PBIC Livable Communities Webinar Series

Pedestrian Crashes and Treatments from Around the World

Pedestrian and Bicycle Information Center

THE UNIVERSITY OF NORTH CAROLINA HIGHWAY SAFETY RESEARCH CENTER

By Charlie Zegeer
Pedestrian and Bicycle Information Center
UNC Highway Safety Research Center

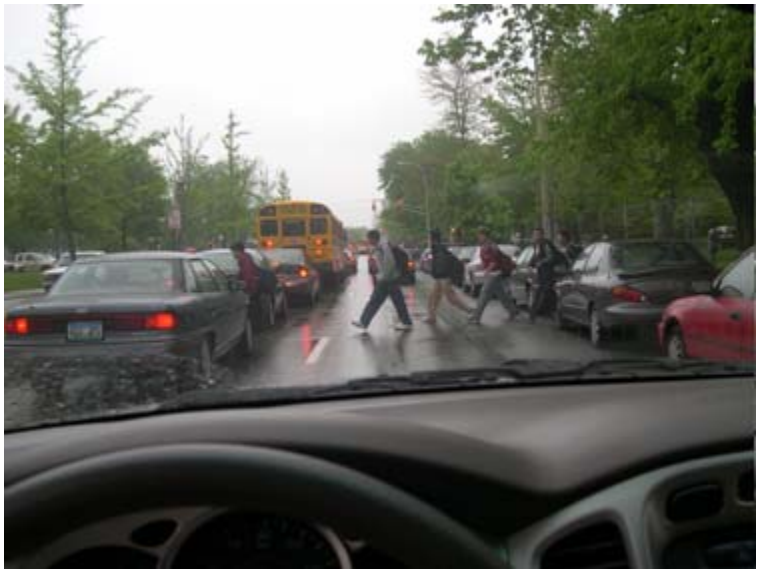
Worldwide Motor Vehicle Crashes

- 1.2 Million deaths per year
- 20 to 50 million non-fatal injuries
- Crash fatalities are comparable to deaths from all communicable diseases

Source: World Health Organization. (2009). *Global Status Report on Road Safety: Time for Action*. Geneva, Switzerland: WHO Press.

Source: http://drusilla.hsrc.unc.edu/imagelib/l

Worldwide Motor Vehicle Crashes



Source: http://drusilla.hsrc.unc.edu/imagelib/largeimages/

- Leading cause of death in the world for people 15 to 29 years old
- Third highest cause of death for people aged 5 to 44 years old
- About half of the road fatalities are Vulnerable Road Users (pedestrians, cyclists, and users of motorized two-wheeled vehicles)

Source: World Health Organization. (2009). *Global Status Report on Road Safety: Time for Action*. Geneva, Switzerland: WHO Press.

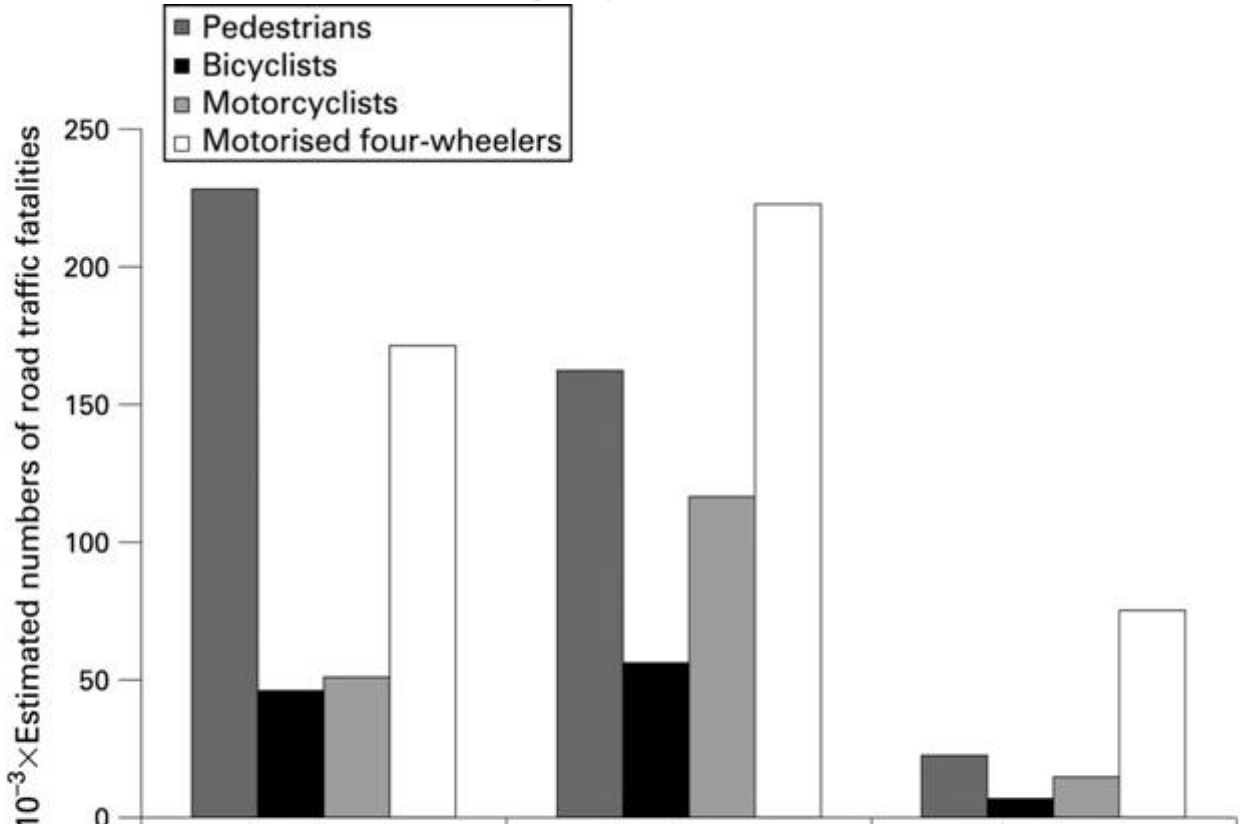
Focus on Children

- Approximately 21% of road traffic deaths involve children
- There are an average of 720 child deaths in road traffic crashes on a daily basis
- Road traffic crashes are also the leading cause of disability for children

Source: World Health Organization & United Nations Children's Fund. (2008). *World Report on Child Injury Prevention* M. Peden et al. (Eds.). Geneva: WHO Press.

Source:http://www.pedbikeimages.org/pubdetail.cfm?picid=1200

Estimated annual number of road traffic deaths by road user group and income category



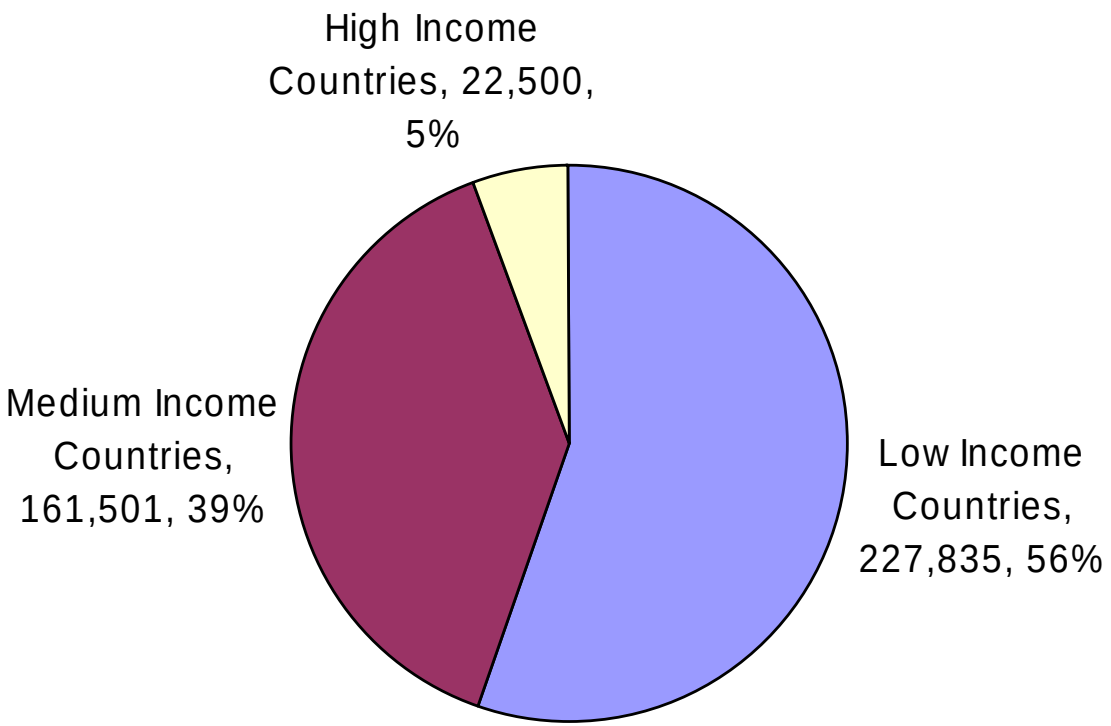
	Low income	Middle income	High income
Pedestrians	227 835	161 501	22 500
Bicyclists	45 567	55 690	6250
Motorcyclists	50 630	116 949	15 000
Motorised four-wheelers	172 142	222 760	75 000

Naci H et al. Inj Prev 2009;15:55-59

©2009 by BMJ Publishing Group Ltd

Worldwide Pedestrian Fatalities

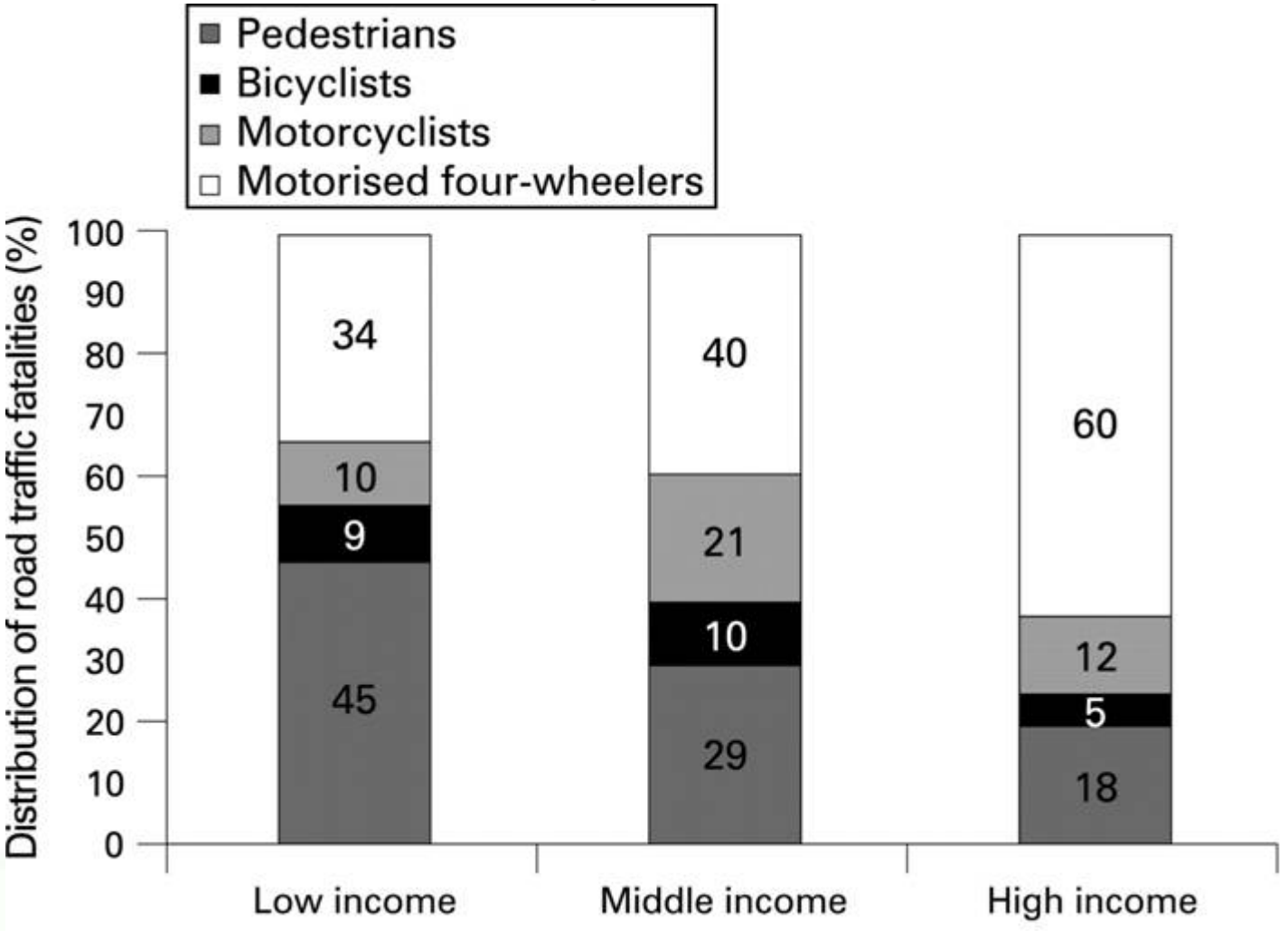
Total Pedestrian Traffic Fatalities



- Over 400,000 pedestrians die each year with more than half of the pedestrian deaths occurring in poor countries
- This trend is also reflected among children

Source: Naci, H., Chisholm, D., and Baker, T. D. (2009). Distribution of Road Traffic Deaths by Road User Group: A Global Comparison. *Injury Prevention, 15*, 55-59. doi: 10.1136/ip.2008.018721.

