



# TRANSPORTATION...

## That's *Actually* Good for the Soul

BY CATHERINE O'BRIEN, Ph.D.

The subject of this article was inspired by an informal conversation with a colleague at York University (Toronto, Canada). We were discussing the potential for a car free zone in Toronto and I found myself describing the experience of walking around Amsterdam – the uplifting feeling of seeing so many people, young and old, walking and cycling; the novelty of crossing a street and realizing that I was watching for bicycle traffic, rather than cars.

The words just popped out that this felt like 'transportation that's good for your soul'. As I reflected more on this notion I realized that it had the potential to draw together two areas of research that have engaged me: 1) children's health and transportation and, 2) the significance of social support and social connections for our health.

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*Photo: Kirstin Schwass.*



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*Photo: Dan Burden*

when we understand the extensive harm that our motorized transportation is having on their developmentally susceptible bodies. My hope in documenting these impacts has been that it would strike a chord with drivers, and parents in particular, who may be moved to choose more sustainable transportation modes.

Another aim has been to raise the profile of children for policy makers who are seeking opportunities to educate the public about sustainable transportation, greenhouse gases and public health. Along the way, children have taught me that transportation is not only about “moving people and goods.”

Five years ago, in Canada, I was the only person presenting work about children at academic conferences on transportation. Thanks to the efforts of many people nationally and internationally, the subject is more mainstream.

For example, our federal transportation department, Transport Canada, is drafting a three-year sustainable development plan that recognizes children’s health and transportation as one of the areas for more focused work. The World Health Organization and Ministries of Transportation, Health and Environment of the European Union are gathering evidence regarding the health impacts of transportation on children.

Around the world, as we have broadened our understanding and applications of sustainability we have learned that we need far more inter-disciplinary research and cooperation.

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While transportation discussions now involve input from many more stakeholders, including health, the recognition of the social costs and benefits of transportation needs to be strengthened. My view is that we have not yet incorporated the remarkable health research that demonstrates how powerful our thoughts, feelings, relationships and even spiritual health are to our overall well being. (See Figure 1). It is important to pay attention to this because our definition of health determines the health impacts we study.

I'd like to put forward the notion that our transportation discussions would benefit from an understanding of the potential benefits and harmful impacts to our health, using a broader view of health. David Simon, M.D. has suggested the following:

*The World Health Organization has defined health as not only the absence of disease but as a state of physical, mental and emotional well being. It is now time to add a fourth element, spiritual well being.*<sup>3</sup>

Let's view this recommendation through the lens of children's health and see what happens, beginning with a reminder of children's special susceptibility.

### **FIGURE 2. CHILDREN'S SPECIAL SUSCEPTIBILITY**

*A child's developing body systems, particularly tissues and organs, are more sensitive to environmental toxicants. Tissues that are under development are more susceptible to toxic effects because they rely on chemical messengers for growth. Organ development begins during early fetal life and continues into adolescence.*

*Children receive greater exposures than adults because they eat more food, drink more water, breathe more air per unit of body weight than adults. Furthermore, depending on their age, children's ability to metabolize, detoxify and excrete many toxicants is different from that of adults.*<sup>4</sup>

### **FIGURE 1. MIND-BODY RESEARCH**

*There is good evidence that each and every thought, feeling, mood, desire, and experience is accompanied by corresponding and instantaneous changes in the brain's chemical messengers. These messengers, which were initially discovered in the nervous system, are now known to communicate with every other physiological system in the body. They are like chemical keys searching for the correct lock to initiate a desired response.*

*The "locks" which are embedded on the surface of cells, are called receptors, and have been identified throughout the nervous system. We have learned that the cells of the immune system also have receptors for and respond rapidly to these same chemical keys. Immune cells also release many of these same chemical messengers, which feed back information to the nervous system on the body's immune status.*<sup>1</sup>

*I believe that happiness is what we feel when our biochemicals of emotion, the neuropeptides and their receptors, are open and flowing freely throughout the psychosomatic network, integrating and coordinating our systems, organs, and cells in a smooth and rhythmic movement... Physiology and emotions are inseparable.*<sup>2</sup>

*Children who live near high-traffic areas (20,000 cars passing per day) may be six times more likely to develop childhood leukemia and other cancers.*

*Photo: John Williams*



## **CHILDREN'S PHYSICAL WELL BEING & TRANSPORTATION**

The list below is a partial summary of some of the links between children's physical well being and the harmful impacts of transportation.

