This training package is based on a proposal by Hanns Moshammer, MD, Institute for Environmental Health, Medical University of Vienna. The module was reviewed by Roberto Romizi, Wim Zwart-Voorspuij
Children and transport

LEARNING OBJECTIVES

- Impact of (motorised) transport on children’s health
- Modes of impact
- What we can do about it

Photo by W Kofler, Innsbruck. The once lovely alpine village in the Tyrol is now surrounded by the Brenner highway.

Impact on children: Why are children more susceptible and vulnerable?
Modes of impact: Air pollution, noise, lack of activity, injuries, global change
What we can do: the parents, patients, doctors, decision makers
Children and transport

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- Introduction
- Air pollution
  - Soil pollution, food contamination
- Noise
- Water pollution
- Lack of Physical Activity
- Injuries
- Urban Environment
- Psychological Effects
- Climate Change

Photos: WHO, P. Virot. Ethiopia, 2002 (above), CDC (below)
Children and transport

INTRODUCTION I
The scope of the problem

- Transport and urban infrastructure have a huge - direct & indirect - impact on health & wellbeing
  - Air pollution, Noise, Injuries, Barrier function, Mobility
- Concentrate on physical activity, because:
  - Burden of disease stemming from sedentarism (both physical and psychological health)
  - Direct impact on individual health

Photo by WHO

Effects have been studied extensively in many settings mostly in North America and Europe. Most of the studies conducted so far have not focused on children specifically but the studies that compared effects in children to those in the general population often found stronger effects in children. Some of the effects (e.g. learning and behavioural/cognitive development) are unique to children and have long lasting consequences. Only few studies have been conducted in “Third World” countries. But those few that exist indicate that especially in urban centres of the South impact of transport on population health is eventually even greater than in North America and Europe.

Medical doctors are powerful advisors to their patients / parents. In their advice they should concentrate on what the individual can do to improve his health prospects. Positive messages are more successful in influencing behaviours. Therefore stressing the beneficial effects of walking and cycling will encourage people to lead a more healthy life and by that way also reduce the environmental burden due to motorised transport. Positive role models for the children are essential in this respect!
Children and transport

INTRODUCTION II
What is done about transport & health?

- Some very good declarations and programs (Vienna 1997, London 1999, THE PEP), but:
- Low degree of implementation, because: responsibility of different sectors and levels of authority
- Improvements (better technology) often outweighed by increase in transport volume

CHARTER ON TRANSPORT, ENVIRONMENT AND HEALTH:
EUR/ICP/EHCO 02 02 05/9 Rev.4, 09009 – 16 June 1999

Vienna Declaration adopted by the UNECE Regional Conference on Transport and the Environment (Vienna, 12-14 November 1997).


There are powerful interest groups that gain from increasing transport volume.

In former days poor roads were an obstacle to industrial development and welfare. In the meantime in all industrialised countries and in many urbanised parts of countries in transition road infrastructure is sufficient for the economy’s needs. Over-use of road infrastructure even hinders prosperity (detoriation of living quarters, disruption of local economies). But old habits and believes such as in new roads enhancing wealth remain in many decision makers’ heads.
INTRODUCTION III
Impact Estimates for the European Region

Road traffic injuries:
- 6,500 children (< 15 years old) killed each year
- Uneven distribution between European countries:
  - Great potential for preventive measures

Air pollution:
- 4,000 – 13,000 children (0 – 4 years) killed each year in the WHO European Region (mostly in Eastern Europe)

Noise:
- Reading ability and memory impairment

Physical activity & individual mobility

WHO Europe, 2004: EUROPEAN MOBILITY WEEK 2004 – 16 September 2004. “SMART MOVES FOR SUSTAINABLE MOBILITY”. The effects of transport on children’s health in Europe: a WHO overview. With the following references:


Stansfeld S, Haines M. Noise exposure from various sources - cognitive effects on children. London, Department of Psychiatry, Barts and the London, Queen Mary's School of Medicine and Dentistry (in paper presented at the WHO technical meeting on dose - effect relationships of noise on health, Bonn, 2002).


Kahn A et al. Noise exposure from various sources: sleep disturbance, dose-effect relationships on children, Brussels, Queen Fabiola University Paediatric Hospital, 2002 (in paper presented at the WHO technical meeting on dose - effect relationships of noise on health, Bonn, September 2002).


