

# **Land Use, Transportation, Population and Human Health Indicators**

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# Land Use, Transportation, Population & Human Health Indicators

## INDICATOR

## CONTACTS

Land Use Changes	Xuan Liu, Data Centre, SEMCOG
Human Population Growth and Distribution	Xuan Liu & Jim Rogers, Data Centre, SEMCOG
Transportation Trends	Jennifer Evans, Transportation Coordinator, SEMCOG
Michigan's Carbon Emissions	US Environmental Protection Agency
Rates of Asthma Hospitalization	Robert Wahl, Michigan Department of Community Health & Guadalupe Cummins, Wayne State University
Lead Poisoning	Valerie Monet & Guadalupe Cummins, Wayne State University
West Nile Virus	Erik Foster, Michigan Department of Community Health

# Land Use Change: SE Michigan

Xuan Liu, SEMCOG

■ 1950: Agriculture → urban

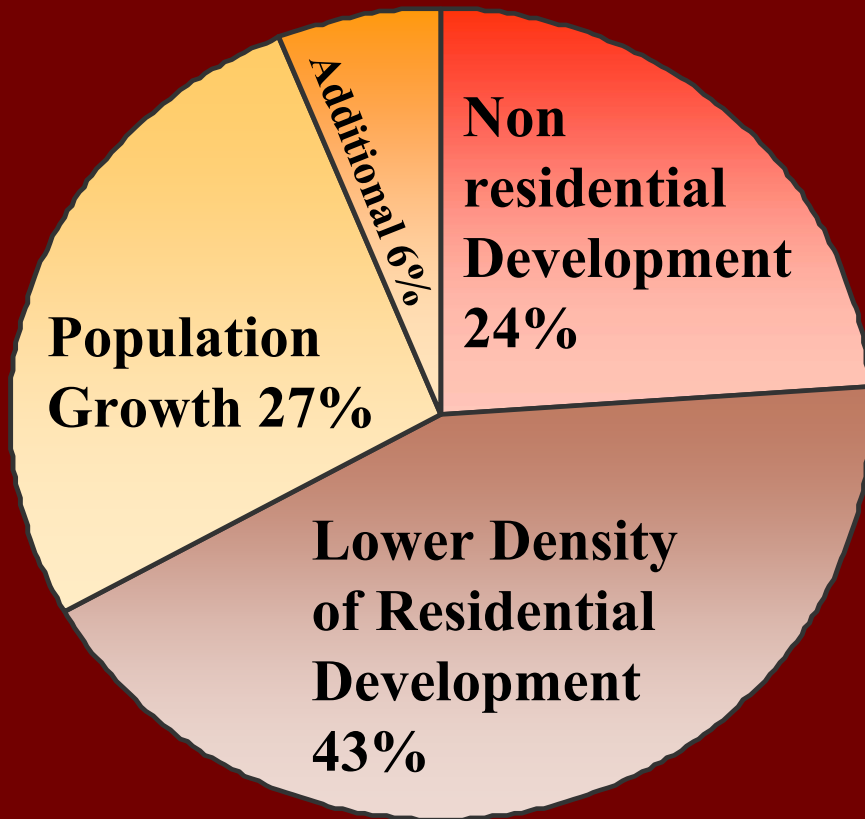
■ 1990 – 2000:

