



First Annual TRIPP Lecture

The First Annual TRIPP Lecture on "Urban Transport in the Age of Global Warming" by Professor Hermann Knoflacher was held on 14th December 2007 at the Indian Institute of Technology Delhi. Professor Knoflacher is the Head of the Institute for Transport Planning and Traffic Engineering, University of Technology, Vienna, Austria.

This is the first of a series of annual lectures instituted at TRIPP, IITD to honour outstanding contributors in the field of sustainable transport including health, safety and environmental issues.



Workshop on Transport, Health, Environment

A three-day workshop was held December 17-19, 2007, on Transport, Health, Environment and Equity in Indian Cities, at the Indian Institute of Technology (IIT), Delhi. The workshop addressed the critical impacts of air pollution, road safety and access for the urban poor and non-motorized modes, and the underlying themes of health, environment and equity, because of linkages and trade-offs between these impacts and thus the imperative for urban transport policy to focus on them in an integrated fashion, rather than in isolation from one another.

Besides dealing with the urban transport problem comprehensively, the workshop was explicitly inter-disciplinary with over 60 participants from Canada, India, the UK, USA and Bangladesh. They included academic researchers in a wide range of disciplines (atmospheric sciences, biomedical, civil and mechanical engineering, economics, environmental policy, epidemiology, management, urban policy, and urban transport planning), senior government decision makers, medical professionals, and private sector, industry, NGO, and pedestrian, cyclist, and cycle-rickshaw puller group representatives from India, Canada and other countries. The discussions focused on the critical research needs for better understanding, and more effectively addressing, the urban transport situation in India, and useful approaches for meeting those needs. Workshop sessions were devoted to the following topics: Transport Air Pollution, and Health; Road Safety; Access for Non-motorized Modes and the Urban Poor; and the Research-Policy Interface.

A brief report containing a summary of the presentations and the research agenda discussed on the final day of the workshop is being produced for the Shastri Indo-Canadian Institute, and the Ministry of Urban Development, Government of India. Research projects and funding proposals are being developed jointly by some of the participants, as a direct result of the workshop.

International Course

The Transportation Research and Injury Prevention Programme (TRIPP) at the Indian Institute of Technology, Delhi organized a seven day International Course on Transportation Planning and Safety from 10-16 December 2007 at the Indian Institute of Technology Delhi. The course was co-sponsored by the Volvo Research and Education Foundations, INRETS, France, World Health Organisation, TATA Motors Ltd. and the Ministry of Road Transport and Highways. The course (an annual feature for the last 17 years), was attended by 59 participants from 13 countries. The faculty members included Anoop Chawla (IIT Delhi), Dinesh Mohan (IIT Delhi), Farida Saad (INRETS, France), Geetam Tiwari (IIT Delhi), Harald Zellmer (Autoliv, Germany), Hermann Knoflacher (Technical University of Vienna), Janusz Kajzer (Chalmers University, Sweden), Marie-Chantal Jayet (INRETS, France), Mathew Varghese (St. Stephen's Hospital, Delhi), Nicole Muhrad (INRETS, France), Shrikant Bangdiwala (University of North Carolina, USA), Sudipto Mukherjee (IIT Delhi), Sylvain Lassarre (INRETS, France).



TRIPP Publication

"Mythologies, Metros and Future Urban Transport" by Professor Dinesh Mohan is available at www.iitd.ac.in/~tripp

There is still no clear vision among planners, policy makers and transport experts about what cities in India need and what will make them better places to live in as far as mobility and access are concerned. The prevailing mythology is that construction of metro rail systems will somehow solve problems of the future and they remains the single one point agenda of almost all transport consultants in India. Review of urban mass transport systems over the past century shows that metro systems were the obvious choice when relatively inexpensive cars and two-wheelers were not available. With the introduction of efficient buses, computer and information technologies to manage large fleets, and the need to have flexible, medium capacity systems that go close to homes and destinations, bus rapid transit systems with dedicated lanes seem to be the only choice for providing affordable mass transport in our cities