A physically active life through everyday transport with a special focus on children and older people and examples and approaches from Europe. Copenhagen, WHO Regional Office for Europe, 2002 (http://www.euro.who.int/document/e75662.pdf).


INTRODUCTION IV
What shall we do about it?

- Different levels for implementation:
  - Individual, Local (groups, schools, enterprises),
    Communal, Sub-national, National, International

- Question of Environmental Justice:
  - How do we reach the disadvantaged?

- Money issue: Road pricing, higher fuel taxes:
  - good, but often not feasible

- Good practices:
  - School mobility concepts, walking school bus, children’s parliament for local planning, …

Only a concerted effort of different actors on various levels will improve the situation. These efforts will more likely be implemented in the living quarters of the wealthy people (pedestrian zones, better public transport, separation of major roads from living quarters through spatial planning etc.). Therefore environmental justice issues should always be considered as well.

Policy makers could influence increasing trends in transport volume by financial incentives (supporting public transport and local scale economies) and by taxing fuel and road use. But many of these methods are not very popular and not easy to implement. Individual townships or even states often cannot afford to raise fuel prices individually.

In spite of these problems many local initiatives have been shown to be successful. Especially the participation of children in the local planning processes often brought about surprisingly clever solutions for local problems.

Examples of good practices (on the “Walking Bus” issue):
http://www.walkingbus.com/
http://www.walktoschool.org.uk/site.htm
http://www.iwalktoschool.org/
http://www.readybrek.co.uk/walktoschool/bus_01.asp
http://www.geocities.com/transport_and_society/walkingbus.html
http://news.bbc.co.uk/2/hi/education/880055.stm

Kids on the move:
Children may be more vulnerable to the effects of air pollution than adults. Children’s lung development is not complete at birth. Lung development proceeds through proliferation of pulmonary alveoli and capillaries until the age of 2 years. Thereafter, the lungs grow through alveolar expansion until 5-8 years of age. Lungs do not complete their growth until full adult stature is reached in adolescence.

Refs:

Picture: ISDE Austria (Bubu Dujmic)
This example from Austria shows the huge success in air pollution abatement for sulphur dioxide (SO₂). SO₂ mostly stems from stationary sources. The transport sector is only responsible for part of the small dark area in the upper line of the figure (together with agriculture). A huge success was made in the industrial areas of Austria like in Linz, the capital of Upper Austria. The other figure shows our results (Neuberger, M; Moshammer, H; Kundi, M (2002): Declining ambient air pollution and lung function improvement in Austrian children. Atmospheric Environment 36: 1733-1736) concerning lung function improvements in children from two areas in Linz: While the children from the area with high SO₂ pollution (that was mainly influenced by industry and witnessed remarkable improvements) showed better lung function over time the other group of children (from a more urban area mostly influenced by road traffic with the indicator pollutant NO₂ unchanged) showed no improvements.

Children and transport

AIR POLLUTION III
Bad news: transport increases!

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP (real growth)</th>
<th>Passenger transport (pkm)</th>
<th>Freight transport (tkm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>2.3</td>
<td>1.7</td>
<td>2.4</td>
</tr>
<tr>
<td>2002</td>
<td>1.1</td>
<td>1.7</td>
<td>0.9</td>
</tr>
</tbody>
</table>


In the urban centres of many developing countries and in parts of China the increase in transport (passengers and goods) is even more frightening.
Children and transport

**AIR POLLUTION IV**
Transport drives air urban pollution

In most of the EU urban settings motorised transport accounts for more than 50% of the fine airborne particles (by combustion and abrasion processes)!

Figure: Vienna Environmental Protection Department. It shows the drop in air pollutants concentration during the Vienna City Marathon when no traffic is allowed on the main road next to the monitoring station „Hietzinger Kai“ (http://www.wien.gv.at/ma22/luft/pdf/iglstatus2000.pdf)

Mind that this monitoring station was very strongly influenced by local high traffic and was not representative for the surrounding living area. But it gives a fine idea of the importance of road traffic for urban air pollution. While generally the contribution of the transport-sector in terms of tons per year emitted varies for different pollutants and regions as a rule of thumb in (Western) European cities (with stringent pollution abatement measures for stationary sources and dense car traffic) motorised traffic accounts for more than 50% of the pollution (both due to burning of fuels and due to abrasion and re-suspension of dust and similar mechanisms). Since many children live in cities in close contact to roads this exposure scenario is of great importance!
Children and transport

