# Valuing Bicycling's Economic and Health Impacts in Wisconsin

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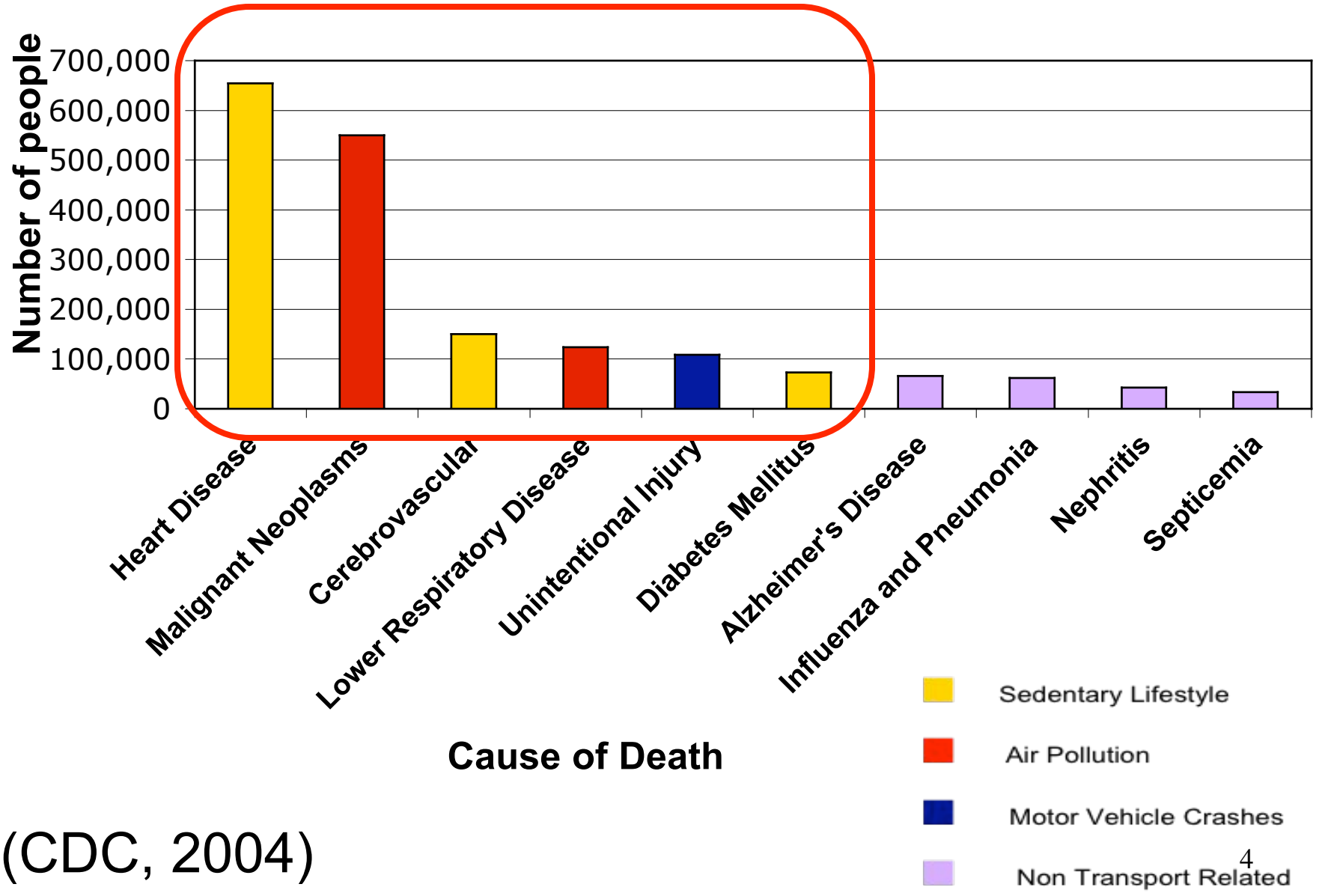
# Trail Map

- Part I: Health, Air Quality, and Greenhouse Gas Mitigation Impact
- Part II: Economic Impact

