Data Collection & Research

Overview

This module will review some of the methods and reasons behind conducting research on bicycle and pedestrian planning. Research on bicycle and pedestrian planning helps answer questions about behavior, needs, and will help set benchmarks to determine the progress and success of a program. From answering questions about users to facilities, this research can improve the outcomes of a bicycle or pedestrian facility and network. Different approaches are available for a researcher to - utilize, and should be selected based on context of the issue and available resources.

Learning Objective:

- Understand data collection methods and appropriate applications
- Identify applications for research and appropriate methods for each

Suggested Use

_x_ Professional Development _x_ Graduate Level _x_ Undergraduate

Time Required

__Less than 1 hour ___ 1 hour __x_ 2-3 hours __Half-day Workshop __Full-day Workshop

Instructions

1. Announce purposes and give brief overview of the day
2. Give lecture
3. Break for discussion and questions
4. Summarize lecture and discussion
5. Assignments
6. Circulate handouts and evaluations

Lecture

1. Why Research is Necessary
2. Conducting and Using Research
3. Methods and Typical uses
    a. Counts
    b. Surveys
    c. Interviews
    d. Travel Diaries
    e. GPS
4. Facilities Evaluations

Materials/Handouts

- Pedestrian audit form examples

Assignments and Activities

1. Pathway counts
2. Intersection counts

Suggested Readings

1. Schneider, Robert, Robert Patten, and Jennifer L. Toole. "A Case Study Analysis of Pedestrian and Bicycle Data Collection in United States Communities." (2005).

2. Schneider, Robert, Lindsay S. Arnold, and David R. Ragland. "A Methodology for Counting Pedestrians at Intersections: Using Automated Counters to Extrapolate Weekly Volumes from Short Manual Counts." (2009).

3. Schneider, Robert, Lakesha C. Dunbar, Jennifer L. Toole, and Charles Flink. "Avoiding Biased Interpretation of Bicycle Surveys: Comparing Results from Four Distribution Methods in Winston-Salem NC." (2006).

4. Schneider, Robert, Robert Patton, Jennifer Toole, and Craig Raborn. "Pedestrian and Bicycle Data Collection in United States Communities: Quantifying Use, Surveying Users, and Documenting Facility Extent." (2005).

5. National Bicycle and Pedestrian Documentation Project: http://bikepeddocumentation.org/

6. Value of counting trail users: http://www.sjparks.org/Trails/TrailCount.asp

7. Dill, J. (2009). Bicycling for Transportation and Health: The Role of Infrastructure. *Journal of Public Health Policy*, *30*, S95–S110. doi:10.1057/jphp.2008.56

Related Modules

- Bicycle Facilities Design
- Pedestrian Facilities Design

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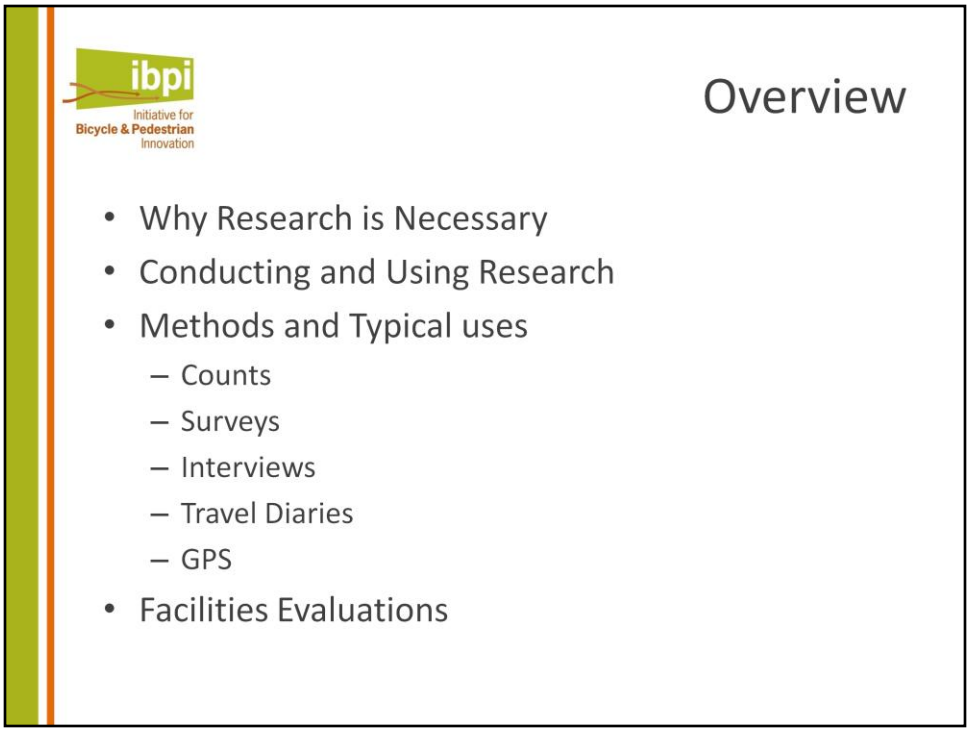
Data Collection and Research



This module will review some of the methods and reasons behind conducting research on bicycle and pedestrian planning.

Research on bicycle and pedestrian planning helps answer questions about behavior, needs, and will help set benchmarks to determine the progress and success of a program. From answering questions about users to facilities, these are general categories for why we need to do research in our planning process. This research can improve the outcomes of a bicycle or pedestrian facility and network.

Answer questions about pedestrians and bicyclists
•What types of people walk or bicycle?
•When and where do they walk or ride?
•What types of facilities do they prefer?

This research can get at important information about facilities. This could be research on where there are facilities-or gaps- the relative quality of the facility, number of people who use them, or their safety and performance.

Research can also make the case for a new type of facility based on these results. It may be an opportunity to investigate the facilities return on investment, a metric more and more decision makers are looking for.

In San Jose, California they began collecting data on trail usage in 2007 and have found this research to be essential in grant applications. Since 2007 they have been able to accomplish the following:

•Secured grant from the State of California for $700,000 awarded for construction of the Guadalupe River Trail (Woz Way to Virginia Street). State representatives reported that the Trail Count Fact Sheet influenced the grant panel's decision to award the grant.
•In discussing a $350,000 grant application, State of California (Caltrans) staff said that the Trail Count Fact Sheet data about commuting was impressive and wished other agencies gathered similar data.
•The City received a $150,000 grant from the Bay Area Ridge Trail for Penitencia Creek Trail and $123,000 from the State of California for Guadalupe River Trail enhancements. Both applications included the Trail Count Fact Sheet.
•The City coordinated with sponsors of the San Jose Grand Prix to minimize impacts from event closures along the Guadalupe River Trail. The Trail Count Fact Sheet helped to document the negative impact of such closures to bicycle commuting.

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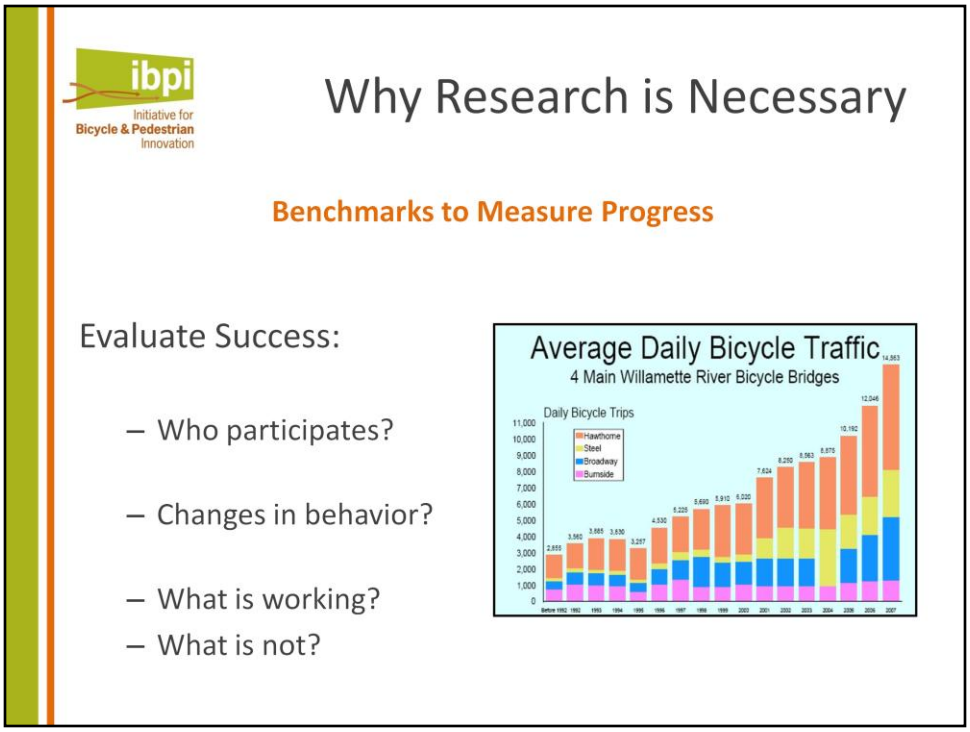
Why Research is Necessary

Input for Design & Plans

- Provide input to facilities design and plans
- Inform improvements and design
- Preference for facility types

Research can provide input for decision makers and planners on the types of facilities that would be best for a community. It can also determine what improvements are needed within the system or the community's preference for one type of facility over another.



Good research can also provide benchmarks to measure the use of a facility or progress of a project. These benchmarks can be important for fundraising, grants, and getting buy in from decision makers for future projects.

Benchmarks can also help redirect efforts if projects are not meeting objectives. It might provide information for how the project got derailed and give insight to improve the plan in the future.

The National Bicycle and Pedestrian Documentation Project is attempting to overcome one of the greatest challenges facing the bicycle and pedestrian field--the lack of documentation on usage and demand. Without accurate and consistent demand and usage figures, it is difficult to measure the positive benefits of investments in these modes, especially when compared to the other transportation modes such as the private automobile. The website http://bikepeddocumentation.org/ may help measure and evaluate bicycle and pedestrian data in your community while supporting an effort to have standardized, national information on active transportation modes.

Conducting and Using Research

Conducting Research:

- Practitioners at all levels
- University researchers
- Advocates
- Citizens

Used for:

- Educate policy makers
- Inform advocates & citizens
- Inform best practices

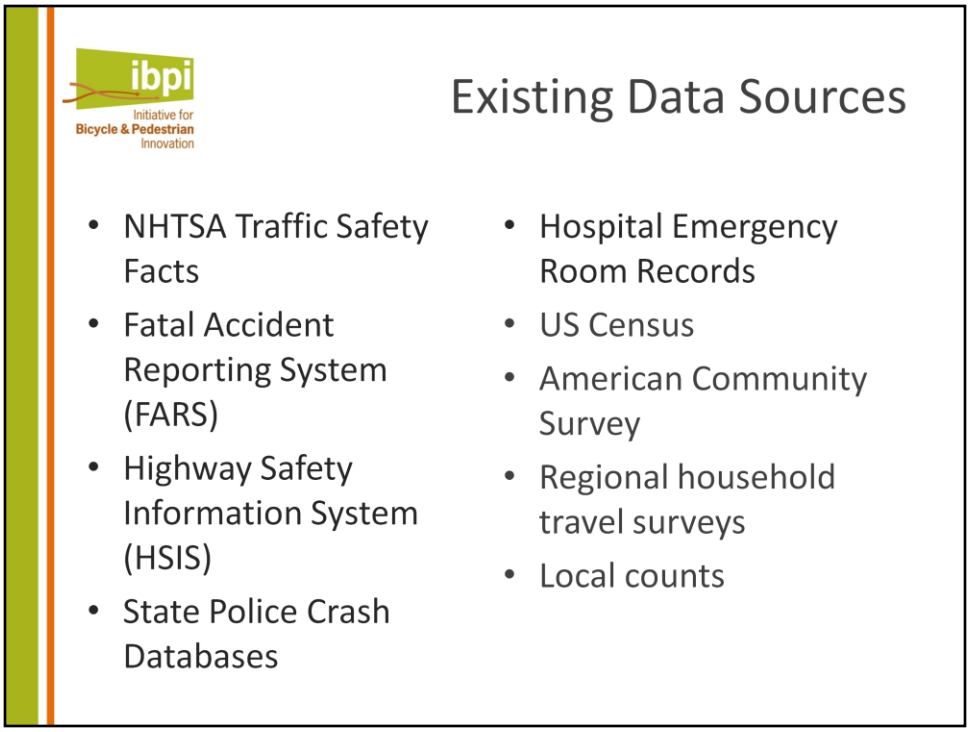
Who uses research? Everyone! Practitioners in local, state and federal government may need it for program funding and planning facilities. These practitioners may collaborate with University researchers, or enlist advocate and citizens to help conduct the research. (e.g. counting)

This research can be used to inform policy makers. They may need data in order to convince them of the need for facilities, to make better policies and decisions and to turn them into cheerleaders.

Academics
- growing interest in faculty to conduct research on bicycle facilities and travel behavior

Advocates
- use the data – they can help with data collection

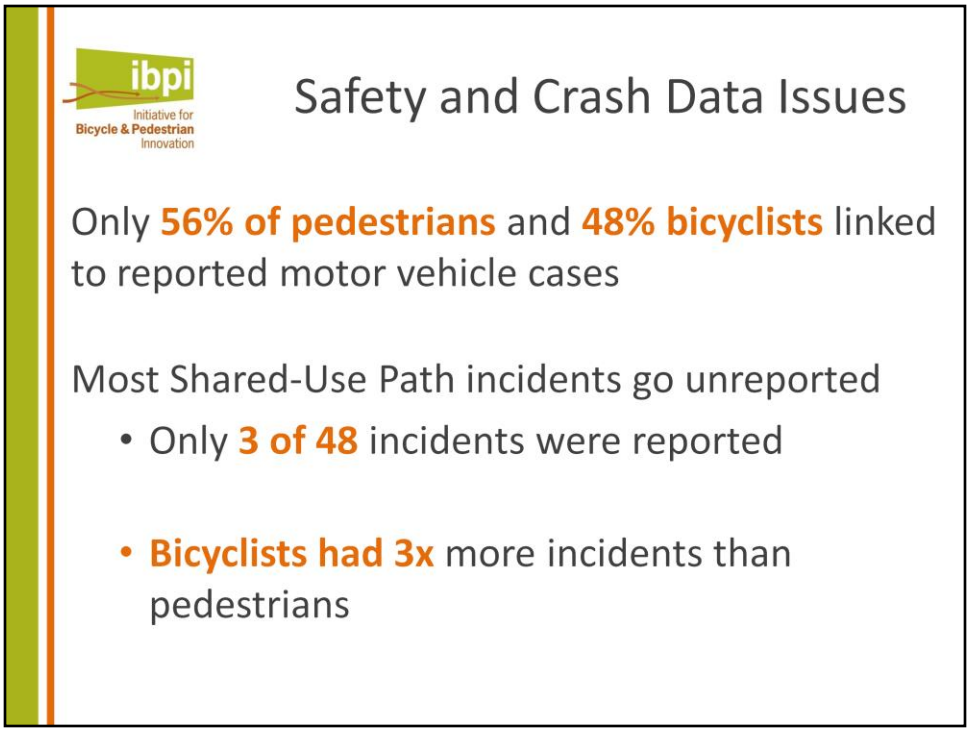
Citizens
-Participate in counts, other research



There are numerous places that provide data that could be used for planning bike and pedestrian facilities. Specific databases for the area of safety and crash data and other data sources that get more at users, travel behaviors, and change over time for geographic areas.

