

# Public Health and Safety

In addition to furthering transportation goals, walking and bicycling assist in advancing multiple public health and safety goals. The following section focuses on three areas of public health that are related to travel by foot and bicycle: physical activity, air quality, and injuries. Policies, goals, and strategies for these three areas are at different states of development. The following reflects those differences, both in the data available and the information showing where we are in accomplishing objectives. The overview ties these divergent strands together to put forth a public health and safety framework supporting the development of an action plan to promote and facilitate walking and bicycling for transportation in northeastern Illinois.

## Public Health and Safety Overview

Walking and bicycling will help reduce the threats posed by physical inactivity and travel-induced air pollution. However, there are many walking and bicycling injuries, though many of these are not caused by walkers and bicyclists, but by motorists. To give perspective, it's useful to compare the years of life lost by causes of death, that is, the extent of premature death.<sup>1</sup> Analyses of years of life lost justify accident prevention measures.

For Illinois in 2001, heart disease caused 61,568 years of life lost.<sup>2</sup> Bicycle and pedestrian accidents, for comparison, caused approximately 4,734 years of life lost in Illinois in 2001, or less than 8% of that from heart disease.<sup>3</sup> Many health advocates would argue that reducing premature deaths from heart disease should receive increased attention, since it presents a dramatically higher threat than walking or bicycling. We will show below that we have been going in the opposite direction on this issue, and have been losing ground in controlling obesity and promoting physical activity. Public policy may need to be rebalanced to promote physical activity, including bicycling and walking, and reverse physical activity and obesity trends.

So we should encourage people to travel by foot or bicycle to improve their health. Would this necessarily have a bad impact on safety statistics? Consider this excerpt from Malcolm Gladwell's article "Wrong Turn:"

Every two miles, the average driver makes four hundred observations, forty decisions, and one mistake. Once every five hundred miles, one of those mistakes leads to a near collision, and once every sixty - one thousand miles one of those mistakes leads to a crash. *When people drive*, in other words, mistakes are endemic and accidents inevitable....<sup>4</sup> [emphasis added]

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<sup>1</sup> Years of life is calculated as the sum of the differences between age 65 and the age of death, for those deaths at age 64 or less.

<sup>2</sup> Illinois Department of Public Health. IPLAN data system report of Cause-Specific Years of Potential Life Lost, ICD-10. <http://app.idph.state.il.us>

<sup>3</sup> Illinois Department of Transportation. "Illinois Crash Data 1997-2001." Used 2001 crash totals for pedestrians and pedalcyclists by age to calculate the total years life lost (pp. 6-7). For all motor vehicle accidents (including motor vehicle occupants, IPLAN gives 36,679 years of life lost, still less than heart disease.

<sup>4</sup> Malcolm Gladwell, "Wrong Turn: How the Fight to Make America's Highways Safer Went Off Course." *The New Yorker*. June 11, 2001, p. 50. Staff asked Mr. Gladwell for the primary source of the data, but he was unable to provide it at this late date.



Accidents are inevitable *when people drive*. So if more trips were made by foot or bicycle, the largest causative factor in pedestrian and bicycle deaths -- automobile travel -- would be reduced. Automotive deaths could also fall. Indeed, some countries with very high levels of pedestrian and bicycle activity and good infrastructure and other policies to support it (e.g. most of northwestern Europe) also have lower traffic death rates overall. Many of these countries with high rates of bicycling and walking even have pedestrian and bicycle death rates per capita lower than the United States. See Table 1. Table 1 shows that lower traffic fatality rates are achievable with high levels of bicycle and pedestrian travel. There is some indication that the countries of northwestern Europe have achieved safety, physical activity, and transportation benefits simultaneously by application of sufficient funds for the improvement of the transportation system combined with transportation priorities somewhat different than the priorities prevalent in the United States.<sup>5</sup>

**Table 1**  
**Bicycle and Pedestrian Mode Share and Traffic Fatalities, 2002**

See notes.

Nation	Bicycle + Pedestrian Trips as a Percent of All Passenger Trips <sup>6</sup>	Year 2002 Bicycle + Pedestrian Fatalities per 100,000 Population <sup>7</sup>	Year 2002 Total Traffic Fatalities per 100,000 Population <sup>8</sup>
United States	7%	1.9	14.9
Australia	20%	1.4	8.8
Norway	27%	0.9	6.9
United Kingdom	30%	1.6	6.1
Switzerland	32%	1.7	9.4
Germany	40%	1.8	8.3
Netherlands	48%	1.6	6.1

The relationships among health, transportation, and diet variables is very complicated and needs further study that is beyond the scope of this plan. For example, some of the nations above have higher cardiovascular death rates than the United States, perhaps because of diet and smoking rates. For example, the Netherlands, Denmark, and Sweden have obesity rates that are only a third of the United States, while Germany has rates that are half of the United States, but perhaps because of smoking rates higher than the United States, Germany has higher cardiovascular

<sup>5</sup> John Pucher and Lewis Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons from the Netherlands and Germany." *American Journal of Public Health*. 93:9, September, 2003. See especially pp. 1512-1515.

<sup>6</sup> Calculated from Andreas Schafer. "Regularities in Travel Demand: An International Perspective." *Journal of Transportation Statistics*. Vol. 3, no. 3. Bureau of Transportation Statistics. USDOT. Used latest survey from among reports, Table A-2.

<sup>7</sup> Calculated from: Organization for Economic Co-operation and Development, International Road and Traffic Accident Database, July, 2004 (fatality estimates). (OECD adjusts estimates for varying lengths of time deaths different countries apply in attributing deaths to collisions). Population reflects January 2002 Estimates.

<http://www.bast.de/htdocs/fachthemen/irtad/english/englisch.html>

<sup>8</sup> Ibid.



mortality than the United States.<sup>9,10,11</sup> Japan has a low auto mode share with high rate of non-motorized transportation, a low traffic death rate, and low cardiovascular death rates (again, diet may be influential here). The result is that Japan tops the world in years of healthy life expectancy.<sup>12</sup> Less developed countries with high bicycle and pedestrian mode shares have high traffic fatality rates because of their infamous lack of infrastructure to accommodate bicycles, pedestrians, and motorized traffic, but have frequently have a low cardiovascular death rate that may also be because of a healthy diet.

More research regarding the relationships between transportation, public health, and safety is expected. Indeed, several studies were released while the draft of this report was being reviewed.<sup>13</sup> We can expect more information to refine policy. The above seems sufficient to show that it is possible to promote walking and bicycling for public health and transportation goals while improving overall traffic safety.

Having this broad overview, we set out below the details of the public health and safety context for bicycling and walking in northeastern Illinois.

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<sup>9</sup> Pucher and Dijkstra, op cit., p 1514. Despite some higher cardiovascular disease rates, note that these four countries have longer life spans than the United States (motor vehicle crashes contributing) and per capita health care expenditures only one-half those of the United States.

<sup>10</sup> World Health Organisation. *Tobacco Atlas*. "Part 6, World Tables, Table A, The Demographics of Tobacco." 2004. <http://www.who.int/tobacco/en/atlas40.pdf>. Adult smoking rates are Germany: 35%, Denmark: 30.5%, Netherlands: 33.0%, Sweden: 19.0%, USA: 23.6%.

<sup>11</sup> Global Cardiovascular Infobase. WHO Collaborating Center on Surveillance of Cardiovascular Diseases. <http://www.cvdinfobase.ca/GCVI/default.htm>. Except for Germany, the countries Pucher mentions have lower CVD rates than the U.S for both males and females.

<sup>12</sup> Additional data is available upon request. Strong correlations were present when the United States and Japan (extreme and opposite values in almost all of the data) were included in univariate analyses, but weakened or disappeared when these countries were omitted, so other variables may be lurking that would need to be analyzed in a multi-variate analysis that is beyond the scope of this study. Among the problems to be overcome would be developing a uniform data set for travel behavior among countries (most analyses now published contain data for only a few countries, or don't have bicycle and pedestrian travel data).

<sup>13</sup> In addition to Pucher and Dijkstra, op cit., see:

- Ewing, Schieber, and Zegeer, "Urban Sprawl as a Risk Factor in Motor Vehicle Occupant and Pedestrian Fatalities" *American Journal of Public Health*. 93: 9 (September, 2003) 1541- 1545.
- Saelens, Sallis, Black and Chen, "Neighborhood-Based Differences in Physical Activity: An Environment Scale Evaluation," *American Journal of Public Health*. 93: 9 (September, 2003) 1552-1558.
- Lucy, "Mortality Risk Associated with Leaving Home: Recognizing the Relevance of the Built Environment," *American Journal of Public Health*. 93: 9 (September, 2003) 1564-1569.
- World Health Organization. *World Report on Road Traffic Injury Prevention*. Geneva, Switzerland: WHO. 2004. Available at [http://www.who.int/world-health-day/2004/infomaterials/world\\_report/en/](http://www.who.int/world-health-day/2004/infomaterials/world_report/en/)



## Public Health Policy Context: Physical Activity.



Recent initiatives at the state and national levels address health issues such as physical activity and obesity. Walking and bicycling are key strategies for reducing the risk of heart attacks, strokes, diabetes, cancer and other chronic diseases associated with inactivity. The U.S. Department of Health and Human Services has adopted *Healthy People 2010* as its blueprint of goals and objectives for improving the health of Americans. *Healthy People 2010* includes objectives that are related to bicycling and walking. Table 2 shows that these health objectives are substantially higher than the current baseline information:<sup>14</sup>