# Part I: Health Benefits of Bicycling in Wisconsin

# Ten Leading Causes of US Deaths per Year



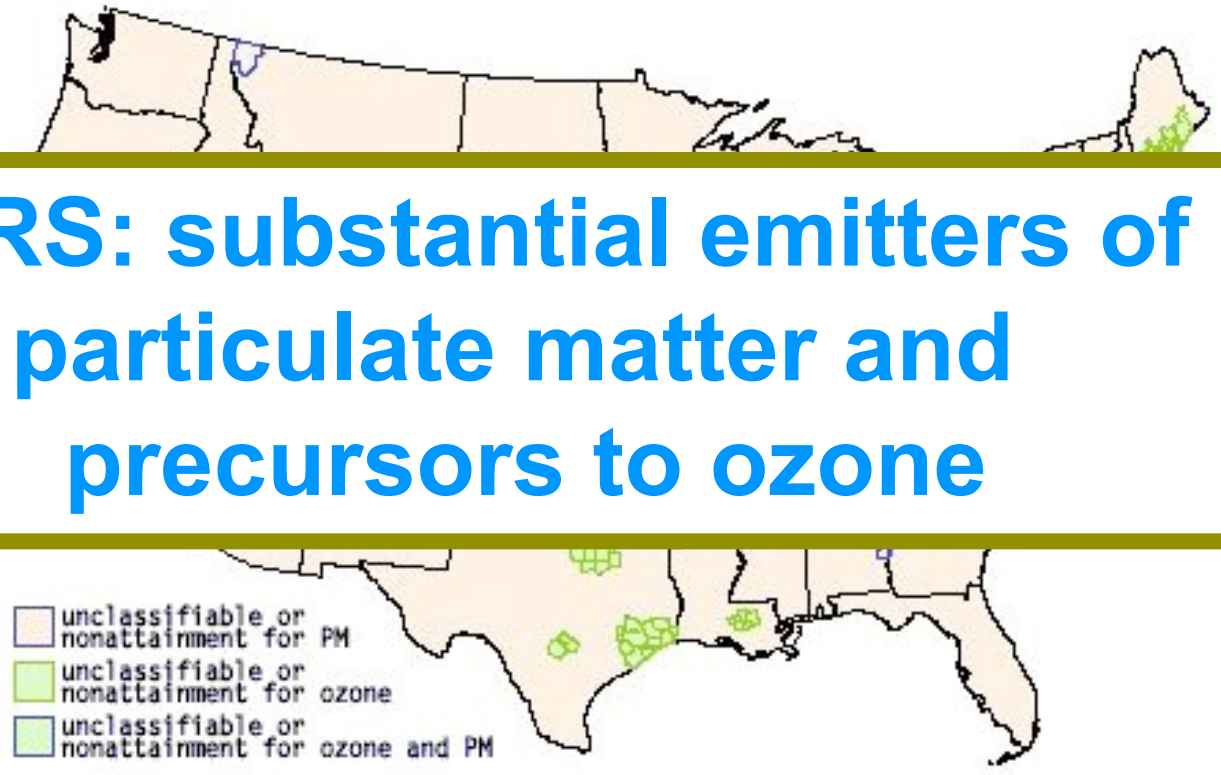

(CDC, 2004)


**50% of Americans do not meet physical activity recommendations**

**2/3 of Americans are overweight or obese**


CDC, BRFSS 2005

## 100+ cities in nonattainment-- EPA 8-hour Ozone Standards




**CARS: substantial emitters of particulate matter and precursors to ozone**

## 50+ cities in nonattainment-- EPA $PM_{2.5}$ Standards



EPA 2005

# Asthma and Air Pollution

- Natural experiment during 1996 Summer Olympic games in Atlanta
- Peak morning traffic decreased 23% and peak ozone levels decreased 28%

- Asthma-related emergency room visits by children decreased 42%
- Children's emergency visits for non-asthma causes did not change during same period



Friedman et al. *JAMA* 2001;285:897

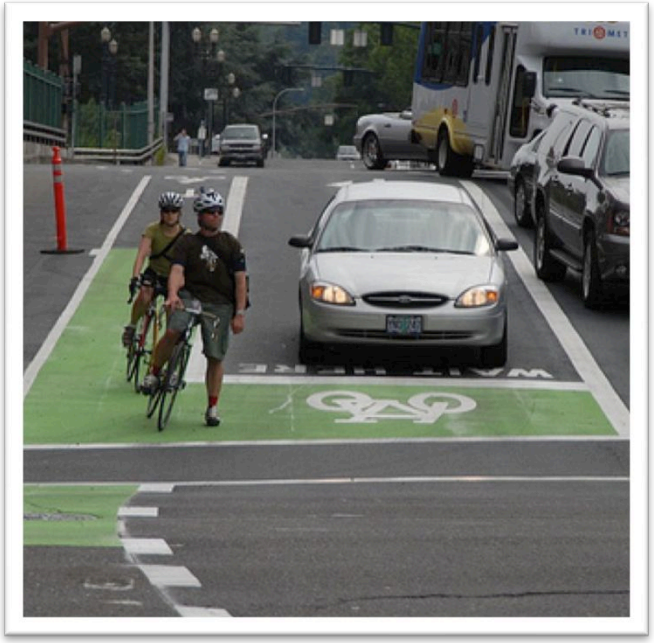

# **1/3** of Wisconsin $CO_2$ emissions come from transportation sector



US Dept. of Energy, 2005

# In the United States…

- **40%** of all car trips in the US are **two miles or less**



- **50%** of the working population commutes **five miles or less** to work

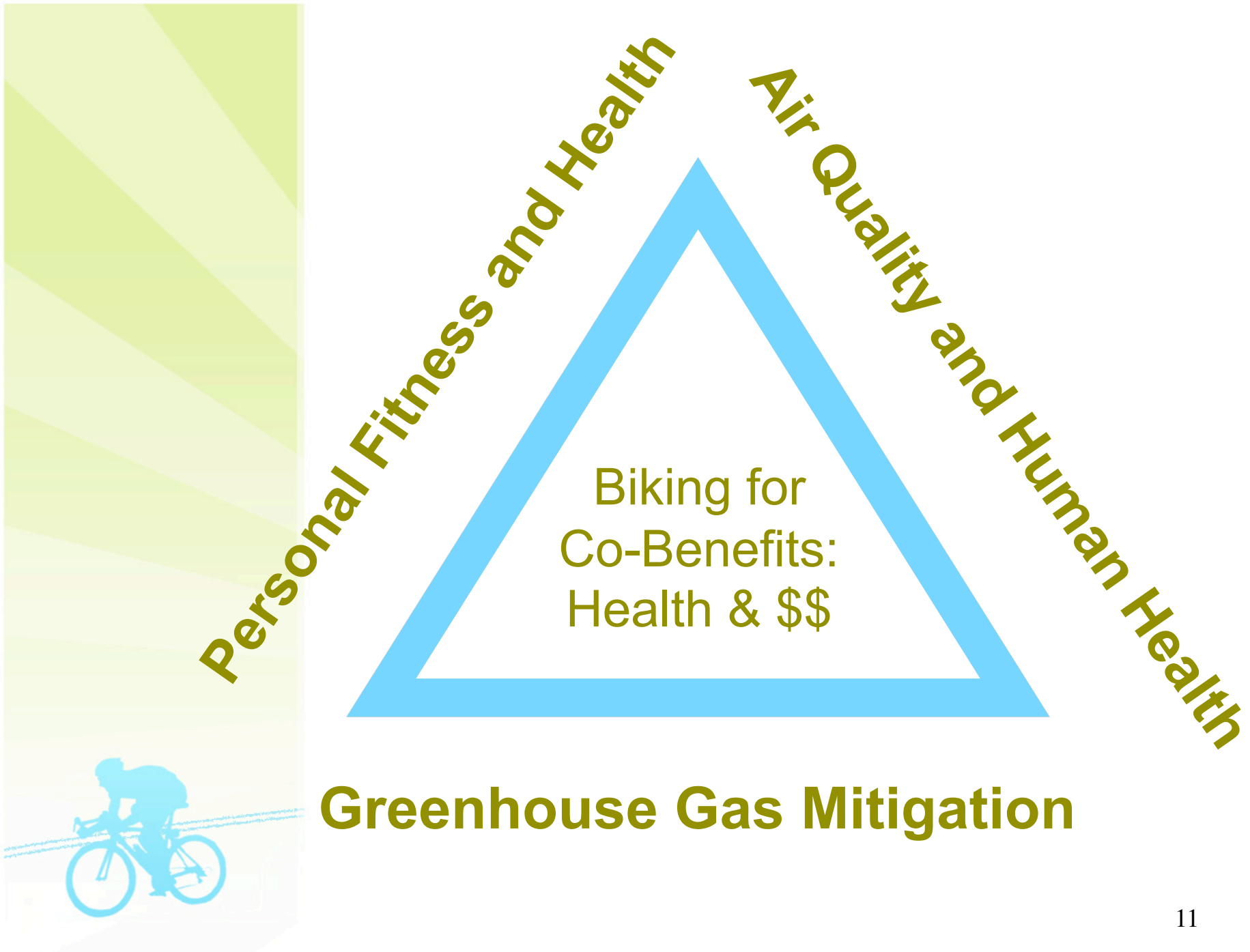
- more than **82%** of trips **five miles or less** are made by personal motor vehicle

NHTS 2001

# THE FACTS

- **OBESITY** - a problem of EPIDEMIC proportions
- **PHYSICAL INACTIVITY** increasing
- Cities failing to meet **AIR QUALITY** standards
- **GREENHOUSE GAS EMISSIONS** rising

**What does this mean for our health and the economy?**


Personal Fitness and Health
Air Quality and Human Health
Biking for
Co-Benefits:
Health & $$
Greenhouse Gas Mitigation

# Personal Fitness and Human Health

**if sedentary people meet recommended physical activity standards…**

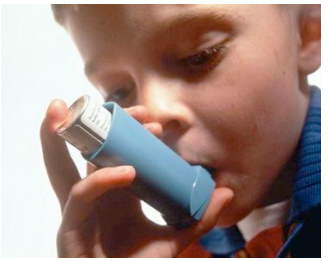
**$318,589,585**

**(in Milwaukee and Madison)**

- **Breast cancer (34%)**
- **Colorectal cancer (43%)**
- **Diabetes Type II (31%)**
- **Heart Disease (47%)**
- **Stroke (39%)**

WHO 2005

# Air Quality and Human Health



**Reducing 20% of urban short car trips (5 mi or less) with bicycle trips in Milwaukee and Madison**

**Total Economic Benefit from reduced $PM_{2.5}$: $85,807,200**

**+**

**Total Economic Benefit from reduced $O_3$: $3,407,000**

**= $89,214,200**

# Greenhouse Gas Mitigation

**Reducing $CO_2$ emissions by commuting by bike instead of by car**

20% Madison bikers ≈ **$336,577 value****

20% Milwaukee bikers ≈ **$821,282 value****

**Total value: $1,157,859****

**Based on European Climate Exchange, November 2009

# Equivalent Wind Turbines for Avoided Emissions

- average WI wind turbine offsets **4,141 tons $CO_2$** annually

- biking in Madison and Milwaukee could offset **57,405 tons of $CO_2$** annually

- equal to nearly **14 wind turbines** -- just from increased biking in Milwaukee and Madison

# Summary and Implications

- Value of Additional Physical Activity:
**$318,589,585**

- Value of Air Quality Improvement:
**$89,214,200**

- Value of Greenhouse Gas Reductions:
**$1,157,859**

- Significant Implications for the State and Region

- Co-Benefits of Replacing Short Car Trips with Bicycling

# *Part II: Economic Impact of Bicycle Recreation*

# Determining how much cyclists contribute to the economy:

Key Questions:

1. What kind of cycling do people do for recreation?
2. How many cyclists in each category?
3. How much do they spend?

# What kind of cycling?

Courtesy of CowaLUNGa Bike Tour, an event of Respiratory Health Association of Metro Chicago

# How many road cyclists?

Arnold Reinhold Wikipedia Commons

# How many trail cyclists?

# Single-day Events and Tours


Eric Schramm

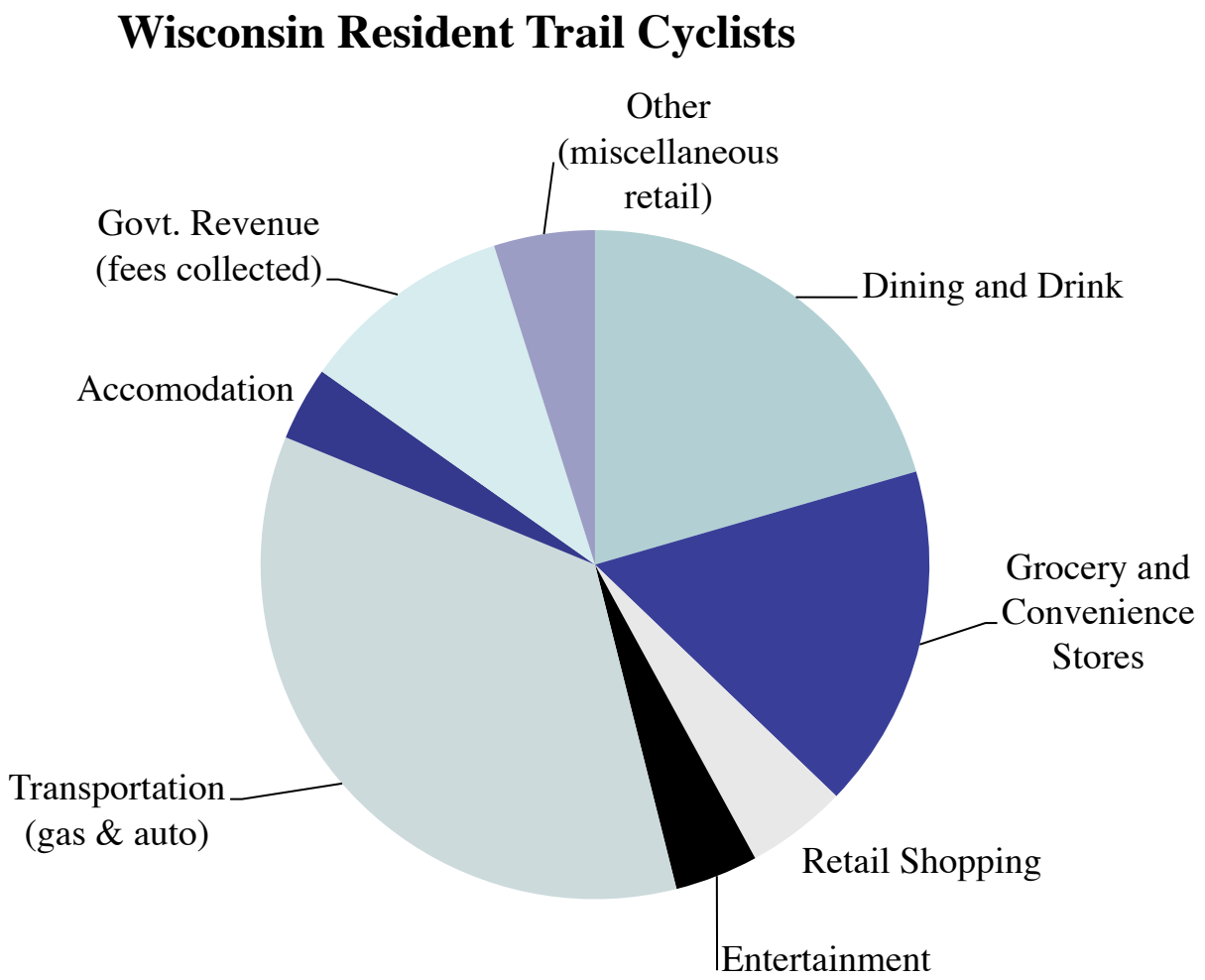
# Multi-day Tours

# How much do they spend?

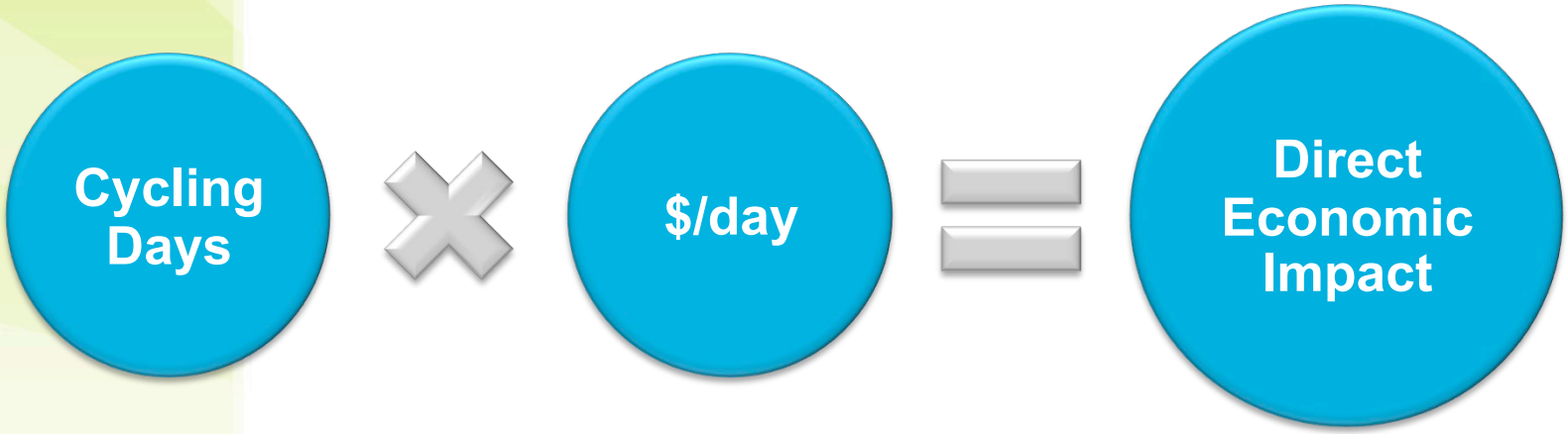
| Expenditures | | |
|---|---|---|
| **Bicycling Activity** | **Resident Daily Expenditure** | **Non-Resident Daily Expenditure** |
| Roadways | $39.57 | $53.55 |
| Trails | $17.99 | $33.95 |
| Single-Day Bike Events/ Tours | $76.17 | $76.17 |
| Multi-Day Tours | $80.84 | $80.84 |

Schwecke Sprehn & Hamilton 1988, Stynes & White 2006, Velo Quebec 2006, BFW & WDOT 2006

# How do they spend it?



# Direct Economic Impact



# Direct Economic Impact

| | Person Days | Direct Economic Impact | |
|---|---|---|---|
| **Bicycling Activity** | **Total Number of Bicycle Person Days** | Direct Impact Residents | Direct Impact Non-Residents |
| **Roadways** | **8,324,916** | $168,990,884 | $217,104,236 |
| **Trails** | **3,691,034** | $32,045,462 | $64,835,708 |
| **Single-Day Bike Events/Tours** | **61,289** | $2,420,987 | $2,596,764 |
| **Multi-Day Tours** | **38,834** | $1,281,572 | $1,477,229 |
| **Total** | 12,116,073 | $204,738,904 | $286,013,937 |
| **GRAND TOTAL** | | $532,883,557 | |

# What sectors are affected?

## Economic Interlinkages:

Many industries affected through intermediate supplies

### Agricultural Products

- Purchased Inputs (seeds, fertilizer, equipment)
- Employees
- Taxes

### Wholesale Food Processors/ Distributors

- Purchased Inputs (ag produce)
- Employees
- Real Estate
- Taxes

### Restaurants

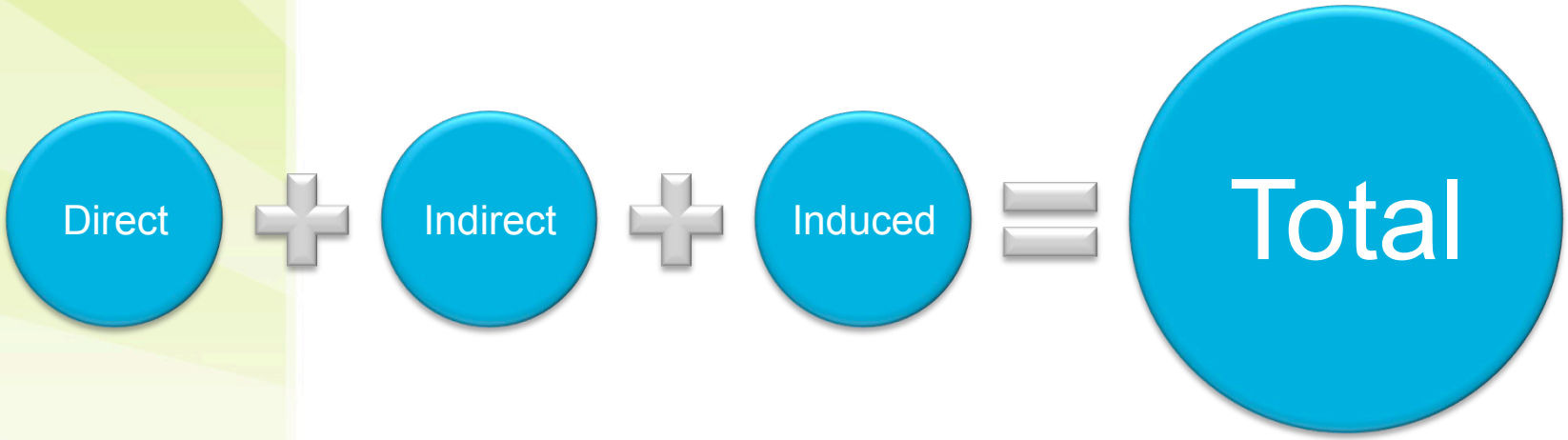
- Purchased Inputs (Ingredients, appliances, etc.)
- Employees
- Real Estate (Rent, buildings)
- Taxes

# Input-Output Model

- Indirect Impacts: For every $ spent in one sector, it accounts for the impacts of this on supplying sectors, and on the labor force.

- Induced Impacts: For every $ of output in an industry, a worker is paid. Workers then respend some of their earnings in the economy.

# Total Economic Impact



# Total Economic Impact: $924 million

## Output Impact

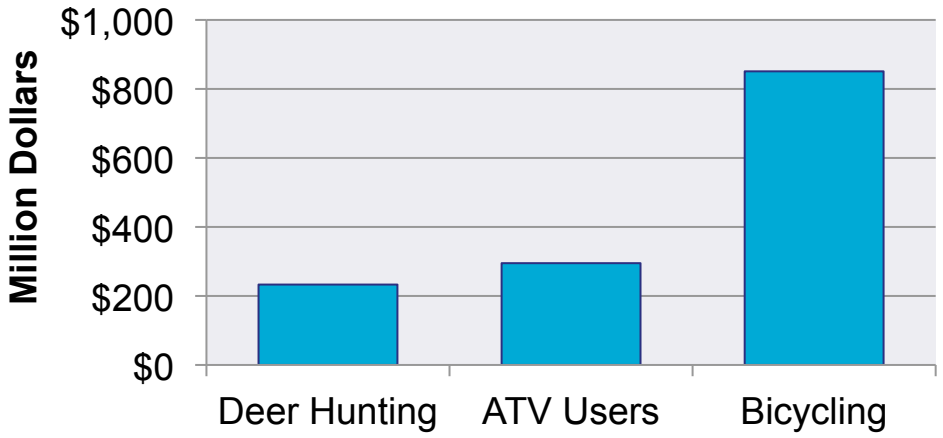
| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Wisconsin Resident | $204,738,560 | $69,782,528 | $80,255,232 | $354,776,064 |
| Non-Resident | $286,013,440 | $98,398,976 | $112,129,536 | $496,541,696 |
| **TOTAL** | $490,752,000 | $168,181,504 | $192,384,768 | 924,211,000 |

## Employment Impact

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Wisconsin Resident | 3,797 | 543 | 717 | 5,058 |
| Non-Resident | 5,319 | 763 | 1,002 | 7,083 |
| **TOTAL** | 9,116 | 1,306 | 1,719 | 13,193 |

# Implications

- How do our results compare?




- Non-resident bicycle tourism economic impact: $496 million
- Total tourism in Wisconsin: $12.8 billion
  - Small fraction, but still important
- Accuracy? Need for a more comprehensive survey.
- So…Build a paved multi-use bike path at $115,000 per mile?

Payback < 2.5 Years

# Recreation + Manufacturing, Sales, & Service

| | |
|---|---|
| Economic Impact of Manufacturing, Sales, & Services* | $593,787,990 |
| Economic Impact of Tourism & Recreation | $924,211,000 |
| **TOTAL Economic Impact** | **$1,517,998,990** |

*BFW & WDOT, 2006, adjusted for inflation

# Summary of Findings

| | |
|---|---|
| **Economic Impact of Manufacturing, Sales, & Services*** | **$593,787,990** |
| **Economic Impact of Tourism & Recreation** | **$924,211,000** |
| **Value of Additional Physical Activity** | **$318,589,585** |
| **Value of Air Quality Improvement** | **$89,214,200** |
| **Value of Greenhouse Gas Reductions** | **$1,157,859** |

- Significant Implications for the State and Region
- Co-Benefits of Replacing Short Car Trips with Bicycling
- Invest in infrastructure to encourage more bicycling in future

*BFW & WDOT, 2006

# Thank You

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http://sage.wisc.edu/IGERT/download/bicycling_Final_Report.pdf