Corporate Report

Clerk's Files

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DATE: June 6, 2006

TO: Chair and Members of Planning and Development Committee
Meeting Date: June 26, 2006

FROM: Edward R. Sajecki
Commissioner of Planning and Building

SUBJECT: **Public Health and Urban Form**

RECOMMENDATION: That the report titled "*Public Health and Urban Form*" dated June 6, 2006 from the Commissioner of Planning and Building, be received.

BACKGROUND: In February 2005, City Council considered the report titled "*Report on Public Health and Urban Sprawl in Ontario*". That report summarized the findings of the College of Family Physicians, who reviewed a wide array of literature examining the linkage between the physical form of the built environment and public health.

Subsequently, the College of Family Physicians released a series of four brochures titled "*The Health Impacts of Urban Sprawl*" that identify some of the key impacts of urban form on public health. These are provided under separate cover.

City Council referred the report back to staff to determine how this issue could be addressed in Mississauga. In May of 2005, staff held a think-tank which, among other matters, considered how future development patterns could occur in a manner that enhanced public health.

In September of 2005, City staff and the Peel Medical Officer of Health made a joint presentation to the Mississauga Healthy City Stewardship Centre regarding the linkage between public health and urban form.

Lastly, a Public Health and Urban Form Committee has been formed to ensure that public health considerations are integrated into the future urban growth and development of Mississauga. The objectives of the committee are as follows:

- to identify and support with research findings, the linkages between public health and urban form;
- to identify the changes to urban form that would contribute to improved public health;
- to amend, as necessary, the policy planning framework (e.g. strategic plan, official plan, zoning by-law, recreation and parks master plan, transportation strategy) and city practices (e.g. transit services, park development) to ensure they are supportive of an urban form conducive to good public health;
- to identify public health criteria against which development applications will be evaluated;
- to develop implementation processes for policy decisions and development application evaluation;
- to increase public awareness of how urban form affects public health and increase public acceptance to urban form changes that support good public health;
- to encourage the development industry to incorporate consideration of good public health in their development proposals;
- to encourage public service providers (e.g. school boards) to incorporate consideration of good public health in their decision-making;
- to work with and support the initiatives of other groups promoting public health (e.g. The Healthy City Stewardship Centre and the University of Toronto in Mississauga).

Because urban form is the collective result of many decisions affecting land use, the transportation system and open spaces, the committee is composed of staff from all City departments. In addition, the committee includes representation from Peel Health and the Region of Peel Planning Department.

It is anticipated that the Public Health and Urban Form Committee will consult regularly with the Mississauga Healthy City Stewardship

Centre to identify activities and initiatives that are mutually supportive of their common goal of a healthy citizenry.

It should also be noted that the Ontario Professional Planners Institute (OPPI) is holding a symposium in September 2006 titled "The Shape of Things to Come: Improving Health Through Community Planning". OPPI has recognized that "*land use planning decisions shape us in ways that we are only just beginning to appreciate – obesity, heart disease, mental health, social isolation and air quality. This symposium will help OPPI position the planning profession to advocate for healthy communities throughout Ontario*".

This report outlines some of the early responses to urban form that resulted from concerns regarding public health. It discusses some of the current urban form features affecting public health and broad principles that promote a built environment more conducive to public health.

COMMENTS: **Historical Influences on Urban Form**

The form of cities in the western world has changed dramatically since the 19th century when mass urbanization occurred in response to the industrial revolution. The 19th century city was a compact, highly walkable place where people worked and shopped in close proximity to where they lived. Buildings and streets were at a human scale and people walked or took a short trolley or streetcar ride to meet their basic daily needs. Cities were also dirty, polluted places where many people lived in crowded situations and communicable diseases and epidemics spread rapidly.

In response to the ills of the 19th century city, urban reformers advocated for a number of changes. Among the first were sanitation reforms. Health boards were established and dirty streets and contaminated water supplies were addressed. Parks were built to give access to clean air, light and green space.

There were also housing reforms. Tenement housing design made it difficult, if not impossible, for light and fresh air to penetrate living quarters. Poor housing was thought to affect people physically, morally and psychologically. The abysmal quality of crowded tenements laid the foundation for the idea that large concentrations of

people were unhealthy. Aversions to higher density housing began at this time. Housing reforms sought to ensure sufficient air and light by placing limitations on building heights, lot depths, block sizes and street layout.

The housing reforms were institutionalized in the 20th century through tools such as building codes and zoning by-laws. Building codes focused on establishing minimum building standards which improved the living conditions of the poor. Zoning was proposed initially as a means to separate residential areas from noxious land uses but was then embraced as a tool that stabilized the housing market, protected property values and segregated the population in cities by class.

Yet another response to the conditions of the 19th century city was new ideas on city building. Ebenezer Howard's "Garden City" concept was highly influential. He advocated that rather than a large central city, a series of small cities of about 30,000 residents should be built in the "countryside". Garden cities were proposed as complete cities that provided housing, factories, institutional and cultural uses and would be separated from each other by large greenbelts. These garden cities were intended to combine the best of city living with the best of country living.

At the same time as new ideas about city building were emerging, cars were becoming the dominant form of transportation. Designing cities to address the car concentrated on separating cars from people. Instead of planning for the city as an integrated whole, the neighbourhood became the primary planning unit. Neighbourhoods were internally focused – grid roads gave way to circuitous road patterns and cul-de-sacs to discourage cut through traffic, major roads whose primary function was to move cars quickly separated neighbourhoods, and housing turned its back on the main street and into the neighbourhood.

The main street which had been the traditional heart of a city, the place where people met and interacted, became focused on the needs of the car. As traffic volumes and speeds increased, uses stepped back from the street and separated themselves from the street with landscaped strips and/or parking lots. Spread out and separated land uses and high traffic volumes and speeds made main streets

unwelcoming to non-vehicular traffic. Main streets became lifeless and dangerous places that people avoided rather than sought out.

As a result of the above changes, today's cities have vastly improved housing and diseases such as typhus, cholera, small pox, tuberculosis and yellow fever no longer plague urban dwellers. However, the modern city consumes large amounts of land, is automobile congested and streetscapes are typified by strips malls, parking lots and blank walls separated by patches of lawn. Air quality is poor, water consumption is high and run-off from paved areas affects water quality. A new series of public health issues related to the form of the urban environment have been created.

"More than a century ago, when congested slum conditions were prevalent, public health specialists were concerned with urban design and advocated dwellings that are more spacious with better plumbing, and more parks and playgrounds. Today a different problem of urban design – the structure of the suburb – is contributing to critical public and environmental health issues."

Understanding Sprawl, David Suzuki Foundation, 2003

Physical Activity by Community Design

The Region of Peel 2005 Health Status Report indicated 32% of adults in Peel are overweight and another 14% are obese. A disturbing trend is the increase in the prevalence of weight problems among children. According to a study in the Canadian Medical Association Journal, between 1981 and 1996, the number of overweight boys increased from 15% to 35% and the number of overweight girls increased from 15% to 29%. During this same time, the incidence of obesity in children tripled, from 5% to 17% for boys and from 5% to 15% for girls.

Being overweight puts people at greater risk of developing diabetes, heart disease, stroke, osteoarthritis, high blood pressure, high blood cholesterol, sleep apnea, some respiratory problems and some cancers.

Health care professionals recommend 20 or more minutes of vigorous exercise at least three days per week or 30 or more minutes of moderate exercise at least five days per week. According to the 2000/01 Canadian Community Health Survey, half of Canadians twelve years of age and older are physically inactive.

The built environment affects physical activity and physical activity in turn affects health. Because the built environment is not the only influence on health - diet, genetics, lifestyle, culture and poverty also affect health - the connection between health and the built environment is difficult to isolate. While the built environment is not the sole factor affecting health, it is an important factor in promoting physical activity and consequent improvements to public health.

Historically, physical activity was an integral part of daily living but modern living has engineered physical activity out of routine activities. Work has become less physical for most people, elevators and cars reduce the need for walking, telephones and computers allow us to communicate from our desk or armchair, television fills leisure time, retail shopping is geared to cars with drive-through restaurants and banks being examples of how car-oriented our environment has become.

Studies of trip behaviour in the United States, found that although a quarter of all trips were less than one mile most of these trips were made by car. Almost half of all trips were less than three miles, an easy bike ride, but less than one percent of these trips were made by bicycle.

Numerous products and entire industries have grown in response to our increasingly sedentary lifestyle and the health consequences of this lifestyle. Even so, only a small percentage of people get the recommended amount of physical activity.

Physical activity is now a leisure time activity. It has been suggested that physical activity needs to be reintegrated into daily activity. To do this various features of the urban form need to be considered. These includes the following:

- Land Use Patterns The arrangement of land uses such as the proximity of residences to where people work and to retail and service uses affects the feasibility of walking or cycling. The mix of uses determines if trips will be single or multi purpose. The distance between buildings and uses influences walking and cycling. Also, road patterns such as short blocks and connected streets (e.g., streets on a grid patterns vs. cul-de-sacs and dead-end streets) influences walkability.

- Urban Design Characteristics The comfort level people have in their built environment affects whether people want to spend time in a place or if the place is to be avoided. Places that are uncomfortable, hostile, dangerous, ugly or dull are avoided while places that are comfortable, friendly, safe, attractive and vibrant attract people. More people will walk if they are provided with a pedestrian-oriented environment (e.g., make the pedestrian and cycling environment comfortable and convenient by bringing stores close to the street with entrances oriented to the pedestrian access rather than to parking lots; provide sidewalks, awnings, trees, benches and bike racks; reduce the distance between stores).

- Transportation Systems Infrastructure decisions, the connections between places and the feasibility of various modes of transportation influence how people will move around the city. The provision of public transit, sidewalks, trails and bike racks and how well connected and safe they are will play a role in transportation decisions. Public transit stops should be comfortable (e.g., rain and wind protection), safe (e.g., visible, well-lit) and attractive (e.g., clean, street furniture in good repair).

Mental and Social Health Impacts

Living in a car-dependent environment not only impacts health by influencing levels of physical activity but also has implications for mental and social health. Time spent in traffic is stressful and time that could otherwise be spent with family and on leisure pursuits.

For persons that do not have access to a car because of age, health or economic reasons, conducting routine trips such as going to work, attending medical appointments or getting together with friends, can be difficult resulting in social isolation and becoming dependent on others. For those that do have access to a car their stress is added to by needing to drive children to after school activities and elderly parents to appointments. This will become more of an issue as the number of older adults increases.

Reducing the length of car trips will free up time and reduce stress for those that must use a car. Isolated individuals are more prone to loneliness, depression and feeling disconnected from society. Creating an environment conducive to walking and cycling will allow

some car trips to be avoided and will allow a wider segment of the population to be more independent and to more fully participate in society. Walking and cycling increases opportunities for social interaction which in turn allows people to feel more connected to the people in their community.

Environmental Impacts

Sprawling development has led to increased driving which results in air pollution and urban areas becoming heat islands. To accommodate a car-dependent lifestyle, roads, highways and parking lots are built. These surfaces radiate heat and because they are impervious, run-off collects oil and dirt which affects water quality.

Among the physical health impacts caused by deteriorating air quality are diseases of the respiratory system, cardiovascular system, cancer, reproductive systems and birth defects. Children and the elderly are the most vulnerable to respiratory aliments.

Last year there were over 40 smog days in Mississauga. When air quality is poor, people (particularly vulnerable people) are advised to stay indoors which affects their ability to get the physical activity and social interaction necessary for their physical and social well-being.

Urban Form Principles for Healthy Living

Mississauga was largely developed during the latter decades of the 20th century. The car was fundamental to how urban environments were built during this time period. Development patterns in Mississauga are evident in many communities built at the same time. Radical changes to the built environment, particularly in the short term, are not realistic.

Changing the urban environment also means changing human behaviour. To change behaviour, people must have feasible options. Asking people to drive less when public transit is unavailable or overly onerous or when sidewalks and cycling paths are not provided or are cumbersome to access is also not realistic. Further, people have to understand why they should be making other transportation choices or accept different types of development.

Many ideas about what constitutes a desirable urban form have evolved over many years. The need to make the transition from an environment geared to the needs of a car-dependent society to a walkable and bikeable environment was not widely accepted but has recently increased in popularity.

Some broad principles that can create an urban form that promotes public health are provided below.

1. Encourage a mix of land uses – places were people can live, work and recreate.
2. Encourage the use of public transit, walking and cycling as modes of transportation.
3. Encourage developments to focus on the needs of pedestrians and cyclists (e.g. entrances to the street, connected road patterns).
4. Encourage a compact urban-form.
5. Encourage urban design that is attractive and welcoming to pedestrians.
6. Encourage uses that provide opportunities for social interaction for persons of all ages, physical abilities, cultures and economic circumstances.
7. Encourage environmentally sustainable development practices that consider impacts on air and water quality.

The above principles which reflect good land use and transportation planning, urban design policies and environmental protection practices, are already addressed in may of the City's policies and practices. To achieve an urban-form that supports public health, all proposals involving the growth and development of the City must also be viewed through a public health lens.

FINANCIAL IMPACT: Not applicable.

CONCLUSION: Numerous studies have identified the effect urban form can have on the physical, mental and social health of individuals. Creating an urban form that deals with the public health issues will take a long-term effort, but just as earlier public health issues were successfully tackled, so too can the public health issues of today. It is imperative that we confront these issues – the legacy we leave future generations

depends on it. The establishing of the Public Health and Urban Form Committee is the first step in this process.