Distribution of road traffic fatalities by road user group in low-income, middle-income and high-income countries

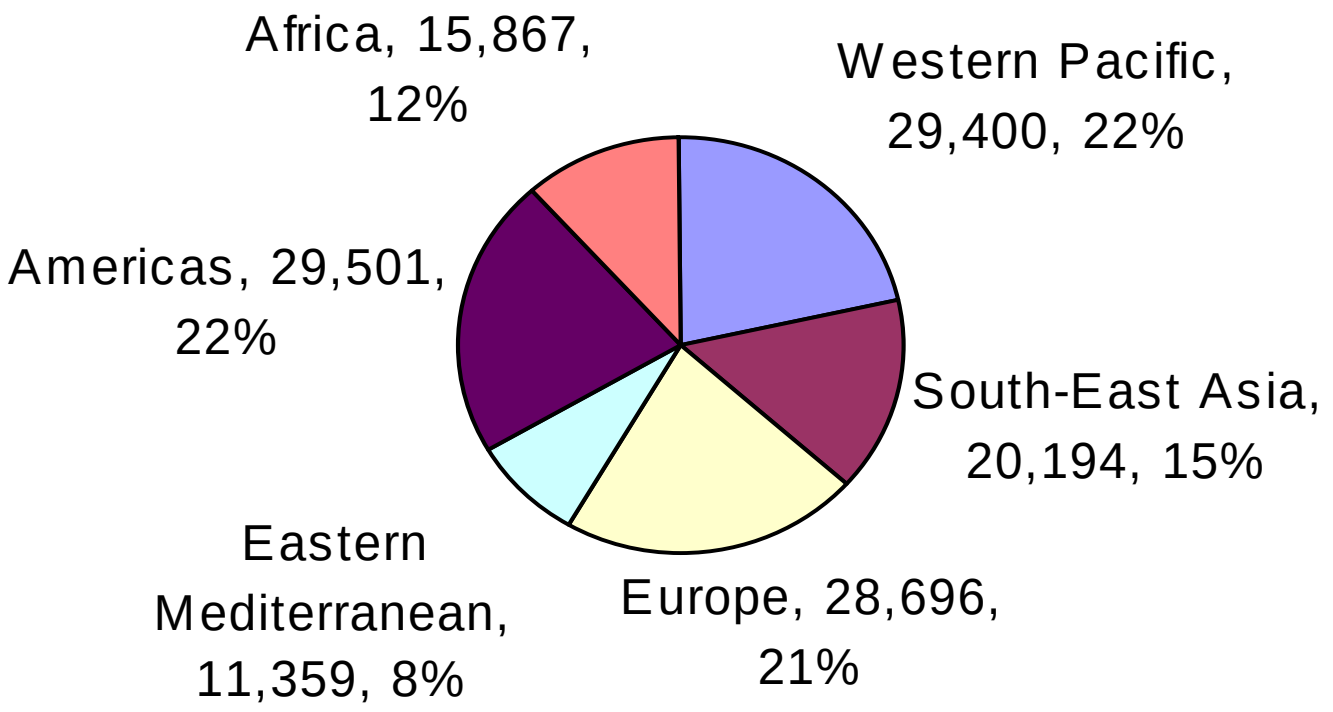


Naci H et al. Inj Prev 2009;15:55-59

©2009 by BMJ Publishing Group Ltd

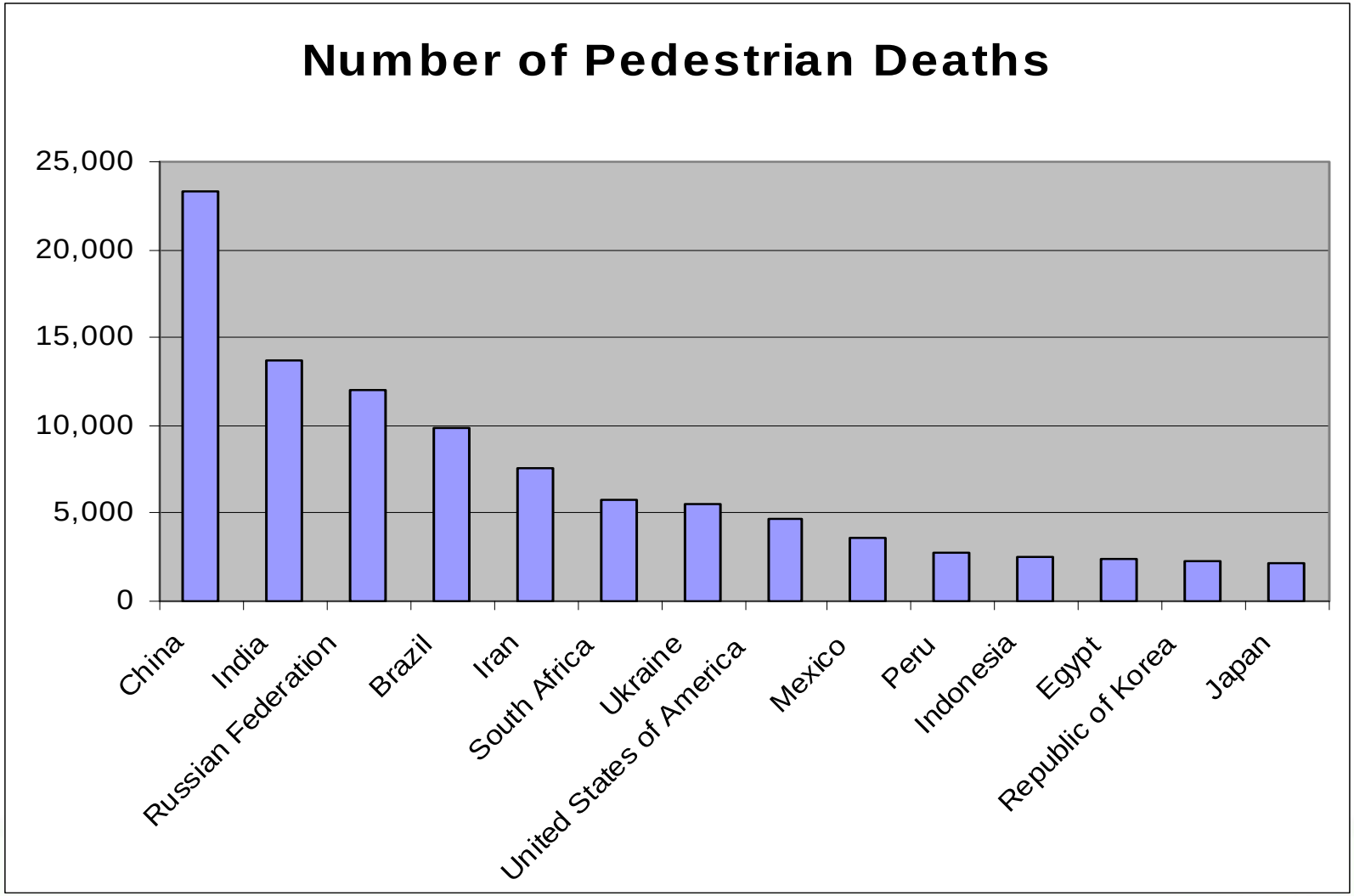
Pedestrian Fatalities by Region

Total Regional Pedestrian Fatalities for Countries over 5 Million People



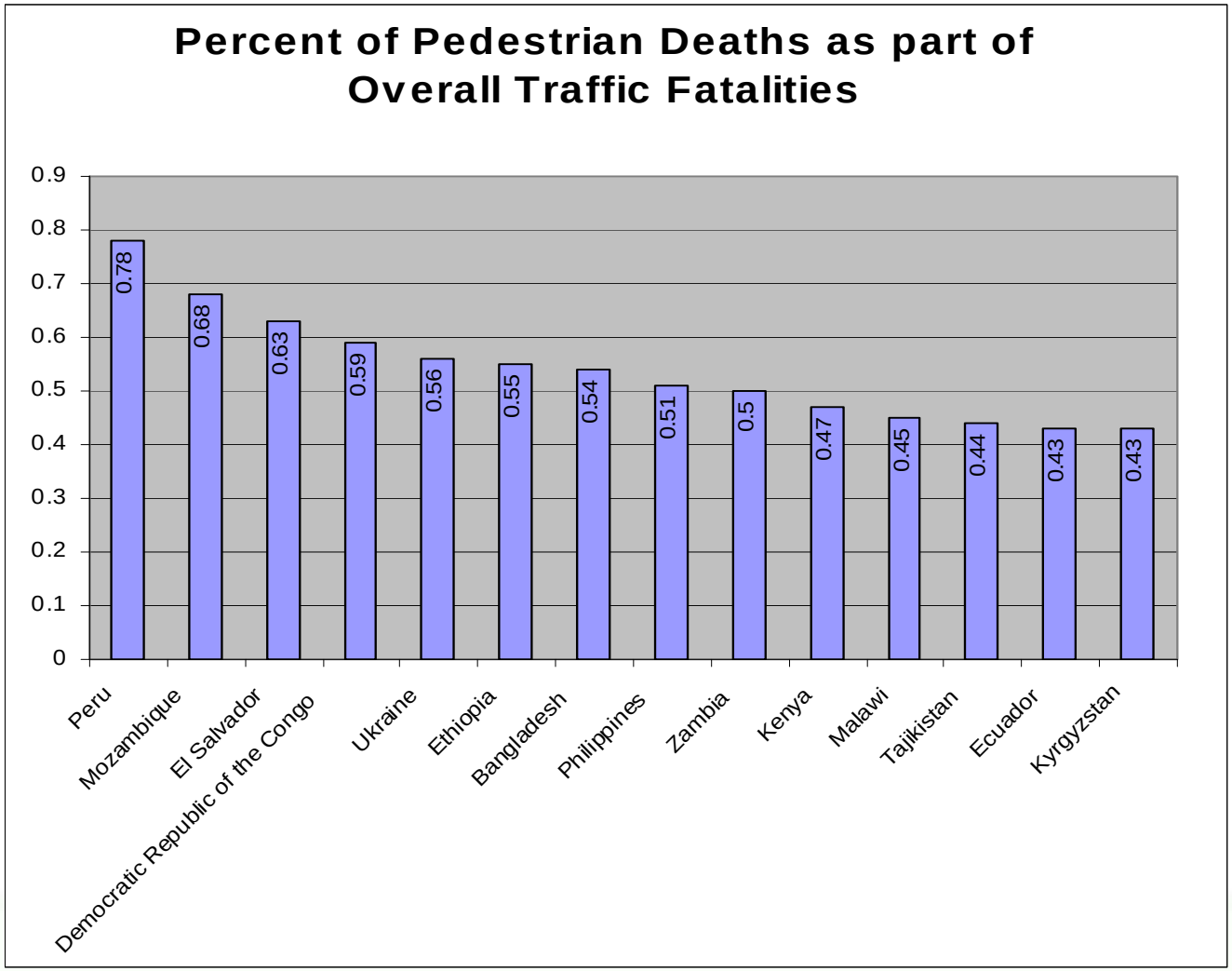
Source: World Health Organization. (2009). *Global Status Report on Road Safety: Time for Action*. Geneva, Switzerland: WHO Press.

Numbers of Pedestrian Fatalities by Country



Source: World Health Organization. (2009). *Global Status Report on Road Safety: Time for Action*. Geneva, Switzerland: WHO Press.

Percentage of Pedestrian Fatalities by Country



Source: World Health Organization. (2009). *Global Status Report on Road Safety: Time for Action*. Geneva, Switzerland: WHO Press.