Safety and Crashes
•NHTSA Traffic Safety Facts
•Fatal Accident Reporting System (FARS)
•Highway Safety Information System (HSIS)
•State Police Crash Databases
•Hospital Emergency Room Records

Other Data Sources
•US Census
•American Community Survey
•Regional household travel surveys
•Local counts (National Documentation Project)



However, there are some problems with using existing safety and crash data. While it is not perfect, it may be the best information we have available.

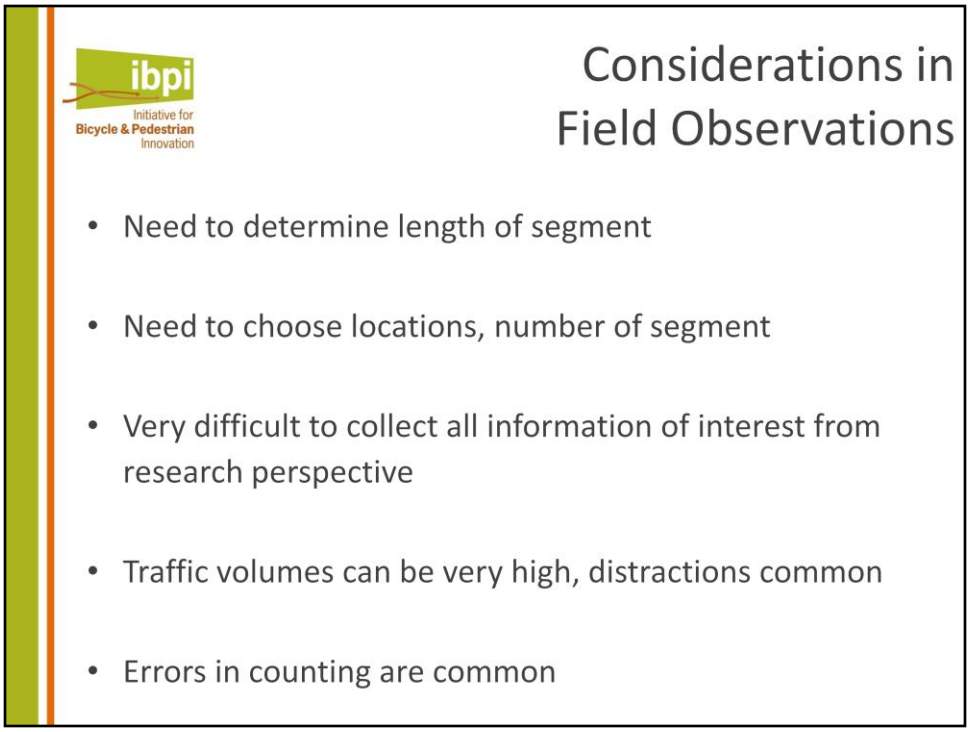
•Only **56% of pedestrians** and **48% of bicyclists** were successfully linked to cases reported on their respective state motor vehicle crash files (Stutts & Hunter, 1998)

•Most shared-use path incidents were unreported (Aultman-Hall & LaMondia, 2005)
- •Only 3 of 48 incidents were reported to police
- •Bicyclists had 3 times more incidents than pedestrians
- •Falls were much more common than collisions
- •Highest-volume paths had highest incident rates

Methods and Typical uses

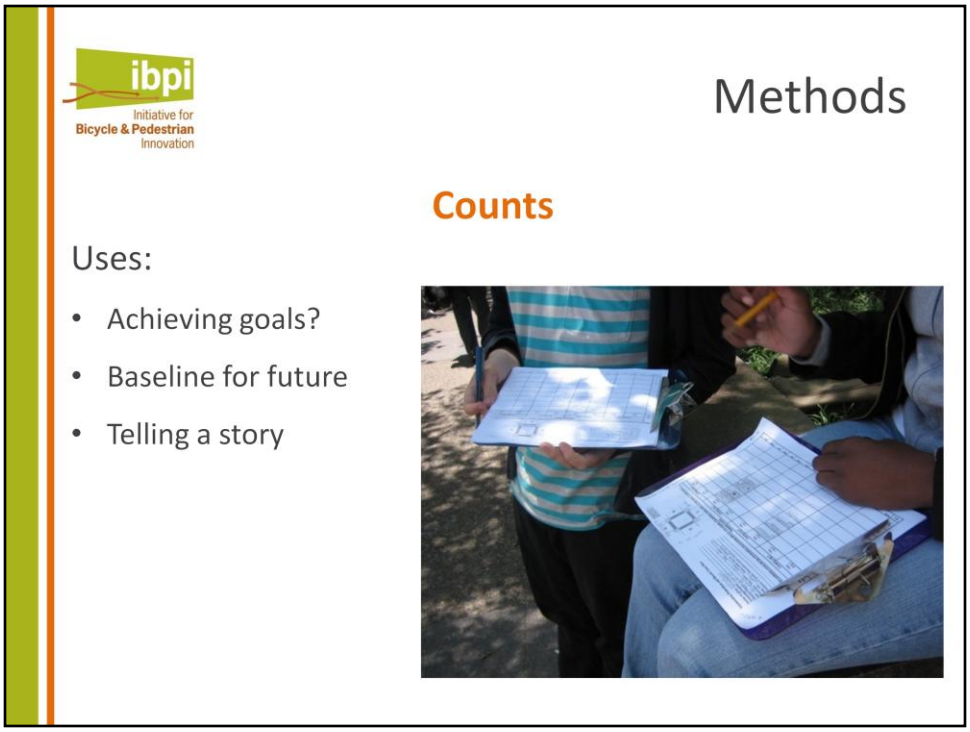
1. Counts
2. Surveys
3. Interviews
4. Travel Diaries
5. GPS

There are a variety of methods to conduct research on bicycle and pedestrian travel. Typical methods range from counts, to travel diaries, or utilizing GPS technology to track travel behavior.



When beginning field observations, certain considerations should be taken. For example, how much time do you want to dedicate to the sample?< one hour, 1-2 hours, peak hour(s), 12 hours. What will different locations tell us about the usage? How many sites should be selected.

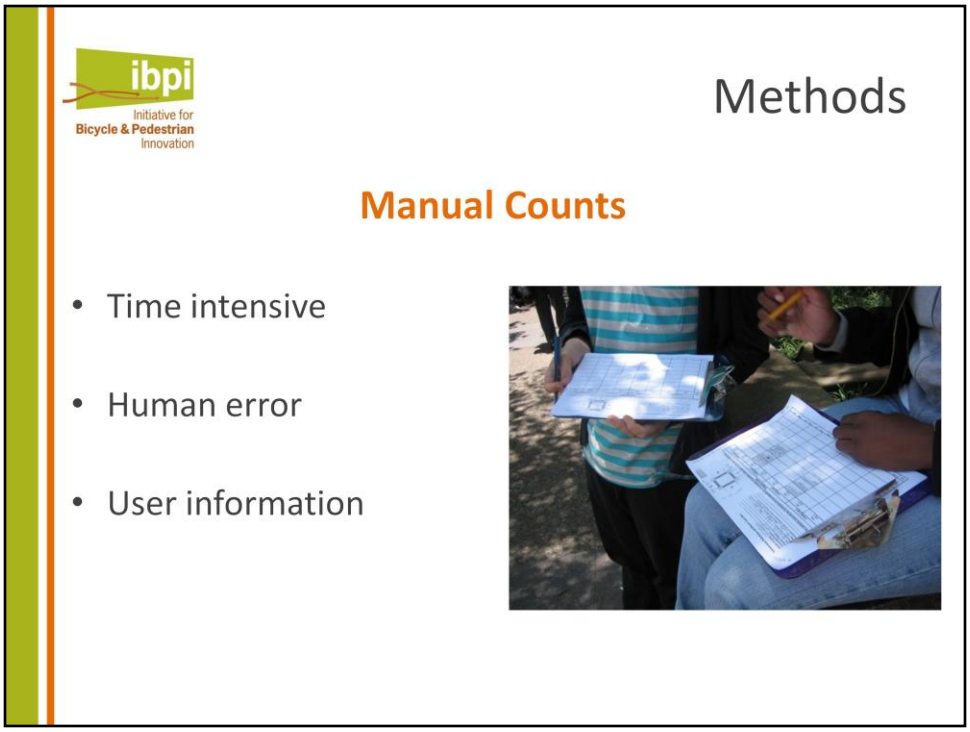
It's also important to realize that it may be difficult to collect all the information you want in a count, so you should know ahead of time what you want to count, gender, race, age, direction, group size, helmet, etc



Counting is easy. Counting accurately & consistently is the challenge

Uses for counts:

- Are we achieving our goals?
- Collect baseline data for future projects
- Project usage - provide inputs to models
- Tell a story – make walking & bicycling more visible
- Make the case



Manual Counts can be completed by staff or volunteers, and require a substantial time commitment. Accuracy of the information can be an issue due to human error, however these counts can obtain more in depth information on the user, such their turning movements, gender, use of helmets or other safety gear, and age.

Electronic Counts are utilized by placing counters in the field. There is no information about the user that can be gathered, and accuracy can be compromised by how it is places or obstacles in the field. There are several types of electronic counters available.

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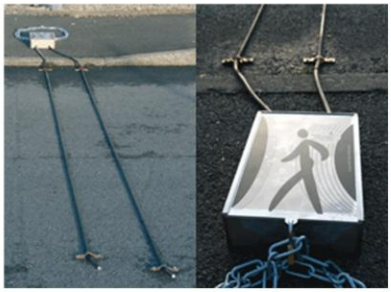
Methods

Pneumatic Tubes

- Can be semi- permanent or mobile
- Can be bicycle-specific
- Can detect riders side by side
- Does not count pedestrians

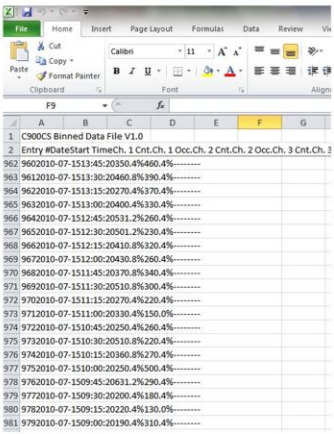


For more info see: http://www.eco-compteur.com/TUBES.html?wpid=15040

Methods

Electronic Counts: Magnetic Loop

- Placed in field
- No information about users
- Cyclists riding in wrong lane can confound directionality results



	A	B	C	D	E	F	G
1	C900CS Binned Data File V1.0						
2	Entry	#DateStart TimeCh. 1 Cnt.Ch. 1 Occ.Ch. 2 Cnt.Ch. 2 Occ.Ch. 3 Cnt.Ch. 3					
962	9602010-07-1513:45:20350.4%460.4%--------						
963	9612010-07-1513:30:20460.8%390.4%--------						
964	9622010-07-1513:15:20270.4%370.4%--------						
965	9632010-07-1513:00:20400.4%330.4%--------						
966	9642010-07-1512:45:20531.2%260.4%--------						
967	9652010-07-1512:30:20501.2%230.4%--------						
968	9662010-07-1512:15:20410.8%320.4%--------						
969	9672010-07-1512:00:20430.8%260.4%--------						
970	9682010-07-1511:45:20370.8%340.4%--------						
971	9692010-07-1511:30:20510.8%300.4%--------						
972	9702010-07-1511:15:20270.4%220.4%--------						
973	9712010-07-1511:00:20330.4%150.0%--------						
974	9722010-07-1510:45:20250.4%260.4%--------						
975	9732010-07-1510:30:20510.8%220.4%--------						
976	9742010-07-1510:15:20360.8%270.4%--------						
977	9752010-07-1510:00:20250.4%500.4%--------						
978	9762010-07-1509:45:20631.2%290.4%--------						
979	9772010-07-1509:30:20200.4%180.4%--------						
980	9782010-07-1509:15:20220.4%130.0%--------						
981	9792010-07-1509:00:20190.4%310.4%--------						

This tool holds 3 months of data that can be imported into Excel

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Methods

Electronic Counts: Infrared

- Detects each trail user as infrared beam is broken
- Data reported as a stream of dates and time

Can be imported to Excel as space-delimited text file with a maximum of 16,000 entries

These sensors (eg: http://www.eco-compteur.com/Pyroelectric-Sensor.html?wpid=15036) can detect different user groups such as pedestrians, cyclists, etc. These also direct direction of movement.