➤ ↓ farmland by 140,000 acres

➤ 19 % ↑ residential land

➤ 18.3% ↑ open-pit extraction

➤ pre-1990: 2.84 housing units/acre  
post-1990: 1.26 housing units/acre

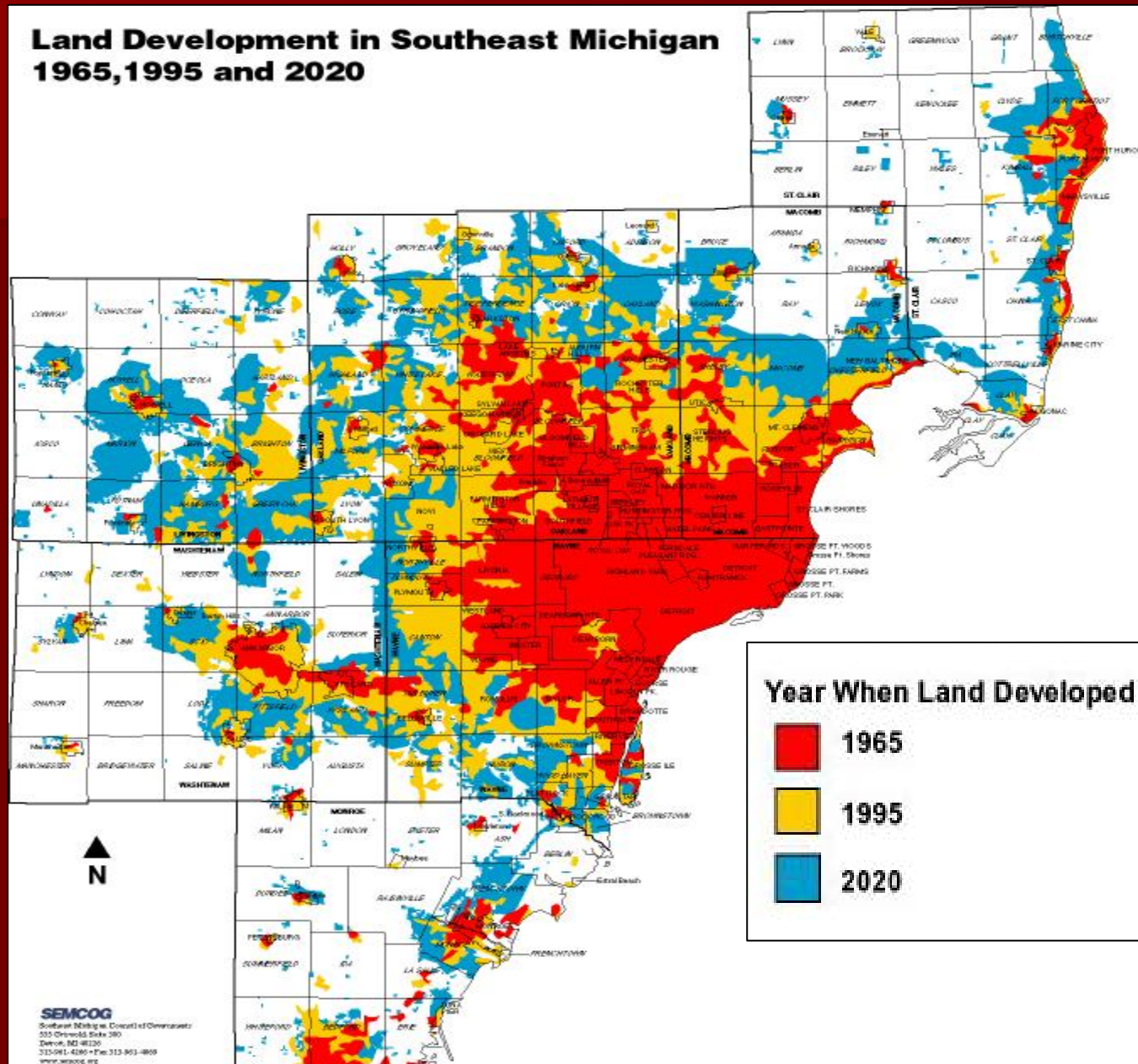


Uses of Developed Land: 1990-2000



# Land Use Change: SE Michigan

## Land Development in Southeast Michigan 1965, 1995 and 2020

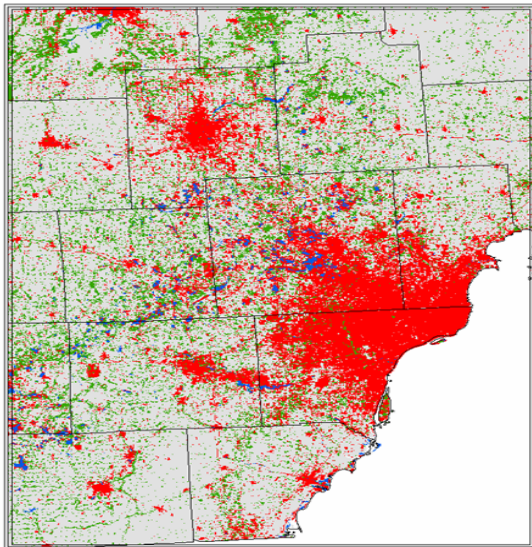




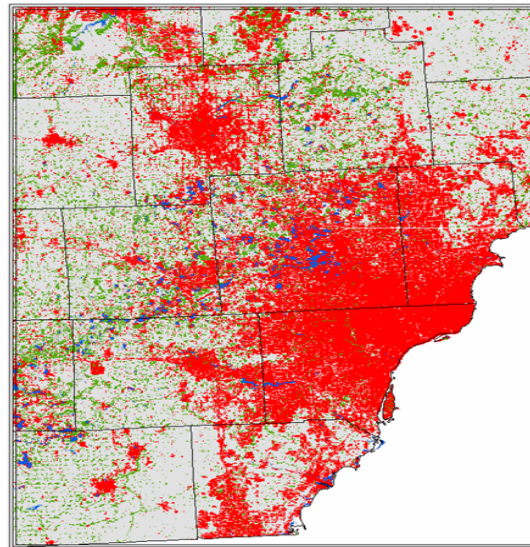
# Land Use Change: SE Michigan

## ■ Needs:

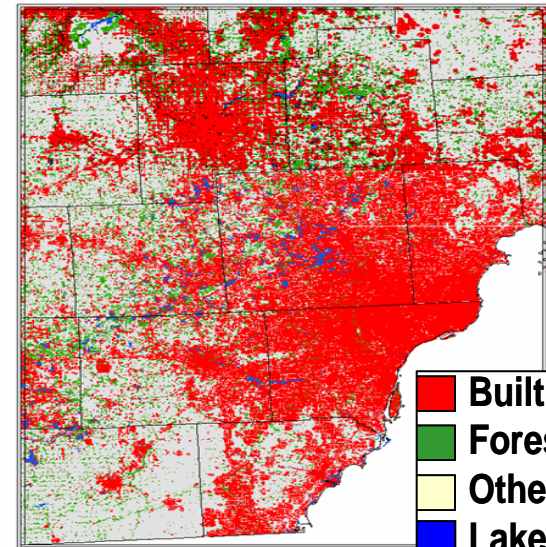
- Ecosystem-based land management
- Defined roles by all government levels
- Research



1980



2020



2040



# Human Population Growth and Distribution in SE Michigan

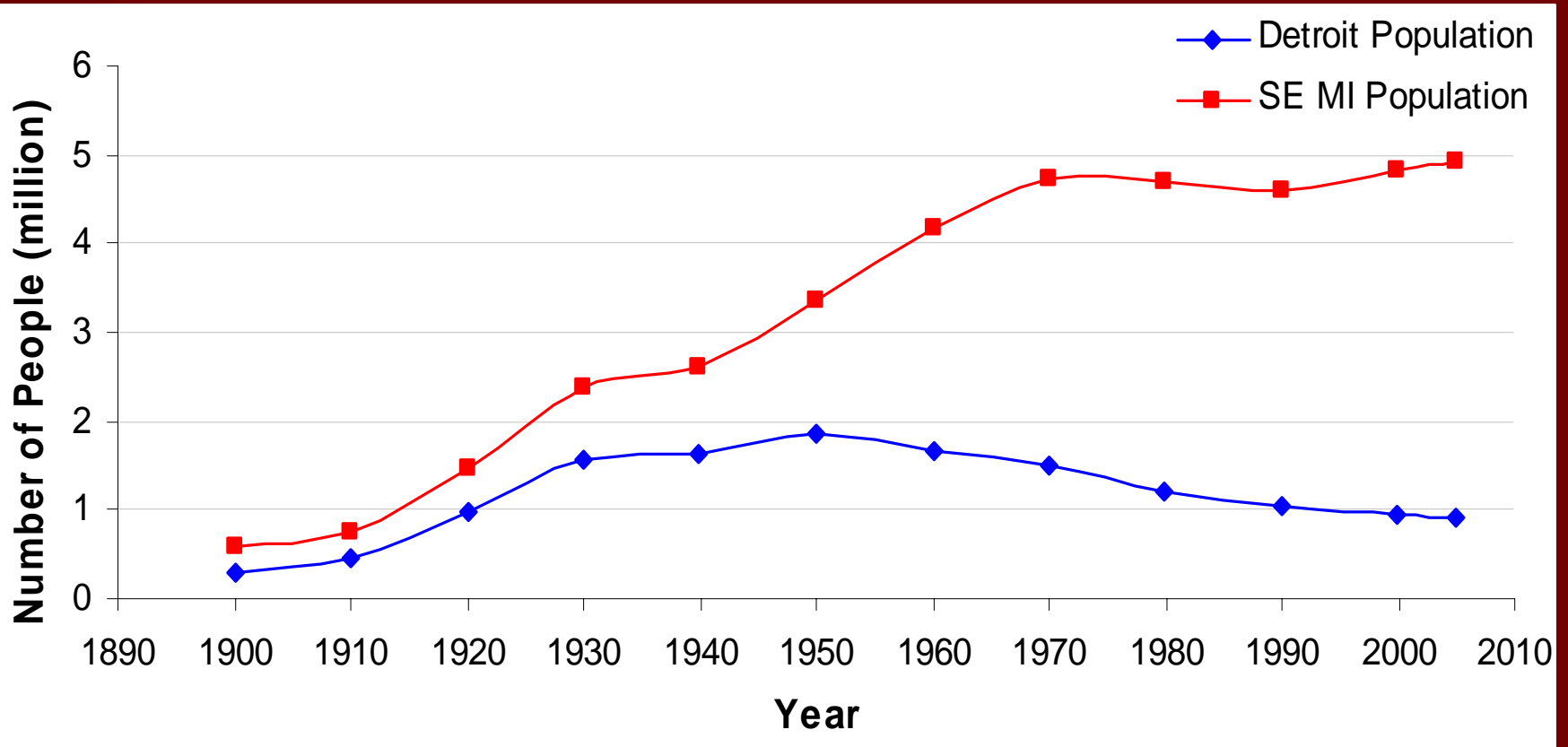
Xuan Liu & Jim Rogers, SEMCOG



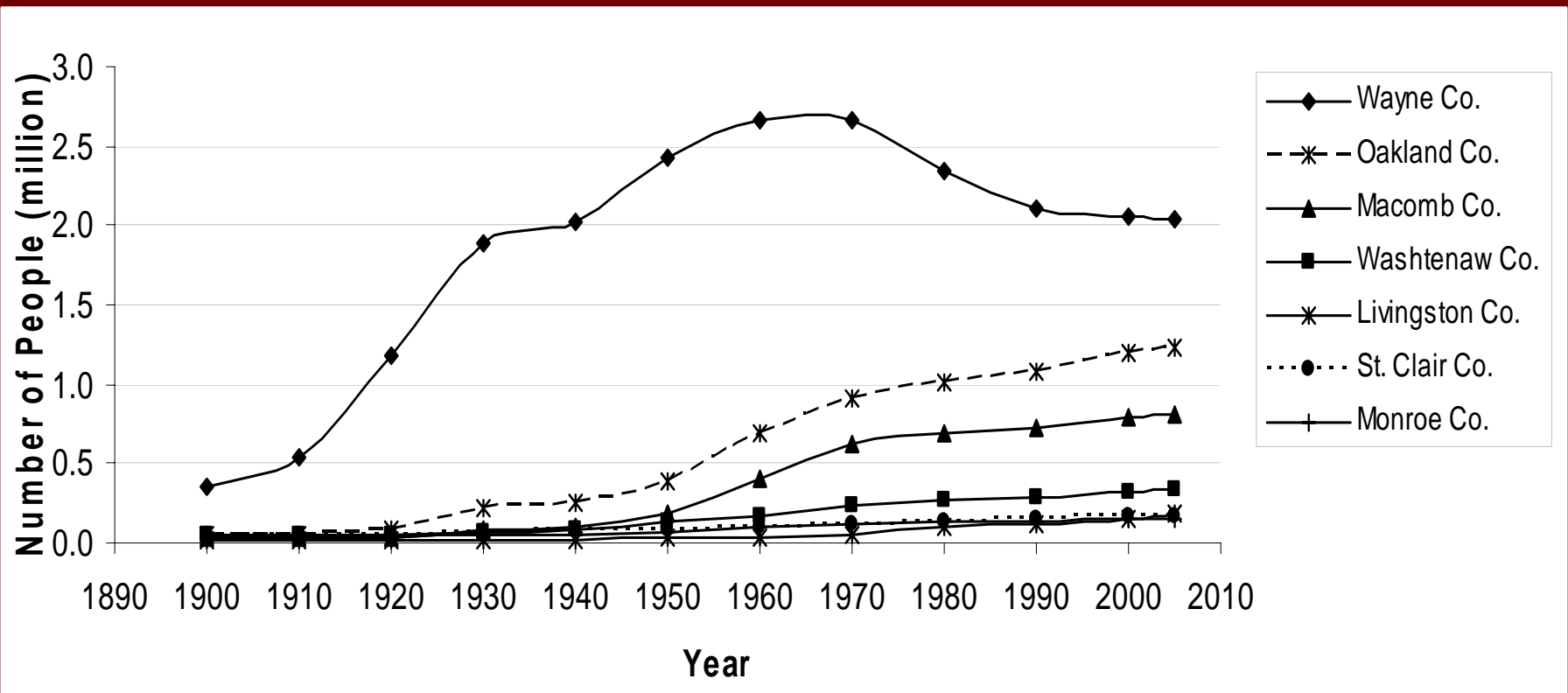
- Population decentralization
- City pushing outwards
- Growth = ecosystem pressure
  - Storm water runoff problems
  - ↓ wildlife habitat
  - ↑ water & air pollution
  - ↑ herbicides/pesticides
  - invasive species



# Human Population Growth and Distribution in SE Michigan



# Human Population Growth and Distribution by County





# Human Population Growth and Distribution in SE MI



- By 2030:
  - 10 % pop. growth
  - 250,000 acres converted
- Needs:
  - Growth management techniques
  - Integrated land use & transportation
  - Preserve key ecosystem features
  - Awareness & research

# Transportation Trends in SE Michigan

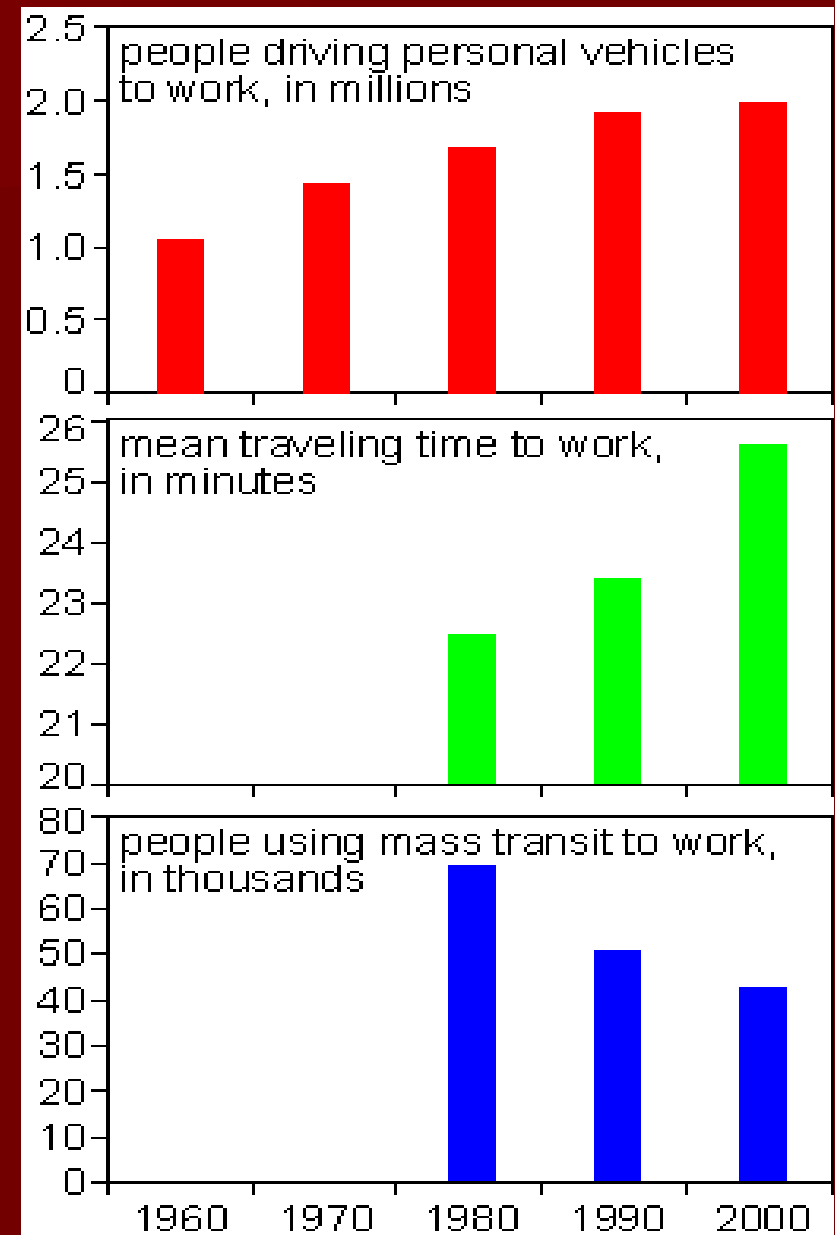
Jennifer Evans, SEMCOG



- Pre-1950: walking or bus
- Auto = ↑ commute time
- 2004: (SE Michigan)
  - 4 million vehicles
  - 27,684 miles of roads
  - 30 airports
- Air pollution & overuse of natural resources

# Transportation Trends in SE Michigan

- People driving further, often unaccompanied
- As population ↑, roads will age/deteriorate
- ↓ mass transit usage
  - Economics
  - Limited availability
  - reliance on automobile



# Transportation Trends in SE Michigan

Conditions unlikely to change unless we:

## 1) Emphasize greenways & carpooling

- Alleviate congestion
- Improve air quality
- ↓ commuting cost



## 2) Improve mass transit

- Must be safe, reliable, accessible, cost-effective
- ↓ pollution, ↓ congestion
- ↑ quality of life



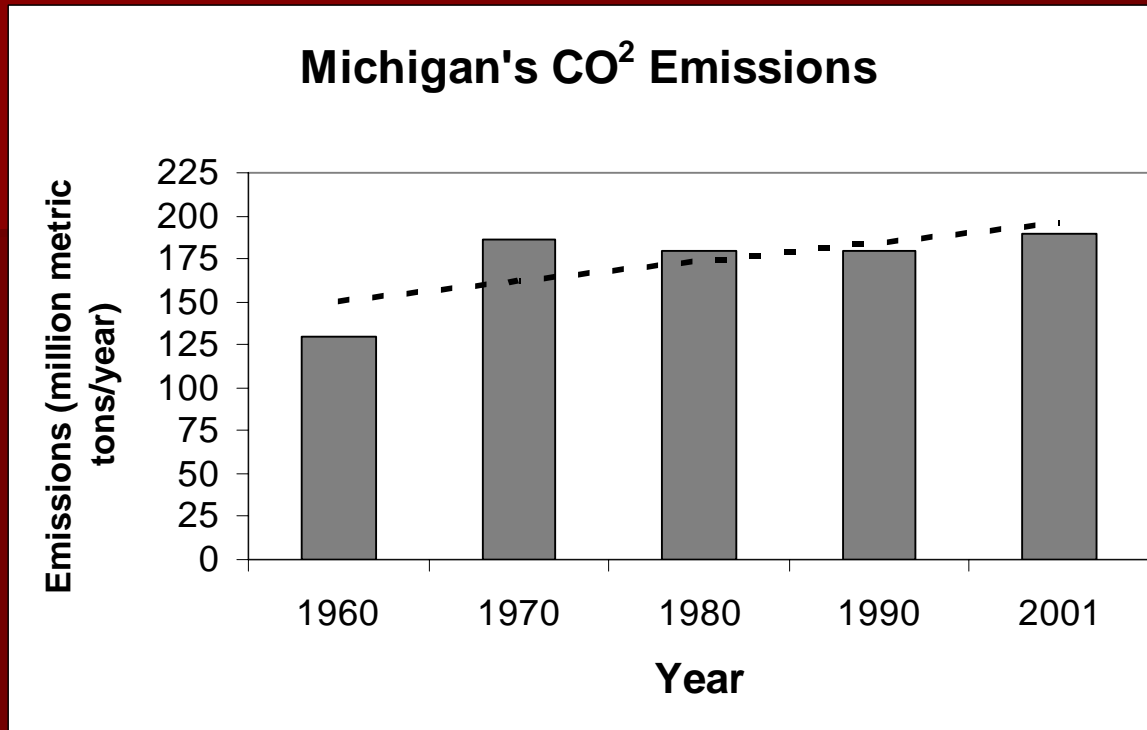
# Michigan's Carbon Emissions

U.S. Environmental Protection Agency



- ↑ concentration of greenhouse gases:
  - $\text{CO}_2$  : ↑30%
  - Methane ( $\text{CH}_4$ ) : ↑100%
  - Nitrous oxide ( $\text{N}_2\text{O}$ ):  
↑15%
- Burning fossil fuels, agriculture, deforestation & mining
- 2001: Michigan ranked 9th

# Michigan's Carbon Emissions



- Oil and Coal Emissions – 80% of increase
- Needs:
  - Reduce fossil fuel dependence
  - Research & computer models
  - Global, national & local change

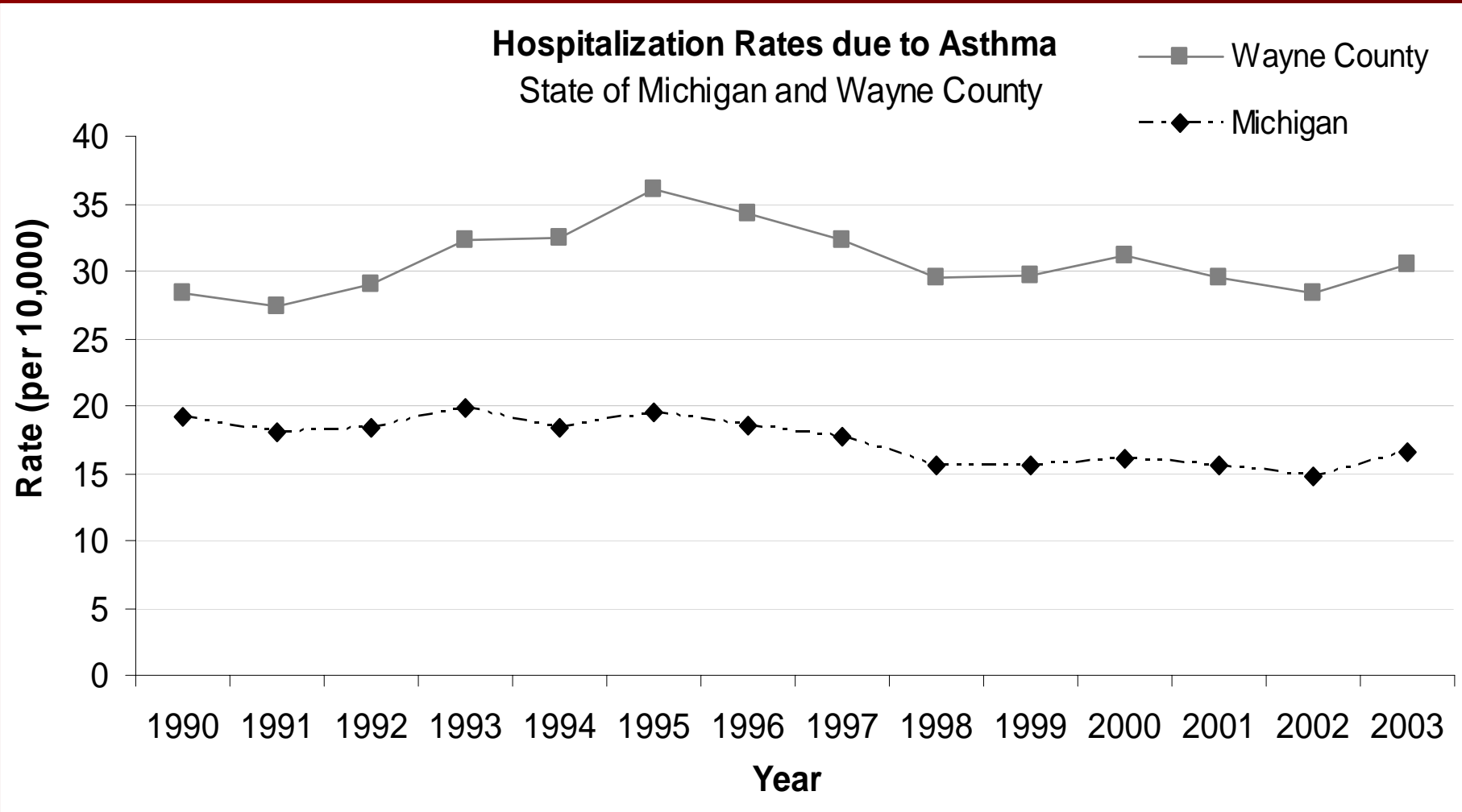
# Asthma Hospitalization Rates in Wayne County, MI

Robert Wahl, Michigan Department of Community Health & Guadalupe Cummins, Wayne State University



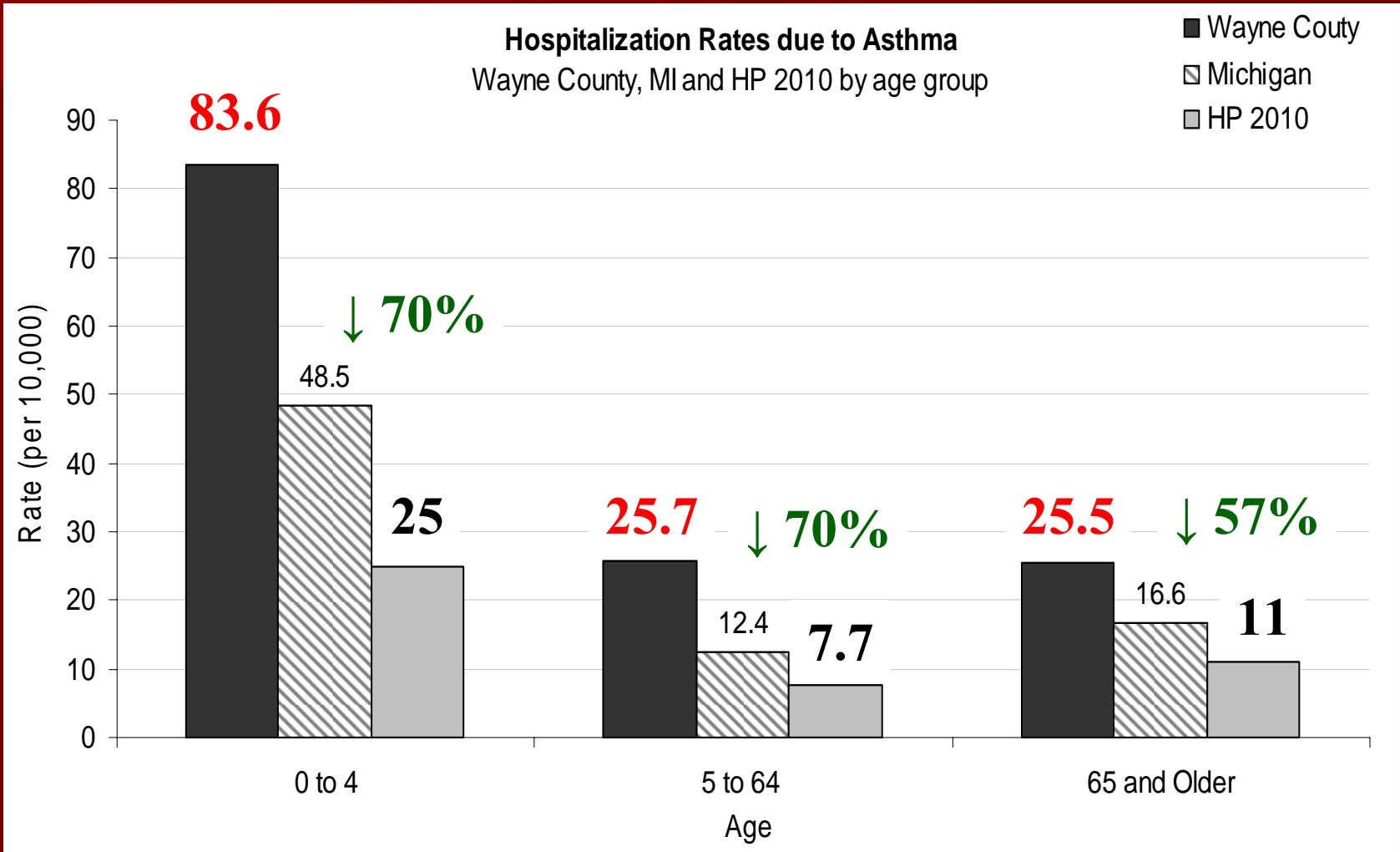
- Irritants, allergens, air pollutants, non-environmental factors
- Ozone & particulate pollution
- Detroit (2005):
  - 6<sup>th</sup> most polluted city (by year-round particle pollution)
  - 20<sup>th</sup> most ozone polluted city

# Asthma Hospitalization Rates in Wayne County, MI





# Asthma Hospitalization Rates in Wayne County, MI



# Asthma Hospitalization Rates in Wayne County, MI

- Asthma can be controlled, not cured
- \$ to prevent hospitalization increasing exponentially
- Needs:
  - Surveillance
  - Interventions
  - Partnerships
  - Research



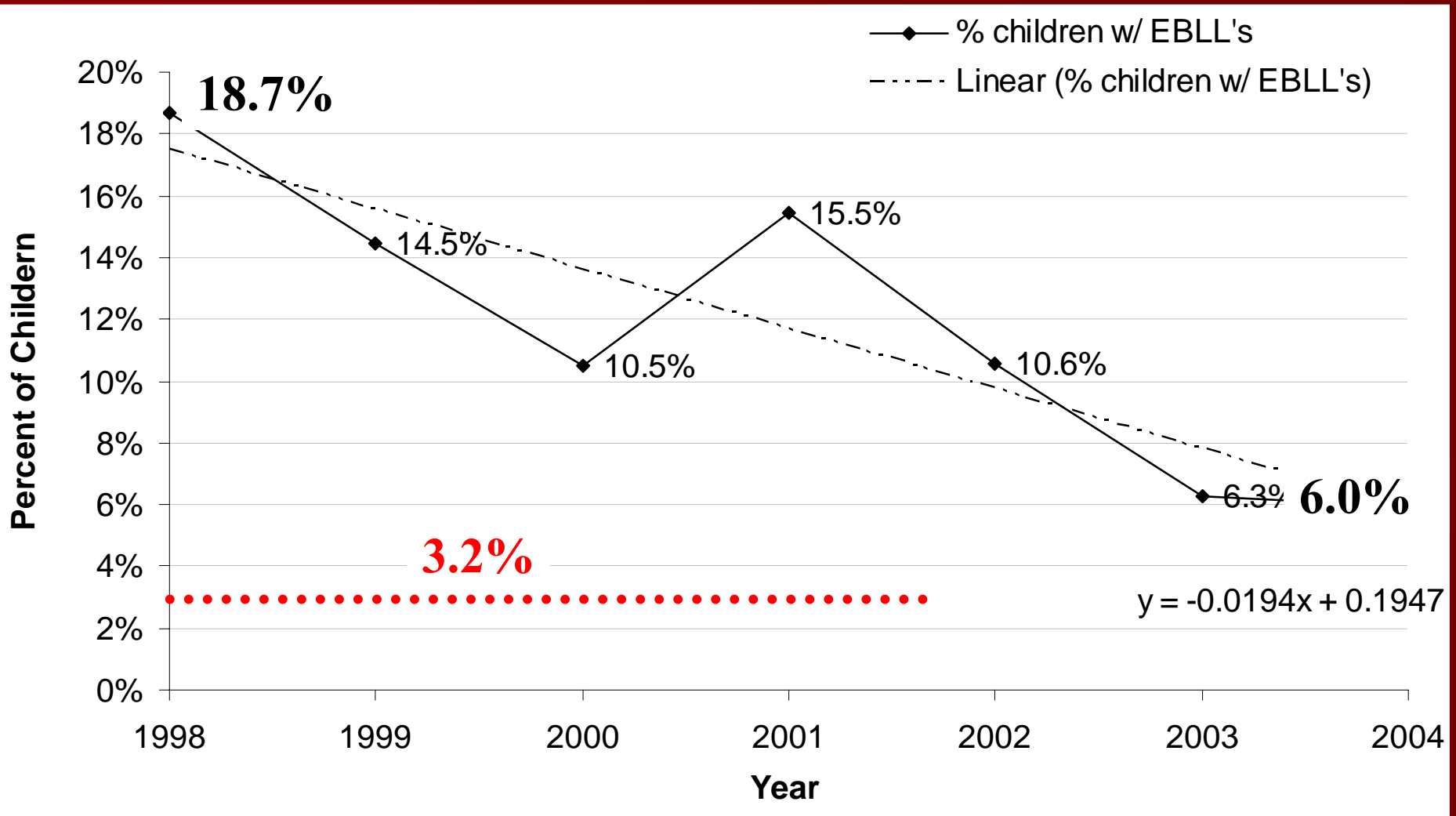
# Lead Poisoning in Detroit

Valerie Monet & Guadalupe Cummins, Wayne State University

- Highly toxic but widely used & ubiquitous
- Neurological and behavioural effects on children
- Sources:
  1. Lead-based paint
  2. Soil around smelters
  3. Leaded gasoline
  4. Water in old lead pipes
- High risk neighbourhoods



# Lead Poisoning in Detroit



% of children in Detroit City with elevated blood lead levels (> 10µg/dL)



# Lead Poisoning in Detroit

## ■ Needs:

- Remove lead based paint
- Industrial cleanup in residential areas
- Increase # children tested
- Target high-risk neighbourhoods
- Lead-safe housing
- ↑ funding, support & awareness
- Research



# West Nile Virus

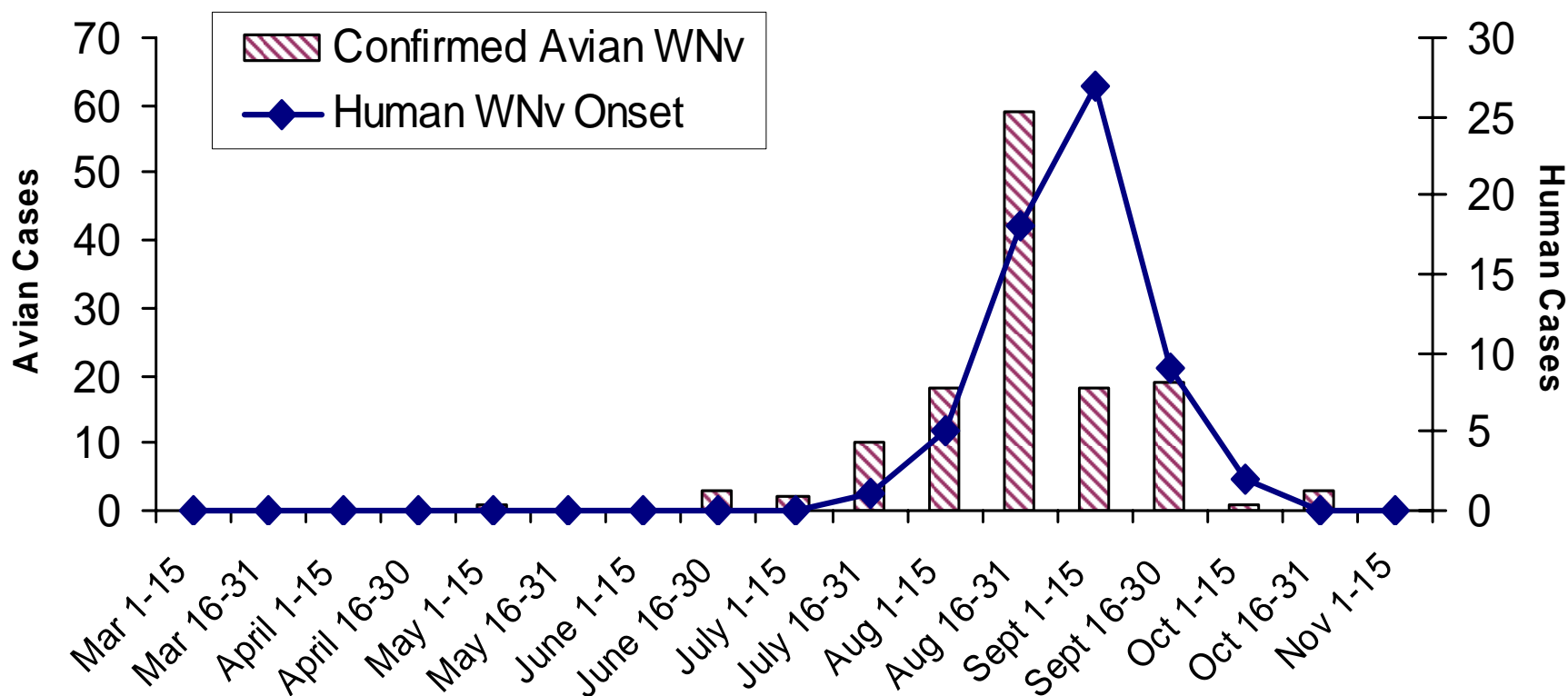
Erik Foster, Michigan Department of Community Health



- “Emerging Infectious Disease”
- Birds, horses, humans
- Stagnant water
- Found In MI crows in 2001
- 20% of infected humans show symptoms (encephalitis/meningitis is rare but should be monitored)

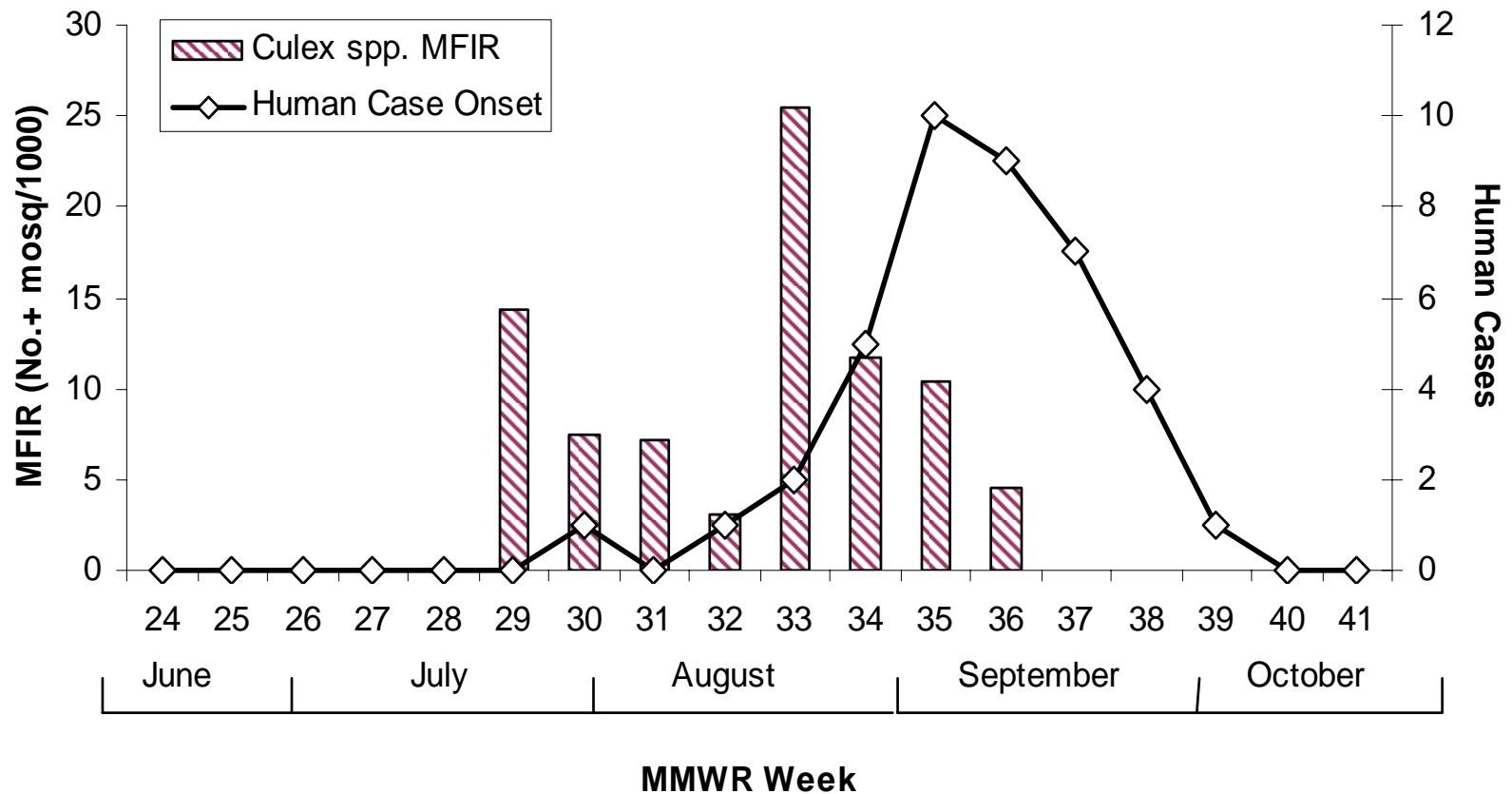
# West Nile Virus

Avian vs. Human WNV in Michigan, 2005



# West Nile Virus

- Southeast Michigan 2005 -  
*Culex* spp. Mosquito Field Infection Rate  
vs.  
Human WNV Case Onset





# West Nile Virus

Year	West Nile virus- Positive Corvids	Human Cases Wayne Co. (Statewide)	Human Deaths Wayne Co. (Statewide)
2001	15	0	0
2002	2	203 (644)	15 (51)
2003	3	10 (19)	0 (2)
2004	5	8 (16)	0
2005	7	28 (62)	3 (4)

## ■ Needs:

- Education and prevention
- Source reduction
- Surveillance

<b>INDICATOR</b>	<b>GOAL</b>	<b>TREND</b>
<b>Land Use Changes</b>	<b>Need regional planning</b>	↓ <b>farm land</b> ↑ <b>urban/suburban dev.</b>
<b>Human Population Growth and Distribution</b>	<b>Managed population growth &amp; minimal ecological impact</b>	↑ <b>suburbia</b> ↑ <b>land conversion</b>
<b>Transportation Trends</b>	↑ <b>mass transit/carpooling</b> ↓ <b>automobile dependence</b>	↑ <b>automobile usage</b> ↓ <b>mass transit</b>
<b>Michigan's Carbon Emissions</b>	↓ <b>carbon emissions</b>	↑ <b>carbon emissions</b>
<b>Rates of Asthma Hospitalization</b>	↓ <b>hospitalization rates</b>	<b>no decline since 1990</b> ↑ <b>costs of medication</b>
<b>Lead Poisoning</b>	↓ <b>elevated blood lead levels in children</b>	<b>60% ↓ in elevated blood lead levels</b>
<b>West Nile Virus</b>	↓ <b>human WNV cases</b>	<b>2005 - 2<sup>nd</sup> worst year since outbreak</b>

INDICATOR	Monitoring	Education & Awareness	Research	HIGH PRIORITIES
Land Use Changes	✓	✓	✓	Ecosystem-based land management
Human Population Growth & Distribution	✓	✓	✓	Growth management & ecosystem preservation
Transportation Trends	✓	✓	✓	Emphasize carpooling & improve mass transit
Michigan's Carbon Emissions	✓	✓	✓	↓ fossil fuel dependence
Rates of Asthma Hospitalization	✓	✓	✓	↓ ozone and particulate pollution
Lead Poisoning	✓	✓	✓	Remove lead based paint
West Nile Virus	✓	✓	✓	Avian & human case surveillance