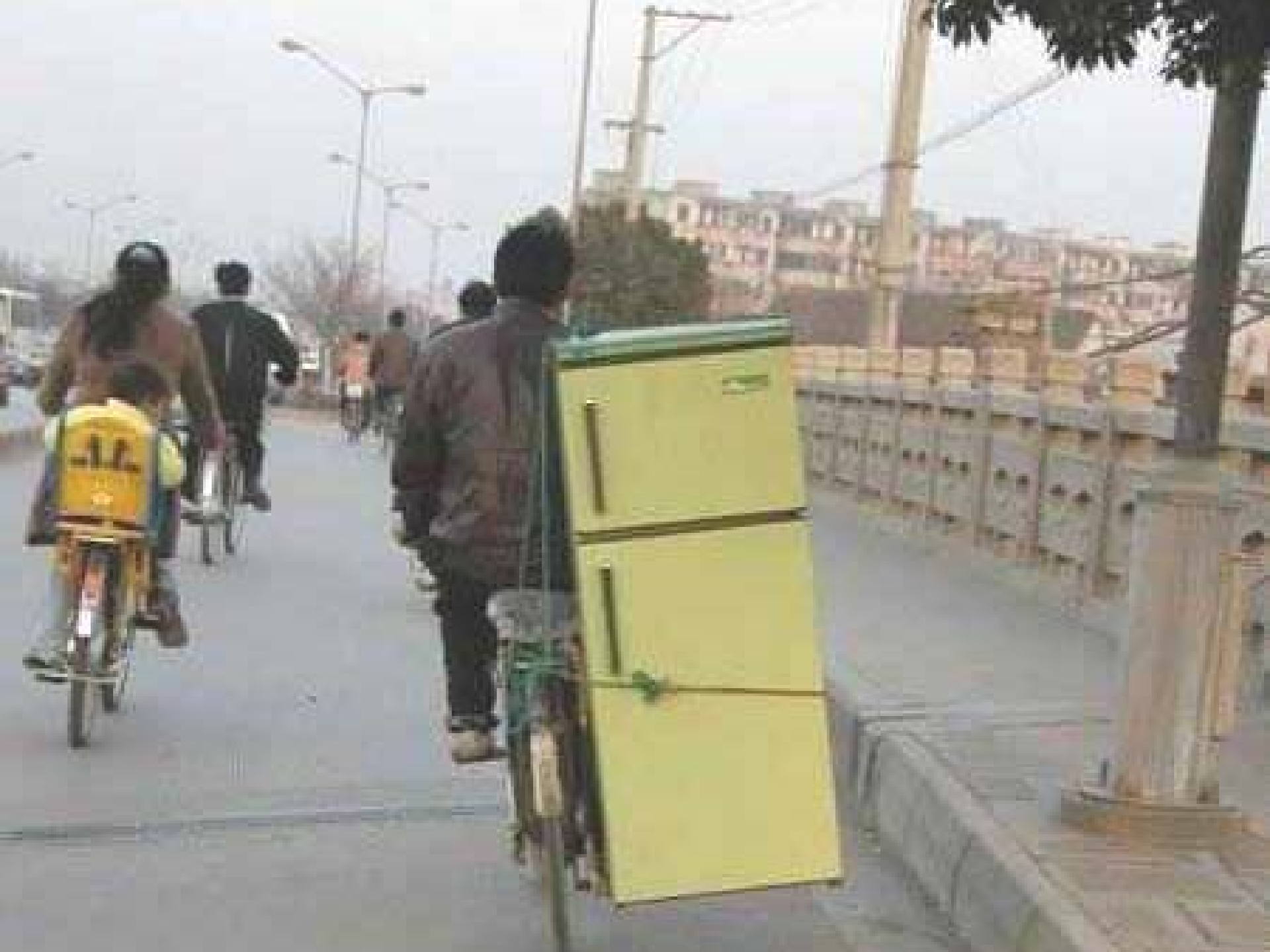
Factors affecting road crash fatalities

- Speed
- Drinking and driving
- Use of motorcycle helmets
- Seat-belt use
- Use of child restraints

Source:http://drusilla.hsrc.unc.edu/imagelib/largeimages/

Source: World Health Organization. (2009). *Global Status Report on Road Safety: Time for Action*. Geneva, Switzerland: WHO Press.

Masters of Transport and Logistics



Malgust

ZZ9625

MoneyGram
CASA DAVID

CHUYÊN BÁN
QUẦN ÁO THỜI TRANG

SANYO
SANYO
National
Panasonic

J4-F1
5414

HO NG HUC

VINH KY
VINH PHÁT
VINH PHÁT

Roads and streets should be designed to provide for the safety needs of all road users, including pedestrians

Special Thanks to:

- Karl Fjellstrom, ITDP web site
- Michael King, New York, USA
- Tom Bertulis, Seattle, USA
- John LaPlante, Illinois, USA
- Ryan Snyder, California, USA
- Shawn Turner & FHWA Ped/Bike Scan team

Jerusalem

United States

United States

United States

United States

United States

United States

England

What's wrong with this picture?

United States

United States

United States

Jerusalem

Jerusalem

Barcelona, Spain

Jerusalem

Jerusalem

What's wrong with this picture?

Dubai, United Arab Emirates

Mexico City, Mexico

Tanzania, Africa

Mexico City, Mexico

Jakarta, Indonesia

Tanzania, Africa

Ahmedabad, India

Hyderabad, India

Hyderabad, India

Copenhagen, Denmark

Jakarta, Indonesia

London, England

Jakarta, Indonesia

Beijing, China

Seoul, South Korea

Seoul, South Korea

United States

Principle # 1

Pedestrians want & need to cross the street safely

Pedestrians shouldn't be terrified to cross the street

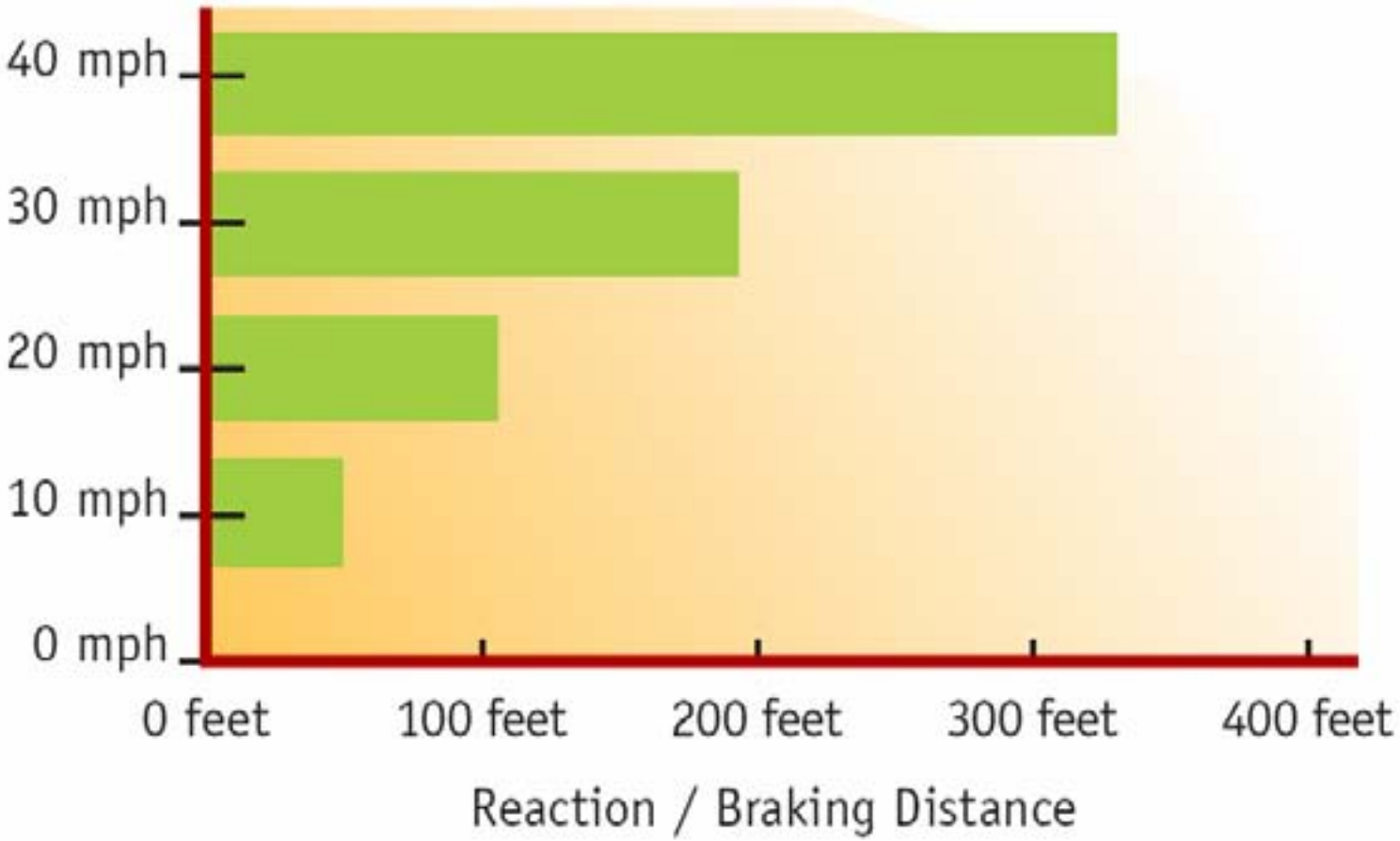
Principle # 2

Pedestrians will cross where it's most convenient

Principle # 3

Drivers need to understand pedestrians' intent

Speed Affects Crash Avoidance

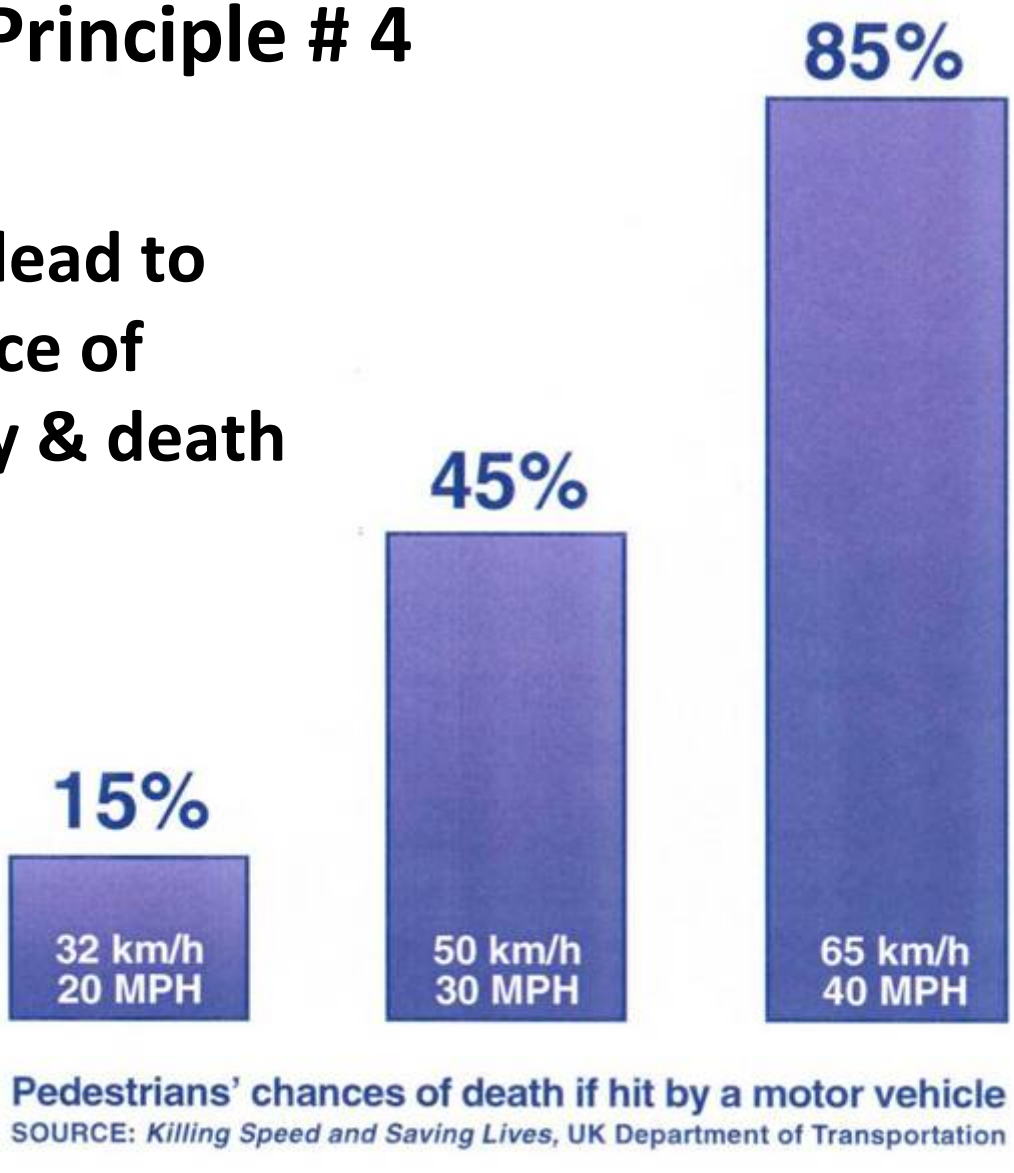


High speeds equate to greater reaction and stopping distance

Principle # 4

High speeds lead to greater chance of serious injury & death

Speed matters



Pedestrians' chances of death if hit by a motor vehicle
SOURCE: *Killing Speed and Saving Lives*, UK Department of Transportation

Principle # 5

Good design makes use of these principles

People shouldn't have to run to cross a street

Depoe Bay OR

Safe Street Crossing Summary

- ⇨ **Keep it simple**
- ⇨ **Shorten crossing distances**
- ⇨ **Carefully select crossing locations and marked crosswalks**
- ⇨ **Create visible crossings**
- ⇨ **Proper traffic control (signs, signals, guards)**
- ⇨ **Slow down traffic speeds**

United States

United States

Other plan…

PEDESTRIAN X-ING
1-15
"I never know where I'm going to cross, so I keep the sign with me."