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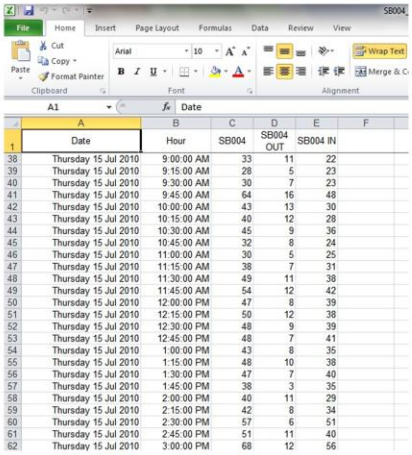
Methods

Electronic Counts: Passive Infrared

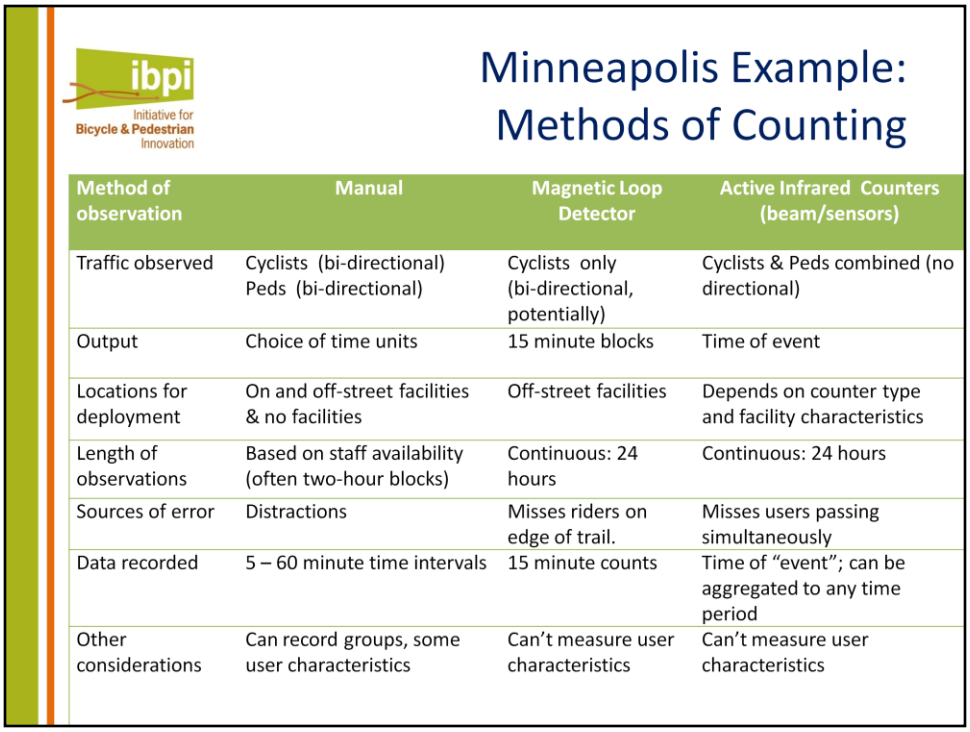
- Detects trail users' infrared heat signatures
- Differentiates direction
- Imports information in 15-min increments



	A	B	C	D	E	F
1	Date	Hour	SB004	SB004 OUT	SB004 IN	
38	Thursday 15 Jul 2010	9:00:00 AM	33	11	22	
39	Thursday 15 Jul 2010	9:15:00 AM	28	5	23	
40	Thursday 15 Jul 2010	9:30:00 AM	30	7	23	
41	Thursday 15 Jul 2010	9:45:00 AM	64	16	48	
42	Thursday 15 Jul 2010	10:00:00 AM	43	13	30	
43	Thursday 15 Jul 2010	10:15:00 AM	40	12	28	
44	Thursday 15 Jul 2010	10:30:00 AM	45	9	36	
45	Thursday 15 Jul 2010	10:45:00 AM	32	8	24	
46	Thursday 15 Jul 2010	11:00:00 AM	30	5	25	
47	Thursday 15 Jul 2010	11:15:00 AM	38	7	31	
48	Thursday 15 Jul 2010	11:30:00 AM	49	11	38	
49	Thursday 15 Jul 2010	11:45:00 AM	54	12	42	
50	Thursday 15 Jul 2010	12:00:00 PM	47	8	39	
51	Thursday 15 Jul 2010	12:15:00 PM	50	12	38	
52	Thursday 15 Jul 2010	12:30:00 PM	48	9	39	
53	Thursday 15 Jul 2010	12:45:00 PM	48	7	41	
54	Thursday 15 Jul 2010	1:00:00 PM	43	8	35	
55	Thursday 15 Jul 2010	1:15:00 PM	48	10	38	
56	Thursday 15 Jul 2010	1:30:00 PM	47	7	40	
57	Thursday 15 Jul 2010	1:45:00 PM	38	3	35	
58	Thursday 15 Jul 2010	2:00:00 PM	40	11	29	
59	Thursday 15 Jul 2010	2:15:00 PM	42	8	34	
60	Thursday 15 Jul 2010	2:30:00 PM	57	6	51	
61	Thursday 15 Jul 2010	2:45:00 PM	51	11	40	
62	Thursday 15 Jul 2010	3:00:00 PM	68	12	56	

- Detects trail users' infrared heat signatures
- Differentiates direction (i.e. left-to-right vs. right-to-left) and types of users
- Holds one year of data
- Data imported in Excel in 15-minute increments

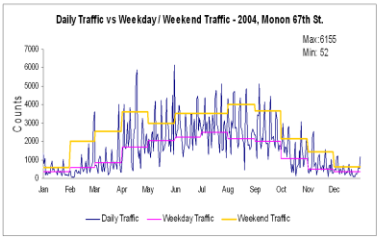
See previous slide for link to additional examples

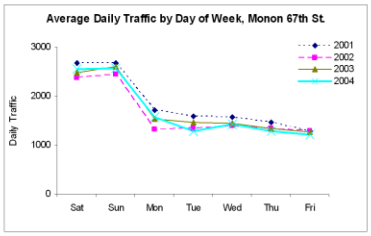


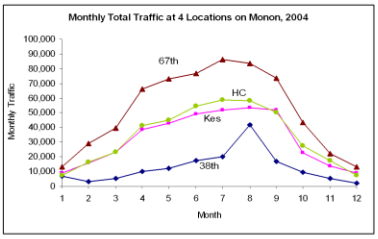
Method of observation	Manual	Magnetic Loop Detector	Active Infrared Counters (beam/sensors)
Traffic observed	Cyclists (bi-directional) Peds (bi-directional)	Cyclists only (bi-directional, potentially)	Cyclists & Peds combined (no directional)
Output	Choice of time units	15 minute blocks	Time of event
Locations for deployment	On and off-street facilities & no facilities	Off-street facilities	Depends on counter type and facility characteristics
Length of observations	Based on staff availability (often two-hour blocks)	Continuous: 24 hours	Continuous: 24 hours
Sources of error	Distractions	Misses riders on edge of trail.	Misses users passing simultaneously
Data recorded	5 – 60 minute time intervals	15 minute counts	Time of "event"; can be aggregated to any time period
Other considerations	Can record groups, some user characteristics	Can't measure user characteristics	Can't measure user characteristics

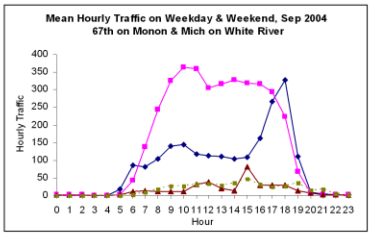
So when should these be used? Work done in Minneapolis did a side by side comparison of these count methods

Temporal Patterns in Trail Traffic

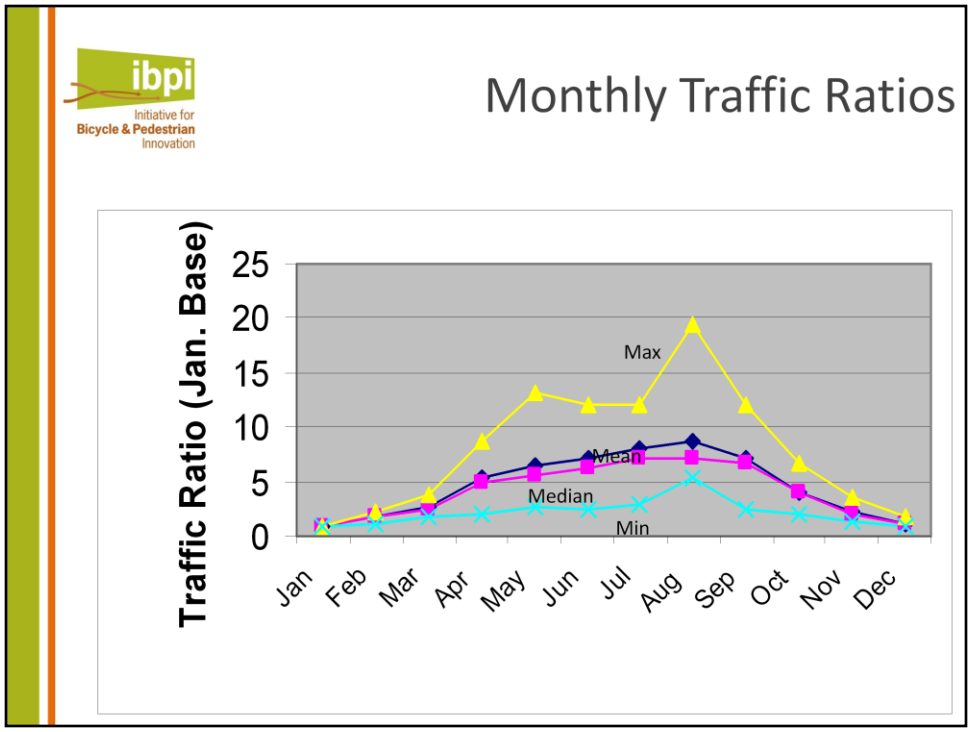




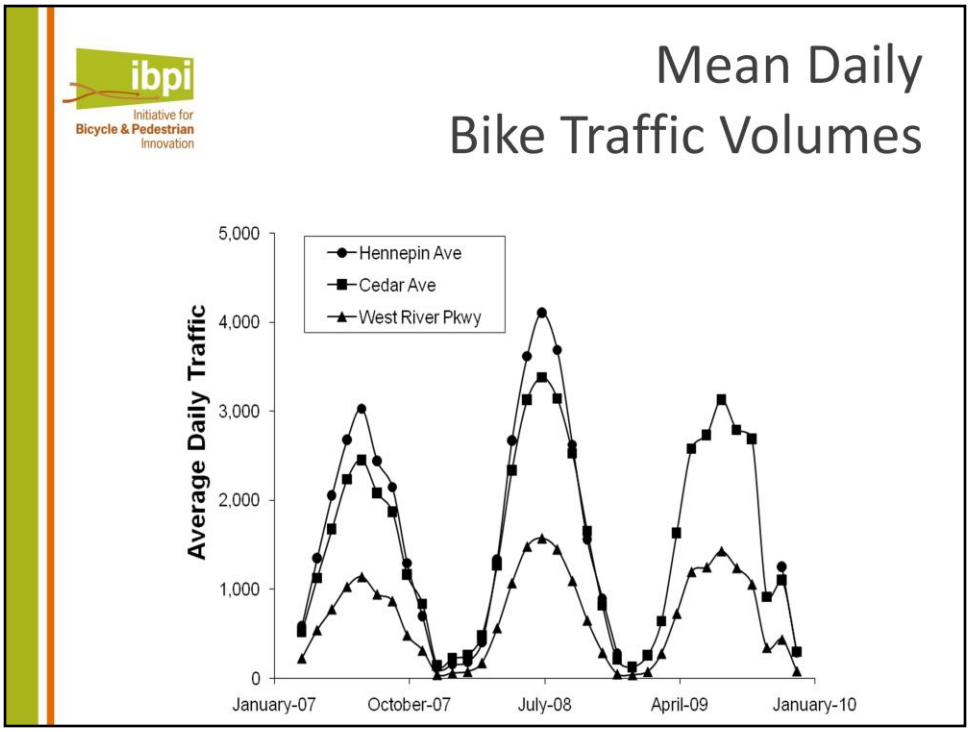




Here is output from different count methods that investigate patterns in trail use over time.



Here is that information on trail use over the months



Data from Midtown Greenway in Minneapolis MN

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Methods

Surveys

- Calculate mode share
- Can predict behavior
- Can provide meaningful input on preferences
- Can measure knowledge, attitudes, behaviors

Surveys can be used to determine mode shares, predict participant behavior, gauge people's opinions and preferences for facility types, and analyze the performance of a facility. There are different approaches to using surveys we will cover next, each with its own sets of drawbacks and benefits.

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Methods

Mail Surveys

- Allows follow up
- Expensive, not representative

Encuesta sobre ir caminando o andando en bicicleta a la escuela
- Para Padres -

Estimado Padre o Proveedor,

La escuela donde su hijo/hija asiste desea saber sus pensamientos sobre niños caminando y andando en bicicleta a la escuela. Esta encuesta tomará entre 5 y 10 minutos para completer. Le pedimos a las familias que completen sólo una encuesta por escuela a la que asisten sus niños. Si recibe más de un formulario de la misma escuela, por favor complete solo una encuesta, la del niño que cumpla años en la fecha más próxima al día de hoy.

Después de completar esta encuesta, devuélvala a la escuela a través de su hijo o entréguesela a la maestra. Sus respuestas se mantendrán confidencial y no se asociará su nombre ni el de su hijo a ningún resultado. **¡Gracias por participar en esta encuesta!**

Nombre de la Escuela:

¿Cómo llenar este formulario? Escriba en letras MAYÚSCULAS. Marque las cajas con "X" en vez de "√."

1. **¿En qué grado esta el niño que trajo esta encuesta al hogar? (K – 8vo)** ☐ grado
2. **¿El niño que trajo a casa la encuesta es varón o niña?** ☐ Varon ☐ Niña
3. **¿Cuántos niños tiene usted entre Kindergarten y el 8vo grado?** ☐ niños
4. **¿Cuál es la intersección más cerca de su casa?** *(el cruce de las dos calles)*
5. **¿A qué distancia vive su niño de la escuela?** *(elija uno y marque la caja con X)*

☐ a. menos de 1/4 milla	☐ c. media milla hasta 1 milla	☐ e. Más de 2 millas
☐ b. milla de 1/4 milla el hasta 1/2	☐ d. 1 milla hasta 2 millas	☐ f. No lo sé

6. **La mayoría de los días, ¿cómo va su niño a la escuela y cómo regresa a la casa después de la escuela?** *(una respuesta por columna con una "X" en la caja)*

	Llega a la escuela	Llega a casa
a. Caminando	☐	☐
b. Bicicleta	☐	☐
c. Autobús escolar	☐	☐
d. Vehículo de la familia (solo con niños de la familia)	☐	☐
e. Compartiendo el viaje en auto con niños de otras familias	☐	☐
f. Tránsito (autobús de la ciudad, subterráneo, etc.)	☐	☐
h. Otro (patineta, monopatín, patines, etc.)	☐	☐

7. **¿Cuánto tiempo le toma a su niño para ir y regresar de la escuela?** *(una respuesta por columna con una "X" en la caja)*

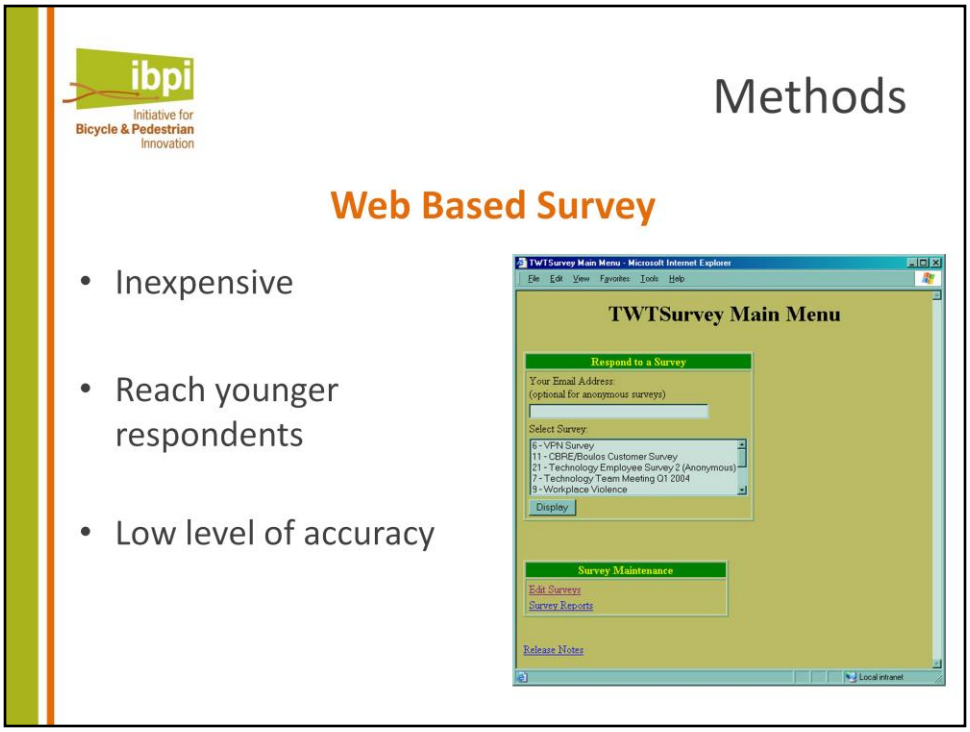
	Tiempo del recorrido a la escuela	Tiempo del recorrido para llegar a casa
a. Menos de 5 minutos	☐	☐
b. 5 a 10 minutos	☐	☐
c. 11 a 20 minutos	☐	☐
d. Más de 20 minutos	☐	☐
e. No lo sé / No estoy seguro/a	☐	☐

Página 1 de 2

There are numerous types of surveys that can get at the information you are hoping to gather. Choosing which method depends upon the relevant benefits and draw backs of each, and the context of the project.