AIR POLLUTION V
The impact on health

Künzli et al, 2000

<table>
<thead>
<tr>
<th>Annual impacts in Austria</th>
<th>Due to PM₁₀</th>
<th>Due to transport alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchitis (cases per year, children&lt;15 a)</td>
<td>48000</td>
<td>21000</td>
</tr>
<tr>
<td>Asthma-attacks (attacks per year, &lt;15 a)</td>
<td>94000</td>
<td>40000</td>
</tr>
</tbody>
</table>


There are several studies on lung function decrement due to air pollution. They provide ample evidence that there are acute effects (in time series studies: Just et al., 2002; Ponsonby et al., 2001) and chronic effects (when comparing cohorts: Calderon-Garciduenas et al., 2003; Longhini et al., 2004; Gauderman et al., 2004, 2002, 2000; Horak et al., 2002; Fritz and Herbarth, 2001; Yu et al., 2001; Avol et al., 2001; or longer time intervals: Frye et al., 2003) of air pollution on lung function and lung growth. Studies looked at asthmatic subjects (in panel studies: Delfino et al., 2003; Timonen et al., 2002; for a review see Ward and Ayres, 2004) or on children from the general public (e.g.). The percent changes per 10 µg/m³ are also supported by my own data (yet unpublished) and are backed up by data on adults.

The cancer data are not sufficient to give any dose-effect estimates although some studies found a higher prevalence of childhood leukaemia or other cancers near busy roads or in higher polluted areas. (Feychting, 1998; Harrison, 1999; Nordlinder, 1997; Savitz, 1989).

These tables provide examples on the impact of air pollution on (children’s) health. Künzli used PM10 as an indicator for the overall air pollution mixture. So the upper table shows not only the effect of PM but that of all pollutants combined. The same paper also estimated the impact on Switzerland and France. Similar estimations have been prepared for Germany or the UK.

The second table summarises the findings of various studies on air pollution and children’s health. Not all studies used the same indicator (PM10, PM2.5, black carbon, NO2, ...) for the air pollution. Not all studies controlled for the same confounders. The studies have different designs (cross-sectional, panel studies, time series) and therefore cannot be compared strictly speaking. But the overall picture on the dose-effect association is quite consistent.

The findings of the second table are supported by other studies that found health effects in children living near busy roads (measuring exposure not by analysing a specific pollutant but either measure distance to road or number of cars: Brunekreef, 1997; Ciccone, 1998; Edwards, 1994; Fritz, 2001; Keil, 1996; Osterlee, 1996; Venn, 2001; Wijst, 1993).
Children and transport

AIR POLLUTION VI

More examples

Elementary school (4*-5*), Utah Valley, 1989-1990 (Pope, 1991)

Source: Paediatric Hospital Meyer, Florence
References:
Children and transport

EXAMPLE: ALLERGY

- Atlanta Olympic Games 1996: 40% Reduction of Asthma-Episodes in Children
  Friedman et al., 2001

- Germany (Comparison East - West)
  Former Eastern Germany: originally low transport density, high pollution from stationary sources – Low rates of atopy
  Sanitation of stationary sources, increase in transport density, increase in ultrafine particles – Increase in atopy rates
  Krämer et al., 2000

  in spite of a decrease in respiratory diseases (linked to coarse dust and sulphur dioxide).
  Krämer et al., 1999; Frye et al., 2003

- Pollen and ultrafine (diesel-)particles: Interactions?


Krämer, U; Koch, T; Ranft, U; Ring, J; Behrendt, H (2000): Traffic-related air pollution is associated with atopy in children living in urban areas. Epidemiology 11(1): 64-70

Frye, Christian; Hoelscher, Bernd; Cyrys, Josef; Wjst, Matthias; Wichmann, H.-Erich; Heinrich, Joachim (2003): Association of Lung Function with Declining Ambient Air Pollution. Environmental Health Perspectives 111(3): 383-387

Krämer, U; Behrendt, H; Dolgner, R; Ranft, U; Ring, J; Willer, H; Schlipkoter, HW (1999): Airway diseases and allergies in East and West German children during the first 5 years after reunification: time trends and the impact of sulphur dioxide and total suspended particles. Int J Epidemiol. 28(5): 865-873
Generally the association between air pollution from motorised transport and asthma and allergies is complex. It is well established that children with asthma and allergies of the respiratory tract are especially sensitive to high air pollution episodes and especially to soot and ultra-fine particles: Symptoms-scores, hospital admissions, drug use etc. increase with air pollution.

The introduction of allergic disease is a more complex issue. While it is well established that genetic factors play a major role, the causes for the tremendous increase in atopy prevalence is not so well understood. Immunological mechanisms at an early stage of life (Hygiene-Hypothesis) are important, but fine particles and some irritant gases also contribute when they hit during a vulnerable time window in early life. Epidemiological findings on that are still somewhat contradictory but this could well be because of the fact that this time window is not yet exactly defined.

This slide highlights the atmospheric reactions between pollen (and other natural allergens) and ultra-fine particles. (Photos kindly provided by Herwig Schinko, Linz).

Center: Light microscopy of alder pollen. Their surface is covered by fine particles (soot). The soot in this picture is in red (after electronical transformation of picture data by picture analysis system “LUCIA”). Note the sometimes very high burden of soot on airborne pollen grains. Specimen taken from the Burkard pollen trap situated in the center of Linz.


Raster-electron microscopic pictures of birch (left) and willow (right) (pictures also provided by Schinko).

Take note of the anorganic particles on the pollen surfaces.

Bottom right: raster electron microscopy of soot on a filter.

Soot and pollen interact in the air (especially under damp conditions) or in the airways. Soot sticks to the pollen surface and induces swelling and rupturing of pollen grains. Allergenic pollen structures previously coated by the pollen surface become free in the ruptured pollen particles. Parts of pollen that are substantially smaller than the whole pollen grain remain airborne for a considerably longer period of time and reach deeper parts of the airways upon inhalation.
Get the lead out!

Effect of primary prevention – removing lead from gasoline (petrol) in the USA closely parallels the reduction of average blood lead levels in the American population. This strong correlation illustrated by the graph of falling lead levels is dramatic proof of how a single intervention can profoundly improve population health.

Ref:

• Institute of Medicine, Lead in the Americas: A Call for Action, EPA, 1996
• H T Delves et al.: Blood lead concentrations in United Kingdom have fallen substantially since 1984. BMJ 1996;313:883-884 (5 October)
INDIRECT CONSEQUENCES of air pollution

- Acid rain
- Nitrate in ground water
- Soil contamination
  - Also due to accidents, waste management, spills
- Contamination of foods
  - E.g. heavy metals (Pb, Pt, Pd) increased near busy roads
  - Soot, benzene, PAHs on goods sold in street markets

Photo: street market scene from Athens, Greece (H. Moshammer):
Foodstuff is exposed to traffic fumes the whole day. Children tend to forget to wash fruits or sweets before eating.

Think also of foods sold at petrol stations!
Children and transport

NOISE I

Why might children be susceptible to noise effects?
- Possible Increased risk due to immaturity
  - Increased cochlear susceptibility?
  - In utero effects supported by animal data
- Critical periods in relation to learning
- Lack of developed coping repertoires
- Vulnerable tasks
- Vulnerable settings (schools, home)

What might be the implications of noise effects?
- Lifelong impairment of learning and education
- Short term deficit followed by adaptation

<<READ SLIDE>>
Evidence suggest that exposure to excessive noise and vibration during pregnancy may result in high frequency hearing loss in the newborn, may be associated with prematurity and growth retardation.


The role of the amniotic fluid is not yet defined, nor when and which noises can damage the fetal auditory system (e.g. cochlea). Concern about synergism between exposure to noise and ototoxic drugs remains incompletely defined. There are studies on fetal audition dating from 1932 that explore the reaction of the fetus to external noises but even today this remains incompletely characterized.
References

(a) Evans et al., 1998; Evans et al., 2001; Ising and Ising, 2002;
(b) Cohen, 1981; Evans et al., 1998; Van Kempen et al., 2003
(c) Stansfeld et al., 2000; Haines et al., 2001; Hygge et al., 2002; Stansfeld et al., 2003
(d) Bullinger et al., 1998; Sukowski et al., 2000; Haines et al., 2003; van Kamp et al., 2003
(e) Eberhardt, 1990; Passchier-Vermeer, 2000; Öhrström et al., 2003

Often adults report stronger reactions of noise (sleep disturbance, annoyance) but when subtle biological effects or lasting impacts (learning, psycho-social development, cognitive functions) are studied noise effects in children might even be more severe than in adults.
In spite of many noise abatement measures the number of highly annoyed persons keeps fairly stable in Austria. Transport is by far the most important source of annoying noise. 80 – 90% of those annoyed or highly annoyed by noise claim transport to be the primary source of their annoyance.
Interaction: children score worse at school (school performance, perceived health) when they are exposed to high noise. But in this study only in those children that had a lower birth-weight the impact of transport noise was evident indicating a susceptible subgroup of children.


Abstract:

**Objectives:** To investigate the relation between typical ambient noise levels (highway, rail, road) and multiple mental health indices of school children considering psychosocial and biological risk factors as potential moderators.

**Methods:** With a two stage design strategy (representative sample and extreme sample) two cross sectional samples (n=1280; n=123) of primary school children (age 8–11) were studied. Individual exposure to noise at home was linked with two indices of mental health (self reporting by the child on a standard scale and rating by the teacher of classroom adjustment on a standard scale). Noise exposure was modelled firstly according to Austrian guidelines with the aid of a geographical information system and then calibrated and corrected against measurements from 31 locations. Information on potential confounders and risk factors was collected by mothers and controlled in regression modelling through a hierarchical forward stepping procedure. Interaction terms were also analysed to examine subgroups of children at risk—for example, low birth weight and preterm birth.

**Results:** Noise exposure was significantly associated in both samples with classroom adjustment ratings. Child self reported mental health was significantly linked to ambient noise only in children with a history of early biological risk (low birth weight and preterm birth).

**Conclusions:** Exposure to ambient noise was associated with small decrements in children’s mental health and poorer classroom behaviour. The correlation between mental health and ambient noise is larger in children with early biological risk.
Interaction: In the children’s study, none of the objective exposure indicators (traffic flow, NO$_2$) were associated with respiratory and allergic illnesses. But reported perception of car fumes was associated significantly with recurrent colds, chronic bronchitis and a respiratory index indicative of hyperreactive airways. No association was seen with eczema, pollinosis, acute bronchitis and asthma. Finally children in the exposed area were found to spend fewer hours in outdoor activities (prevalence OR 0.58, 95% confidence interval 0.35 – 0.85). Lercher et al., 1995

Noise is an important source for perception of environmental threats!

Children and transport

WATER POLLUTION

- Transport of dangerous goods & accidents
- Removal of wastes (tires, batteries, old cars)
- Air pollution – acid rain, nitrate
- Oil / Gasoline spills
- Ship freight transport

Source: PAHO, 1998


Water transport tends to be an increasingly important cause of environmental pollution. While legal limits for exhaust emissions of street vehicles get stricter all the time much less control is put on emissions from ships. Spills, cleaning of tanks and ships, anti-fouling agents, etc. pose a threat to the aquatic environment.

The other examples: read them, think of own examples (maybe show a photo from a recent car accident from your region where dangerous goods have been involved)
Photo by Hans-Peter Hutter, Vienna: Much room for cars – little room for children.
Cities are designed for the use of cars, not for the use of children....
Perceived health in children depending on their usual mode of transport to school. Children that are brought to school by car feel less healthy. This cross-sectional study done at our institute (master thesis of E. Braunschmid and J. Jäger, 2004) cannot discern between cause and effect: Are less healthy children more strongly protected or do more independent children score better? In truth both would be the case.

A pilot study investigated the effect of walking to school on psychological aspects of well being, aggression and related aspects of mental health, and was conducted by Elisabeth Braunschmid and Johannes Jäger as part of a master thesis.

The study is based on a survey from 244 youngsters (128 females and 116 males, with a mean age of 11.75 years (range 9 – 16 years). In a first analysis the four dimension of a health questionnaire, somatisation, depression, anxiety as well as aggression/hostility were investigated in relation to the frequency of walking to school.

The figure shows a significant difference in scores related to (mental) health depending on the type of coming to school. Young people who walk always to school showed a lower score in depression and in aggression/hostility than people who never or seldom walk to school. Moreover, they also showed a statistical tendency of less psychosomatic symptoms and have a lower score in anxiety.

Other results from our group also indicate that a more active mode of going to school has positive short term effects on lung function.
Children are highly exposed when playing and working in the streets. Especially working in the streets is usually poorly regulated. It is a problem in developing countries. linked to poor socioeconomic status.

Photos:
Upper right: Copyright (c) 1998 The History Place (tm) All Rights Reserved

Lower left: PHOTO LIBRARY OF THE INTERNATIONAL LABOUR OFFICE (ILO);
Reference no.: c1277; Caption: Young driver's assistant on a "jeepney"; Support: Slide
Photographer: Lissac P.
Country: Philippines; Date taken: 1999; Copyright: ILO
When ever children enter into another mode of mobility the accident rates are soaring. 1997 data from Austria. Figure from Schmidt L; Schmidt GA (2000). Measures to improve transport safety as well as sustainability – two case studies. Paper for the twelfth workshop of ICTCT at Corfu, October 05-07, 2000.
Children and transport

INJURIES II

- Social injustice: distribution of the burden
- Fear and avoidance behaviour
- Loss of room for exercise
- Feelings of loss of power

http://europa.eu.int/comm/mediatheque

It's not only injuries themselves (though harmful they are) but also the reactions that follow injuries and the preventive steps taken that reduce the children's mobility and increase their dependence on adults.
Children and transport

**URBAN ENVIRONMENT I**

**Vicious circles:**
- More traffic > longer ways to reach recreational areas > more transport
- Cars > shopping centres > local shop keepers close > cars
- Highways and major roads hinder walking and cycling
- Pedestrians’ walks lead through dark underground passages etc…
- Less incentives to walk
- No room for playing and meeting with friends

**Tracking of childhood behaviour into adulthood:**
Motor-city children will become motor-city planners

<read slide>
Children and transport

**URBAN ENVIRONMENT II - Map of Greater London**

- Where are the roads? Road density (ward - smoothed)
- Where is the pollution? NO2 Concentrations (ward)
- Where are people dying? SMR for respiratory disease
- Where is the poverty? Deprivation
- Where are the cars? Proportion of households with ≥2 cars

- Environmental justice
- Susceptibility
- Groups of higher risk (SES, age, other environmental burdens)
- Acceptability


Socio-economic disparities in London: High pollution, car density, and accidents rates are evident in the districts with the poorest inhabitants (with less car owners). Our designs of today’s cities are the demographic and political structure of the societies of our children! The way we organise our cities has long lasting impacts not only on the health and safety of our children but strengthens existing injustice and inequalities.
Children and transport

SOCIO-ECONOMIC ASPECTS

Results of the LISA birth cohort study:
Inverse social gradient in exposure to traffic

<table>
<thead>
<tr>
<th>SES (parental education)</th>
<th>(high &gt; low)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Living at main road</td>
<td>16,0</td>
</tr>
<tr>
<td>Regular traffic jam</td>
<td>10,3</td>
</tr>
<tr>
<td>Suffering from traffic noise</td>
<td>12,6</td>
</tr>
<tr>
<td>Frequent truck traffic</td>
<td>24,3</td>
</tr>
</tbody>
</table>

Gabriele Bolte, 2003

Relative risk of mortality associated with an increase in fine particles by educational level

<table>
<thead>
<tr>
<th>RR (95% CI)</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS-Study</td>
<td>1,06 (0,95-1,17)</td>
<td>1,23 (1,07-1,40)</td>
<td>1,35 (1,17-1,56)</td>
</tr>
<tr>
<td>Six Cities</td>
<td>0,97 (0,71-1,34)</td>
<td>1,30 (0,98-1,73)</td>
<td>1,45 (1,13-1,85)</td>
</tr>
</tbody>
</table>

(Health Effects Institute, 2000)

Gabriele Bolte: GSF National Centre for Environment and Health, Germany: „Children's environmental health - why socio-economic factors should be taken into account“. PINCHE Start Conference, 6 and 7 February 2003 in Amsterdam.

The poorer the people the higher the exposure to transport.
The lower the social status the greater the impact of air pollution (example: for the same increase in fine particle concentration).
Children and transport

PSYCHOLOGICAL EFFECTS I

Threatening world:

- Children experience a threatening road environment.
- They get trained to be careful and are told they are weak and have to watch out.
- The playful investigation of space and bodily activity is restricted to video games.
- Only with a mechanical device (motor bike, car) they feel powerful and influential.
- Velocity shows power.
- A strong car is desire and bliss.
- The personality depends on my motorised mobility.
- Aggressiveness when driving underlines independence.
- Loosing the car (due to a minor crash even without harm to health) equals a severe personal loss.