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Barcelona, Spain

Beijing, China

Beijing, China

Beijing, China

Beijing, China

Beijing, China

Beijing, China

Sydney, Australia

Sydney, Australia

Sydney, Australia

Sydney, Australia

Sydney, Australia

Sydney, Australia

Dubai, United Arab Emirates

Cairo, Egypt

Cairo, Egypt

Cairo, Egypt

Mexico City, Mexico

Mexico City, Mexico

Tanzania, Africa

Tanzania, Africa

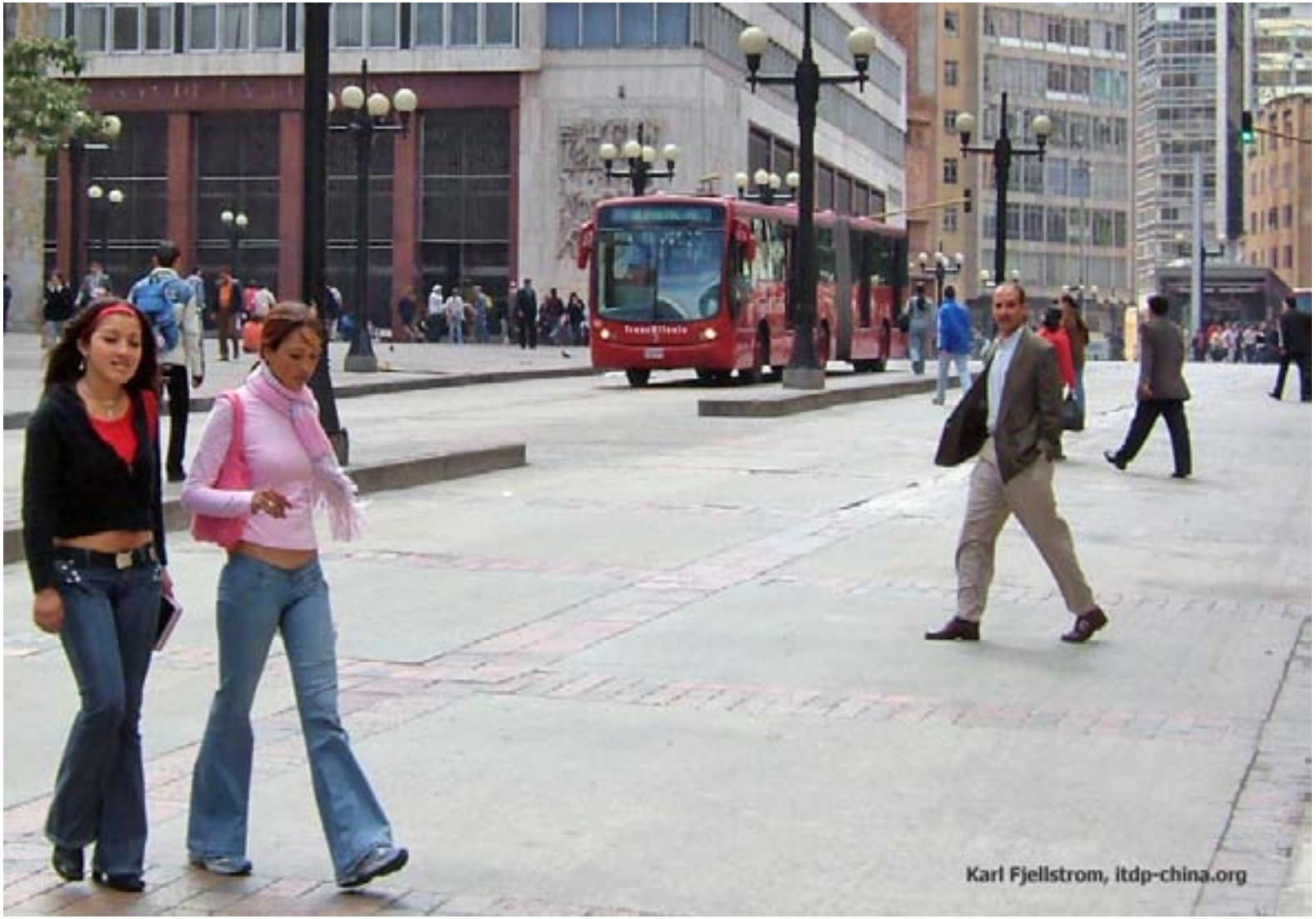
Tanzania, Africa

Tanzania, Africa

Bogotá, Columbia

Bogotá, Columbia

Bogotá, Columbia



Bogotá, Columbia

Bogotá, Columbia

Bogotá, Columbia

Jakarta, Indonesia

Duan Xiaomei, GMTDC

Jakarta, Indonesia

Jakarta, Indonesia

Jakarta, Indonesia

Duan Xiaomei, GMTDC

Jakarta, Indonesia

Osaka, Japan

PACHINKO & SLOT
PACHINKO & SLOT
Karl Fjellstrom, itdp-china.org

Osaka, Japan

Osaka, Japan

Osaka, Japan

心斎橋筋
SHIN SAI BASHI-SUJI
ARROW
アイフル
Karl Fjellstrom, itdp-china.org

Ahmedabad, India

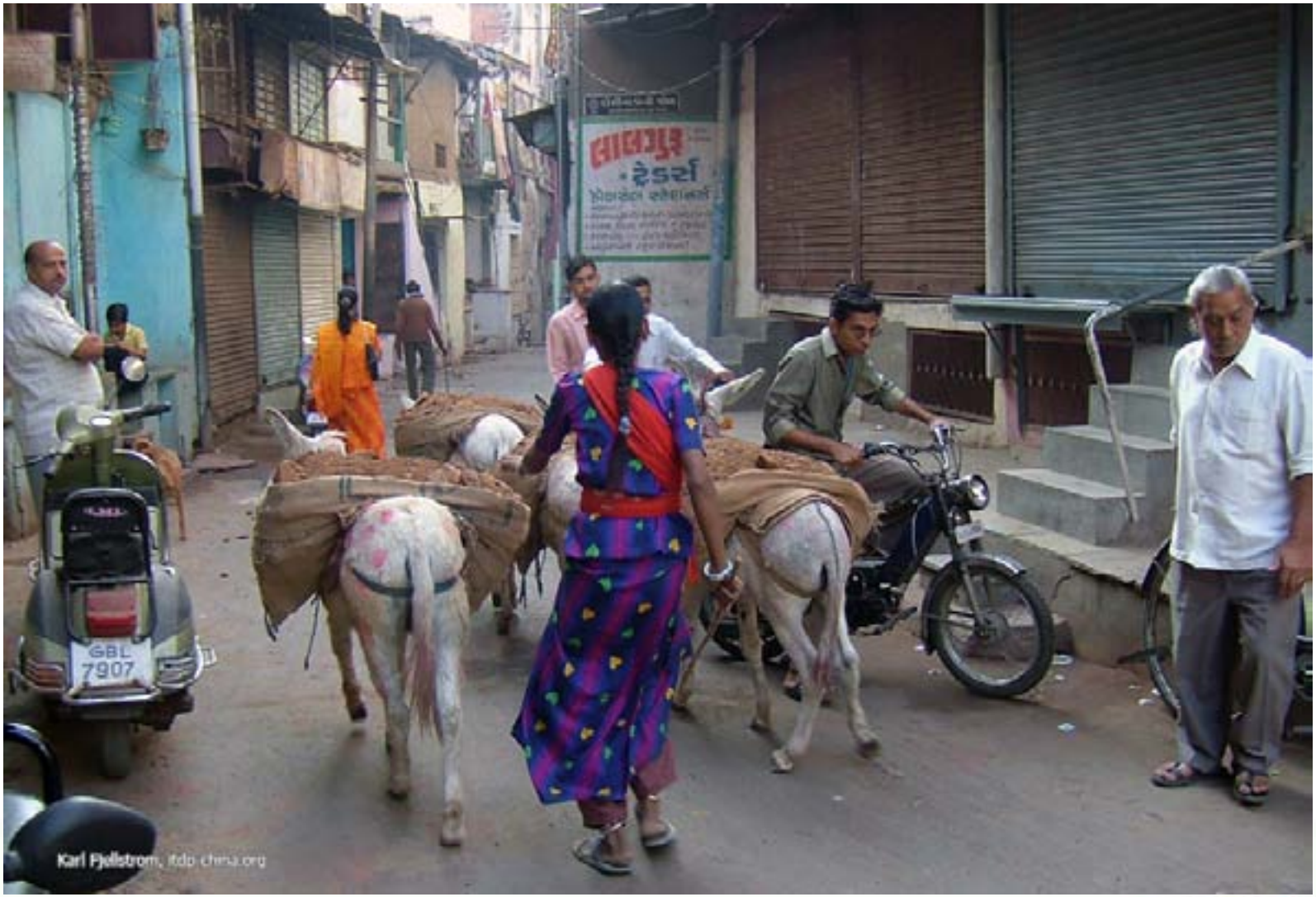
Hyderabad, India

Ahmedabad, India

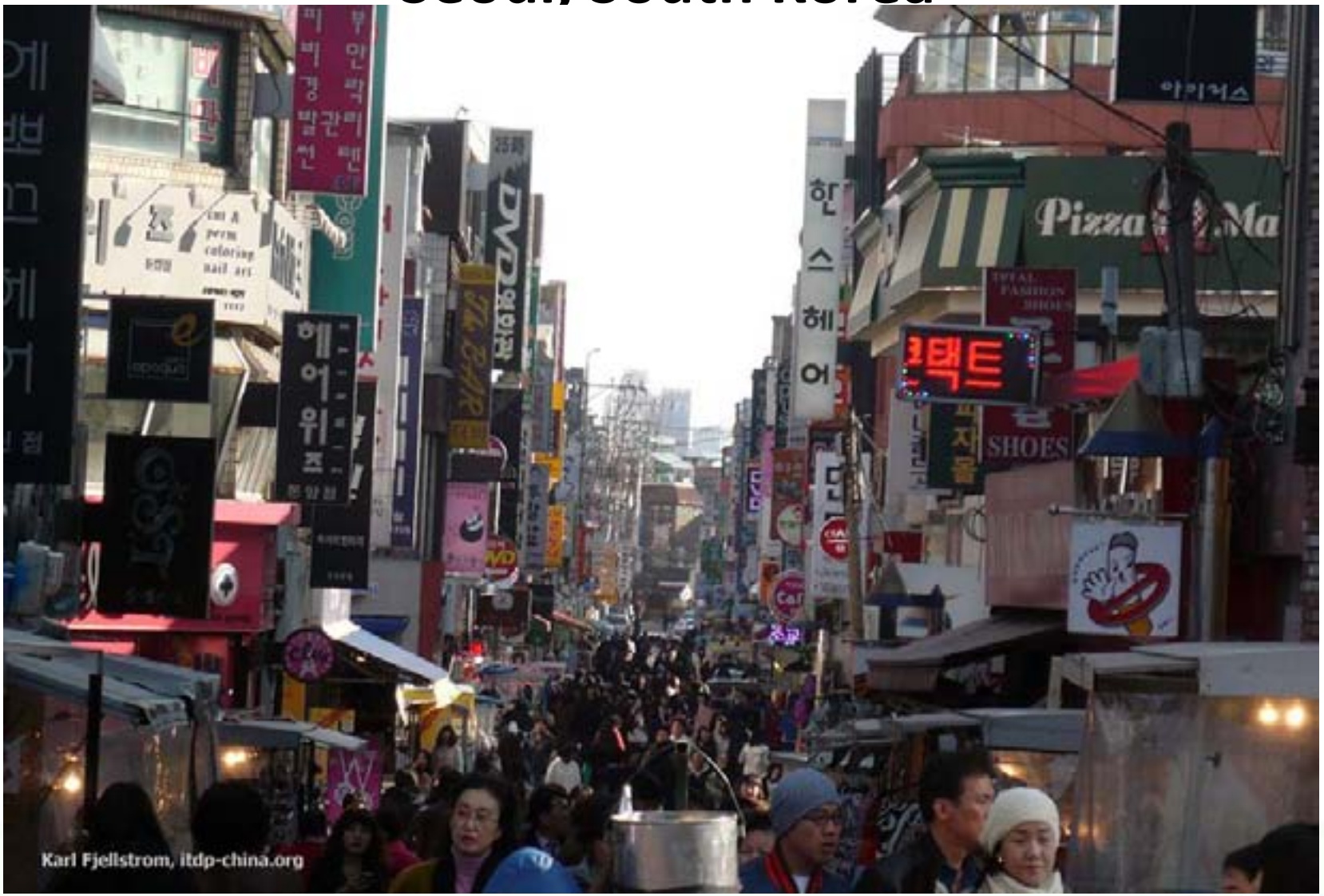
Ahmedabad, India

Ahmedabad, India

Ahmedabad, India



Seoul, South Korea



Seoul, South Korea

Seoul, South Korea

Seoul, South Korea

Seoul, South Korea

Seoul, South Korea

Curitiba, Brazil

Jerusalem

Jerusalem

Jerusalem

Jerusalem

Jerusalem

Jerusalem

Jerusalem

Jerusalem

Jerusalem

Jerusalem

New Zealand

New Zealand

New Zealand

New Zealand

New Zealand

New Zealand

New Zealand

Over 70 pedestrians were injured on Wellington city roads last year. This year it could be you
Stop, look, live
Absolutely
POSITIVELY
Wellington

Ireland

Ireland

Ireland

Ireland

Ireland

Ireland

Florence, Italy

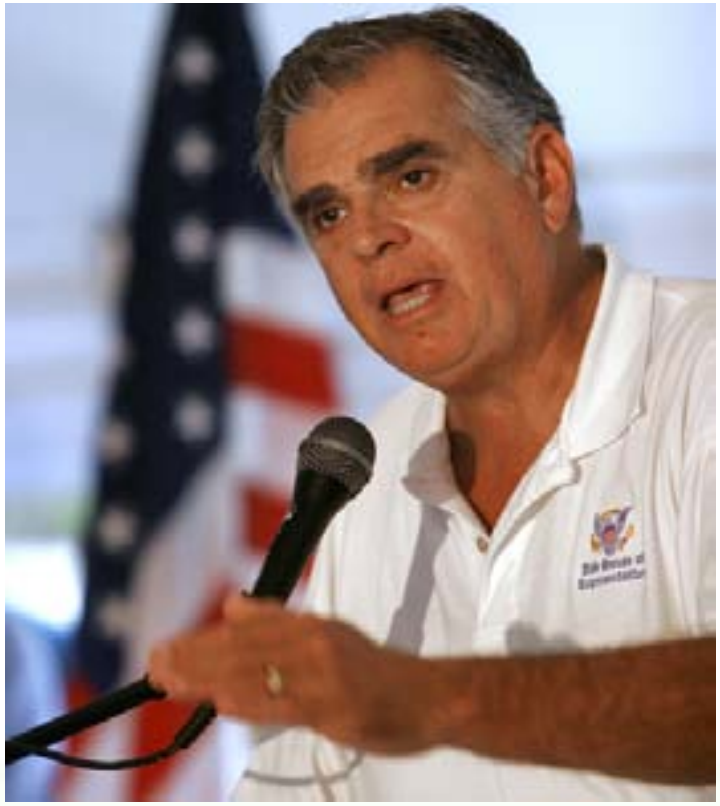
Florence, Italy

Munich, Germany

Secretary Ray LaHood, U.S. Department of Transportation

June 16, 2009

"Our goal is to build livable communities, where safe, convenient and affordable transportation is available to all people, regardless of what mode they use. **For the past 50 years, most government investment in transportation has undermined this goal.**"

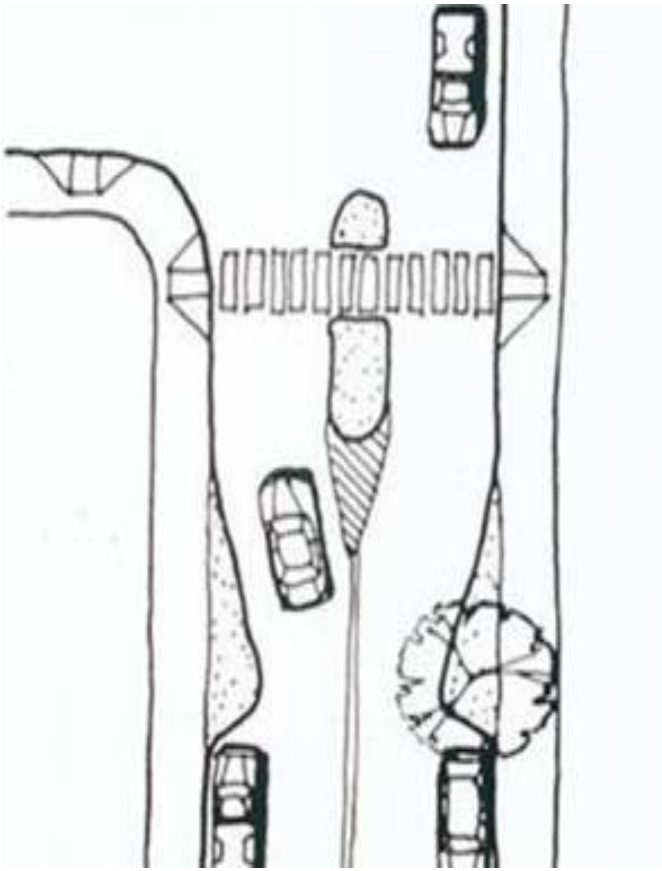


U.S. Pedestrian Treatments

United States

United States

Crossing islands



Countdown Pedestrian Signal

Pedestrian Underpasses and Bridges

School Crossing Guard

New York, New York

New York, New York

New York, New York

New York, New York

New York, New York

New York, New York