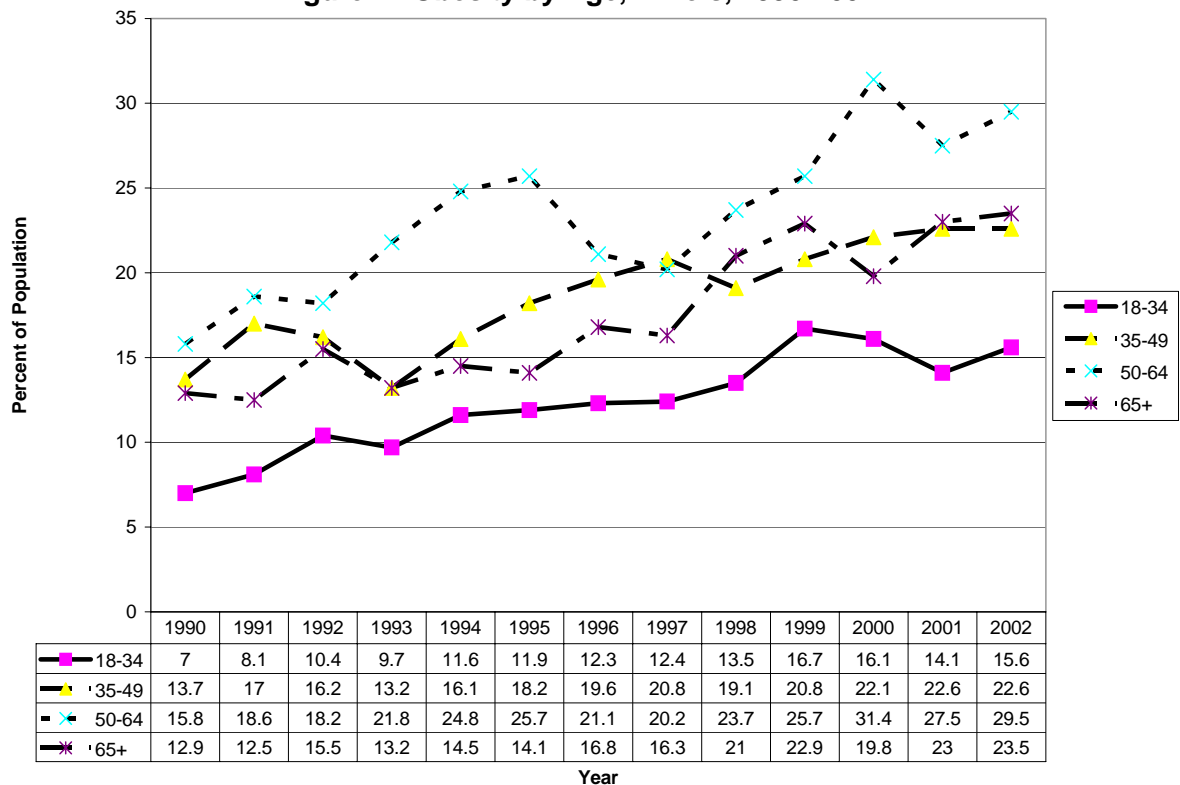
**Table 2**  
**Healthy People 2010 Objectives Related to Walking and Bicycling**

Objective	Population	Percentage of Total US Population	
		Baseline	2010 Objective
Trips of ≤ 1 mile made by walking	Adults	17% (1995)	Increase to 25%
Trips to school of ≤ 1 mile made by walking	Children and adolescents	31% (1995)	Increase to 50%
Trips of ≤ 5 miles made by bicycling	Adults	0.6% (1995)	Increase to 2%
Trips to school of ≤ 2 miles made by bicycling	Children and adolescents	2.4% (1995)	Increase to 5.0%

Another of the *Healthy People 2010* objectives is to reduce the prevalence of obesity among adults to less than 15%. However, the trend is in the opposite direction. Increasing numbers of people are overweight or obese because of physical inactivity or poor diets. In 2001, twenty states have obesity prevalence rates of 15-19 percent; 29 states (among them Illinois) have rates of 20-24 percent. Figure 1 shows the trend of increasing obesity in Illinois. The data indicate that the proportion of residents who are obese went up by at least 60% for all adult age groups from 1990 to 2002. The proportion of young adults who are obese doubled in the same period.

<sup>14</sup> Cited in Centers for Disease Control and Prevention, "Increasing Physical Activity: a Report on Recommendations of the Task Force on Community Preventive Services." *Morbidity and Mortality Weekly Report* 2001; 50 (No. RR-18): 2.

**Figure 1. Obesity by Age, Illinois, 1990-2002**



Source: Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System. [Http://apps.nccd.cdc.gov](http://apps.nccd.cdc.gov). Data represent percent of respondents 18 and older who report their body mass index (BMI) is 30.0 or more. BMI is defined as weight in kilograms divided by height in meters squared (w/h<sup>2</sup>). Denominator includes all survey respondents except those with missing, don't know, or refused answers. Data is based on a sample.

Among youth in Illinois, physical inactivity is a major problem. In the city of Chicago, 30.5% of students did not participate in sufficient "vigorous" or "moderate" physical activity during a sample week; 11.7% of Chicago students did not participate in any physical activity meeting vigorous or moderate benchmarks. Statewide (excluding Chicago), 22.0% of high school students did not participate in sufficient vigorous or moderate physical activity; 4.6% participated in no vigorous or moderate physical activity.<sup>15</sup>

As noted above, inactivity and obesity are associated with many diseases. Currently, the relationship between inactivity and cardiovascular disease is getting special attention because of the development of a state cardiovascular health plan. Driving this interest is the high costs of

<sup>15</sup> Youth Risk Behavior Surveillance - United States, 2001. *Morbidity and Mortality Weekly Report*. June 28, 2002 / 51 (SS04); 1-64 Table 41. *Insufficient* physical activity is defined as not having participated in vigorous physical activity for >= 20 minutes on >= 3 of the 7 preceding days preceding the survey and had not participated in moderate physical activity for >= 30 minutes on 5 of the 7 days preceding the survey. *No* physical activity means not having participated in either vigorous physical activity for >= 20 minutes or moderate physical activity for >= 30 minutes on any of the 7 days preceding the survey. Weaknesses of YRBS data include that it is self-reported, unweighted, and therefore perhaps unrepresentative. Chicago and Illinois rates of reported inactivity are lower than most states and other large cities, the trend in the state is for substantial increases in youth inactivity, perhaps because of a combination of changing travel habits and frequent recent exemptions to the P.E. requirements. Further study is needed to determine the accuracy of the self-reported information, and the source of differences between Chicago and the remainder of the state and among states.



cardiovascular disease in Illinois. Annual Illinois hospital costs of \$4 billion, including Medicaid payments of \$240 million, strain the resources of Illinois businesses and taxpayers.<sup>1617</sup>

The Centers for Disease Control and Prevention forecasts that the burden of cardiovascular disease - both deaths and survivors requiring care - will increase markedly from 2010 to 2030. Cardiovascular disease is already the leading cause of death in Illinois. The CDC forecast suggests "instead of increasing quality and years of healthy life, we may lose ground."<sup>18</sup>

To address both physical inactivity and obesity and the diseases they cause, the CDC has developed a myriad of programs including Active Community Environments (ACEs), KidsWalk-to-School and State-based Nutrition and Physical Activity Programs. All these initiatives recognize the health benefits of improved walking and bicycling environments and address both inactivity and obesity by promoting walking and bicycling as exercise. ACEs specifically promotes walking, bicycling, and the development of accessible recreation facilities. KidsWalk-to-School not only encourages children to walk and bicycle to and from school, but also encourages regular physical activity for children, improved pedestrian safety, and healthy and walkable community environments.

The national government has also taken some recent steps regarding physical activity. In June, 2002, President Bush issued Executive Order 13266, which ordered a number of departments, including the U.S. Department of Transportation, to review policies to promote physical activities, among other goals. President Bush also kicked off *HealthierUS*, which is designed to "empower Americans with the knowledge, motivation, and skills they need to make healthy choices," improved government policies and services, and effective and efficient federal collaboration with others. Secretary of Health and Human Services Tommy Thompson since established "Steps to a *HealthierUS*," to advance the President's initiative.<sup>19</sup> "Steps to a *HealthierUS*" adopts 5 strategies to increase physical activity from *A Guide to Community Preventive Services*. These strategies have been shown to be effective and are consistent with other documents:<sup>20</sup>

- *Community-wide campaigns.* Large-scale, highly visible, multi-component campaigns with messages promoted to large audiences through diverse media, including television, radio, newspapers, movie theaters, billboards, and mailings.
- *Individually targeted programs.* Programs tailored to a person's readiness for change or specific interests; these programs help people incorporate physical activity into their daily routines by teaching them behavioral skills such as setting goals, building social support, rewarding themselves for small achievements, solving problems, and avoiding relapse.

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<sup>16</sup> Illinois Cardiovascular Disease Prevention Task Force. *The Burden of Cardiovascular Disease and Obesity in the State of Illinois*. A Report to the Governor of Illinois and the Illinois General Assembly as Required by S.J. R. 37. June 30, 2000.

<sup>17</sup> Increased costs and suffering will also follow from higher rates of other diseases caused by higher obesity. For example, cancer is another chronic disease, sometimes fatal, that is very expensive to treat. Recent evidence provided by Calle et al in "Overweight, Obesity, in a Prospectively Studied Cohort of U.S. Adults" (*New England Journal of Medicine* 2003 348: 1625 - 38 [April 24, 2003]) shows significantly higher risks of death from many types of cancers for overweight and obese people.

<sup>18</sup> Centers for Disease Control and Prevention. *A Public Health Action Plan to Prevent Heart Disease and Stroke*. April 15, 2003.

<sup>19</sup> U.S. Department of Health and Human Services. *Healthy People 2010 Quarterly Report*. December, 2002.

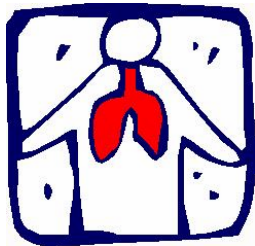
<sup>20</sup> U.S. Department of Health and Human Services. *Steps to a HealthierUS: A Program and Policy Perspective - Prevention Strategies that Work*. 2003.



- *School-based physical education (PE)...*
- *Interventions that provide social support for physical activity in community settings...* [Such as walking groups].
- *Interventions to provide people greater access to places for physical activity.* Examples include building walking or biking trails and making exercise facilities available in community centers or workplaces.

Thus, walking and biking provide support to a wide variety of national public health policy goals. In Illinois, there are also many programs and initiatives that address health, wellness and physical fitness. The legislature also created the *Governor's Council on Health and Physical Fitness*. The mission of the Council is to encourage Illinois citizens to participate more actively in health and fitness activities that will help them to live healthier, happier and more productive lives. *Illinois Health and Wellness Initiative (IHWI)* is a funding support mechanism that helps implement physical activity programs and other *Healthy People 2010* objectives through local health departments.<sup>21</sup>

## Public Health Policy Context: Air Quality.



Bicycling and walking support and enhance regional, state and national initiatives and programs to improve air quality. Bicycling and walking reduce harmful motor vehicle emissions and improve air quality. Bicycling and walking have no tailpipe emissions, no evaporative emissions, and no emissions from gasoline pumping or oil refining. Nationally, walking and bicycling support the air quality goals of the Clean Air Act (CAA) and the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21).

Air quality standards are based on human health effects of pollutants. Once health standards (National Ambient Air Quality Standards) are established, states must monitor pollutant levels to determine where the standards are not being attained. States must adopt plans (State Implementation Plans, or SIPs) to attain the standards in non-attainment areas. Integral in these plans are both an inventory of the sources of the pollutant as well as future emissions budgets consistent with regulatory requirements to attain the standard. SIPs may also include Transportation Control Measures (TCMs) which are strategies that:

1. are specifically identified and committed to in State Implementation Plans (SIPs); and
2. are either listed in Section 108 of the Clean Air Act or will reduce transportation-related emissions by reducing vehicle use or improving traffic flow.<sup>22</sup>

Transportation plans and programs must conform to approved SIPs through a process referred to in transportation planning as "conformity." Thus, plans and programs must reflect SIP mobile source budgets and TCMs.

<sup>21</sup> Other Illinois programs that have goals and objectives that are supported by improvements to bicycling and walking environments include *Illinois Strategic Direction 2002* and *Illinois Tomorrow*. In the area of public health, *Illinois Strategic Direction 2002* seeks to provide "a community of services that enhance health and well being" while *Illinois Tomorrow* seeks to "encourage the creation, expansion, and restoration of livable communities in Illinois."

<sup>22</sup> See <http://www.fhwa.dot.gov/environment/tcm.htm>.

Northeastern Illinois is designated as a non-attainment area for ozone.<sup>23</sup> Ozone is a product of a chemical reaction between volatile organic compounds (VOC's) and nitrogen oxides, with sunlight and heat acting as a catalyst. 40% of VOC emissions come from transportation sources.<sup>24</sup> Control of transportation sources of VOC's has been important in reducing ozone levels. Much of the most effective control has been at the technology level (e.g., combustion that completely burns fuels). However, reducing vehicle use or improving traffic flow has helped move toward attaining air quality standards, while simultaneously reducing congestion.<sup>25,26</sup>

Figure 2 shows Illinois' exceedances of the 1-hour ozone standards since 1988 and VOC emissions budgets through 2007, when the ozone standard is to be attained.<sup>27</sup> Figure 2 shows that the air quality is improving. Since 1987, the number of days our region exceeded the 1-hour ozone standard has decreased from a high of 25 days in 1988 to five days or less since 1996.

Air quality is still a health concern. A new 8-hour standard is taking effect based on more recent information regarding the impacts of ozone on health. In 2001, there were 14 exceedance days for the 8-hour ozone standard.<sup>28</sup> In addition, while this report was being compiled, stricter standards were put into place for fine particulate matter; the Chicago area fails to attain these new standards. So while air quality has improved, some additional improvement is necessary for the air in northeastern Illinois to be healthy for everyone to breathe every day.

<sup>23</sup> According to the U.S. Environmental Protection Agency, here are the health effects of ozone pollution:

- Ozone can irritate lung airways and cause inflammation much like a sunburn. Other symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable, but even healthy people that are active outdoors can be affected when ozone levels are high.
- Repeated exposure to ozone pollution for several months may cause permanent lung damage. Anyone who spends time outdoors in the summer is at risk, particularly children and other people who are active outdoors.
- Even at very low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Source: (<http://www.epa.gov/air/urbanair/ozone/hlth.html>)

<sup>24</sup> U.S. DOT, Federal Highway Administration. *A Summary: Transportation Programs and Provision of the Clean Air Act Amendments of 1990*. 1992

<sup>25</sup> Transportation Research Board of the National Academies. *The Congestion Mitigation and Air Quality Improvement Program: Assessing 10 Years of Experience*. Special Report 264. 2002. Pp. 158-159.

<sup>26</sup> Particulate matter, broadly, is perhaps more harmful than ozone. Particulates are often associated with individual sources, particularly diesel engines. Improved technologies, regulation enforcement, and exposure control are generally thought to be the primary means of particulate health impact controls. However, walking and bicycling (away from particulate matter sources) can be an alternative to exposure to particulate emissions. For example, diesel fume build-up in school buses can be a health threat (David R. Brown Sc.D., John Wargo Ph.D., "Children's Exposure to Diesel School Bus Emissions" Voices for Clean Air Research Symposium Presentation. June 3, 2003. - or see <http://www.ehhi.org>) Walking or bicycling can be a healthy alternative to such exposure.

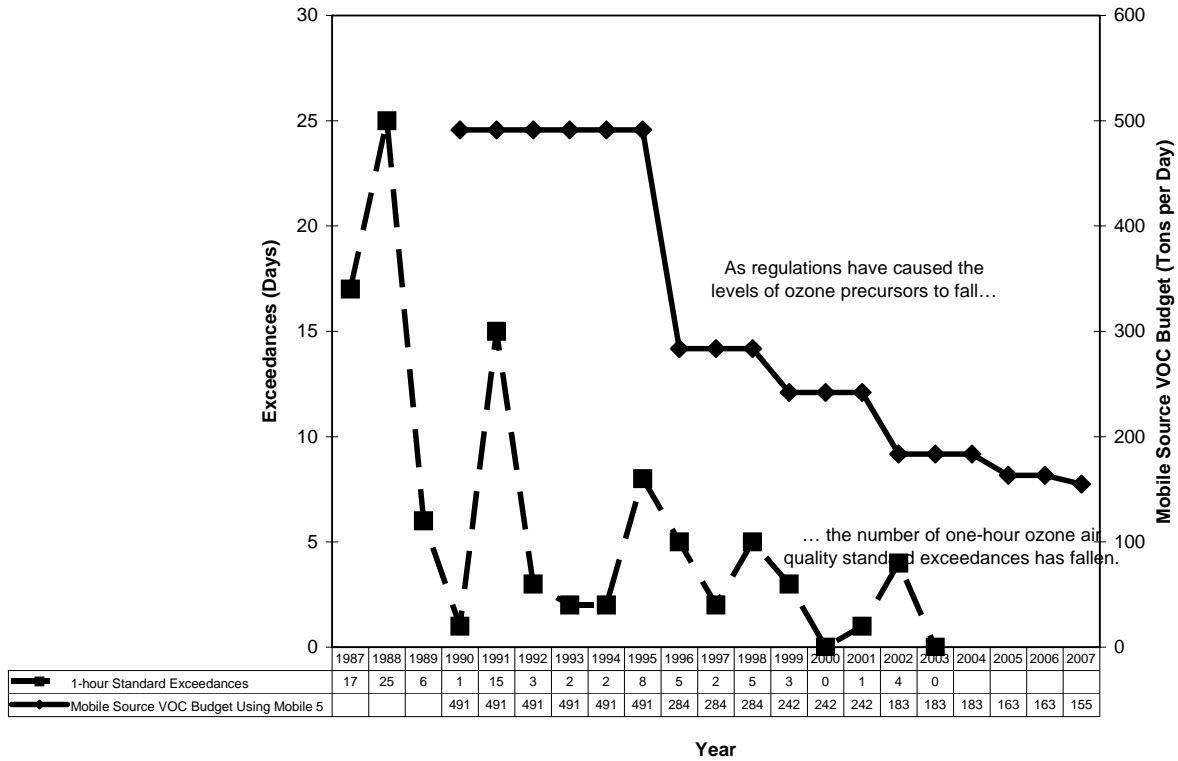
<sup>27</sup> Sources: CATS, *FY 2002-2006 Transportation Improvement Program for Northeastern Illinois Conformity Analysis Supplement*, March, 2002, pp 3, 5; CATS, *FY 1998-2002 Transportation Improvement Program Conformity Analysis Documentation*, November 1997 p. 57. CATS, *FY 1998-2002 Transportation Improvement Program Conformity Analysis Supplement*, April 1998, Overview. CATS, *FY 2001-2006 Transportation Improvement Program Conformity Analysis Documentation*, October, 2000 p. 100. US EPA, *The Ozone Report: Measuring Progress through 2003* (April 2004). <http://www.epa.gov/air/data/monvals.html?st~IL~Illinois>.

