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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

Fifth joint session
Geneva, 9–13 September 2019
Item 14 of the provisional agenda
Progress in activities in 2019 and further development of effects-oriented activities

Effects of air pollution on health

Report of the Joint Task Force on the Health Aspects of Air Pollution on its twenty-second 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 the request of the Executive Body for the Convention on Long-range Transboundary Air Pollution in the 2018–2019 work plan for the implementation of the Convention (ECE/EB.AIR/140/Add.1, items 1.1.1.7, 1.1.1.17–1.1.1.19 and 1.1.3.1–1.1.3.3).

The report presents the results of the discussions on the health impacts of ambient air pollution and other workplan items at the Task Force's twenty-second meeting (Bonn, Germany, 15 and 16 May 2019).

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Contents

I. Introduction

1. The present report summarizes the results and discussions on the health impacts of ambient air pollution presented at the twenty-second 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. The report also provides a summary of workplan items discussed at the meeting, in accordance with the 2018–2019 workplan for the implementation of the Convention (ECE/EB.AIR/140/Add.1) adopted by the Executive Body at its thirty-seventh session (Geneva, 11–14 December 2017).

2. The twenty-second meeting of the Task Force on Health was held in Bonn, Germany, on 15 and 16 May 2019. Altogether, 38 representatives from 37 Parties to the Convention attended the 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 Ms. Dorota Jarosińska (WHO European Centre for Environment and Health) and co-chaired by Ms. Alison Gowers (United Kingdom of Great Britain and Northern Ireland). Mr Fahad Alfahad (WHO European Centre for Environment and Health) acted as rapporteur. Sixteen temporary advisers participated in the meeting from the following organizations: the International Institute for Applied Systems Analysis, the Health Effects Institute (United States of America); Health Canada (Canada), Staffordshire University (United Kingdom of Great Britain and Northern Ireland), King’s College London (two experts) (United Kingdom of Great Britain and Northern Ireland), the University of Düsseldorf (Germany), the L’Institut Paris Région (France), the Swiss Tropical and Public Health Institute (Switzerland), the Swedish Environmental Protection Agency (Sweden), Sun Yat-Sen University (China), the National Institute for Public Health and the Environment (Netherlands), Santé publique France (France), the Max Planck Institute for Chemistry (Germany), the United States Environmental Protection Agency National Center for Environmental Assessment (United States of America) and the Health and Environmental Alliance (Belgium). Two observers participated: one from the Regional Environmental Centre for Central Asia (Kazakhstan) and one from the Norwegian Institute for Air Research (Norway).

II. National and international policies and processes on air quality and health

A. Updates on partner organizations’ activities

3. A representative of the Convention secretariat provided an overview of the outcomes of the thirty-eighth session of the Executive Body (Geneva, 10–14 December 2018), highlighting the adoption of the long-term strategy for the Convention for 2020−2030 and beyond (Executive Body decision 2018/5). The strategy’s priorities included: targeting ozone (O_3) and particulate matter (PM) as key pollutants; identifying linkages in scales (from urban to global); linking air pollution with climate change and biodiversity; and outreach to other organizations and conventions. Additionally, the Executive Body had begun preparations for the review process of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), which had been amended in 2012. The Gothenburg Protocol was expected to receive one more ratification in the coming months, hence bringing it into force. Both the Working Group on Effects and the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe would contribute to the review process. In relation to capacity-building managed by the secretariat, several workshops had been carried out on the development of national emission inventories in some countries in Eastern Europe, Caucasus and Central Asia, in addition to policy round table discussions on national legislation. A representative of the secretariat had participated in a pilot training course on the use of the AirQ+ software tool, organized by WHO European Centre for Environment and Health (Sarajevo, 12–16 November 2018). The secretariat had organized a special event during the thirty-eighth

session of the Executive Body on outreach and facilitating knowledge sharing with countries and partner organizations outside of the ECE region. The aim of the event had been to discuss clean air globally and share experiences in reducing air pollution. That had led to the idea of setting up a forum for collaboration on clean air with non-ECE regions. The forum was expected to be launched during the celebration of the fortieth anniversary of the Convention at the thirty-ninth session of the Executive Body (Geneva, 9–13 December 2019).

4. A representative of the European Commission provided an overview of the air quality challenges faced in the European Union, emphasising that, despite improvements, air pollution in Europe remained a problem. Air pollution was responsible for 400,000 premature deaths annually (European Environment Agency estimates), as well as for one in seven deaths from lung cancer. From an economic perspective, direct costs, such as loss of productivity, and indirect costs, such as loss of life expectancy, amounted to €24 billion per year and between €330 billion and €940 billion per year, respectively. Environment-wise, approximately 72 per cent of ecosystems had exceeded allowable limits for eutrophication. Particulate matter particles with an aerodynamic diameter equal to or less than 10 micrometres (PM_{10}) and nitrogen dioxide (NO_2) had been identified as key pollutants exceeding the allowable limits in the European Union. PM_{10} was linked to fuel combustion involving poor-quality fuel or occurring in areas that did not allow for dispersion, such as northern Italy. NO_2 was mainly linked to transport, in particular diesel engines; hence exceedances often occurred in large urban areas. Numerous sources of air pollutants, which originated across all scales, required a comprehensive package. The European Commission communication entitled “A Europe that protects: clean air for all”[1] had three pillars: the Ambient Air Quality Directives;[2] the National Emission Ceilings Directive;[3] and some source-specific emission standards, for example, the Industrial Emissions Directive.[4] In setting European Union standards, technoeconomic aspects had been considered, whereas WHO air quality guidelines had drawn on evidence-based health recommendations. Air quality directives did not prescribe measures to be taken by member States due to the principle of subsidiarity, however, the “A Europe that protects: Clean air for all” communication[1] suggested measures to reduce air pollution. In order to help implement the targets, incentives in the form of funding had been offered that totalled €1.8 billion allocated for air quality from 2014 to 2020. Nevertheless, approximately 30 infringement cases had also been recorded involving member States not abiding by their commitments. Dialogue with several forums, including the Clean Air Dialogue and the Clean Air Forum (most recently held in Paris, on 16 and 17 November 2017), had been found to be useful.