San Jose, Costa Rica

Buenos Aires, Argentina

Buenos Aires, Argentina

Santiago, Chile

Thailand

International Scan on Pedestrian and Bicyclist Safety and Mobility: May 2009

U.S. Department of Transportation
Federal Highway Administration

AASHTO
THE VOICE OF TRANSPORTATION

NCHRP

National Cooperative Highway Research Program (NCHRP)

Scan Tour Objectives

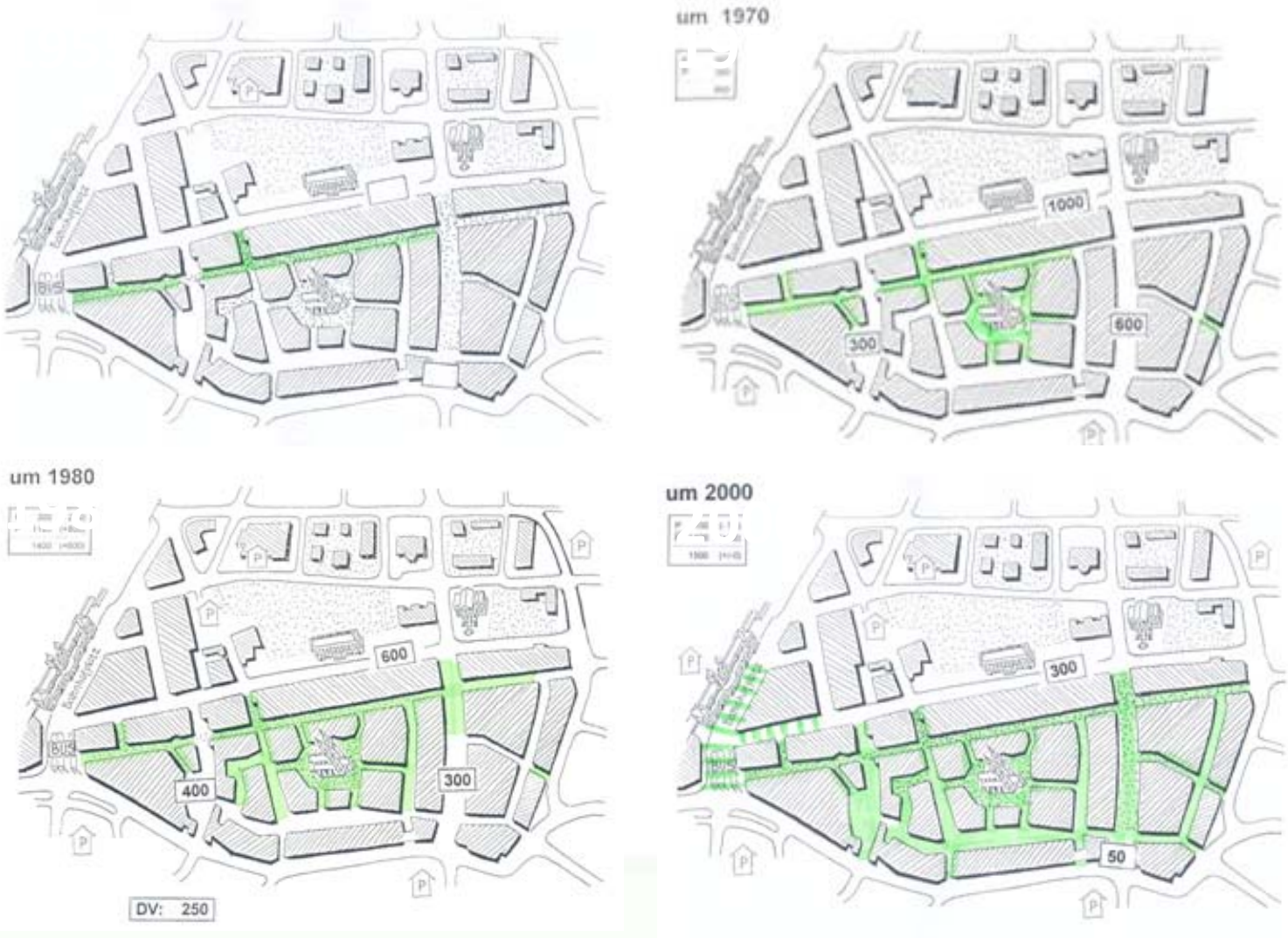
- Improving Pedestrian and Bicyclist Safety and Mobility
  - Policy
  - Engineering
  - Education
  - Enforcement
- Safe Routes to School Programs
- Monitoring Usage Levels and Exposure
- Safety Research and Evaluation

May 2009 Scan Tour

Winterthur, Switzerland

(Source: Presentation by Stefan Gerber, City of Winterthur, Switzerland)

Winterthur, Switzerland



(Source: Presentation by Stefan Gerber, City of Winterthur, Switzerland)

Winterthur, Switzerland

Winterthur, Switzerland

Strøget, Copenhagen, 1960

Source: Gehl and Gemzøe, *New City Spaces*, 2000

Strøget, Copenhagen, 2000

Source: Gehl and Gemzøe, *New City Spaces*, 2000

Bern, Switzerland, 1960s/70s

Source: http://www.parlament.ch

Bern, Switzerland, 2009

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

Bern, Switzerland

London, England

London, England

London, England

London, England

London, England

London, England

London, England

London, England

Safety-in-Numbers (Awareness-in-Numbers)

- When pedestrians and bicyclists are a common element on/along streets, motorists expect their presence
- For this reason, biking and walking is actively promoted beyond providing “asphalt and concrete”

Engineering Measures for Pedestrians

- Passive detection to call, truncate, extend, or cancel pedestrian phase (PUFFIN signal)
- Near-side pedestrian signal heads

Engineering Measures for Pedestrians

- Crossing islands
- Railing to direct pedestrians to preferred crossing locations
- Raised crosswalks at unsignalized crossings

Low-Speed Street Design

- Residential and commercial areas
- 20 mph, 20 to 30 kilometers per hour
- 4 conditions for use

Widespread Photo Enforcement

- Not just a tool for motor vehicle safety
- Better motorist compliance with speed limits and traffic signals improves walking and biking safety

Traffic Safety Education

- Pervasive, widespread, ongoing education programs for children
- Participation from wide range of agencies and organizations
- Branded traffic safety campaigns

