OVERVIEW OF THE ENVIRONMENTAL AND HEALTH IMPACTS OF URBAN TRANSPORT IN THE RUSSIAN FEDERATION AND EECCA

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OBJECTIVES

- Summarize the main urban transport trends in East Europe, Caucasus and Central Asia (EECCA)
- Describe their effects on environment and health
  - Emissions of air pollutants (urban air quality, greenhouse gas emissions)
  - Traffic related injuries
  - Noise
  - Unsustainable development of urban areas e.g. urban sprawl affecting quality of life of its citizens and reducing opportunities for physical activity
- Recommend further steps towards healthier and more environmentally friendly urban transport and land-use planning
METHODOLOGY

- Review of main international sources of information available:
  - UNECE Environmental Performance Reviews (EPRs) (include a chapter on environmental health from the WHO/Europe);
  - ECMT and UNECE statistics on transport;
  - Health for All Database of the WHO/Europe;
  - EEA: Assessment of Europe’s environment;
  - Other data-bases, reports and scientific papers published internationally (cf. bibliography)
  - Personal communications from EECCA experts

- Data on the EECCA not always available/ reliable
MAJOR URBAN TRANSPORT TRENDS IN THE EECCA

*Transport volumes are growing rapidly*

- Declined sharply during the early 90s, mainly due to economic recession.
- Currently the number of vehicles is steadily growing, in particular passenger cars.
- Freight transport is also recovering, and freight volume increasing.
- This leads to increase of traffic density and to frequent traffic jams, especially in urban areas.
The majority of the cars are older than 10 years, in relatively poor condition and still using low-quality fuels including leaded petrol.

Second-hand cars are imported from Western Europe.

Technical inspections of vehicles and emission controls are not systematic nor efficient.

There is further room for improving the use financial instruments to manage demand for private motorization, such as taxes and charges on fuels, vehicles and their importation, parking, road use, congestion.
MAJOR URBAN TRANSPORT TRENDS IN THE EECCA

Car ownership in Europe and changes 1999 to 1990

MAJOR URBAN TRANSPORT TRENDS IN THE EECCA

...while public transport is declining

- In the 90’s, responsibility for public transport was transferred to municipalities
- Lack of funds to maintain and upgrade the vehicle fleet, infrastructure and services adequately.
- In recent years, public transport run by private operators has increased
  - E.g., minibuses, which travel on fixed roads, but stop by passengers demand.
Emissions of air pollutants

- Transport is a major source of NO2, CO, benzene, black smoke, lead, PM-10 and PM-2.5, ground level ozone (VOC, NOx).
- Emissions from point sources have decreased in EECCA, mainly due to decline in industrial production.
- Share of transport emissions is rapidly increasing owing to the growth of private motorized transport, the high age of the motor vehicles and the use of low quality leaded fuels.
- Air pollution levels in EECCA remain very high, in particular in urban areas.
ENVIRONMENTAL AND HEALTH EFFECTS

The share of traffic related emission in the total volume of emissions is increasing
ENVIRONMENTAL AND HEALTH EFFECTS

- Health risks of transport-related air pollution*:
  - Increased cardiopulmonary morbidity and mortality
  - Increased risk of development of non-allergic respiratory symptoms;
    - Particulate matters exposure leads to increased prevalence and incidence of bronchitis and cough.
    - Particulate matters and ozone exacerbate asthma attacks
  - Exacerbation of allergic reactions.

- Children are particularly vulnerable to the risks from air pollution
  - Exposure to lead can have neuro-developmental effects.
  - There is evidence for a causal relationship between particulate air pollution and respiratory death in the post-neonatal period
  - Children’s risk of mortality has been calculated to increase by 1% from respiratory causes attributed to exposure to air pollution

* The association is particularly strong in studies where particulate matter is used as an indicator of air pollution
Environmental and Health Effects

Issues with assessment of exposures to air pollution

- Estimates of traffic emissions are calculated on the basis of fuel composition, rather than of monitoring of real exhausts.

- Maximum permissible concentrations (MPCs) in the EECCA are often more stringent than WHO guiding values or EU standards.

- However, monitoring of the air pollutants is insufficient, (including no capacity to fully monitor and analyze the respirable fractions of PM10 or the PM2.5)

- Regulations to reduce emissions of air pollutants from mobile sources are lacking or are not being implemented.
Among children aged 0-4 years, outdoor air pollution (based on PM10) is estimated to be associated to:

- between 0.9% and 2.4% of all-cause children’s deaths*
- between 5.8% and 7.5% of all-cause children’s deaths (**)  

In the Russian Federation:
- Urban air pollution has been associated with about 40,000 excess deaths
- Each inhabitant of cities with the highest levels of suspended particles loses approximately 4 years of life over a mean lifetime.

(*) lower limit of the estimate, based on applying relative risks to acute respiratory infections only
(**) upper limit of the estimate, based on applying relative risks to acute respiratory infections only
Source: WHO 2004
On a yearly basis, exposure to high levels of suspended particles has been associated to:

- Up to 200 premature deaths annually in Moldova
- Ca. 500 deaths premature deaths in Yerevan (Armenia)
- 21% of respiratory diseases and 3.4% of adult mortality in Uzbekistan

The burden of mild mental retardation in children 0-4 years attributable to blood lead has been estimated in the range of 0.9 and 3.1% of all-cause disability adjusted life years.
Energy consumption by transport is increasing - together with the CO2 emissions

- Consumption of non-renewable sources of energy (fossil fuels) emits greenhouse gases.
- In EECCA, transport consumes 17% of total energy use. (EU-15 30%, CEE 22%, RU 18.9%)
- The consumption vary between 28.7% in Tajikistan and 6.0% in Turkmenistan.
- In most EECCA countries, the road transport consumes more than 70% of the energy consumed by the transport sector.
- With the increasing demand for road transport these figures are on the rise.

