive information about children, such as where they live or information about their health.

Some communities have a strong historical distrust of data and data collection, because data has been used unethically to create false images or impose policies that are not rooted in the community's own values and priorities. One of the most infamous examples of this was the unethical use of blood samples from the Havasupai Tribe in Arizona. Tribal members volunteered to participate in research studies on diabetes by providing blood samples. The researcher later used the samples to study family lineage,



schizophrenia, alcoholism, and migration patterns without obtaining additional consent. Following a lawsuit, the tribe was paid a substantial financial settlement and the samples were returned to the tribe.

Guidance on collecting and using data in an ethical manner is readily available. One guidance document is the National Committee on Vital Statistics' Toolkit for Communities Using Health Data: How to Collect, Use, Protect, and Share Data Responsibly. The primary focus of the toolkit is health data. However, the principles in the toolkit are more broadly applicable to many different types of data and their uses for communities. The toolkit recommends and details good stewardship practices, and warns that failure to follow such practices could harm individuals or communities, limit participation, and impede the use of data.

The toolkit includes seven principles of data stewardship:

- **Accountability** — being responsible for ensuring appropriate collection or creation, use, disclosure, and retention of data through policies and practices,

and establishing mechanisms to find and respond to any failure to follow policy and procedures.

- **Openness, transparency, and choice** — promoting trust among data users, data sources, individuals, and communities through community engagement, notices, and consent processes.
- **Community and individual engagement and participation** — promoting trust by engaging communities and individuals in understanding community views and interests in a specific issue.
- **Purpose specification** — defining the questions the data is aimed at answering.
- **Quality and integrity** — ensuring accuracy, relevance, timeliness, completeness, validity, and reliability of the data. Ensuring the data has not been corrupted.
- **Security** — protecting the data's confidentiality, integrity, and availability.
- **De-identified data** — removing or obscuring any directly or indirectly identifying information from data in a way that minimizes the risk of

unintended disclosure of individuals' identity and information. By removing directly identifying elements and otherwise treating data through de-identification, released information can be both confidential and useful for legitimate purposes. More information about de-identification of data is provided by the [US Department of Education Privacy Technical Assistance Center](#).

For Safe Routes to School, not all data needs to be completely open and accessible by all, helping to address concerns about security and privacy. There are different levels based on the uses of the data. For example, student addresses can be useful and needed by local Safe Routes to School coordinators planning walking school bus routes. It would make more sense for these coordinators to have access to this data, while other community members may only have access to "heat maps" that show general locations of where students live, but without specific addresses. This aggregating or rolling up of the data helps preserve privacy while still providing useful information.



OWNERSHIP

Another area of some complexity involves the ownership of data, the tools used by community members to view and use the data, and data analyses. When it comes to the data itself, data is generally considered to be factual, and facts are not protected under American copyright laws. Though facts cannot be owned, there can be some privacy rights that apply to certain kinds of facts, such as personal identifiers of private citizens. In some instances, compilations of facts can be protected if those seeking to use the facts copy the selection or arrangement of the compilation.

Even if the raw data is not “owned” by the person or agency that collects or makes the data public, the tools, programs, and applications that a community member might use to view, access, or analyze the data might be owned by a third party. These tools might be provided for free at a given moment, but that provides no assurance that the owner will not charge in the future or discontinue the service altogether. It is also noteworthy that the owner of the tool may be able to use the data or products that are created from the data for other purposes. For example, when information is put into the online mapping application Google Earth, Google’s license entitles it to exercise any of the rights of the person who input the data. So the owner of the tool might potentially use data or information for purposes not desired by the person who provided the data.

The implication of all of this is simply that it is important, when collecting data, designing apps, or interacting with data management tools, to be aware of both the copyright issues and the contract or license issues at play. Though ownership impediments can often be avoided fairly easily, it is wise to be proactive to ensure that your organization will retain access to the data and tools needed for effective momentum.



photo courtesy Dan Burden on Flickr

DEVELOPING ORGANIZATIONAL GUIDELINES AND POLICIES

For organizations and agencies that plan on making data accessible, either through an open data platform or other means, a good practice to address many of the concerns described in this section is to create organizational guidelines or policies. These guidelines or policies can include best practices such as processes to ensure data quality, measures to safeguard information, and methods of prioritizing data releases. Some agencies identify an open data ombudsman who provides oversight for all of the necessary policies and practices.

An example of an organizational guide is the California Health and Human Services (CHHS) [Open Data Handbook](#), which was developed for the CHHS Open Data Portal. The handbook provides “guidelines to identify, review, prioritize and prepare publishable CHHS data for access by the

public – with a foundational emphasis on value, quality, data and metadata standards, and governance.” The guidelines include:

- What data should be open
- How is data prioritized to be opened
- Procedures for pre-publication
- Process for publication, including any standardization and metadata
- Disclosures and licenses
- Support of public use

These guidelines and policies go a long way in addressing many of the challenges organizations and agencies grapple with and provide best practices that can help them feel more willing and able to make data more accessible.