Encouragement

- Promotion was important for both mode share and safety goals
- Variety of programs and activities
  - Route signing and maps
  - Online travel planners
  - Employer-sponsored programs (bike-to-work)
  - Public health-sponsored programs
  - Government marketing campaigns

Integration With Public Transport

- Plentiful, convenient bike parking at stations
- Bikes on trains & buses, even during peaks
- Bike rental or sharing near stations
- Channels/ramps on stairways for bike access

Evaluation (Monitoring)

- Regular performance reports that measure progress toward policy goals
  - Pedestrian and bicyclist mode share
  - Pedestrian and bicyclist safety
- "Showcase" counters in highly visible location

Deliberate Combination of Policies and Practices

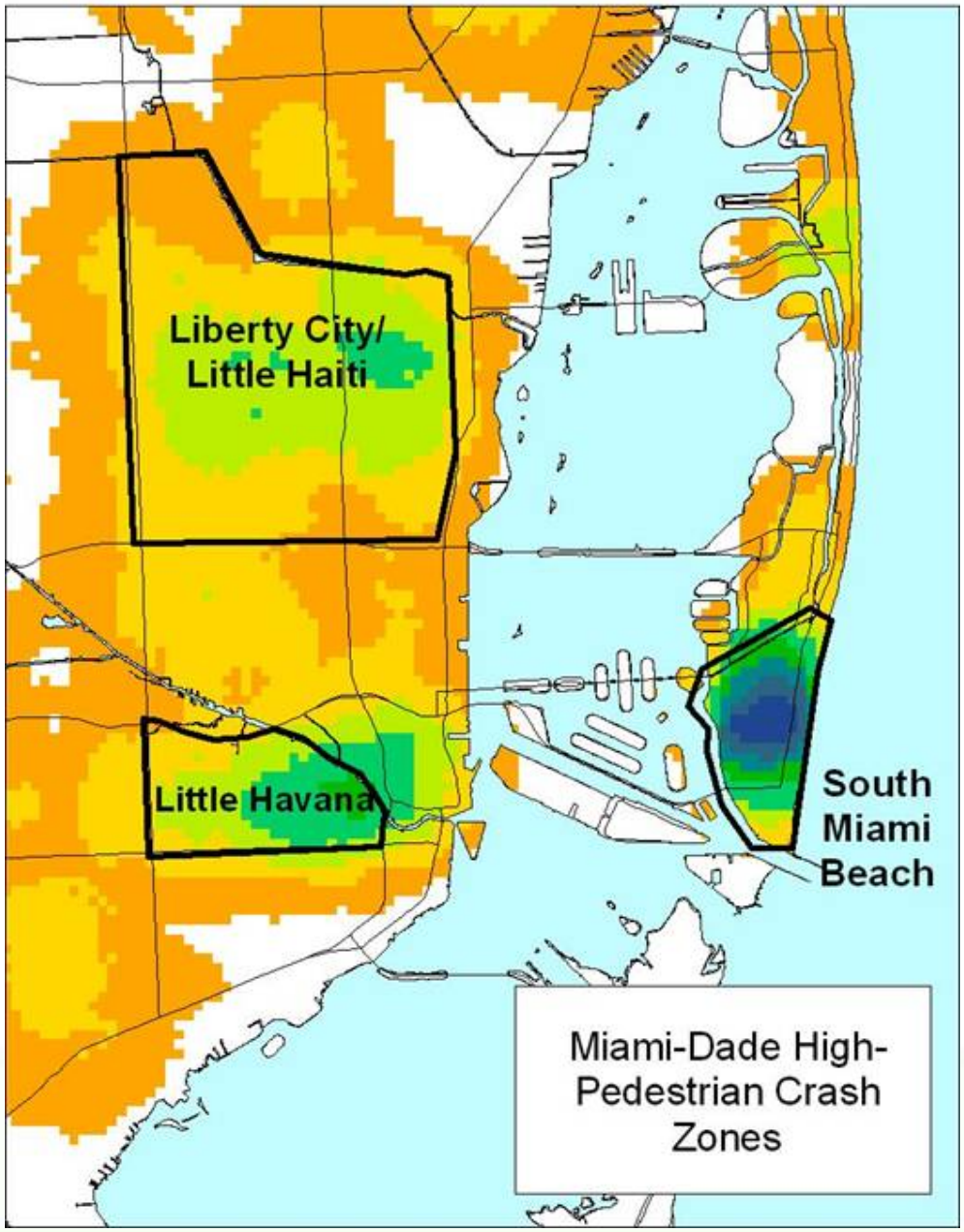
- Urban and land use policy
- Political support at all levels, not just staff
- Motor vehicle operating costs
- Parking policies
- Enforcement policies
- Street design hierarchy
- Integration with public transport
- Connected on-street and off-street networks
- Traffic safety education for children
- Many other details that make walking and bicycling easy, convenient, and enjoyable

Next Steps

- Scan team identified numerous approaches
- Have already started implementation
- Will also rely on "champions" in the U.S. to implement policies and practices

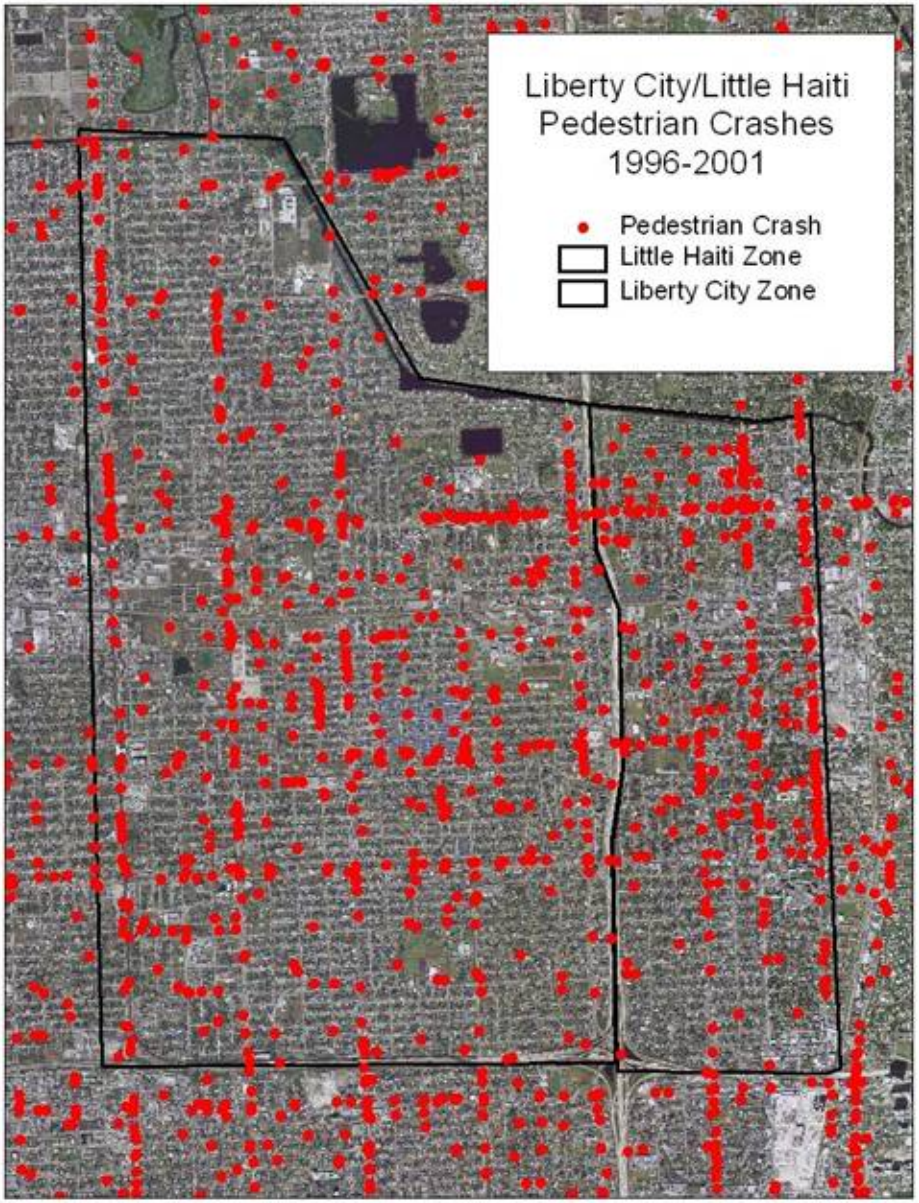
<u>WANTED:</u>
CHAMPIONS

High-Crash Zones

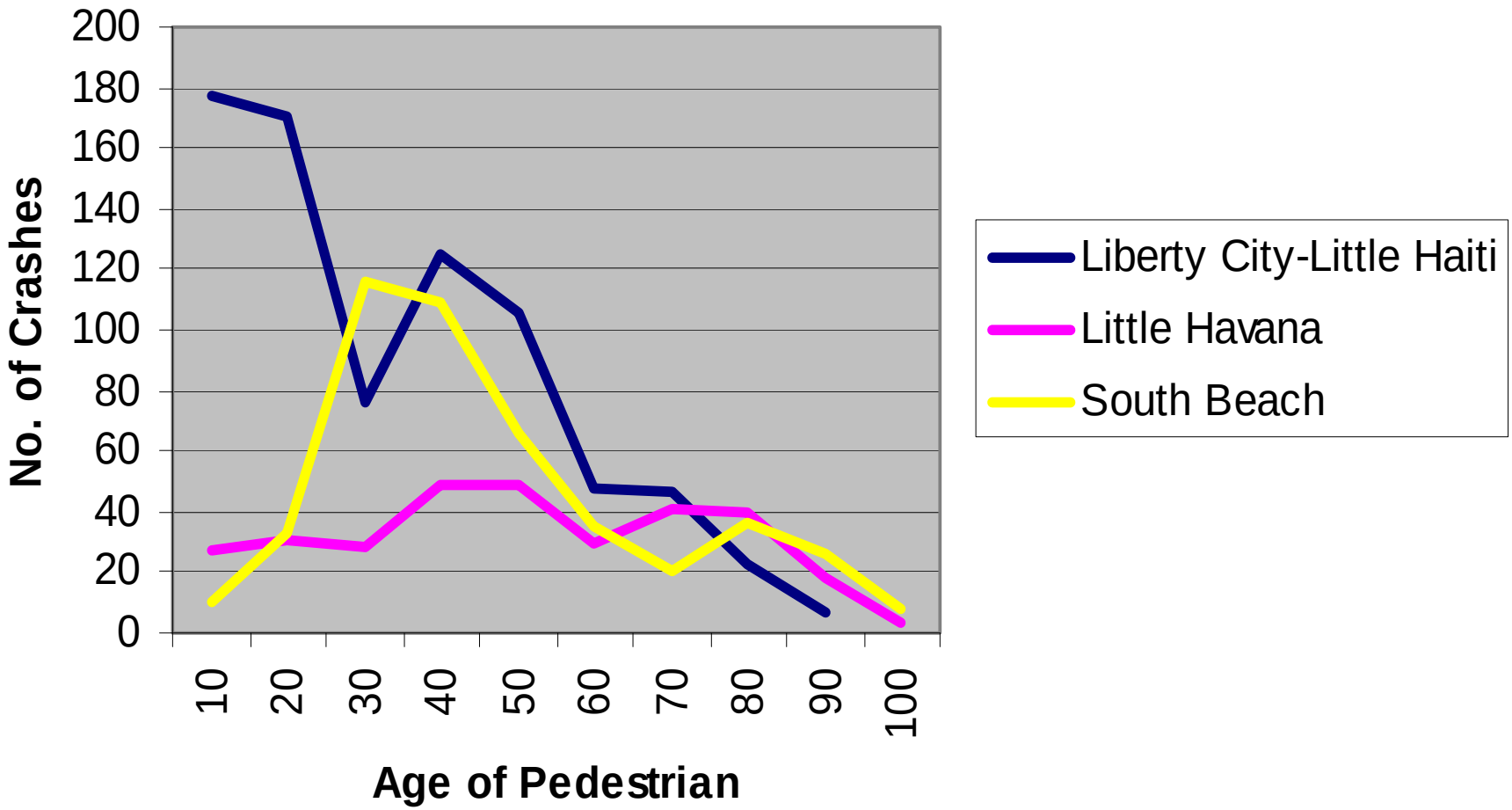


South Beach Pedestrian Crashes

Liberty City/Little Haiti Crash Map



High-Crash Zone Characteristics



Children wait for school bus in Liberty City

Students cross to middle school

Pedestrian crossings at midblock sometimes creates conflicts with motorists

Four-lane undivided street with pedestrian crashes at midblock

Pedestrian at-risk crossings

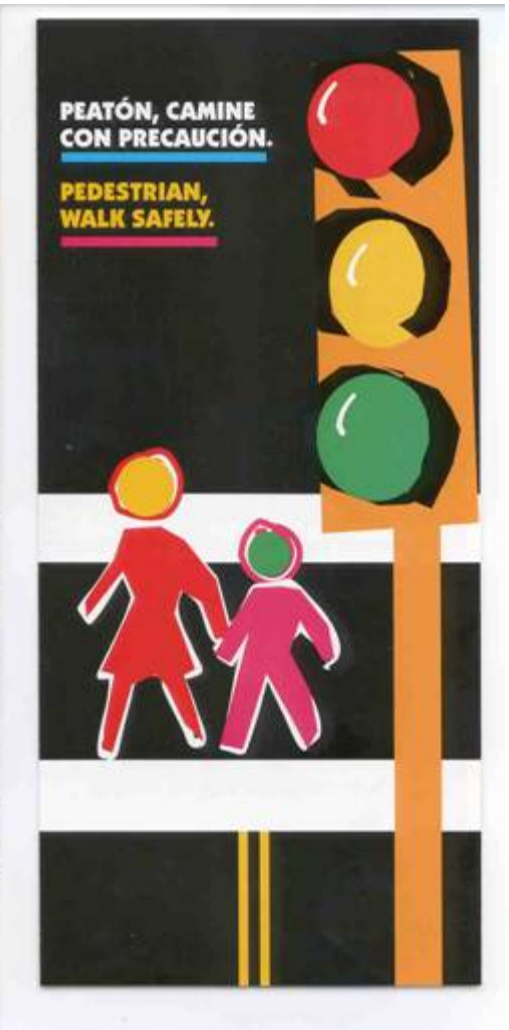
Motorist fails to yield to pedestrian in crosswalk