ATTACHMENTS:

APPENDIX 1: *Under Separate Cover:* The Health Impacts of Urban Sprawl – Air Pollution

APPENDIX 2: *Under Separate Cover:* The Health Impacts of Urban Sprawl – Road Injuries & Fatalities

APPENDIX 3: *Under Separate Cover:* The Health Impacts of Urban Sprawl – Obesity

APPENDIX 4: *Under Separate Cover:* The Health Impacts of Urban Sprawl – Social and Mental Health

Original Signed By:

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Commissioner of Planning and Building

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APPENDIX 1

VOLUME ONE

THE HEALTH IMPACTS OF
URBAN **SPRAWL**

AIR POLLUTION

AN INFORMATION SERIES FROM
ONTARIO COLLEGE OF FAMILY PHYSICIANS
www.ocfp.on.ca

1. The air we breathe

Many people move to the suburbs to escape the "ills of the city." They move out of the city to get closer to the country air, to have a bigger yard for their kids to play in, or to get away from the noise and bustle of the city. While suburban life has some benefits, a growing body of evidence suggests there are significant public health costs of spread-out urban development, often called "urban sprawl". One particularly harmful impact of urban sprawl is the negative effect that car-dependent communities have on the air we breathe.

Spread-out, sprawling developments make car travel the most convenient way to get around. Driving creates more smog, which has been linked to:

- **respiratory conditions such as asthma**
- **cardiovascular disease**
- **lung cancer**
- **delayed lung development**
- **negative effects on pregnancy**
- **birth defects**

Smog kills.

***The Ontario Medical Association* estimates that over 5,800 people in Ontario will die prematurely in 2005 because of air pollution.**

In 2005, ***The Ontario College of Family Physicians*** published a review of recent research on urban sprawl and human health. In this report, the College summarized the effects of sprawl on

- **AIR QUALITY**
- **ROAD ACCIDENTS** (injuries & fatalities)
- **LACK OF PHYSICAL ACTIVITY** (obesity, diabetes & cardiovascular disease) and
- **MENTAL AND SOCIAL HEALTH**

Air Pollution outlines how urban sprawl contributes to air pollution, how poor air quality endangers our health, and how to build communities where we can all breathe more easily.

SPRAWL **CARS** **SMOG** **HEALTH PROBLEMS**

2. Urban sprawl drives more car use

URBAN SPRAWL refers to low-density, car-dependent development on the outskirts of an urban area. In these spread-out suburbs, population densities are too low to support an effective public transportation system. Homes are too far away from stores, restaurants, schools and workplaces for people to walk or ride a bike. Car-dependent development promotes car-dependent behaviour.

Results from several studies in Canada and the United States have shown the connection between sprawl and car use. They found that people in low density sprawl developments:

- **Spend more time in cars**
- **Drive greater distances**
- **Own more cars**
- **Ride public transit less**[1, 2, 3]

Neighbourhoods in the Greater Toronto Area (GTA) reflect the same pattern. Every day, residents of York, Peel, and Durham take more car trips and drive longer distances than residents of Toronto. In the GTA, as you move farther away from Toronto, each household on average owns more cars, travels farther in their car every day, and spends more on transportation costs.[4]

Vehicle Use in Toronto, York, Durham, and Peel
(Joint Program in Transportation 2001)

	Average number of vehicles per household	*Average number of daily trips per household*	*Median trip length (km)*
Toronto	1.1 vehicles	5.1 trips/day	5 km
York	1.9 vehicles	7.2 trips/day	6.4 km
Durham	1.7 vehicles	6.5 trips/day	5.7 km
Peel	1.7 vehicles	6.6 trips/day	6.4 km

More cars on the road cause more vehicle emissions and more smog.

3. More roads, more cars, more air pollution

WHEN SMOG ADVISORIES ARE ISSUED, WE KNOW TO CAREFULLY MONITOR CHILDREN WITH ASTHMA AND TO LIMIT OUTDOOR ACTIVITY. **BUT WHAT IS SMOG?**

SMOG is a combination of the airborne pollutants, ground-level ozone and fine particulate matter. It is hazardous to your health. Each year 64,000 emergency room visits in Ontario are because of exposure to smog.[5]

Ground-level ozone is formed when nitrogen oxides and volatile organic compounds (VOCs) react in the presence of sunlight. There is no safe level of exposure to ground-level ozone.

Fine particulate matter can be formed by reactions of other primary pollutants in the air, or by direct emissions from vehicles. Smaller particulate matter is more dangerous because it becomes lodged in your lungs more easily. Most particulate matter is produced from the burning of fossil fuels.

Vehicles emit various air pollutants including volatile organic compounds (VOCs), nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO) and sulphur oxides (SO_x). Both nitrogen oxides and volatile organic compounds are involved in a series of complex reactions that result in the formation of ground-level ozone, which is one of the major components of smog.

TRANSPORTATION EMISSIONS IN ONTARIO, 2001

OXIDES OF NITROGEN ➤ 33% from on-road vehicles, and another 30% from other transportation.

PARTICULATES ➤ 20% of particulate matter less than 2.5 microns ($PM_{2.5}$) from transportation.

CARBON MONOXIDE ➤ 58% derived from vehicular travel and another 27% from transportation.

VOCs ➤ 18% of volatile organic compounds from transportation.

(Ontario Ministry of the Environment, Air Quality in Ontario, 2002)

4. Our health depends on the air we breathe

Exposure to air pollutants can harm our health on many fronts:

Respiratory effects ➤

Air pollution exacerbates asthma and other respiratory diseases. Smog days are correlated with an increase in visits to physicians, and ER and hospital admissions for breathing problems. Children, people with chronic diseases such as chronic obstructive pulmonary disease (COPD), and people who work or exercise outdoors are particularly vulnerable.[6, 7, 8, 9, 10, 11]

Cardiovascular effects ➤

Exposure to particulate matter has been shown to contribute to cardiovascular illness, hospitalization, and mortality.[12, 13, 14, 15] Elderly patients, people with underlying heart or lung disease, lower socioeconomic populations, and diabetics may be at increased risk.[16]

Cancer ➤

A study by *the American Cancer Society* found a link between fine particulate pollution and lung cancer.[17] Exposure to vehicle-exhaust has also been linked to ovarian cancer.[18]

Reproductive effects ➤

Exposure to carbon monoxide and ozone during the second month of pregnancy has been linked to cardiac and orofacial birth defects. Long term exposure to air pollution is associated with low birth weight, preterm birth, intrauterine growth retardation, and negative pregnancy outcomes such as miscarriages, stillbirths, and deaths in early infancy.[19, 20]

Long term exposure ➤

Important recent research has shown that children living in communities with higher pollution exhibit delayed lung development. This developmental delay could contribute to chronic obstructive airway disease in adulthood. Recent research has also shown that exposure to air pollution can both exacerbate asthma in children who are already asthmatic, and cause new cases of asthma.[21, 22] These new findings of delayed lung development and new cases of asthma are particularly worrying.

Exposure to air pollution has been linked to delayed lung development in children.

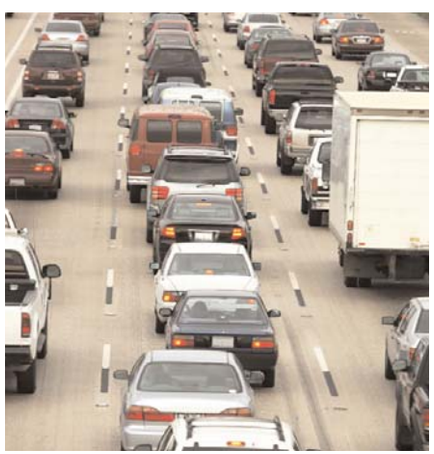
5. The hazards of a busy road

Levels of fine particulate matter and other traffic-related pollutants emitted are highest near busy roadways.

➤ A recent California study found higher levels of air pollution in schools downwind from and near major roads. **The researchers also noted a five to eight per cent increase in asthma and bronchitis symptoms with exposure to these traffic-related pollutants.**[23] The results of this study helped support the passage of a law that requires new school sites to be at least 500 feet from busy traffic corridors.[24]

➤ A similar study undertaken in southeast Toronto showed **an association between exposure to fine particulate matter from motor vehicle emissions from living near a busy road, and hospital admissions for certain respiratory diseases, including asthma.**[25]

➤ Another study in Hamilton found that **living close to a major road could take 2.5 years off a person's life.** In comparison, chronic ischemic heart disease can decrease your life span by an average of 3.1 years and diabetes can take 4.4 years off your life.[26]



➤ *Living close to a major road can take 2.5 years off your life.*

➤ *Researchers found a 5-8% increase in asthma and bronchitis symptoms among children exposed to traffic-related pollutants.*

6. The burden of illness from air pollution

The Ontario Medical Association (OMA) uses an ***"Illness Cost of Air Pollution"*** model to estimate the impact of smog and air pollution on the incidence of disease and mortality. For 2005 in Ontario, the OMA estimates that the following numbers are attributable to air pollution:

- **5,829 premature deaths**
- **59,696 emergency room visits**
- **$506,612,700 million in health care costs**
- **$374,342,400 million in lost productivity costs**[27]

ASTHMA:
The staggering statistics in Canada

in 1978:	*today:*
2.5% of children 0-14 years of age had asthma[28]	an estimate of up to **20%** of children have asthma[29]

In Toronto alone, the *Toronto Public Health Unit* estimates approximately 1,700 premature deaths each year and 3,000 to 6,000 hospital admissions are associated with inhaling air pollutants.

CLIMATE CHANGE IS A GREAT THREAT TO OUR HEALTH. Burning gasoline in cars, trucks and other motorized vehicles releases carbon dioxide, a greenhouse gas that contributes to climate change. The health effects of climate change can be direct, such as the impacts of heat stress as seen in Paris in 2003 when thousands of elderly people died of heat exhaustion.[30] Health effects can also be indirect, such as increased precipitation leading to flooding and run-off contamination of wells, rivers and streams, as well as an increase in extreme weather events such as hurricanes and tornadoes.

7. What Can We Do?

Air pollution from cars is bad for everyone's health. One way to improve the air quality in our neighbourhoods is to build communities where residents have more options than just driving to their destination. The interests of public health require interventions in urban planning and public transportation.

➤ **WALKABLE, COMPACT, TRANSIT-FRIENDLY COMMUNITIES.** Well-designed, compact communities where people can walk to school and work, to stores, parks and restaurants can significantly reduce the need to drive.

➤ **SAFE PEDESTRIAN PATHS AND BIKE LANES.** Safe routes to bike and walk along make healthier communities by encouraging daily physical activity.

➤ **EFFICIENT PUBLIC TRANSPORTATION SYSTEMS.** Buses, subways, and trains that run frequently and on time, reach more communities and are affordable offer more alternatives to driving.

➤ **PRESERVE GREENSPACE.** Parks and wildlife refuges can help clean and cool the air and offer a fresh air refuge for residents.

The Ontario government is now working on the second step of its work to curb urban sprawl through the new ***Places to Grow*** Plan.

The health of EVERYONE in southern Ontario will be affected by how well the plan encourages healthy urban planning and public transportation policies.

In 2005, smog will cause over 5,800 premature deaths in Ontario.

References

[1] Frumkin H, Frank L, Jackson R. (2004). *Urban sprawl and public health. Designing, planning and building for healthy communities.* Island Press.

[2] Criterion Planning Engineers. (April 4, 2000). *"Daily per capita home based VMT 1998" in Analysis of potential impacts of smart growth land use planning.* Prepared by Criterion Planning Engineers for the Georgia Regional transportation Authority.

[3] Frank L, Stone B, Bachman W. (2000) *"Linking land-use with household vehicle emissions in the central Puget Sound: Methodological framework and findings.* Transportation research Part D". pp 173-196.

[4] Miller, Eric. (2004). *Travel and Housing Costs in the Greater Toronto Area 1986 –1996.* Toronto: Neptis Foundation. pp. 24,29

[5] MOE 2003

[6] Annesi-Maesano, N. Agabiti, R. Pistelli, M-F. Couilliot, and F. Forastiere. (2003). *"Subpopulations at increased risk of adverse health outcomes from air pollution".* European Respiratory Journal. 21(40):57S-63s.

[7] Thurston G, Kazuhiko I. (2001). *"Epidemiological studies of acute ozone exposure and mortality".* Journal of Exposure Analysis and Environmental Epidemiology. 11:286-94

[8] Brunekreef B, Holgate ST. (2002). *"Air pollution and health".* The Lancet. 350:1233-42

[9] Gent J, Triche EW, Holford TR, Belanger K, Brackren MB, Beckett WS, Leaderer BP. (2003) *"Association of low level ozone and fine particles with respiratory symptoms in children with asthma".* JAMA; 290:1859-1867

[10] Chauhan AJ, Inskip HA, Linaker CH, Smith S, Schreiber J, Johnston SL, Holgate ST. (2003). Lancet. 361:1939-44.

[11] Pathmanathan S. Krishna MT. Blomberg A. Helleday R. Kelly FJ. Sandstrom T. Holgate ST. Wilson SJ. Frew AJ. (2003). *"Repeated daily exposure to 2 ppm nitrogen dioxide upregulates the expression of IL-5, IL-10, IL-13, and ICAM-1 in the bronchial epithelium of healthy human airways".* Occupational & Environmental Medicine. 60(11):892-6.

[12] Pekkanen J, Peters A, Hoek G, et al. (2002). *"Particulate air pollution and risk of ST segment depression during repeated submaximal exercise tests among subjects with coronary heart disease: the ULTRA Study".* Circulation. 106: 933–938.

[13] Godleski JJ, Verrier RL, Koutrakis P, et al. (2000). *"Mechanisms of morbidity and mortality from exposure to ambient air particles".* Res Rep Health Eff Inst. 91: 5–88.

[14] Brook RD, Brook JR, Urch B, et al. (2002). *"Inhalation of fine particulate air pollution and ozone causes acute arterial vasoconstriction in healthy adults".* Circulation. 105: 1534–1536

[15] Pope CA, Burnett RT, Thun MJ, Calle EE, Krewski D, Ito K, Thurston GD. (2002). *"Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution".* JAMA. 287(9):1132-1141.