The **Transportation Research and Injury Prevention Programme (TRIPP)** at the Indian Institute of Technology Delhi, is an interdisciplinary programme focussing on the reduction of adverse health effects of road transport. TRIPP attempts to integrate all issues concerned with transportation in order to promote safety, cleaner air, and energy conservation. Faculty members are involved in planning safer urban and inter-city transportation systems, and developing designs for vehicles, safety equipment and infrastructure for the future. Activities include applied research projects, special courses and workshops, and supervision of student projects at postgraduate and undergraduate levels. Projects are done in collaboration with associated departments and centres at IIT Delhi, government departments, industry and international agencies.





Interview with Carlos Dora

Carlos Dora is an environmental health policy expert with the WHO, where he leads the development of new approaches to impact assessment that include both environment and health. He is presently involved in a series of pilot projects testing new impact assessment approaches in developing countries of Asia and Africa. As a medical doctor he first worked to develop quality medical care in Latin America. He later completed his Ph.D. at the London School of Hygiene and Tropical Medicine.



What is WHO's role in promoting sustainable transport policies internationally (as distinct from other UN agencies)?

WHO speaks for global public health. As the technical UN Agency responsible for providing technical guidance to Health Agencies and agents, WHO sees that Transport policies are key to solving a number of major public health issues: Air pollution, noise, traffic injuries and lack of physical activity are all closely linked to the means of transport available to people, and is one of the main causes of disease and death. It is therefore the role of WHO to clarify what transport policies benefit health, and by how much, as well as to provide examples of good practice where transport changes lead to health improvements. WHO also supports stakeholders in health, transport and environment, with tools for documenting the health impacts of transport, and for influencing policies in the sector so as to promote public health and environment.

Besides air pollution and road crashes, what are the other health aspects of transport policies that need to be addressed urgently?

Health benefits from walking and bicycling

Walking and cycling to work have been shown to meet metabolic criteria for achieving health benefits from exercise. The health benefits of regular sustained physical activity include:

- a 50% reduction in the risk of developing coronary heart disease (a similar effect to not smoking);
- a 50% reduction in the risk of developing adult diabetes;
- a 50% reduction in the risk of becoming obese;
- a 30% reduction in the risk of developing hypertension;
- a 10/8-mmHg decline in blood pressure in people with hypertension (a similar effect to drugs);
- reduced osteoporosis;
- relief of symptoms of depression and anxiety; and
- Prevention of falls in the elderly.

The world is facing an epidemic of chronic diseases, like cardiovascular disease, stroke, and diabetes. We are also seeing a major increase in obesity, including childhood obesity.

These health problems are among the largest causes of death and disability, which cause individuals and their families a lot of unnecessary suffering and high costs (from lost wages and medical treatments for example). Regular physical activity is one of the ways to prevent these diseases, and can produce a benefit similar to quitting tobacco smoke. Cycling or walking to work or to school, is therefore a strategy that could be used by anyone to prevent these diseases at no extra cost to the individual (it could even lead to savings). A key deterrent to walking and cycling for daily activities is lack of safety on the road. If transport plans and choice of transport modes available to people allow safe walking and cycling, it would go a long way to preventing diseases in society at little or no cost. The most urgent action for transport planners is to think of promoting safe walking and cycling for most people; that will require increasing road safety and also contribute to air pollution reduction.

What are the estimated magnitudes for each one of these effects in different regions of the world?