B. Updates on World Health Organization regional activities

5. A representative of WHO headquarters provided a follow-up to activities including: the WHO Global Conference on Air Pollution and Health (Geneva, 30 October–1 November 2018); the development of a Global Energy-Health Platform of Action; and the development of health sector training; and communication. One main outcome of the WHO Global Conference had been the Geneva Action Agenda to Combat Air Pollution, which was a voluntary, non-negotiated document. Additionally, voluntary commitments made by

[1] European Commission, “Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Europe that protects: Clean air for all” COM (2018) 330 final.

[2] Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, *Official Journal of the European Union*, L 23 (2005), pp. 3–16; and Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, *Official Journal of the European Union*, L 152 (2008), pp. 1–44.

[3] Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC, *Official Journal of the European Union*, L 344 (2016), pp. 1–31.

[4] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control), *Official Journal of the European Union*, L 334 (2010), pp. 17–119.

participants had been compiled, including on goals and standards, policies and investment, monitoring and forecasting, advocacy and strengthening capacity. Those commitments would be presented in a qualitative report at the United Nations Climate Action Summit in September 2019, highlighting the link between climate and the air pollution agenda. The Director-General of WHO had made five commitments, including: the establishment of a Global Energy-Health Platform of Action; equipping health workers to be agents for change; and scaling up the WHO air pollution programme. Clean cooking had been identified as an area to be tackled as a priority, creating synergy between energy and health and combining Sustainable Development Goals 3, 7 and 13. Training efforts focused on equipping the health sector, namely clinicians and public health professionals, with competencies to deal with air pollution, in line with World Health Assembly resolutions A68/8, of 2015, and A69/18, of 2016. In that regard, a toolkit was planned, which would include a training-of-the-trainers manual and screening tools for clinicians. Other WHO technical activities included: the Global Platform on Air Quality and Health; non-communicable disease-related activities; and the Clean Household Energy Solutions Toolkit (CHEST). As to communication, WHO was seeking a new strategy to balance technical information and awareness-raising with activities in regional offices, including analysing YouTube videos to investigate how to improve video communication. WHO worked with partners on global awareness campaigns, such as BreatheLife, which targeted cities, the general public and the health sector and which aimed to involve local champions.

6. A representative of the WHO European Centre for Environment and Health provided a brief overview of the activities carried out with experts and stakeholders. The flagship of the WHO European Centre for Environment and Health was the ongoing project on the development of WHO Global Air Quality Guidelines, which was in its third year. Another activity was capacity building in air quality and health, with the first subregional workshop on that issue being held in Sarajevo, in November 2018. Efforts had been made to develop methods and tools, including AirQ+ (a software tool for health risk assessment of air pollution) and the new Carbon Reduction Benefits on Health (CaRBonH) calculation tool, acknowledging the links between climate change and the air quality and health agenda. An expert consultation on the health impact assessment of NO_2 in the European region had been held in Bonn, Germany, in February 2019. Following the recognition of air pollution as a risk factor for non-communicable diseases by the United Nations in 2018, the WHO European Centre for Environment and Health had participated in the WHO European High-level Conference on Non-communicable Diseases (Ashgabat, 9 and 10 April 2019), at which it had presented, for the first time in that forum, the topic of air pollution and health. The aim had been to integrate consideration of air pollution as a risk factor for non-communicable diseases and to introduce interventions to improve air quality as one of the measures to reduce the burden of non-communicable diseases. The work with member States continued to support the development of national portfolios of actions in response to the sixth Ministerial Conference on Environment and Health (Ostrava, Czechia, 13–15 June 2017). Sustainable Development Goals would be used as the main indicators in monitoring the progress in the implementation of the Ostrava commitments.