[16] Brook RD, Brook JR, Urch B, et al. (2002). *"Inhalation of fine particulate air pollution and ozone causes acute arterial vasoconstriction in healthy adults".* Circulation. 105: 1534–1536

[17] Pope CA, Burnett RT, Thun MJ, Calle EE, Krewski D, Ito K, Thurston GD. (2002). *"Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution".* JAMA. 287(9):1132-1141.

[18] Guo J. Kauppinen T. Kyyronen P. Heikkila P. Lindbohm ML. Pukkala E. (2004). *"Risk of esophageal, ovarian, testicular, kidney and bladder cancers and leukemia among Finnish workers exposed to diesel or gasoline engine exhaust".* International Journal of Cancer. 111(2):286-92

[19] Ritz B, Yu F, Fruin F, Chapa G, Shaw G, Harris J. (2002). *"Ambient air pollution and risk of birth defects in Southern California".* Am J Epidemiology. 155:17-25

[20] Wilhelm M, Ritz B. (2005). *"Local Variations in CO and Particulate Air Pollution and Adverse Birth Outcomes in Los Angeles County, California, USA".* Environ Health Perspect. 113(9):1212-21.

[21] Gauderman,W.J.; Avol,E.; Gilliland,F.; Vora,H.; Thomas,D.; Berhane,K.; McConnell,R.; Kuenzli,N.; Lurmann,F.; Rappaport,E.; Margolis,H.; Bates,D.; Peters,J. (2004). *"The effect of air pollution on lung development from 10 to 18 years of age".* N.Engl.J.Med. 351, 11, 1057-1067

[22] McConnell R, Berhane K, Gilliland F, London SJ, Islam T, Gauderman WJ, Avol E, Margolis HG, PetersJM. (2002). *"Asthma in exercising children exposed to ozone: a cohort study".* Lancet. 359: 386–91.

[23] Kim,J.J.; Smorodinsky,S.; Lipsett,M.; Singer,B.C.; Hodgson,A.T.; Ostro,B. (2004). *"Traffic-related air pollution near busy roads: the East Bay Children's Respiratory Health Study".* American Journal of Respiratory & Critical Care Medicine. 170, 5, 520-526

[24] Air Resources Board. California Environmnetal Protection Agency. (Dec 9, 2004). *"The East bay Children's respiratory Health study. Traffic-Related Pollution near busy roads".* ftp://ftp.arb.ca.gov/carbis/research/health/healthup/dec04.pdf

[25] Buckeridge D, Glazier R, Harvey B, Escobar M, Amrhein C, Frank J. (2002). *"Effect of motor vehicle emissions and respiratory health in an urban area".* Environmental Health Perspectives. 110(3):293-300.

[26] Finkelstein M, Jerret M, Sears M. (2004). *"Traffic air pollution and mortality rate advancement periods".* Am J Epidemiol. 160:173-77.

[27] Ontario Medical Association. (2005). *Illness Cost of Air Pollution (ICAP) 2005.* Available at: http://www.oma.org/Health/Smog/report/icap05a.asp

[28] Millar WJ, Hill GB. *Childhood asthma.* Health Reports. Statistics Canada 1998, Winter; 10:3:12 (as quoted in *"Respiratory Diseases in Canada,"* Health Canada, Ottawa, Canada 2001; Chapter 3, p35). Available at: http://www.phac-aspc.gc.ca/publicat/rdc-mrc01/pdf/rdc0901e.pdf <http://www.phac-aspc.gc.ca/publicat/rdc-mrc01/pdf/rdc0901e.pdf>

[29] *Institute of Infection and Immunity (III): Asthma Facts.* Available at: http://www.cihr-irsc.gc.ca/e/18796.html

[30] Haines A, Patz J. (2004). *"Health effects of climate change".* JAMA. 291(1):99-103.

APPENDIX 1

THE HEALTH IMPACTS OF URBAN SPRAWL INFORMATION SERIES

VOLUME ONE AIR POLLUTION

September 2005

For further information please contact:

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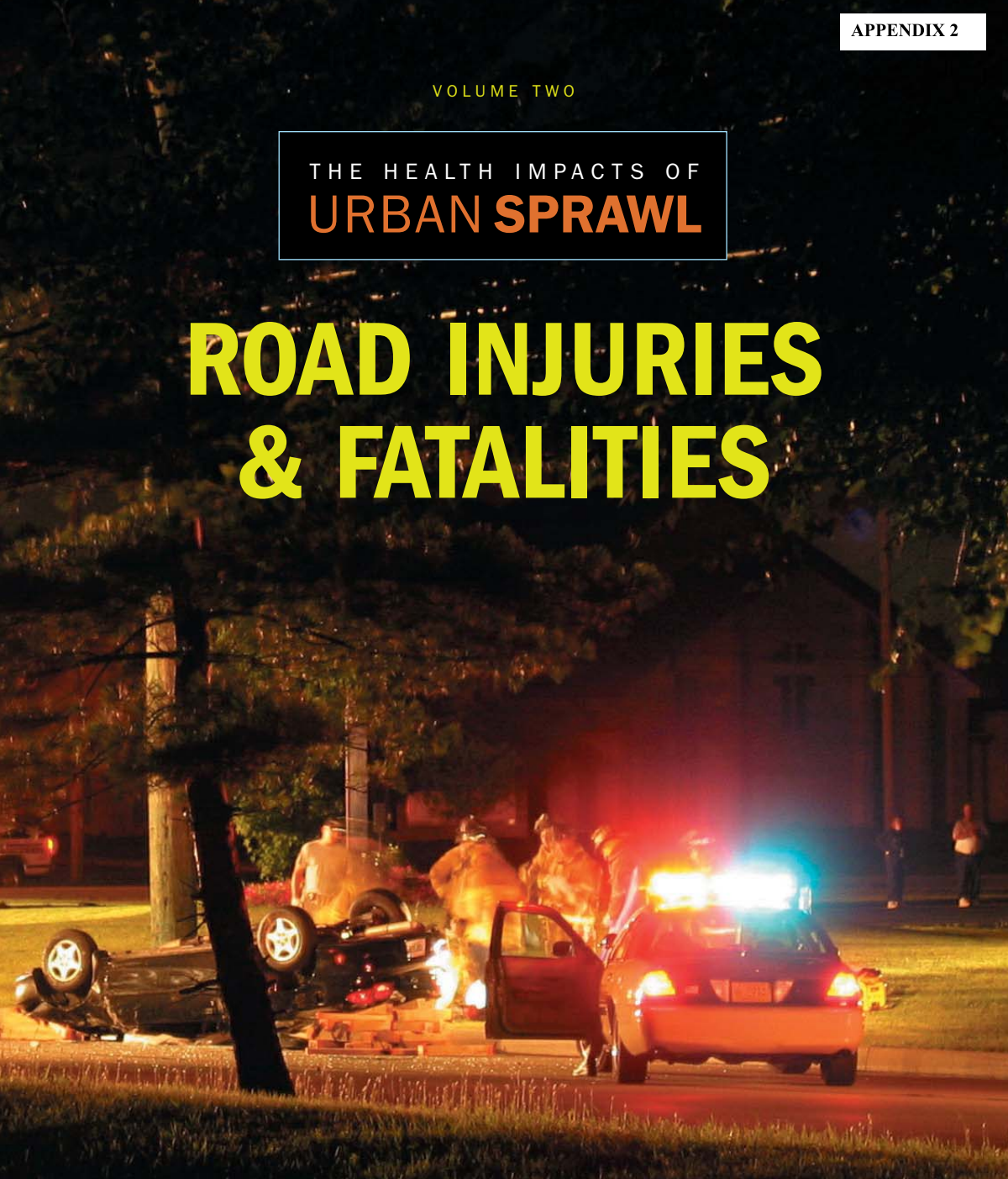
APPENDIX 2

VOLUME TWO

THE HEALTH IMPACTS OF
URBAN **SPRAWL**

ROAD INJURIES & FATALITIES



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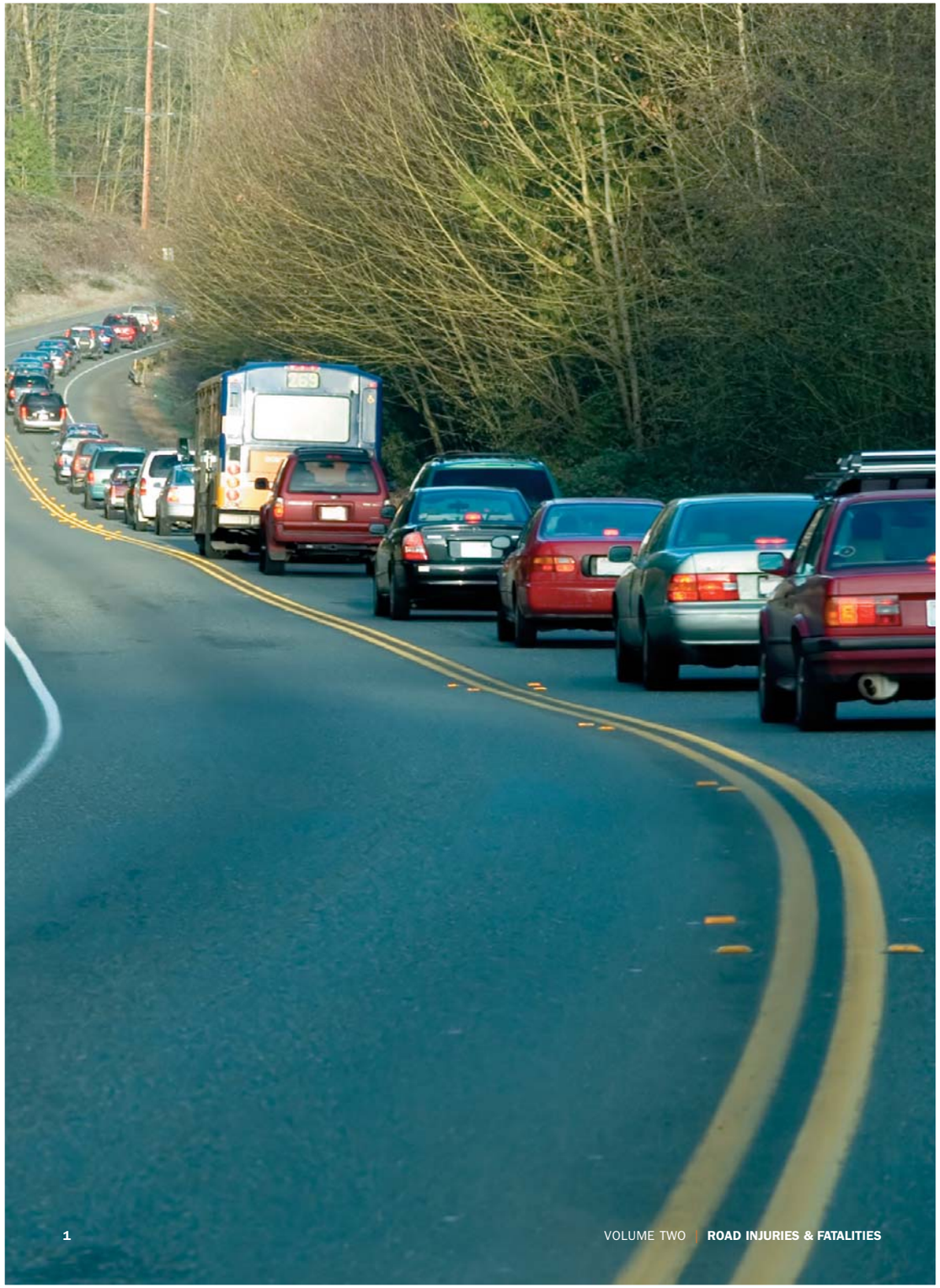


1. Injury and death on our roads

Many people move to the suburbs to escape the "ills of the city". They move out of the city to get closer to the country air, to have a bigger yard for their kids to play in, or to get away from the noise and bustle of the city. While suburban life has some benefits, a growing body of evidence suggests there are significant public health costs of spread-out urban development, often called "urban sprawl". Injury and death caused by traffic accidents is one of the particularly harmful effects of sprawling, car-dependent communities.

Spread-out suburban communities make car travel the fastest, most convenient way to get around. The often long distances separating suburban homes from workplaces means that people spend a significant amount of time each day on busy highways. The more hours people spend driving or riding in cars increases the likelihood they will be injured or killed in a car accident.

In 2005, ***The Ontario College of Family Physicians*** published a review of recent research on urban sprawl and human health. In this report, the College summarized the effects of sprawl on

- **AIR QUALITY**
- **ROAD ACCIDENTS** (injuries and death)
- **LACK OF PHYSICAL EXERCISE** (obesity, diabetes and heart disease) and
- **MENTAL AND SOCIAL HEALTH**

Road Injuries and Fatalities outlines how urban sprawl contributes to injury and death from road accidents and how to build safer, healthier communities.

SPRAWL **MORE HIGHWAYS** **MORE DRIVING** **MORE ROAD ACCIDENTS**

THE IMPACT OF URBAN SPRAWL

2. Injury and death from road accidents

Road accidents are something we are all aware of, but which most of us rarely think seriously about. Injuries and death caused by road accidents have become a familiar part of our lives' background. Most people know someone – a friend or relative – who has been in a car accident. Yet, people are largely unconscious of the risks they run every day when they set out to drive to work, school or the shopping mall.

The number of injuries and deaths caused on the road every year is staggering: nearly a million deaths each year worldwide, tens to hundreds of millions injured and many affected for the rest of their lives.