The following table describes the effects of the external costs of transport in the EU, Norway and Switzerland (1995)

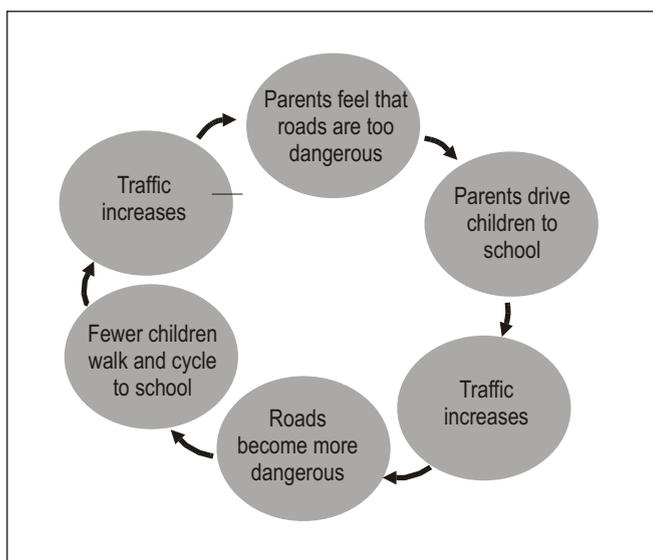
Effect	Cost		
	Total (Billion euros)	Per Person (euros)	Share of gross domestic Product (%)
Accident	155.6	406	2.3
Air pollution	134.3	350	2.0
Congestion	128.4	335	1.9
Climate change	121.8	318	1.8
Upstream			
Processes	56.5	147	0.8
Noise	36.5	95	0.5
Landscape	16.0	42	0.2
Urban effects	8.9	23	0.1
Total	658.0	1716	9.7

WHO estimates that globally 1,9 million deaths are due to lack of physical activity, 1,2 million deaths are due to traffic injuries, and 0.8 million deaths are due to urban air pollution. This varies a lot between different parts of the world. Air pollution, traffic injuries, and obstacles to physical activity tend to be greater in the large mega-cities of developing countries, affecting more the poor, who need to travel longer to get anywhere and who are more exposed to transport health risks. Transport authorities in those countries have a specially large role to play in developing plans and adopting modes of transport that will benefit health. They can make a unique contribution to national and city development by improving the health of the poor by reducing health inequalities. The performance of transport authorities could in fact be judged against the contributions they make to improve the health of the poor, through reductions in traffic pollution and injuries and through enabling cycling and walking for daily activities. The use of such an index of performance could create the incentives for transport authorities to realize their potential for improving population health.



If cycling and walking are good for health, why are their numbers declining the world over?

This figure illustrates the effects of ever-increasing traffic on children's freedom of movement



Transport and land use planners in many places are not yet seeing the benefits from cycling and walking as a key contributor to congestion reduction, pollution abatement, livelihood, safety of cities and people's health. It would be necessary to study the reasons for this decline rigorously, and I find this question a necessary topic of research. What one could explore in an analysis of this issue are a number of possible contributors, for example, a) the lack of strong economic interests/lobby groups behind cycling, in view of the small margin of gain by those producing bicycles; b) the lack of awareness of the benefits from cycling to the individual cyclist and to communities of having a large proportion of the population cycling and walking; c) the image of cycling as something outdated, not modern, d) the lack of role models, such as politicians and celebrities that cycle (this is not the case any longer in Nordic countries, where kings and ministers cycle, but still the case elsewhere). I do hope to see good social science research into the policy making in transport, exploring the reasons for cycling and walking to be often so invisible in that process.

What urban issues would you like to highlight that need urgent attention from the point of view of transport policies

Traffic levels	Contacts living on the same street	
	Friends	Acquaintances
Light traffic (200 vehicles at peak hour)	3.0	6.3
Moderate traffic (550 vehicles at peak hour)	1.3	4.1
Heavy traffic (1900 vehicles at peak hour)	0.9	3.1

More attention should be paid to documenting the quality of life in cities with healthy transport, and the benefits to the economy of these cities. Cities compete for a qualified workforce in a globalized world. Dirty and unpleasant cities will increasingly suffer from their lack of amenities. Clean air, cycle routes, green spaces, low noise levels, safe streets, are all very valued aspects of cities, which increasingly play a role in attracting the people that can make it grow and develop.

Why is health and transport not on the top of the list of priorities of most countries?