III. Country experiences on air quality and health

7. An expert from the National Institute for Public Health and the Environment of the Netherlands presented an action programme involving cities and the national Government, aimed at reducing health risks and ensuring continuous air quality improvements beyond the current air quality limit values and, in the future, beyond the WHO air quality guidelines values. The current concentrations in the Netherlands were already quite low; for example, PM_{10} concentrations were compliant with European Union air quality limit values, and were almost at WHO air quality guideline values. For NO_2, concentrations at traffic stations exceeded the limits, however, with a downward trend due to the introduction of cleaner cars. One of the main issues was the amount of pollutant reduction that national measures could achieve as compared to the transboundary contribution. It was estimated for $PM_{2.5}$ (primary and secondary) and NO_2 that transboundary contribution was 75 per cent and 50 per cent, respectively. Transport had been identified as the main source of NO_2, with transport and agriculture being the main causes of $PM_{2.5}$. To assess the health impact, the concentration-

response functions from the WHO Health Risks of Air Pollution in Europe[5] project had been used, as well as those from the Dutch Environmental Longitudinal Study[6] and another study. For example, the city of Utrecht, Netherlands, could only influence 12 per cent of $PM_{2.5}$ concentrations, while the rest originated from outside the city, as compared to 50 per cent for NO_2. The study also included elemental carbon (black carbon). Health impact assessment of local policy measures had been carried out exploring several scenarios, for example, whether all cars were electric. However, the impact on the number of attributable deaths, for example, was minor. An overview of the health impact assessment of the entire Netherlands had been provided showing the impact of applying current legislation and additional policies on the reduction of burden of disease by the year 2030. The study also included the health benefits in other countries, which could justify the cost-benefit of the measures taken, especially because, in the Netherlands, the expected costs of measures might not exceed €100,000 per disability-adjusted life year saved.

8. A representative of the Institute of Public Health of the Republic of North Macedonia gave an overview of the recent national experiences in improving air quality, in particular with regard to PM_{10} and $PM_{2.5}$. A law on ambient air quality had been enacted in 2004, with various subsequent amendments, and a national plan for air quality protection and improvement had been adopted in 2012. The Ministry of Environment and Physical Planning had set up several monitoring stations in both urban and rural areas, some of which contained high volume automatic sampling devices. Three cities of North Macedonia had featured in the list of the ten most polluted cities in Europe in 2017, and WHO estimated that air pollution was the main cause of 1,300 deaths annually. A study from 2012 had shown that long-term exposure to $PM_{2.5}$ had reached 49 micrograms per cubic meter ($\mu g/m^3$), causing an estimated 1,199 premature deaths and an economic cost of between €570 million and €1.47 billion. Despite that, air pollution in the residential heating sector, for example, was projected to increase by 30 per cent by 2025, unless urgent measures were taken. That had motivated the introduction of a programme for decreasing air pollution in December 2018, with very ambitious targets of up to 50 per cent reduction of air pollution in some cities by 2020. In addition to heating, transport was a major contributor to air pollution, mainly due to a fleet of old vehicles. Priority activities included: monitoring of ambient air quality; capacity building; and raising public awareness. Sectors targeted for reducing air pollution included: residential heating; transport; industry; construction; and urban green spaces. A technical paper was presented that investigated the health impacts and economic costs of air pollution in the metropolitan area of Skopje.

9. A representative of the Public Health Department of Lithuania presented an overview of the air quality and health situation in Lithuania. Twenty pollutants were monitored by 18 automatic monitoring stations, 4 of which were located in rural areas. Concentrations of pollutants were usually lower than limit values, with the exception of PM_{10} and benzo(a)pyrene. During the period 2005–2016, sulphur dioxide (SO_2) concentrations had decreased in some areas and increased in others, especially industrial ones. NO_2 had shown a tendency to decrease, yet in some industrial and large cities concentrations had increased; particulate matter ($PM_{2.5}$, PM_{10}) had shown a tendency to decrease. Ozone (O_3), lead (Pb), arsenic (As), and nickel concentrations had all decreased, whereas benzo(a)pyrene had increased. Lithuanian air protection legislation identified three priorities: increasing energy efficiency and reducing the pollution caused by fuel combustion in power plants; reducing vehicle pollution by increasing the use of electric cars; and implementing the best available techniques and technologies. In April 2019, the Government had adopted a plan to ensure compliance with the European Union National Emission Ceilings Directive and the National Environmental Protection Strategy approved by the Lithuanian Parliament in 2015. The plan set the ambitious target of reducing all pollutants, except ammonia, by more than 50 per cent by 2020. The plan also extended to cover the modernization of environmental air pollution

[5] World Health Organization (WHO), *Health Risks of Air Pollution in Europe–HRAPIE Project: Recommendations for concentration-response functions for cost-benefit analysis of particulate matter, ozone and nitrogen dioxide* (Copenhagen, 2013).

[6] Paul H. Fischer and others, “Air Pollution and Mortality in Seven Million Adults: The Dutch Environmental Longitudinal Study (DUELS)”, *Environmental Health Perspectives*, vol. 123, No. 7 (July 2015), pp. 697–704. Available at https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.1408254.

reporting and monitoring systems. An exhaustive list of goals to achieve the plans and their associated costs was reported. Odour management was highlighted as an issue to be tackled, with the aim of ensuring the recognition of odour as an air pollutant at the European level and the preparation, by WHO, of a regulation guidance document.