- *Traffic fatalities are the leading cause of injury death in Canada for children over the age of one year.<sup>5</sup>*
- *Less than half of Canadian children walk to school. (Most children who live within three kilometres of school do walk, but a sufficient number live farther from school to bring the average who walk down to less than half of all children.)<sup>6</sup>*
- *Two out of three Canadian children do not meet average physical activity guidelines to achieve optimum growth and development.<sup>7</sup>*
- *More than a quarter of Canadian children and youth are overweight.<sup>8</sup>*
- *Children who live near high-traffic areas (20,000 cars passing per day) may be six times more likely to develop childhood leukemia and other cancers.<sup>9</sup>*
- *Smog has been linked to asthma as both a trigger and possible cause.<sup>10</sup>*
- *There appears to be no threshold for ozone levels that are safe, and children are particularly susceptible.<sup>11</sup>*
- *Children may be more vulnerable to airborne pollution because their airways are narrower than those of adults.<sup>12</sup>*
- *Children living in areas with poor air quality have been found to have reduced lung function growth that places them at risk for future respiratory illness.<sup>13</sup>*
- *A study of children's exposure to diesel exhaust on school buses in the United States indicated that concentrations of PM2.5 were often 5-10 times higher than average levels measured at fixed-site monitoring stations.<sup>14</sup>*
- *"In-car benzene concentrations sometimes exceed concentrations in the roadside air by up to four fold. Carbon monoxide concentrations may be more than 10 times higher inside cars than at the side of the road. Elevated in-car pollution concentrations particularly endanger children, the elderly, and people with asthma and other respiratory conditions. They receive little attention. Nevertheless, in-car air pollution may pose one of the greatest modern threats to human health."<sup>15</sup>*
- *In Canada, approximately 30% of greenhouse gas emissions result from transportation. These emissions are contributing to global warming which will have long term impacts on children.<sup>16</sup>*

Of course, there are positive health benefits of physical activity through transportation and the reduced risk of future ailments related to physical inactivity such as childhood obesity, type 2 diabetes, hypertension, osteoporosis, depression, smoking/ alcohol/ drugs, and adolescent pregnancy.<sup>17</sup>

### CHILDREN'S EMOTIONAL & MENTAL WELL BEING & TRANSPORTATION

Research regarding children's emotional and mental well being and transportation is scarce. The Department of Transport for Britain has conducted an extensive study and literature review regarding children and transportation.

They recognized the need for "primary research about the impact of mass use of different modes of transport on children's independence, social networks, opportunities to participate in after-school activities, and sense of wider community."<sup>18</sup> The following is a brief summary of transportation's impact on children's emotional and mental well being.

- *Heavy traffic reduces the independent mobility of children and youth.*<sup>19</sup>
- *Opportunities and locations for spontaneous, non-structured play are severely restricted by traffic.*<sup>20</sup>
- *Low-level but chronic noise of moderate traffic can stress children and raise their blood pressure, heart rates and levels of stress hormones.*<sup>21</sup>
- *25-30% of children who survive traffic accidents may suffer from post-traumatic stress disorder, unless treated. This may include depression, recurring nightmares, difficulty attending to school work, fear of cars.*<sup>22</sup>
- *Children living in a neighbourhood where traffic is a nuisance and a threat spend less time playing outside, and engage in a small range of play activities. Notable differences were in the amount of time spent in imaginative play, drawing with chalk, picking flowers, building dens, and riding a bicycle or tricycle. Children who live in neighbourhoods not dominated by traffic have a wider circle of friends, and so do their parents.*<sup>23</sup>



*Opportunities and locations for spontaneous, non-structured play are severely restricted by traffic.*

*Photo: Dan Burden*

In Rome, a research team found that “children who are more independent play more often with their peers, both indoors and outdoors.” Also, their mothers have more neighbourhood relations.<sup>24</sup> Research that has looked at the effect of sprawl on neighbourhood social ties found a strong relationship between automobile dominance in a neighbourhood and the level of social ties. Also, research that has looked at the effect of sprawl on neighbourhood social ties found a strong relationship between automobile dominance in a neighbourhood and the level of social ties.<sup>25</sup> Driving to work reduces the likelihood of engaging with one’s neighbours if they are driving as well.

