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and Environment Pan-European Programme****Eighteenth session**

Geneva, 25–27 November 2020

Item 5 of the provisional agenda

**Preparation of the Fifth High-level Meeting on Transport, Health and  
Environment****Facts and figures on the Transport, Health and Environment  
Pan-European Programme****Preparatory note by the Ministry of Infrastructure and Water  
Management, the Netherlands***Summary*

At its seventeenth session (Geneva, 21–23 October 2019), the Steering Committee of the Transport, Health and Environment Pan-European Programme (THE PEP) supported the continuation of the preparation of a brochure on the major topics related to transport, health and environment as one of the outcomes of the Fifth High-level Meeting on Transport, Health and Environment. It emphasized that the brochure should be short, visually attractive and easily understandable. The Netherlands took the lead in the preparation of the brochure (ECE/AC.21/SC/2019/2–EUPCR1814179/2.1/THE PEP SC/2, para. 48).

At an extraordinary meeting of THE PEP (Geneva (online), 22 April 2020) it was agreed that the brochure on THE PEP would also include elements on the impact of the coronavirus disease (COVID-19) pandemic on transport, health and environment.

Delegates from the Netherlands and its National Institute for Public Health and the Environment presented an annotated outline of the brochure at the thirty-seventh meeting of the Bureau of THE PEP Steering Committee (Geneva (online), 29 June 2020) and at a preparatory meeting to the Fifth High-level Meeting on Transport, Health and Environment (Geneva (online), 30 June 2020). The Bureau requested the secretariat to present the draft brochure as an official document for the eighteenth session of THE PEP Steering Committee.<sup>a</sup>



The present document was submitted by the National Institute to the secretariat. It is an expanded outline of the draft brochure and is based on data collected by the National Institute in collaboration with several experts from member States.

<sup>a</sup> See Report of the meeting, para. 9 (h), available at [https://thepep.unece.org/sites/default/files/2020-07/Draft%20report%20Bureau%20meeting%2029%20June\\_for%20the%20web.pdf](https://thepep.unece.org/sites/default/files/2020-07/Draft%20report%20Bureau%20meeting%2029%20June_for%20the%20web.pdf).

## Background

1. At its seventeenth session (Geneva, 21–23 October 2019), the Steering Committee of the Transport, Health and Environment Pan-European Programme (THE PEP) supported the continuation of the preparation of a brochure on the major topics related to transport, health and environment as one of the outcomes of the Fifth High-level Meeting on Transport, Health and Environment. It emphasized that the “facts and figures” brochure should be short, visually attractive and easily understandable. The Netherlands took the lead in the preparation of the brochure (ECE/AC.21/SC/2019/2–EUPCR1814179/2.1/THE PEP SC/2, para. 48).
2. At an extraordinary meeting of THE PEP (Geneva (online), 22 April 2020) it was agreed that the brochure on THE PEP facts and figures should also include elements on the impact of the coronavirus disease (COVID-19) pandemic on transport, health and environment.<sup>1</sup>
3. Delegates from the Netherlands and its National Institute for Public Health and the Environment presented an annotated outline of the brochure at the thirty-seventh meeting of the Bureau of THE PEP Steering Committee (Geneva (online), 29 June 2020)<sup>2</sup> and at a preparatory meeting to the Fifth High-level Meeting (Geneva (online), 30 June 2020).<sup>3</sup> The Bureau requested the secretariat to present the draft brochure as an official document for the eighteenth session of THE PEP Steering Committee.<sup>4</sup>
4. Overall, the brochure addresses the question of how clean and environmentally friendly our mobility and transport are today. The brochure will introduce THE PEP and explain the importance of the brochure in supporting a move together towards cleaner, healthier and more environmentally friendly mobility. It will provide the basis for policies and cooperation to accelerate towards low and zero emissions and healthy mobility and transport in the decade to come. It will also explain the context of changes in mobility due to COVID-19.
5. The brochure is intended for a wide range of target groups, notably senior level policymakers from multiple fields and backgrounds.
6. The present document was submitted by the National Institute to the secretariat. It is an expanded outline of the draft brochure and is based on data collected by the National Institute in collaboration with several experts from member States. This version of the brochure defines the table of contents, storyline, first messages and some sources. Only complete references have been included below.<sup>5</sup> The aim of this document is to facilitate further discussion on the desired content of the brochure by the Steering Committee at the present session and the collection of data, ideas and messages among the 56 member States of the United Nations Economic Commission for Europe (ECE) as input to the final version.
7. The remainder of the document is structured as the brochure is expected to be structured, beginning with an introduction (section I), a short section on transport and mobility in the region (section II), a core section on the health and environmental effects of transport and mobility, looking at several themes (section III), and then a short section on understanding regional variations (section IV) and a conclusion (section V).

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<sup>1</sup> See Report of the extraordinary meeting of the Transport, Health and Environment Pan-European Programme (THE PEP), para. 22 (b). Available at <https://thepep.unece.org/sites/default/files/2020-06/Report%20special%20THE%20PEP%20meeting%20clean%20for%20web.pdf>.

<sup>2</sup> See Report of the meeting, para. 18 (b), available at [https://thepep.unece.org/sites/default/files/2020-07/Draft%20report%20Bureau%20meeting%2029%20June\\_for%20the%20web.pdf](https://thepep.unece.org/sites/default/files/2020-07/Draft%20report%20Bureau%20meeting%2029%20June_for%20the%20web.pdf).

<sup>3</sup> See Report of the Preparatory meeting for the Fifth High-level Meeting on Transport, Health and Environment, para. 9. Available at <https://thepep.unece.org/sites/default/files/2020-07/Draft%20report%20Preparatory%20meeting%2030%20June%20for%20the%20web.pdf>.

<sup>4</sup> See Report of the meeting, para. 9 (h), available at [https://thepep.unece.org/sites/default/files/2020-07/Draft%20report%20Bureau%20meeting%2029%20June\\_for%20the%20web.pdf](https://thepep.unece.org/sites/default/files/2020-07/Draft%20report%20Bureau%20meeting%2029%20June_for%20the%20web.pdf).

<sup>5</sup> Incomplete references have not been included in this document; an informal document with references will be provided to the Steering Committee.

8. In addition, two annexes to the brochure are foreseen, one providing information on additional thematic indicators, and the other providing more detailed information on the region covered.

## **I. Introduction**

### **A. A new decade, a new reality, a new future**

9. A temporary drop in air pollution, less noise on the streets, the rediscovery of walking and cycling. These are just some of the early positive effects on traffic of the pandemic, despite its devastating impact. These positive effects encourage and allow us to rethink the way we travel and commute.

10. Traffic is the cause of several environmental, economic, social and health challenges. Moreover, under the influence of a global increase in population and welfare, the sector will continue to grow. This makes the need to transform the sector of transport and mobility for the better both urgent and imminent.

11. The current crisis shows the constraints of our existing transport and mobility system, which is not sustainable. The pandemic shows the sense of urgency regarding ambition and action in directions like the Sustainable Development Goals and the Paris Agreement. The aim is to build a cleaner, healthier and more prosperous system for our transport and mobility, embracing: net zero effects; a balanced sustainable system, in which accessibility, efficiency, environment and safety are equally valued; and a system that improves liveable residential areas and encourages its citizens to live a healthier lifestyle.

12. As a result of COVID-19, there are new developments in the living environment and changes that had already started are being accelerated. Of particular importance are densification in urban areas, climate change, changes in mobility patterns and changes in our food system. By embracing a new reality, all actors in the transport and mobility sector have the task of ending the burden of the sector's negative aspects. As a part of this new reality:

- (a) Information on health and environment induces and directs improvement in the sector to make it healthier and more resilient;
- (b) Clean technologies and solutions are on the horizon, ready for market;
- (c) Consumers are willing to make more conscious choices;
- (d) Greening our transport and mobility offers our economies a smart recovery and creates opportunities for green investments;
- (e) Integrated policy development becomes the main precondition for sustainable development.

### **B. Moving towards a new reality**

13. We need to be pragmatic. Nobody can achieve this new reality alone and it will take a lot of time, effort and resources to make progress. To accelerate, we need to take into account the different discourses, languages and approaches. We need good governance and patience, the best science, smart entrepreneurs and critical citizens. We must communicate and exchange our ideas and work together to find solutions within transport, health and environment, but also with related sectors like energy, information and communications technology and city planning.

14. The brochure is a stepping stone for all who want to move forward: a compact and clear point of reference to start answering the question "How clean and environmentally friendly is our mobility and transport in the region today?". It gives an insight into our current system for transport and mobility in the ECE region, its impact on our health and the environment and an overview of the economic, social, cultural and geographical context. The brochure sets the scene, highlighting the position of health and the environment in transport today as one of the drivers for the transition of the transport sector. It will help decision

makers to understand and to work together on accelerating the transition towards a net zero effect system.

15. The region can take the lead in building a new future for our mobility and transport, benefiting our health, environment and prosperity at the same time. ECE and the World Health Organization (WHO) Regional Office for Europe offer through THE PEP a programme that brings 56 countries in the ECE region together. THE PEP's ambition is to accelerate the transformation of the transport sector and make that change irreversible, guiding a new THE PEP in the decade 2020–2030, seizing opportunities and bringing together in joint efforts knowledge from different spheres – the worlds of transport, health and environment, the work of transport economists, environmentalist, health and behaviour specialists; and the ambitions of politicians, policymakers, entrepreneurs and citizens – and the will to change.

16. A new reality offers opportunities and possibilities. So let us face the challenges together, by knowing the facts and understanding the differences, to spearhead cleaner solutions.

## II. Transport and mobility in the region

17. Data on the modal split of road and urban transport in countries are needed to understand the challenges across and differences within the region, for example on:

- (a) Passenger cars (numbers, km travelled, ownership, etc.);
- (b) Public transport buses and trams (numbers, km travelled, etc.);
- (c) Trucks and vans (numbers, km travelled, etc.);
- (d) Motorcycles and mopeds (numbers, km travelled, etc.);
- (e) Walking and cycling (numbers, km travelled, etc.);
- (f) Fuel consumption of internal combustion engines (petrol, diesel, gas and biogas) and electric vehicles;
- (g) Vehicles (average age of vehicles, etc.);
- (h) Age of car fleet.<sup>6</sup>

18. Ideally data from the whole region would be collected. Unfortunately, this is extremely difficult due to the lack of relevant data. Some data sources have been located, some others are specific to the situation in the Netherlands, while an Organization for Economic Cooperation and Development (OECD) database contains multiple countries.

19. The present section sets out further information on data and statistics on km travelled by passengers and freight and numbers of vehicles, for instance.

### A. Kilometres travelled – passengers

20. OECD collects data on km travelled in passenger cars, rail and buses and coaches.<sup>7</sup> Rail includes both national and local railway networks, and perhaps tramways and metros. Eurostat, the statistical office of the European Union, collects similar statistics.<sup>8</sup>

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<sup>6</sup> Only data from the Netherlands are available at present.

<sup>7</sup> See [https://stats.oecd.org/Index.aspx?DataSetCode=ITF\\_CQ](https://stats.oecd.org/Index.aspx?DataSetCode=ITF_CQ), accessed through the rubric “Themes”, then “Transport”, “Transport measurement”, “Passenger transport” and “Inland passenger transport”. Passenger cars seem to include both driver and passenger.

<sup>8</sup> See <https://ec.europa.eu/eurostat/web/transport/data/database>, accessed through the rubric “European Commission”, then “Eurostat”, “Transport”, “Data” and “Database”.

21. For the Netherlands, good statistics are available for all transport modes, including walking and cycling, measured in a uniform way.<sup>9</sup> The share of public transport is relatively low in the Netherlands because of the widespread use of bicycles. The share of clean transport – public transport, cycling and walking – is relatively high when compared internationally. Whether or not cycling and walking are included makes a lot of difference in the comparison.

22. No statistics were found to be available for km travelled by tram. Statistics are only available for all buses, both public and private coaches, and all railways. There are no international statistics for km travelled walking and cycling.

## **B. Kilometres travelled – freight**

23. No international statistics for freight km travelled are available, but instead for ton-km.<sup>10</sup> However, Eurostat provides statistics on vehicle km for lorries and road trains.<sup>11</sup> It is unclear how to account for international freight transport.

## **C. Numbers**

24. OECD gathers statistics on the numbers of pieces of rail and road equipment, with several detailed breakdowns, such as vehicle type, weight, age and power (diesel, petrol or electric).<sup>12</sup> Similar statistics are gathered by Eurostat.<sup>13</sup> It may also be worthwhile looking at combustion-engine car phase-out announcements across Europe.<sup>14</sup>

# **III. Health and environmental effects of transport and mobility**

25. The present section provides an overview of themes covering the six main health and environmental challenges of transport and mobility.

26. Based on previous work of THE PEP, challenges related to transport, health and environment in the pan-European region were identified and, during the seventeenth session of THE PEP Steering Committee, it was decided to collect the best available data for the major challenges and prepare a short brochure (ECE/AC.21/SC/2019/2–EUPCR1814179/2.1/THE PEP SC/2, para. 48). These major challenges are air pollution, traffic noise, greenhouse gas emissions, road traffic injuries, physical activity and accessibility. These six themes are also identified in the draft declaration of the Fifth High-level Meeting on Transport, Health and Environment (ECE/AC.21/SC/2020/3–EUPCR2016697/5.3/3) as the key challenges.

27. For each of the six themes, three questions are to be answered:

- (a) What is it?
- (b) What do we know today?
- (c) What is the greatest challenge to change?

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<sup>9</sup> See <https://www.kimnet.nl/mobiliteitsbeeld/mobiliteitsbeeld-2019#/rapport/0>, accessed through the rubric “Inhoudsopgave” then “Kerngegevens” (available in Dutch only).

<sup>10</sup> For OECD data, see [https://stats.oecd.org/Index.aspx?DataSetCode=ITF\\_CQ](https://stats.oecd.org/Index.aspx?DataSetCode=ITF_CQ), accessed through the rubric “Themes”, then “Transport”, “Transport measurement”, “Freight transport” and “Inland freight transport”.

<sup>11</sup> Click on the rubric “Road transport”, then “Road freight transport measurement” and “Total road freight transport” in the Eurostat transport database identified above.

<sup>12</sup> See [https://stats.oecd.org/Index.aspx?DataSetCode=ITF\\_CQ](https://stats.oecd.org/Index.aspx?DataSetCode=ITF_CQ), accessed through the rubric Themes, then Transport and Data from ITF/Eurostat/UNECE questionnaire.

<sup>13</sup> See <https://ec.europa.eu/eurostat/web/transport/data/database>.

<sup>14</sup> Wappelhorst, S., “The end of the road? An overview of combustion-engine car phase-out announcements across Europe”, Briefing (International Council on Clean Transportation, May 2020), available at <https://theicct.org/sites/default/files/publications/Combustion-engine-phase-out-briefing-may11.2020.pdf>.

28. In this section, information on one key indicator will be shown for each of these themes. Facts and figures on additional indicators for each theme will be presented in an annex.

## A. Air pollution

29. Participants in an informal meeting of air pollution experts (Utrecht, Netherlands (online), 28 July 2020) mentioned the following key statements and suggestions for indicators. This section needs to be revised in line with comments recorded in the minutes of that meeting.<sup>15</sup> Additional sources of information may also be considered.

### Key statements

30. The following statements have been suggested:

- (a) The overall volume of air pollutants has decreased. However, safe levels have not yet been reached. Transport is an important source, especially within urban areas;
- (b) Air pollution poses one of the largest health risks: 9 out of 10 people breathe air that exceeds the WHO Air Quality Guidelines threshold limits;
- (c) Air pollution is not only a health but also a socioeconomic problem because of the high costs for society. Transport is a very important source of air pollution;
- (d) If we look at highly exposed people, then transport is the most important source. This is not reflected in average levels of air pollution;
- (e) Air pollution and its health impact are different for different modes of transport, fuel types and quality of combustion and may vary in different subregions;
- (f) The location of roads and cities is not the only obvious topic; deprivation is also an important issue. Inequality has received more attention in recent years;
- (g) Do not focus only on particulate matter and mortality;
- (h) Also take into account nitrogen dioxide (NO<sub>2</sub>) and black smoke, morbidity and the costs of air pollution.

### Suggested indicators

31. The following air pollution indicators have been suggested:

- (a) Emission of particulate matter (for example, PM<sub>2.5</sub>, which is particulate matter under 2.5 microns in diameter) and/or NO<sub>2</sub>; total traffic contribution, per inhabitant, per km driven; and total per country in 2017. The contribution of road transport, as well as the contribution per mode of transport (combustion vehicles) need to be compiled;
- (b) Concentration of particulate matter (for example, PM<sub>2.5</sub>) and/or NO<sub>2</sub>; concentration mass per m<sup>3</sup> (total traffic contribution, per inhabitant, per km driven); and in 2017. The contribution of road transport, as well as contribution per mode of transport (combustion vehicles) need to be compiled (which is more time-consuming for concentrations than for emissions);
- (c) Can be extended with other air pollutants (for example, black carbon and PM<sub>10</sub>).

32. The following health indicators have been suggested:

- (a) Long-term exposure to air pollutants; reduction of life expectancy (months); premature death; and years of life lost, per year, per km driven, per 100,000 inhabitants;
- (b) Similarly, an exposure indicator with the assumption that lower emissions are healthier;

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<sup>15</sup> The minutes of the thematic expert meetings referred to in this document are available online on a password-protected website, <https://platform.healthandsafety.nl/>.

(c) Health impact, which is the most relevant indicator. However, it is difficult to include NO<sub>2</sub> and black carbon in health impact calculations. Hopefully, WHO can give guidance on the issue;

(d) Asthma related to air pollution, if possible, and days of hospitalization. There are tools available to calculate such indicators (for example, in the Netherlands).

33. The choice of health indicator depends on the target group. The burden of disease related to PM<sub>2.5</sub> is a good indicator for influencing politicians and specialists, but is not suitable for influencing the public. THE PEP publication should be for the public as well. Indicators targeting a specific person would be more helpful, for example, the number of hours spent in a passenger car. Our target is policymakers; however, politicians are driven by the public. If we can explain the issue to the public, they will put pressure on politicians. Researchers from the Netherlands compared driving a car with smoking cigarettes, though that might be overly dramatic. Disability-adjusted life years describe effects in an objective way, showing the large burden at the same time. Instead of years of life lost or burden of disease, individual risks may be more suitable for communication.

34. The following other types of indicators – which might motivate individuals to get out of their cars (besides their exposure to ambient pollution levels) –, have been suggested:<sup>16</sup>

(a) The number of days that restrictions are imposed on car use because of exceeding pollution limits, likely not regional coverage but a possible case study;

(b) The number of hours in a car that are affecting individuals.

#### **Environmental health inequities<sup>17</sup>**

35. Air pollution is a major environmental challenge that often seriously affects socially disadvantaged areas more than others and can be associated with increased exposure levels among socially disadvantaged populations. Although air pollution levels have decreased over recent years, inequalities in exposure persist. The most important drivers for inequalities in air pollution exposure are:

(a) Land use and urbanization, because people with lower socioeconomic status tend to live and work in areas with higher levels of traffic and industrial activity, leading to higher levels of air pollution;

(b) Housing conditions, as low-income groups tend to live closer to work in city centres or industrial areas due to better access and/or lower costs;

(c) Socioeconomic disparities. Employment status, education level and income can affect people's underlying health conditions, influencing their sensitivity and, therefore, vulnerability to the health effects of air pollution. These effects tend to be stronger among populations with lower socioeconomic status as a result of long-term health conditions, poor housing, inadequate diet and stress.<sup>18</sup>

36. There is good evidence from ecological studies that higher deprivation indices and low economic position are usually linked with higher levels of pollutants such as particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) and nitrogen oxides (NO<sub>x</sub>). The studies using data at the individual level are mainly focused on pregnant women or new mothers; in these studies, deprivation and ethnicity are more likely to be linked to higher exposures to poor air quality.

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<sup>16</sup> While also looking at the opportunity that people have to benefit from not being in their cars.

<sup>17</sup> See also section IV.E below.

<sup>18</sup> European Commission, Science for Environment Policy In-depth Report, No. 13, "Links between noise and air pollution and socioeconomic status" (Luxembourg, Publications Office of the European Union, August 2016); and Barnes J. and others, "Qualitative assessment of links between exposure to noise and air pollution and socioeconomic status", *WIT Transactions on Ecology and the Environment*, vol. 230 (2018), pp. 15–25; and National Institute for Public Health and the Environment, *Cycling in the Netherlands*, 2018, available at [https://www.sportenbewegenincijfers.nl/sites/default/files/2019-02/011047\\_Factsheet%20Fietsen\\_V3\\_TG.pdf](https://www.sportenbewegenincijfers.nl/sites/default/files/2019-02/011047_Factsheet%20Fietsen_V3_TG.pdf).



37. The table below indicates that PM<sub>2.5</sub> exposure tends to be higher in more disadvantaged areas; this is valid at all spatial scales and for most of the indicators of disadvantage considered. When examining small regions for specific diagnosis (Nomenclature of territorial units for statistics 3)<sup>19</sup>, more disadvantaged regions according to gross domestic product (GDP) per capita tend to have higher PM<sub>2.5</sub> exposure (an exposure ratio of 1.3:1, indicating 30 per cent higher exposure levels in the most disadvantaged regions). See also figure I below.

### Perspectives

38. Suggested mitigation actions for exposure to air pollution in the transport sector are:<sup>20</sup>

(a) Road traffic management, such as a shift in transport mode to walking and cycling, improving public transport or the introduction of low-emission zones in city centres – this would help to reduce exposure to air pollution where socially vulnerable groups tend to live;

(b) Improved spatial and land-use planning (for instance, creating multipolar cities or greening public spaces) to reduce emissions of air pollutants and exposure of most deprived groups, reducing socioeconomic and exposure contrasts;

(c) Defining measures in short-term action plans to reduce concentrations in places where deprived people live or spend their time.

### PM<sub>2.5</sub> exposure by social disadvantage indicators at NUTS 3 region, NUTS 2 region and city levels.

Spatial scale	Social indicator	Exposure difference between most disadvantaged and least disadvantaged quintile (µg/m <sup>3</sup> )					
		Exposure ratio of most disadvantaged: least disadvantaged quintile			2007–2008	2010–2011	2013–2014
		2007–2008	2010–2011	2013–2014	2007–2008	2010–2011	2013–2014
NUTS 3 region	Per capita GDP	1.31:1	1.30:1	1.33:1	4.6	4.7	4.3
NUTS 2 region	Percentage of people without higher education	1.45:1	1.36:1	1.46:1	5.8	5.0	5.2
	Household income	1.29:1	1.39:1	1.37:1	4.5	6.1	5.0
	Long-term unemployment rate	1.39:1	1.24:1	1.29:1	5.1	3.3	3.3
				<b>2010–2012</b>			<b>2010–2012</b>
Urban Audit city	Percentage of people without higher education			1.20:1			2.9
	Unemployment rate			1.01:1			0.1

Notes: An exposure ratio value >1:1 indicates that the most disadvantaged regions have higher exposure levels than the least disadvantaged ones; a value <1:1 indicates the opposite.

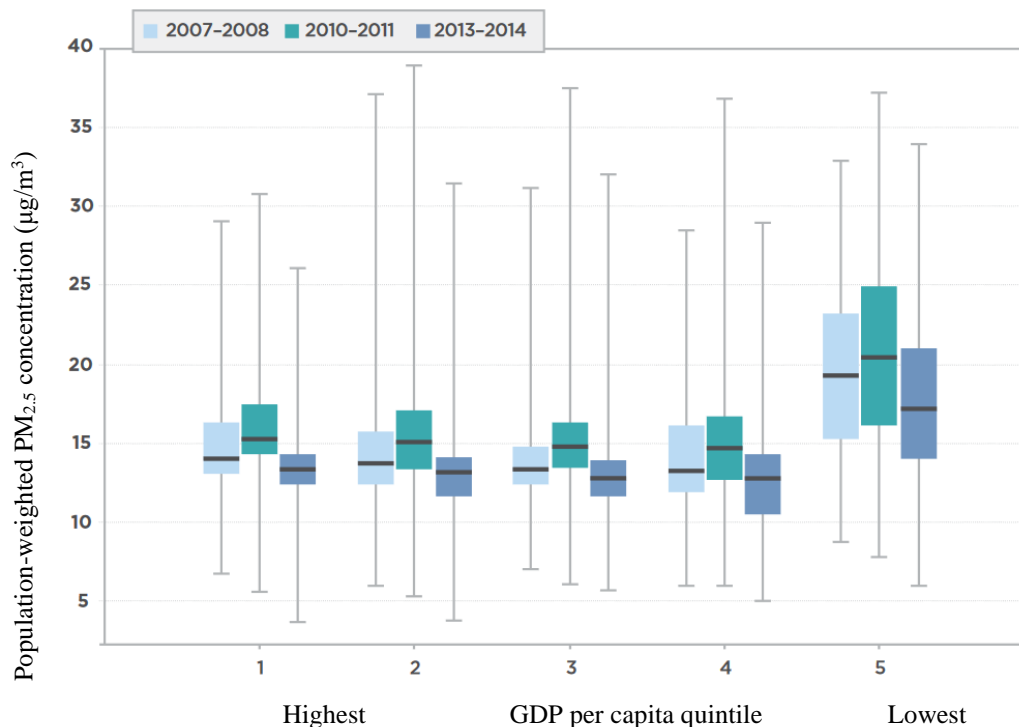
Source: WHO Regional Office for Europe, *Environmental health inequalities in Europe. Second assessment report* (Copenhagen, 2019), based on European Environment Information and Observation

<sup>19</sup> The Nomenclature of territorial units for statistics (NUTS) is a hierarchical system for dividing up the economic territory of the European Union for statistical studies, with NUTS 1 being major socioeconomic regions, NUTS 2 basic regions for the application of regional policies and NUTS 3 small regions for specific diagnoses.

<sup>20</sup> Proposals by WHO.

Network/European Topic Centre on Air Pollution and Climate Change Mitigation Report, No. 7/2018, “Analysis of air pollution and noise and social deprivation” (Bilthoven, Netherlands, October 2018).<sup>21</sup>

Figure I  
**PM<sub>2.5</sub> exposure by GDP per capita across NUTS 3 regions over time.**



Source: WHO Regional Office for Europe, *Environmental health inequalities in Europe. Second assessment report* (Copenhagen, 2019), based on European Environment Information and Observation Network/European Topic Centre on Air Pollution and Climate Change Mitigation Report, No. 7/2018, “Analysis of air pollution and noise and social deprivation” (Bilthoven, Netherlands, October 2018).

## B. Traffic noise

39. Participants in an informal meeting of traffic noise experts (Utrecht, Netherlands (online), 30 July 2020) mentioned the following key statements and suggestions for indicators. This section needs to be revised in line with comments recorded in the minutes of that meeting.<sup>22</sup> Additional sources of information may also be considered.

### Key statements

40. The following statements have been suggested:

- (a) Noise is one of the major environmental problems in Europe. At least 50 per cent of areas have noise level problems that affect health. It is a particular problem in urban areas;
- (b) Noise is a serious issue. Even if you are used to noise, it is present and there are still health effects. Emphasizing its importance can help in future to collect data. Many countries do not take noise seriously and people should understand the negative effects of noise;
- (c) The number of complaints does not necessarily reflect the health effects;

<sup>21</sup> Available at <https://www.eea.europa.eu/data-and-maps/data/external/analysis-of-air-pollution-and-1>.

<sup>22</sup> The minutes of the thematic expert meetings referred to in this document are available online on a password-protected website, <https://platform.healthandsafety.nl/>.

- (d) Apart from the annoyance, there is a risk of cardiovascular disease;
- (e) Environmental noise guidelines should be followed with specific recommendations for road traffic noise. A limit of 53 decibels (dB) day-evening-night level (Lden) could be used for messaging. At night, the limit should be reduced to 45 dB and the impact on health shown in detail;
- (f) Noise exposure needs to be reduced by source measures with a focus on road traffic noise, although rail and aircraft noise are also important;
- (g) For road traffic noise, mitigating measures for air quality are also effective for noise;
- (h) Noise from road traffic is an important source and produces a strong negative health effect. The noise map from the European Union Environmental Noise Directive<sup>23</sup> is only for agglomerations and covers 5 dB and lower, whereas the WHO guidelines<sup>24</sup> start at 53 dB; this needs to be considered. Limits should not be considered as new restrictions and advice should be focused more on improvement of health: make sure the problem is not getting worse;
- (i) A road traffic noise limit is a point on the horizon to reach to prevent the situation getting worse;
- (j) Measures for sources are important and can be combined with air pollution measures, but there is still not enough systemic evidence (lack of data) that noise measures improve people's health.

#### **Suggested indicators**

41. The following indicators have been suggested:

- (a) The number of people exposed to average Lden greater than or equal to 55 dB and number of people exposed to night-time noise level (Lnight) greater than or equal to 50 dB;
- (b) The number of people exposed to below 53 dB Lden or 45 dB Lnight and impact on health. No detailed data from whole region, but mainly European Environment Agency member countries; reference should be made to guidance levels;
- (c) European Union broad work on noise maps is the best we have but only tells part of the story and only for agglomerations and high noise levels. A health impact assessment has also been carried out;
- (d) The number of people exposed to above 55 dB Lden, broadly available at European Union level mainly; and the number exposed above the WHO level during both day and night. A choice needs to be made as to which health effect is shown, for example, annoyance or sleep disturbance. Possibly, the first indicator should be chosen for exposure and the second for health effects. Most data are above 55 dB Lden but a method has been developed to model data for lower noise levels, though the method is not official and is based on extrapolation;
- (e) Sleep disturbance, which is a good indicator (self-reporting). Eurostat collects information on noise in neighbourhoods, which might be a useful indicator. This indicator measures something other than annoyance.

#### **Environmental health inequities**

42. Inequalities in complaints about noise from neighbours or from the street are evident among different income levels: poorer people show a higher prevalence, especially in Euro

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<sup>23</sup> Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise, *Official Journal of the European Communities*, L 189 (2002), pp. 12–25.

<sup>24</sup> World Health Organization (WHO) Regional Office for Europe, *Environmental Noise Guidelines for the European Region* (Copenhagen, 2018), p. 30

1 countries. The same pattern of inequalities in self-reported noise annoyance is observable for urban and for rural regions in Euro 2 countries.

43. Although the prevalence of self-reported noise annoyance due to noise from neighbours or from the street has decreased slightly over recent years in Euro 1 and Euro 2 countries, absolute inequalities have increased – especially in Euro 1 countries.

### Health relevance

44. At least 100 million people in the European Union are affected by road traffic noise, and in Western Europe at least 1.6 million years of healthy life are lost because of road traffic noise. The effects of noise can be physiological as well as psychological. There is also convincing evidence of the non-auditory effects of noise on adult health, highlighting the substantial public health impact of this type of environmental pollution.<sup>25</sup>

45. Epidemiological studies present inconsistent results on the distribution of noise exposure between different social groups. Studies using indicators of material deprivation or deprivation indices showed higher environmental noise exposure levels in groups with lower socioeconomic positions.<sup>26</sup>

46. Studies show mixed results for affluent people, who may be more exposed as they prioritize a central living location to avoid commuting.<sup>27</sup> More advantaged individuals are less likely to suffer from noise-related health impacts, even if they live in noisier areas.<sup>28</sup> Health inequalities may therefore arise not only as a result of exposure differentials but also of differences in vulnerability.

47. It is most likely that a combination of higher exposure, increased vulnerability and fewer resources results in more pronounced noise-related health impacts among socially disadvantaged people.

48. Self-reported noise annoyance is available from the Eurostat survey of Statistics on Income and Living Conditions, which includes some Western and South-Eastern European countries not members of the European Union.<sup>29</sup> A figure could be included here showing the prevalence of complaints about noise from neighbours or from the street by income quintile in 2016.<sup>30</sup>

### Perspectives

49. Suggested mitigation actions are:

(a) Better reporting of objective traffic-related noise exposure and subjective noise annoyance by gender and further socioeconomic dimensions as a prerequisite for efficient targeting of most affected population groups or neighbourhoods;

(b) Further enforcement of the Environmental Noise Directive to tackle the important public health issue of traffic-related noise, particularly addressing socially vulnerable groups in monitoring and mitigation measures. This Directive does not apply to countries that are not members of the European Union, which should enforce their own regulations; in case such regulations are not available they should be developed;

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<sup>25</sup> WHO Regional Office for Europe, *Environmental Noise Guidelines for the European Region* (Copenhagen, 2019), p. 66.

<sup>26</sup> Dreger S. and others, “Social inequalities in environmental noise exposure: a review of evidence in the WHO European Region”, *International Journal of Environmental Research and Public Health*, vol. 16, No. 6 (2019).

<sup>27</sup> Havard S. and others, “Social inequalities in residential exposure to road traffic noise: an environmental justice analysis based on the RECORD Cohort Study”, *Occupational and Environmental Medicine*, vol. 68, No. 5 (2011), pp. 366–374; and Dreger, “Social inequalities in environmental noise exposure”.

<sup>28</sup> European Commission, Science for Environment Policy In-depth Report, No. 13.

<sup>29</sup> Eurostat, European Union Statistics on Income and Living Conditions database, available at <https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions>.

<sup>30</sup> A figure was included by the author, but without source information.

(c) Ensuring that action plans to address noise issues at a regional level take into account potential social inequalities in noise exposure and different vulnerabilities;

(d) Targeted measures to reduce the vulnerability of socioeconomically deprived populations to the health impacts of noise exposure, to ensure that they are not subjected to greater risks because of a lack of resources, lack of coping capacity or higher exposure;

(e) Promoting and adopting more sustainable forms of transport to reduce both noise and air pollution from motorized traffic.

50. In addition to subjective noise exposure, data on objective source-specific noise exposure would increase the validity of noise exposure monitoring. Moreover, vulnerable groups such as children and chronically ill and elderly persons<sup>31</sup> should always be considered when monitoring social inequalities in noise exposure and developing mitigation actions specifically to address those with increased vulnerability and poorer coping capacities due to their socioeconomic position.

### C. Greenhouse gas emissions

51. Participants in an informal meeting of greenhouse gas emissions experts (Utrecht, Netherlands (online), 28 July 2020) mentioned the following key statements and suggestions for indicators. This section needs to be revised in line with comments recorded in the minutes of that meeting.<sup>32</sup> Additional sources of information may also be considered.

#### Key statements

52. The following statements have been suggested:

(a) Greenhouse gas emissions are difficult to link directly to transport and mobility;

(b) Several global organizations indicated transport as the second sector contributing to greenhouse gas emissions, stating that this sector is growing and is expected to grow for the next 20 years due to increasing wealth around the world;

(c) The growth in transport is often faster than that of GDP. It would be interesting to show the share of transport in greenhouse gas emissions, including the types of transport (in addition, for cars, also whether diesel or not); such information could also give an idea of what mitigation measures could be adopted;

(d) The use of fossil fuels in the transport sector is the key obstacle to decarbonization. Road transport is the key source. Passenger cars and trucks contribute the most;

(e) The age of cars shows how clean cars are and the use of cleaner cars will lead to decreased emissions. The type of fuel is also important for emissions;

(f) It would be interesting to look at subregional variations to have a better understanding of the trends in the ECE region;

(g) Even if outside the scope of THE PEP, it would be interesting to have a look at the growing share of emissions from aviation and shipping;<sup>33</sup>

(h) It would also be interesting to see how electric vehicles will develop and how to get to the electricity they need;

(i) The effect of climate change is very important not only for health but also for the environment.

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<sup>31</sup> WHO Regional Office for Europe, *Environmental health inequalities in Europe. Second assessment report* (Copenhagen, 2019), p. 70.

<sup>32</sup> The minutes of the thematic expert meetings referred to in this document are available online on a password-protected website, <https://platform.healthandsafety.nl/>.

<sup>33</sup> THE PEP Bureau could be asked whether it agrees to mention these sectors in the brochure.

### **Suggested indicators**

53. The following indicators have been suggested:

(a) Greenhouse gases (carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), hydrofluorocarbons, perfluorinated compounds, sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>) plus four indirect greenhouse gases (NO<sub>x</sub>, carbon monoxide (CO), non-methane volatile organic compounds and sulphur dioxide (SO<sub>2</sub>) displaying greenhouse gas total, per inhabitant, per petajoule, per km, for example: CO<sub>2</sub> per km driven per inhabitant. Indicators could be split by mode of transport and even by different energy carriers. For the impact on health, use the same exposure indicator with the assumption that less emissions are healthier;

(b) Many indicators available from the European Environment Agency especially for 2015 (modal shift, number of cars, etc.).

54. However, the main indicators do not cover the entire ECE region and data availability from non-European Union countries should be the basis for the search for indicators. Ideally, modal split, share of car transport compared to public transport and walking and cycling, and the age of the vehicle fleet would be covered.

55. The following data are available through the ECE statistical database:<sup>34</sup> road vehicle fleet at 31 December by vehicle category and age group; road vehicle fleet at 31 December by vehicle category and fuel type; motorization level (number of cars per 1,000 people); share of diesel vehicles in the fleet (cars, buses, trucks); share of electric vehicles (per cent); and motor vehicle movements on national territory by road (vehicle-km) for the ECE region.

56. Emissions from steel industries, precursors of transport, might also be relevant. Especially if promoting private electric-driven transport, there could be interest in the source of energy for manufacture. This might not be used as an indicator as such but could be part of the discussion.

57. The Russian Federation is starting to calculate greenhouse gas emissions; data should be available in 2021.

## **D. Road traffic injuries**

58. Participants in an informal meeting of road traffic injuries experts (Utrecht, Netherlands (online), 27 July 2020) mentioned the following key statements and suggestions for indicators. This section needs to be revised in line with comments recorded in the minutes of that meeting.<sup>35</sup> Additional sources of information may also be considered.

### **Key statements**

59. The following statements have been suggested:

(a) In general, road traffic injuries are a major public health concern and are the second cause of death for persons aged 5–30 years. The good news is that this is an avoidable death toll. Measures to improve road safety should include measures to promote active mobility (cycling and walking). In order to put the numbers of injuries into perspective with increased motorization, the number of casualties could be compared with the number of cars or of km driven, but care is needed. Overall, adding car use or km may be useful because it may show that it is possible to have lower casualties with more motorization;

(b) There is still a lot to be done but it is good to show the trend of reduction in road traffic fatalities. Show differences in relation to a baseline year;

(c) Disaggregation to show who is a victim will send an important message. Show differences in the mode of transport, age distribution (and thus awareness of traffic accidents among young people), geographical distribution and the social dimension (ethnicity,

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<sup>34</sup> See <https://w3.unece.org/PXWeb/en>.

<sup>35</sup> The minutes of the thematic expert meetings referred to in this document are available online on a password-protected website, <https://platform.healthandsafety.nl/>.

socioeconomic status). The geographical scale that will be addressed is also important for the messages;

(d) Show the context: greater benefits from cycling and walking and a low risk of accidents;

(e) Road accidents from new innovations like the electric bicycle and the scooter.

### Suggested indicators

60. The number of traffic fatalities has been suggested as an indicator. It is more precise as an indicator than traffic injuries.<sup>36</sup> Any discussion on death risks for cyclists and pedestrians must be accompanied by a description of the benefits of physical activity.<sup>37</sup>

61. Other suggestions for indicators are:

(a) Victims killed or injured;

(b) Fatality rate, which is influenced by access to health care and road design (urban planning, bicycle lanes, etc.);

(c) Accidents on pedestrian crossings (in urban areas), which might be especially relevant for children;

(d) Indicators corrected for age, as young adults cause a lot of incidents.

62. Eurostat has a very good database on road safety.<sup>38</sup> Local statistics are always best when describing local situations.

## E. Physical activity

63. Motorized transport is associated with a sedentary lifestyle and growing levels of overweight and obesity. A five-country survey under the European Union INter-sectoral Health and Environment Research for InnovaTion project emphasizes that, for many people across the European Union, personal car use continues to be the principal means of transportation for the most recurring tasks, such as commuting to work, or shopping.<sup>39</sup> This is despite the fact that many of these activities take place within a small radius.<sup>40</sup>

64. Regular physical activity is a well-established protective factor for the prevention and treatment of the leading noncommunicable diseases, namely heart disease, stroke, diabetes and breast and colon cancer.<sup>41</sup> It also contributes to the prevention of other important non-communicable disease risk factors such as hypertension, overweight and obesity, and is associated with improved mental health,<sup>42</sup> delay in the onset of dementia<sup>43</sup> and improved quality of life and well-being.<sup>44</sup>

<sup>36</sup> Injuries statistics lead to difficulties in follow-up regarding death. WHO definitions include a follow-up period of 30 days.

<sup>37</sup> The question is raised as to whether the health economic assessment tools for walking and for cycling include road traffic injury risks.

<sup>38</sup> See [https://ec.europa.eu/transport/road\\_safety/specialist/statistics\\_en](https://ec.europa.eu/transport/road_safety/specialist/statistics_en).

<sup>39</sup> Zvěřinová I., Ščasný M. and Máca V., “Barriers and Potential for Adopting Healthier, More Equitable and Environmentally Friendly Solutions Identified in a Five-Country Survey”, INter-sectoral Health and Environment Research for InnovaTion Report, 2018.

<sup>40</sup> See <https://inherit.eu/active-transport/#note-footer-page>.

<sup>41</sup> WHO, *Global Recommendations on Physical Activity for Health* (Geneva, 2010).

<sup>42</sup> Schuch F. and others, “Exercise as a treatment for depression: A meta-analysis adjusting for publication bias”, *Journal of Psychiatric Research*, vol. 77 (June 2016), pp. 42–51; and Mammen G. and Faulkner G., “Physical activity and the prevention of depression: a systematic review of prospective studies”, *American Journal of Preventive Medicine*, vol. 45, No. 5 (2013), pp. 649–657.

<sup>43</sup> Livingston G. and others, “Dementia prevention, intervention, and care”, *Lancet*, vol. 390, No. 10113 (December 2017), pp. 2673–2734.

<sup>44</sup> Das P. and Horton R., “Rethinking our approach to physical activity”, *Lancet*, vol. 380, No. 9838 (July 2012), pp. 189–190.

65. Worldwide, one in four adults and three in four adolescents (aged 11–17 years) do not currently meet the global recommendations for physical activity set by WHO.<sup>45</sup> As countries prosper economically, levels of inactivity increase. In some countries, levels of inactivity can be as high as 70 per cent, due to changing patterns of transportation, increased use of technology and urbanization.<sup>46</sup>

66. Finding ways to increase physical activity through, for example, more walking and cycling, to school or work, could contribute to achieving many of the Sustainable Development Goals,<sup>47</sup> as identified in the 2016 Bangkok Declaration on Physical Activity for Global Health and Sustainable Development.<sup>48</sup>

67. One in three persons who commute on foot or by (electric) bicycle reach the WHO physical activity recommendation by doing so. For example, in the Netherlands, people use bicycles on average 75 minutes per week and have an increased life expectancy of half a year more than non-cyclists, preventing around 6,500 deaths annually.

68. By including equity in active transport plans and recommendations, triple wins for health, equity and environmental sustainability can be created.

69. Participants in an informal meeting of physical activity experts (Utrecht, Netherlands (online), 28 July 2020) mentioned the following key statements and suggestions for indicators. This section needs to be revised in line with comments recorded in the minutes of that meeting.<sup>49</sup> Additional sources of information may also be considered.

### Key statements

70. The following statements have been suggested:

- (a) Regular physical activity helps to prevent health problems;
- (b) Walking and cycling (active transport) as means of transport should be promoted;
- (c) Investing in policies on walking and cycling can support the achievement of different Sustainable Development Goals;<sup>50</sup>
- (d) The WHO Global Action Plan on Physical Activity 2018–2030 could also be used as a reference for key messages. THE PEP should also be connected to the Global Action Plan;
- (e) Physical activity, as a theme, can connect other themes as it helps to connect different sectors;
- (f) Different messages can be used, according to the target age: walking and cycling for commuting and to public transport hubs (people of working age); going to school and learning about traffic rules and dealing with traffic safety (children); and walking (elderly people);
- (g) Physical activity levels are still lower than we would like to see in the region;<sup>51</sup>

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<sup>45</sup> WHO, *Global Recommendations on Physical Activity for Health*.

<sup>46</sup> WHO, *Global Action Plan on Physical Activity 2018–2030: More Active People for a Healthier World* (Geneva, 2018). A graphic from the Global Action Plan on Physical Activity could be included here to show how physical activity has multiple health, social and economic benefits.

<sup>47</sup> WHO Regional Office for Europe, *Physical Activity Factsheets for the 28 European Union Member states of the WHO European Region* (Copenhagen, 2018).

<sup>48</sup> See <https://bjsm.bmj.com/content/51/19/1389>.

<sup>49</sup> The minutes of the thematic expert meetings referred to in this document are available online on a password-protected website, <https://platform.healthandsafety.nl/>.

<sup>50</sup> See lessons learned in World Cycling Alliance and the European Cyclists Federation. *Cycling delivers on the Global Goals. Shifting towards a better economy, society, and planet for all*, available at [www.ecf.com/global-goals](http://www.ecf.com/global-goals).

<sup>51</sup> See [www.who.int/gho/ncd/risk\\_factors/physical\\_activity/en/index2.html](http://www.who.int/gho/ncd/risk_factors/physical_activity/en/index2.html).



(h) Many activities within a small radius are done by motorized transport. Substitute motorized transport with more environmentally friendly and healthy modes of transport such as cycling or walking;<sup>52</sup>

(i) Better cycling and walking infrastructure is a major prerequisite for increasing the share of active mobility and consequently increasing the overall physical activity and health of a city;

(j) Link to infrastructure to make walking and cycling easier and safer. Link to reducing air pollution to make walking and cycling healthier;<sup>53</sup>

(k) Monitor physical activity in a comparable and relevant way between countries. Time per km spent walking and/or cycling per person per day would be a relevant indicator.

#### **Suggested indicators**

71. The following indicator was suggested: total length of cycling paths in km.

72. The Health economic assessment tools for cycling and walking enable policymakers at the local, regional and national levels to estimate the economic value of the health benefits of increased cycling and/or walking. Methods and a user guide on physical activity, air pollution, injuries and carbon impact assessments are available in English, French and German.<sup>54</sup>

#### **Research and monitoring recommendations**

73. All countries are encouraged to strengthen reporting of disaggregated data to reflect the dual priorities: to increase the overall level of physical activity and to reduce within-country disparities and levels of physical inactivity in the least active populations, as identified by each country.<sup>55</sup>

## **F. Accessibility**

74. There are inequalities in access to safe and active transport means and healthy transportation networks (public transport, cycling and walking). See section IV.F below for a short discussion on equity interventions.

#### **Inequalities in access to recreational or green areas**

75. In almost all countries, people with lower socioeconomic status report having greater difficulty accessing recreational or green areas than people with higher socioeconomic status. Visiting recreational or green areas can be considered as mitigation against potentially harmful environmental exposures such as air and noise pollution, excessive ultraviolet from sunlight and heat stress. It also reported to be beneficial for: recovery from mental fatigue and attentional capacities (restoration); facilitation of physical activity and social contact; stimulation of development in children, personal development and a sense of purpose; and improved functioning of the immune system. Socioeconomic inequalities in access to recreational or green areas seem to persist over time.

76. Unfortunately, equity-sensitive data on urban environmental conditions could not be identified from international databases for countries in the eastern part of the WHO European Region. People with lower socioeconomic status have greater difficulty in almost every country; in some countries this can affect them three times more. The data do not allow for

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<sup>52</sup> Active transport also includes skateboarding and skating. Cycling includes e-cycling according to WHO. See [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0005/382334/28fs-physical-activity-euro-rep-eng.pdf?ua=1](http://www.euro.who.int/__data/assets/pdf_file/0005/382334/28fs-physical-activity-euro-rep-eng.pdf?ua=1).

<sup>53</sup> World Cycling Alliance and the European Cyclists Federation, *Cycling delivers on the Global Goals: Shifting towards a better economy, society, and planet for all*.

<sup>54</sup> WHO Regional Office for Europe, *Health economic assessment tool (HEAT) for walking and for cycling Methods and user guide on physical activity, air pollution, injuries and carbon impact assessments* (Copenhagen, 2017).

<sup>55</sup> WHO, *Global Action Plan on Physical Activity*, p.11.

identification of the specific difficulties faced, which could arise from several factors. One potential explanation could be a lack of recreational or green areas in the direct surroundings of the home, another could be that the green space is not accessible, that it is not perceived to be safe or that people do not have time to go there. Adequate provision of recreational or green areas that are nearby, easily accessible, attractive and safe, as well as that meet the needs of all potential users, is therefore important.

#### **Towards healthy transportation networks for all**

77. Healthy transportation networks prioritize safe and accessible transportation systems for all ages and abilities and incorporate a diversity of transportation modes (for example, cycling, walking and transit). Health benefits such as reduced pedestrian and cyclist injury, increased physical activity, decreased obesity and increased social connectivity are associated with safe, attractive and accessible transportation systems that prioritize active transportation.

78. Equity in transit planning involves considering the needs of different “publics”, each of whom may have different identities, transportation needs, visions and priorities (for example, people may identify primarily as transit riders, cyclists, pedestrians, car drivers, business people, taxpayers, progressives, etc.). Access to public transportation is particularly important for people with low incomes or mobility challenges, who may depend on it to get to work, shops, school and other necessities. Population subgroups, such as females, older adults, people of lower socioeconomic status and people who are overweight or obese are likely to experience greater barriers to walking, primarily related to safety, poor health status and physical disabilities.

79. It is therefore necessary to prioritize the safety and enjoyment of public and active transportation in neighbourhoods with low socioeconomic status. Longitudinal research indicates that young children in such neighbourhoods are more likely to use active transportation to get to school and are more likely to be exposed to environmental hazards such as dangerous traffic or unsafe neighbourhoods.

80. In addition, locations and schedules for public and active transportation options must support the daily activity flows of people who depend on them. Miss-matched transit and work schedules, infrequent transit routes and poor route connections cost the people who depend on them in terms of time and stress.

## **IV. Understanding our region and the differences between countries**

81. This chapter should support discussion on several themes:

- (a) Living in urban or rural areas, urban sprawl and land take;
- (b) Socioeconomic aspects and disparities in the ECE region;
- (c) Economic circumstances;
- (d) Other environmental aspects, like biodiversity.

82. These topics are also identified in the draft declaration of the Fifth High-level Meeting on Transport, Health and Environment (ECE/AC.21/SC/2020/3–EUPCR2016697/5.3/3).

83. This section examines a range of topics but also picks up on the new context provided by COVID-19.

### **A. Coronavirus disease crisis may permanently change our mobility**

84. Due to COVID-19-related measures, many people work at home more often and our travel behaviour has significantly changed, with less use of public transport but more frequent use of bicycles. This change obviously depends on the type of work and what alternative travel options are available. For low-income groups and people in rural areas, this change

will often be more difficult than for higher-income groups and people living in urban areas. Social distancing measures in countries and cities around the world may reinforce a change towards sustainable mobility. This might also have a positive effect on exercise, road safety and environment-related health.

85. Before the COVID-19 crisis, an increase in car and public transport use was expected for the period 2019–2024, although changes in some metropolitan areas may be different. In the Netherlands over the past 10 years, residents of five major cities have increasingly used public transport, cycled or walked, especially for distances between one and seven km.<sup>56</sup> This has a positive effect on their health and well-being, especially for people who otherwise do not exercise much.<sup>57</sup> This trend is being reinforced by the COVID-19 social distancing measures in cities in almost all countries. To create distance and facilitate active and safe transport in some cities, walking paths have been widened, cyclists moved on to major roads and car traffic limited. This reduces, even if only temporarily, the pressure on space and the environment from motorized traffic and promotes a healthy lifestyle.

86. Mobility data and various panel studies in the Netherlands<sup>58</sup> show that, during the summer of 2020, we still travelled less than before the COVID-19 crisis. As at the beginning of the crisis, the decrease in journeys is greatest for public transport and the car as a passenger. The question is whether these behavioural changes will be permanent.

87. The Google Community Mobility Reports<sup>59</sup> aim to provide insights into what has changed in response to policies aimed at combating COVID-19. The Reports chart movement trends over time by geography, across different categories of places such as retail and recreation, parks, transit stations and workplaces.<sup>60</sup> Figure II below shows how the frequency of visits to transit stations has been changed since the COVID-19 outbreak in most of Europe.

88. In most of Europe, visitor numbers in transit stations decreased in the first half of 2020 because of COVID-19 measures (for example, working at home, limiting measures in public transport and anxiety about COVID-19 exposure in public transport). Overall mobility decreased and now is slowly increasing again with the less strict COVID-19 measures that are in force.

## **B. Active mobility (bicycling and walking)**

89. Walking and cycling are forms of active transport and provide physical exercise, which has a positive effect on people's fitness and thus their health, as noted above in section III.E on physical activity. Cycling is also relaxing and can improve sleep quality and mental health. For people who switch from car to bicycle for short-distance journeys, this leads to an increase in life expectancy of 3–14 months because they exercise more.

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<sup>56</sup> See report by the Knowledge Institute for Mobility Policy of the Netherlands, available at [www.kimnet.nl/mobiliteitsbeeld/mobiliteitsbeeld-2019#/](http://www.kimnet.nl/mobiliteitsbeeld/mobiliteitsbeeld-2019#/) (in Dutch only).

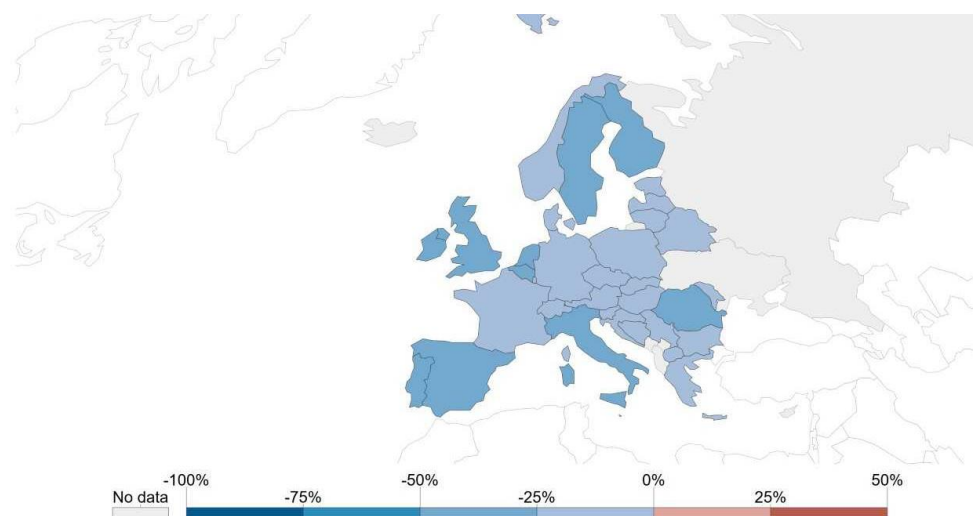
<sup>57</sup> Additional transport data from the European Environment Agency needs verification.

<sup>58</sup> For information on the Netherlands Mobility Panel and the results of its work, see <https://english.kimnet.nl/the-netherlands-mobility-panel>.

<sup>59</sup> Reference to a commercial company or product does not imply any endorsement by the United Nations or its States Members.

<sup>60</sup> See [www.google.com/covid19/mobility/](http://www.google.com/covid19/mobility/).

Figure II  
Change in visitor numbers relative to a baseline day, 30 July 2020.



*Note:* A baseline day is the median value from the five-week period between 3 January and 6 February 2020.

*Source:* Google COVID-19 Community Mobility Trends and Our World in Data, Statistics and Research, Coronavirus Pandemic (COVID-19).<sup>61</sup>

90. Cycling also promotes social interaction and contributes to the independence and self-reliance of people with a low income.<sup>62</sup> Nevertheless, the car is still often used for distances that most people can cycle well – half of the car journeys in the Netherlands are shorter than 7.5 km and a third are shorter than 5 km.<sup>63</sup>

91. Many municipalities have made interventions in the public space such as widening footpaths and cycle paths and installing pedestrian roundabouts to guarantee distancing measures. Furthermore, in some areas, traffic lights at busy intersections were set to stay green longer for cyclists and pedestrians in order to prevent bicycle traffic jams or group formation. These interventions indirectly mean that there is less space for cars within cities.

92. Based on mobility reports, we also see a significant increase in visits to parks and green areas (after the lifting of lockdown regulations). More space for cyclists, and pedestrians in particular, can stimulate the development of modern and green cities. That development had already started, but COVID-19 might accelerate this process. The challenge is whether the economic crisis may hamper investments in healthy and sustainable transport.

93. Bicycle (especially electric bicycle) share has increased since the COVID-19 outbreak and is higher than before the crisis. These changes in travel behaviour may be temporary. Still, about 20 per cent of the respondents to the mobility panel in the Netherlands think they will eventually spend more time walking and cycling than before the crisis. The same percentage expect to take fewer flights in the near future.

### C. Solutions for sustainable, safe and healthy mobility

94. Growing urbanization and current and future housing needs will lead to an increasing need for sustainable and healthy mobility solutions.

<sup>61</sup> See <https://ourworldindata.org/covid-mobility-trends> and <https://ourworldindata.org/grapher/visitors-transit-covid?year=2020-06-29&time=2020-07-31&country=NLD~FRA~LTU~POL~DEU&region=Europe>.

<sup>62</sup> Staatsen B. and others, “Exploring triple-win solutions for living, moving and consuming that encourage behavioural change, protect the environment, promote health and health equity”, INter-sectoral Health and Environment Research for InnovaTion Report, 2017.

<sup>63</sup> See [www.kimnet.nl/mobiliteitsbeeld/mobiliteitsbeeld-2019#/rapport/0](http://www.kimnet.nl/mobiliteitsbeeld/mobiliteitsbeeld-2019#/rapport/0) (in Dutch only).

95. Measures by Governments and employers to facilitate working from home because of COVID-19 have a major influence on sustainable, safe and healthy mobility. Employers are interested in advice on safe and healthy mobility solutions such as electric bicycles, tax benefits and responsible use of public transport. A new and appropriate mix of these must be properly secured in regulations. One challenge for sustainable behaviour during COVID-19 is to determine how less travel and more working from home might become a new habit. Instead of building new roads, it might therefore be better to invest in existing infrastructure, for example by making it more sustainable or by modernizing it.

96. The effects of the COVID-19 crisis on our activity patterns, our work and travel behaviour and thus our health are significant. However, how long these effects will persist and whether the crisis will prompt lasting changes in work, activities and travel remains to be seen. This will be a challenge for current and newly developing programmes like THE PEP.

#### **D. Environmental health inequity**

97. Environmental conditions are a major determinant of health and well-being, but they are not shared equally across the population resulting in environmental health inequalities. Higher levels of environmental risk are often found in disadvantaged and/or vulnerable population subgroups which can further amplify the resulting health outcomes and inequalities. This is referred to as environmental health inequity<sup>64</sup> and it occurs both between and within countries (see, for example, figure III below). The uneven distribution of environmental risks on top of health inequalities is of increasing concern and leaving no one behind is a key theme of the 2030 Agenda for Sustainable Development.

98. Inequalities and inequities related to transport are found in exposure and negative health outcomes from air pollution, noise and road traffic injuries and are discussed in the relevant sections above. Furthermore, inequity is also present in unequal benefits from transport, that is access to healthy transportation networks and recreational or green areas. However, the available (environmental) monitoring data do not often allow for an accurate quantification of these benefits.<sup>65</sup>

#### **E. Transport and inequity**

99. Inequality is often associated with deprived or disconnected areas with high levels of air and noise pollution, greater risk of injury on the road network and unequal access to safe and healthy transport modes (public transport, cycling and walking).

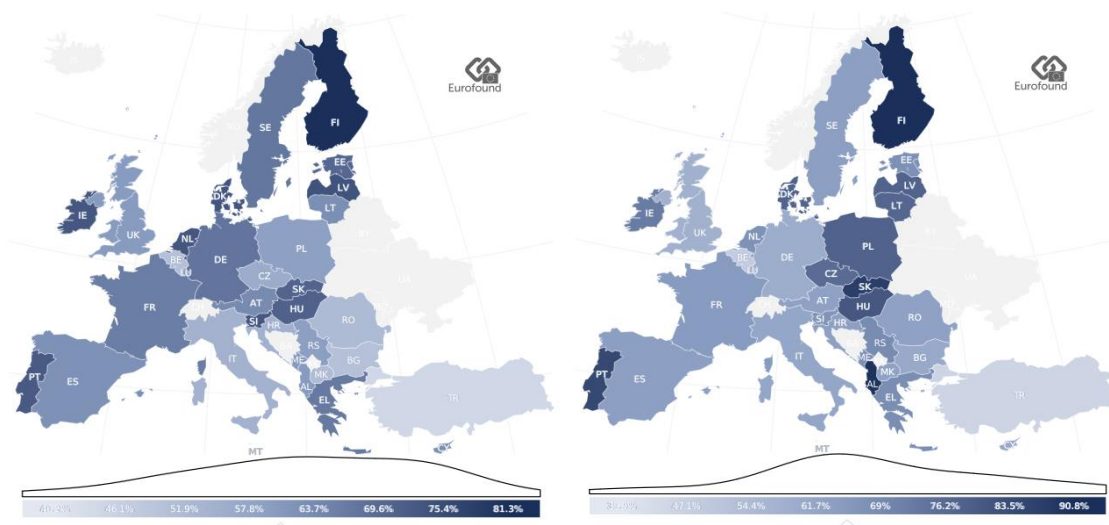
100. Equity interventions can focus on the development of sustainable, environment-friendly, inclusive and safe transport modes, while reducing the mobility disparities of vulnerable groups and those living or working in disconnected or underserved areas.

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<sup>64</sup> Environmental health inequality represents differences in exposure to environmental health risks and related health outcomes. These can relate to individuals who are more or less exposed, certain population groups that are being disadvantaged, or spatial areas that are affected by higher levels of environmental pollution. Environmental health inequity refers to unfair, unjust and avoidable differences in exposure to environmental health risk factors, and to unfair, unjust and avoidable differences in health status caused by environmental conditions. The difference between (in)equality and (in)equity must be emphasized. Although both promote fairness, equality achieves this through treating everyone the same regardless of need, while equity achieves this through treating people differently dependent on need. However, this different treatment may be the key to reaching equality.

<sup>65</sup> For addressing environmental health inequalities, available environmental monitoring often does not allow for an accurate quantification of differential exposure. For addressing environmental health inequities, combining the differential exposure data with data on variable vulnerability of different population subgroups is key.

Figure III  
**Percentage of people per country who answered “No problems” when asked about “Neighbourhood Problems: heavy traffic”, with differentiation between income groups 4 (left-hand map) and 1 (right-hand map)**



Source: Eurofound, 2017.<sup>66</sup>

## F. Transport planning and inequity

101. Transport is an essential part of modern life but can also cause a significant burden on health, the environment and national economies. The benefits and negative impacts of transport are not evenly spread across societies and citizens in more deprived urban areas in particular may have limited access to public transport and to safe infrastructure for active mobility. Adequate transport planning aims to assure that: all city districts are well connected; public transport is healthy, inclusive, accessible, affordable, safe and environmentally friendly; and infrastructure for active mobility is developed. A sustainable transport system will not only reduce road traffic injuries, congestion, air and noise pollution in general but will also mitigate health and mobility disparities in society and improve social interactions, liveability and amenity values.

## V. Overall conclusion on the main question

102. This final chapter will include some concluding remarks taking into account all themes and the different country contexts.

<sup>66</sup> Eurofound, *European Quality of Life Survey 2016: Quality of life, quality of public services, and quality of society* (Luxembourg, Publication Office of the European Union, 2017); and European Quality of Life Survey 2016 - Data visualisation, available at [www.eurofound.europa.eu/data/european-quality-of-life-survey](http://www.eurofound.europa.eu/data/european-quality-of-life-survey).