SECTION VII

CONCLUSION

As we have discussed throughout this report, widespread access to data holds great promise for innovation and improvement related to Safe Routes to School – and for community health and planning more generally. The increasing ease of collecting, manipulating, analyzing, and understanding large sets of data is creating real change on the ground. Agencies, community members, and other stakeholders have the potential to understand the strengths and weaknesses occurring on the streets and in Safe Routes to School programming differently and better than ever before. These analyses and improvements will help Safe Routes to School efforts be more successful in improving health and safety for kids and communities.

Where do we go from here? This report highlights some key needs and opportunities for data in Safe Routes to School:

Consistency and ease of data collection:

Consistent data collection for Safe Routes to School across communities will bring strong benefits. With consistent indicators, we will be more easily able to track progress, compare communities, and identify the effects of interventions, as well as understand how community contexts such as violence, rurality, and so on, can affect walking and bicycling rates and safety. While tallies and surveys developed by the National Center for Safe Routes to School provide an excellent start, particularly around consistent data for mode share, there is a strong opportunity to use technology to ease the collection itself. Apps, counters, and streetscape digital analyses are helping communities collect more data. In addition, there is a strong need for consistent indicators related to street conditions, school distance, and neighborhood design.

Systems for analysis and translation:

Another key need is for systems that will make it easier for people in every community to access, manipulate, and analyze data. The Safe Routes to School movement needs appropriate free or open source tools for the collection and analysis of data – tools that are geared toward school neighborhood design and mode share assessments. Mapping tools can assist community members in developing images that show relationships and tell their story. Graphs can also help translate data. Such tools have the potential to assist with translation and interpretation, making data analysis more convenient and common across all communities.

Collaboration:

Partnerships and collaboration between different sectors – education, health, transportation, and others – can lead to better sharing of resources to make data more accessible. When agencies holding data make it more open to others and facilitate its use, unexpected benefits across systems and sectors can take place. Collaboration can lead to insights,

efficiencies, and more effectiveness. Clear guidelines and policies can support collaboration and sharing, while reducing risks to privacy or operations.

Integrating data sharing and reliance upon data into policy and practice for different governmental bodies:

From school district siting policies, to bicycle and pedestrian planning, to state transportation finance – government agencies can be inconsistent in whether and how they consider relevant data when making decisions that have enormous long term impacts on the health and well-being of children and communities. Policies at all levels of government must call for data informed practices, support the public sharing of data, and commit agencies to listening to communities as they analyze, innovate, and reflect upon how data can help achieve community visions.

Realizing the promise of accessible data requires overcoming many hurdles. We need to collect the data in the first place; ensure quality and protect individual privacy; store data in accessible, secure formats that allow flexibility for analysis and manipulation; and translate data so it is coherent and provides direction. As we wrestle with these challenges, one of the key dangers is that they will be overcome slowly, in piecemeal fashion, and inequitably, with some communities becoming the strong beneficiaries of technological improvements and others being left behind. But we can do better than that. Through strong coordination amongst different players, meaningful investments by foundations and government, and strategic development of tools and approaches, we can use data to improve Safe Routes to School practices and transform communities into equitable, active, and healthy places.