Mail Surveys
Pros:
- Control
- Allows follow up

Cons
- Expensive
- Less accurate
- Not representative of the population (self selection of respondents)



There are numerous types of surveys that can get at the information you are hoping to gather. Choosing which method depends upon the relevant benefits and draw backs of each, and the context of the project.

Web surveys

Pros:

- Inexpensive
- low barrier to entry
- young people (more likely to be online)

Cons:

- lowest level of accuracy
- cannot target invitations
- excludes those who are not online

Phone surveys

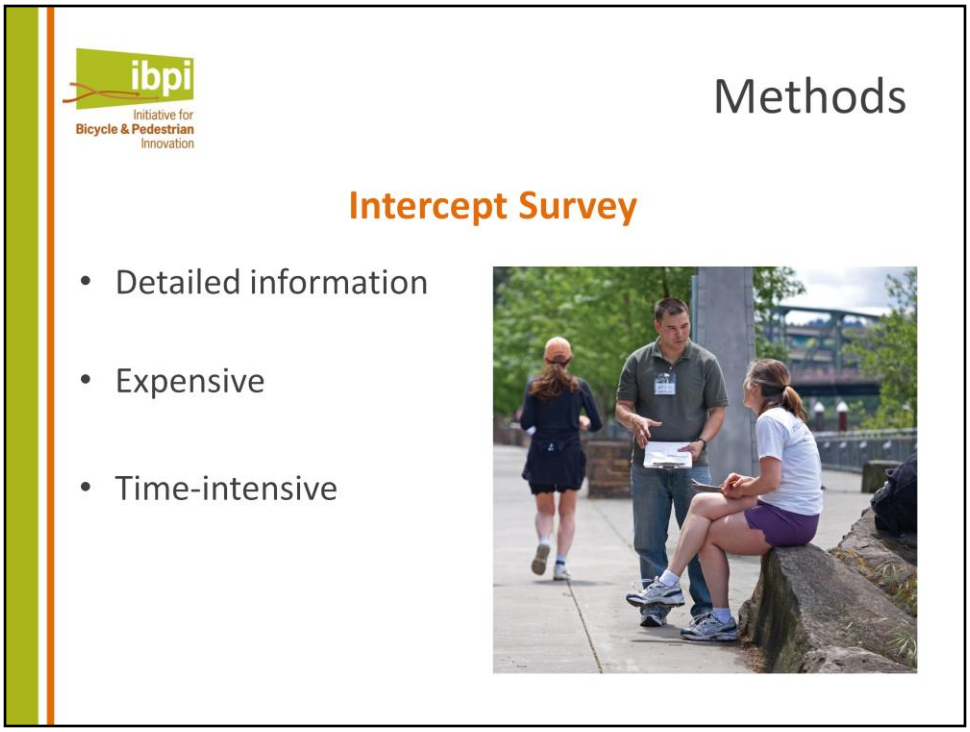
Pros:

Accurate

Cons:

Very, very expensive

cell phones (many people do not have land lines, randomized numbers only use land lines)



Intercept surveys
Pros
Detailed information
Ability to clarify content

Cons
Expensive
Only obtain information from users/participants
Don't get info from those who do not/will not use facility (one-sided)

Methods

Participant Surveys

- Measures knowledge, attitudes, and behavior change
- Can't measure impact on total population

Encuesta sobre ir caminando o andando en bicicleta a la escuela
- Para Padres -

Estimado Padre o Proveedor,

La escuela donde su hijo/hija asiste desea saber sus pensamientos sobre niños caminando y andando en bicicleta a la escuela. Esta encuesta tomará entre 5 y 10 minutos para completar. Le pedimos a las familias que completen sólo una encuesta por escuela a la que asisten sus niños. Si recibe más de un formulario de la misma escuela, por favor complete solo una encuesta, la del niño que cumpla años en la fecha más próxima al día de hoy.

Después de completar esta encuesta, devuélvala a la escuela a través de su hijo o entréguesela a la maestra. Sus respuestas se mantendrán confidencial y no se asociará su nombre ni el de su hijo a ningun resultado. **¡Gracias por participar en esta encuesta!**

Nombre de la Escuela:

¿Cómo llenar este formulario?: Escriba en letras MAYÚSCULAS. Marque las cajas con "X" en vez de "✓".

1. ¿En qué grado está el niño que trajo esta encuesta al hogar? (K – 8vo) ☐ grado
2. ¿El niño que trajo a casa la encuesta es varón o niña? ☐ Varon ☐ Niña
3. ¿Cuántos niños tiene usted entre Kindergarten y el 8vo grado? ☐ niños
4. ¿Cuál es la intersección más cerca de su casa? (el cruce de las dos calles)
   _____ Y _____
5. ¿A qué distancia vive su niño de la escuela? (elija uno y marque la caja con X)
   ☐ a. menos de 1/4 milla ☐ c. media milla hasta 1 milla ☐ e. Más de 2 millas
   ☐ b. milla de 1/4 milla al hasta 1/2 ☐ d. 1 milla hasta 2 millas ☐ f. No lo sé
6. La mayoría de los días, ¿cómo va su niño a la escuela y cómo regresa a la casa después de la escuela? (una respuesta por columna con una "X" en la caja)

	Llega a la escuela	Llega a casa
a. Caminando	☐	☐
b. Bicicleta	☐	☐
c. Autobús escolar	☐	☐
d. Solo con la familia (solo con niños de la familia)	☐	☐
e. Compartiendo el viaje en auto con niños de otras familias	☐	☐
f. Tránsito (autobús de la ciudad, subterráneo, etc.)	☐	☐
h. Otro (patineta, monopatín, patines, etc.)	☐	☐

7. ¿Cuánto tiempo le toma a su niño para ir y regresar de la escuela? (una respuesta por columna con una "X" en la caja)

	Tiempo del recorrido a la escuela	Tiempo del recorrido para llegar a casa
a. Menos de 5 minutos	☐	☐
b. 5 a 10 minutos	☐	☐
c. 11 a 20 minutos	☐	☐
d. Más de 20 minutos	☐	☐
e. No lo sé / No estoy segura/o	☐	☐

Página 1 de 2

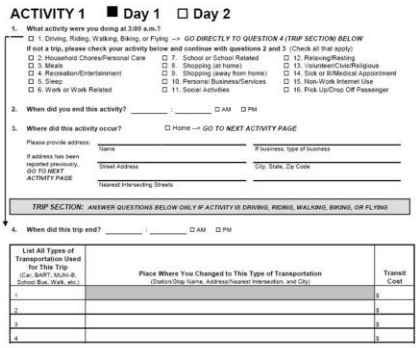
Participant Surveys
Only measures knowledge, attitudes and/or behavior change among participants
Pros:
Inexpensive to administer
Cons:
Cannot measure impact on total population
usually don't know demographic characteristics of participants

Interviews can provide in-depth information on a topic from the perspective of different community members. Depending on how interviews are structured and who is contacted to give interviews, they may or may not provide representative information. These interviews can be time consuming but are relatively inexpensive to administer.

Methods

Travel Diary

- Participants maintain diary of trips
- Detailed information on modes and purposes
- Expensive, time consuming



ACTIVITY 1 ■ Day 1 ☐ Day 2

1. What activity were you doing at 3:00 a.m.?
   ☐ 1. Driving, Riding, Walking, Biking, or Flying --> *GO DIRECTLY TO QUESTION 4 (TRIP SECTION) BELOW*
   If not a trip, please check your activity below and continue with questions 2 and 3 (Check all that apply)
   ☐ 2. Household Chores/Personal Care ☐ 7. School or School Related ☐ 12. Relaxing/Resting
   ☐ 3. Meals ☐ 8. Shopping (at home) ☐ 13. Volunteer/Civic/Religious
   ☐ 4. Recreation/Entertainment ☐ 9. Shopping (away from home) ☐ 14. Sick or Ill/Medical Appointment
   ☐ 5. Sleep ☐ 10. Personal Business/Services ☐ 15. Non-Work Internet Use
   ☐ 6. Work or Work Related ☐ 11. Social Activities ☐ 16. Pick Up/Drop Off Passenger
2. When did you end this activity? _____ : _____ ☐ AM ☐ PM
3. Where did this activity occur? ☐ Home --> *GO TO NEXT ACTIVITY PAGE*
   Please provide address: Name / If business, type of business
   If address has been reported previously, *GO TO NEXT ACTIVITY PAGE*: Street Address / City, State, Zip Code
   Nearest Intersecting Streets

TRIP SECTION: ANSWER QUESTIONS BELOW ONLY IF ACTIVITY IS DRIVING, RIDING, WALKING, BIKING, OR FLYING

4. When did this trip end? _____ : _____ ☐ AM ☐ PM

List All Types of Transportation Used for This Trip (Car, BART, MUNI-B, School Bus, Walk, etc.)	Place Where You Changed to This Type of Transportation (Station/Stop Name, Address/Nearest Intersection, and City)	Transit Cost
1		$
2		$
3		$
4		$

Participants maintain a diary of trips, mode, purpose etc over a given period of time. This gives the researcher detailed information on both the mode choice and purpose of the trip. This is a time consuming method for both researchers and participants.

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Methods

GPS

- Global Positioning System unit tracks routes
- Self selection bias
- Detailed information
- Best when coupled with travel diaries

Using GPS is a relatively new method to gather information on routes. The participants will carry a GPS device over a certain length of time to track the routes they choose. This tracking gives great, detailed information on route choice and preferences for types of facilities. They are often coupled with travel diaries to get more information about purpose of the trip.

There is some self-selection bias for who is willing to participate.

For more info see: [Dill, J. (2009). Bicycling for Transportation and Health: The Role of Infrastructure. *Journal of Public Health Policy*, *30*, S95–S110. doi:10.1057/jphp.2008.56]

It is important to evaluate facilities in order to see what is working within the community and how the facilities are being used. This can provide valuable information about which facilities should be implemented in the future.

Evaluations can measure the use of and behaviors of various users at facilities. Generally, the evaluations look at crossings, intersections, new facility types e.g. bike boxes, cycle tracks etc. They work best if evaluations are done pre and post facility construction and with controls. Evaluations can measure economic and other benefits

Facilities Evaluations

Methods:

1. Video pre and post
2. Survey users
3. Manual counts, analysis, and observations

In order to do evaluation, there are certain methods that tend to work well. We will look at each of these in a little more detail.

Methods for Facilities evaluation

Collect video in the pre- and post-periods
Collecting video of how users use the space pre and post construction can be informative.

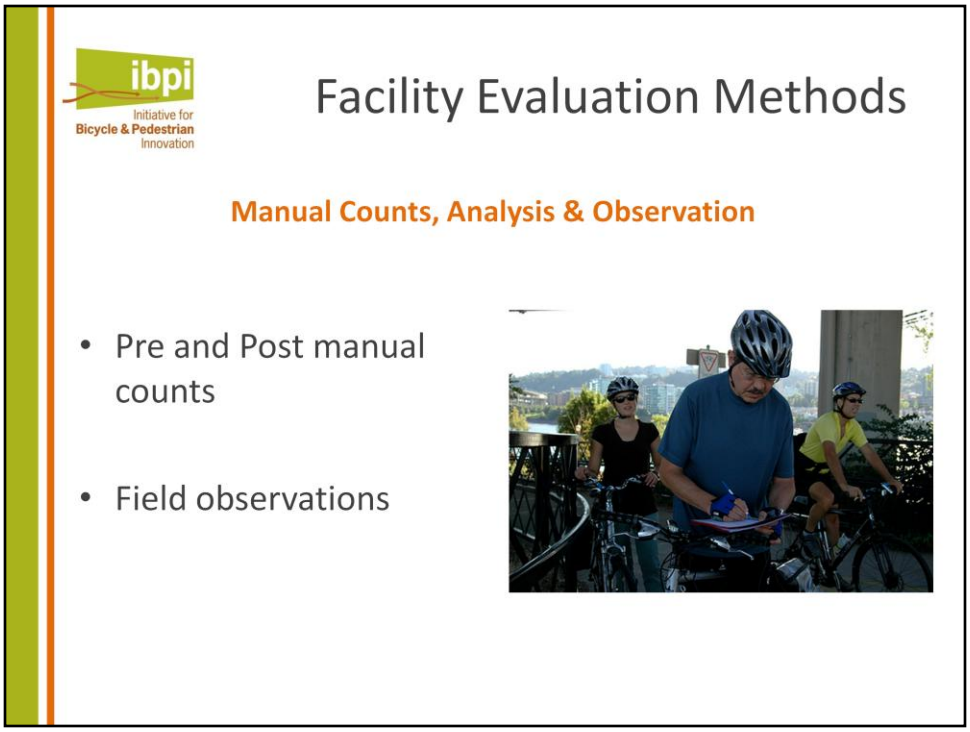
Facility Evaluation Methods

Survey Users

Intercept surveys

- Motorists
  - Mail or web based (with post card)
- Cyclists
  - Intercept, mail, web based
- Pedestrians
  - Intercept, mail, web based
- Adjacent businesses
  - In person, mail, web based

To survey users of a facility it is best to do an intercept survey. It can either be a survey they complete at the location, or they are given the survey to take later and mail back (or complete online). This will get information on how users of the facility, and those impacted by its presence, feel about the change.