10. An expert from the L'Institut Paris Région (France) reported on the findings of a collaborative project studying the implementation of various low emission zone scenarios in the greater Paris area, assessing fine-scale reduction of exposure and expected health benefits. Paris had been the first French city to implement a low emission zone, which was covered by the "Crit'Air" system, based on European Emission Standards classification categories. The study had investigated four scenarios and had aimed to study the impact in terms of air quality and health effects, in addition to assessing the impact in relation to the socioeconomic status of the population. The main analysis had been performed with NO_2, as it was the most associated with traffic air pollution. A detailed description of the methodology was provided. The findings of the study showed that the greater the number of vehicles banned, the greater the health impact. Additionally, the health benefits extended to the population beyond the perimeter of the low emission zone. Health gains in terms of adult morbidity took the form of the reduced onset of preventable chronic diseases, such as ischemic heart disease, and a reduction in hospitalization rates. For children, up to 3,000 cases of asthma could be prevented, accounting for 4.8 per cent of the number of preventable cases of asthma. Low birth weight showed the highest potential, with reductions of up to 8 per cent inside the low emission zone. However, the health gains in terms of life years gained were the least significant, with a less than 1 per cent reduction in preventable deaths. From a socioeconomic perspective, the less deprived population benefited the most from the low emission zone, while enlarging the low emission zone tended to favour social equity.

11. A representative of the European Environment Agency reported on a project carried out in collaboration with countries in Eastern Europe. The European Environment Agency aimed to help achieve environmental improvements through the provision of timely, reliable and relevant environmental information. It supported countries in their monitoring and reporting of environmental information, in addition to performing environmental impact assessments and knowledge transfer. That work was facilitated by the European Environment Information and Observation Network. The European Environment Agency was currently working on the implementation of the Shared Environmental Information System, as a part of the European Neighbourhood Instrument. A case study was presented on the European Environment Agency and European Neighbourhood Instrument Shared Environmental Information System II East project, which covered Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova and Ukraine. The project was implemented in collaboration with the Norwegian Institute for Air Research, 4sfera,[7] and national authorities, among others. The expected results of the project were to: enhance environmental reporting; improve capacity to support decision-making; and produce regular "state of the environment" reports in line with European Union and European Environment Agency methodologies. In the field of air quality, the overall objective was to increase the use of air quality data and their public accessibility. Specific objectives were to: evaluate the status of air quality monitoring and use of data; identify examples linking air quality to policy evaluation; and share European Union/European Environment Agency knowledge on monitoring and reporting. Regional workshops and country visits had been carried out to draft and update country air quality factsheets. In Georgia, near real-time air quality data had been linked to the European Environment Agency air quality information system. Future activities included including Georgia in the calculations of the European Air Quality Index and expanding the project following the example of Georgia and based on the interest of the countries.

IV. Communication and public health messages on air pollution

12. An expert from Health Canada presented (remotely) the Canadian Air Quality Health Index. A major challenge faced was the variations in means of communicating air quality reports, if any, across the different provinces and audiences. Additionally, where air quality

[7] See www.4sfera.com/.

public reporting was well established, it contained very little health-related information. The Canadian Air Quality Health Index had been developed using the following formula, based on three parameters only (O_3, NO_2 and $PM_{2.5}$):

$$AQHI = \left(\frac{1000}{10.4}\right) \times [(e^{0.000537 \times O_3} - 1) + (e^{0.000871 \times NO_2} - 1) + (e^{0.000487 \times PM_{2.5}} - 1)]$$

Abbreviations: AQHI, Air Quality Health Index

13. The result had been transformed into a colour-scale from one to ten-plus, and divided into four risk categories of low, moderate, high and very high. The target audience was divided into two categories, the general population and population at risk, which included the very young or old and those with pre-existing conditions, such as respiratory or cardiovascular diseases. The aim of the messages was to encourage the adaptation of behaviour according to current air quality levels. Forecasts of air quality were provided for the following day to allow enough time for adaption and planning of activities. Currently, the tool covered 80 per cent of the Canadian population, with a target to reach the entire population within two years. In an effort to popularize the tool, a campaign entitled “Know your number” had been launched, which helped individuals to identify their own critical Air Quality Health Index number. Health professionals had been identified as a key target audience as they dealt directly with the targeted population. A train-the-trainer e-learning programme had been conducted and integrated into the WHO Urban Health Initiative in an effort to expand internationally. To reach a wider audience, the Air Quality Health Index tool had been integrated into a national weather channel. Additionally, retail partnerships had been established with companies targeting healthy lifestyles and outdoors activity to increase their reach to their audiences. A mobile application had been developed for sports coaches to help them when scheduling outdoor activities. Children had been targeted through the creation of educational puppet shows and an online game that had been integrated into some school curriculums.

14. An expert from the Health and Environment Alliance (Belgium) provided background information about the Alliance, which was made up of over 70 organizations from the health community focusing on awareness raising and communication. The Alliance delivered evidence-based scientific information to the general public using culture-specific messaging and used targeted messages to reach other groups such as policymakers and health professionals. One example highlighted was the European Union Urban Air Quality Partnership, which brought together cities and stakeholders, such as the European Commission, to discuss how to achieve clean air. To facilitate that task, a toolkit on communication of air quality and health had been developed that included inspiring practices, challenges and tips; for example, guidelines on how to write a good press release. One inspiring practice highlighted was the development, in Helsinki, of a map with an air quality index connected to health advice that had been distributed in the metro system in the form of a mobile application. The second example highlighted was “Unmask my City”; a health-sector-led global initiative calling for cities to meet the WHO air quality guidelines by 2030. That initiative relied on community-based monitoring as a form of engaging residents and raising their awareness of the issue, despite some concern regarding the reliability of the data. Sofia, one of the most polluted capitals in Europe, had recently joined the initiative, with the support of the mayor and a coalition of nine health organizations. India had also adopted the initiative in the city of Bengaluru, in an attempt to share knowledge outside of Europe. Another activity was the publication of materials in different languages and the use of visuals to make materials more accessible to the public and policymakers. In response to sceptical comments recently made in Germany regarding air pollution, fact checks had been distributed to journalists in an effort to clarify the challenges to the science.