CITATIONS

- ¹ National League of Cities. 2014. City Open Data Policies. [http://www.nlc.org/Documents/Find City Solutions/City-Solutions-and-Applied-Research/CSAR Open Data Report FINAL.pdf](http://www.nlc.org/Documents/Find%20City%20Solutions/City-Solutions-and-Applied-Research/CSAR%20Open%20Data%20Report%20FINAL.pdf).
- ² "What Is Open Data?" What Is Open Data? Accessed May 20, 2016. <http://opendatahandbook.org/guide/en/what-is-open-data/>.
- ³ "What Is Open Data?" What Is Open Data? Accessed May 20, 2016. <http://opendatahandbook.org/guide/en/what-is-open-data/>.
- ⁴ Open Source Initiative. "Frequently Answered Questions." Frequently Answered Questions. Accessed May 20, 2016. <https://opensource.org/faq#osd>.
- ⁵ SAS. "What Is Big Data and Why It Matters." What Is Big Data? Accessed May 20, 2016. http://www.sas.com/en_us/insights/big-data/what-is-big-data.html.
- ⁶ Merriam-Webster. Crowdsourcing. Accessed May 20, 2016. <http://www.merriam-webster.com/dictionary/crowdsourcing>.
- ⁷ Hand, Eric. "Citizen Science: People Power." *Nature* 466, no. 7307 (2010): 685-87. doi:10.1038/466685a.
- ⁸ National Center for Safe Routes to School. *Creating Healthier Generations: A Look at the 10 Years of the Federal Safe Routes to School Program*. Report. September 2015. Accessed May 1, 2016. http://saferoutesinfo.org/sites/default/files/SRTS_10YearReport_Final.pdf.
- ⁹ National Center for Safe Routes to School. *Creating Healthier Generations: A Look at the 10 Years of the Federal Safe Routes to School Program*. Report. September 2015. Accessed May 1, 2016. http://saferoutesinfo.org/sites/default/files/SRTS_10YearReport_Final.pdf.
- ¹⁰ Sankin, Aaron. "How the Federal Government Is failing the American People on Transparency." *The Daily Dot*. June 04, 2015. Accessed May 20, 2016. <http://www.dailydot.com/politics/foia-reform-hearing-congress/>.
- ¹¹ HIMSS. "What Is Interoperability?" What Is Interoperability? Accessed May 20, 2016. <http://www.himss.org/library/interoperability-standards/what-is-interoperability>.
- ¹² Russell, Adam. "New Bikeshare Data Standard Opens Doors for More Apps, Research." *Mobility Lab*. May 04, 2016. Accessed May 20, 2016. <http://mobilitylab.org/2016/05/04/new-bikeshare-data-standard-gbfs/>.
- ¹³ "Story | In San Bernardino, CA, County Health Department Takes Lead to Improve Area's Poor Health Ranking." *County Health Rankings & Roadmaps*. Accessed May 20, 2016. <http://www.countyhealthrankings.org/roadmaps/stories/san-bernardino-ca-county-health-department-takes-lead-improve-area's-poor-health>.
- ¹⁴ Genaro Escarzaga. Telephone interview by author. April 22, 2016.
- ¹⁵ Cranor, David. "Cold Weather, Lack of Plowing Affects Bike Commuting." *Greater Greater Washington*, January 21, 2011. Accessed April 15, 2016. <http://greatergreaterwashington.org/post/8909/cold-weather-lack-of-plowing-affects-bike-commuting/>.
- ¹⁶ Sullivan, Patricia. "Arlington to Plow Up to 10 Miles of Bike Trails after Snowstorms This Winter." *The Washington Post*, November 14, 2014. Accessed 2016. http://www.highbeam.com/doc/1P2-37398290.html?refid=easy_hf.
- ¹⁷ "Clearing Snow on Trails - Emergency." *Emergency*. Accessed May 20, 2016. <https://emergency.arlingtonva.us/weather/snow-ice/clearing-snow-on-trails/>.
- ¹⁸ National Center for Safe Routes to School. "Ways to Collect Information." *SRTS Guide*. Accessed May 20, 2016. http://guide.saferoutesinfo.org/evaluation/ways_to_collect_information.cfm.
- ¹⁹ National Center for Safe Routes to School. "Ways to Collect Information." *SRTS Guide*. Accessed May 20, 2016. http://guide.saferoutesinfo.org/evaluation/ways_to_collect_information.cfm.
- ²⁰ National Center for Safe Routes to School. "Federal Safe Routes to School Program Evaluation Plan." *Federal Safe Routes to School Program Evaluation Plan*. August 2011. Accessed December 20, 2015. <http://www.saferoutesinfo.org/sites/default/files/resources/NationalEvaluationPlan.pdf>.
- ²¹ McDonald, Noreen. "Active Living Research." *Infographic: Benchmark Yourself*. July 9, 2014. Accessed May 20, 2016. <http://activelivingresearch.org/blog/2014/07/infographic-benchmark-yourself-providing-practitioners-school-travel-information>.



²² National Center for Safe Routes to School. "Federal Safe Routes to School Program Evaluation Plan." Federal Safe Routes to School Program Evaluation Plan. August 2011. Accessed December 20, 2015. <http://www.saferoutesinfo.org/sites/default/files/resources/NationalEvaluationPlan.pdf>.

²³ National League of Cities. 2014. City Open Data Policies. [http://www.nlc.org/Documents/Find City Solutions/City-Solutions-and-Applied-Research/CSAR Open Data Report FINAL.pdf](http://www.nlc.org/Documents/Find%20City%20Solutions/City-Solutions-and-Applied-Research/CSAR%20Open%20Data%20Report%20FINAL.pdf).

²⁴ Code for America. "Recommendations." Police Open Data Census. May 2015. Accessed May 20, 2016. <https://codeforamerica.github.io/PoliceOpenDataCensus/recommendations.html>.