Manual counts can assist facility evaluation. Counts will allow analysis for changes over time in the number of users or how people are using the facility.

Observations in the field will assist with the evaluation and analysis of the facility. This will depend on what needs to be analyzed or the goal of the facility.

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Discussion

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Data Collection and Research

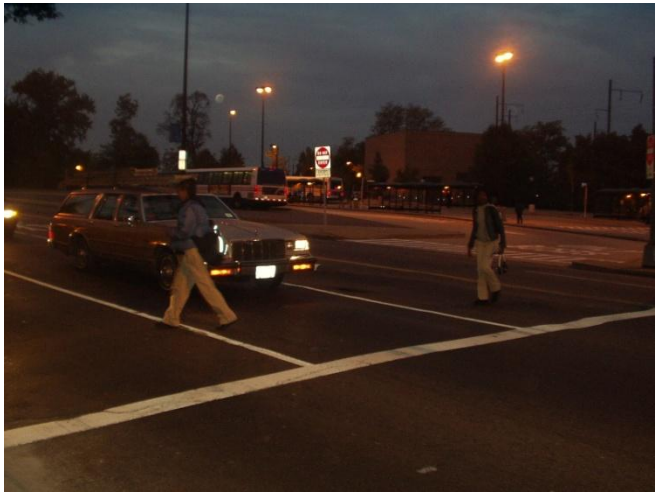
Overview

- Why Research is Necessary
- Conducting and Using Research
- Methods and Typical uses
  - Counts
  - Surveys
  - Interviews
  - Travel Diaries
  - GPS
- Facilities Evaluations

Why Research is Necessary

Answers Questions on Pedestrians & Cyclists

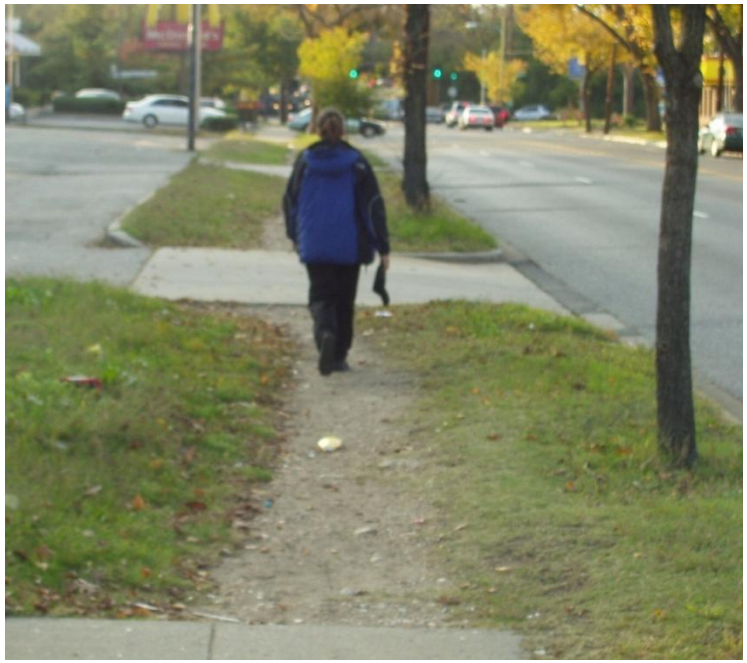
- What types of people walk or bicycle?
- When and where do they walk or ride?
- What types of facilities do they prefer?



Why Research is Necessary

Information on facilities

- Where are facilities located (or missing)?
- How many people use them?
- Examine safety & performance
- Demonstrate viability of new facility types
- Document return on investment



Why Research is Necessary

Input for Design & Plans

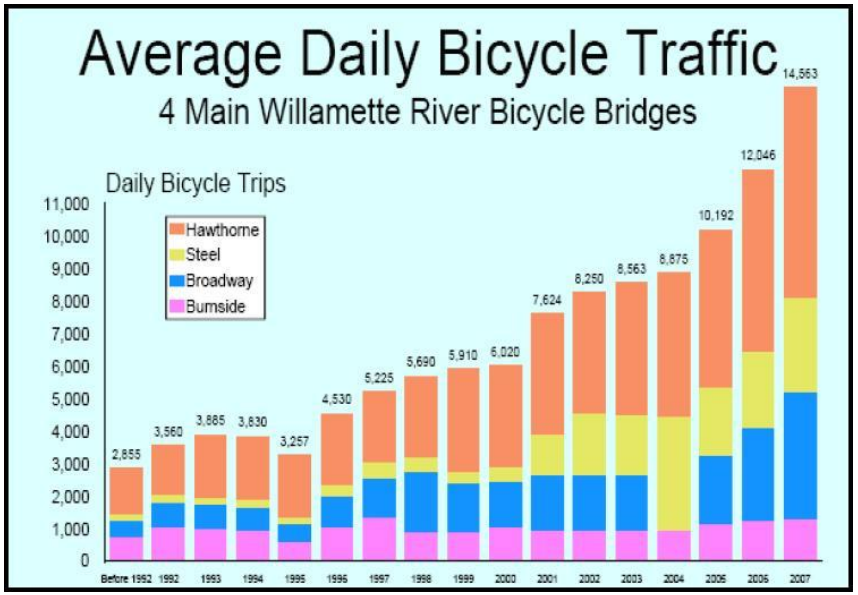
- Provide input to facilities design and plans
- Inform improvements and design
- Preference for facility types

Why Research is Necessary

Benchmarks to Measure Progress

Evaluate Success:

- Who participates?
- Changes in behavior?
- What is working?
- What is not?



Conducting and Using Research

Conducting Research:

- Practitioners at all levels
- University researchers
- Advocates
- Citizens

Used for:

- Educate policy makers
- Inform advocates & citizens
- Inform best practices

Existing Data Sources

- NHTSA Traffic Safety Facts
- Fatal Accident Reporting System (FARS)
- Highway Safety Information System (HSIS)
- State Police Crash Databases
- Hospital Emergency Room Records
- US Census
- American Community Survey
- Regional household travel surveys
- Local counts

Safety and Crash Data Issues

Only **56% of pedestrians** and **48% bicyclists** linked to reported motor vehicle cases

Most Shared-Use Path incidents go unreported

- Only **3 of 48** incidents were reported
- **Bicyclists had 3x** more incidents than pedestrians

Methods and Typical uses

1. Counts
2. Surveys
3. Interviews
4. Travel Diaries
5. GPS

Considerations in Field Observations

- Need to determine length of segment
- Need to choose locations, number of segment
- Very difficult to collect all information of interest from research perspective
- Traffic volumes can be very high, distractions common
- Errors in counting are common

Methods

Counts

Uses:

- Achieving goals?
- Baseline for future
- Telling a story

Methods

Manual Counts

- Time intensive
- Human error
- User information

Methods

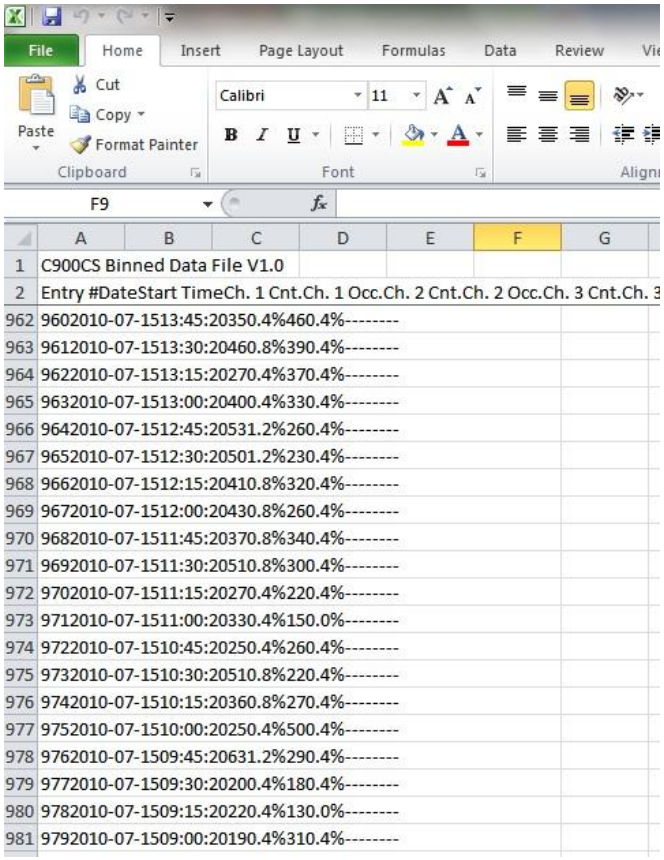
Pneumatic Tubes

- Can be semi- permanent or mobile
- Can be bicycle-specific
- Can detect riders side by side
- Does not count pedestrians

Methods

Electronic Counts: Magnetic Loop

- Placed in field
- No information about users
- Cyclists riding in wrong lane can confound directionality results



	A	B	C	D	E	F	G
1	C900CS Binned Data File V1.0						
2	Entry #DateStart TimeCh. 1 Cnt.Ch. 1 Occ.Ch. 2 Cnt.Ch. 2 Occ.Ch. 3 Cnt.Ch. 3						
962	9602010-07-1513:45:20350.4%460.4%--------						
963	9612010-07-1513:30:20460.8%390.4%--------						
964	9622010-07-1513:15:20270.4%370.4%--------						
965	9632010-07-1513:00:20400.4%330.4%--------						
966	9642010-07-1512:45:20531.2%260.4%--------						
967	9652010-07-1512:30:20501.2%230.4%--------						
968	9662010-07-1512:15:20410.8%320.4%--------						
969	9672010-07-1512:00:20430.8%260.4%--------						
970	9682010-07-1511:45:20370.8%340.4%--------						
971	9692010-07-1511:30:20510.8%300.4%--------						
972	9702010-07-1511:15:20270.4%220.4%--------						
973	9712010-07-1511:00:20330.4%150.0%--------						
974	9722010-07-1510:45:20250.4%260.4%--------						
975	9732010-07-1510:30:20510.8%220.4%--------						
976	9742010-07-1510:15:20360.8%270.4%--------						
977	9752010-07-1510:00:20250.4%500.4%--------						
978	9762010-07-1509:45:20631.2%290.4%--------						
979	9772010-07-1509:30:20200.4%180.4%--------						
980	9782010-07-1509:15:20220.4%130.0%--------						
981	9792010-07-1509:00:20190.4%310.4%--------						

Methods

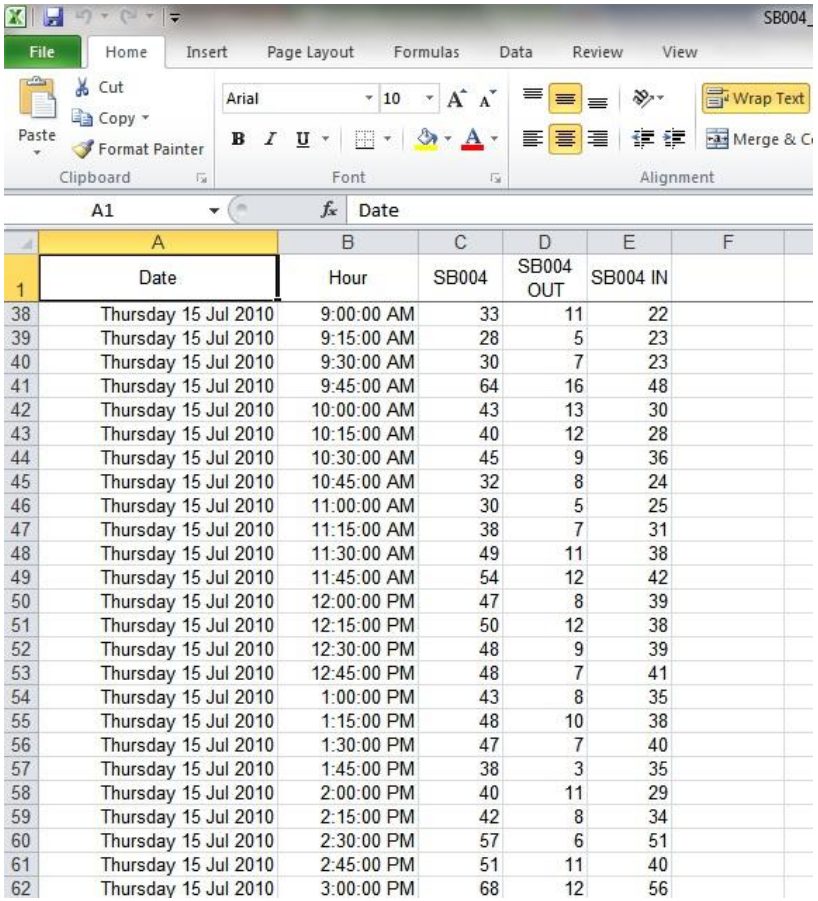
Electronic Counts: Infrared

- Detects each trail user as infrared beam is broken
- Data reported as a stream of dates and time

Methods

Electronic Counts: Passive Infrared

- Detects trail users' infrared heat signatures
- Differentiates direction
- Imports information in 15-min increments



SB004_

File | Home | Insert | Page Layout | Formulas | Data | Review | View

Cut | Copy | Format Painter | Paste | Clipboard | Arial | 10 | Font | Wrap Text | Merge & C | Alignment