ENVIRONMENTAL AND HEALTH EFFECTS

Traffic related injuries

- More than 60 000 people die prematurely each year as a result of road traffic injuries in the EECCA countries.
- The average mortality rate from motor vehicle traffic accidents in EECCA is higher than in EU-15 and in CEE.
- The number of road traffic accidents involving injuries per 100 000 population is still lower than EU-15 and CEE.
- Differences regarding mortality and non-fatal injury data may reflect:
  - differences in reporting systems,
  - problems with under-reporting of crashes resulting in non-fatal injuries
  - differences in levels of motorization.
ENVIRONMENTAL AND HEALTH EFFECTS

Traffic related injuries

Standardized mortality rates from motor vehicle traffic accidents per 100,000 population

Road traffic accidents with injuries per 100,000 population

Traffic related injuries

- The highest injury rates in road traffic accidents in 2000 were reported by the Russian Federation, Kazakhstan, Moldova, Ukraine.
- The majority of accidents occurs in built-up areas.
- The involvement of alcohol in road traffic accidents is higher in Russian Federation, than in other EECCA countries.
- Children, elderly, pedestrians are at greater risk of mortality.
  - In 2001 in Russian Federation, 44.1% of killed in road traffic accidents were pedestrians.
- The outcomes of motor vehicle accidents are more severe in EECCA, comparing with average for the ECMT region.
ENVIRONMENTAL AND HEALTH EFFECTS

Traffic related injuries

- Main risk factors for pedestrians:
  - excess speeds
  - low quality of roads and infrastructure
  - lack of pedestrian crossroads and bypasses
  - violations of traffic safety rules
  - inadequate street lightening
  - use of residential roads by trucks
  - inadequate medical assistance to road traffic victims
Transport-related noise in urban settings

• Noise pollution from transport is steadily increasing. One of the main contributors is the growing motor vehicle fleet.
  - In Moscow 70-80% of the population lives in conditions of increased noise pollution
  - In Armenia transport activities account for approximately 90% of the noise emissions in urban areas. 30% of the Yerevan’s population is exposed to noise levels exceeding 65 dB.
  - In Minsk, noise levels around transport arteries reach up to 83 dB, and about 60% of public complaints concerning urban noise are directed towards traffic noise.
  - In Tbilisi, noise measurements showed levels of 70-80 dB in some residential areas.
  - Noise levels in buildings around main transport arteries in big Ukrainian cities are at levels 85 dB, much higher than allowable standards (65 dB).
  - In Uzbekistan, in some areas noise reaches levels of up to 70-80 dB.
ENVIRONMENTAL AND HEALTH EFFECTS

Un-integrated urban transport and land-use planning aggravate the environmental and health problems in urban areas:

- Dispersed city development and urban sprawl lead to the need of further and longer trips to reach jobs, services and leisure facilities.
- Traditionally dense public transport networks in the EECCA are being replaced by infrastructure to satisfy the growing demand for private road transport.
- Building new roads and parking areas in urban areas:
  - Prompts further dependency on car use increasing air pollution, noise and accidents.
  - Makes public transport loose further ground.
  - Increases congestion, which reduces the mobility of citizens.
  - Takes up more space.
  - Reduces the opportunities for physical activity (walking and cycling) and leisure (green areas etc.)
Risks/effects related to reduced levels of physical activity

- Opportunities for physical activity practiced through walking and cycling have decreased.
- Physical inactivity increases risks of cardiovascular diseases, diabetes type II, hypertension, some cancers, and the risks related to overweight and obesity.
- A WHO report has estimated that in EECCA, between one fourth and one fifth of the population is physically inactive. Mortality attributable to physical inactivity could be in the range of 8-10 % of total mortality.
EECCA countries should consider developing and implementing national strategies for the integration of environmental and health considerations into transport policies and urban planning, through:

- **Carrying out environmental and health impact assessments of transport projects and policies (SEA,EIA,HIA)**
  - In compliance with the UNECE Protocol on Strategic Environmental Assessment;

- **Participating in the implementation of**
  - the **Transport, Health and Environment Pan-European Programme (THE PEP)**; [www.thepep.org](http://www.thepep.org)
  - the **Children’s Environment and Health Action Plan**.
RECOMMENDATIONS - 2

_The following issues have to be addressed on a priority basis:_

1. Reducing air pollution, notably through
   • Phasing out lead (in compliance with the Heavy Metals Protocol of the UNECE Air Pollution Convention)
   • Improving the quality of fuels
   • Improving emission control techniques
   • Improving vehicle inspections
   • Implementing new emission limits
   • Upgrading monitoring systems to improve exposure assessment (e.g. to particulate matter)

2. Investing in maintaining and upgrading the public transport infrastructure, fleet and services
3. Further economic evaluation of the possible effects of alternative transport and urban development options and further use of economic instruments to manage the demand for transport.

4. Implementing effective measures for reducing and preventing traffic-related accidents and injuries.

5. Improving the availability and quality of data to support informed and evidence-based decision making.