It is on the top list of priorities of cities wanting to increase the quality of life in urban areas, or to go green, like Bogota or Beijing, and is a key part of urban renewal in some European cities and New York. However a view persists that transport problems are about vehicle flows, and transport solutions are about the building of infrastructure. A low priority is often put into assessing the interplay of people, space and movement, and to estimating the impacts of transport interventions into quality of life, health and wellbeing.

What are the current and future challenges for researchers working on sustainable transport and health issues?

I would say first to understand better the process of transport policy making, and the reasons for excluding cycling and walking or health issues for example from the policy and decision making considerations. What are the framework assumptions espoused by transport policy and decision makers; who do they see as their audience; what do they see as their role? Second and more important, to document the consequences of transport decision making to health and well being, to the environment, to quality of life, generating the evidence about the real impact of different modes of transport and land use planning, facilitating comparisons and the identification of good practice. We urgently need a substantial body of evidence about the consequences of transport decisions to people who have to live with the results of those decisions. The lack of this type of research and analysis can lead to the unquestioning repetition of errors, that are difficult and expensive to remedy. The enormous growth of cities makes this knowledge gap ever more worrying.

You have had a long association with TRIPP. How do you see TRIPP's role in the context of transport and health issues in the future?

TRIPP is very influential in transport thinking, and I see that it has a key role in advancing the perspectives, raising questions and above all generating the evidence and research that can change and improve transportation planning and decision making. The impacts of TRIPP are worldwide and I strongly believe that leading thinkers such as some of those in TRIPP can have a major impact in the actual practice of transport in the future. The ease of communication and world connections today needs to be used to amplify the results of TRIPP's work.

[All figures and Box items adapted from: Dora, C. & Phillips, M.(eds) (2000) *Transport, Environment and Health*. WHO Regional Office for Europe, Copenhagen]



News

On the Social Desirability of Urban Rail Transit Systems

Rail's share of urban travelers is declining during a period when there has been little investment in new roads; its deficits are rising sharply; and yet investment to build new systems and extend old ones continues.

We find that with the single exception of BART in the San Francisco Bay area, every U.S. transit system actually reduces social welfare. Worse, we cannot identify an optimal pricing policy or physical restructuring of the rail network that would enhance any system's social desirability without effectively eliminating its service.

Rail transit's fundamental problem is its failure to attract sufficient patronage to reduce its high (and increasing) average cost. Rail operations, unfortunately, are best suited for yesterday's concentrated central city residential developments and employment opportunities; they are decidedly not suited for today's geographically dispersed residences and jobs. Ironically, however, rail transit enjoys powerful political support from planners, civic boosters, and policymakers, making it highly unlikely that rail's social cost will abate.

In theory, rail transit could provide additional external benefits besides reducing roadway congestion, but empirical evidence of these benefits is weak. First, it has been claimed that by attracting auto users, rail reduces emissions. But given its low load factor, which includes a large share of users who keep older cars to get to suburban rail stations, its high consumption of electricity, whose generation produces pollution, and its consumption of smaller amounts of heavy petrochemicals, such as kerosene and bunker fuel, a greater share of rail ridership has, at best, an ambiguous effect on the environment. In addition, the construction and expansion of new and existing rail systems is very energy intensive.

It has also been argued that rail transit improves the safety of urban travel by reducing traffic on the road. But motorists absorb (internalize) most of the cost of accidents through various types of insurance. And the net improvement in safety to those who switch to rails is small because travelers are still exposed to losses in property and bodily harm from transit accidents and serious crimes on trains and in stations.

Finally, it has been suggested that rail has contributed to commercial development. But case studies have yet to show that after their construction transit systems have had a significant effect on employment or land use close to stations and that such benefits greatly exceed the benefits from commercial development that would have occurred elsewhere in the absence of rail construction. What factors contribute to rail transit's social undesirability? Rail's budget balance is inherently strained by the high costs of building and maintaining a network to serve urban and suburban travelers and by the inefficiencies associated with low load factors and excessive labor expenses. Rail is unable to generate revenues to cover these costs because it must offer low (subsidized) fares to compete with the convenience and flexibility of autos.