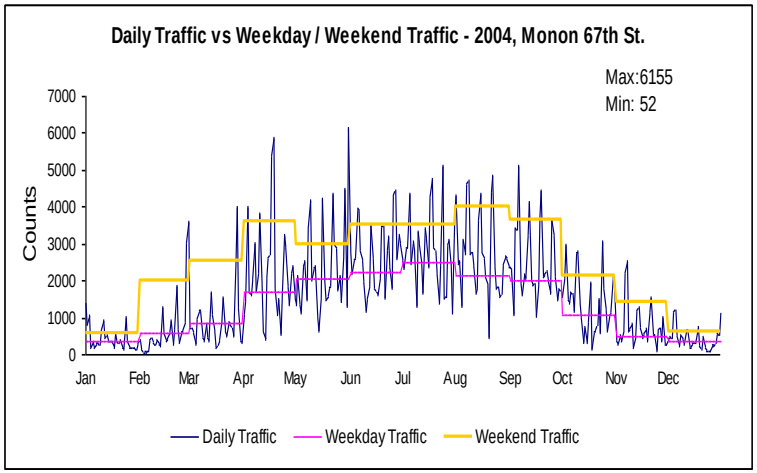
A1 | Date

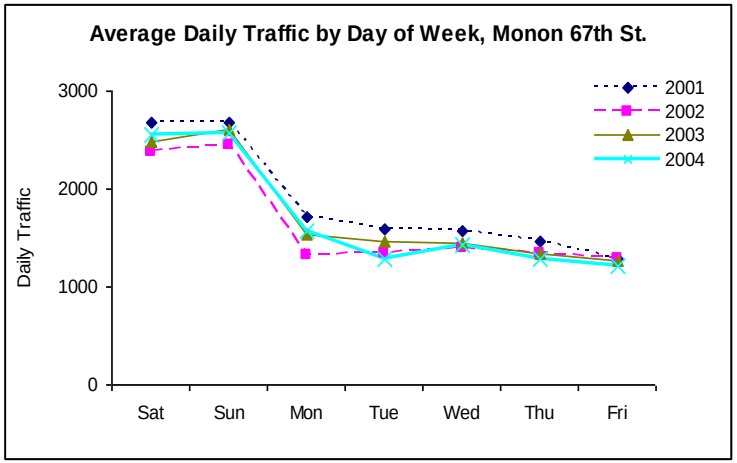
	A	B	C	D	E	F
1	Date	Hour	SB004	SB004 OUT	SB004 IN	
38	Thursday 15 Jul 2010	9:00:00 AM	33	11	22	
39	Thursday 15 Jul 2010	9:15:00 AM	28	5	23	
40	Thursday 15 Jul 2010	9:30:00 AM	30	7	23	
41	Thursday 15 Jul 2010	9:45:00 AM	64	16	48	
42	Thursday 15 Jul 2010	10:00:00 AM	43	13	30	
43	Thursday 15 Jul 2010	10:15:00 AM	40	12	28	
44	Thursday 15 Jul 2010	10:30:00 AM	45	9	36	
45	Thursday 15 Jul 2010	10:45:00 AM	32	8	24	
46	Thursday 15 Jul 2010	11:00:00 AM	30	5	25	
47	Thursday 15 Jul 2010	11:15:00 AM	38	7	31	
48	Thursday 15 Jul 2010	11:30:00 AM	49	11	38	
49	Thursday 15 Jul 2010	11:45:00 AM	54	12	42	
50	Thursday 15 Jul 2010	12:00:00 PM	47	8	39	
51	Thursday 15 Jul 2010	12:15:00 PM	50	12	38	
52	Thursday 15 Jul 2010	12:30:00 PM	48	9	39	
53	Thursday 15 Jul 2010	12:45:00 PM	48	7	41	
54	Thursday 15 Jul 2010	1:00:00 PM	43	8	35	
55	Thursday 15 Jul 2010	1:15:00 PM	48	10	38	
56	Thursday 15 Jul 2010	1:30:00 PM	47	7	40	
57	Thursday 15 Jul 2010	1:45:00 PM	38	3	35	
58	Thursday 15 Jul 2010	2:00:00 PM	40	11	29	
59	Thursday 15 Jul 2010	2:15:00 PM	42	8	34	
60	Thursday 15 Jul 2010	2:30:00 PM	57	6	51	
61	Thursday 15 Jul 2010	2:45:00 PM	51	11	40	
62	Thursday 15 Jul 2010	3:00:00 PM	68	12	56	

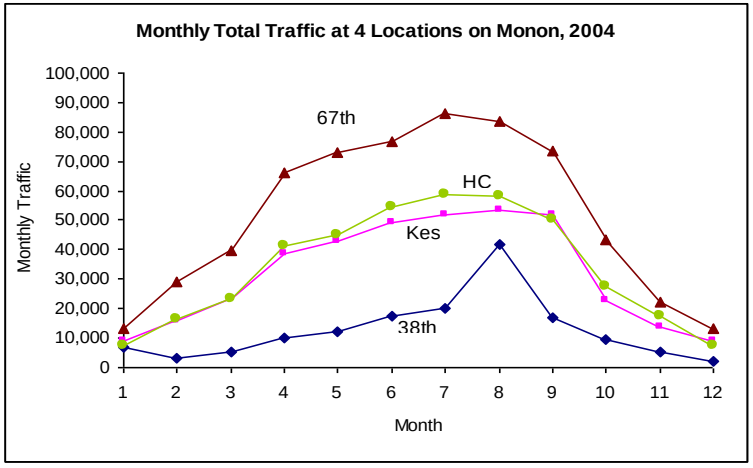
Minneapolis Example: Methods of Counting

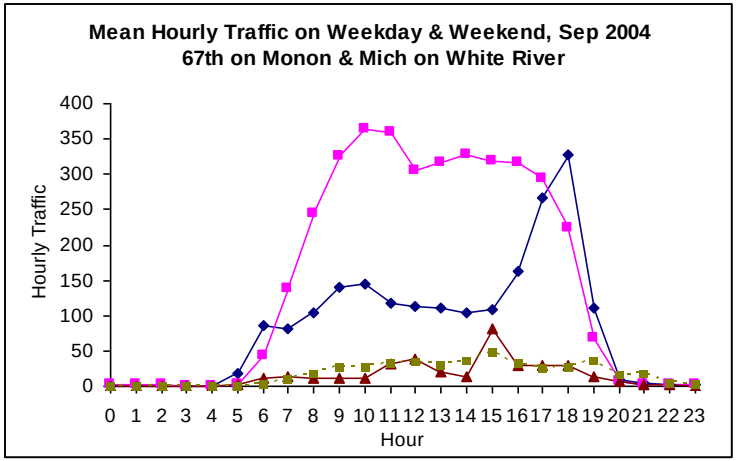
Method of observation	Manual	Magnetic Loop Detector	Active Infrared Counters (beam/sensors)
Traffic observed	Cyclists (bi-directional) Peds (bi-directional)	Cyclists only (bi-directional, potentially)	Cyclists & Peds combined (no directional)
Output	Choice of time units	15 minute blocks	Time of event
Locations for deployment	On and off-street facilities & no facilities	Off-street facilities	Depends on counter type and facility characteristics
Length of observations	Based on staff availability (often two-hour blocks)	Continuous: 24 hours	Continuous: 24 hours
Sources of error	Distractions	Misses riders on edge of trail.	Misses users passing simultaneously
Data recorded	5 – 60 minute time intervals	15 minute counts	Time of “event”; can be aggregated to any time period
Other considerations	Can record groups, some user characteristics	Can’t measure user characteristics	Can’t measure user characteristics

Temporal Patterns in Trail Traffic

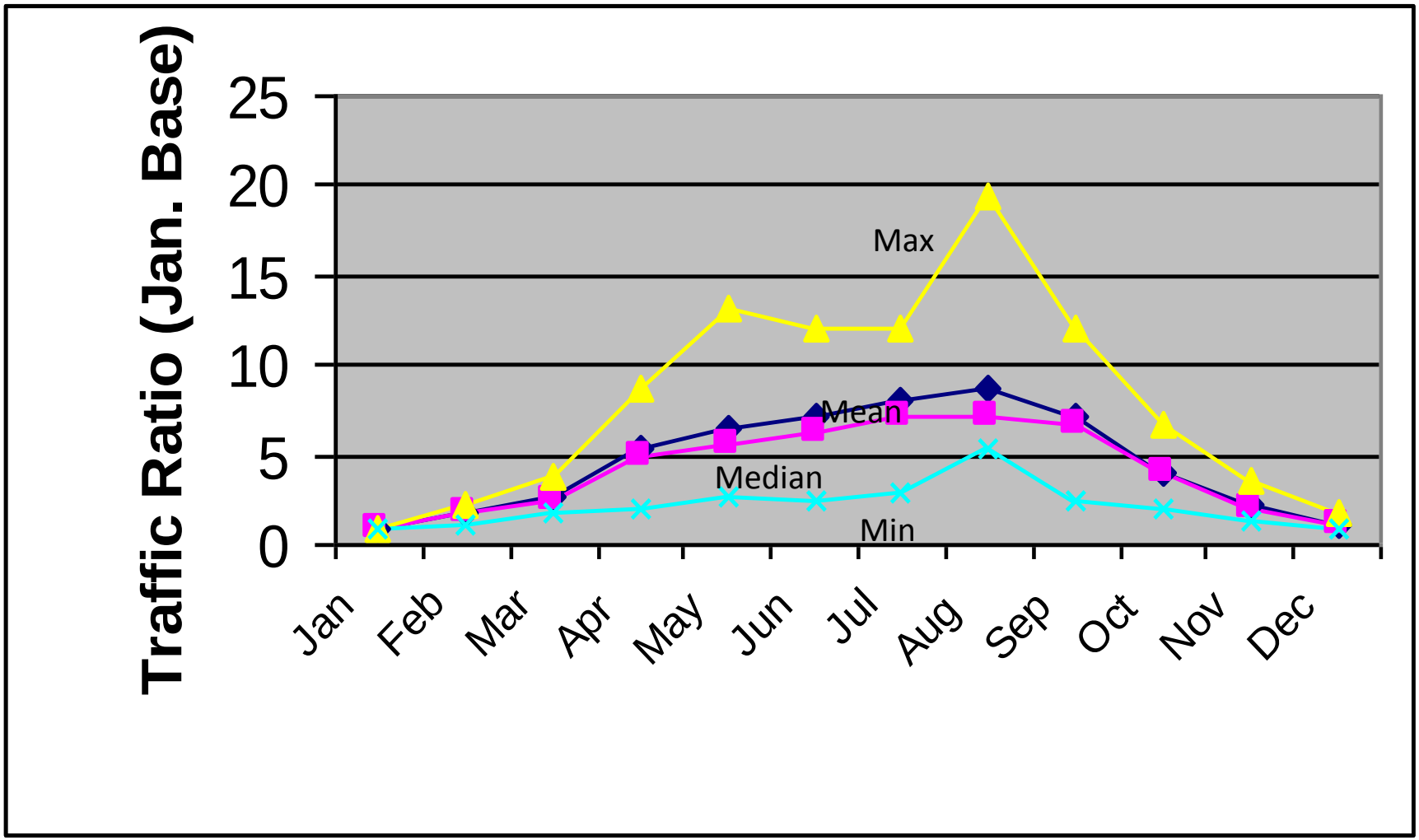




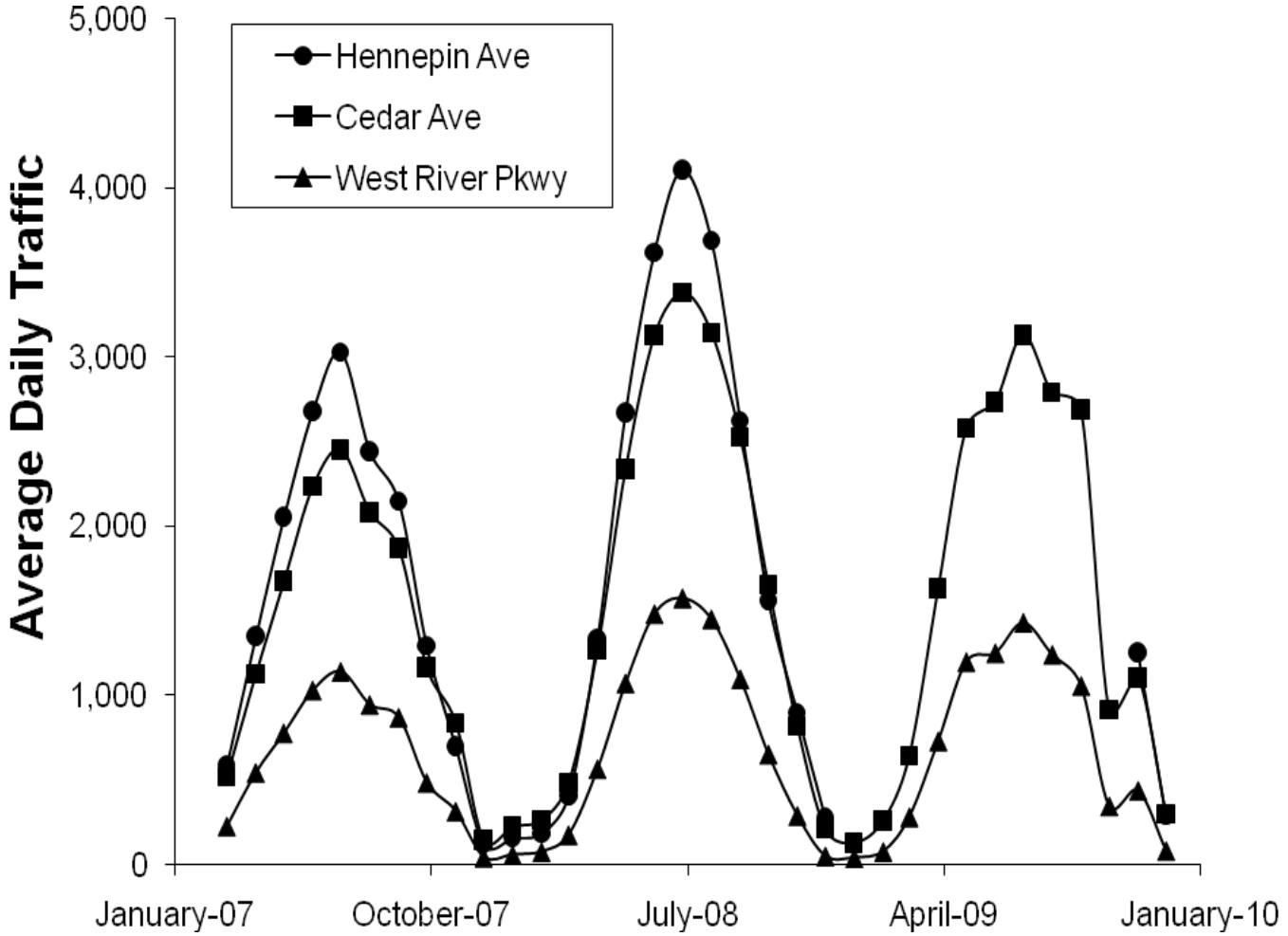




Monthly Traffic Ratios



Mean Daily Bike Traffic Volumes



Methods

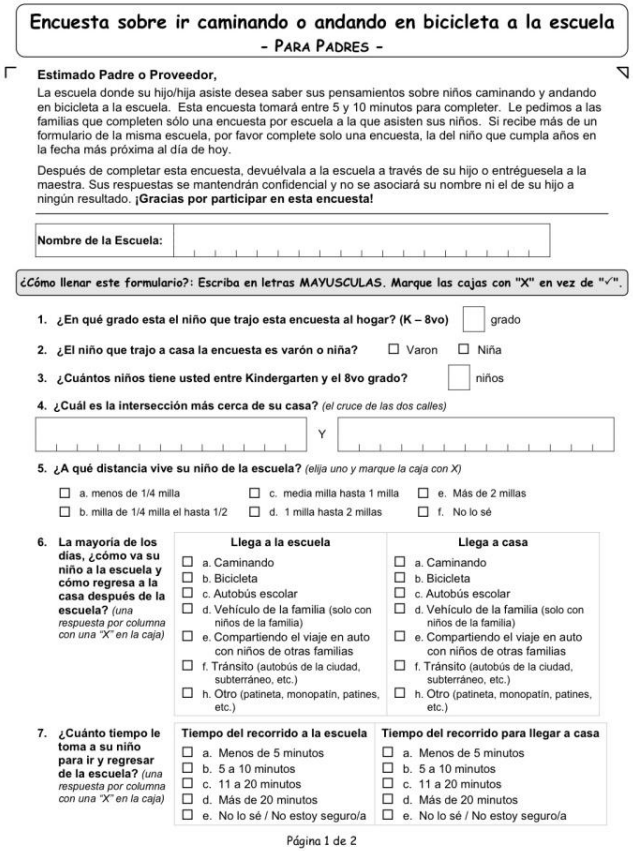
Surveys

- Calculate mode share
- Can predict behavior
- Can provide meaningful input on preferences
- Can measure knowledge, attitudes, behaviors

Methods

Mail Surveys

- Allows follow up
- Expensive, not representative



Encuesta sobre ir caminando o andando en bicicleta a la escuela
- Para Padres -

Estimado Padre o Proveedor,

La escuela donde su hijo/hija asiste desea saber sus pensamientos sobre niños caminando y andando en bicicleta a la escuela. Esta encuesta tomará entre 5 y 10 minutos para completer. Le pedimos a las familias que completen sólo una encuesta por escuela a la que asisten sus niños. Si recibe más de un formulario de la misma escuela, por favor complete solo una encuesta, la del niño que cumpla años en la fecha más próxima al día de hoy.

