4-to-3 Lane Conversions

National / State Perspectives

Dave Morena
Highway Safety Specialist
FHWA Michigan Division

4-to-3 Lane Conversions

4 -

3 -

Battle Creek, MI

What is the Position of State and Federal Agencies in MI?

- **MDOT:** very pro-active on MDOT roads
- **FHWA HQ:** ramping up support
- **FHWA Michigan:** promote
- **Governor's Traffic Safety Advisory Commission:**

Governor's Traffic Safety Advisory Commission

MI Strategic Highway Safety Plan

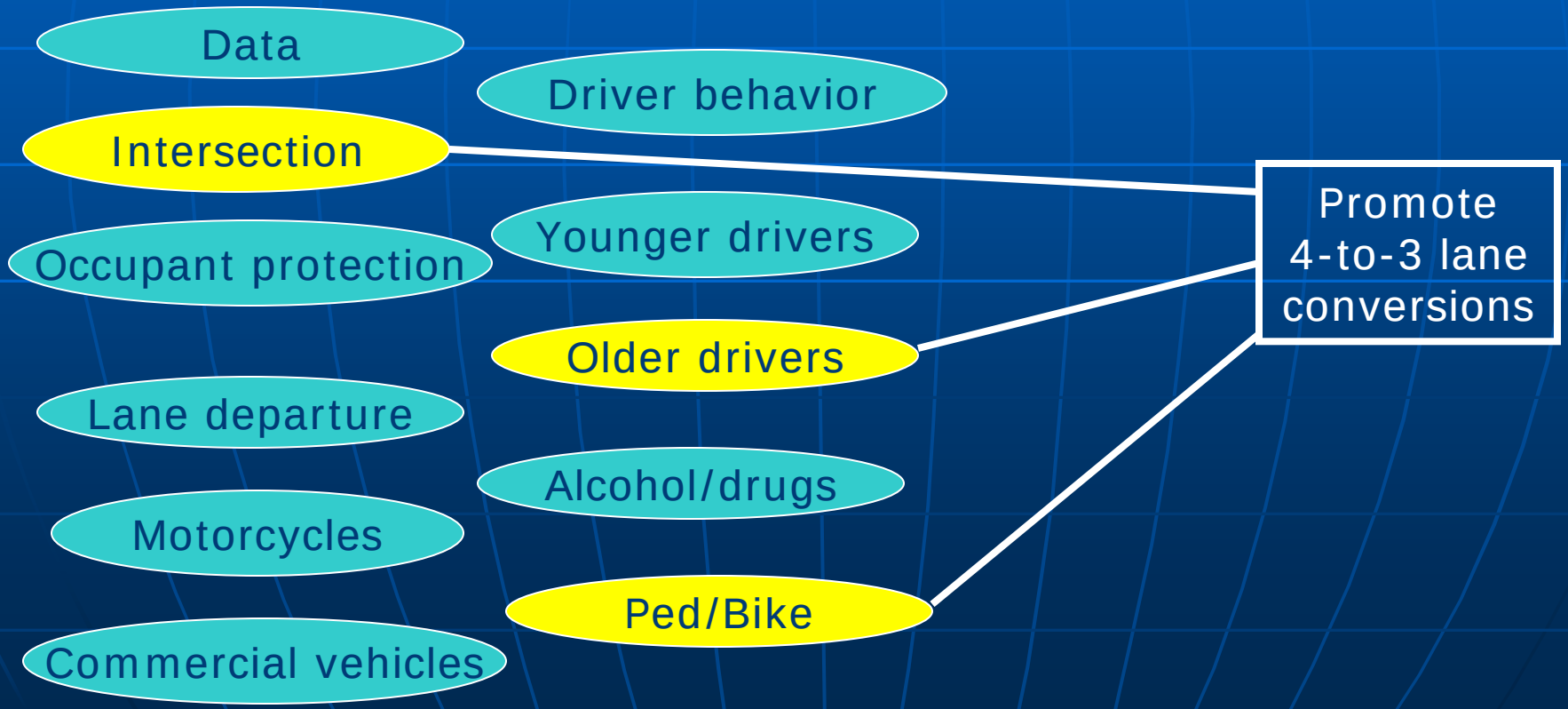
11 emphasis areas / action teams:

- Data
- Driver behavior
- Intersection
- Occupant protection
- Younger drivers
- Older drivers
- Lane departure
- Alcohol/drugs
- Motorcycles
- Ped/Bike
- Commercial vehicles

Governor's Traffic Safety Advisory Commission

MI Strategic Highway Safety Plan

11 emphasis areas / action teams:



Intersection Safety

- Benefits are at the intersections !!!

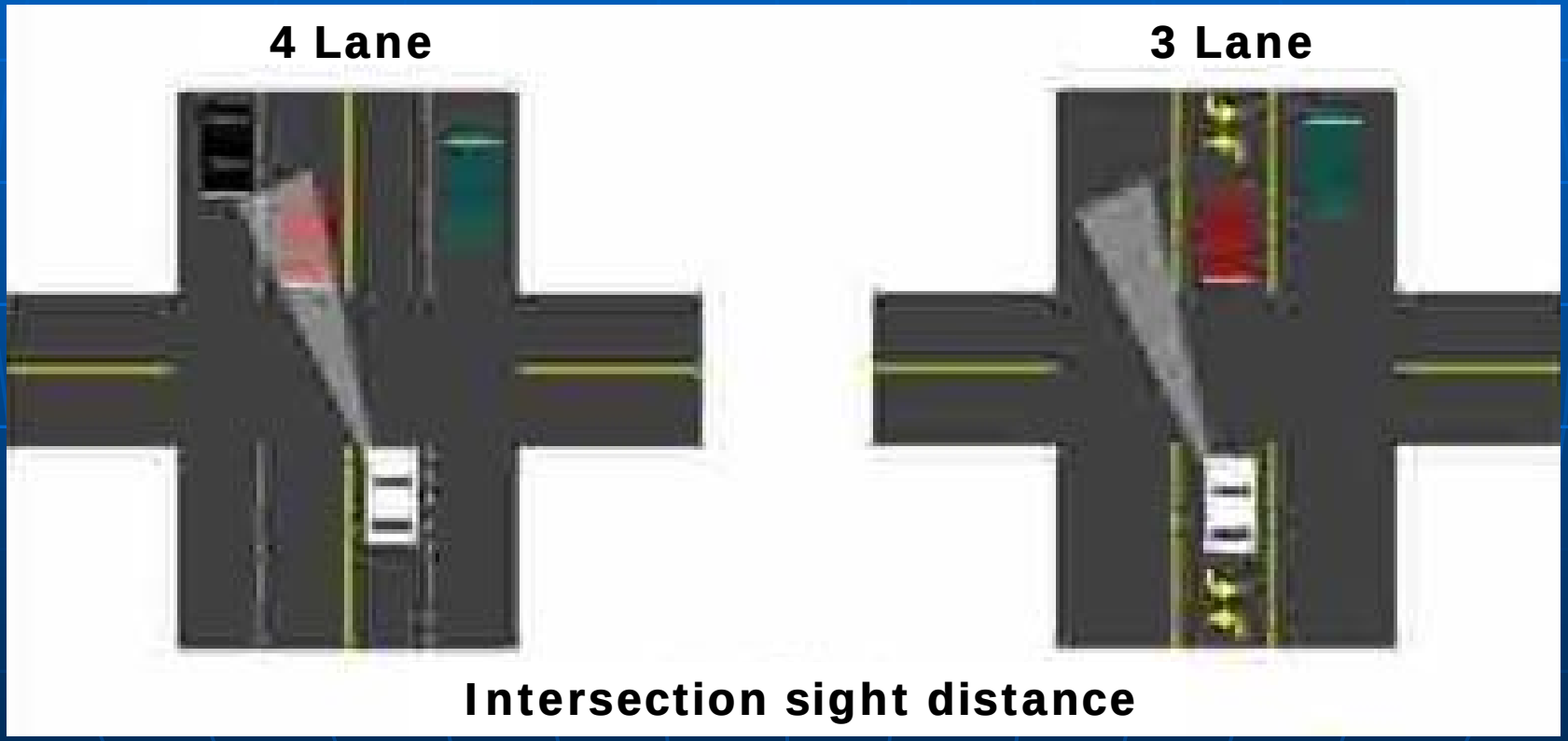
Scanning and the left turn decision

All LTs cross one lane only

All LTs cross one lane only

Right turn radiuis

Intersection Sight Distance



Sideswipe Potential

Depending on traffic demands, 4-lane roads can see:

- speed differential between vehicles
- weaving

Older Driver Benefits

Safe and comfortable
navigation of intersections
is an
older driver issue

FHWA Highway Design Handbook for Older Drivers and Pedestrians:

"The single greatest concern in accommodating older road users … is the ability of these persons to *negotiate intersections safely.*"

Aged Diminished Capabilities

GENERAL CATEGORIES

Physical

Visual

Cognitive

Older Driver Research:

Compared to drivers age 40-49:

- Drivers age 65-69 are 2.3 times more at risk for multiple-vehicle crashes at intersections
- Drivers age 85+ are 10.6 times more at risk

1998 study. Preusser et al

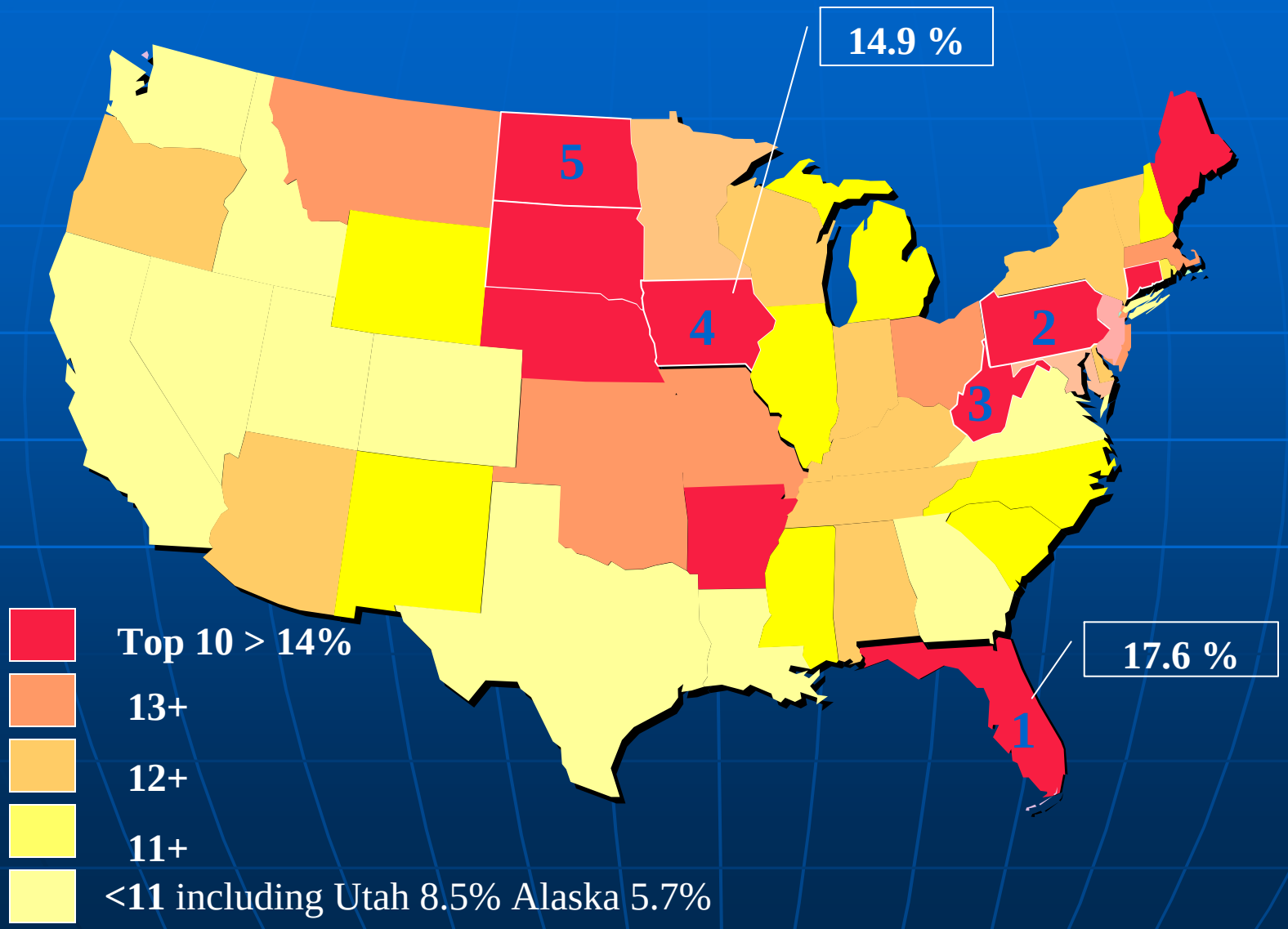
North American Conference on Elderly Mobility

Detroit, Michigan 2004

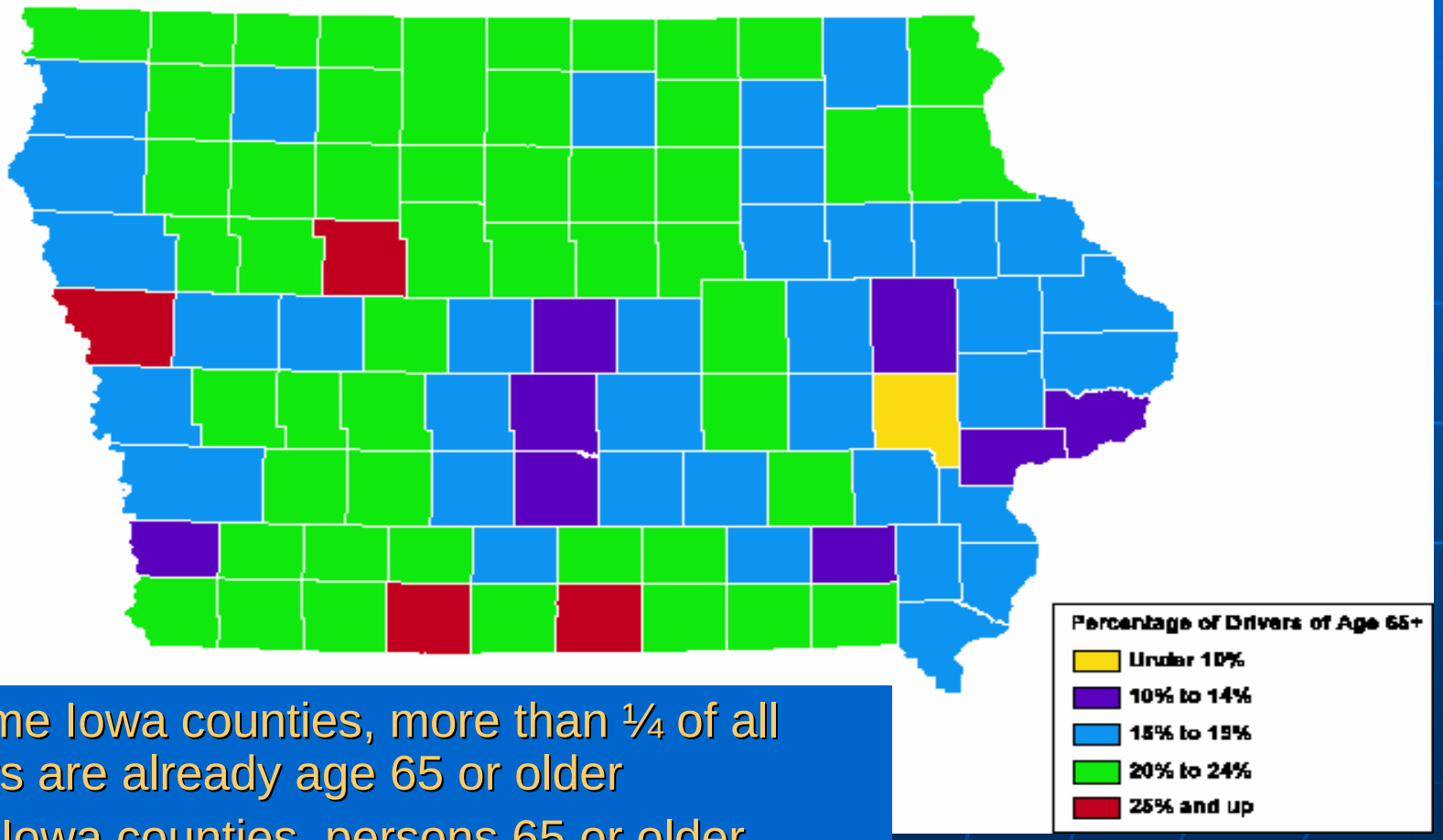
4-Lane to 3-Lane Conversions

Thomas M. Welch, P.E.
State Transportation Safety Engineer
Iowa DOT

Percentage of Population Age 65 and Older 2000 Census, by State



Percent of Iowa Drivers 65 & Older by County 2001



- In some Iowa counties, more than ¼ of all drivers are already age 65 or older
- In 53 Iowa counties, persons 65 or older represent 20% or more of the licensed drivers.

Injury Crash Reduction:
8 Michigan Corridors

All ages ↓ 26%

Drivers over 65 ↓ 37%

M-43, Lansing, MI

Ped & Bike Safety

- Accommodates bicyclists & peds
  - mobility
  - safety

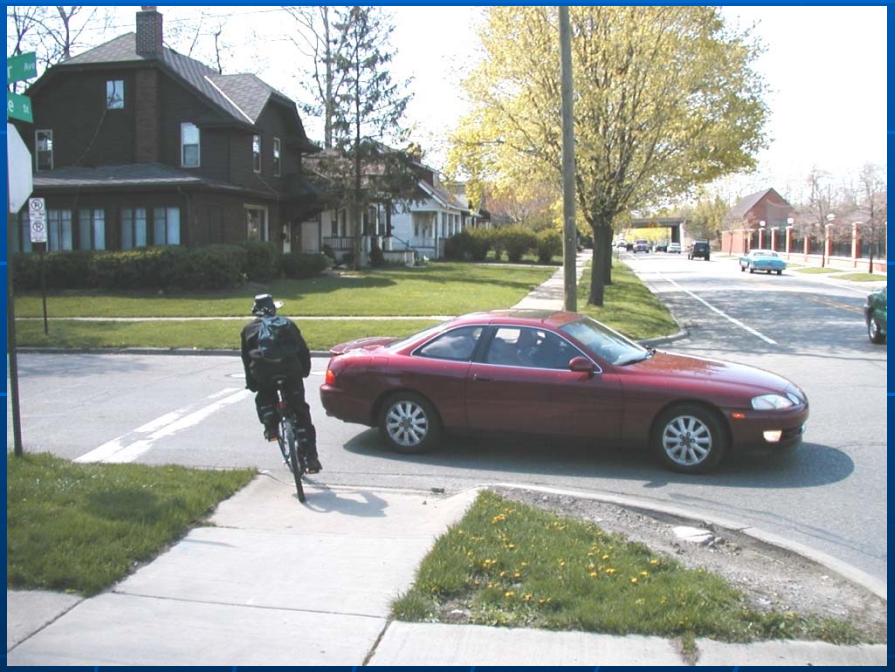
4-to-3 lane conversions

often produce bike lanes as a desirable design addition

Benton Harbor, MI

E. Lansing, MI

Bike lanes are safer than sidewalk



Bicyclist Danger Index

Major Streets w/o bike lanes	1.28
Minor Streets w/o bike lanes	1.04 *
Streets with bike lanes	0.5
Mixed-use paths	0.67
Sidewalks	5.32

(* = shared roadway)

1.00 = median

Source: William Moritz, U.W. - "Accident Rates for Various Bicycle Facilities" - based on 2374 riders, 4.4 million miles

Bike Lanes are move convenient than sidewalks

Battle Creek, MI

Pedestrian Crossing

← 3-lane

← 4-lane

Refuge Islands

Lansing, MI

National Report
Who is doing this and how much?

States

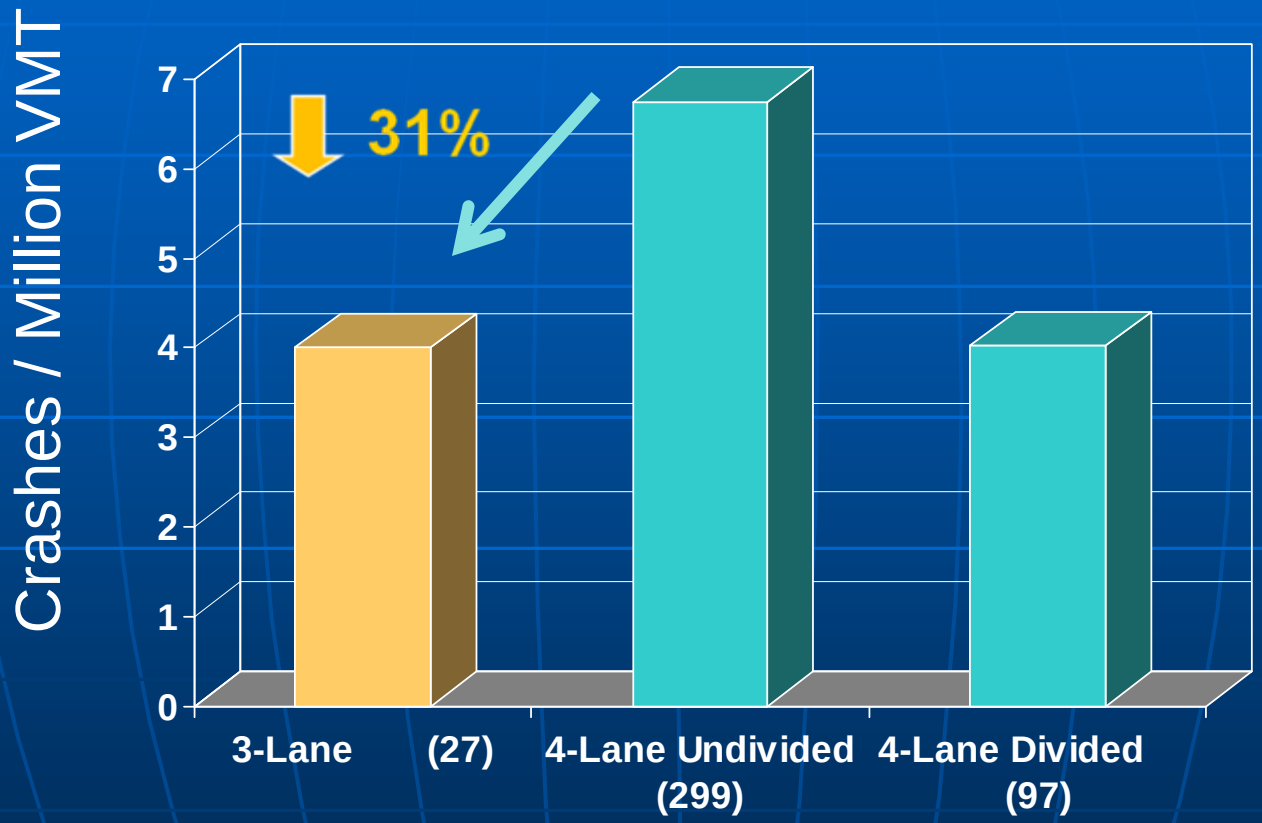
- Minnesota DOT – 58 corridors
- Michigan Dot – 44 corridors
- Iowa DOT – 25 + stopped counting

- a few: AK, CO, IN, MT, OR, WI
- none: AR, MA, PA, WV

Cities

- Seattle - 32 corridors
- Phoenix - 14 miles
- CA - many cities
- NYC - plans 20 corridors

Urban Minnesota DOT Crash Rates



National study – Iowa
15 corridors


HSIS
Highway Safety Information System

The Highway Safety Information System (HSIS) is a multi-State safety database that contains crash, roadway inventory, and traffic volume data for a select group of States. The participating States—California, Illinois, Maine, Michigan, Minnesota, North Carolina, Ohio, Utah, and Washington—were selected based on the quality of their data, the range of data available, and their ability to merge the data from the various files. The HSIS is used by FHWA staff, contractors, university researchers, and others to study current highway safety issues, direct research efforts, and evaluate the effectiveness of accident countermeasures.

U.S. Department of Transportation
Federal Highway Administration

Research, Development, and Technology
Turner-Fairbank Highway Research Center
6300 Georgetown Pike • McLean, VA 22101-2296

SUMMARY REPORT

Evaluation of Lane Reduction "Road Diet" Measures on Crashes

This Highway Safety Information System (HSIS) summary replaces an earlier one, Evaluation of Lane Reduction "Road Diet" Measures and Their Effects on Crashes and Injuries *(FHWA-HRT-04-082), describing an evaluation of "road diet" treatments in Washington and California cities. This summary reexamines these data using more advanced study techniques and adds an analysis of road diet sites in smaller urban communities in Iowa.*

A *road diet* involves narrowing or eliminating travel lanes on a roadway to make more room for pedestrians and bicyclists.[1] While there can be more than four travel lanes before treatment, road diets are often conversions of four-lane, undivided roads into three lanes—two through lanes plus a center turn lane (see figure 1 and figure 2). The fourth lane may be converted to a bicycle lane, sidewalk, and/or on-street parking. In other words, the existing cross section is reallocated. This was the case with the two sets of treatments in the current study. Both involved conversions of four lanes to three at almost all sites.

Road diets can offer benefits to both drivers and pedestrians. On a four-lane street, speeds can vary between lanes, and drivers must slow or change lanes due to slower vehicles (e.g., vehicles stopped in the left lane waiting to make a left turn). In contrast, on streets with two through lanes plus a center turn lane, drivers' speeds are limited by the speed of the lead vehicle in the through lanes, and through vehicles are separated from left-turning vehicles. Thus, road diets may reduce vehicle speeds and vehicle interactions, which could potentially reduce the number and severity of vehicle-to-vehicle crashes. Road diets can also help pedestrians by creating fewer lanes of traffic to cross and by reducing vehicle speeds. A 2001 study found a reduction in pedestrian crash risk when crossing two- and three-lane roads compared to roads with four or more lanes.[2]

Under most annual average daily traffic (AADT) conditions tested, road diets appeared to have minimal effects on vehicle capacity because left-turning vehicles were moved into a common two-way left-turn lane (TWLTL).[3,4] However, for road diets with AADTs above approximately 20,000 vehicles, there is an increased likelihood that traffic congestion will increase to the point of diverting traffic to alternative routes.

While potential crash-related benefits are cited by road diet advocates, there has been limited research concerning such benefits. Two prior studies were conducted using data from different urbanized areas. The first, conducted by HSIS researchers, used data from treatment sites in eight cities in California and Washington.[5] The second study analyzed data from treatment sites in relatively small towns in Iowa.[6] While the nature of the treatment was the same in both studies (four lanes reduced to three), the settings, analysis methodologies, and results of the studies differed. Using a comparison of treated and matched comparison sites before and after treatment and the development of negative binomial regression models, the earlier HSIS study found a 6 percent reduction in crash frequency per mile and no significant change in crash rates at the California and Washington sites. Using a long-term (23-year) crash history for treated and reference sites and the development of a hierarchical Poisson model in a Bayesian approach, the later Iowa study

1

Total crashes ↓ 47%

National study – CA and WA
30 corridors

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1

Total crashes ↓ 19%

Table 3

Data on Street Conversions - Seattle, Washington

ROADWAY SECTION	DATE CHANGE			CHANGE	COLLISION REDUCTION
Greenwood Ave. N, from N 80th St. to N 50th St.	April 1995	11872	12427	4 lanes to 2 lanes plus TWLTL plus bike lanes	24 to 10 58%
N 45th Street in Wallingford Area	December 1972	19421	20274	4 lanes to 2 lanes plus TWLTL	45 to 23 49%
8th Ave. NW in Ballard Area	January 1994	10549	11858	4 lanes to 2 lanes plus planted median with pockets as needed	18 to 7 61%
Martin Luther King Jr. Way, north of I-90	January 19			nes to 2 lanes plus LTL plus bike lanes	15 to 6 60%
Dexter Ave. N, East side of Queen Anne Area	June 1991	13606	14949	4 lanes to 2 lanes plus TWLTL plus bike lanes	19 to 16 59%
24th Ave. NW, from NW 85th St. to NW 65th St.	October 1995	9727	9754	4 lanes to 2 lanes plus TWLTL	14 to 10 28%
Madison St., from 7th Ave. to Broadway	July 1994	16969	180	4 lanes to 2 lanes plus TWLTL	28 to 28 0%
W Government Way/Gilman Ave W, from W Ruffn St. to 31st. Ave. W					6 to 6 0%
12th Ave., from Yesler Way to John St.	March 1995	11751	12557	4 lanes to 2 lanes plus TWLTL plus bike lanes	16 to 16 0%
				Total	185 to 122 34%

Seattle, WA

9 corridors

crashes 34%

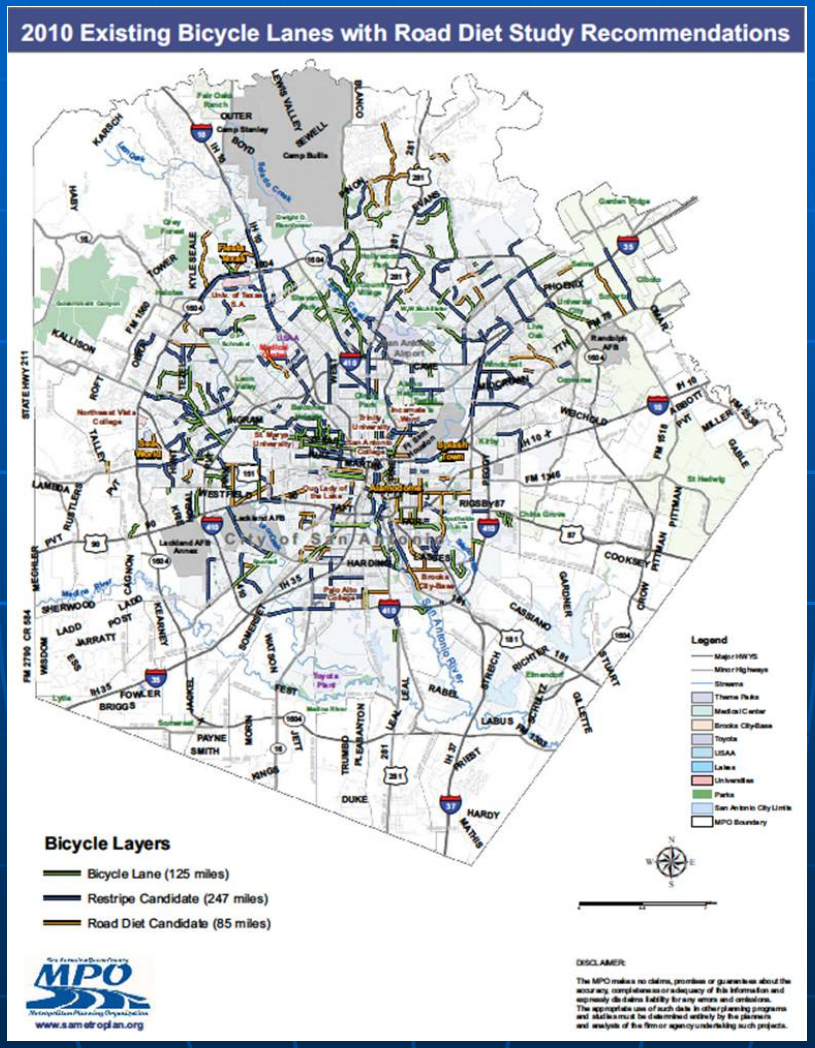
What drives these conversions?

- Iowa, Mich DOT – crash reduction

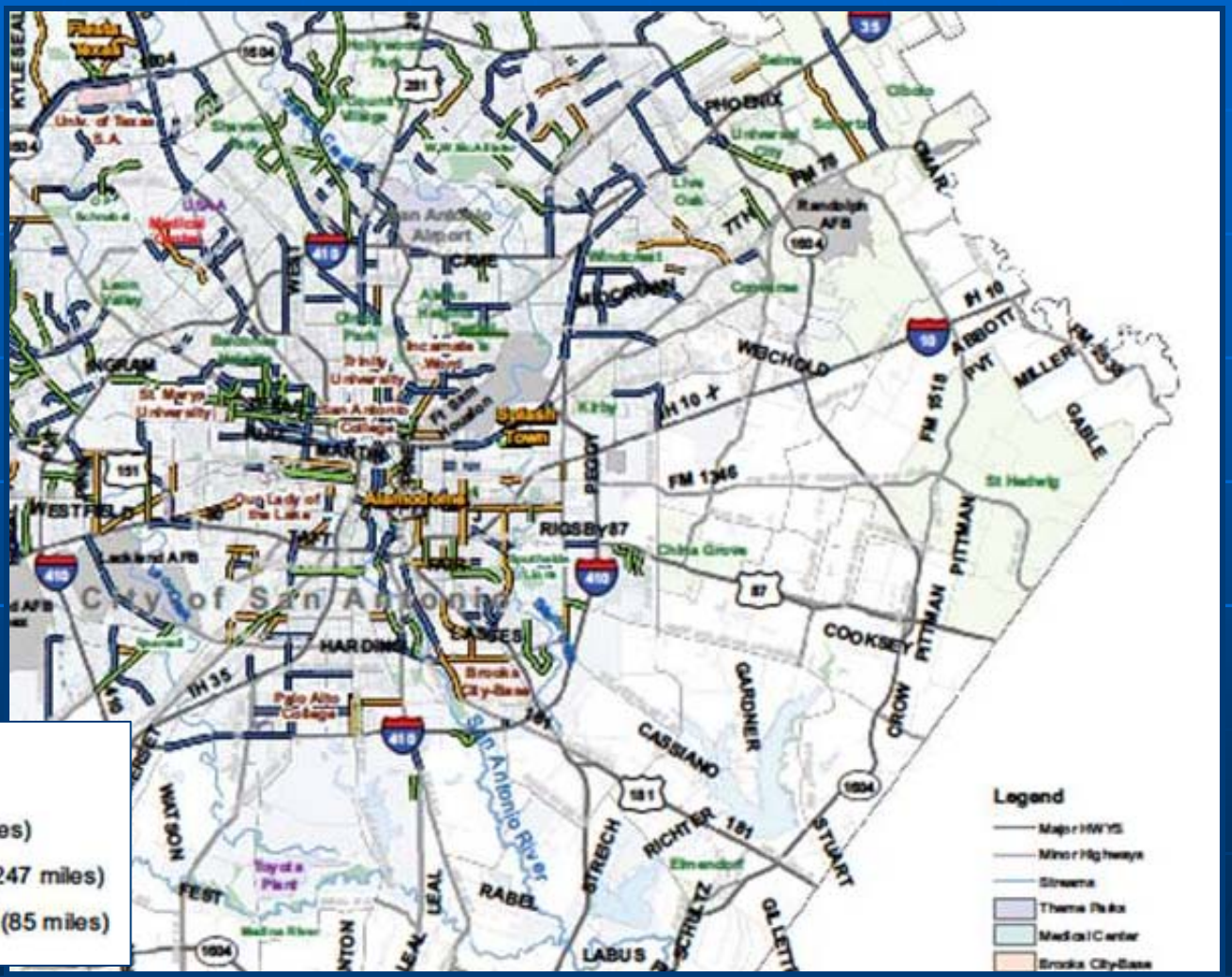
What drives these conversions?

- Iowa, Mich DOT – crash reduction
- Cities –
  - Livability, walkability
  - Bicycle/ Ped accommodation - San Antonio
  - Complete streets

San Antonio


2010 Existing Bicycle Lanes with Road Diet Study Recommendations
Bicycle Layers
Bicycle Lane (125 miles)
Restripe Candidate (247 miles)
Road Diet Candidate (85 miles)
Legend
MPO
www.sametroplan.org
DISCLAIMER:

San Antonio


Bicycle Layers
Bicycle Lane (125 miles)
Restripe Candidate (247 miles)
Road Diet Candidate (85 miles)
City of San Antonio
Legend
Major HWYS
Minor Highways
Streams
Theme Parks
Medical Center
Brooks City-Base

Michigan Report
Who is doing this and how much?

MDOT -	41 corridors	
Genesee MPO -	19 corridors	(Flint – 14)
Tri-county MPO –	15 corridors	(Lansing - 8)
Ann Arbor -	10 corridors	
Kent Co. -	6 corridors	

Injury Crash Reduction:
8 Michigan Corridors

M-43, Lansing, MI

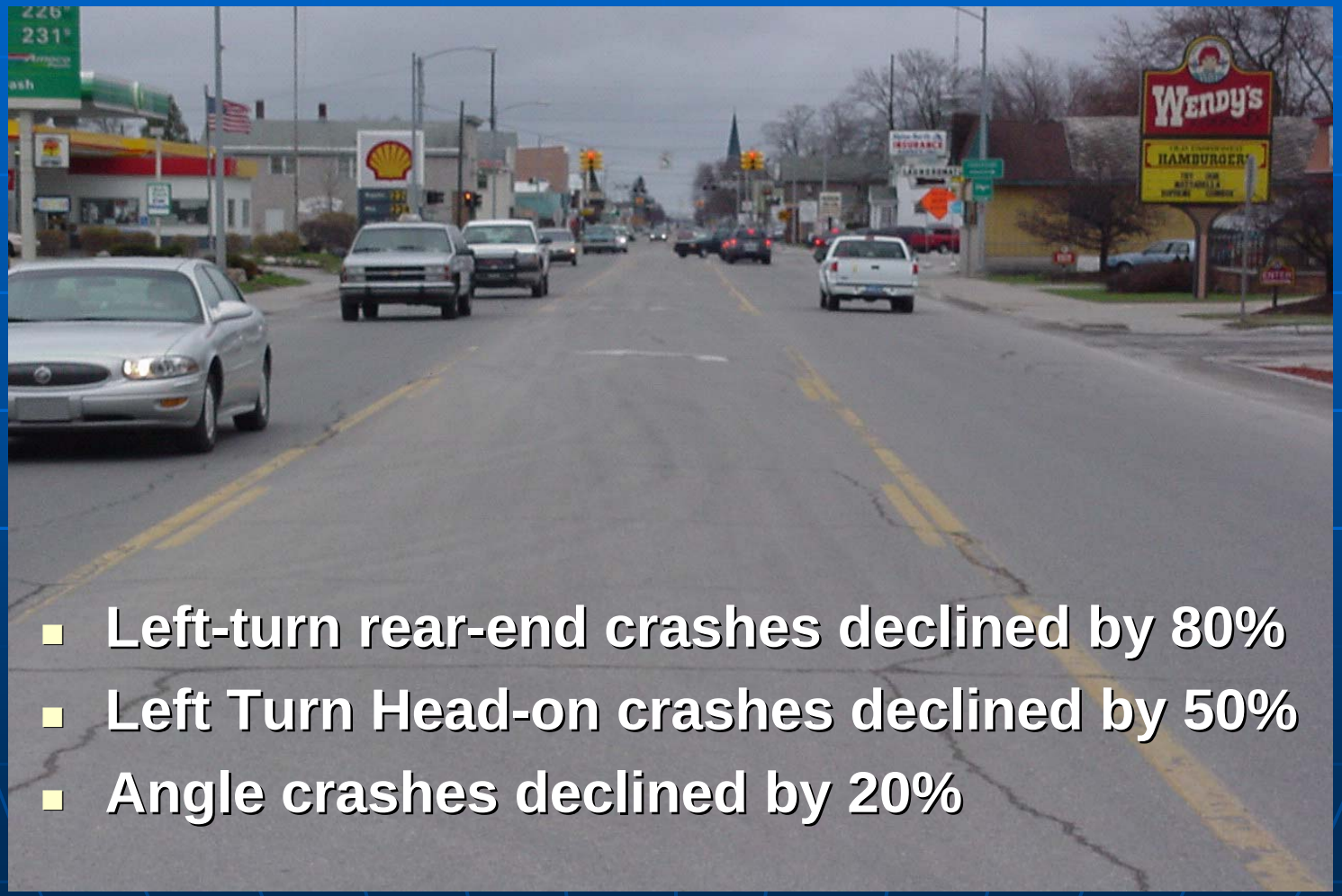
All ages ↓ 26%

Drivers over 65 ↓ 37%

Pedestrians ↓ 37%

US-23 in city of Alpena

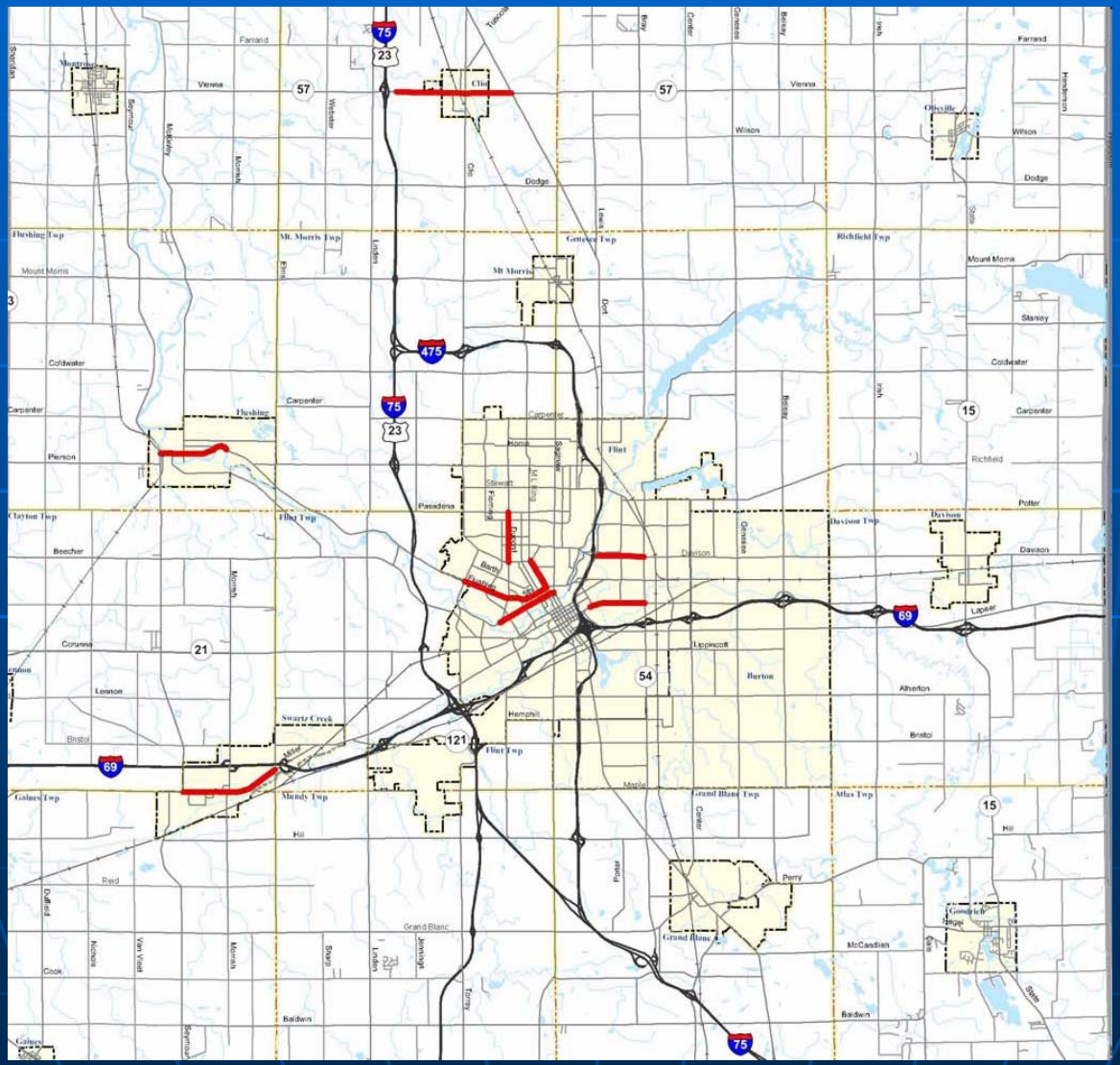
2000 conversion



- **Left-turn rear-end crashes declined by 80%**
- **Left Turn Head-on crashes declined by 50%**
- **Angle crashes declined by 20%**

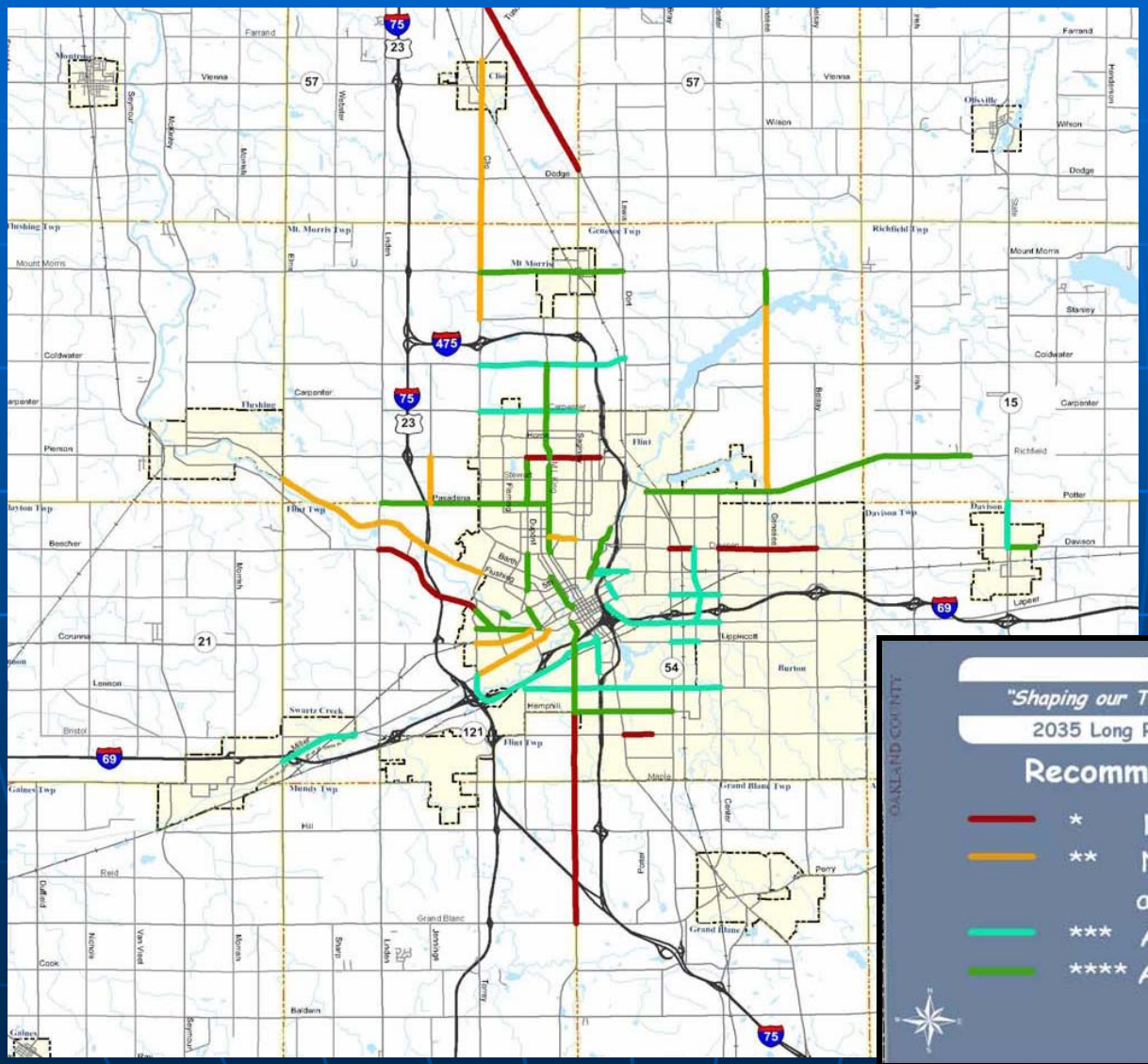
Genesee County MPO

Converted corridors



Genesee County MPO

Potential corridors



Genesee County MPO – 8 corridors:

Non-alcohol, non-deer crashes

↓ 32%

Michigan Research

- MDOT has let a research contract, beginning Oct 1, 2010 to evaluate benefits/effects of 4-to-3 lane conversions in Michigan
  - Safety, delay, ped , bike, operational impact
  - Literature review of design considerations
- Final report due Sep 2011

Design Considerations

What is appropriate ADT?

< 15,000	considered an assumed success
15–20,000	worth looking at
20–24,000	depends on: • project goals • driveways • left-turning traffic • widen at intersections

Michigan road Diets
High ADT

Northline Rd, Wyandotte -	19,900 ADT
Cass Ave, Mt. Clemens -	19,200 ADT
M-57, Clio -	17,000 ADT
Abbot Rd, E. Lansing -	16,500 ADT
US-31, Parkdale -	14,600 ADT

What is appropriate Design Year?

Restriping only - 3 years

What is appropriate Design Year?

Pavement resurfacing / same curb line - 3 years

Reconstruction / curb line moved in - 20 years

What is appropriate Lane Width?

12’ - moving traffic / trucks

11’ - traffic calming effect

10’ - has worked in cities, neighborhoods

CONTROVERSY

Bessemer

TUESDAY, MAY 20, 2008

DAILY GLOBE

Comments on US-2 change mostly negative

■ Many residents say at Monday public hearing that excessive speed is a problem through city

CONTROVERSY

Frankenmuth

Serving The Frankenmuth Area Since 1906 **50¢**

Frankenmuth

The City With Bavarian Hospitality

NEWSPAPER - DO NOT DELAY
USPS 207-960

VOL. 95
NO. 20 WEDNESDAY, NOVEMBER 15, 2000 Frankenmuth, MI 48734

Council stands by decision; Main Street back to 4 lanes

Overflow audience attends final meeting

THREE LANE TO BE REMOVED BY NOV. 30

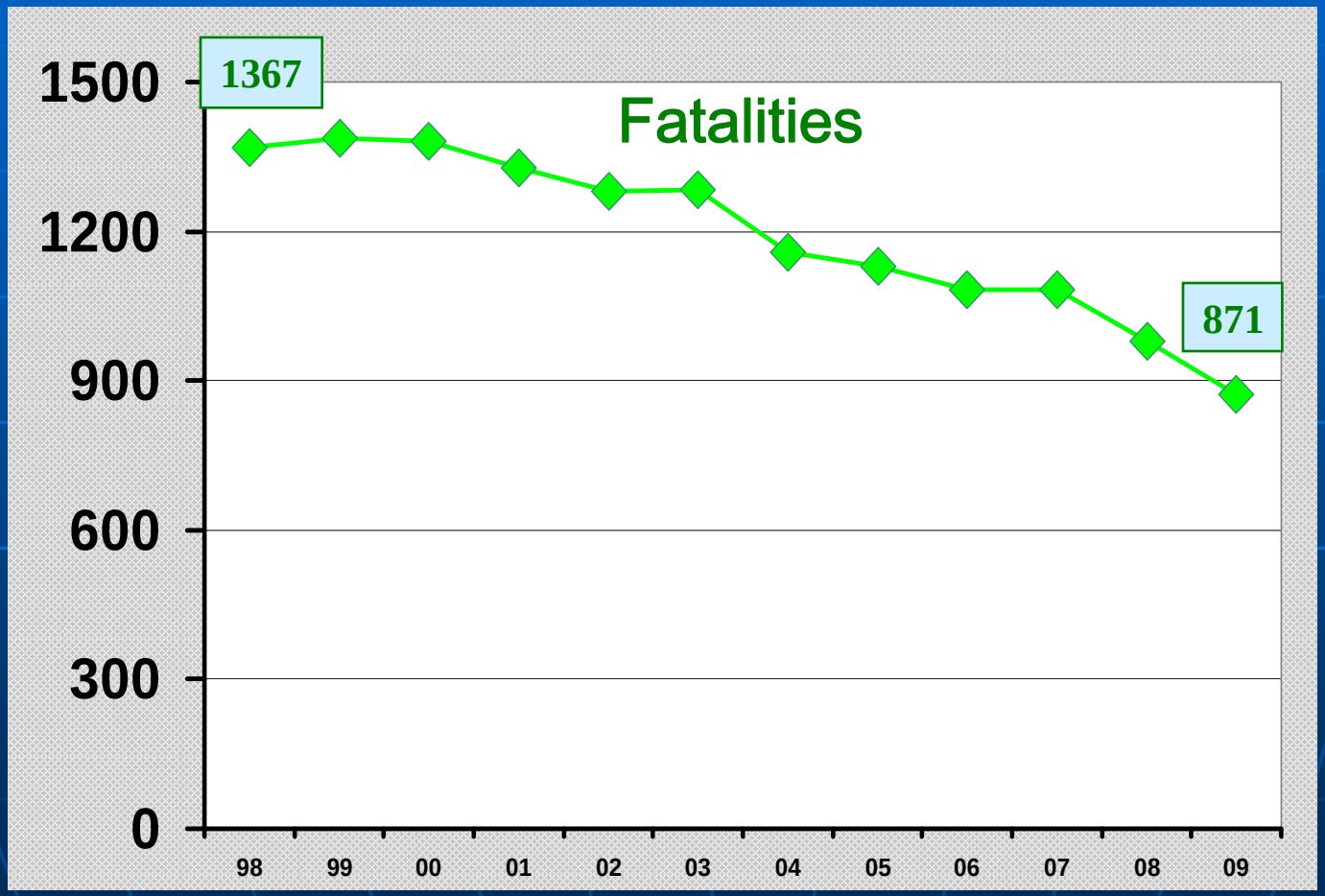
The City Council Chambers were full last Wednesday evening with an overflow crowd sitting on chairs and standing in the hallway outside the chamber doors. The subject of intensive local interest was the old three lane versus four lane configuration for the downtown area of Main Street. The question was played up the council

In his Oct. 24 letter to Mayor Rupprecht which was reprinted in its entirety in last week's issue of the NEWS, Mr. DeSana listed his reasons why he thought the three lane highway was the best design for our downtown area. However, in his next to last sentence in the three page letter, DeSana said "Please work with the Bay Region Office to coordinate the conversion back to the four lane cross section." In effect, he was again letting the City Council make the final decision and he was approving a

CONTROVERSY

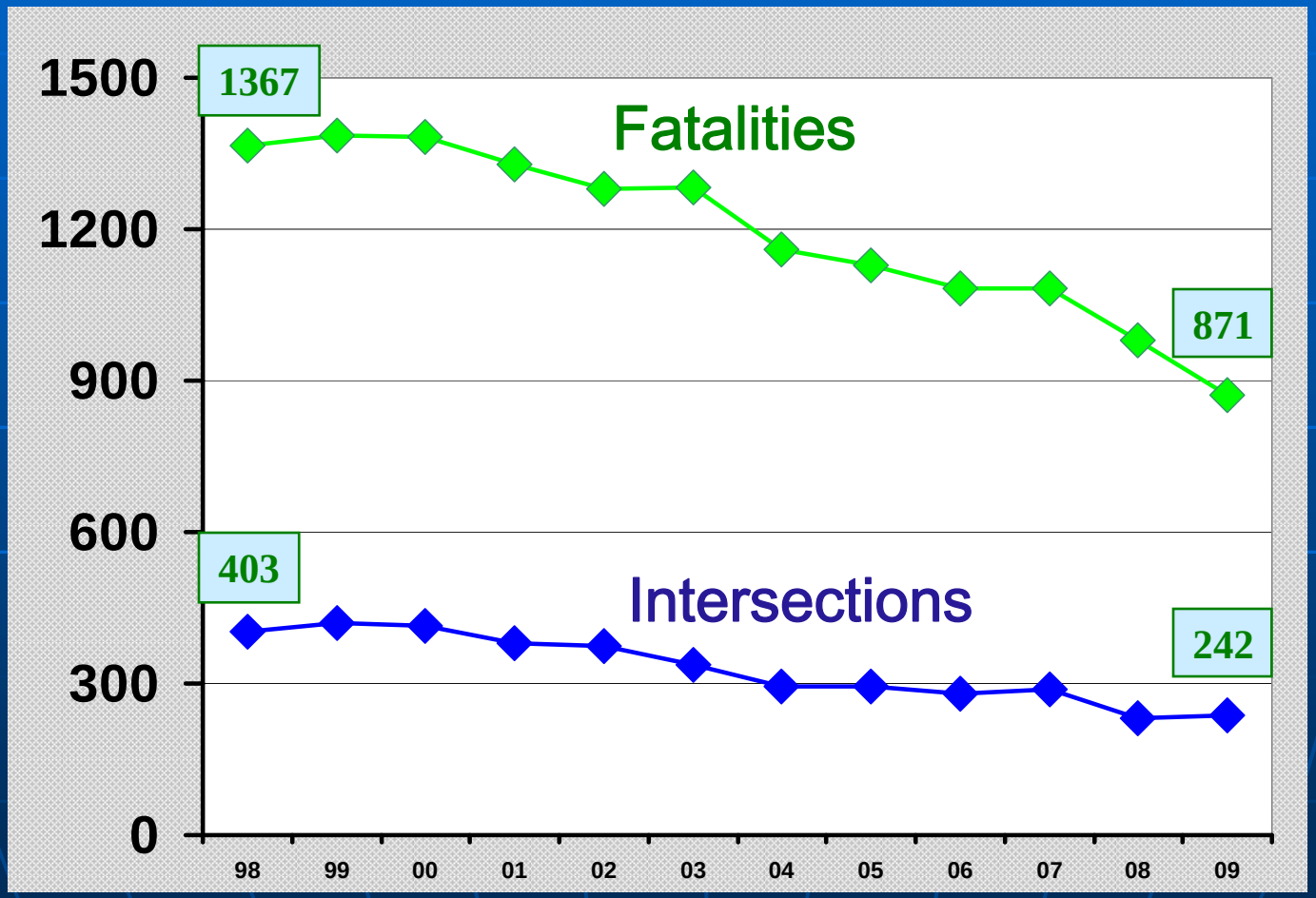
Owosso

Michigan success story:



36%

Michigan success story:



36%

40%

Questions?

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