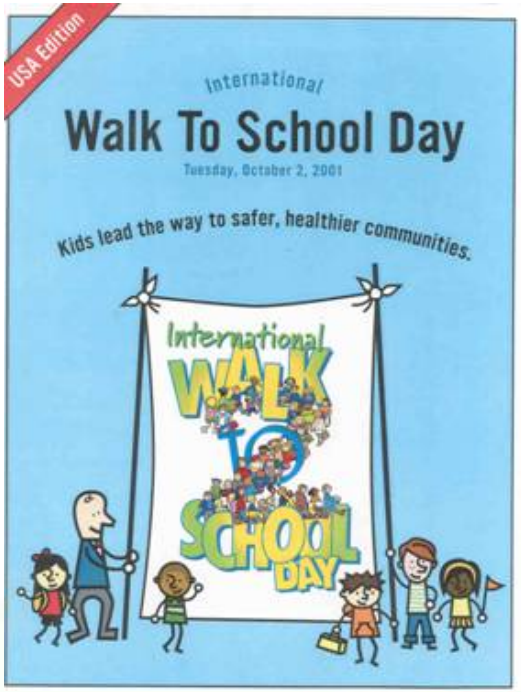
Pedestrian signal violations are prevalent

Senior Pedestrians Crossing Wide Streets

Turning motorists failing to yield to pedestrians

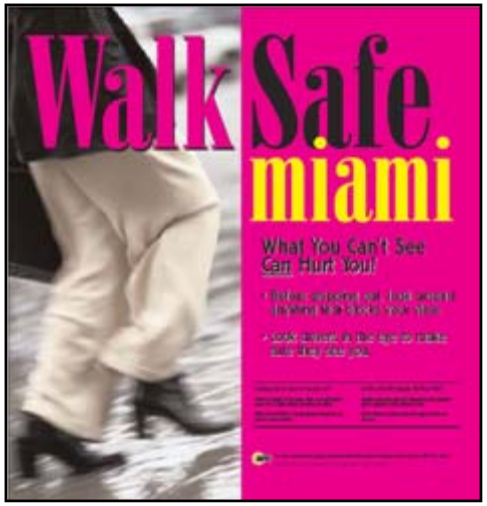
Education: Children

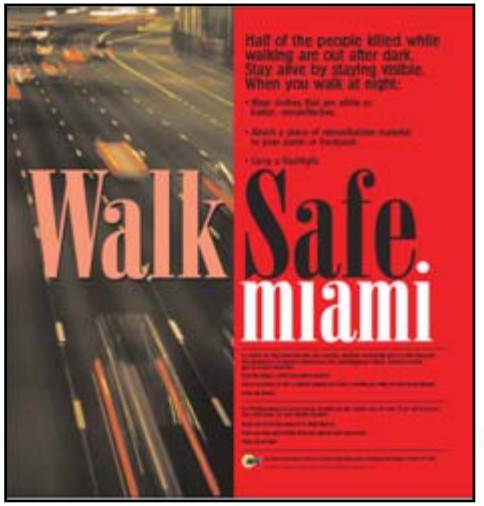




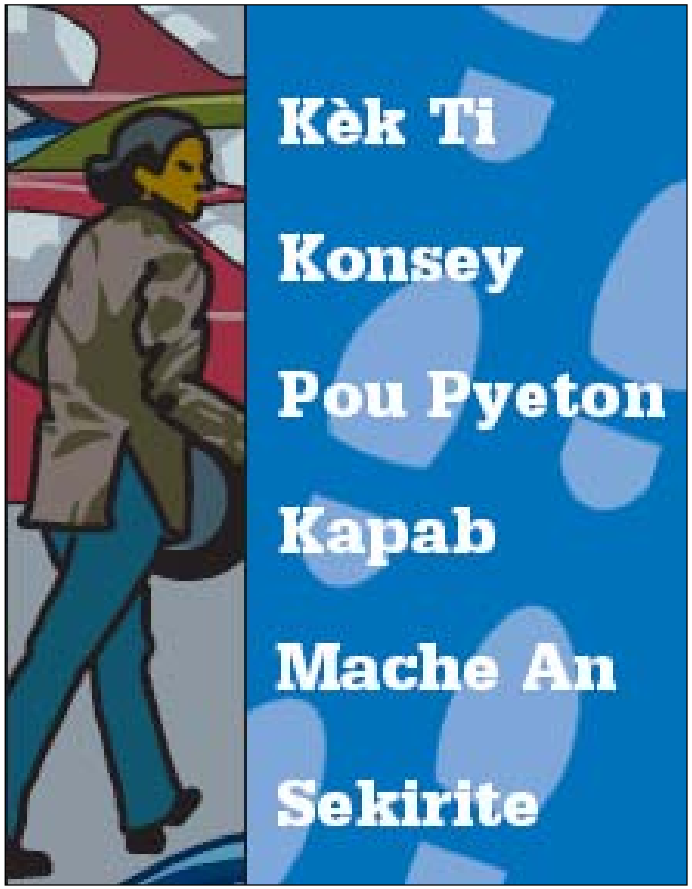
WalkSafe Pedestrian Safety Program

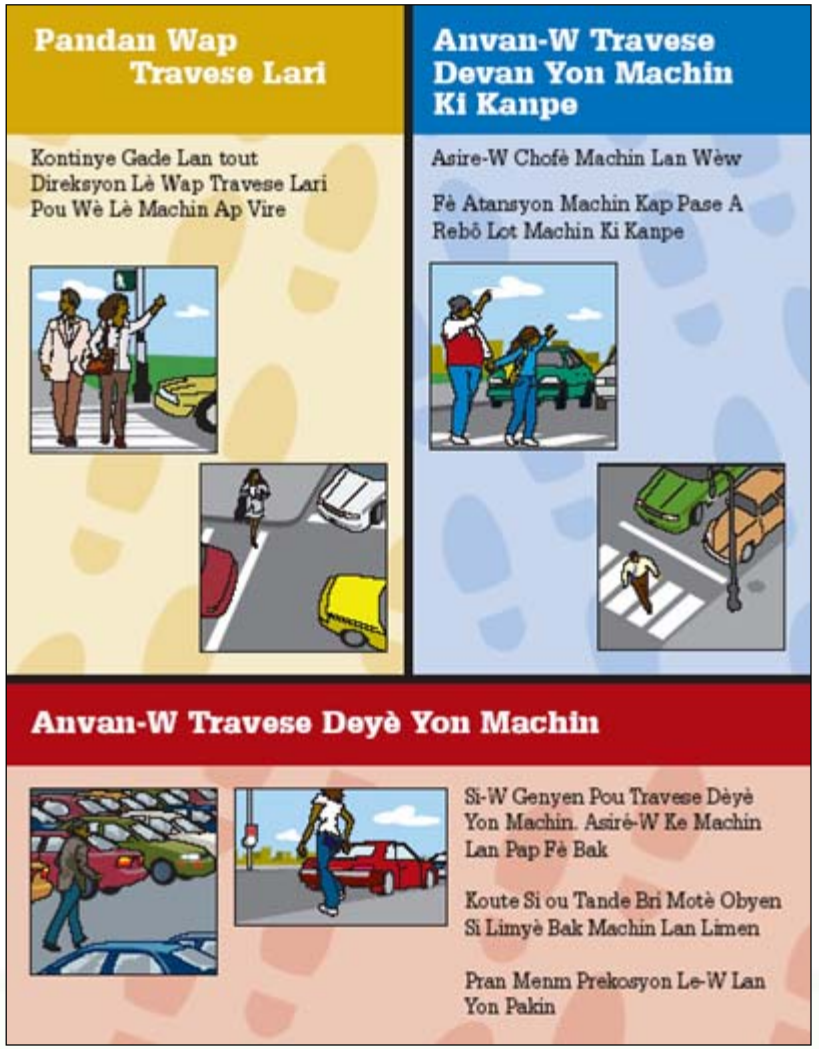
Education: Transit Riders



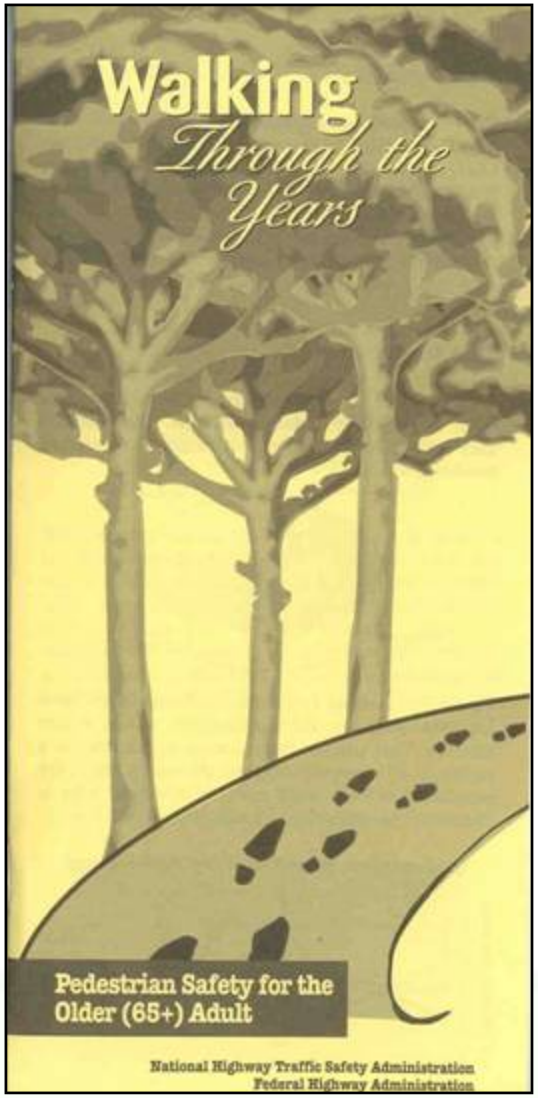


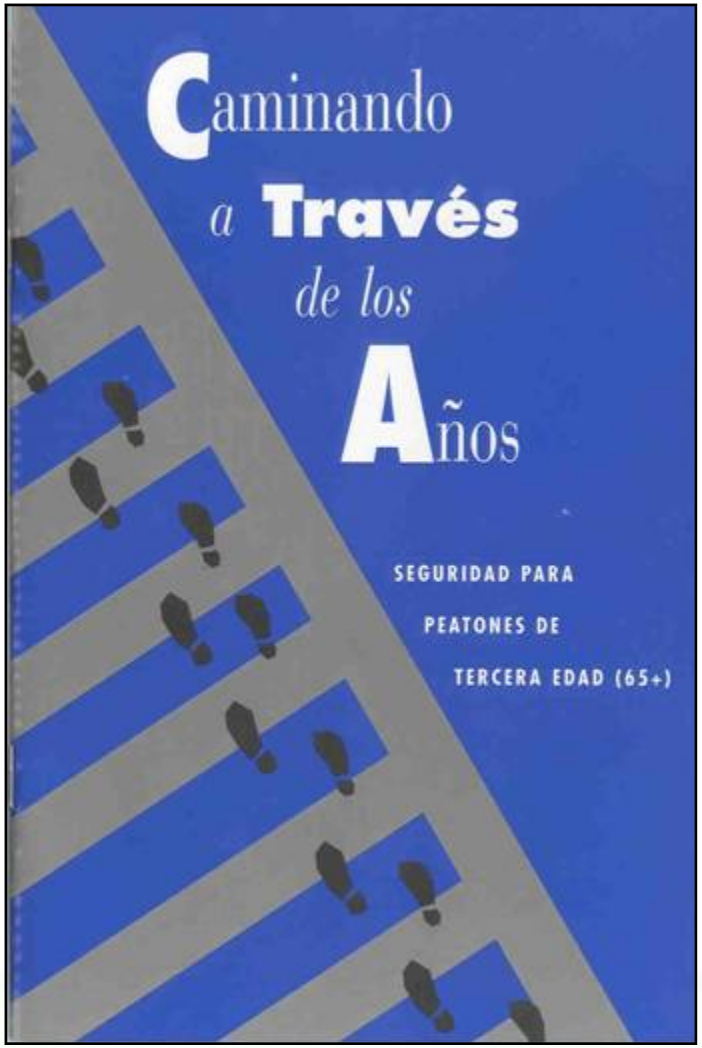
Education: Little Haiti





Education: The Elderly





Enforcement

BARBARA P. HERNANDEZ/FOR THE HERALD

IN DANGER: As cars make their turns, a pedestrian navigates the crosswalk in the 7100 block of Collins Avenue in Miami Beach. Another pedestrian was killed nearby earlier this month.