Después de completar esta encuesta, devuélvala a la escuela a través de su hijo o entréguesela a la maestra. Sus respuestas se mantendrán confidencial y no se asociará su nombre ni el de su hijo a ningún resultado. **¡Gracias por participar en esta encuesta!**

Nombre de la Escuela:

¿Cómo llenar este formulario?: Escriba en letras MAYUSCULAS. Marque las cajas con "X" en vez de "✓".

1. **¿En qué grado esta el niño que trajo esta encuesta al hogar? (K – 8vo)** ☐ grado
2. **¿El niño que trajo a casa la encuesta es varón o niña?** ☐ Varon ☐ Niña
3. **¿Cuántos niños tiene usted entre Kindergarten y el 8vo grado?** ☐ niños
4. **¿Cuál es la intersección más cerca de su casa?** *(el cruce de las dos calles)*

   ☐ Y ☐
5. **¿A qué distancia vive su niño de la escuela?** *(elija uno y marque la caja con X)*

   ☐ a. menos de 1/4 milla ☐ b. milla de 1/4 milla el hasta 1/2 ☐ c. media milla hasta 1 milla ☐ d. 1 milla hasta 2 millas ☐ e. Más de 2 millas ☐ f. No lo sé
6. **La mayoría de los días, ¿cómo va su niño a la escuela y cómo regresa a la casa después de la escuela?** *(una respuesta por columna con una "X" en la caja)*

	Llega a la escuela	Llega a casa
☐ a.	Caminando	Caminando
☐ b.	Bicicleta	Bicicleta
☐ c.	Autobús escolar	Autobús escolar
☐ d.	Vehículo de la familia (solo con niños de la familia)	Vehículo de la familia (solo con niños de la familia)
☐ e.	Compartiendo el viaje en auto con niños de otras familias	Compartiendo el viaje en auto con niños de otras familias
☐ f.	Tránsito (autobús de la ciudad, subterráneo, etc.)	Tránsito (autobús de la ciudad, subterráneo, etc.)
☐ h.	Otro (patineta, monopatín, patines, etc.)	Otro (patineta, monopatín, patines, etc.)

7. **¿Cuánto tiempo le toma a su niño para ir y regresar de la escuela?** *(una respuesta por columna con una "X" en la caja)*

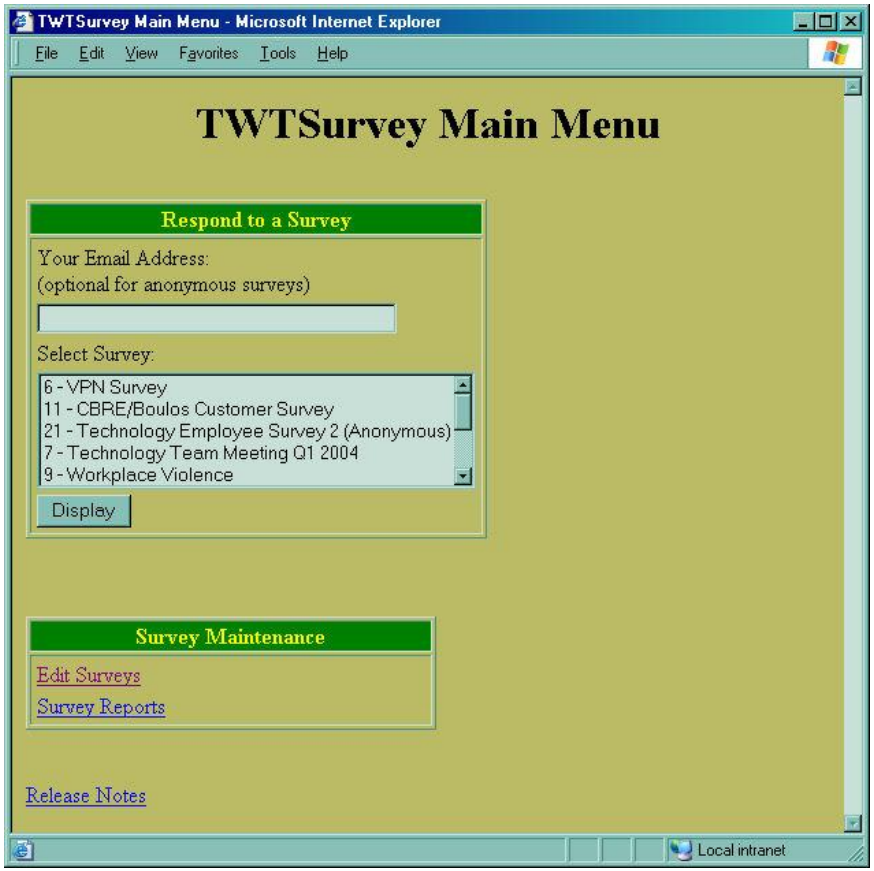
	Tiempo del recorrido a la escuela	Tiempo del recorrido para llegar a casa
☐ a.	Menos de 5 minutos	Menos de 5 minutos
☐ b.	5 a 10 minutos	5 a 10 minutos
☐ c.	11 a 20 minutos	11 a 20 minutos
☐ d.	Más de 20 minutos	Más de 20 minutos
☐ e.	No lo sé / No estoy seguro/a	No lo sé / No estoy seguro/a

Página 1 de 2

Methods

Web Based Survey

- Inexpensive
- Reach younger respondents
- Low level of accuracy



Methods

Phone Survey

- Accurate
- Very Expensive

Methods

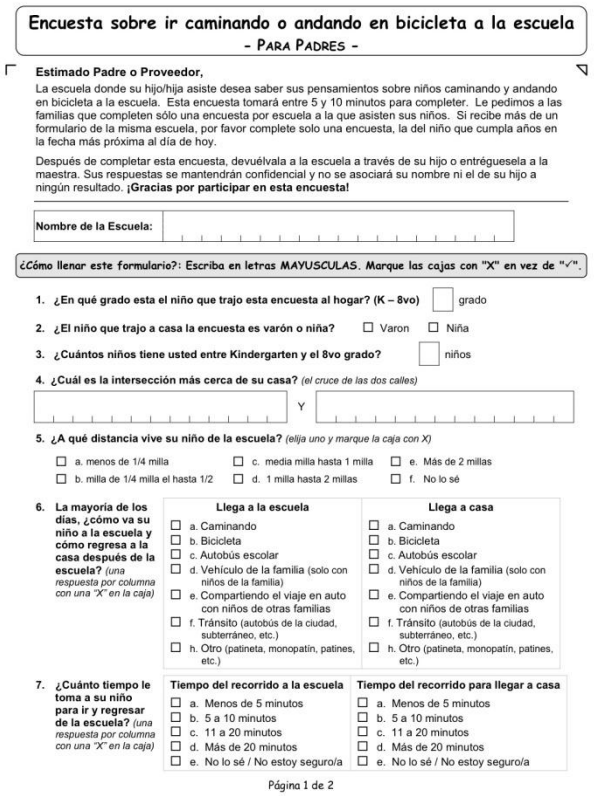
Intercept Survey

- Detailed information
- Expensive
- Time-intensive

Methods

Participant Surveys

- Measures knowledge, attitudes, and behavior change
- Can't measure impact on total population



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Después de completar esta encuesta, devuélvala a la escuela a través de su hijo o entréguesela a la maestra. Sus respuestas se mantendrán confidencial y no se asociará su nombre ni el de su hijo a ningún resultado. **¡Gracias por participar en esta encuesta!**

Nombre de la Escuela:

¿Cómo llenar este formulario?: Escriba en letras MAYUSCULAS. Marque las cajas con "X" en vez de "✓".

1. **¿En qué grado esta el niño que trajo esta encuesta al hogar? (K – 8vo)** ☐ grado
2. **¿El niño que trajo a casa la encuesta es varón o niña?** ☐ Varon ☐ Niña
3. **¿Cuántos niños tiene usted entre Kindergarten y el 8vo grado?** ☐ niños
4. **¿Cuál es la intersección más cerca de su casa?** *(el cruce de las dos calles)*
   ☐ Y ☐
5. **¿A qué distancia vive su niño de la escuela?** *(elija uno y marque la caja con X)*
   - ☐ a. menos de 1/4 milla
   - ☐ b. milla de 1/4 milla el hasta 1/2
   - ☐ c. media milla hasta 1 milla
   - ☐ d. 1 milla hasta 2 millas
   - ☐ e. Más de 2 millas
   - ☐ f. No lo sé
6. **La mayoría de los días, ¿cómo va su niño a la escuela y cómo regresa a la casa después de la escuela?** *(una respuesta por columna con una "X" en la caja)*

	Llega a la escuela	Llega a casa
☐ a.	Caminando	Caminando
☐ b.	Bicicleta	Bicicleta
☐ c.	Autobús escolar	Autobús escolar
☐ d.	Vehículo de la familia (solo con niños de la familia)	Vehículo de la familia (solo con niños de la familia)
☐ e.	Compartiendo el viaje en auto con niños de otras familias	Compartiendo el viaje en auto con niños de otras familias
☐ f.	Tránsito (autobús de la ciudad, subterráneo, etc.)	Tránsito (autobús de la ciudad, subterráneo, etc.)
☐ h.	Otro (patineta, monopatín, patines, etc.)	Otro (patineta, monopatín, patines, etc.)

7. **¿Cuánto tiempo le toma a su niño para ir y regresar de la escuela?** *(una respuesta por columna con una "X" en la caja)*

	Tiempo del recorrido a la escuela	Tiempo del recorrido para llegar a casa
☐ a.	Menos de 5 minutos	Menos de 5 minutos
☐ b.	5 a 10 minutos	5 a 10 minutos
☐ c.	11 a 20 minutos	11 a 20 minutos
☐ d.	Más de 20 minutos	Más de 20 minutos
☐ e.	No lo sé / No estoy seguro/a	No lo sé / No estoy seguro/a

Página 1 de 2

Methods

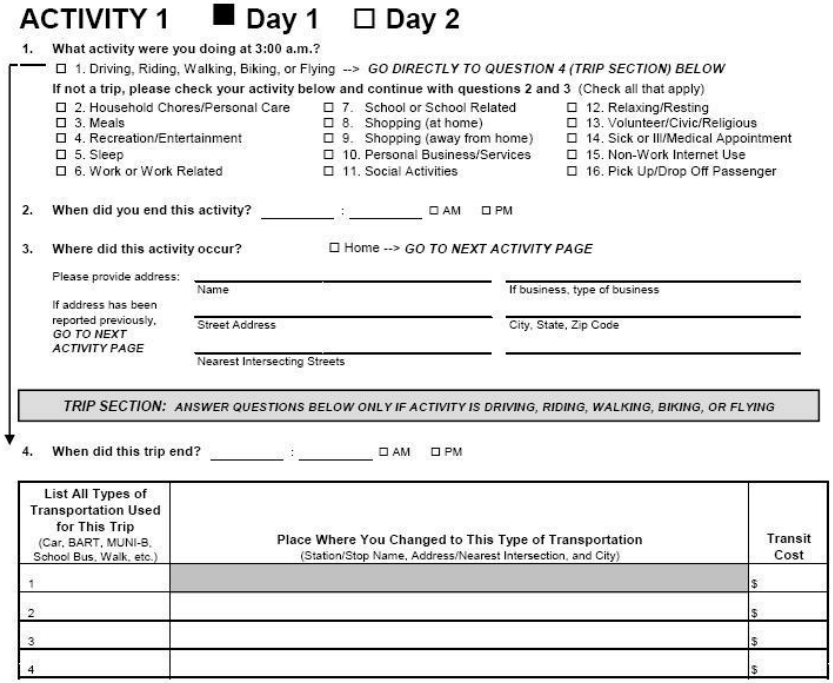
Interviews

- In-depth information
- May not be representative
- Qualitative information

Methods

Travel Diary

- Participants maintain diary of trips
- Detailed information on modes and purposes
- Expensive, time consuming



ACTIVITY 1 ■ Day 1 ☐ Day 2

1. **What activity were you doing at 3:00 a.m.?**
   ☐ 1. Driving, Riding, Walking, Biking, or Flying --> *GO DIRECTLY TO QUESTION 4 (TRIP SECTION) BELOW*
   If not a trip, please check your activity below and continue with questions 2 and 3 (Check all that apply)
   ☐ 2. Household Chores/Personal Care ☐ 7. School or School Related ☐ 12. Relaxing/Resting
   ☐ 3. Meals ☐ 8. Shopping (at home) ☐ 13. Volunteer/Civic/Religious
   ☐ 4. Recreation/Entertainment ☐ 9. Shopping (away from home) ☐ 14. Sick or Ill/Medical Appointment
   ☐ 5. Sleep ☐ 10. Personal Business/Services ☐ 15. Non-Work Internet Use
   ☐ 6. Work or Work Related ☐ 11. Social Activities ☐ 16. Pick Up/Drop Off Passenger
2. **When did you end this activity?** _____ : _____ ☐ AM ☐ PM
3. **Where did this activity occur?** ☐ Home --> *GO TO NEXT ACTIVITY PAGE*
   Please provide address: Name; If business, type of business
   If address has been reported previously, *GO TO NEXT ACTIVITY PAGE*: Street Address; City, State, Zip Code; Nearest Intersecting Streets

TRIP SECTION: *ANSWER QUESTIONS BELOW ONLY IF ACTIVITY IS DRIVING, RIDING, WALKING, BIKING, OR FLYING*

4. **When did this trip end?** _____ : _____ ☐ AM ☐ PM

List All Types of Transportation Used for This Trip (Car, BART, MUNI-B, School Bus, Walk, etc.)	Place Where You Changed to This Type of Transportation (Station/Stop Name, Address/Nearest Intersection, and City)	Transit Cost
1		$
2		$
3		$
4		$

Methods

GPS

- Global Positioning System unit tracks routes
- Self selection bias
- Detailed information
- Best when coupled with travel diaries

Facilities Evaluations

Purposes:

- Use and behavior of various users
- Crossings, intersections, new facility types
- Measure benefits

Facilities Evaluations

Methods:

1. Video pre and post
2. Survey users
3. Manual counts, analysis, and observations

Facility Evaluation Methods

Video

- Collect video of area pre and post facility
- Analyze user behavior

Facility Evaluation Methods

Survey Users

Intercept surveys

- Motorists
  - Mail or web based (with post card)
- Cyclists
  - Intercept, mail, web based
- Pedestrians
  - Intercept, mail, web based
- Adjacent businesses
  - In person, mail, web based

Facility Evaluation Methods

Manual Counts, Analysis & Observation

- Pre and Post manual counts
- Field observations

ibpi
Initiative for
Bicycle & Pedestrian
Innovation

Discussion

Data Collection & Research

Assignment 1: Pathway Counts

Assignment Description for *Instructor*:

This assignment is for students to gain familiarity with manual pedestrian counts along a pathway.