In North America, road accidents are the leading cause of death between the ages of 4 and 35.[1]

Injury and death caused by road accidents are a consequence of the increased distances people drive to work, school and to visit family and friends spread out across the province or country. Over the last 20 years in Canada, road accident deaths have dropped by about one-third as safety improvements in cars have helped to reduce the number of people killed. Injuries, however, have stayed about the same in recent years.

Deaths and injuries on the road in Canada (Transport Canada 2002)

YEAR	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
FATALITIES	**4,216**	**4,120**	**4,364**	**4,068**	**4,286**	**4,154**	**4,246**	**3,963**	**3,690**	**3,501**
INJURIES	**224,297**	**237,455**	**259,189**	**264,481**	**280,575**	**278,618**	**284,937**	**262,680**	**249,217**	**249,821**

YEAR	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
FATALITIES	**3,615**	**3,263**	**3,351**	**3,091**	**3,064**	**2,949**	**2,985**	**2,927**	**2,781**	**2,936**
INJURIES	**247,588**	**245,110**	**241,935**	**230,890**	**221,349**	**217,803**	**222,551**	**227,458**	**221,121**	**227,768**

3. More urban sprawl, more driving, more accidents

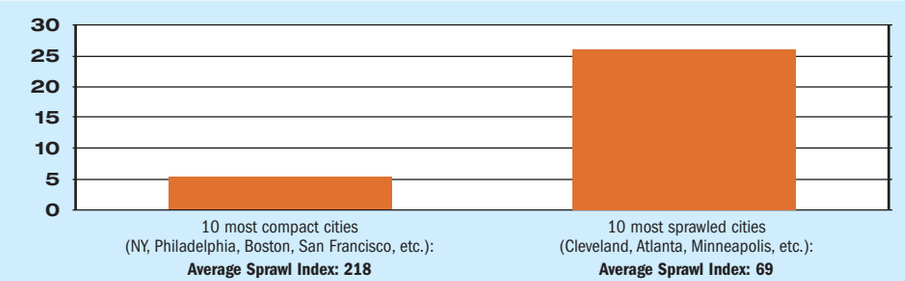
URBAN SPRAWL is poorly-planned development characterized by low-density, car-dependent communities typically built on the outskirts of an urban area. People living in sprawling communities are too spread out to make public transportation convenient or effective. That means people depend on their cars to get around – everything from getting to work or school, running errands or going shopping.

With greater dependence on cars comes an increased risk of death or injury on the roads. To examine the relationship between urban sprawl and road accidents, researchers in the United States took a look at 450 counties, about two-thirds of the total population. Researchers found that the 10 most compact, dense communities (New York, Philadelphia, Boston and San Francisco) had fewer deaths from traffic accidents than the 10 least dense communities (Cleveland, Atlanta and Minneapolis). In fact, the more spread-out cities had a death rate from car accidents almost five times that of more dense cities.[2]

Overall, the relationship indicates that a 1% increase in the sprawl index, which signifies increasing density, is associated with a 1.5% decrease in fatality rate. The higher the sprawl index, the more dense and compact the community.

Urban sprawl areas have a higher rate of death from road accidents.

Road Death Rate as function of Urban Density per 100,000 pop.



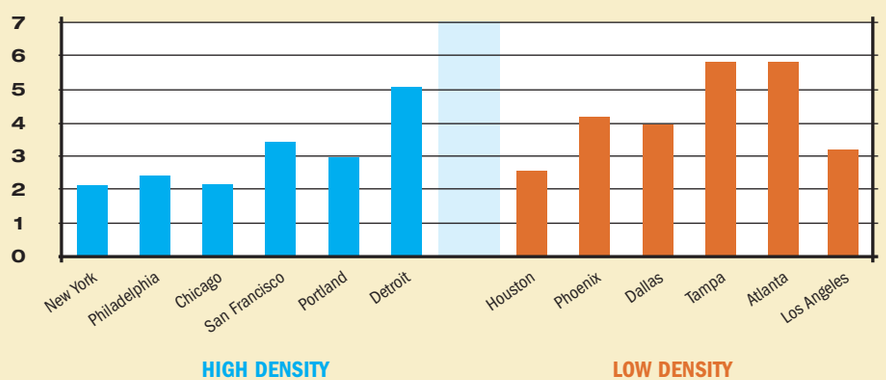
4. Urban sprawl harms pedestrians

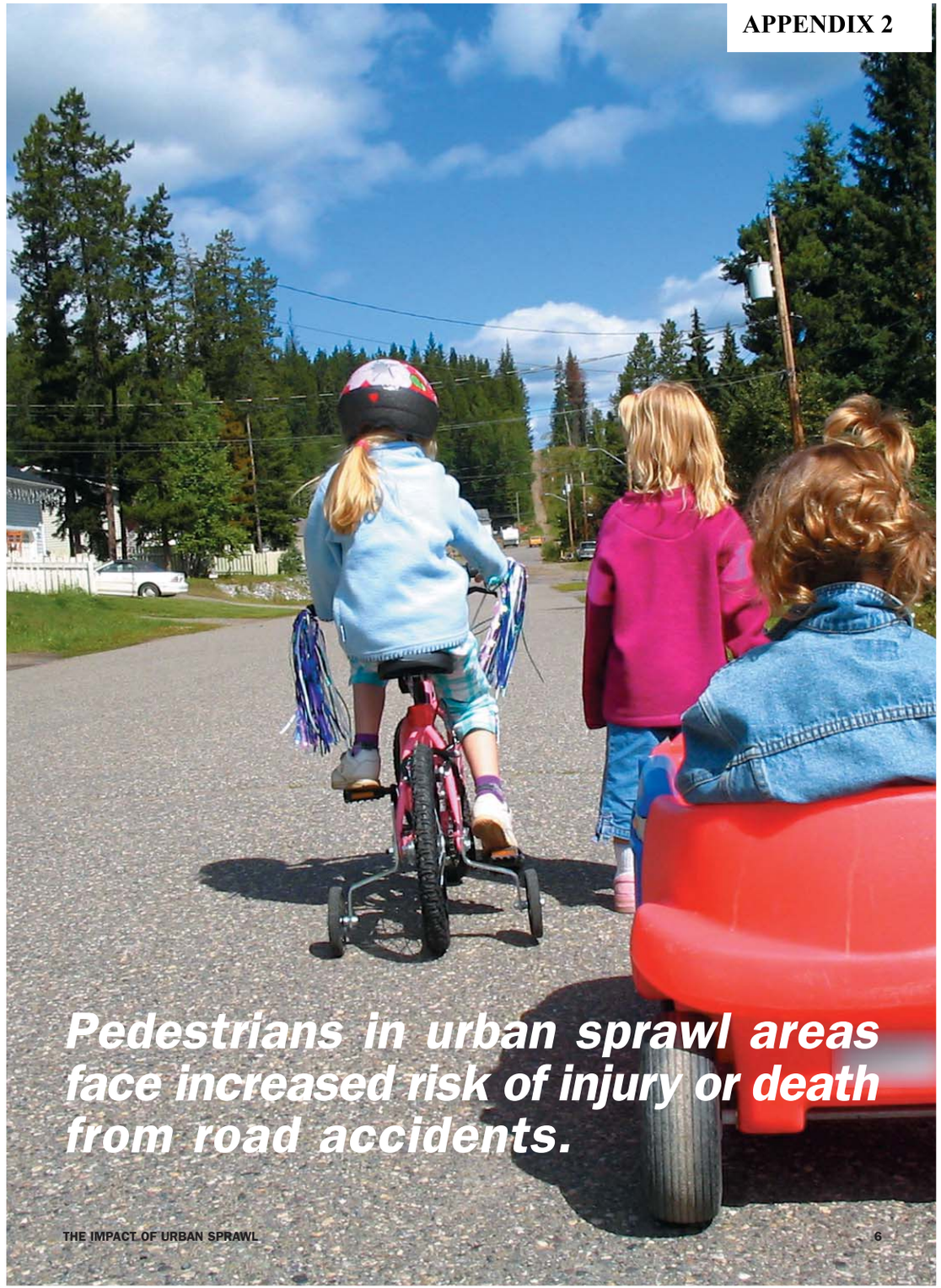
Drivers and their passengers are not the only ones affected by increased cars and traffic on suburban roads. Urban sprawl also harms pedestrians. Research in the UNITED STATES shows 6,000 pedestrians are killed and 110,000 injured in accidents involving cars.[3, 4] In Canada, an average of one pedestrian is killed every day on our roads.[5]

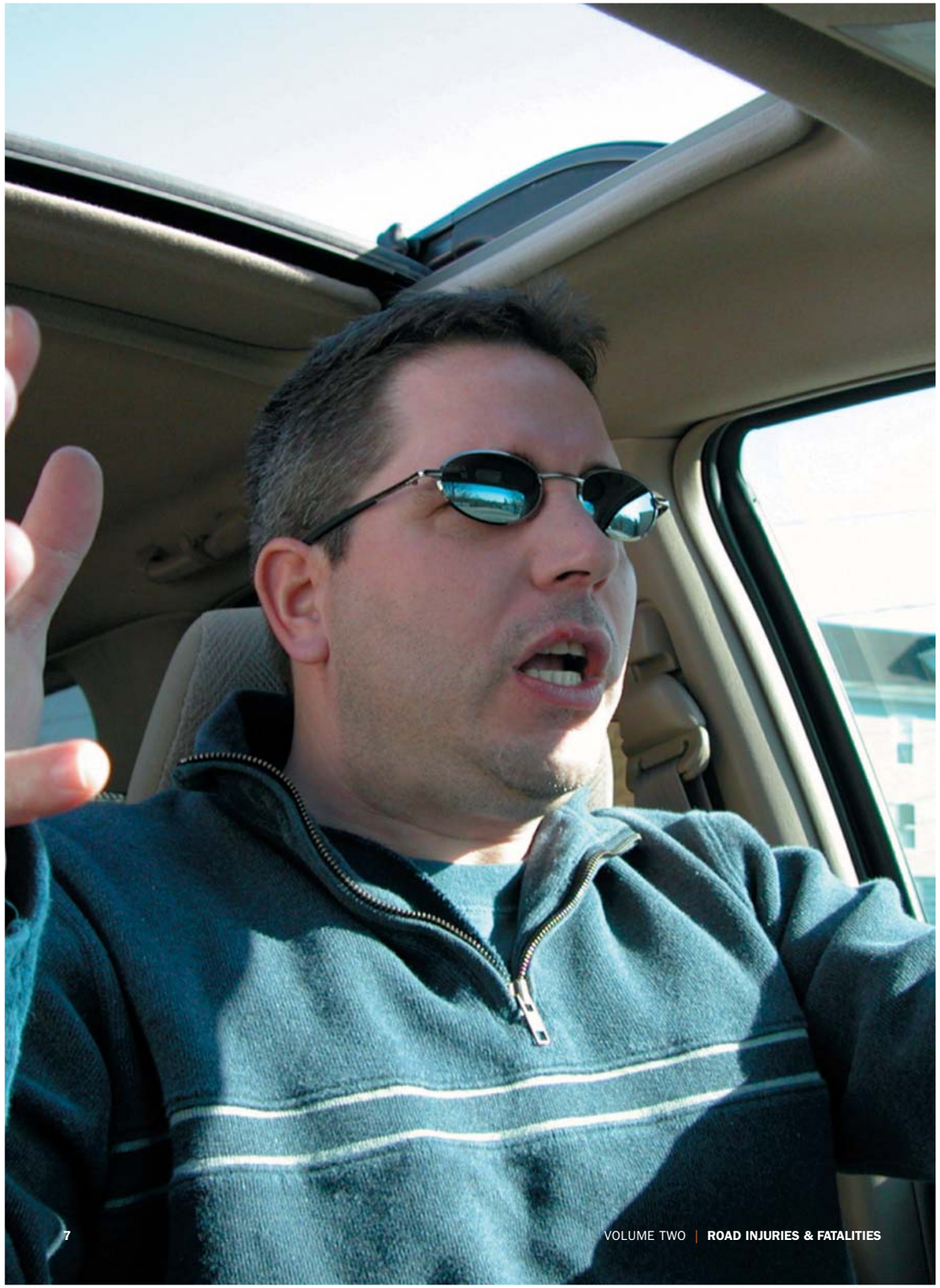
Roads in sprawling suburban areas are particularly dangerous for pedestrians. In car-dependent communities, roads and highways are built to serve drivers, not pedestrians. Suburban roads are usually several lanes wide to handle large numbers of cars. They are designed for high speeds to move drivers quickly to and from their destinations. Crosswalks and sidewalks are virtually non-existent, making it very dangerous for people to walk anywhere.

Researchers in the United States found pedestrians in urban sprawl communities experience a higher rate of death from traffic accidents than pedestrians in compact cities.[6]

Pedestrian Fatality Rates for Selected American Cities per 100,000 pop.







6. What Can We Do?

Road accidents are a leading cause of death and injury in Canada. The more people need to drive to carry out their everyday activities, the more likely they will be injured or killed on the road. Sprawling communities force people to rely on their cars to do almost everything – get to work, pick up children from school and do their daily errands.

Building more compact, dense communities where residents can walk, cycle or take public transit is one important way to improve the rate of death and injury on our roads. The interests of public health require interventions in urban planning and public transportation.

➤ **BETTER SUBURBAN ROAD DESIGN.** Pedestrian-friendly, traffic-calming roads can significantly reduce the risk of injury and death for drivers and walkers on suburban roads.

➤ **WALKABLE, COMPACT NEIGHBOURHOODS.** Well-designed, compact communities where people can walk to do errands, go shopping or pick up children from school can cut the risk of death or injury from driving. Governments should encourage zoning changes that promote the diversification of business activities in or near residential locations.

➤ **SAFER ROADS.** Governments should help to publicize and make people aware of the risks of road accidents, concentrating particularly on bad habits that amplify the risk. They should also promote the adoption of sub-urban road design features to reduce risks.

Urban planners are beginning to tackle the health costs of urban sprawl by designing communities to encourage walking, cycling and public transportation. Stapleton, Colorado is a well-designed community with smaller housing lots, more parks and open spaces and a vibrant town centre with shops, restaurants and theatres nearby. Not surprisingly, 80% of working people in Stapleton use modes of transportation other than a car.[7]

The Ontario government is now working on the second step of its work to curb urban sprawl through the new ***Places to Grow*** Plan.

The health of EVERYONE in southern Ontario will be affected by how well the plan encourages healthy urban planning and public transportation policies.

References

[1] Subramanian, R., (2003). *"Motor Vehicle Traffic Crashes as a Leading Cause of Death in the United States, 2001"*. U.S. Department Of Transportation, National Highway Traffic Safety Administration, document DOT HS 809 695

[2] Ewing, R., Schieber, R., and Zegeer, C., (2003). *"Urban Sprawl as a Risk Factor in Motor Vehicle Occupant and Pedestrian Fatalities"*. American Journal of Public Health, 93, pp1541 – 1545

[3] Cohen BA, Wiles R, Campbell C, Chen D, Kruse J, Corless J. (1997). *Mean Streets. Pedestrian Safety and Reform of the Nation's Transportation Law. Washington: Surface Transportation Policy Project and Environmental Working Group.* http://www.ewg.org/pub/home/Reports/meanstreets/mean.html

[4] McCann B, DeLille B. (2000). *Mean Streets 2000. Pedestrian Safety, Health and Federal Transportation Spending. Washington: Surface Transportation Policy Project.* http://www.transact.org/Reports/ms2000/.

[5] *Safety Canada.* (2005). Available at: http://www.safety-council.org/news/sc/2005/Eng-2-05

[6] Hanzlick R, McGowan D, Havlak J, Bishop M, Bennett H, Rawlins R, et al. (1999). *"Pedestrian fatalities—Cobb, DeKalb, Fulton, and Gwinnett Counties, Georgia, 1994-98"*. Morbid. Mortal Weekly Report; 48:601-05.

[7] Larkin, M. (Sept. 2003). *"Can cities be designed to fight obesity?"* The Lancet. 362, 9389, pp. 1046

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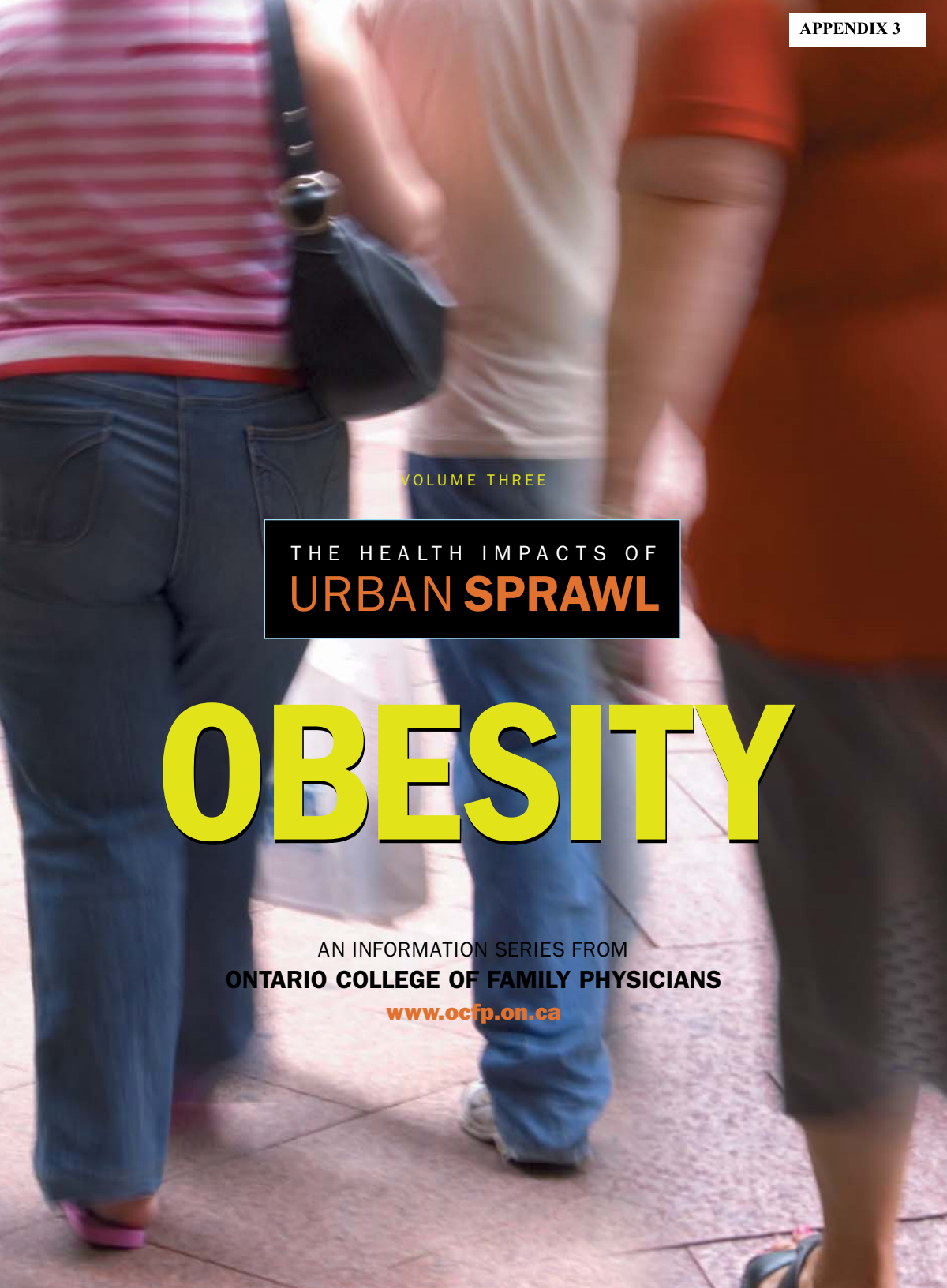
APPENDIX 3



VOLUME THREE

THE HEALTH IMPACTS OF
URBAN **SPRAWL**

OBESITY

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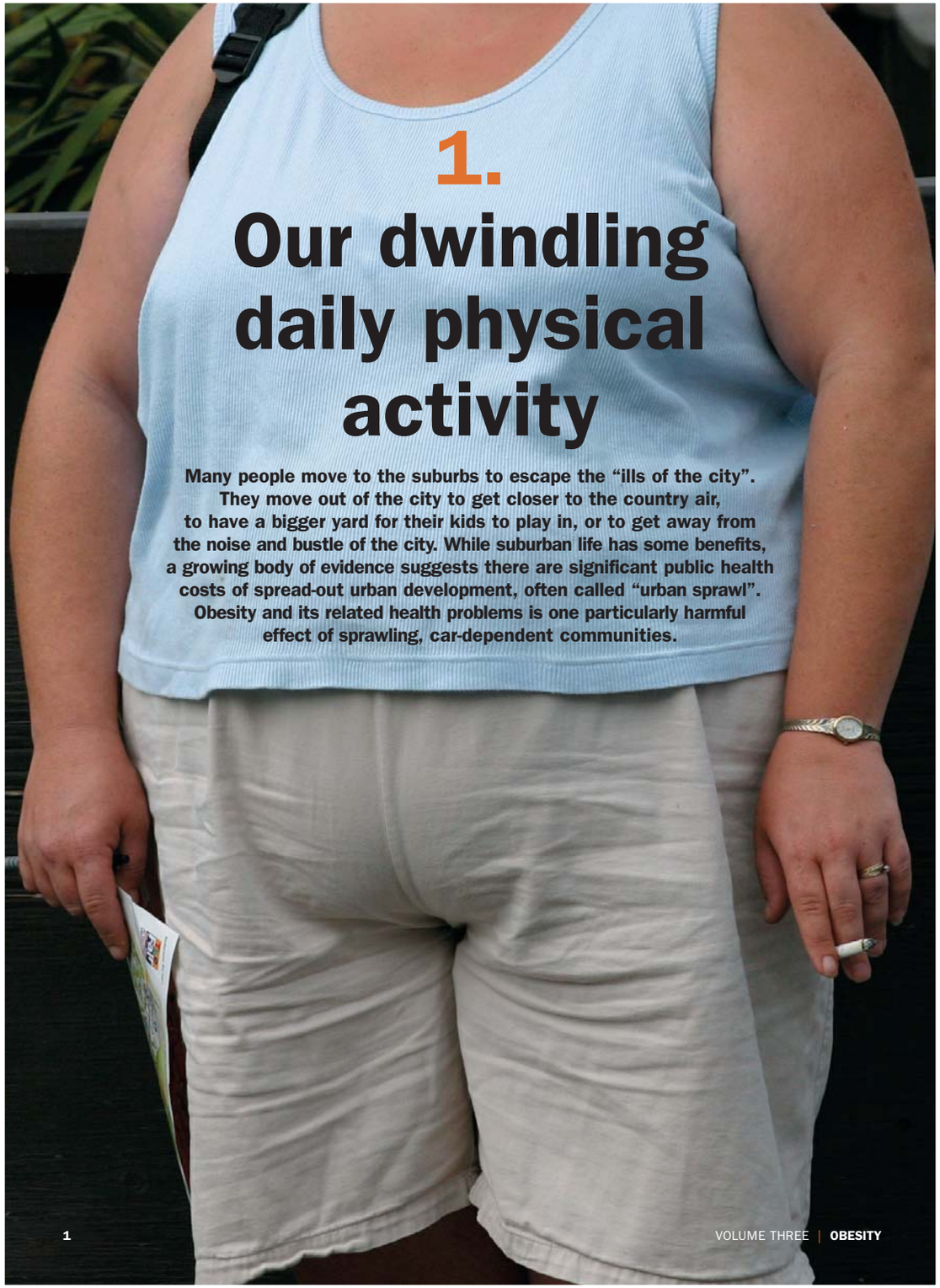


1. Our dwindling daily physical activity

Many people move to the suburbs to escape the "ills of the city". They move out of the city to get closer to the country air, to have a bigger yard for their kids to play in, or to get away from the noise and bustle of the city. While suburban life has some benefits, a growing body of evidence suggests there are significant public health costs of spread-out urban development, often called "urban sprawl". Obesity and its related health problems is one particularly harmful effect of sprawling, car-dependent communities.

Spread-out suburban communities make car travel the fastest, most convenient, and sometimes the only, way to get around. The design of most sprawling communities makes it difficult for residents to walk or ride their bikes to carry out even the most basic errands, such as buying milk at a local store. The lack of daily physical activity is a factor in the growing rate of obesity among adults, teenagers and children across Canada. Obesity has been linked to serious health problems, including:

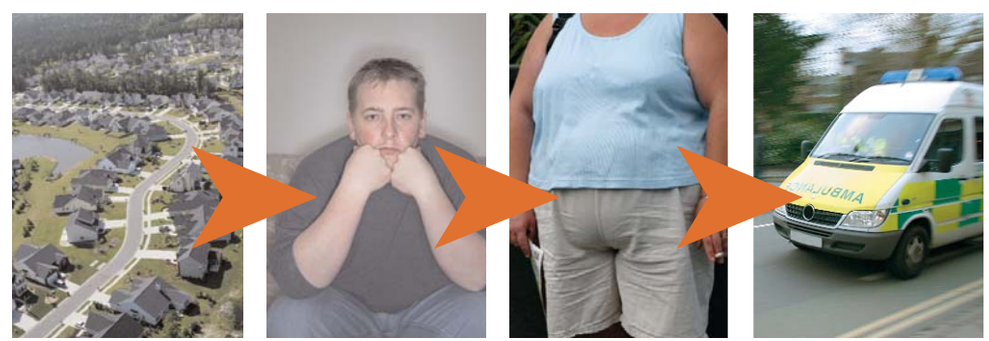
- **diabetes**
- **high blood pressure**
- **heart disease**
- **some cancers**
- **osteoarthritis**

Obesity is a growing public health crisis, so much so that it is often referred to as the "new tobacco". The number of deaths in Canada related to obesity has almost doubled over the past 15 years, from 2,514 in 1985 to 4,321 in 2000.[1]

In 2005, ***The Ontario College of Family Physicians*** published a review of recent research on urban sprawl and human health. In this report, the College summarized the effects of sprawl on

- **AIR QUALITY**
- **ROAD ACCIDENTS** (injuries and death)
- **LACK OF PHYSICAL EXERCISE** (obesity, diabetes and heart disease) and
- **MENTAL AND SOCIAL HEALTH**

OBESITY outlines how urban sprawl contributes to obesity and related illnesses, how obesity threatens our health, and how to build healthier communities.



SPRAWL | **LESS PHYSICAL ACTIVITY** | **OBESITY** | **HEALTH PROBLEMS**

2. Urban sprawl causes obesity

URBAN SPRAWL IS POORLY-PLANNED DEVELOPMENT CHARACTERIZED BY LOW-DENSITY, CAR-DEPENDENT COMMUNITIES TYPICALLY BUILT ON THE OUTSKIRTS OF AN URBAN AREA.

Researchers in urban planning and public health have only recently started to look at the relationship between sprawling communities, physical activity and obesity. **Research consistently shows that people who live in low-density towns and cities use cars more often (even for short trips) and walk and cycle less than people living in more compact, dense communities.**

Compared to people living in Europe, **North Americans have a very low rate of walking and riding their bicycles as ways of getting around.** About one-fourth of urban trips in most European countries are made by walking or cycling. In a few countries, such as Denmark and the Netherlands, 40% of trips are made without a motorized vehicle. **In Canada, only 10% of trips are made by walking or cycling, and only 6% in the United States.**[2]

The problem is that sprawling communities are not designed to encourage walking or cycling. Urban sprawl neighbourhoods typically have street patterns with lots of loops, crescents and circles that make it difficult for people to walk where they want to go. Often there are no sidewalks, bike paths or pedestrian crossings. What's more, **urban sprawl communities separate people's homes from stores, offices, services and restaurants. This makes it nearly impossible for people to carry out their errands or go to work without using their car.**[3, 4, 5, 6, 7]

Poorly-designed, sprawling communities force people to drive everywhere, even to buy a litre of milk.

3. More driving, more obesity

Public health experts are raising the alarm over the increasing rates of obesity in Canada. **Almost half of Canadians are overweight and one in six is obese,** according to the National Population Health survey published in 2001. **Adults aren't the only ones gaining weight. The number of obese children has tripled over the past 20 years, and 10 to 25% of all teenagers have a weight problem.**[8] While the obesity epidemic has several contributing factors, research consistently points to the lack of physical activity as a prime culprit.

As several studies show, using cars more increases the rates of obesity. One study found that **walking or cycling to work protected middle-aged men in France and Ireland from gaining weight.**[9] Researchers in San Diego, California tested the relationship between the 'walkability' of a community and the physical activity of people living there. Comparing two San Diego neighbourhoods, the researchers found that people living in the high-walkability neighbourhood took part in 70 more minutes per week of moderate to vigorous exercise than those living in the low-walkability community. Overall, the residents of the high-walkability neighbourhood had lower Body Mass Indexes, a standard measure of obesity.[10]

In Canada, *the Heart and Stroke Foundation* has taken a closer look at urban sprawl and the increasing rate of obesity by comparing daily physical activity between city dwellers and people who live in rural and suburban areas. The study concluded that **people living in suburbia and smaller towns rely more on cars to travel; they therefore get less physical activity and are at greater risk of being overweight or obese.**[11]

***The Heart and Stroke Foundation* found that Canadians living in cities are twice as likely to walk, bike or take public transit to get to work than their non-urban counterparts. More city-dwellers walk or bike to carry out daily errands.**

***The Heart and Stroke Foundation* research found that each additional kilometre walked per day reduces the likelihood of becoming obese by nearly 5%. Each hour per day spent in a car increases the likelihood of becoming obese by 6%.**

4. Designing walkable, livable communities

Communities with little or no urban sprawl tend to be more people and pedestrian friendly. Through their design, compact cities and towns encourage daily physical activity, such as walking and riding bicycles. Four urban planning features are key when designing communities that enable and promote daily physical activity:

CONNECTIVITY ➤
the directness or availability of alternative routes from one point to another within a street network. Areas of urban sprawl have low connectivity, typified by long blocks and dead-end or crescent streets. This indirect street pattern is less safe and less convenient for walking and cycling.[12]

LAND-USE MIX ➤
the proximity of different land uses within a given area. A mixed-used neighbourhood includes homes as well as offices, stores, restaurants and other services and amenities. Urban sprawl communities typically have low mixed-use land patterns, with large residential areas separated from businesses and services.[14]

DENSITY ➤
the measure of the amount of activity found in an area, often defined as population, employment or building square footage per unit area. Sprawling communities have low density with fewer people living on large lots in large areas far away from businesses, jobs, stores and restaurants.[13]

AESTHETICS ➤
the attractiveness or appeal of an area. Aesthetics includes building design, landscaping and availability of amenities such as benches and lighting.[15]

Research consistently shows that people who live in low- density towns and cities use cars more often and walk and cycle less than people living in more compact, dense communities.

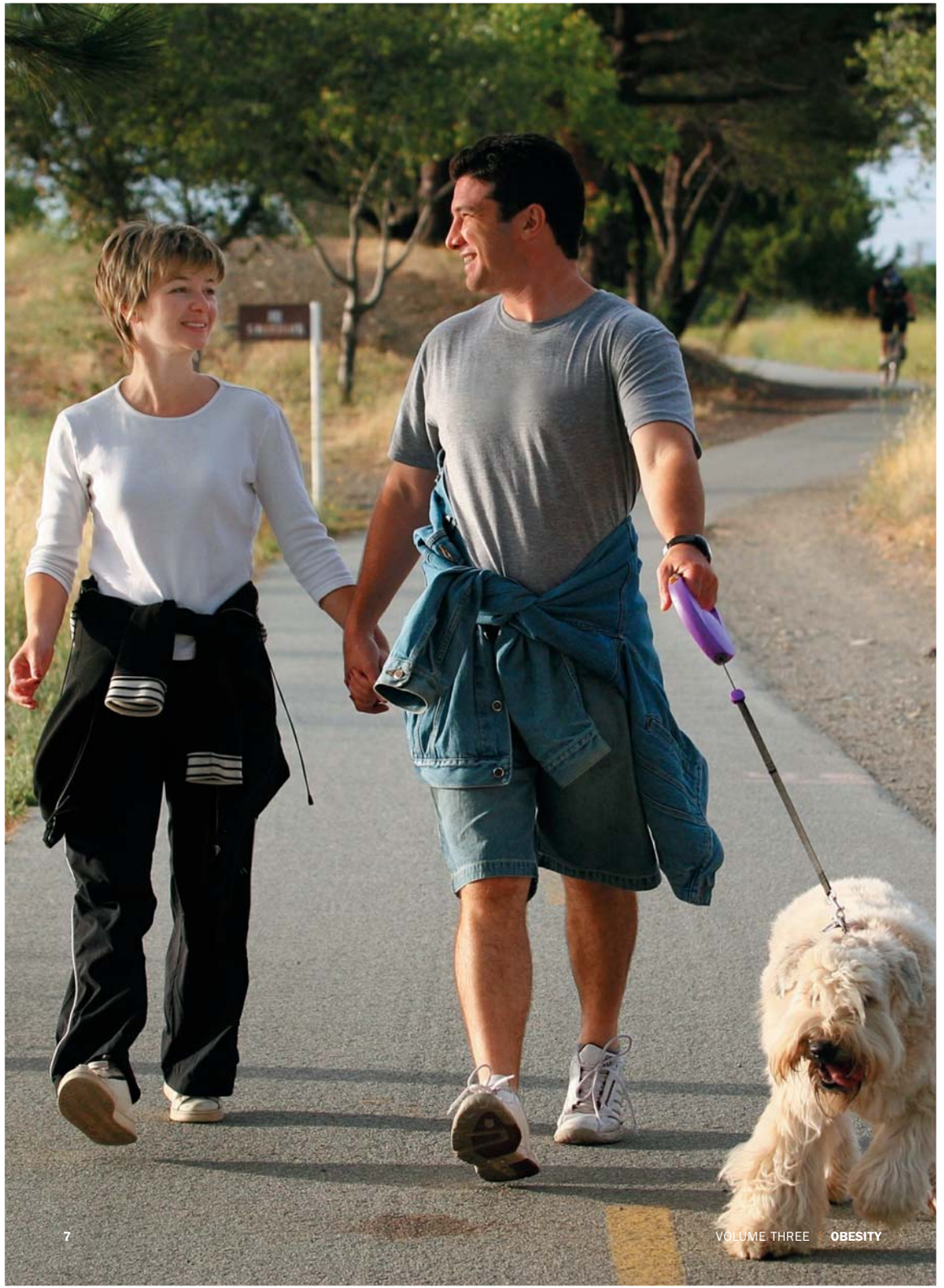
5. The health costs of obesity

The relationship between obesity and many serious illnesses, such as high blood pressure, diabetes and heart disease, is well established by doctors and public health experts. The long-term effects of high blood pressure and diabetes are devastating – heart disease, strokes, kidney disease, blindness and vascular disease. Two recent studies show that increasing rates of diabetes, heart disease and high blood pressure are linked with increasing degrees of urban sprawl.[16, 17]

The increasing rate of obesity in Canada is one of the fastest growing epidemics of our time. Obesity is costing lives – 4,321 in 2000, up from 2,514 in 1985. Obesity is also costing Canada's healthcare system – $4.3 billion in 2000/2001: $1.6 billion in costs for hospital care, drugs and doctors; and $2.7 billion in indirect costs such as lost earnings because of illnesses and premature death.[18]

Canadians who are overweight and obese are at greater risk of developing chronic diseases (heart disease, stroke, cancer and diabetes) that can lead to early death.

Heart and Stroke Foundation



6. What Can We Do?

Lack of physical activity contributes to obesity and related health problems. One way to get people walking, cycling and being physically active everyday is to build better, healthier communities where residents can choose **not** to drive. The interests of public health require interventions in urban planning and public transportation.

➤ **WALKABLE, COMPACT, TRANSIT-FRIENDLY COMMUNITIES.** Well-designed, compact communities where people can walk to school and work, to stores, parks and restaurants can significantly reduce the need to drive.

➤ **SAFE PEDESTRIAN PATHS AND BIKE LANES.** Safe routes to bike and walk make healthier communities by encouraging daily physical activity.

➤ **EFFICIENT PUBLIC TRANSPORTATION SYSTEMS.** Buses, subways, and trains that run frequently and on time, reach more communities and are affordable offer more alternatives to driving.

Urban planners are beginning to tackle the health costs of urban sprawl by designing communities to encourage walking, cycling and other physical activity. Stapleton, Colorado is a well-designed community with smaller housing lots, more parks and open spaces and a vibrant town centre with shops, restaurants and theatres nearby. Not surprisingly, 80% of working people in Stapleton use modes of transportation other than a car.[19]

The Ontario government is now working on the second step of its work to curb urban sprawl through the new ***Places to Grow*** Plan.

The health of EVERYONE in southern Ontario will be affected by how well the plan encourages healthy urban planning and public transportation policies.

References

[1] Heart and Stroke Foundation. *"Heart and Stroke Foundation Warns Fat is the New Tobacco"*. Heart and Stroke Foundation. Available at: http://ww2.heartandstroke.ca/Page.asp?PageID=33&ArticleID=2916&Src=news&From=SubCategory

[2] Pucher J., Dijkstra L. *Promoting safe walking and cycling to improve public health: lessons from the Netherlands and Germany.* American Journal of Public Health; Sept. 2003; vol.93; no. 9; p.1509-1516

[3] Librett J., Yore M., Schmid T. *Local ordinances that promote physical activity: a survey of municipal policies.* American Journal of Public Health; Sept. 2003; vol. 93; no. 9; p. 1399-1403

[4] Lopez, R., (2004). *"Urban Sprawl and Risk for Being Overweight or Obese"*. Am. J. Pub. Health, 94, 9, pp 1574 – 1579

[5] Sturm, R., and Cohen, D., (2004). *"Suburban Sprawl and Physical and Mental Health"*. Public Health, 118, pp 488 – 496

[6] Ewing R., Schmid T., Killingsworth R., Zlot A., Raudenbush S. *Relationship between urban sprawl and physical activity, obesity and morbidity.* American Journal of Health Promotion. Sept/Oct. 2003: vol.18: no. 1; p. 41-57

[7] Hoehner C., Brennan L., Brownson R., Handy S., Killingsworth R. *Opportunities for integrating public health and urban planning approaches to promote active community environments.* American Journal of Public Health, 2003; 18(1) p. 14-20

[8] http://www.obesitycanada.com

[9] Wagner et al. (2001). *"Leisure-time physical activity and regular walking or cycling to work associated with adiposity and by weight gain in middle-aged men: the PRIME study"*. International Journal of Obesity, 25, 940-948.

[10] Saelens B., Sallis J., Black J., Chen D. *Neighbourhood-based differences in physical activity: an environment scale evaluation.* American Journal of Public Health; Sept. 2003a; vol. 93; no. 9; p. 1552-1558

[11] Heart and Stroke Foundation, (2005). *"Heart And Stroke Foundation 2005 Report Card On Canadians' Health – Has The Suburban Dream Gone Sour?"* Heart and Stroke Foundation. Available at: http://ww2.heartandstroke.ca/Page.asp?PageID=33&ArticleID=3832&Src=news&From=SubCategory

[12] Handy S., Boarnet M., Ewing R., Killingsworth R. *How the built environment affects physical activity – views from urban planning.* American Journal of Preventive Medicine 2002; vol. 23; no. 2; p. 64-73

[13] Handy S., Boarnet M., Ewing R., Killingsworth R. *How the built environment affects physical activity- views from urban planning.* American Journal of Preventive Medicine 2002; vol. 23; no. 2; p. 64-73

[14] Handy S., Boarnet M., Ewing R., Killingsworth R. *How the built environment affects physical activity- views from urban planning.* American Journal of Preventive Medicine 2002; vol. 23; no. 2; p. 64-73

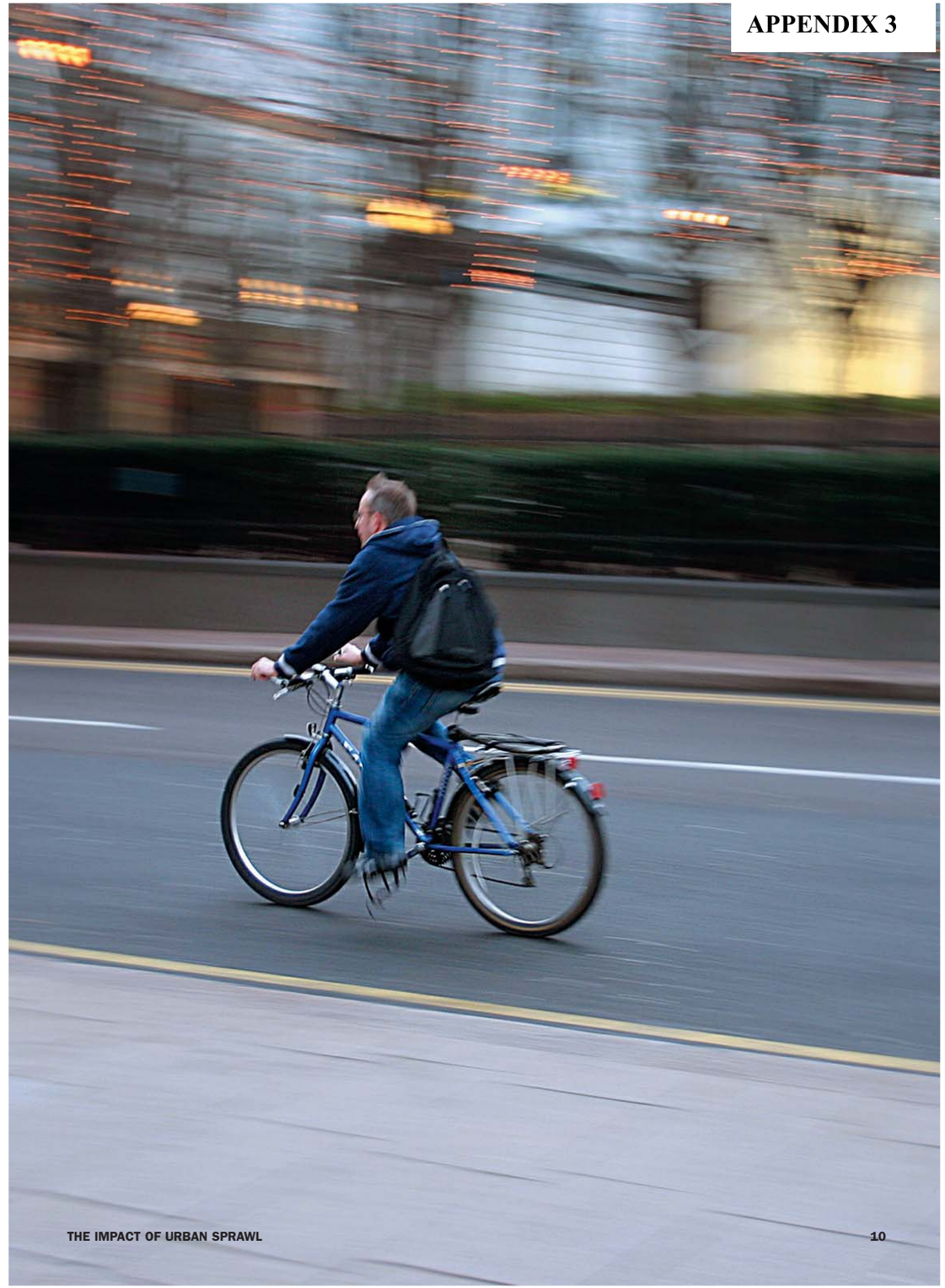
[15] Handy S., Boarnet M., Ewing R., Killingsworth R. *How the built environment affects physical activity- views from urban planning.* American Journal of Preventive Medicine 2002; vol. 23; no. 2; p. 64-73

[16] Sturm, R., and Cohen, D., (2004). *"Suburban Sprawl and Physical and Mental Health"*. Public Health, 118, pp 488 – 496

[17] Ewing R., Schmid T., Killingsworth R., Zlot A., Raudenbush S. *"Relationship between urban sprawl and physical activity, obesity and morbidity.* American Journal of Health Promotion." Sept/Oct. 2003: vol.18: no. 1; p. 41-57

[18] Chief Medical Officer of Health Report. (2004). *"Healthy Weights, Healthy Lives."* Available at: http://www.health.gov.on.ca/english/public/pub/ministry_reports/cmoh04_report/healthy_weights_112404.pdf

[19] Larkin M, *"Can cities be designed to fight obesity?"* The Lancet; Sept. 2003; 362, 9389, p. 1046



THE HEALTH IMPACTS OF URBAN SPRAWL INFORMATION SERIES

VOLUME THREE OBESITY

September 2005

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VOLUME FOUR

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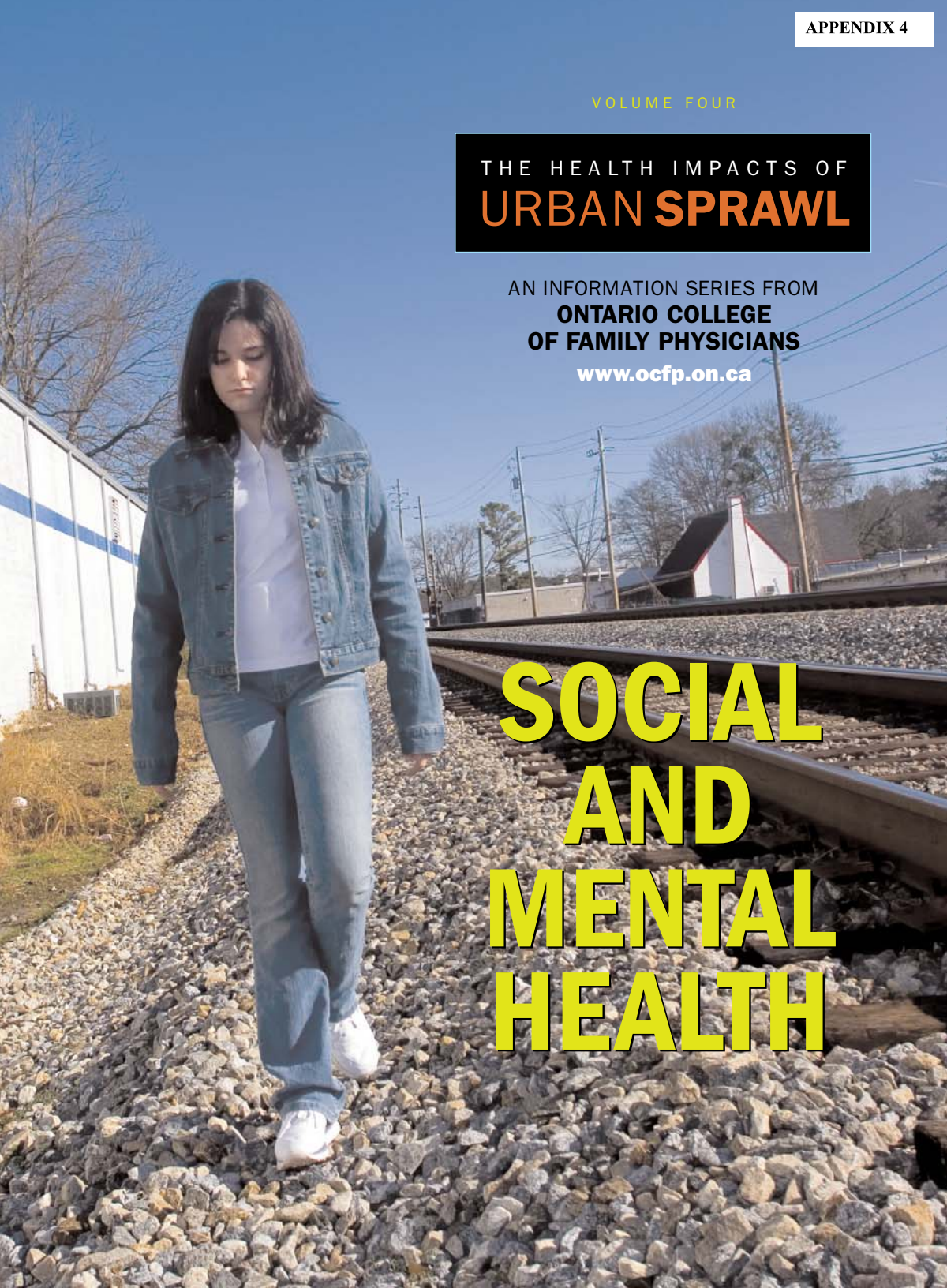

SOCIAL AND MENTAL HEALTH

1. Social integrity and mental health impacts of urban sprawl

Many people move to the suburbs to escape the "ills of the city". They move out of the city to get closer to the country air, to have a bigger yard for their kids to play in, or to get away from the noise and bustle of the city. While suburban life has some benefits, a growing body of evidence suggests there are significant public health costs of spread-out urban development, often called "urban sprawl". One particularly harmful impact of urban sprawl is its negative effect on social integrity and mental health.

In 2005, ***The Ontario College of Family Physicians*** published a review of recent research on urban sprawl and human health. In this report, the College summarized the effects of sprawl on

- **AIR QUALITY**
- **ROAD ACCIDENTS** (injuries and death)
- **LACK OF PHYSICAL EXERCISE** (obesity, diabetes and heart disease) and
- **MENTAL AND SOCIAL HEALTH**

Social and Mental Health outlines how urban sprawl affects social integrity and mental health, and how to build healthier communities.

Sprawl impacts negatively on well-being by eroding social capital, robbing people of all ages of the opportunity to have a balanced healthy lifestyle, degrading the surrounding natural environment, and increasing the stress of commuting, which not only impacts on mental health but also physical health.

The *World Health Organization* defines **health** as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".

2. Urban sprawl: commuting and driver's stress

URBAN SPRAWL IS POORLY-PLANNED DEVELOPMENT CHARACTERIZED BY LOW-DENSITY, CAR-DEPENDENT COMMUNITIES TYPICALLY BUILT ON THE OUTSKIRTS OF AN URBAN AREA.

In these spread-out communities, homes are separated from schools, workplaces, stores and services, forcing people to drive virtually everywhere. More time driving means less time with family and friends, less time for oneself, and less time to engage in community activities.[1] **Research shows that urban sprawl commuters spend 3 to 4 times more hours driving than individuals living in well-planned, dense communities.**[2]

Studies in the United States seem to indicate that **long commutes, increasing traffic delays and long work hours leave people overwhelmed with time demands**.[3] Traffic congestion also impairs health, psychological adjustment, work performance and overall satisfaction with life.[4] Research also shows that **job satisfaction and commitment declines with increased commuting distance on the road, but not with public transit use**.[5]

Commuting is associated with more back pain, cardiovascular disease, arthritis, asthma, headaches and self-reported stress.[6, 7] One study showed that perceived traffic stress (a combination of the challenges of driving and parking, the potential for unintentional injuries, and the hardships and inconveniences of vehicle maintenance and purchase) was associated with both lower general health status and depression.[8]

The impediments of long commutes are both physical, which includes congestion, traffic jams, road construction, and long trip distances that delay the commuter's arrival at home, and subjective (perceived stress of travel). **Research shows that high impedance commuting has adverse effects on blood pressure, mood, frustration tolerance, illness occasions, work absences, job stability and overall life satisfaction.**[9]

Thousands of pedestrians and drivers die every year in North America. The anguish and emotional scarring caused by the death of a loved one, permanent disabilities and related pain and suffering greatly impacts at every level of our social structure. 14% of traffic accident survivors have Post Traumatic Stress Disorder[10] and 25% have psychiatric problems one year after an accident. A United Kingdom study found that one in three children involved in road traffic accidents suffered from Post Traumatic Stress Disorder two months later. The child's perception of the accident as life-threatening was the most important determinant.[11]

The impact of traffic fatalities on the psyche due to urban sprawl cannot be underestimated. **Children and the elderly are particularly at risk, and places where crosswalks are not available are the most dangerous.**[12]

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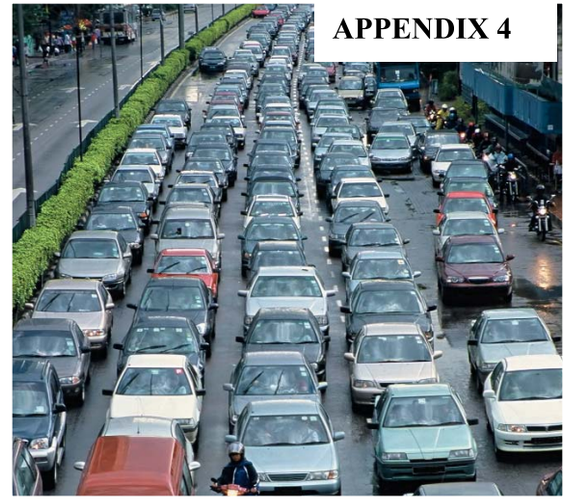

3. More driving, more stress, more road rage

Commuting from suburban areas can have profound mental health effects.[13] **Road rage** is one example of mental health stress related to driving that has received considerable attention in recent years. **Road rage is characterized by violent disputes between drivers that sometime causes serious injuries or even death; often road rage involves people who are not usually violent**.[14]

The two primary causes for aggressive driving are being rushed or behind schedule, and increased congestion and traffic. Both of these problems occur more so as a result of urban sprawl.[15] Not surprisingly, road rage incidents are most likely to occur on Friday afternoon, during peak travel times, and in good weather. Moderate traffic rather than very high congestion seems to be a defining scenario in road rage. In medium congestion situations, as found in sprawling communities, drivers may feel that they are in competition with others for faster lanes and some drivers will try to bypass congestion at exits by cutting in front of others.[16] Other studies have suggested that, as expected, traffic volumes, travel distances and delays are risk factors for road rage.[17, 18]

A review of more than 10,000 road rage incidents reported via news media, police and insurance companies, found a 60% increase during a six-year period up to 1996.[19]

4. Loss of the natural environment

Loss of the natural environment – animals, plants, landscapes and wilderness - have a tremendous impact on human well-being, as humans are innately attracted to other living organisms.[20] Positive effects of the natural environment have been documented and include improved social and cognitive functioning, and decreased violence.[21, 22]

- *A study done in Chicago found that people who live in buildings surrounded by greenspace have a stronger sense of community, better relationships with neighbours and less heated domestic conflicts.*[23]

- *Urban sprawl highly disturbs the natural environment and impacts negatively on biodiversity. People who leave urban areas to seek a greater connection with nature in the sprawling suburbs are actually short-changed.*[24]

5. Loss of social capital & sense of community

People feel a 'sense of community' when they connect with others, share a sense of belonging, feel that they matter to one another and believe that all their needs will be met through being together.[25] Societies that thrived in the past were integrative, emphasizing centrality, continuity and easy access.

SOCIAL CAPITAL is the social, political, and economic networks and interactions that inspire trust and reciprocity among citizens leading to common good and mutual obligation.[26] Social capital is strengthened by short commutes, which allow people more time for recreation, voluntary activities, civic engagement and self care.

The erosion of social capital reduces trust and exchange among citizens. In other words, less civic engagement leads to the loss of a sense of community. Social science has shown a positive association between social relationships and health, such that the higher the quality and quantity of these relationships, the greater the health benefits.[27] Studies also have shown that persons with low social capital may be at risk for poor physical and mental health.[28, 29]

Travelling via walking, cycling, public transit or carpooling can improve mental health and counteract the negative effects of driving. Studies have found that walkable, pedestrian-friendly neighbourhoods can help create more 'social capital' by improving community and social relationships.[30]

It has been suggested that commutes done by walking, bicycling, using transit, or carpooling may actually improve mental health and counteract the negative effects of using motor vehicles. Studies also support the fact that walkable, mixed-use neighbourhood designs encourage the development of social capital through enhanced levels of community and social engagement.[31] Improved social life would occur with decreased time on the roads, more local schools, small stores or other places where people interact and provide gathering spots for teens and the elderly.[32, 33]

For each 10 additional minutes spent commuting everyday, people spend 10% less time participating in community activities.[34]

6. Urban sprawl harms high risk groups

Children ➤

For children to thrive, they need schools, sports fields, friends' homes, libraries, shops, or places of worship. They also need privacy, tranquility, safety and community.[35] Studies show a marked decline over the last 20 years in the number of children aged 5 to 15 who are walking or biking to school.[36] The lack of opportunity for walking or biking and lack of easy access to parks and playgrounds typified by urban sprawl communities affects children's well-being. In fact, childhood obesity has reached epidemic proportions in Canada. Obesity is an important predictor of pediatric hypertension and increases the risk of adult coronary artery disease, hypertension, dyslipidemia, osteoarthritis, diabetes mellitus and some cancers.[37, 38]

Research shows that living in car-dependent areas with high traffic affects children even before they are born. A study in Los Angeles County showed that pregnant women who live near busy highways and roads have a 10-20% increase in risk of having premature and low birth weight babies.[39] A Denver study showed that children living within 250 yards of a road with 20,000 or more vehicles per day using it are eight times more likely to get leukemia and six times more likely to get other cancers because of exposure to car exhaust pollutants associated with cancer.[40]

Women ➤

Although an excellent form of exercise, walking can have negative effects on a family's welfare if they live in an area where access to amenities such as grocery stores, health care services and social networks is limited. This is particularly so in urban sprawl areas where there are typically few sidewalks or safe roads for pedestrians, and women bear the major brunt of this burden.

A suburban study found that women are more likely than men to indicate problems managing stress and feelings of sadness, worthlessness and hopelessness.[41]

Women experience a significant amount of stress in sprawling, poorly-planned communities that lack access to public transit and amenities, particularly if they have full-time jobs with long commutes, and household duties, such as driving children to school and after-school activities, taking elderly dependents to the doctor and running errands.

The Elderly and People with Disabilities ➤

Two major issues are important to consider for the health of elderly people: mobility and community; both of these are threatened by sprawling, car-dependent communities. Elders who can no longer drive safely must have stores, places of worship, medical offices, recreational and cultural facilities close to home, as well as safe, maintained sidewalks.[42] **One large cohort study showed that living in areas with walkable greenspaces near one's residence positively influenced the longevity of urban senior citizens independent of their age, sex, marital status, baseline functional status, and socio-economic status.**[43]

Without easy access to effective public transit, the elderly and disabled, who may be homebound, experience more difficulty going from place to place, visiting doctors or receiving other health and social services. Overall, they are more isolated, and may be lonelier than the average person. Research shows that death from cardiovascular disease among the elderly increases four-fold when social supports are lacking.[44]

The design of sprawling communities can prevent people with disabilities from being physically active, using transportation systems and being socially integrated into their community. People in wheelchairs or using other mobility devices benefit from walkable, safe communities. Environmental barriers, such as lack of access to mass transit routes, bus shelters or other public services, affect quality of life and health.

6. What Can We Do?

SPRAWLING, CAR-DEPENDENT COMMUNITIES AFFECT SOCIAL INTEGRITY AND MENTAL HEALTH. We have a choice to continue to build sprawling communities that contribute to increased air pollution, people spending more time in cars and the destruction of greenspace; or we can build healthy, vibrant communities that offer a wealth of opportunities for walking and exposure to nature. The interests of public health require interventions in urban planning and public transportation.

➤ **PUBLIC TRANSIT.** Governments should provide easy public transit access that is comfortable, clean, efficient and devoid of high exhaust emissions.

➤ **SAFER ROADS.** There needs to be better policing of dangerous and aggressive driving and stricter penalties with a 'zero tolerance' mandate. For the health of children and babies, heavy traffic areas should be re-routed away from established communities to lessen exposure of vehicle exhaust.

➤ **WALKABLE, COMPACT NEIGHBOURHOODS WITH GREENSPACE.** We should support the formation of dense communities with strict preservation of natural surroundings and wildlife, and safe ways for people to get around by foot and bike. In addition, medical, social and health care services must be made more abundant and easily accessible in established communities. Social gathering areas (cultural and recreational) and green-spaces must be easily accessible by foot, wheelchair or buggy to support the disadvantaged in the community.

➤ **ADDITIONAL RESEARCH.** More research is warranted in Ontario to determine the impact of urban sprawl, traffic noise and lack of greenspace on mental health.

The Ontario government is now working on the second step of its work to curb urban sprawl through the new ***Places to Grow*** Plan.

The health of EVERYONE in southern Ontario will be affected by how well the plan encourages healthy urban planning and public transportation policies.

References

[1] Putnam, R., (2000). *"Bowling Alone: The Collapse and Revival of American Community"*. New York, NY. Simon and Schuster.

[2] Sierra Club, (2004). *Highway Health Hazards*. www.sierraclub.org/sprawl

[3] Goldberg, D., (1999). *"Covering Urban Sprawl: Rethinking the American Dream"*, Washington D.C.,Environmental Journalism Center

[4] Novaco R, Stokols D, Milanesi L. *Objective and subjective dimensions of travel impedance as determinants of commuting stress*. American Journal of Community Psychology 1990;18:23

[5] Gee, G., and Takeuchi, T., (2004). *"Traffic Stress, Vehicular Burden and Well-Being: a Multilevel Analysis"*. Soc. Science and Med., 59, pp 405 – 414

[6] Koslowsky M, Kluger AN, Reich M. (1995) *Commuting Stress: Causes, Effects, and Methods of Coping*. New York: Plenum Press.

[7] Sturm, R., and Cohen, D., (2004). *"Suburban Sprawl and Physical and Mental Health"*. Public Health, 118, pp 488 – 496

[8] Gee, G., and Takeuchi, T., (2004). *"Traffic Stress, Vehicular Burden and Well-Being: a Multilevel Analysis"*. Soc. Science and Med., 59, pp 405 – 414

[9] Novaco R, Kliewer VV; Broquet A. *Home environmental consequences of commute travel impedance*. American Journal of Community Psychology 1991;18:881-909

[10] Goldberg, L., and Gara, M., (1990). *"A Typology of Psychiatric Reactions to Motor Vehicle Accidents"*. Psychopathology, 23, pp 15 – 20

[11] WHO, (2000). *"Transport, Environment and Health"*. Ed. Dora, C., and Phillips, M. WHO Regional Publications, European Series, No. 89

[12] Savich, H., (2003). *"How Suburban Sprawl Shapes Human Well-Being"*. J. Urban Health, 80 (4), pp 590 – 607

[13] Koslowsky M, Kluger AN, Reich M. (1995) *Commuting Stress: Causes, Effects, and Methods of Coping*. New York: Plenum Press.

[14] Rathbone DB, Huckabee JC. (1999). *Controlling Road Rage: A Literature Review and Pilot Study*. Washington: AAA Foundation for Traffic Safety, June. http://www.aaafts.org/Text/Research/RoadRageFinal.pdf.

[15] National Traffic and Safety Administration, (1998). *Volume II: Driver Attitudes and Behaviour (Pub No: DOT HS 808749)*. National Survey of Speeding and Other Unsafe Driving Actions.

[16] Rathbone DB, Huckabee JC. (1999). *Controlling Road Rage: A Literature Review and Pilot Study*. Washington: AAA Foundation for Traffic Safety, June. http://www.aaafts.org/Text/Research/RoadRageFinal.pdf.

[17] Harding RW, Morgan FH, Indermaur D, Ferrante AM, Blagg H, (1998). *Road rage and the epidemiology of violence: something old, something new*. Studies on Crime and Crime Prevention 1998;7:221-28.

[18] Parker D, Lajunen T, Summala H, (2002). *Anger and aggression among drivers in three European countries*. Accident Anal Prev 2002;34:229-35

[19] Mizell L. (1997). *Aggressive Driving. In: Aggressive Driving: Three Studies*. Washington: AAA Foundation for Traffic Safety, March. Available at http://www.aaafts.org/Text/Research/RoadRageFinal.pdf.

[20] Frumkin, H., (2001). *"Beyond Toxicity: Human Health and the Natural Environment"*. Am. J. Prev. Med., 20, 3, pp234 – 240.

[21] Kuo, F., and Sullivan, W., (2001). *"Environment and Crime in the Inner City: Does Vegetation Reduce Crime?"* Environ. Behav. 33, pp 343 – 367.

[22] Taylor, A., Kuo, F., and Sullivan, W., (2001). *"Coping with ADD: The Surprising Connection to Green Play Settings"*. Environ. Behav., 33, pp 54 – 77.

[23] Kuo, F., and Sullivan, W., (2001). *"Environment and Crime in the Inner City: Does Vegetation Reduce Crime?"* Environ. Behav. 33, pp 343 – 367.

[24] Schmidt, C., (2004). *"Sprawl: The New Manifest Destiny?"* Environmental Health Perspectives. 112, (11), pp A621 – A627.

[25] McMillan UW; Chavis DM. *Sense of community: A definition and theory*. American Journal of Community Psychology 1986; 14:6-2 3

[26] Putnam, R., (2000). *"Bowling Alone: The Collapse and Revival of American Community"*. New York, NY. Simon and Schuster.

[27] Frumkin, H., (2003). *"Healthy Places: Exploring the Evidence"*. Am. J. Pub. Health, 93, (9), pp 1451 – 1456.

[28] Kawachi I, Kennedy BP. *Income inequality and health: Pathways and mechanisms*. Health Services Research 1999;34(1 Pt 2):215-27.

[29] Hawe P, Shiell A. *Social capital and health promotion: A review*. Social Science and Medicine 2000;51:871-85.

[30] Leyden K. *Social capital and the built environment: The importance of walkable neighborhoods*. American Journal of Public Health 2003;93: 1546-51.

[31] Leyden K. *Social capital and the built environment: The importance of walkable neighborhoods*. American Journal of Public Health 2003;93: 1546-51.

[32] WHO, (2000). *"Transport, Environment and Health"*. Ed. Dora, C., and Phillips, M. WHO Regional Publications, European Series, No. 89.

[33] Frumkin H, Frank L, Jackson R. (2004). *Urban sprawl and public health. Designing, planning and building for healthy communities*. 2004. Island Press.

[34] Putnam, R., (2000). *"Bowling Alone: The Collapse and Revival of American Community"*. New York, NY. Simon and Schuster.

[35] Frumkin H, Frank L, Jackson R. (2004). *Urban sprawl and public health. Designing, planning and building for healthy communities*. 2004. Island Press.

[36] Savich, H., (2003). *"How Suburban Sprawl Shapes Human Well-Being"*. J. Urban Health, 80 (4), pp 590 – 607.

[37] Must, A., Spadano, J., Coakley, E., et al, (1999). *"The Disease Burden Associated with Overweight and Obesity"*. J.A.M.A., 282, pp 1523 – 1529.

[38] Pi-Sunyer, F., (1991). *"Health Implications of Obesity"*. Am. J. Clin. Nutr., 53, pp 1595 – 1603.

[39] Wilhelm, Michelle and Beate Ritz, (2002). *"Residential Proximity to Traffic and Adverse Birth Outcomes in Los Angeles County, California, 1994 – 1996"*. Environmental Health Perspectives, doi: 10.1289/ehp.5688.

[40] Pearson, et al. *"Distance Weighted Traffic Density in Proximity to a Home is a Risk Factor for Leukemia and other Childhood Cancers"*, Journal of Air and Waste Management Association, 2000; 50: 175 – 180.

[41] Lundeen, S., (1992). *"Health Needs of a Suburban Community: A Nursing Assessment Approach"*. J. Community Health Nursing, 9 (4), pp 235 – 244.

[42] Frumkin, H., (2001). *"Beyond Toxicity: Human Health and the Natural Environment"*. Am. J. Prev. Med., 20, 3, pp234 – 240.

[43] Takano, T., Nakamura, K., and Watanabe, M., (2002). *"Urban Residential Environments and Senior Citizen's Longevity in Megacity areas; The Importance of Walkable Greenspaces"*. J. Epidem. Community Health, 56, pp 913 – 918.

[44] Greenwood, D., et al, (1996). *"Coronary Heart Disease: A Review of the Role of Psychosocial Stress and Social Support"*. J. Pub. Health Med.,18, pp 221 – 231.

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