15. A representative of WHO headquarters provided a summary of the Expert Consultation held in Geneva, from 12 to 14 February 2019, which had set milestones for a broad range of ongoing activities, including communication. Previous efforts by WHO had focused on the long-term implications of tackling air pollution on the global scale and not at an individual level. The Consultation had investigated the best ways to communicate health risks associated with air pollution and to reduce exposure. It had formulated practical advice – which had not yet reached yet the level of a set of recommendations due to inconclusive evidence – and had identified priority areas to be tackled in terms of research. The three

following review topics had been highlighted: the categories at risk; physical activity versus air pollution; and the use of face masks. Categorization of risk looked at: socioeconomic status; how to prioritize susceptibility in risk communication; and the specific diseases, medical conditions and personal characteristics that conferred increased risk of adverse health due to exposure to air pollution. On the issue of physical activity, evidence suggested that the long-term health benefits of regular physical activity outweighed the adverse effects of air pollution. Regarding face masks, from a technical perspective, lessons could be learned from occupational health practices. Nevertheless, there was only limited evidence of face masks' effectiveness, which had led other parties, such as the French Ministry of Health, to discourage their use. Issues of equity and the need for solutions that were applicable worldwide, even in developing regions and in work situations involving outdoor physical activities, had prevented WHO from recommending the use of face masks, with the Organization choosing instead to emphasize the need for continuous implementation of actions to reduce air pollutant emissions. The next steps for the Consultation were to develop a checklist to map exposure, factsheets and training materials for health professionals, and to map out potential target groups. A summary report was expected to be published in 2019.

16. An expert from the University of Düsseldorf provided an overview of a recent case in which the evidence and political discussions related to air pollution, in particular NO_2, and diesel-powered cars in Germany had been called into question. The European Union limit value for NO_2 was set at 40 µg/m^3, aligned with the WHO air quality guidelines. Since that target had not been achieved in many cities in Germany, legal action had been initiated by the European Commission. In response, cities had begun introducing zonal diesel-powered car bans, to the dissatisfaction of many citizens and politicians. Fuelling an already heated public debate, a former president of the German pulmonologists association had published an open letter questioning the European Union Air Quality limits, arguing that current pollutant concentrations in Germany were harmless; an opinion that had rapidly spread to the media. Several aspects of air quality and health effect assessment had been challenged, including the methodology of deriving WHO guidelines, the accuracy of global burden of disease calculations and the methodology for monitoring pollutants in Germany. Shortly thereafter, the Ministry for Traffic and Digital Infrastructure had suggested re-evaluating the European Air Quality limit values; a move that had further contributed to the debate. In response, the German Chancellor had commissioned the German National Academy of Sciences to investigate the case and develop a statement on the scientific basis of the WHO guidelines and the derivation of the limit values. In the meantime, a national law had been passed that limited diesel-powered car bans to NO_2 exceedances of a more lenient limit of 50 µg/m^3. The case highlighted the need for the expert community to be prepared to react in a timely fashion to statements made by sceptics by developing counter arguments to allow for a rapid response by scientists and by drafting a plan of action. Lessons learned from other sectors, such as climate change, where similar instances in which the evidence had been questioned had occurred, could be used for that purpose. The case also highlighted the need for further education and awareness-raising efforts aimed at medical professionals and the public to avoid the spread of such scepticism.

V. Review of the progress in research on the health impacts of air pollution

17. An expert from Sun Yat-sen University School of Public Health in China presented (remotely) the findings of a systematic review and meta-analysis of short- and long-term health effects of fine particulate matter constituents ($PM_{2.5}$). Despite studies showing a close association with mortality and morbidity, especially with cardiovascular and respiratory diseases, $PM_{2.5}$ effects showed significant regional and seasonal heterogeneity. Potential reasons could include the population's susceptibility, study design and exposure pattern. However, the main reason could be attributed to the chemical components of $PM_{2.5,}$ where some species were likely be more toxic than others. The study had identified a gap in literature and provided a systematic review and metadata analysis, in order to help identify specific control measures of standards for the different toxic components. Black carbon (BC) had been found to be associated with all-cause mortality and morbidity in both short- and long-term exposure, with cardiovascular diseases in short-term, and not associated with respiratory diseases in either short- or long-term effects. Organic carbon (OC) had been found

to be associated with acute mortality and morbidity and short-term effect on cardiovascular mortality. Potassium (K) had only been found to be associated with short-term all-cause mortality. Nitrate had been found to be associated with short-term effects on overall mortality and short- and long-term effects on morbidity. Sulphate had been found to be associated with short-term mortality and morbidity; no significant association for long-term effects had been reported due to the low number of long-term studies. The study had concluded by suggesting that $PM_{2.5}$ components should be divided into two groups: constituents that were probably to cause health effects; and constituents that were most likely to cause adverse health effects. The former group included nitrate, sulphate, K, OC, zinc, silicon, iron, ammonium and vanadium. The latter group consisted of BC and OC for all-cause mortality and cardiovascular diseases. No clear association had been made to respiratory diseases, as the number of studies included had been insufficient to draw final conclusions.