If you have not performed a similar pedestrian count, it is suggested you do a brief practice run to better be able to guide the students through this assignment. To use the form, instruct the students to follow the following instructions:

1. Fill in your name, the location where you are counting, the date and time. Because you will be recording 15 minutes-worth of information per form, clearly label the time period represented by each form. Weather information can be general. Note if it's cool, cold, warm, hot, sunny, raining, overcast…

   Note anything unusual you observe. For example, nearby construction that might impact path users or lots of conflicts between bikes and pedestrians on the paths.

2. Count each pedestrian, cyclist, wheelchair user, or other user passing through the path or intersection by making tick-marks in the tally boxes for mode and gender. Begin counts precisely at the beginning of the 15-minute period and end promptly at the end of the 15-minute period.

   After the end of each 15-minute period, begin a new form (remember: you set up all eight blank forms before the count!) and count the next 15-minute's pathway users

3. After counting for two hours, tally your counts. Record the number of cyclists, pedestrians, etc. by gender in the areas provided.

4. Write the total number of pathway users for each 15-minute period in the box in the lower right-hand corner of the table.

Remind the students to:

- Pick a point at their count location that users must pass before recording their information. Make tally marks on the sheet **only after** pathway users have passed this point (i.e. do not mark them in advance anticipating that they will continue forward).
- If working in teams, and especially on busy pathways, one person can record the directional information and another can record the gender and mode information on a separate form. Transfer the gender/mode information to the count form after the 2-hour count.
- Do not try to tally count information after each 15-minute period. Do it following the complete count.

Instructor Prep Work:

Select a local path and assign segments to students. This can be either an individual or group project. If you are unfamiliar with this form and/or procedure, do a trial run yourself to get up to speed. If possible, encourage the students to each do their observations at different days and/or times. This will be a good point for students to discuss in class after their observations and reports are complete.

Time Required for Students:

Out of class:

- 2 hours for pathway count
- Report write up

In-class discussion of findings

Assignment:

The final product will be the completed counts and a 2-3 page summary of observations from the experience.

Data Collection & Research

Assignment 1: Pathway Counts

Assignment Description for Students:

This assignment is to gain familiarity with manual pedestrian counts along a pathway. You will be assigned a pathway segment.

To use the form, follow the following instructions:

1. Fill in your name, the location where you are counting, the date and time. Because you will be recording 15 minutes-worth of information per form, clearly label the time period represented by each form. Weather information can be general. Note if it's cool, cold, warm, hot, sunny, raining, overcast…

   Note anything unusual you observe. For example, nearby construction that might impact path users or lots of conflicts between bikes and pedestrians on the paths.

2. Count each pedestrian, cyclist, wheelchair user, or other user passing through the path or intersection by making tick-marks in the tally boxes for mode and gender. Begin counts precisely at the beginning of the 15-minute period and end promptly at the end of the 15-minute period.

   After the end of each 15-minute period, begin a new form (remember: you set up all eight blank forms before the count!) and count the next 15-minute's pathway users

3. After counting for two hours, tally your counts. Record the number of cyclists, pedestrians, etc. by gender in the areas provided.

4. Write the total number of pathway users for each 15-minute period in the box in the lower right-hand corner of the table.

Things to consider

- Pick a point at your count location that users must pass before you'll record their information. Make tally marks on the sheet **only after** pathway users have passed this point (i.e. do not mark them in advance anticipating that they will continue forward).
- If working in teams, and especially on busy pathways, one person can record the directional information and another can record the gender and mode information on a separate form. Transfer the gender/mode information to the count form after the 2-hour count.
- Do not try to tally count information after each 15-minute period. Do it following the complete count.

Time Required:

Out of class:

- 2 hours for pathway count
- Report write up

In-class discussion of findings

Assignment:

The final product will be the completed counts and a 2-3 page summary of observations from your experience.

Pathway Count Form (use different form for each 15-minute period)

Name of Data Collector:_____

Location:_____

Date:_____ Time Period:_____ Weather:_____

Notes:_____

_____

Users		Northbound	Southbound	Totals
Bicyclists	Male			
	Female			
	Child			
Pedestrians	Male			
	Female			
	Child			
Other (scooter, rollerblade, wheelchair, etc.)	Male			
	Female			
	Child			

Totals			

Pathway Count Form (use different form for each 15-minute period)

Name of Data Collector:_____

Location:_____

Date:_____ Time Period:_____ Weather:_____

Notes:_____

_____

Users		Northbound	Southbound	Totals
Bicyclists	Male			
	Female			
	Child			
Pedestrians	Male			
	Female			
	Child			
Other (scooter, rollerblade, wheelchair, etc.)	Male			
	Female			
	Child			
Totals				

Data Collection & Research

Assignment 2: Intersection Counts

Counting protocol and form developed by Robert Schneider, UC Berkeley

Assignment Description for *Instructor*:

This assignment teaches the methodology that students will use to count pedestrians and bicyclists at intersections. Review the instructions and if necessary do a trial run to familiarize yourself with the procedures as well as any portions students may find challenging or confusing.

Instructor Prep Work:

Select intersections for students to observe—it would be best to choose different street segments than students used for the previous assignment. This may be an individual or group project. Review the instructions on the student assignment sheet. As with the previous assignment, encourage the students to each do their observations at different days and/or times. This will be a good point for students to discuss in class after their observations and reports are complete.

Time Required for Students:

Out of class:

- 2 hours for counts
- Analyze and summarize the data, write up the report

In-class discussion of findings

Assignment:

The final product will be the completed counts and a 2-3 page summary of observations and analysis from the experience.

Data Collection & Research

Assignment 2: Intersection Counts

Counting protocol and form developed by Robert Schneider, UC Berkeley

Assignment Description for Students:

This assignment describes the procedure that you will use to count pedestrians and bicyclists at intersections.

- Arrive at the count intersection at least 15 minutes before the count period is scheduled to find a location where you can see all of the intersection crossings and to fill in general information
- Record the name of the mainline roadway (roadway with more traffic) and intersecting roadway
- Label the intersection diagram with the names of each roadway
- Record your name as the observer
- Record the date and time period of the count
- Estimate the current temperature (°F) and weather (sunny, cloudy, rainy, etc.)
- Describe the intersection, including surrounding buildings (e.g., restaurants, single-family houses, offices, etc.), roadway characteristics (traffic signals, median islands, fast traffic, etc.)

Pedestrian Counting Procedure (See Side 1 of Data Collection Sheet):

- Tally each time a pedestrian crosses each leg of the intersection from either direction
- Pedestrians should be counted whenever they cross within the crosswalk or when they cross an intersection leg within 50 feet of the intersection
- Do NOT count pedestrians who do not cross the street (e.g., turn the corner on the sidewalk without crossing the street)
- If the pedestrian is female, mark an "O"; if male, mark an "X"; if unknown, mark a "+". If the pedestrian volume is so high that it is difficult to count by gender, use standard line tally marks.
- Count for two hours. Enter tally marks in a new row after each 15-minute period. Record totals at the bottom of the sheet after the two hours are completed.
- If the intersection is a "T" intersection with only three legs, you should still count four sides of the intersection. Pedestrians using the "sidewalk side" of the intersection should be counted when they travel along the sidewalk for at least half of the width of the intersection. Label the "sidewalk side" on the intersection diagram.
- Pedestrians include people in wheelchairs, people using canes and other assistive devices, children being carried by their parents, children in strollers, runners, skateboarders, people walking with a bicycle, etc., but do NOT include people riding bicycles, people in cars, etc.

Bicyclist Counting Procedures (See Side 2 of Data Collection Sheet):

- Tally each time a bicyclist leaves each leg of the intersection and enters any of the other intersection legs (this includes turning left, going straight, or turning right)
- Count bicyclists who may be riding on the wrong side of the street (against traffic)
- Count bicyclists who ride on the sidewalk (i.e., if a bicyclist on the sidewalk turns right without crossing the street, they should still be counted as turning right)
- If the bicyclist is female, mark an "O"; if male, mark an "X"; if unknown, mark a "+". If the bicycle volume is so high that it is difficult to count by gender, use standard line tally marks.
- Count for two hours. Enter tally marks in a new row after each 15-minute period. Record totals at the bottom of the sheet after the two hours are completed.
- Bicyclists include people riding bicycles. They do NOT include people who are walking their bicycles across the intersection.

Time Required:

Out of class:

- 2 hours for counts
- Analyze and summarize the data
- Report write up

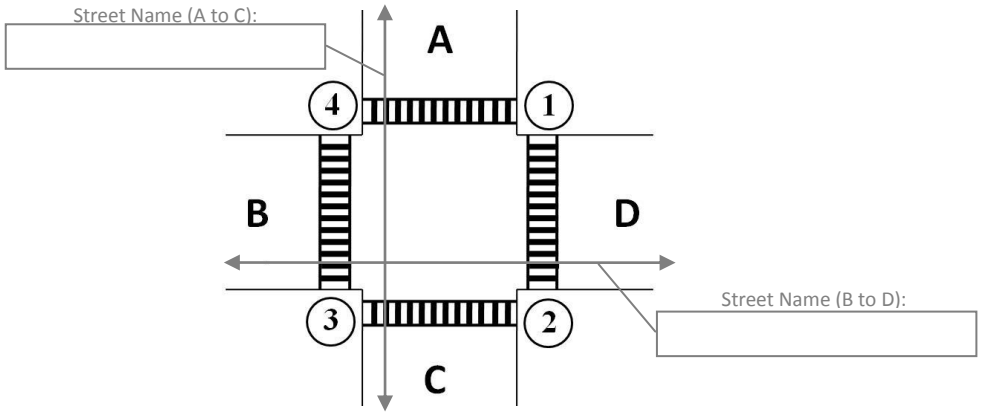
In-class discussion of findings

Assignment:

The final product will be the completed counts and a 2-3 page summary of observations and analysis from the experience.

Side 1: Intersection Pedestrian Count Sheet

Mainline Roadway: _____
Intersecting Roadway: _____
Observer Name(s): _____
Date: _____
Observation Time: (Start) _____(End)_____
Temp. (°F): _____ Sunny, cloudy, rainy, etc.: _____
Description of Specific Observation Location: _____
_____
_____

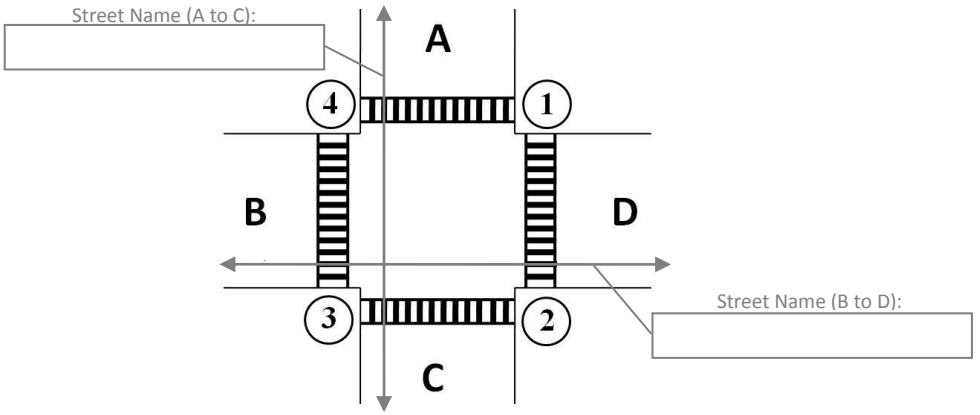


Tally each time a pedestrian crosses each leg of the intersection (count all crossings within 50 ft. of the crosswalk). If the pedestrian is female, mark an "O"; if male, mark an "X"; unknown, mark a "+".

Time Period #	Pedestrian Counts							
	Crossing Leg A		Crossing Leg B		Crossing Leg C		Crossing Leg D	
	From 4 to 1 OR From 1 to 4		From 3 to 4 OR From 4 to 3		From 2 to 3 OR From 3 to 2		From 1 to 2 OR From 2 to 1	
(0-15 min)								
(15-30 min)								
(30-45 min)								
(45-60 min)								
(60-75 min)								
(75-90 min)								
(90-105 min)								
(105-120 min)								
TOTAL	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:

Side 2: Intersection Bicycle Count Sheet

Mainline Roadway: _____
Intersecting Roadway: _____
Observer Name(s): _____
Date: _____
Observation Time: (Start) _____(End)_____
Temp. (°F): _____ Sunny, cloudy, rainy, etc.: _____
Description of Specific Observation Location: _____
_____
_____



Tally each time a bicyclist leaves each leg of the intersection (include bicyclists on sidewalks). If the pedestrian is female, mark an "O"; if male, mark an "X"; unknown, mark a "+".

Time Period #	Bicycle Counts																	
	Leaving Leg A			Leaving Leg B			Leaving Leg C			Leaving Leg D		
	(Turning Right) A to B	(Going Straight) A to C	(Turning Left) A to D	(Turning Right) B to C	(Going Straight) B to D	Turning Left) B to A	(Turning Right) C to D	(Going Straight) C to A	Turning Left) C to B	(Turning Right) D to A	(Going Straight) D to B	Turning Left) D to C
(0-15 min)												
(15-30 min)												
(30-45 min)												
(45-60 min)												
(60-75 min)												
(75-90 min)												
(90-105 min)												
(105-120 min)												
TOTAL	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male:	Female:	Male: