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Executive Body for the Convention on Long-range Transboundary Air Pollution

Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe

Working Group on Effects

Eighth joint session
Geneva, 12–16 September 2022
Item 2 (a) of the provisional agenda
Progress in activities in 2022 and further development of effects-oriented activities: air pollution effects on health

Effects of air pollution on health*

Report of the Joint Task Force on the Health Aspects of Air Pollution on its twenty-fifth meeting

Summary

The present report is being submitted for the consideration of the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe and the Working Group on Effects, in accordance with both the 2022–2023 workplan for the implementation of the Convention (ECE/EB.AIR/148/Add.1, items 1.1.1.27, 1.1.1.28, 1.2.3, 1.3.5 and 1.3.6) and the revised mandate for the Joint Task Force on the Health Aspects of Air Pollution (Executive Body decision 2019/21).[a]

The report presents the results of the discussions on the health impacts of ambient air pollution and other workplan items at the Joint Task Force's twenty-fifth meeting (online, 10 and 11 May 2022).

[a] Available at www.unece.org/env/lrtap/executivebody/eb_decision.html.

* The present document is being issued without formal editing.

I. Introduction

1. The present report summarizes the results and discussions on the health impacts of ambient air pollution presented at the twenty-fifth meeting of the Joint Task Force on the Health Aspects of Air Pollution (Task Force on Health) under the World Health Organization (WHO) European Centre for Environment and Health and the United Nations Economic Commission for Europe (ECE) Executive Body for the Convention on Long-Range Transboundary Air Pollution (online, 10 and 11 May 2022). The report also provides a summary of workplan items discussed at the meeting, in accordance with both the 2022–2023 workplan for the implementation of the Convention on Long-Range Transboundary Air Pollution (ECE/EB.AIR/148/Add.1, items 1.1.1.27, 1.1.1.28, 1.2.3, 1.3.5 and 1.3.6) and the revised mandate for the Task Force on the Health (Executive Body decision 2019/21).[1]

2. Altogether, 38 representatives from 36 Parties to the Convention attended the twenty-fifth meeting, in addition to one representative of the Convention secretariat. The European Union – a Party to the Convention – was represented by the European Commission and the European Environment Agency. The meeting was chaired by Dr. Dorota Jarosińska (WHO European Centre for Environment and Health). Mr. Pilmu Ryu (WHO European Centre for Environment and Health) acted as rapporteur. Seventeen temporary advisers participated in the meeting from the following organizations: Bulgarian National Assembly (Bulgaria); Colorado State University (United States of America); European Commission (Belgium); Environment and Climate Change Canada (Canada); Department for Environment, Food and Rural Affairs (United Kingdom of Great Britain and Northern Ireland); Health Canada (Canada); Health Effects Institute (United States of America); Imperial College London (United Kingdom of Great Britain and Northern Ireland, Two experts); Lund University (Sweden); Macedonian Academy of Sciences and Arts (North Macedonia); New York University (United States of America); Owl RE (Switzerland); University College London (United Kingdom of Great Britain and Northern Ireland); Spadaro Environmental Research Consultants (United States of America); Swiss Tropical and Public Health Institute (Switzerland); and Washington University in St. Louis (United States of America). Eleven observers participated in the meeting. The Governments of Germany and Switzerland both provided financial support for the Task Force on Health activities.

II. International policies and processes on air quality and health

3. A representative of the Convention secretariat provided an overview of recent developments under the Convention on Long-Range Transboundary Air Pollution. Executive Body for the Convention at its forty-first session (Geneva (hybrid), 6-8 December 2021)[2] reviewed the implementation of the 2020-2021 workplan and adopted the 2022-2023 workplan and recommendations. The Executive Body welcomed the draft report on the review of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, as amended in 2012 (ECE/EB.AIR/2021/4). The Working Group on Strategies and Review at its sixtieth session (Geneva, 11-14 April 2022)[3] reviewed sufficiency and effectiveness of the Gothenburg Protocol and discussed the revised draft report on the review (ECE/EB.AIR/WG.5/2022/3). Seventh Joint Session of the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) and the Working Group on Effects (WGE) (online,13-16 September 2021)[4] covered progress in activities of all centres and task forces, and progress on the common website[5] of the WGE. The Joint Meeting of the Extended Bureaux of the EMEP Steering Body and the WGE (online, 21–24 March 2022) covered contributions of EMEP and WGE to the review of the Gothenburg Protocol, progress in the implementation of the 2022–2023 workplan, and updated strategy for EMEP and WGE to be adopted in December

1 Available at www.unece.org/env/lrtap/executivebody/eb_decision.html.
2 See https://unece.org/info/events/event/350953.
3 See https://unece.org/info/events/event/360937.
4 See https://unece.org/info/Environmental-Policy/Air-Pollution/events/350954.
5 See https://www.unece-wge.org/.

2022. The representative presented a variety of capacity-building and awareness-raising activities for 2022, including preparation of e-learning course on the Convention and its three latest amended protocols (June 2022), regional workshop on tier 2 and tier 3 (COPERT model) methods for estimation of road transport emissions (June 2022), and National Clean Air Dialogue in Georgia (October 2022). The International Day of Clean Air for Blue Skies (7 September 2021) was promoted by the Convention secretariat with the contribution to the official campaign organized by the United Nations Environment Programme (UNEP) and online events by the Republic of Korea.

4. A representative of the European Commission presented the ongoing revision of the European Union legislation on air quality. The main identified shortcomings of the current air quality legislation are in the areas of health outcome, enforcement, governance, information and monitoring. The consequences of these shortcomings include elevated concentration levels of air pollutants, leading to more than 400,000 premature deaths each year across the European Union, €20 billion direct cost to healthcare due to lost workdays, ecosystem impacts and climate change, €330-940 billion indirect costs, and many other negative impacts. In order to further develop options/scenarios for each policy area and to address the shortcomings, the Commission had focused on augmenting the current Ambient Air Quality Directive in three policy areas: closer alignment of the European Union air quality standards with scientific knowledge, including the latest WHO recommendations; improvement of the air quality legislative framework, including provisions on penalties and public information; and strengthening of air quality monitoring, modelling and plans. The representative presented $PM_{2.5}$ concentrations in 2019 by country in Europe and indicated that both Iceland and Estonia could meet the recommendation of WHO global air quality guidelines on average. The Commission shared the European Union clean air policy milestones from 2020 to 2023, highlighting the adoption of legislative proposal for the revision of the European Union rules in the second half of 2022, as well as the European Council discussions of the legislative proposal in the first half of 2023.

5. A representative of WHO headquarters provided an update on WHO activities, beginning with an overview of the WHO Ambient Air Quality Database update and the Sustainable Development Goals (SDG) monitoring and reporting, on SDG 3.9.1 (Mortality from air pollution), SDG 7.1.2 (Access to clean energy), and SDG 11.6.2 (Air quality levels in cities). Established in 2021, the Global Air Pollution and Health – Technical Advisory Group (GAP-TAG) was presented with its six sub-groups: climate change and air pollution; intervention and response; exposure assessment; methodologies for Burden of Disease (BOD) source attribution; health outcome and expose-response functions; and desert, dust and health. The representative presented the training toolkit (training modules, trainer's manual, tools, such as clinical case scenarios, communication and outreach material) on air pollution and health for the health workforce, indicating pilot workshops in Ghana in June 2022 and Rwanda in July 2022, and launch of the training toolkit by the end of 2022. With regards to household air pollution, the Clean Household Energy Solutions Toolkit (CHEST) was presented, used to support countries in implementing the recommendations to achieve air quality guidelines.[6] The representative also shared the Benefits of Action to Reduce Household Air Pollution tool, which could calculate costs and benefits of transitions to clean/cleaner household energy, in addition to the Guidance on Standard and Testing, which could support adoption of national standard for cookstoves, such as those produced by International Organization for Standardization (ISO). A Strategic Roadmap for the Health and Energy Platform of Action[7] with six priority actions, was endorsed by the High-level Coalition on Health and Energy in June 2021.

III. World Health Organization Global Air Quality Guidelines and Implementation

6. A representative of the WHO European Centre for Environment and Health gave an overview of the WHO global air quality guidelines (AQG) that were launched in September

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[6] See https://www.who.int/tools/clean-household-energy-solutions-toolkit/.

[7] See www.who.int/initiatives/health-and-energy-platform-of-action.

2021. Since 2005, there had been a marked increase in the quality and quantity of evidence that showed how air pollution affected different aspects of health. There were also clearer insights about global concentrations, sources of emissions, inequities and the contribution of air pollutants to the global burden of disease. For that reason, and after a systematic review of the accumulated evidence, several of the updated AQG levels were identified to be lower than 15 years ago. The AQGs included: recommended levels for PM_{10}, $PM_{2.5}$, NO_2, O_3, SO_2 and CO for both long- and short-term exposure in relation to critical health outcomes; interim targets to guide reduction efforts for the achievement of the AQG levels; and good practice statements in the management of certain types of particulate matter such as particles originating from sand and dust storms, black /elemental carbon and ultrafine particles. The AQGs could be used as a tool for policy making, to stimulate research, and to enhance climate action. The representative wrapped up the presentation by emphasising that successful implementation required intersectoral action and highlighted the ways in which WHO was supporting implementation, in particular: translation of the executive summary into 10 languages; communication and advocacy to promote the uptake of AQGs; resource package including tools and materials related to air quality management; science-policy dialogues within and among Member States and with sectors and stakeholders; and capacity building training in health and other sectors. In about seven months, the AQGs had been cited over 160 times in journal articles, downloaded by end-users over 80,000 times, and WHO had listed the AQGs in the context of climate change and health as one of 10 key global health moments in 2021.

7. A representative of Austria gave an overview of the ongoing work on the development of a resource package to support countries in the WHO European Region in implementing WHO AQGs. The resources on different aspects of air quality management were compiled from materials developed by international organizations, networks, and projects. The resources were assessed for their applicability in the WHO European Region in terms of the type, geographical scope, user-friendliness, and languages. The selected resources were categorized according to thematic area, type of material, topics, and relevance. The draft report was peer-reviewed by several experts, who provided feedback on the overall clarity in terms of the organization and ease of navigation for a user; the scope and target audience; the methodology used and the structure; any missing relevant elements or resources; adequacy and the level of the description of resources; and any other suggestions to further improve the draft report. The representative presented the structure of draft report, its contents, and example of resources. Overall, the draft resource package included the summary of WHO AQGs, and four main sections on: setting air quality standards and objectives; design and implementing control strategies; assessing the air quality status; and continuous and supporting activities and cross-cutting issues, such as health impacts, communication, capacity building, training, networking, funding, and interaction with climate change policy. The resource package is planned to be published by WHO European Centre for Environment and Health by the end of 2022.

8. An expert from University College London (United Kingdom of Great Britain and Northern Ireland) presented the forthcoming UNEP Guide on air quality legislation. National efforts to attain WHO AQGs and to significantly lower the impacts of air pollution to human health cannot succeed without a robust legal and institutional foundation. The purpose of UNEP Guide is to assist national lawmakers and policymakers in developing or improving ambient air quality laws, prioritising public health outcomes. The UNEP Guide focuses on law and legislative structures, and how these make air quality standards binding within states through robust national systems of air quality governance. It also focuses on ambient air quality standards as key drivers for improving air pollution, and gives illustrative examples of legislation rather than model laws. Specific national legal expertise will be needed to adapt and apply the UNEP Guide within national legal contexts, taking into account the nature of the legal system, maturity of air quality legislation and any planned revisions, constitutional arrangements and governmental structures, environmental conditions, cost and capacity constraints, and political contexts. Major challenges in air quality legislation globally currently include: the lack of common global legal framework for ambient air quality standards (AAQS), 36 per cent of countries not yet having embedded AAQS in their legislation, high incidence of legal AAQS in secondary legislation, most national AAQS not legally aligned with WHO AQG values, poor coordination of national policy to achieve

AAQS, and lack of effective regulation of transboundary air pollution and indoor air pollution. In light of this, the expert presented priorities for air quality legislation addressed in the Guide: setting AAQS within a legal instrument; designing ambitious legislative purposes to inform entire air quality regimes; regularly reviewing legislation over time; using the WHO AQGs as the starting point for national evaluation of AAQS; legal construction of robust air quality monitoring systems; putting clear legal accountability on the state for air quality obligations, including strong compliance and enforcement measures; legally coordinating policymaking and interconnected/sectoral regulation; and providing procedural rights in relation to air quality.

9. A representative of Poland gave a presentation on the implication of WHO AQGs on air quality in Poland. In 2021, air quality measurements were carried out in 1,895 measuring stations in 46 air quality zones. In relation to annual PM_{10} concentration, 96 per cent of the Polish population was exposed to concentration exceeding WHO AQGs level. In relation to annual $PM_{2.5}$ concentration, 100 per cent of the Polish population were exposed to concentrations exceeding WHO AQGs level, and 26 per cent were exposed to concentration exceeding the European Union limit value. The main source of $PM_{2.5}$ emission in Poland in 2019 was fuel combustion, which accounted for 83 per cent of the total $PM_{2.5}$ emissions. The fuel combustion was mainly associated with the burning of coal and wood in individual heating system in household, responsibe for 49 per cent of $PM_{2.5}$ emissions. To improve air quality, a programme was implemented that provided subsidies for the replacement of heat sources and thermo-modernization of houses. Anti-smog resolutions and local legal acts had been enacted in relation to installation of heating systems in new buildings, restrictions of using solid fuel boilers, bans or prohibitions of most emissive types of devices, and prohibition of using fuels non-compliant with the minimum quality standards and requirements. The representative concluded that the AQGs recommendations would be difficult to implement legally as limit values. The AQG recommendations should be used in communicating short-term exposure health risks, especially for vulnerable group. Due to current exposure levels in Poland, adoption of interim targets should be considered. The WHO AQG publication and the availabilitzy of AirQ+ in Polish language triggered the Polish decision-makers to elaborate health impact assessment in the annual air quality report.

10. A representative of Bulgaria gave a presentation on the implication of WHO AQGs on air quality in Bulgaria, highlighting the past, present and future of air quality actions. The premature death attributable to $PM_{2.5}$ declined from 2005 to 2019, with the progress towards the Zero Pollution Action Plan target on air pollution. However, despite continuous improvement in air quality, Bulgaria remained a hotspot with high premature death attributable to $PM_{2.5}$ in Europe. The representative indicated that Bulgaria would remain a country with high mortality attributable to $PM_{2.5}$ between 2030 and 2050. The annual mean concentration of PM_{10} in Sofia was 26.2 $\mu g/m^3$ in 2020, and the annual $PM_{2.5}$ concentration in Bulgaria in 2021 was 3.3 times above the recommended level in WHO AQGs. Therefore, interim target in WHO AQGs should be communicated as a pathway to achieve the recommended WHO AQGs level. In the survey about air quality policy, 79 per cent of the European Union citizens thought that the European Union air quality standards should become more stringent, fully aligned with the WHO AQGs. In contrast, 62 per cent of respondents from public authority thought that European Union air quality standards should be made more stringent, however only partially aligned with the WHO AQGs. The representative noted that there is insufficient coverage by the air quality monitoring stations in Bulgaria, which could be surmounted by the use of low-cost sensor and improving modelling ability. The representative also emphasized shortcomings in the governance and relevance of intercountry collaboration to address transboundary air pollution.

11. A representative of the WHO European Centre for Environment and Health gave a presentation on the Bonn Dialogues on Environment and Health. These are high-level events to provide the Environment and Health Task Force (EHTF) with evidence and reflection to support identification of priorities and formulation of possible commitments of the Seventh Ministerial Conference on Environment and Health, to be held in Budapest in July 2023. The representative shared the results of the Bonn Dialogue on air quality and health, which was held in 2021, as a follow-up to the publication of the WHO AQGs. It aimed to provide impetus to the discussion on how to plan and implement comprehensive policies and actions in the WHO European Region to efficiently tackle the challenge of air pollution in view of

the new AQGs and to provide EHTF members with a stronger health argument for reinforced climate action. During the Bonn dialogue, participants discussed the importance of implementation and monitoring of the AQGs; further research and normative developments; relevance of international cooperation; importance of a cross-sectoral approach; air quality and climate change mitigation efforts; phase out of coal-based power plants; use of recovery funds to address air pollution; role of civil society in advocacy for implementation; and indoor air quality. The Bonn Dialogues would continue, and the latest one took place on 3 June 2022, the World Bicycle Day, focusing on transport health and environment, particularly on walking and cycling for green, healthy and sustainable mobility.

IV. Health Effects of Polycyclic Aromatic Hydrocarbons (PAHs)

12. An expert from Health Canada (Canada) presented carcinogenic effects and risk assessment of polycyclic aromatic hydrocarbons (PAHs), organic molecules comprised of multiple aromatic rings. PAHs might be involved in toxicological processes, such as genotoxicity, upon metabolic activation. For these reasons, cancer was the primary health concern of chronic exposure to PAHs. The International Agency for Research on Cancer (IARC) had evaluated carcinogenic risks to humans of 45 PAHs. Benzo[a]pyrene (B[a]P) was the most well studied PAHs and was the only PAHs classified as a known human carcinogen. There was a paucity of information on the relationship between exposure to PAHs in ambient air and the development of cancer in the general population. In relation to breast cancer, there appeared to be a positive correlation between exposure to PAHs and development of breast cancer. In relation to childhood cancer, there appeared to be a positive correlation between prenatal exposure to PAHs and development of childhood cancers. However, conclusions could not be drawn due to low number of studies and potential confounding from smoking and exposure to other pollutants within these studies. In relation to other cancers, additional three studies were identified for the lung cancer, bladder cancer, and cervical dysplasia. Overall, there was a lack of data on other cancer types to draw any firm conclusions, however associations were observed for development of breast cancer and childhood cancers. In order to assess cancer risk for airborne PAHs, B[*a*]P was used as a marker for complex PAHs mixtures, however assessing PAHs as a mixture remained an important issue. Considering relative potency of individual PAHs and investigating potency of known mixtures offer promising alternatives to relying exclusively on B[*a*]P concentrations.

13. A representative of Norway gave a presentation on effects of PAHs on respiratory and cardiovascular diseases. Based on animal and cell culture studies, when people inhaled PAHs, either PAHs in the gas phase or PAHs bound to PM affected the balance in the autonomous nervous system, local damage and pro-inflammatory response to lung and circulation/blood, ultimately causing the respiratory, heart, vascular and blood dysfunction /disturbance. Studies on effects of pre- and postnatal exposure to PAHs provided support for an association with asthma development in children. The association was not limited to B[a]P, but also encompassed low-molecular weight PAHs such as naphthalene, phenanthrene and pyrene. Epidemiological studies indicated associations between low-molecular weight PAHs and asthma also in adults. Most studies seemed to suggest an association between PAHs exposure, measured as PAHs metabolites in urine, with respiratory functions and symptoms in adults. Few studies from occupational and environmental settings had shown association with cardiovascular mortality, myocardial infarction and altered heart rate variability. In few studies PAHs exposure had been correlated to pro-inflammatory cytokines and biomarkers of oxidative damage, important predictors of cardiovascular events. Few studies had also found an association of PAHs exposure with high blood pressure. Overall, very few studies were related to cardiovascular diseases, some more studies included biomarkers that might be involved in the development of diseases. Experts evaluated the epidemiological studies on respiratory and cardiovascular diseases, highlighting the limited number of available studies; difficulties in discriminating the specific role of PAHs from other combustion-related pollutants; the role of different sources of exposure in addition to PAHs in ambient air for the PAHs levels measured in blood and urine. Other sources such as food were more important and contributed to uncertainties in the epidemiological studies.

14. A representative of the United Kingdom of Great Britain and Northern Ireland gave a presentation on effects of PAHs on neurodevelopmental outcomes in children. The literature identification included: PubMed search for epidemiological, toxicological and mechanistic studies; LUDOK literature search for reviews on neurodevelopmental effects; and the US EPA Integrated Risk Information System (IRIS) Toxicological Review of B[*a*]P. In the US EPA IRIS Toxicological Review of B[*a*]P, neurodevelopmental studies in rodents consistently demonstrated persistent neurodevelopmental outcomes, particularly during the late gestation or early postnatal development. Several types of effects were found, such as cognitive function, neuromuscular function, coordination and sensorimotor development, and anxiety and activity. Experimental neurodevelopmental studies used zebrafish embryos and larvae for learning and memory deficits in adults exposed as embryos, and killifish for short-term and persistent locomotor and behavioural impairments. In the epidemiological studies, cohort studies in New York city, NHANES in the United States of America, Krakow in Poland, Tongliang in China, and Barcelona in Spain were considered. Most studies reported the association between PAHs exposure in the air and health outcomes, such as cognitive development, behavioural development and difficulties, brain physiology or biochemistry; the limitations included relatively small sample sizes and no adjustment for other air pollutants. The representative concluded that the limited epidemiological evidence suggested associations between prenatal and early life exposures and effects on cognitive or behavioural function, explaining the knowledge gaps and challenges.

15. An expert from Environment and Climate Change Canada (Canada) presented emissions and ambient exposure to PAHs, highlighting how PAHs get into the air and exposure to PAHs occurs. Human exposure to PAHs might occur from inhalation, dermal exposure or the ingestion of food contaminated with PAHs. The main sources of emission were the combustion processes, such as vehicles exhausts, residential heating with wood and coal combustion. PAHs, to which people can be exposed, in the ambient air could be degraded in the light and react with other chemicals depending on the temperature. The anthropogenic PAHs emissions by sector in the EU and Canada had similar pattern, where PAHs emissions from the commercial, institutional and household sectors were much greater than those from the industrial sector. In the EMEP[8] region, the lowest emission of PAHs tended to be in the Nordic countries and higher emissions in the areas like southern Spain and the Atlantic coast of Spain, as well as some parts of Portugal, Poland, and some areas of Russian Federation. B[*a*]P concentration in the EMEP region had not changed much since the early 2000s. In Canada, the situation was different and since 1990 there has been a reduction by about a factor of three, largely driven by technological solutions to emissions in the alumimum and iron and steel industry. In the European Union, between 2007 and 2017, 65 per cent of national monitoring sites reported decreasing B[*a*]P concentrations, though a significant number of sites showed increasing concentrations in Austria, Cyprus, Czech Republic, Ireland, Italy, Poland, Slovakia, Spain and the United Kingdom. Source contributions to PAHs emission varied locally. For example, in Toronto, contribution to PAHs emission from motor vehicles was close to 50 per cent, while at the national scale the estimate was 8 per cent.

16. A representative of Sweden presented the report "Human health effects of polycyclic aromatic hydrocarbons as ambient air pollutants: Report of the Working Group on Polycyclic Aromatic Hydrocarbons of the Joint Task Force on the Health of Air Pollution[9]". The report summarized the recent findings on the relationship between exposure to PAHs from ambient air and different health outcomes. The report concluded that PAHs were important to several cancers, such as lung cancer, breast cancer, childhood cancer, as well as to a number of non-cancer health effects, e.g. development and exacerbation of asthma and cardiovascular disease and adverse effects on neurodevelopment in children. Additionally, the report concluded that besides B[a]P, other highly potent carcinogenic PAHs and PAHs mixtures should also be considered and of the carcinogenic PAHs, individual PAHs might differ in carcinogenic potency by an order of magnitude. The representative pointed at the knowledge

[8] Officially called the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe.

[9] Available at https://apps.who.int/iris/handle/10665/350636?msclkid=c497acd9d09e11ecbc3b089caca62cfa.

gaps, including the following: whether B[a]P was a representative marker for exposure to other PAHs; whether current WHO guidelines for B[a]P provided sufficient protection against diseases other than cancer; need to explore non-cancer health end-points of PAHs exposure in order to establish regulatory guidelines for the non-cancer effects of PAHs; and lack of high-resolution exposure data. In relation to policy implication, the representative explained that for carcinogenic PAHs, the lowest possible exposure should be aimed to minimize the risk of cancer development in view of a no-effect threshold; monitoring programmes should be optimized to support the protection of populations from PAHs exposure; and PAHs were often emitted from the same sources as other common air pollutants.

V. Progress in research on health impacts of air pollution

17. An expert from the Health Effects Institute (United States of America) presented an overview of the systematic review of selected health effects of long-term exposure to traffic-related air pollution. The systematic review had been peer reviewed by an independent review panel in 2021, and after the revision was undergoing editing. The expert provided the key methodological features of the review, such as: to evaluate the epidemiologic literature only; to focus on a selected set of health outcomes chosen a priori; to consider only long-term exposure to traffic-related air pollution; to consider exposure contrasts in near-roadway and neighborhood environments; and to assess confidence in the evidence for an association with two complementary methods with ratings of very low, low, moderate, or high for traffic-related air pollution mixture, not individual pollutants. Most of the studies were published after 2008. Nitrogen dioxide (NO_2) was the traffic-related exposure indicator that was most widely used, followed by elemental carbon (EC) and fine particulate matter ($PM_{2.5}$). The health outcomes associated with traffic-related air pollution were as follows: term low birth weight, small for gestational age (birth outcome); asthma onset, acute lower respiratory infections, active asthma (in children); and all-cause mortality, circulatory mortality, ischemic heart disease mortality, lung cancer mortality, asthma onset, respiratory mortality, ischemic heart disease events, and diabetes (in adults). Overall, the findings had provided an overall high or moderate-to-high level of confidence in an association between long-term exposure to traffic-related air pollution and the adverse health outcomes, such as all-cause, circulatory and ischemic heart disease mortality, lung cancer mortality, asthma onset in children and adults, and acute lower respiratory infections in children.

18. An expert from Washington University in St. Louis (United States of America) gave a presentation on source sector and fuel contributions to ambient $PM_{2.5}$ and attributable mortality across multiple spatial scales. Throughout the presentation, the expert focused on two questions: what the sources of ambient $PM_{2.5}$ were; and what the health impacts in all countries were. The expert explained the approach how to find major air pollution emission sources, and how to conduct emissions sensitivity simulations with a global atmospheric chemistry transport model. Previous studies, which quantified the relative contribution of different sectors both at the global scale and for different countries as well, provided useful starting point, However the studies were limited to previous years, and emission sources and $PM_{2.5}$ were changing quickly, as well as there was lack of consistency across countries, completeness, transparency and connection to health endpoints. A detailed inventory of fuel- and sector-specific emissions for 1970-2017 showed that globally about 50 per cent of the $PM_{2.5}$ disease burden was attributable to fuel combustion, and nearly 27 per cent of total $PM_{2.5}$ attributable deaths (1.05 million) were linked to fossil-fuel combustion. Globally, about 3.8 million deaths in 2017 were attributed to long term exposure to ambient $PM_{2.5}$, and coal was the dominant fuel type contributing to $PM_{2.5}$ across parts of Europe, Asia, and South Africa. Dominant sectors varied regionally and within countries, and increased spatial resolution provided policy-relevant information.

19. A representative of the United Kingdom of Great Britain and Northern Ireland gave a presentation on quantifying effects on mortality due to particulate air pollution.[10] It

[10] See https://www.gov.uk/government/publications/particulate-air-pollution-quantifying-effects-on-mortality.

summarized the recent work on quantifying mortality associated with long-term exposure to $PM_{2.5}$ finalised by the Committee on the Medical Effects of Air Pollutants (COMEAP) in March 2022. Previous recommendations for long-term exposure to $PM_{2.5}$ on all-cause mortality were as follows: concentration-response function (CRF) of 1.06 (95 per cent Confidence Interval: 1.04, 1.08) per 10 µg/m^3 $PM_{2.5}$; cut-off that extrapolated to zero anthropogenic pollution or applying a cut-off of 7 µg/m^3; cessation lag of 30 per cent of the risk reduction in the first year after pollution reduction, 50 per cent across years 2-5 (i.e. 12.5 per cent per year) and the remaining 20 per cent of the risk reduction distributed across years 6-20; and exposure assessment of annual mean concentrations at "background" sites simulated by pollution climate mapping at a spatial resolution of 1 km x 1 km. Since 2018, there had been a number of developments in the new systematic reviews, meta-analyses, and studies in cohorts exposed to lower concentrations. The representative explained the challenges in interpretation on new studies of lower concentrations. The view of COMEAP in relation to the challenges was "there is, as yet, no consensus on the shape of the CRF at lower levels of $PM_{2.5}$ and we do not consider the evidence sufficient, at this time, to recommend any change from the current assumption of a linear CRF when quantifying the effects associated with long-term exposure to $PM_{2.5}$". The new recommendation from COMEAP in 2022 were as follows: CRF of 1.08 (95 per cent Confidence Interval: 1.06 - 1.09); quantification to zero $PM_{2.5}$ with no recommendation for a cut-off and assumption of continuing linearity; same cessation lag as previously; uncertainties of heterogeneity in associations, and attribution of causality to individual pollutants.

20. A representative of WHO headquarters presented an update of WHO Ambient Air Quality Database. Until now, WHO had published five compilations of worldwide annual mean concentrations of particulate matter (PM_{10} and $PM_{2.5}$), with the databases published in 2011, 2014, 2016, 2018, and 2022. The representative explained the fifth update of WHO Ambient Air Quality Database that was released in early April 2022, which included: about 6700 human settlements, mostly in Europe, North America and some Asian countries; settlement size ranged from less than 100 to over 30 million inhabitants; data was available for 117 countries. For the first time, NO_2 measurements were included, in addition to $PM_{2.5}$ and PM_{10}.[11] Primary data source was official reports of countries sent to WHO and official national and subnational reports and websites. In case official data was not available, results from publications in peer-reviewed journals were used. The highest levels of PM were reported in Asia, Middle East and Africa; for NO_2 levels, there was less heterogeneity across regions than for PM. Comparison of PM levels by income group indicated higher exposure in low-middle-income countries by a factor of about 3 in comparison with high-income countries, while only 1.5 for NO_2. Data from different countries were of limited comparability because of different location of measurement stations, measurement methods, etc. Another limitation was a possible inclusion of data not eligible for this database due to insufficient information to ensure compliance, and omission of the existing but not accessible data. The next step would be an update with 2020 data by the fourth quarter of 2022, and the discussion in the GAP-TAG to advise on the future version of the database.

21. An expert from Swiss Tropical and Public Health Institute (Switzerland) presented health risk assessments for air pollution in Switzerland, highlighting interim results of the project for quantification of health impact of air pollution in Switzerland (QHIAS). The project started in March 2021 and will be finalised in September 2023. Comparison of air pollution health risk assessments (AP-HRAs) for Switzerland was implemented, and the methodological handbook for AP-HRAs was drafted. Additionally, the sensitivity analysis of mortality attributed to air pollution in Switzerland in 2010 will be conducted later in 2022, and the quantification of mortality attributed to air pollution in Switzerland in 2018 will be published in February 2023; finally, the methodological handbook will be published in September 2023. In the comparison of AP-HRAs on all-cause adult mortality attributable to particulate matter between the Swiss assessments for transport externalities (STEs) and international AP-HRAs providing specific results for Switzerland, all population-normalized mortality impacts were lower in STEs than health impacts of air pollution from European Environment Agency (EEA). In contrast, the STEs values were higher than in Global Burden of Disease (GBD) and burden of disease calculation for ambient air pollution from WHO.

[11] See https://www.who.int/data/gho/data/themes/air-pollution/who-air-quality-database.

Regarding input data, the ratio of AP-HRAs value and STEs value in 2010 ranged from 0.69 to 1.10 for population exposure, from 0 to 1.81 for counterfactual scenario, from 0.96 to 1.31 for concentration-response function and from to 1.13 for baseline health data. The comparison of AP-HRAs in Switzerland had been recently published in Public Health Reviews.[12]In relation to the draft of methodological handbook, it covered all relevant input data, and one of the most relevant aspects was how to aggregate health impacts from multiple air pollutants.

22. An expert from Lund University (Sweden) presented the evidence of effect and exposure–response functions for $PM_{2.5}$ and NO_2 linked to morbidity, published[13] in 2022. To examine and evaluate which morbidity impacts (long term) were appropriate to include in health impact assessments, the expert used the Health risks of air pollution in Europe (HRAPIE) from WHO in 2013; 2016 Global Burden of Disease (GBD) from WHO; the Environmental Benefits Mapping and Analysis Program; findings from the latest GBD published in 2021; the Integrated Science Assessment for PM, O_3, and nitrogen oxides/dioxide (NO_2/NO_x) from the US Environmental Protection Agency; recently published review articles for NO_2/NO_x exposure; and a review[14] by Perera et al. 2019. Weight of evidence for causal determination of selected health outcomes and long-term and short-term exposure to $PM_{2.5}$ and NO_2 was distinguished as: causal relationship; likely to be a causal relationship; and suggestive of a causal relationship. The expert explained the sieve tables on the NO_2 and outcomes, and $PM_{2.5}$ and outcomes, which included the categories to be evaluated: enough evidence, enough economic reasons, reliable data for a health impact assessment, and without risk of double counting. In relation to NO_2 and outcomes, effects to be included without risk of double counting were low birth weight (at term), preterm birth, lung cancer, and asthma. Health effects attributable to $PM_{2.5}$ that could be included without risk of double counting were lung cancer, myocardial infarction, stroke, chronic obstructive pulmonary disease (COPD), preterm birth, and low birth weight (at term). The expert also provided exposure-response function that could be used for the different outcomes and NO_2, $PM_{2.5}$. The exposure-response function for stroke (age ≥30 years) and $PM_{2.5}$ was 1.10 per 5 $\mu g/m^3$, and that of COPD (age ≥50 years) and NO_2 is 1.07 per 10 $\mu g/m^3$.

23. A representative of WHO headquarters gave a presentation on the project on the Estimation of Morbidity from Air Pollution and its Economic Costs (EMAPEC). The focus of EMAPEC was on the health and economic effects of exposure to fine particulate matter ($PM_{2.5}$) on diseases that were likely to have a large economic burden (e.g., cardiovascular diseases, asthma, diabetes), and the objective was to establish a methodology to estimate economic costs of selected morbidity outcomes of exposure to air pollution in a population and to test its application at various geographical scales (national, regional and global). The methodology and results produced through this project would enhance the communication of clean air benefits to decision makers by allowing them to directly compare the economic gains from reduced morbidity in the market costs to the investments into mitigation action. Two virtual meetings were organized to discuss the current reviews of evidence, methods and applications, identification of data gaps, research needs, and the next steps for the project implementation. The key questions discussed in economic impacts of air pollutants were: the confirmation of the selection of air pollutants and causes of mortality; prioritization of morbidity outcomes from an economic point of view; disaggregation of age groups and social groups to be used; the types of economic evaluation, methods and costs suggested for use; and, how to address the global scope of work and the time-frame. The project started in October 2021; the systematic reviews are to be finalised by June 2022, and the project to be concluded in the beginning of 2023.

24. An expert from the Imperial College London (United Kingdom of Great Britain and Northern Ireland) gave a presentation on the update of Health Risks of Air Pollution in Europe (HRAPIE-2) project, coordinated by the WHO European Centre for Environment and

[12] See https://www.ssph-journal.org/articles/10.3389/phrs.2022.1604431/full).

[13] Oudin, A., Flanagan, E., Malmqvist, E., & Forsberg, B. (2022). Evidence of effect and exposure-response functions for $PM_{2.5}$ and NO_2 linked to morbidity.

[14] Perera, F., A. Ashrafi, P. Kinney and D. Mills (2019). "Towards a fuller assessment of benefits to children's health of reducing air pollution and mitigating climate change due to fossil fuel combustion." Environmental Research 172: 55-72.

Health. The expert presented the rationale for this work, which included the new evidence providing concentration-response functions (CRFs); new WHO AQGs, which used systematic reviews on the effects of $PM_{2.5}$, PM_{10}, O_3 and NO_2 on mortality; and ongoing work of several groups on CRFs. An update of CRFs has also been included in the 2022-2023 work plan of Task Force on Health. Additional opportunity was provided by the WHO EMAPEC project (described above), which enabled HRAPIE-2 to focus on mortality outcomes. The scope of the HRAPIE-2 project would be on $PM_{2.5}$, PM_{10}, NO_2, ozone and mortality, focusing on long-term effects, and on the WHO European region. It would focus on systematic reviews with discussion on the results of pooled analysis or individual major studies. In relation to $PM_{2.5}$ and long-term exposure, new meta-analyses would be needed for all non-accidental mortality and selected cause-of death mortality (for diagnostic groups and more specific causes of death). In relation to PM_{10} and long-term exposure, it was suggested to review literature in search for studies on long-term PM_{10} exposure and infant mortality, to do a meta-analysis if new studies were found, and to include in a meta-analysis the new studies mentioned in Chen & Hoek 2020 paper[15]. The proposed work on ozone and long-term exposure was to develop CRFs for all non-accidental and respiratory mortality based on all studies considered in the WHO AQG update. Regarding NO_2 and long-term exposure, new meta-analyses were needed for all non-accidental mortality and selected cause of death mortality. The expert shared the timeline of the project and indicated that the report of the HRAPIE-2 project should be published by the end of 2023.

VI. Tools on air quality and health

25. An expert from Spadaro Environmental Research Consultants (United States of America) presented an update of the WHO Climate Mitigation, Air Quality and Health (CLIMAQ-H) software, which was previously called the WHO Carbon Reduction Benefits on Health (CaRBonH) calculation tool. The development of CLIMAQ-H is coordinated by WHO European Centre for Environment and Health. CLIMAQ-H was a decision-support tool to facilitate efforts of Member States to screen different carbon mitigation pathways, by comparing potential health and economic co-benefits achieved through implementation of the targets of their Nationally Determined Contributions (NDC). The CLIMAQ-H had enhanced capabilities over its predecessor CarbonH, in particular: improved methods to calculate health and economic benefits of climate mitigation actions; updated default input data; greater flexibility to manipulate/replace modelling parameters and default information; greater choice of risk models to quantify health gains; uncertainty treatment; and improved user-friendly interface. In addition, EU-28 has been replaced by individual EU-27 countries. The basic analysis in CLIMAQ-H involved a pre-analysis of the baseline and alternative pathways in year 2030; the minimalistic user inputs included the reduced emissions of critical pollutants, such as $PM_{2.5}$ (or PM_{10}), SO_2, NO_x and NH_3, linked to CO_2 and other greenhouse gas emission reductions. The CLIMAQ-H came preloaded with default demographic data, health statistics, epidemiological functions, and economic data; in case additional data are available, users may use the advanced analysis. The output from CLIMAQ-H was: $PM_{2.5}$ exposure reduction; health gains from avoided premature mortality and prevented incidences of illness in children and adults; and monetised health benefits from avoidable health care costs, increased economic productivity and welfare gains. The expert shared an example on the health and economic benefits of Colombia's NDC, with the accumulated mortality benefit of 13,175 for 10 years by the year of 2030.

26. An expert from the Macedonian Academy of Sciences and Arts (North Macedonia) provided a case study on the application of CaRBonH tool in North Macedonia. The expert used the MARKAL (MARket ALlocation) model and CaRBonH to evaluate the benefits on human health associated with improvements in ambient air quality that could be expected from the implementation of mitigation policies and measures in the energy sector. In relation to input data into CaRBonH tool, relative to the base year 1990, greenhouse gas emissions in North Macedonia would be reduced by 51 per cent, or 6,420 kt CO_2-eq, of which the energy sector would contribute 98.5 per cent, or 6,321 kt CO_2-eq. Under the NDC scenario, the envisaged energy efficiency measures would decrease the $PM_{2.5}$ emissions, resulting in 2.15

[15] Chen J, Hoek G. Long-term exposure to PM and all-cause and cause-specific mortality: A systematic review and meta-analysis. Environ Int. 2020 Oct;143:105974. doi: 10.1016/j.envint.2020.105974.

kt fewer emissions in 2030 than under the Business as Usual scenario. The outputs of the CaRBonH tool showed that reduction of greenhouse gas emissions would result in the reduction of the population exposure to $PM_{2.5}$ concentrations by 1.097 µg/m^3. Additionally, the preventable mortality from air pollutant emissions in 2030 in North Macedonia would be 143 deaths, representing 28 per cent of the total avoidable deaths, and the benefit of reduced air pollution in terms of years of life lost would be 1,568 years gained in 2030 at a national level, or 31 per cent of the total life-years gained in the region. The economic benefit of the prevented illnesses and mortality attributable to $PM_{2.5}$ in 2030 was $1,457 million in 2005 prices, if the value of the statistical life (VSL) was used, and $624 million in 2005 price if the value of a life year (VOLY) was used. The per capita savings due to the improved air quality in North Macedonia were estimated to be $136 in 2005 prices, if mortality was valued as deaths, or $62 in 2005 prices if mortality was valued as Years of Life Lost (YLL).

27. A representative of the WHO European Centre for Environment and Health presented progress in the development of the WHO AirQ+ software. AirQ+ is a user-friendly tool for estimating the magnitude of the most important and best recognized health impacts of air pollution in population. It was designed for public health or environmental specialists with a minimum knowledge of atmospheric modelling, statistical methods, epidemiology or geographic information systems. It was designed to calculate how much of a particular health impact was attributable to selected air pollutants; and, compared to the current scenario, what would be the change in health impacts if air pollution levels changed in the future. The software is downloadable online[16]. There had been seven updates of AirQ+ software, with five manuals in four languages; as of May 2022, a new version (AirQ+ 2.2) was under test, which would include the update of default parameters based on the WHO AQGs, improved Life Table module, updated Global Burden of Disease functions, and General Matrix Multiplication (GEMM) function available. The representative shared future plans, including: collecting feedback on AirQ+ 2.2; an update of AirQ+ manuals; an update of the Polish and Spanish language versions of AirQ+; further update of AirQ+, with economic module (only in English); identification of priority needs for further updates and improvements; development of additional supporting documentation; harmonization with other WHO tools; and dissemination activities to gather feedback from external experts.

VII. Communication and public health messages on air pollution

28. An expert from Owl RE (Switzerland) gave an overview of effective risk communication for environment and health, drawing mainly from the findings of the 2021 report[17] on that subject. Objectives of risk communication include: to develop understanding of risk, threats, and hazards; to encourage people to adopt risk-reduction behaviour; to promote credibility of institutions that deal with risk; and to involve public in risk management decision-making. Risk communication becomes increasingly important due to increasingly complex, global and uncertain risks; declining trust in experts and authorities; move from one-way to two-way and multidirectional communication; loss of influence of traditional media and fragmentation of channels; and the rise of fake news, malinformation and infodemics. Six challenges for risk communication for environmental health were identified, such as: the difficulties of closing the gap between expert and public risk perceptions; dealing with uncertainty and changing scientific evidence; the shift in who was considered a trusted source; managing the channels to counter the spread of misinformation (and malinformation); the resources, capacity and skills needed for risk communication; and reframing information so that it was understood by the public. Regarding risk communication for air pollution, people tend to consider air pollution as an issue for others or community but not for them. It was important to understand how to balance messaging that communicates the necessary level of risk but is not counter-productive, as well as how to develop two-way communication on air pollution, including how feasible localised and personalised messaging on air pollution is. The trust in the source was also an important issue for air pollution and

[16] Available at https://www.who.int/europe/tools-and-toolkits/airq---software-tool-for-health-risk-assessment-of-air-pollution.

[17] Available at http://apps.who.int/iris/handle/10665/349338?locale-attribute=en.

risk communication. The expert finally shared a report on the systematic analysis of recommendation for air pollution communication.[18]

29. An expert from the Imperial College London (United Kingdom of Great Britain and Northern Ireland) provided an overview of the report[19] on investigating the links between air pollution and COVID-19, and air pollution and lower respiratory infectious diseases. The work built on the preceding report[20], which reviewed key studies published by November 2020. The expert shared the plausible hypothesis that long-term exposure to pollutants would increase the number and severity of COVID-19 cases since the start of the pandemic and pointed out the issue of misleading correlations in addition to inaccuracies in estimating the numbers of COVID-19 cases. In relation to long-term air pollution, of the five studies including individual data, four showed a causal association between exposure to air pollutants and COVID-related health outcomes. Some of the ecological studies reviewed provided evidence to support the hypothesis that pre-existing long-term exposure to air pollution would increase the severity of COVID-19. In relation to short-term air pollution exposure, 27 papers were identified and reviewed, and there was considerable variation in the results of these studies. The studies of transmission of the virus via PM had two approaches of direct measurement of viral RNA on PM, and association studies between PM concentrations and spread of the virus. Overall, PM influence on transmission of the virus was unlikely to provide any significant risk. Speaking about air pollution and lower respiratory infections, the expert emphasized: increased number of studies on $PM_{2.5}$ published since 2011 provided evidence for an association with hospital admissions for lower respiratory infections; the results for PM_{10} were more mixed at least since 2011; only small numbers of studies examining NO_2 and O_3 were available; and this area of evidence did lend some plausibility to an effect of air pollution on hospital admissions with COVID-19.

30. A representative of the European Commission presented the European air quality mobile application. The representative also explained the European Air Quality Index (EAQI), highlighting that the EAQI displays up-to-date air quality information for Europe; is based on concentration values for up to five key pollutants of PM_{10}, $PM_{2.5}$, O_3, NO_2, and SO_2; is calculated hourly for more than 3,500 air quality monitoring stations; uses a combination of up-to-date data reported by the EEA member countries and forecasts of the air quality level, as provided by the Copernicus Atmosphere Monitoring Service. The EAQI had bands of concentrations, index levels based on the relative risks associated to short-term exposure as defined by the HRAPIE project, and health messages.In order to improve the accessibility of the existing EAQI web version, the EAQI mobile app was released at Clean Air Forum in November 2021. It mirrors the functionalities of the EAQI web version, adding more functionalities of favourite air quality stations, air quality at a given location via the Global Positioning System, notifications and alerts, statistics. The representative also illustrated how to explore air quality information and how to select a location on the EAQI mobile app. The representative finally presented the plan for further development of the EAQI mobile app, including translation into 24 languages; alternative colour schemes for visually impaired; personal exposure tracking; station comparison and evolved statistics; newsfeed on air quality; update of the air quality index according to the WHO AQGs; and update of the health recommendations based on the Sharing Key Air Pollution and Health Information in Europe (SKAPHIE) project.

[18] Riley, R., de Preux, L., Capella, P., Mejia, C., Kajikawa, Y., & de Nazelle, A. (2021). How do we effectively communicate air pollution to change public attitudes and behaviours? A review. *Sustainability Science*, 16(6), 2027-2047.

[19] Available at https://www.imperial.ac.uk/school-public-health/environmental-research-group/research/air-pollution-epidemiology/air-pollution-and-covid-19/.

[20] Brunekreef, B, Downward, G, Forastiere, F, Gehring, U, Heederik, DJJ, Gerard, H, Marion P. G., K, Lidwien A. M., S & Vermeulen, RCH 2021, Air pollution and COVID-19. Including elements of air pollution in rural areas, indoor air pollution and vulnerability and resilience aspects of our society against respiratory disease, social inequality stemming from air pollution. study for the committee on Environment, Public Health and Food Safety, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg. Available at https://www.europarl.europa.eu/RegData/etudes/STUD/2021/658216/IPOL_STU(2021)658216_EN.pdf.

31. An expert from New York University (United States of America) provided an overview of air quality indices for risk communication of outdoor air quality in Europe, which is part of the SKAPHIE project, coordinated by WHO European Centre for Environment and Health. The expert shared the key findings from review of EAQI, highlighting considerable variation in how countries in Europe report air quality risks to the general public. Most countries in Europe use a country-specific air quality index instead of the uniform EAQI provided by EEA. This might indicate that uniform risk communication approaches (particularly for the accompanying health messaging) were not flexible enough to account for differences in baseline concentrations, air pollution mixtures, cultural differences with regards to outdoor activities, and health risk preferences. Importantly, there is a critical and urgent need to validate air quality indices using local health data. In total, 37 countries in Europe, including 22 European Union countries, were analysed, with the review of 36 monitoring websites and 18 official apps. The expert presented examples comparing air quality indices from Czech Republic, Estonia, France, Iceland, Ireland, Malta, and United Kingdom of Great Britain and Northern Ireland, the results of which indicated that despite similar pattern, there was a variation in terms of how many levels were being reported to the public, the number and the type of pollutants that were used, and the cut-off points. The need for revisions and updates of air quality indices because of new WHO AQGs was emphasized. The expert also provided illustrative examples of Iceland and Uzbekistan in relation to health messaging on air quality indices, indicating that good health messaging had the following distinct elements: affected populations; symptoms that people might experience if they were affected; and recommendations on specific behavioural changes to reduce exposures and health risk.

32. An expert from Colorado State University (United States of America) gave a presentation on personal-level interventions to reduce outdoor air pollution exposure. SKAPHIE project, mentioned above, aims to summarize evidence on personal-level interventions to reduce outdoor air pollution exposure. It was emphasised that personal interventions should be considered as temporary supplemental solutions, until air quality levels were improved. The expert presented eight personal-level interventions, including: reducing time spent in polluted outdoor environments; physical activity location and time; portable air cleaners; central air cleaners and heating ventilation and air conditioning; respirators; face masks; active transport and routes; and driving style and vehicle settings. The key features for each personal-level intervention were analysed in the perspective of effectiveness, limitations, risks and harms, environmental impacts, cost, and social factors and inequities. For example, social inequities may affect access to indoor facilities and housing, building quality, and who is considered an essential worker. Effectiveness may vary based on indoor measures, outdoor emissions in view of feasibility. The expert wrapped up that based on the narrative review of systematic reviews and expert consultation, there was very limited evidence available for drafting the advice on personal-level interventions.

VIII. Collaboration and Workplan of the Task Force on Health

33. An expert from the Department for Environment, Food and Rural Affairs (United Kingdom of Great Britain and Northern Ireland) provided an overview of Task Force for International Cooperation on Air Pollution (TFICAP). In order to promote international collaboration towards preventing and reducing air pollution to improve air quality globally, TFICAP aims to act as a forum for international exchange and mutual learning, to facilitate the sharing of science, technical and policy expertise internationally. The expert shared the TFICAP workplan for 2022–2023, highlighting the following items: the outreach and engagement in summer 2022; development of website in autumn 2022; first TFICAP meeting in October 2022; and first forum event in Sweden in March 2023. The expert also presented current activities of TFICAP, including presentation at meetings of International Cooperative Programmes, and Task Forces under the Convention on Long-Range Transboundary Air Pollution; organization of the first Task Force meeting on 10-12 October, 2022 in Bristol, United Kingdom of Great Britain and Northern Ireland; outreach and collaboration with other organisations and forums; and translation of the Convention documents identified as of global interest.

34. A representative of the WHO European Centre for Environment and Health provided an overview of the accomplishments of the Task Force on Health in relation to workplan for 2020-2021, including the launch of the WHO global air quality guidelines on 21 September 2021 and publication of the Human health effects of polycyclic aromatic hydrocarbons as ambient air pollutants: Report of the Working Group on Polycyclic Aromatic Hydrocarbons of the Joint Task Force on the Health of Air Pollution in December 2021.

35. The representative also presented activities planned under the 2022–2023 workplan (ECE/EB.AIR/GE.1/2021/18−ECE/EB.AIR/WG.1/2021/11):

(a) Consolidate existing evidence on health outcomes of exposure to air pollution; a report on methods for health risk/impact assessment of air pollution and cost-benefit analysis (update to HRAPIE project); an overview on air pollution and COVID-19 (optional, pending resources);

(b) Further develop methodologies for assessment of direct and indirect impacts of long-range transboundary air pollution on human health; update of tools for quantification of the health impacts of air pollution, including links to climate change mitigation; assessment of health co-benefits and trade-offs between climate change and clean air agendas (optional, pending resources);

(c) Cooperation with other projects and bodies (outreach activities); capacity-building for the health impact assessment of air pollution at regional and subregional levels; development and implementation of the capacity-building curriculum to address different needs;

(d) Promote health messages related to air pollution in Europe; formulation of health messages in air pollution, including on personal-level interventions; workshop on risk communication, including for medical professionals, on health messages related to air pollution to the public and at individual level.