18. An expert from the United States Environmental Protection Agency provided (remotely) an overview of the main conclusions of the Integrated Science Assessment for PM, which had been released for external peer review in October 2018. The Integrated Science Assessment had used a well-established weight-of-evidence framework to assess causality that had relied on integrating evidence across scientific disciplines. The PM Integrated Science Assessment had been tasked with evaluating whether there was an independent effect of PM on health and welfare at relevant ambient concentrations (i.e. < 2 mg/m^3). The evaluation of the health effects evidence had focused on those studies that included a composite measure of PM (for example, $PM_{2.5}$ mass), while the evaluation of the welfare effects evidence had focused on the non-ecological effects of visibility impairment, climate forcing and materials damage. Within the United States of America, there continued to be a steady decline in $PM_{2.5}$ concentrations, along with a change in the overall contribution of the main components of $PM_{2.5}$, with organic carbon replacing sulphate as the most abundant component in many locations. Additionally, recent monitoring of $PM_{10-2.5}$ within the United States of America indicated almost equal contribution of $PM_{2.5}$ and $PM_{10-2.5}$ to PM_{10} concentrations. However, there remained limited monitoring of ultrafine particles and characterization of their spatial and temporal variability. For $PM_{2.5}$, recent evidence supported and extended the 2009 PM Integrated Science Assessment conclusion of a causal relationship for both short- and long-term exposure for cardiovascular effects and mortality. For respiratory effects, recent studies supported a likely to be causal relationship for both short- and long-term $PM_{2.5}$ exposure. New epidemiological and experimental evidence on the nervous system for long-term $PM_{2.5}$ exposure resulted in the conclusion of a likely to be causal relationship, while strong animal toxicological evidence led to a similar conclusion for long-term ultrafine particle exposure. However, there was still a large degree of uncertainty with respect to population exposures and the spatial and temporal variability in ultrafine particle concentrations. For long-term $PM_{2.5}$ exposure, recent evidence resulted in a likely to be causal relationship for cancer. Lastly, an evaluation of populations and life stages potentially at greatest risk of a PM-related health effects found the strongest evidence for children and the non-white population.

19. An expert from the Swiss Tropical and Public Health Institute presented the results of a systematic review on the health effects of exposure. The review had investigated the health effects of ultrafine particles independent of other pollutants, looking at epidemiological studies. An overview of the methodology was provided, with notable exclusion criteria including: toxicological, controlled-exposure, in-vitro studies and animal experiments; and ultrafine particle exposure related to engineered nanoparticles and indoor ultrafine particles. New studies on the long-term effects of ultrafine particles on health were found since the 2010 Health Effects Institute review on health effects of ultrafine particles. The evidence gathered had been used to investigate the effect of adding other pollutants to the model, which had shown that the positive effect estimate decreased when using multi-pollutant effect. The review had observed great inconsistency across endpoints, study design, populations, metrics and exposure windows. The most consistent results had been found in subclinical outcomes, such as pulmonary inflammation and cardiovascular effects. The main challenge remained exposure assessment and how to measure ultrafine particles, as well as with other pollutants, while only a few studies included co-pollutant adjustment, which often led to attenuation of the impact of ultrafine particles. The limitations included not having a formal systematic review and not being able to conduct meta-analysis due to the major

differences in study group characteristics and exposure assessment techniques, leaving few studies per single endpoint.

20. An expert from the Max Plank Institute for Chemistry (Germany) provided an overview of work done on cardiovascular disease burden from ambient air pollution in Europe, reassessed using novel hazard ratio functions. The work had been conducted using a European Centre Hamburg Modular Earth Submodel System; a numerical modelling tool for reproducing the atmosphere on a global scale that makes possible the calculation of intercontinental transport. Excess deaths had then been estimated, with the global total excess mortality rate reaching 8.8 million people per year, compared to previous estimates of 4.5 million people per year. In Europe, premature mortality due to air pollution had been estimated on average to be 2.2 years of life lost per person. Findings had shown a significant increase in mortality due to ischaemic heart diseases reaching 40 per cent of total premature mortality, in addition to the inclusion of a new category for other non-communicable diseases, which had accounted for 32 per cent. In Eastern Europe, excess deaths due to cardiovascular diseases had been ten times more prevalent than excess deaths caused by pulmonary diseases. In Western Europe, ratios had been balanced, which could indicate that results had not only depended on pollution but also on hospitalization quality and population age distribution. In some areas – in Africa for example – estimated life expectancy reduction had been primarily due to natural, nonanthropogenic, sources.