Yield to pedestrians, police warn

Campaign will ticket violators

BY JOHNNY DIAZ
jdiaz@herald.com

MIAMI BEACH

Drivers, beware.

Ignoring or speeding by pedestrians in crosswalks may land you an $83 fine if you don't

pedestrians.

Collaborating on the program: Miami Beach police and

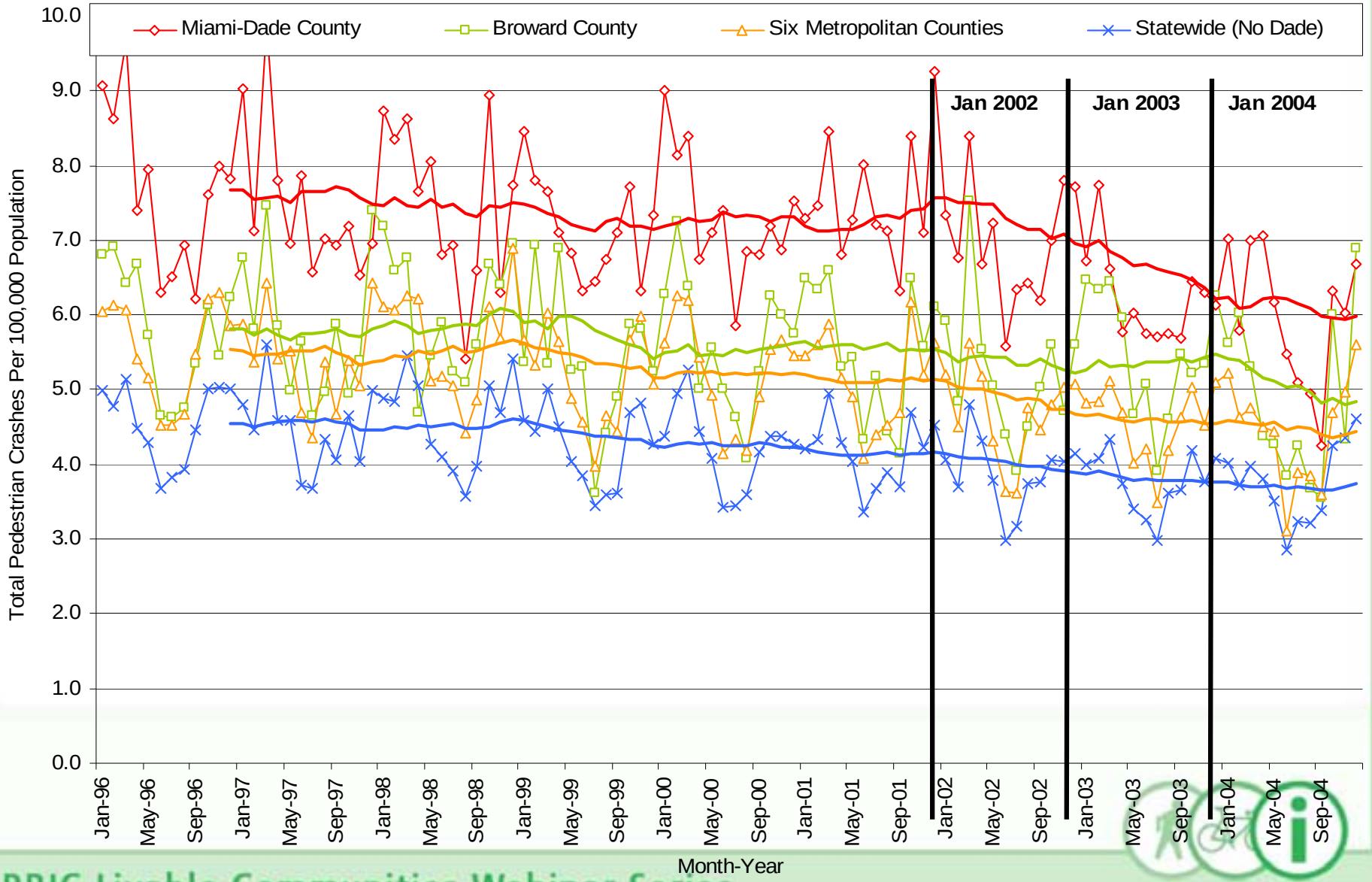
be a hotspot for pedestrian crashes," said Ron Von Hosten, a researcher with the University of Florida who assisted the center with its study based on traffic accidents countywide. "It's the law to yield to the right of way of pedestrians. We want to reach out to the people to make this a walkable commu-

Sign for Crosswalks at Uncontrolled Sites

Sign for Crosswalks at Traffic Signals

Engineering

Results of Time Series Analysis



Analysis Results

- Total program effect countywide was an 8. 5 % to 13 % crash reduction (significant at .05 level)

- This translates to 180 pedestrian crashes reduced/year, or 360 crashes reduced in the 2-year after period

Results (Continued)

- Reduction in crashes countywide attributed to pedestrians aged 14 to 64 (8.6 % annual crash reduction).

- **Crash reductions among children (aged 5 to 12) was 33 % in the 4 zones combined, and greatest reduction in Liberty City.**

- Crash rates lower (not significant) in after period for older Hispanic pedestrians countywide, and no reduction in Little Havana.

- Greatest overall (significant) percent reductions in Liberty City (25 %) and South Beach (22%), not significant in other 2 zones.

Lessons Learned

- A comprehensive pedestrian safety program can be successful, but it requires substantial time and resources
- Program must have broad support and targeting of countermeasures
- More work is needed on improving crash reductions to older adult pedestrians
- Each agency must identify their own unique problems and select countermeasures to best address their specific pedestrian safety problems.

Resources

PBIC: www.walkinginfo.org

FHWA: safety.fhwa.dot.gov

NHTSA: nhtsa.dot.gov

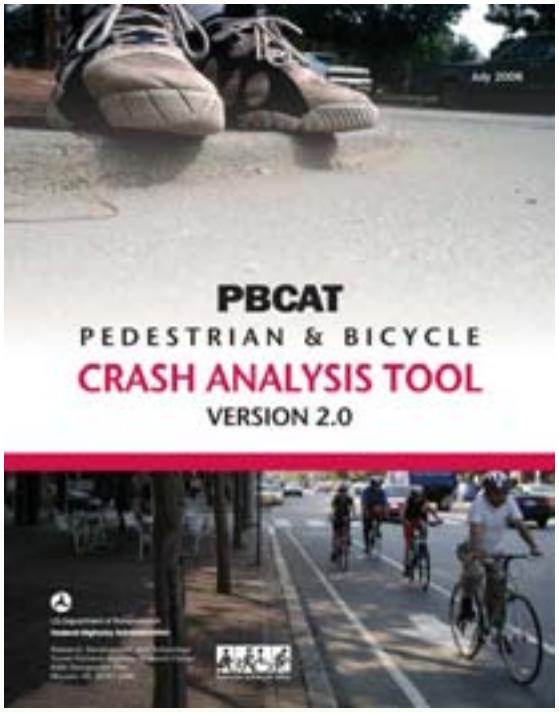
ITE: www.ite.org

AASHTO/NCHRP: safety.transportation.org

Pedestrian and Bicycle Crash Analysis Tool (PBCAT)

www.bicyclinginfo.org/bc/pbcat.htm

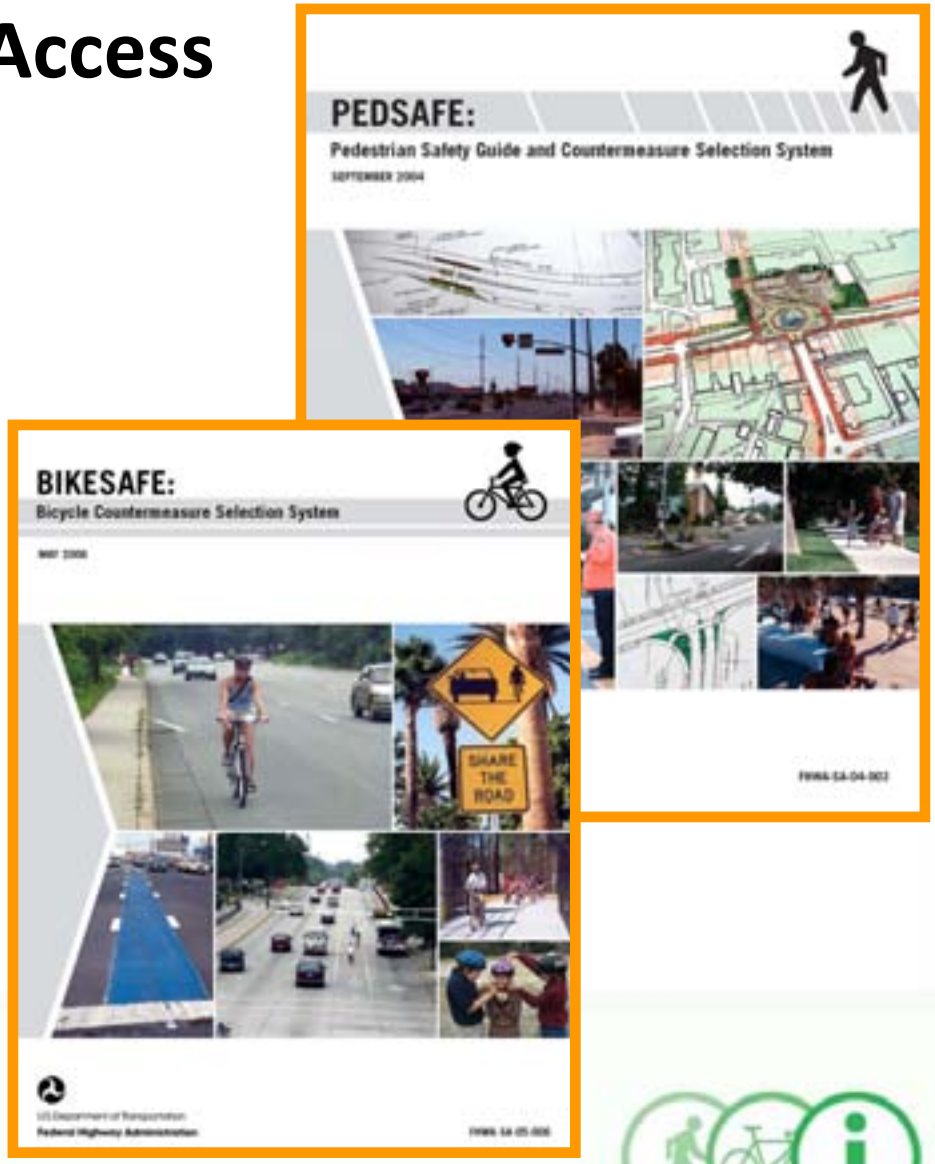
www.walkinginfo.org/pc/pbcat.htm



Product Access

PEDSAFE

– www.walkinginfo.org/pedsafe/



BIKESAFE

– www.bicyclinginfo.org/bikesafe/

Questions?

Thank you for participating.

Charlie Zegeer

zegeer@hsrc.unc.edu

(919) 962-7801