Since the 1970s, deficits expanded as rail costs rose while demand fell. Aging systems have incurred high costs to repair and maintain their systems. For example, the Washington Metro has spent nearly \$ 1 billion in recent years to improve system reliability and ease crowding with little to show for project expenditures. The projected cost of new systems to the public and the federal government has often been underestimated (or understated) by transit promoters.

The demand for rail has continued to shrink because transit networks are unable to keep up with changing land use and travel patterns that have decentralized residences and employment.

Prior to construction, BART projected roughly 18,000 daily boardings to the airport by the year 2010 and that the service, in conjunction with three other new stations on the airport extension, would be profitable. As of 2006, there are 7000 daily boarding, indicating that the 2010 projection is unlikely to be realized, the route is losing money, while BART is embroiled in a fight over funds.

C. Winston, V. Maheshri, (2007), *Journal of Urban Economics*, 62, 362-382.

The Relationship Between Outdoor Air Quality And Respiratory Symptoms In Young Children

The aim of this study was to investigate the relationship between air pollution and respiratory symptoms in young children. A total of 263 children at high risk of developing asthma or atopy were recruited antenatally and all respiratory symptoms experienced by the children were recorded by their parents for five years. Daily pollutant concentrations and meteorological data (ambient temperature and humidity) were collected from network monitoring sites. Logistic regression models investigating relationships between individual air pollutants and respiratory symptoms showed significant associations between Ozone (O₃) (1 h and 8 h) concentrations and raised body temperature (lag 0); Carbon monoxide(CO) (8h) and wheeze/rattle and runny/blocked nose (lag 5 and additive exposure over 5 days); Nitrogen dioxide(NO₂) (24 h) concentrations and cough (Lag 0 and additive exposure over 5 days) and PM_{2.5} and visibility(BSP) (1 h) with cough (Lag 0). These associations were observed even though air pollutant concentrations were below national standards throughout the study period.

Clemencia Rodriguez et. Al. (2007) *International Journal of Environmental Health Research*, 17(5): 351-360.

A Framework and Analysis to Examine the Implication of School Choice on Travel Behavior and Environmental Emissions

We examine the implications of school choice on walkability, school travel mode and overall environmental emissions. In the development of this "proof of concept model" we show – and quantify – how city-wide schools, compared to their neighborhood school counterparts, have: longer routes to school, therefore, fewer children who walk to school, higher system criteria and greenhouse gas emissions, longer travel times and thus more exposure to bus fumes, and overall higher transportation costs. Overall, the city-wide school had six times fewer children walking 2.5 times as many miles traveled, 2.5 times the system cost, and 2.4-2.6 times the amount of criteria air pollutants and greenhouse gas emissions. By providing bus service, the overall miles traveled (and resulting emissions) decreased 1.5 times in comparison to the scenario where no bus service was provided, however system costs were 16 percent higher for the neighborhood school and 9 percent more for the city-wide school when bus service was provided (no externality costs were factored in). Still, transportation costs at the neighborhood school were 2.5 times less expensive in both scenarios than the city-wide school. School choice and institutional form seem to have a large impact on travel behavior and merit further study.

Elizabeth Wilson, Ryan Wilson and Kevin J Krizek (2007). *Transportation Research Part D: Transport and Environment*, 12: 7, 506-518.

Establishment funds have been received from
Ministry of Industry, Government of India
Asian Institute of Transport Development
Tata Motors
Volvo Research and Education Foundations

Endowments for perpetual Chairs
Volvo Chair for Urban Transport
CONFER, India: TRIPP Chair for Transportation Planning

Transportation Research and Injury Prevention Programme
Room MS 808 (Main Building)
Indian Institute of Technology
Hauz Khas, New Delhi 110016, India
Phone: 91-11-26596361, 26596557
Fax: 91-11-26858703, 26851169
Email: mahesh@cbme.iitd.ernet.in
www.iitd.ac.in/~tripp