21. An expert from King's College London (United Kingdom of Great Britain and Northern Ireland) presented (remotely) the findings of a WHO expert consultation on health impact assessment of NO_2 in the European Region, held in February 2019. The aim had been to update the knowledge on performing health impact assessment, with the longer-term objective of updating the Health Risks of Air Pollution in Europe project with revised concentration response functions to perform cost-benefit analysis. An important issue addressed had been the confounding and causality for NO_2. The 2016 United States Environmental Protection Agency Integrated Science Assessment had suggested sufficient evidence for the acute effects of NO_2 especially related to asthma, whereas for long-term effects, including childhood asthma, evidence had been found to be "likely to be causal". Evidence for other health effects had shown higher uncertainty, which had been attributed to the absence of focused toxicological studies and to the epidemiological studies reflecting causal associations with other pollutants, such as $PM_{2.5}$. The expert consultation had addressed the need for a systematic review of studies relating NO_2 to cardiovascular endpoints, the potential use of counterfactual value of 5 $\mu g/m^3$ for health impact assessment, and the use of fine scale exposure assessments. On the communication side, due diligence had been advised when communicating to the public and press, along with the cautious use of vocabulary. It had been recommended that the use of evidence from toxicological studies in addition to epidemiological ones be enhanced, and that relative comparisons to other risk factors be provided.

22. A representative of the WHO European Centre for Environment and Health presented the progress in updating the WHO Global Air Quality Guidelines, a process that had been initiated in 2016. The main objectives were to provide updated numerical concentration values and, where possible, an indication of the shape of the concentration-response function for a number of ambient air pollutants, for relevant averaging times and in relation to critical health outcomes. The air pollutants included were: $PM_{2.5}$, PM_{10}, NO_2, O_3, SO_2 and carbon monoxide. Commissioned in 2017, five core systematic reviews of evidence on health effects from air pollution had been drafted and were subject to peer review. Following the completion of the systematic reviews of evidence and methodological adaptations, the second phase of the WHO Global Air Quality Guidelines update process was about to start, involving the derivation of numerical guideline exposure values, the setting of interim targets and further recommendations. Forthcoming activities included a third Guideline Development Group meeting in June 2019 and the publication of the systematic reviews in a peer-reviewed journal by the end of 2019.

23. An expert from the Swedish Environmental Protection Agency provided an update on the ongoing activities carried out by the Working Group on Polycyclic Aromatic Hydrocarbons. The Working Group had been established as part of the 2018–19 workplan, with members from Canada, Finland, Norway, Sweden, Switzerland and the United Kingdom

of Great Britain and Northern Ireland. Polycyclic aromatic hydrocarbons were emitted from various combustion processes, such as coal and solid fuel burning. Despite structural similarities, polycyclic aromatic hydrocarbons varied greatly in their carcinogenic potency. Other, non-cancer-related health effects of polycyclic aromatic hydrocarbon exposure could include cardiovascular effects and respiratory and asthmatic symptoms. The objectives of the Working Group on Polycyclic Aromatic Hydrocarbons included: highlighting aspects of polycyclic aromatic hydrocarbon exposure relevant to risk assessment; investigating the relevance of using benzo(a)pyrene as a marker for cancer; reviewing epidemiological literature on polycyclic aromatic hydrocarbon exposure in ambient air and its associated health outcomes; and the relation between polycyclic aromatic hydrocarbon and other PM exposure effects on health outcomes. A short report was expected to be finalized by the end of 2019, which would not be based on a literature review. The report would also include a search strategy to identify relevant epidemiological findings on the health effects of polycyclic aromatic hydrocarbons.

24. A representative of Public Health England (United Kingdom of Great Britain and Northern Ireland) presented the main findings of a review of interventions to improve outdoor air quality and public health, published in March 2019. Public Health England was an executive agency of the Department of Health and Social Care. The report reviewed evidence for effective air quality interventions and provided recommendations for actions to improve air quality, focusing on those that could be implemented by local authorities. Five rapid evidence assessments for interventions had been commissioned in the fields of: industry; vehicle and fuel; planning and structural design; agriculture; and social and behavioural interventions. The strength of evidence for effectiveness of available interventions had been assessed. There was limited evidence linking interventions directly with health benefits. Therefore, much of the evidence reviewed related to effects on ambient concentrations or emissions of pollutants. Evidence for some interventions in some categories was well developed, for example: change in diet in agricultural interventions; driving restrictions in planning interventions; and policy and technology in industrial interventions. In the vehicle and fuel interventions, promotion of low emission vehicles had the strongest evidence. The next step of evaluation of the interventions had involved the investigation of the benefits of addressing health inequality, public health co-benefits, the potential to improve public health outcomes nationally or locally, the feasibility of implementation and the timescale to benefits being realized. The report had concluded with some guiding principles, including: emphasis on tackling pollutants together using a range of interventions; the need for local authorities to cooperate; and the need for a coherent approach that included the private sector, individuals and local authorities, in alignment with national policies. Improving air quality could go hand-in-hand with economic growth and could provide opportunities for growth in areas such as green energy. Some groups might need particular support to avoid unintended consequences of policies or interventions. Importantly, the priority for action should be to reduce pollution at source rather than to mitigate its consequences.