<sup>28</sup> The state of Illinois has recommended that the non-attainment area for the ozone 8-hour standard remain the same as for the 1-hour standard.





**Figure 2. Air Quality Trends, Chicago Ozone Non-attainment Area, Ground-level Ozone, 1987 - 2007**



Walking and bicycling make a contribution to air quality improvement as part of adopted laws and regulations. Walking and bicycling, as zero-emissions modes, are listed in the Clean Air Act as potential TCMs.<sup>29</sup> 37 bicycle and pedestrian projects have been included in successive SIP's as TCM's from 1995 through 1999.<sup>30</sup> 36 bike and pedestrian projects in the CATS TIP database could be considered for the next TCM submittal.<sup>31</sup> TCM's as a whole are expected to contribute 4 tons per day toward the VOC budget, although bike projects are a small part of this total.<sup>32</sup>

<sup>29</sup> Section 108 of the Clean Air Act lists the following potential TCMs, among others:

- (ix) programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;
- (x) programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;
- (xiv) programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;
- (xv) programs for new construction and major reconstructions of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest....

<sup>30</sup> However, several TCMs had to be withdrawn because of implementation delays. See: CATS. *FY 2001-2006 Transportation Improvement Program for Northeastern Illinois*. Appendix C. Table 3. Also see the section on funding in this report.

<sup>31</sup> TCM code = "Accepted" and work type = "E-BIKE" or "E-PED."

<sup>32</sup> Illinois Environmental Protection Agency Bureau of Air. *A Revision to the State Implementation Plan for the Chicago Ozone Nonattainment Area: Motor Vehicle Emissions Budgets Using Mobile6*. March, 2003, p. 8.



Funding for projects that help the region attain air quality standards is available through the Congestion Mitigation and Air Quality Improvement (CMAQ) program. In fact, the common formula is "CMAQ funds TCM's." By law, TCM's have CMAQ funding priority. In northeastern Illinois, the CATS CMAQ Project Selection Committee has stipulated that CMAQ projects be included as TCM's in the SIP at the appropriate time for the project. CMAQ project sponsors must agree to this inclusion when they apply for CMAQ funds.<sup>33</sup>

Another fund source with a policy link to air quality is the Locally Programmed Surface Transportation (STP-L) Program. The STP-L/air quality link is not established legislatively, but is maintained as part of the program development process in several CATS regional councils. TCM's are eligible for STP-L funds in all councils. Table 3 shows which councils provide some funding parameters for TCM projects in programming STP-L funds. It will be shown later that these funding parameters are highly correlated with funding levels for bicycle and pedestrian improvements in the councils.

**TABLE 3**  
**Suburban Council STP-L Funding Parameters Regarding TCM Projects**

Suburban Council	Does Council Have TCM Priority?	Description of TCM Priority
North Shore	No	N.A.
Northwest	Yes	Specific Allocation (20%)
North Central	Yes	Specific Allocation (15%)
Central	No	N.A.
Southwest	No	N.A.
South	Yes	Determined Annually
DuPage	Yes	Specific Allocation (30%) and Lower Local Match Rate
Kane	Yes	Lower Local Match Rate
Lake	Yes	Additional Project Ranking Points for TCM Projects
McHenry	No	N.A.
Will	No	N.A.

The bottom line is that since the CMAQ and STP-L Programs fund a large portion of bicycle and pedestrian improvements in northeastern Illinois, the policy link between such improvements and improving air quality to meet public health objectives is very strong.

<sup>33</sup> See [http://www.catsmpo.com/progs/CMAQ\\_FY\\_2004\\_Project\\_Submittal\\_Information\\_Booklet.doc](http://www.catsmpo.com/progs/CMAQ_FY_2004_Project_Submittal_Information_Booklet.doc) and [http://www.catsmpo.com/progs/CMAQ\\_FY\\_2004\\_TCM\\_Committal\\_Agreement.doc](http://www.catsmpo.com/progs/CMAQ_FY_2004_TCM_Committal_Agreement.doc)



## Public Health Policy Context: Injury Prevention



Safety is a key element of national and regional policy. Of roadway improvements in general, Title 23 of the U.S Code<sup>34</sup> directs that safety on the roads other than the interstate system be given increased emphasis.

Section 109 of Title 23 specifically protects non-motorized trip safety in the federal aid highway process:

(m) PROTECTION OF NONMOTORIZED TRANSPORTATION TRAFFIC.

—The Secretary shall not approve any project or take any regulatory action under this title that will result in the severance of an existing major route or have significant adverse impact on the safety for non-motorized transportation traffic and light motorcycles, unless such project or regulatory action provides for a reasonable alternate route or such a route exists.

To facilitate these improvements, Section 134 of Title 23 requires:

(1) IN GENERAL.—The metropolitan transportation planning process for a metropolitan area under this section shall provide for consideration of projects and strategies that will— ...

(B) increase the safety and security of the transportation system for motorized and nonmotorized users....

In support of this, CATS is expected to adopt the objective of developing "a transportation system that provides safe and secure movement for all travelers."<sup>35</sup> The Federal Highway Administration and Federal Transit Administration, in their certification review of the metropolitan transportation planning process in northeastern Illinois, recommended that "CATS give emphasis to issues related to safety in the plan, including the development of specific pedestrian goals and objectives."<sup>36</sup> Compliance certification for this recommendation is scheduled for 2005.

Pedestrian and bicycle safety is a public health concern. Table 4 shows the number of injuries and fatalities in 2000 in northeastern Illinois by county. Table 4 demonstrates that pedestrian and bicyclist injuries and fatalities affect thousands of residents of northeastern Illinois each year. The table also shows that most pedestrian and bicyclist injuries and fatalities are in Cook County. In addition, more injuries and deaths occur among pedestrians than bicyclists.

<sup>34</sup> Title 23, United States Code, "reflecting amendments made through the end of the 105<sup>th</sup> Congress. Excerpted from House Transportation and Infrastructure Committee Print 106-5 (May 1999) *Compilation of Selected Surface Transportation Laws*.

<sup>35</sup> CATS. *2030 Regional Transportation Plan for Northeastern Illinois. Draft*. August, 2003 p. 31.

<sup>36</sup> Federal Highway Administration and Federal Transit Administration. *2002 Certification Review of the Metropolitan Transportation Planning Process for the Northeastern Illinois Transportation Planning Area*. P. 23.

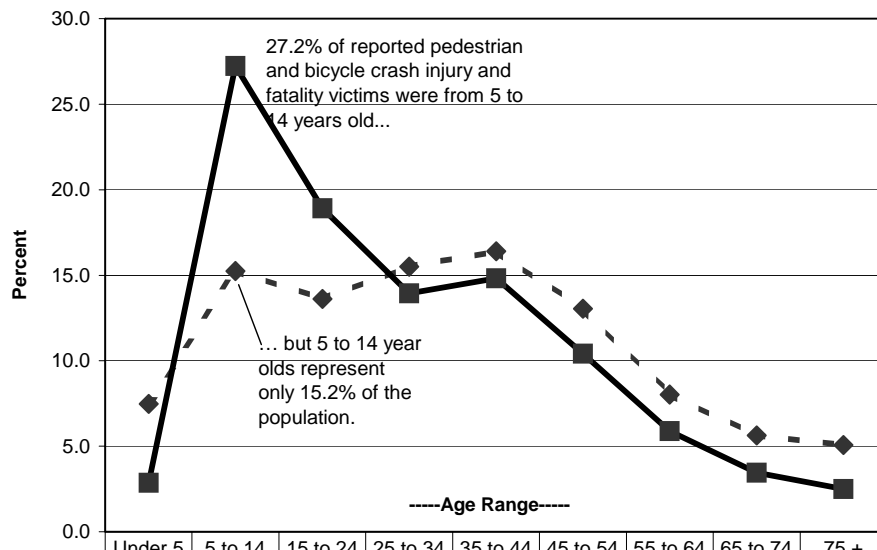
**TABLE 4**  
**Non-occupant Injury and Fatality Crashes by County, Northeastern Illinois, 2000**

County	Pedestrian Injury Crashes	Pedestrian Fatality Crashes	Pedalcyclist Injury Crashes	Pedalcyclist Fatality Crashes	Total
Cook	5,109	116	1,956	9	7,190
DuPage	158	3	169	0	330
Kane	105	3	83	1	192
Lake	131	4	97	0	232
McHenry	44	3	42	2	91
Will	110	3	86	1	200
<b>Total</b>	<b>5,657</b>	<b>132</b>	<b>2,433</b>	<b>13</b>	<b>8,238</b>

Source: Illinois Department of Public Health EMS Reporting System, 2003. See <http://app.idph.state.il.us/emsrpt/index.htm>. Numbers reflect crashes, not victims. Some low numbers resolved using simultaneous equations involving multiple queries.

Figure 3 shows that children suffer from a disproportionately high percentage of crashes with pedestrian or bicyclist injuries.

**Figure 3**  
**Distributions of Population and Reported Bicyclist or Pedestrian Injuries and Fatality Crashes, Northeastern Illinois, 2000, by Age**

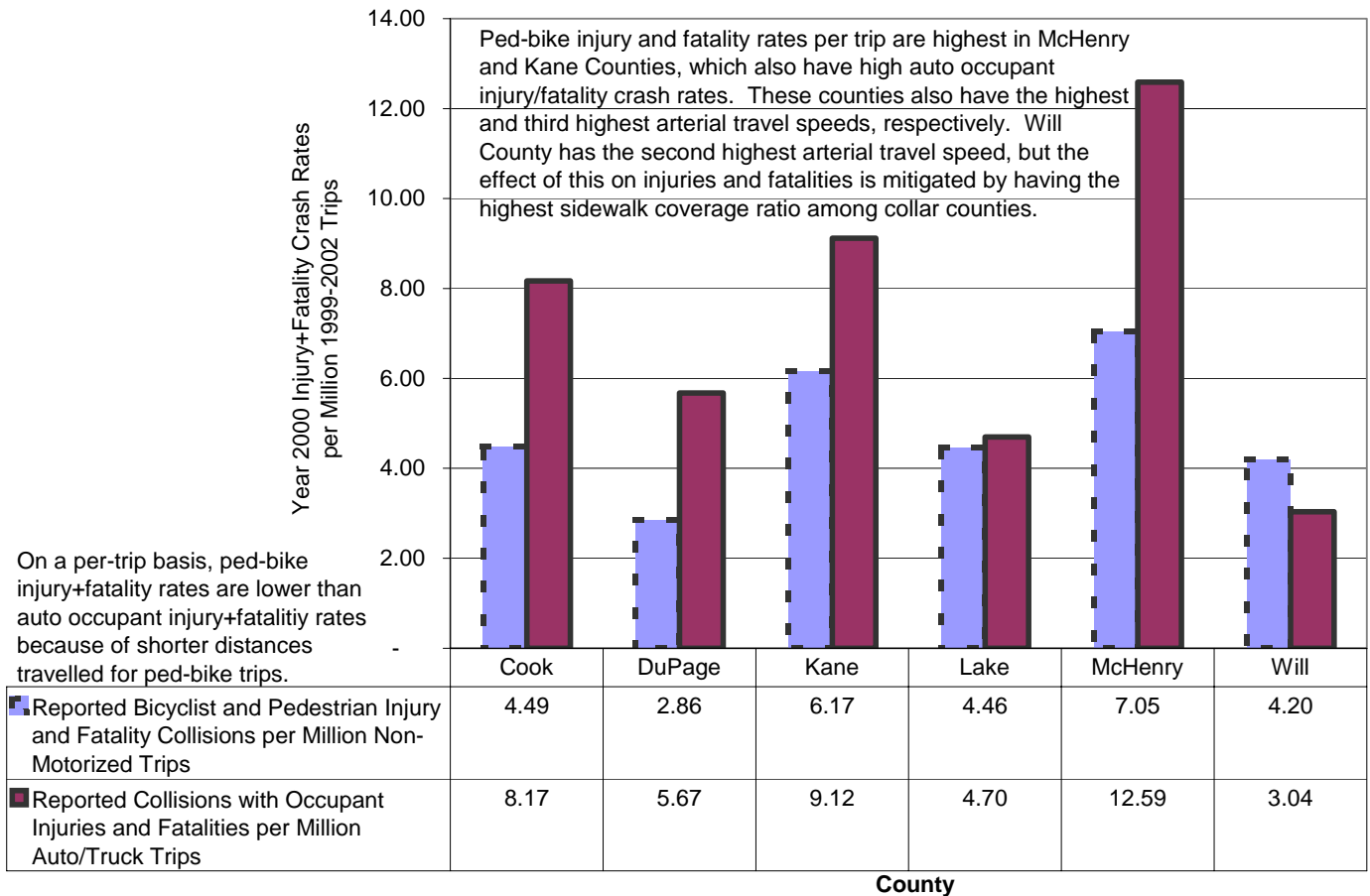


	Under 5	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 +
◆ Percent of Population in Age Range	7.5	15.2	13.6	15.5	16.4	13.0	8.0	5.6	5.1
■ Percent of Reported Bicyclist and Pedestrian Accidents with Injuries and Fatalities in Age Range	2.9	27.2	18.9	13.9	14.8	10.4	5.9	3.5	2.5

Source: IDPH EMS Reporting System and US Census  
 Analyzed and Produced by the Chicago Area Transportation Study,  
 April 2003



**Figure 4**  
**Reported Injury and Fatality Crash Rates per Million Trips,**  
**Northeastern Illinois, 1999-2002**



Data Sources: Chicago Area Transportation Study, Illinois Department of Public Health EMS Reporting System

Geographical disparities exist in the riskiness of bicycle and pedestrian travel. As noted above, Table 4 shows that there are geographic disparities in the number of bicyclist and pedestrian injury crashes. However, when adjusted for population and that population's exposure to risk, the relative risk may not be proportional to the results shown in Table 4. Figure 4 shows that on a per-trip basis, walking and bicycling are riskiest in McHenry and Kane Counties. These counties also have high arterial travel speeds and low municipal sidewalk coverage rates.<sup>37</sup>

The relation of speed and pedestrian accommodations to injuries and fatalities is supported by other data. To give a general view of the relationship, it is necessary to look at national studies, then revisit northeastern Illinois data to see where we fit and the issues that are raised. Tables 4A and 4B show two views of the relationship between speed and the risk of death or serious injury in a car-pedestrian collision. First, in a widely quoted study by Pasanen (Table 5A), impact speeds were related to injury and death. In this study and others like it, impact speeds of 40 miles per hour are estimated to result in an 80% pedestrian fatality rate. Using the same data

<sup>37</sup> Estimated 24-hour arterial travel speeds from the travel demand models for the 2002 network are as follows, from Table 5-7 of the FY 2002-2006 TIP Conformity Analysis Supplement (March 2002): Cook: 33.5, DuPage: 40.0, Kane: 45.1, Lake: 41.4, McHenry: 49.3, Will: 46.5. Estimated municipal sidewalk coverages weighted by population are: Cook: 91%, DuPage: 80%, Kane: 78%, Lake: 60%, McHenry: 73%, Will: 84%.



disaggregated by age, Davis showed injury and fatality rates for the aged are much higher than for the young. For example, at an impact speed of 40 mph, the fatality rate for children is estimated to be 25%, while the fatality rate for adults over the age of 60 is 97% (See Table 4A).

**TABLE 5A**  
**Relationship of Impact Speed to Risk of Death and Injury in Car-Pedestrian Crashes**

Impact Speed (mph)	Pasanen (1992) Probability of Fatality	Ages 0 to 14, Davis (2001)		Ages 60+, Davis (2001)	
		Probability of Fatality	Probability of Serious Injury	Probability of Fatality	Probability of Serious Injury
20	5%	1%	30%	4%	74%
30	40%	5%	71%	54%	45%
40	80%	25%	71%	97%	3%
50	~100%	70%	30%	~100%	0%

Sources: Davis, Gary A. "Relating Severity of Pedestrian Injury to Impact Speed in Vehicle-Pedestrian Crashes." *Transportation Research Record 1773*. Transportation Research Board, 2001. Pasanen, E. *Driving Speeds and Pedestrian Safety; a mathematical model*. Technical Report No. REPT-77, and Nordisk Kabel- og Traadfabriker, Copenhagen, Denmark, 41 pp., 1992. Referenced in W.A. Leaf and D.F. Preusser *Literature Review on Vehicle Travel Speeds and Pedestrian Injuries* National Highway Traffic Safety Administration, October 1999. Notes: Davis column figures compiled by CATS staff using Davis logit model parameters. Adult figures, not shown here, are closer to rates for children than the elderly but show significantly higher fatality probabilities at the higher speed ranges. These estimates are available upon request. The widely referenced UK Department of Transport *Traffic Advisory Leaflet 7/93* (TAU, 1993) has results similar to Pasanen (referenced in Leaf and Preusser, 1999).

A second method is to compare pre-crash travel speed (before any braking or evasive actions) to pedestrian fatalities and injuries. Using this method, an analysis of General Estimates System data (Table 5B) showed that vehicles traveling at more than 45 miles per hour prior to the crash circumstances had pedestrian fatality rates of 35%, with an additional 38% of pedestrians suffering incapacitating injuries.

**TABLE 5B**  
**Relationship of Travel Speed to Risk of Death and Injury in Car-Pedestrian Crashes**

Pre-Crash Vehicle Travel Speed	GES, Fatal Injury	GES, Incapacitating Injury	GES, Non-Incapacitating Injury	GES, Minor or No Injury
<=20	1.0%	32.5%	36.2%	30.3%
21-25	2.9%	40.9%	34.5%	21.7%
26-30	2.8%	47.1%	27.3%	22.8%
31-35	4.9%	47.3%	29.2%	18.6%
36-45	16.2%	44.9%	18.1%	20.7%
46+	35.2%	38.2%	18.2%	8.4%

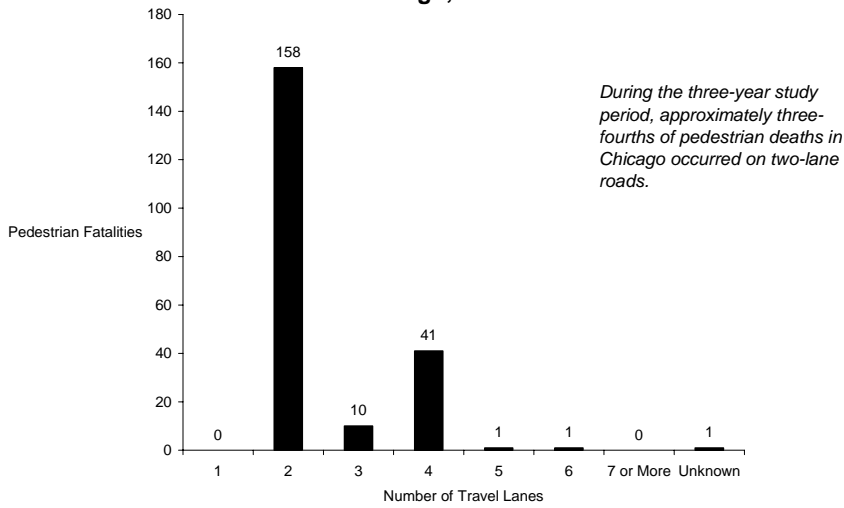
Source: General Estimates System, <ftp://www.nhtsa.dot.gov/ges/> Data analyzed in W.A. Leaf and D.F. Preusser *Literature Review on Vehicle Travel Speeds and Pedestrian Injuries* National Highway Traffic Safety Administration, October 1999.

Figure 4 and Tables 5A and 5B show that high vehicle speeds are an important factor in pedestrian deaths and injuries. *Soles and Spokes* investigated whether fatalities in particular were related to high-speed roads in northeastern Illinois. Staff found that most non-motorist fatalities in northeastern Illinois occur on two-lane roads, instead of multi-lane arterial streets. Multi-lane roads account for a larger share of suburban pedestrian fatalities, however (see Figures 5A, 5B, 5C, and 5D). We also found that a large majority of Chicago non-motorist fatalities occur where speed limits are 30 or 35 miles per hour, while a large proportion of suburban fatalities occur on streets where the speed is 40 miles per hour or higher (compare



Figures 5E, 5F, 5G, and 5H). These figures show that the characteristics of non-motorist crashes in Chicago are clearly different than in the suburbs.

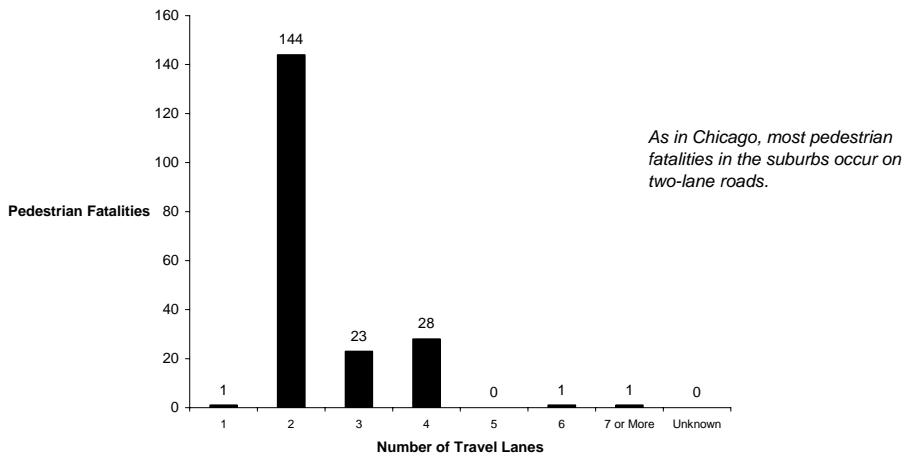
**Figure 5A**  
**Pedestrian Fatalities by Number of Travel Lanes.**  
**Chicago, 1999-2001**



Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002

**Figure 5B**  
**Pedestrian Fatalities by Number of Travel Lanes.**  
**Collar Counties + Suburban Cook County, 1999-2001**

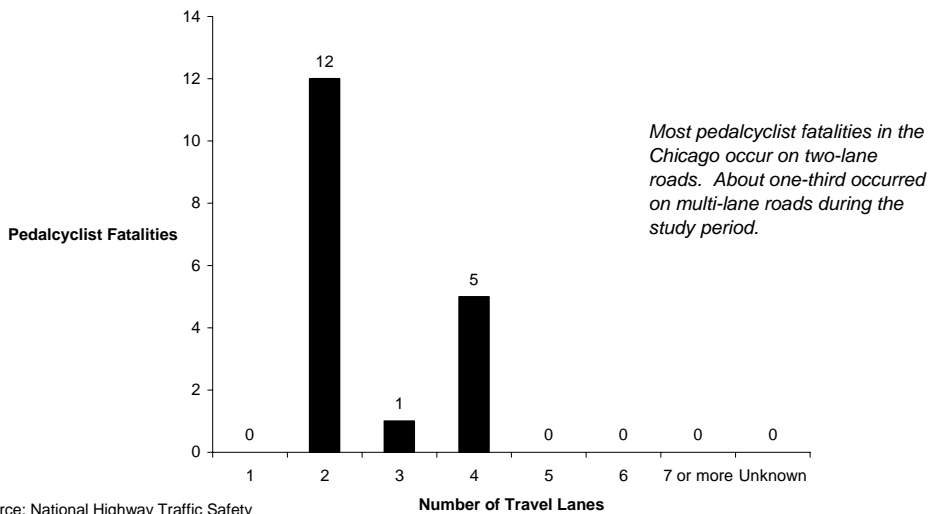


Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002



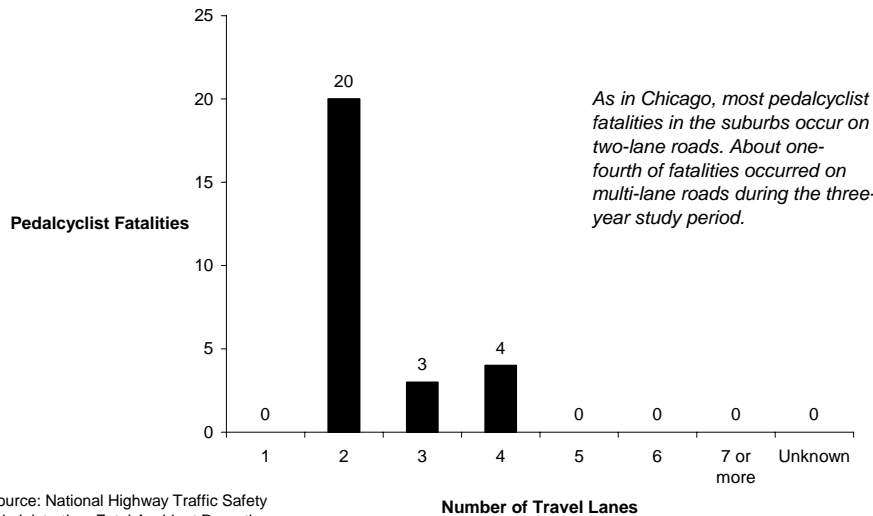
**Figure 5C**  
**Pedalcyclist Fatalities by Number of Travel Lanes.**  
**Chicago, 1999-2001**



Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002

**Figure 5D**  
**Pedalcyclist Fatalities by Number of Travel Lanes.**  
**Collar Counties + Suburban Cook County, 1999-2001**



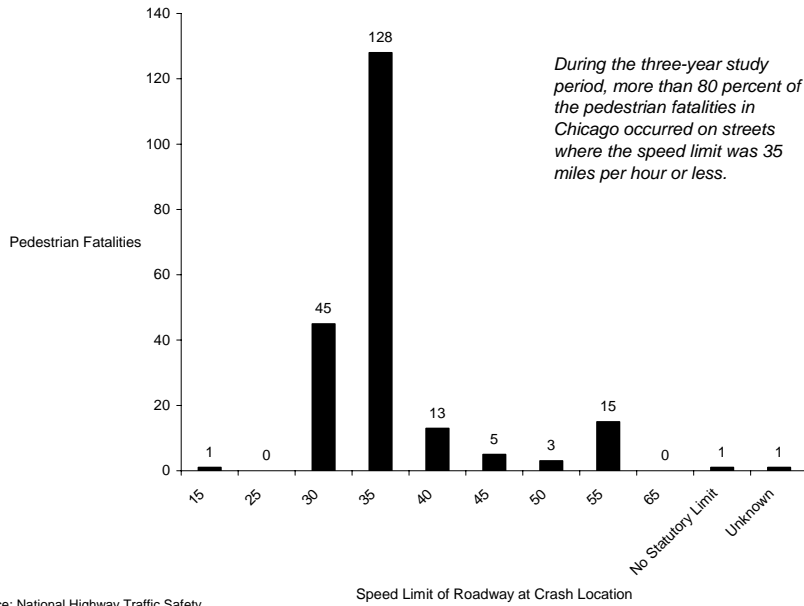
Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002





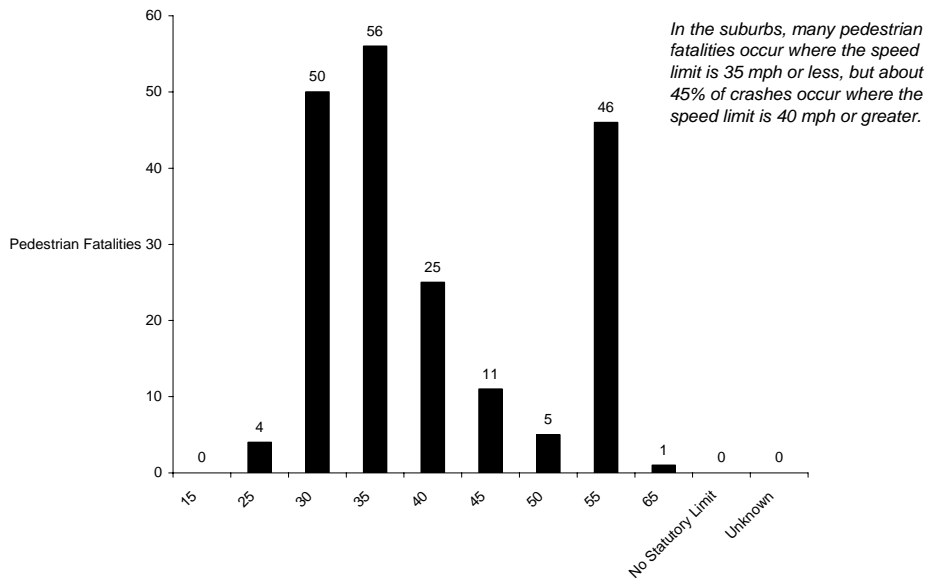
**Figure 5E**  
**Pedestrian Fatalities by Roadway Speed Limit.**  
**Chicago, 1999-2001**



Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002

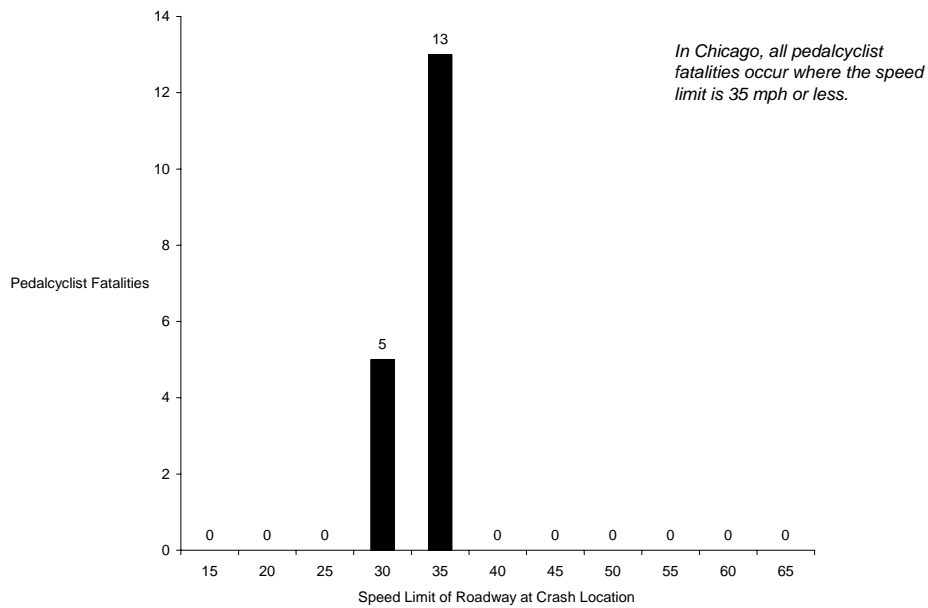
**Figure 5F**  
**Pedestrian Fatalities by Roadway Speed Limit.**  
**Suburban Cook + Collar Counties, 1999-2001**



Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002

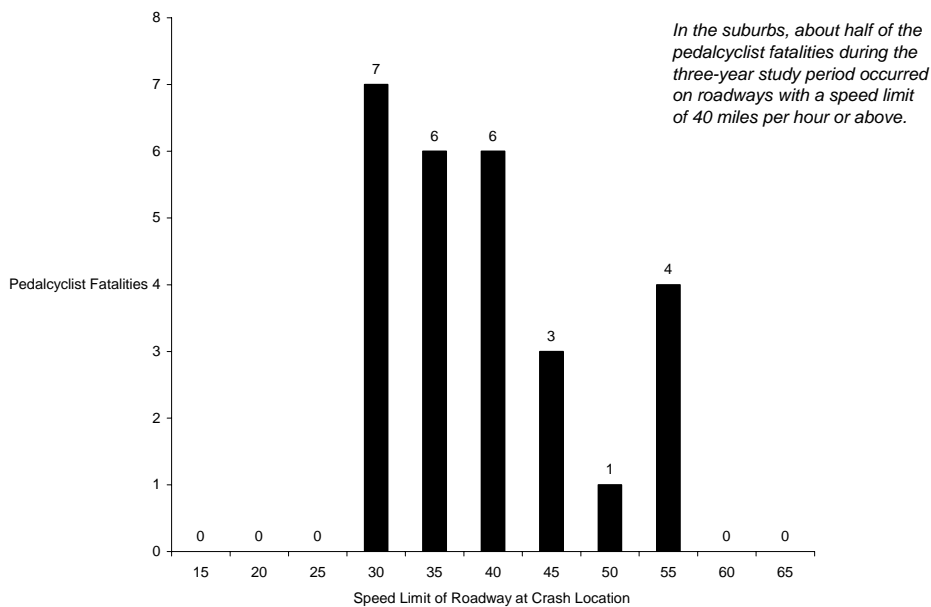
**Figure 5G**  
**Pedalcyclist Fatalities by Roadway Speed Limit.**  
**Chicago, 1999-2001**



Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002

**Figure 5H**  
**Pedalcyclist Fatalities by Roadway Speed Limit.**  
**Suburban Cook + Collar Counties, 1999-2001**



Source: National Highway Traffic Safety Administration, Fatal Accident Reporting System, Web-Based Encyclopedia

Produced by Chicago Area Transportation Study, May, 2002



So control of exposure of pedestrians to vehicles traveling at high speeds may be critical in reducing the risk of deaths and injuries. Control can be exercised through engineering, education, and enforcement. For example, exposure control may be maintained by the provision of sidewalks, refuges, safer crossings, and even grade-separated crossings, particularly on high-speed roads with a high functional class. However, based on the large number of fatalities on moderate-speed roads, speed limit enforcement and other traffic law enforcement appear to be very important - if people were obeying the low speed limits often indicated, Table 4b indicates that the fatalities would be unlikely. The relationship between speed and non-motorist safety also indicates that traffic calming may be an important strategy for improving pedestrian safety.<sup>38</sup>

The preceding figures show differences between the City of Chicago and suburbs. Figure 6 shows child and adolescent pedestrian and bicycle injury trauma center overnight hospitalization rates by Chicago community area. The hospitalization rates vary by a factor of more than seven, from 17 per hundred thousand children in the Ashburn community to 129 in the West Garfield Park community. Differences in hospitalization rates are strongly correlated with socio-economic measures. For example, high hospitalization rates are strongly correlated with low incomes, high minority population shares, low vehicle availability, and crime.<sup>39</sup>

The strong correlation of hospitalizations with low vehicle ownership may indicate a high level of exposure to traffic for pedestrians, increasing the chances of injuries. However, the correlation with crime may bear further investigation. Careless or aggressive behavior is a roadway safety concern. None of these correlations indicate cause, but show that pedestrian and bicycle safety is an issue that disproportionately affects poor and minority populations that face other difficulties. The data in Figure 6 suggest that poor communities may need particular focus in any pedestrian and bicycle safety education, driver education, traffic calming, and traffic enforcement efforts.

So far, we have seen fatalities broken out by bicycle and pedestrian activities. This information indicates that there are many more pedestrian deaths than bicyclist deaths in northeastern Illinois. The remainder of the information we have seen shows bike and pedestrian injuries aggregated. Table 6 shows pedestrian and bicycle injury trauma center overnight hospitalization rates for children by district in Northeastern Illinois. Table 6 also shows that child and youth hospitalization rates for pedestrian injuries range from 8.6 in Lake County to 49.1 in Chicago, while the rates for bicycle injuries range from 8.3 in Chicago to 21.3 in McHenry County. Table 5 also shows that in the collar counties, hospitalization rates for bicycle-related injuries per population are higher than for pedestrian injury rates, while pedestrian rates are much higher than bicycle rates in the Cook County.

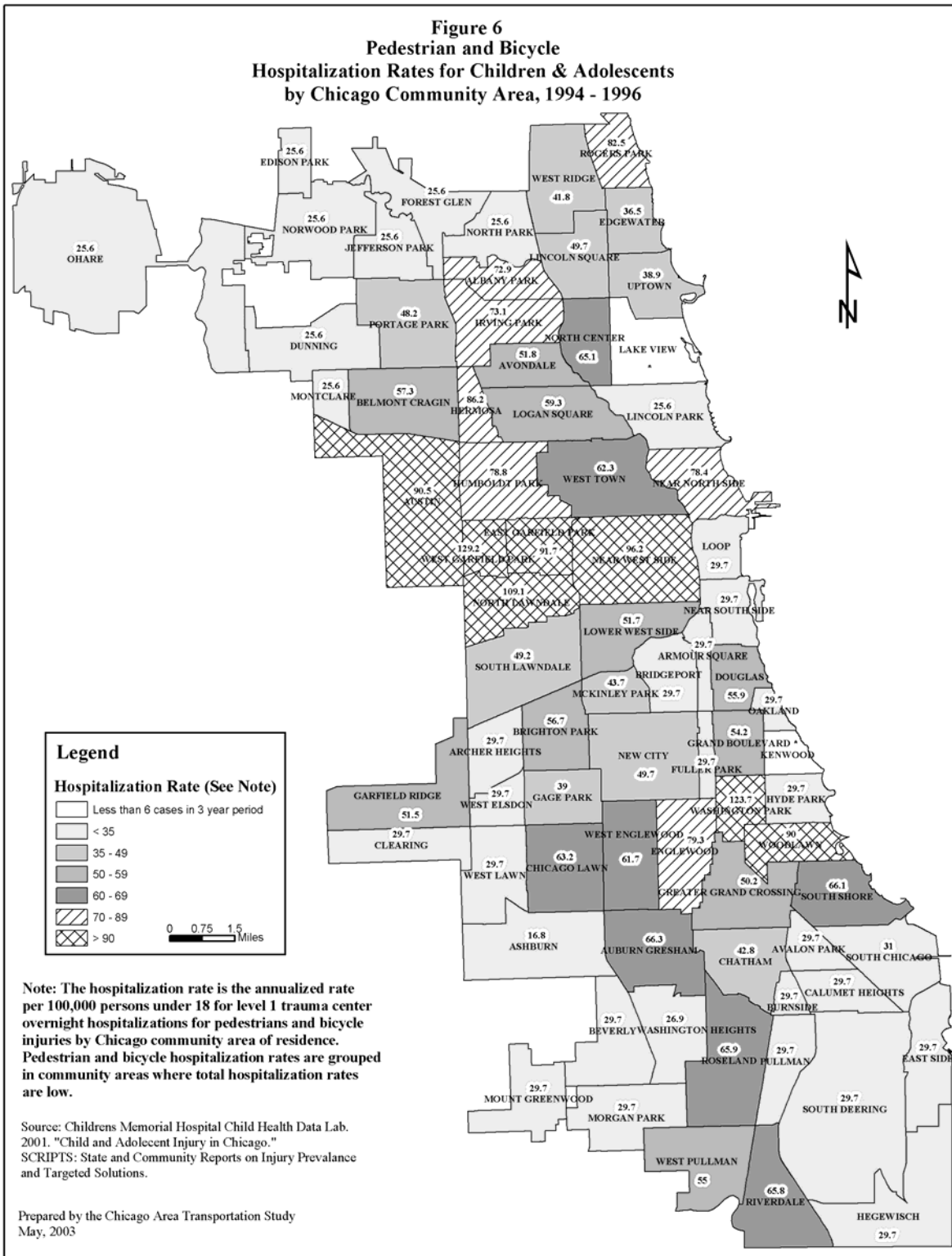
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<sup>38</sup> Many pedestrian fatalities occur on roads where speed limits should make crash fatalities unlikely, especially in Chicago. While four-lane roads may be thought of as the most dangerous for cyclists and pedestrians to cross, there are actually more fatalities on two-lane roads. Therefore, further study should consider how so many fatalities can occur when crossing distances are shorter and speed limits are lower, and evaluate programs and ideas to reduce such fatalities.

<sup>39</sup> With  $n=73$ , the correlation of the community area's hospitalization rate in Figure 6 with median household income is  $-.47$  ( $t=4.53$ ); with % not white,  $.41$  ( $t=3.80$ ); with % of the population with no vehicle available,  $.53$  ( $t=5.21$ ); and with the index crime rate,  $.39$  ( $t=3.53$ ). Additional study is necessary to draw definitive conclusions regarding the importance of each variable; perhaps using another larger dataset. However, it's worth noting that the area with the lowest crash hospitalization rate for children, Ashburn, is a community area where whites make up a minority of the population, but where incomes are high and crime is low. Loop, O'Hare, Lakeview and Kenwood are not included in the analysis because of missing data or because of high index crimes related to employment center status.



**Figure 6**  
**Pedestrian and Bicycle**  
**Hospitalization Rates for Children & Adolescents**  
**by Chicago Community Area, 1994 - 1996**



**Table 6**  
**Hospitalization Rates for Children and Adolescents**  
**by District and Pedestrian or Bicycle Travel**  
**Northeastern Illinois, 1994-1996**

District	Pedestrian Injury - Child and Youth Hospitalization Rate	Bicycle Injury - Child and Youth Hospitalization Rate
City of Chicago	49.1	8.3
Suburban Cook	18.7	14.4
DuPage	13.1	17.4
Kane	14.3	14.9
Lake	8.6	13.5
McHenry	10.4	21.3
Will	13.0	18.1

Note: Data shows annualized rates of pedestrian and bicycle injury hospitalization for persons under age 20 per 100,000 population under age 20.

Source: . Cartland J, Meleedy-Rey P, Christoffel KK. 2001. *Child and Adolescent Injury in Illinois*. Child Health Data Lab, Children's Memorial Hospital. SCRIPTS: State and Community Reports on Injury Prevalence and Targeted Solutions. Pages 33, 36, 52, 53, 55, 57, 62.

Note that the information in Table 6 shows the epidemiological perspective, with a rate per hundred thousand people. The level of risk and exposure to the risk determine these epidemiological rates. A more typical transportation planning perspective, taking exposure and risk into account, is in Figure 4, above. In addition, more information on exposure (usage) and risk (in the form of level of service information) is included later in this report.

Here, it may be useful to present information regarding some risk behaviors on the part of motorists, bicyclists, and pedestrians that contribute to traumatic injuries and fatalities. The information should be used to point to further research, since it is general and not of high quality.<sup>40</sup>

*Alcohol involvement:* In the 6-county area, approximately 17 (10%) of 165 ped and bike fatal crashes in 2001 had alcohol involvement reported by the police on the part of the victim. 2 of

<sup>40</sup> It is extremely important that the information here and other FARS data be used with care. Problems with the information include:

1. Information quality is often poor. For example, a large portion of Chicago's fatalities are reported to be on local roads and streets, when in fact, upon analyzing the individual cases, they are shown to be on arterials.
2. "Person-related factors" are assigned to each case, regardless of whether the related factor was the cause of the crash: so "blame" is assigned to pedestrians and bicyclists in each and every case even when they were not at fault. Therefore, the information should point to further case-specific research, but shouldn't be used to set policy.
3. Missing information is widespread and can be interpreted in a variety of ways. Here, staff interpreted missing alcohol tests as an indication of no alcohol involvement on the part of drivers or pedestrians; if there were suspicion of alcohol involvement, it would be in the report. Others have taken the same information, disregarded the lack of reports, and reported a much higher alcohol involvement rate, based on the assumption that the missing information has the same rate of alcohol involvement as the reported information.
4. Among the pedestrian fatalities reported are people entering and exiting their vehicles while parking and occupational injuries, such as construction workers struck by motor vehicles in construction zones. Hence, some of the pedestrian death reports are not strictly related to foot travel. In Illinois, there were 36 work zone fatalities in 2001 (many of which may have been occupational pedestrians) compared to 185 total pedestrian deaths statewide in 2001.



the 17 with alcohol involvement were bicycle crashes. Approximately 16 crashes (10%) had drivers with reported alcohol involvement.<sup>41</sup>

*Hit and Run:* In the City of Chicago, 33 (35%) of 94 ped and bike fatalities in 2001 were hit and run. In the remainder of the region, 19 (22%) of 87 were hit and run.<sup>42</sup>

*Bicycle Helmet Use among Adolescents:* In Chicago, 92.6% of high school students surveyed who rode a bicycle in a 12-month period ending in 2001 never or rarely wore a bicycle helmet. Statewide in Illinois excluding Chicago, the figure was 93.2%.<sup>43</sup>

*Intersection vs. Non-Intersection.* 99 of 165 fatal bike and ped crashes in the six-county area in 2000 occurred away from intersections in locations where crosswalks were not available.<sup>44</sup>

*Route Signing:* Approximately 44 of 140 fatal pedestrian crashes in 2001 in the six-county area were on federal and state routes; and 96 were on municipal roads and streets. Of approximately 18 fatal bicycle crashes, 7 were on a federal or state route, 1 was on a county route, and 10 were on municipal roads and streets.

*Person Related Factors:* Among fatal ped and bike crashes in the six-county area, frequently cited factors contributing to fatal collisions include:

- motorists not seeing pedestrians;
- darting, running or stumbling into the road;
- improper crossing of the roadway or intersection.<sup>45</sup>

## Public Health Policy Context: A Conclusion

The public health perspective on the bicycle and pedestrian activity seems to argue for increased promotion of bicycle and pedestrian travel as mode choices. However, when doing so, the data

<sup>41</sup> Fatality Analysis Reporting System Web Based Encyclopedia (FARS), Create a Query: Year 2001, State IL, Counties 31, 43,89,97,111,197; Person Types 5,6,7,8 (victims) Person Type 1 (drivers); Count Number of Crashes by Police-Reported Alcohol Involvement by Person Type. For both of these rates, there are large portions with no information reported by the police. Note that there can be multiple victims and multiple drivers in fatal bike and ped crashes. Also note that numbers need are estimates, based on joining a crash database with a database of persons.

<sup>42</sup> Ibid., Year 2001 Counties 31, 43,89,97,111,197, City 1670; Person Types 5,6,7,8. Count Number of Persons by Hit and Run

<sup>43</sup> Grunbaum et al, 2002. "Youth Risk Behavior Surveillance --- United States, 2001. *Morbidity and Mortality Weekly Report Surveillance Summaries*. June 28, 2002 (51 (SS04) 1-64). Table 3. See also <http://apps.nccd.cdc.gov/yrbss/index.asp>. The confidence interval for the Chicago data is 90.2 to 95.0%. Statewide data is unweighted.

<sup>44</sup> FARS, op.cit., Year 2000 Counties 31, 43,89,97,111,197.Count Number of Crashes by Non-Motorist Forms by Non-Motorist Location.

<sup>45</sup> Ibid., Year 2000 State IL, Counties 31, 43,89,97,111,197.Count Number of Crashes by Person-Related Factors. The next most common factor is "walking/riding with or against traffic, playing, working, sitting, lying, standing, etc., in roadway" which could be a legitimate walking, crossing, or riding activity; all bike and ped crashes have a "person-related factor" assigned, so that option may be a catch-all. In addition, NHTSA also categorizes the person-related visibility factor as "not visible." Since few people are in fact invisible, the information is better related as motorists not seeing pedestrians. Improving the chances of seeing a pedestrian may include vehicle illumination, street lighting, and reflective clothing to be worn by pedestrians and bicyclists.



seem to argue that a combination education, enforcement, and engineering be in place to improve safety. Such efforts should include not only non-motorist facilities and programs, but also efforts to design facilities and implement programs to assure that motorized traffic operates in a manner that is safe for non-motorized travelers. The combination of all of these activities to increase bicycle and pedestrian mode share could reduce traffic deaths, reduce illness from mobile source emissions, and improve cardiovascular health and other aspects of health affected by physical activity.

This section set out the data explaining why walking and bicycling are important. The next several sections lay out the level and character of pedestrian and bicycle activity in northeastern Illinois.