In our society cars are not just a simple and everyday device but carry meanings of power and bliss. This unbalanced attitude begins early in life when children learn that as pedestrians they are weak and vulnerable and that grown-ups can show their superiority with strong and fast cars.

Thus motorization strongly influences behaviour and character of a society. Which world do we want our children to be born in? Is it a society that uses means of transport rationally or according to underlying lust and desire?
Children know what they want and can express their needs.

Five environmental scenarios (pictures of the same road with different traffic density) were presented to the children and they were asked to evaluate each scenario. Several measures were provided: Holidays, chocolate, pocket money. Study was done at the Institute of environmental health, Med. University of Vienna (part from the master thesis of B. Bauer).

An indirect method was chosen by starting from some physical description (by presenting subjects photos of the situations in question) and a hypothetical measure that should be spent in order to approach the respective physical descriptions. As the environmental perspective, five intensities of traffic on a major road were chosen (ranging from “traffic jam” to “no cars at all”) and presented to the subjects.

“Willingness to pay” (WTP) was scaled on three dimensions: an abstract one (holiday-days out from an pool of 30), a concrete one (pieces of chocolate out from 28), and a monetary (Euro out from an pool of 20 from the pocket money). Data were normalised to a poll-range from 0 to 1 for comparison of the answer formats. This study is based on ratings from 30 females and 42 males, with an mean age of 12.2 years (range 11–14).

There is a statistically highly significant difference of WTP for the 5 scenarios. Additionally the different formats differed also, with the highest variation in the holiday format, but the distribution is quit good comparable which could also be interpreted as a sing of a relative high internal consistency besides the clear effect of scenario on the amount of WTP.
No comments: It is clear there is a need to act fast.
Data from:


CO2 production in transport grows faster than in all other sectors.
Also fine particles contribute to the greenhouse gas effect.
Children and transport

CLIMATE CHANGE III

Global Warming:
Not only an effect on distant arctic regions.

- Heat Waves
- Floods
- Vector borne diseases

- Global balance
- Migration

Time-scale: decades, centuries.....

- It’s the future of our children and grandchildren

When dealing with Climate Change (CC) we must think in longer time scales: With increasing temperatures the circumference of the ice shields on the poles will shrink. But at the same time higher temperatures mean more vaporisation and more precipitation. This leads to an increase in the thickness of the ice shields. Nowadays we witness both processes: The total amount of ice stored on the poles thus keeps fairly constant. But as the ice moves to the coast line (as it does in alpine glaciers as well) the thicker masses will eventually (in 100 years) reach the coast and melt away. So the climate change that occurs in our days will lead to a significant increase of freshwater input into the seas only in a 100 years time. This will lead to a more pronounced rise in the sea level but maybe also to changes in the main water currents. It’s our grandchildren’s life we are putting at stake right now!

But even nowadays not only effects on the far arctic regions are evident. Heat waves and floods occur more frequently (and although it is not possible to tell for a single event if it is caused by the climate change the models do predict an increase in the number and magnitude of these events).

Warmer climate causes ticks to persist in higher mountain regions which already now has lead to a wider area infested by tick borne diseases like tick borne encephalitis or borelliosis.

Some regions will suffer more under the climate change. This will lead to social stress, wars, and migration waves.
Diagnose: this is the main job of a doctor. The problem with it is that he
does not bother about the underlying environmental causes when he
only looks at the individual person (child) that is sick.

Therefore scientific work has to compliment the day-to-day curative
activities. There are good examples of sentinel studies where local
doctors can contribute. One important issue is: ASK about exposures,
document “distance to busy roads”, document changes over time
(before and after a new road has been constructed)

Medical doctors are in a position to counsel parents and local policy
makers.
CONCLUSION II

What decision-makers could do

- Put health and children first!
- Consider basic medical knowledge in
  - Urban and spatial planning
  - Siting of schools and kindergartens
  - Planning of playgrounds
- Further education and awareness among
  - Families, teachers, and youth organizations
  - Experts and policy-makers
- Provide good role model
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