²⁵ Sunlight Foundation. Guidelines for Open Data Policies. Report. March 2014. [http://assets.sunlightfoundation.com/policy/Open Data Policy Guidelines/OpenDataGuidelines_v3.pdf](http://assets.sunlightfoundation.com/policy/Open%20Data%20Policy%20Guidelines/OpenDataGuidelines_v3.pdf).

²⁶ Transportation Research Board. "A Guide to Ensure Access to the Publications and Data of Federally Funded Transportation-Related Research." NCHRP. Accessed May 20, 2016. <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4062>.

²⁷ National League of Cities. 2014. City Open Data Policies. [http://www.nlc.org/Documents/Find City Solutions/City-Solutions-and-Applied-Research/CSAR Open Data Report FINAL.pdf](http://www.nlc.org/Documents/Find%20City%20Solutions/City-Solutions-and-Applied-Research/CSAR%20Open%20Data%20Report%20FINAL.pdf).

²⁸ Grimmelikhuijsen, S. G., and A. J. Meijer. "Effects of Transparency on the Perceived Trustworthiness of a Government Organization: Evidence from an Online Experiment." *Journal of Public Administration Research and Theory* 24, no. 1 (2012): 137-57. doi:10.1093/jopart/mus048. Kim, Soonhee, and Jooho Lee. Report. May 2011. https://spaa.newark.rutgers.edu/sites/default/files/files/Transparency_Research_Conference/Papers/Kim_Soonhee.pdf Governing Institute. Improving Citizen Trust in Local Government. Report. 2014. <http://www.ncacc.org/DocumentCenter/View/1135>.

²⁹ Shaver, Katherine. "Transit Data Gets Techies' Gears Spinning for New Apps." *The Washington Post*, October 25, 2015. Accessed 2016. http://www.highbeam.com/doc/1P2-38898519.html?refid=easy_hf.

³⁰ US Department of Transportation. "Hackathon Seeks to Crack "Last Mile" Access to Opportunity." *Fastlane*. April 7, 2016. Accessed March 20, 2016. <https://www.transportation.gov/fastlane/hackathon-seeks-to-crack-last-mile>.

³¹ Transportation Research Board. Open Data: Challenges and Opportunities for Transit Agencies. Report no. TCRP 115. 2015. http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_syn_115.pdf.

³² Hipp, J. Aaron, Alicia Manteiga, Amanda Burgess, Abby Stylianou, and Robert Pless. "Webcams, Crowdsourcing, and Enhanced Crosswalks: Developing a Novel Method to Analyze Active Transportation." *Frontiers in Public Health* Front. Public Health 4 (2016). doi:10.3389/fpubh.2016.00097.

³³ Jill Cooper and SangHyoun Oum. Personal interview with author. October 30, 2015.

³⁴ McCahill, Chris. "Researchers Suggest Using Google Street View and Walk Score to Conduct Pedestrian Safety Studies SSTI." February 1, 2016. <http://www.ssti.us/2016/02/researchers-suggest-using-google-street-view-and-walk-score-to-conduct-pedestrian-safety-studies/>.

³⁵ Steer Davies Gleave. Webinar: Using Gamification to Encourage Travel Behavior Change. August 20, 2014. <http://na.steerdaviesgleave.com/news-and-insights/using-gamification-to-encourage-travel-behavior-change>.

³⁶ National Committee on Vital Statistics. Toolkit for Communities Using Health Data. Report. May 2015. <http://www.ncvhs.hhs.gov/wp-content/uploads/2013/12/Toolkit-for-Communities.pdf>.

³⁷ National Committee on Vital Statistics. Toolkit for Communities Using Health Data. Report. May 2015. <http://www.ncvhs.hhs.gov/wp-content/uploads/2013/12/Toolkit-for-Communities.pdf>.

³⁸ National League of Cities. 2014. City Open Data Policies. [http://www.nlc.org/Documents/Find City Solutions/City-Solutions-and-Applied-Research/CSAR Open Data Report FINAL.pdf](http://www.nlc.org/Documents/Find%20City%20Solutions/City-Solutions-and-Applied-Research/CSAR%20Open%20Data%20Report%20FINAL.pdf).

³⁹ Google. "Google Terms of Service – Privacy & Terms – Google." April 14, 2014. Accessed May 20, 2016. <https://www.google.com/intl/en/policies/terms/>.

⁴⁰ National League of Cities. 2014. City Open Data Policies. [http://www.nlc.org/Documents/Find City Solutions/City-Solutions-and-Applied-Research/CSAR Open Data Report FINAL.pdf](http://www.nlc.org/Documents/Find%20City%20Solutions/City-Solutions-and-Applied-Research/CSAR%20Open%20Data%20Report%20FINAL.pdf).

⁴¹ California Health and Human Services Agency. "OPEN DATA HANDBOOK." Accessed May 20, 2016. <http://chhsopendata.github.io/>



www.saferoutespartnership.org