The health-related significance of social ties is proving to be quite extraordinary, though this area has not been adequately addressed for children. Dr. Dean Ornish, M.D. is a cardiac researcher who has documented a broad range of studies that point to the significance of community connections and social support as important factors for promoting health and preventing disease. He recounts a nine-year study conducted by the California Department of Health Services. The study involved almost 7,000 men and women.

*They found that those who lacked social and community ties (contact with friends and relatives, marriage, and church and group membership) were 1.9 to 3.1 times more likely to die during the nine-year follow-up period....*

*This association between social and community ties and premature death was found to be independent of and a more powerful predictor of health and longevity than age, gender, race, socioeconomic status, self-reported physical health status, and health practices such as smoking, alcoholic beverage consumption, overeating, physical activity, and utilization of preventive health services as well as a cumulative index of health practices. Those who lacked social ties were at increased risk of dying from coronary heart disease, stroke, cancer, respiratory diseases, gastrointestinal diseases, and all other causes of death.<sup>26</sup>*

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*Photo: Dan Burden*



## CHILDREN'S SPIRITUAL WELL-BEING & TRANSPORTATION

The Public Health Advisory Committee in New Zealand has drafted an overview document, "Impacts of Transport on Health". Their definition of health includes spiritual well being and recognizes that some readers may assume that this concept would be entangled with views from organized religions. However, the definition they offer has more to do with an experience of connection. They recommend a definition offered by Professor Mason Durie. He writes that spiritual health is:

*"the experience of mutually rewarding encounters between people, a sense of communion with the environment, access to heritage and cultural integrity."*<sup>27</sup>

I am unaware of any literature that has made the link between children's spiritual health and transportation though the following quotes from two junior kindergarten students speak volumes about the uplifting experience of walking to school.

*"We walk to school because...  
We can stop and say hello to a kitty or a pup and sing along with the birds."*

*"The best part was walking in the hard rain. I walked with a friend and saw some worms and birds"*

*Junior Kindergarten students, Maurice Cody Public School,  
Brampton, Walk to School Day 2000.*

*Kids' quotes from the International Walk to School web site are bursting with enthusiasm and sense of connection to their surroundings.*

*Photo: Kirstin Schwass*



Both the sense of celebrating nature and empathetic connection with it are exemplified by the five year-olds. Kids' quotes from the International Walk to School ([www.iwalktoschool.org](http://www.iwalktoschool.org)) web site are bursting with this kind of enthusiasm and sense of connection to their surroundings.

In school, our children learn about empathy and caring for the environment. And yet our transportation may not be very compassionate. Presently, few people consider the impact of their driving behaviour on the health and well being of society and the environment. Parental fears about traffic and "stranger danger" are reasons given for not allowing their children to walk or cycle to school.

This may be contributing to a culture of fear for their children and a sense of disconnection. Road rage and even a general feeling of irritability are increasingly more common as drivers face long commutes or traffic congestion. Aggressive behaviour of parents dropping their children off at school has led one Canadian parent to coin the term, "parent drop-off rage." Karin Sandqvist believes that children observe aggressive behaviour while being chauffeured around.

*Children are likely to learn from their parents that other people are 'idiots' or maniacs. In walking in a pedestrian zone or in using public transport, this will rarely be the case.<sup>28</sup>*



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*Photo: Dan Burden*

A story in *Spirituality and Health* magazine presents a refreshing counterpoint to this. The author described his conscious adjustment from being a two-car family to a one-car family. This involved walking and cycling a great deal more. His words are reminiscent of the child's experience on her walk to school.



*The words of the five year-old children and adult cyclist remind us that transportation can involve joy, compassion and connection – states of mind that are important for our health.*

*Photo: Dan Burden*

*What surprised me was the sheer joy of biking. Giving up “stuff” is supposed to be good for the soul but a drag to go through, but getting down to one car has been surprisingly easy. When we go places as a family, we usually ride in the car together. But when I go to work, the library, etc., alone, I’ve discovered no need or desire to drive. When I ride my bicycle, the wind sweeps past me, awakening my body to the fact that I am moving someplace within this world. I am part of my world and community, not removed from it.<sup>29</sup>*

The words of the five year-old children and adult cyclist remind us that transportation can involve joy, compassion and connection – states of mind that are important for our health. In fact, the significance of joy to our overall well being was the inspiration behind a recent conference in Ottawa, Canada.

Its title was, “*Joy – The Forgotten Vital Sign*” and its aim was to remind health care professionals – physicians, nurses, palliative care workers, and psychiatrists – that joy is essential for our health. The conference advertising stated, “joy, pleasure, satisfaction and fulfillment have slipped from being low priorities to being forgotten all together... People need more than technology to get better.”

Of course, the question arises, how could we quantify spiritual well being? What indicators would we use? These are good questions and may not be easily answered. However, Dr. Dean Ornish encountered the same dilemma when he began to track the health benefits of love, intimacy and social connections. He wrote:

*Although I respect the ways and powers of science, I also understand its limitations as well. What is most meaningful often cannot be measured. What is verifiable may not necessarily be what is most important. As the British scientist Denis Burkitt once wrote, “Not everything that counts can be counted.”<sup>30</sup>*

It's interesting to note that the business sector has already made the link between their products and spiritual well being as the following slogans from automobile-related advertisements indicate:

*BMW "The chosen one"*

*Michelin Tire "Your guardian angel this winter"*

*The New Camry "If it looks familiar, you've seen it in your dreams"*

*Nissan "A Little Slice of Heaven"..."Shift-Joy"  
and my personal favourite...*

*Jeep "Think of it as a 4,000 lb. Guardian Angel"*

Sports equipment ads are also in the game. Reebok has named one of its ladies golf shoes, "The Reebok Spirit Trak". Velotechnik's Recumbent bicycle ad tells us to "Get the Spirit" and EasySpirit shoes ask "What is your Spirit level?"

Perhaps we should follow this example in our transportation discussions and begin to acknowledge that the stress we feel in traffic jams and traffic noise is dispiriting. Choosing slower modes of transportation may not only be good for our body but also nourishing for the soul. Time pressure is the reason that is often given for using less sustainable modes of transportation.

Slowing down and experiencing the moment is emphasized in stress management training as well as meditation techniques for spiritual development. Pleasant walking and cycling paths that lead to destinations that adults and children regularly travel would allow us to use these modes for transportation. And surely "Road Rage" is the antithesis of the compassionate society that we would wish for ourselves and our children?



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*Photo: John Williams*

*To achieve more child-friendly cities, and hence to achieve more sustainable cities, will require much more than changes to speed limits, or widespread traffic calming, or even increases in the density of provision of services. It will require a fundamental change in social values, a cultural revolution, toward greater collective responsibility and away from individualism.*<sup>31</sup>

Learning how to talk about transportation and compassion may ultimately assist us in creating a gentler future for ourselves and our children. Perhaps children can also teach us how to value “transportation that’s good for the soul.”

## NOTES

- 1 Simon, D. (1997). *The Wisdom of Healing*. Three Rivers Press, New York., p. 191.
- 2 Pert, C. (1997). *Molecules of Emotion*. Simon and Schuster, New York, p. 265.
- 3 The World Health Definition that is referred to has not been changed since 1948 according to the WHO web site found at: <http://www.who.int/about/definition/en/>
- 4 Canadian Institute of Child Health (2000). *The Health of Canada’s Children*, Third edition, Ottawa, p. 284.
- 5 See the Source detailed in Note 4.
- 6 Go for Green (1998) *Nation Survey on Active Transportation: Summary Report*. Go for Green and Environics International, Ottawa. Available at: [http://www.goforgreen.ca/active\\_transportation/pdf/AT%20Survey.pdf](http://www.goforgreen.ca/active_transportation/pdf/AT%20Survey.pdf). Accessed September 18, 2003.
- 7 Vail, S. (2001) *The Physical Inactivity Epidemic: The Preventative Role of Active School Communities*. Discussion Paper Prepared for Delegates of the National Roundtable on Active School Communities, October 18-20. Available at: <http://www.yorku.ca/suevail/asc/ASCdiscusspap.doc>. Accessed September 18, 2003.
- 8 See the source detailed in Note 7.
- 9 Pearson, R., Wachtel, H., Ebi, K. (2000) *Distance-weighted traffic density in proximity to a home is a risk factor for leukemia and other childhood cancers*. *Journal of the Air & Waste Management Association*, 50, pp. 175-180.
- 10 California Air Resources Board (2002) *The Children’s Health Study, Fact Sheet*, available at: <http://www.arb.ca.gov/research/chs/CHSfact.pdf>. Accessed September 7, 2003.
- 11 York Centre for Applied Sustainability and Pollution Probe (1996) *Clearing the Air: Transportation, Air Quality and Human Health Conference*. Toronto. Available at: <http://www.pollutionprobe.org/Publications/Air.htm>. Accessed September 18, 2003.
- 12 See the source detailed in Note 11.
- 13 See the source detailed in Note 10.
- 14 Wargo, J. (2002) *Children’s Exposure to Diesel Exhaust on School Buses, Environment and Human Health, report*, Available at: <http://www.ehhi.org>. Accessed September 8, 2003.
- 15 This quotation is from International Centre for Technology Assessment (2000). *In-Car Air Pollution: The Hidden Threat to Automobile Drivers*. International Centre for Technology Assessment, Washington DC. Available at: <http://www.icta.org/projects/trans/incar.pdf>. Accessed September 22, 2003.
- 16 Canadian Institute of Child Health, *Climate Change and Your Child’s Health, Information Package*, Available at: <http://www.cich.ca/Publications.html>. Accessed September 7, 2003.
- 17 See the Source detailed in Note 7.
- 18 Department of Transport, (2001) *Effect of Travel Modes on Children’s Cognitive Development, Executive Summary*, <http://www.local-transport.dft.gov.uk/schooltravel/index.htm>.

- 19 Tranter, P., Doyle, J. (1996). *Reclaiming the residential street as play space*. *International Play Journal*, 4, pp. 81-97.
- 20 Hillman, M., Adams, J. (1992) *Children's freedom and safety*. *Children's Environments*, 9 (2), pp. 10-22.
- 21 Evans, G., Lercher, P., Meis, M., et al (2001) *Community noise exposure and stress in children*, *Journal of the Acoustical Society of America*, 109 (3), pp. 1023-1027.
- 22 Stallard, P., Velleman, R., Baldwin, S. (1998) *Prospective study of post-traumatic stress disorder in children involved in road traffic accidents*. *British Medical Journal*, 317, pp.1619-1623.
- 23 See Page 18 of European Commission, Directorate-General for the Environment (2002) *Kids on the Move*, Office for Official Publications of the European Communities, Luxembourg. This document is available at: [http://europa.eu.int/comm/environment/youth/air/kids\\_on\\_the\\_move\\_en.pdf](http://europa.eu.int/comm/environment/youth/air/kids_on_the_move_en.pdf). Accessed October 1, 2003
- 24 See the source detailed in Note 22.
- 25 Freeman, L. (2001) *The effects of sprawl on neighborhood ties*. *Journal of the American Planning Association*, 67(1), pp. 69-77.
- 26 Ornish, D. *Love and Survival – The Scientific Basis for the Healing Power of Intimacy*. Harper Collins, New York, 1998. p 42.
- 27 Public Advisory Committee (2003). *Impacts of Transport on Health – An Overview*. National Advisory Committee on Health and Disability. April, p. 4.
- 28 Sandqvist, K. (1998) *Are automobiles really benign members of the modern family?* *World Transport Policy & Practice*, 4(3), p. 7.
- 29 Trabue, D. (2003) "Car free, pedaling towards care-free". *Spirituality and Health*, Winter, Available at: [http://www.spiritualityhealth.com/newsh/items/article/item\\_5578.html](http://www.spiritualityhealth.com/newsh/items/article/item_5578.html)
- 30 Ornish, D. *Love and Survival – The Scientific Basis for the Healing Power of Intimacy*. Harper Collins, New York, 1998. p 4.
- 31 Tranter, P., Pawson, E. (2001). *Children's access to local environments: A case study Of Christchurch, New Zealand*. *Local Environment*, 6 (1), 27-48.

## **ABOUT THE AUTHOR**

Catherine O'Brien's research focuses on the health impacts of transportation on children and opportunities to improve their access to active transportation modes and the destinations they wish to travel. She is currently working on a project to develop child-friendly urban planning guidelines in Canada.

## **CONTACT INFO:**

E-mail: [imurray@renc.igs.net](mailto:imurray@renc.igs.net)

Phone: 613-754-2559

NCBW FORUM is an online publication of the National Center for Bicycling & Walking.

EDITOR: John Williams <[john@montana.com](mailto:john@montana.com)>

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