25. An expert from the Health Effects Institute in Boston, United States of America, presented the findings on the results of the Health Effects Institute accountability programme and the Cochrane systematic review on interventions to reduce ambient particulate matter air pollution and their effect on health. Accountability research had been used to test the extent to which air quality actions improved public health using empirical data. The chain of accountability had been a conceptual framework where interventions or regulatory actions led to reduction in emissions, and hence, improvement in ambient air quality and consequently reduction of exposure, leading finally to improvements in human health outcomes. Feedback had been provided from each step of the chain, which had fed into the choice of intervention. The investigation had included four categories: industrial; traffic; residential; and multiple sources. The limitations of the review had included the exclusion of personal and agricultural interventions and indoor air pollution. Thirty-eight interventions had been identified from 19 countries; the number of studies used per intervention category had been relatively low. The results of the review had been summarized qualitatively using graphical tools like harvest plots. Results had shown either no significant association with interventions or a favourable association, with only a little evidence suggesting that interventions were harmful. Some areas of improvement had been identified, including the need to include cost-effectiveness, taking into account unintended outcomes. Most studies

had originated from Europe or North America, hence the need to evaluate those interventions in low- and middle-income regions to verify their applicability. Reporting of data needed to be improved, for instance through the implementation of the Consolidated Standards of Reporting Trials.

26. An expert from the International Institute for Applied Systems Analysis gave a presentation on the prospects for achieving the WHO air quality guideline value for $PM_{2.5}$ in the context of the WHO goal to reduce deaths related to air pollution by two-thirds by 2030. A global overview showed that most areas where the guideline limit of 10 $\mu g/m^3$ had been met were uninhabited, whereas most exceedances were in Asia and Africa, with concentrations exceeding 100 $\mu g/m^3$ in some areas. In Europe, in 2005, only 10 per cent of the population had lived in areas where the air quality guideline limits had been met. There was already a legal obligation for European Union countries to limit pollutants under the National Emission Ceilings Directive by 2030, with reductions of $PM_{2.5}$, nitrogen oxides and SO_2 levels by 50 per cent, 65 per cent and 80 per cent, respectively compared to 2005 base year. It was expected that, by 2030, approximately 90 per cent of the population of Europe would live in areas where WHO air quality guidelines for $PM_{2.5}$ had been met. However, the two problematic areas were Poland and Italy. In Africa, solid fuel combustion in households was a major issue, in addition to a large contribution from non-anthropogenic sources, such as natural dust. Global models estimated that natural dust alone in some parts of Africa and Western Asia exceeded the guideline limits, reaching 50–60 $\mu g/m^3$. In Asia, from 1990 to 2005, air pollution had correlated directly with gross domestic product (GDP) growth. Attention from Governments had led to reductions in SO_2 emissions, followed by nitrogen oxides, despite the continuous economic growth, whereas other pollutants had displayed no change in trend. Several measures were presented to reduce $PM_{2.5}$ emissions in Asia, where it was shown that, in the next 20 to 30 years, reaching the WHO guideline was possible, except for areas where natural factors were a high contributor. Those measures would have co-benefits with several Sustainable Development Goals, including Goal 13 (climate action).

27. An expert from the Business School of Staffordshire University (United Kingdom of Great Britain and Northern Ireland) gave a presentation on social inequalities in air pollution. A systematic review including publications from 2010 to 2017, conducted in the WHO European Region, had investigated social inequalities related to ambient air pollution. The review had not covered aspects of health effects. The studies showed significant heterogeneity in aspects including the scale of spatial units, type of study and socioeconomic or sociodemographic indicators. It was recommended to collect data in small areas and to cover the entire country to allow for stratification of results. Good quality data were needed for both air quality and socioeconomics, in order to establish a link between them. Studies in the United Kingdom of Great Britain and Northern Ireland and the Netherlands showed that residents in “first-order” cities, such as London and Rotterdam, Netherlands, were living with NO_2 levels slightly exceeding the European Union limit, and recipients of income support were more exposed to PM_{10} and NO_2. Another study in the United Kingdom of Great Britain and Northern Ireland had found that areas with the most deprived population experienced the smallest improvements in air quality and the greatest increase in inequity. Although air quality had been improving, the gap between the richest and poorest in society had widened, emphasising the need for targeted policies to address the issues in deprived areas. Interim results of the review related to pregnant women had been mixed, however, mainly suggesting that younger mothers were more exposed, as were immigrant mothers in some cases. It had been found that, at the national level, there was a lack of studies using small spatial units, an important element in preventing the aggregation of data and smoothing differences. On the communication side, emphasis was placed on the importance of WHO and other concerned organizations and entities utilizing social media outlets to advocate air quality and its effects on health to the general public and concerned professionals.

VI. Tools and capacity-building activities on air quality and health

28. An expert from Santé publique France presented (remotely) the results of adapting AirQ+ software in eleven urban areas of France. The first step in that project had been to translate the existing software into French. The translation had the added benefit of raising awareness locally of air pollution and health and of encouraging people to communicate with

one another. The aim of the project had been to better integrate air quality issues into local public policy planning and to investigate how to effectively address the associated health impacts. The objectives had been to develop new partnerships with local stakeholders, engage local authorities on environmental health issues, and integrate AirQ+ findings into local regulatory plans. The main users of the software had been local authority public workers with no background in epidemiology or public health. Initial tests had been conducted on common databases to familiarize users with the software, followed by individual contact by the consultant. Bilateral meetings had been held and consolidation exercises carried out by the local authorities to complete the evaluation of AirQ+ usage. The findings of AirQ+ could be expressed in terms of the number of preventable deaths, the gain in life expectancy and the number of years life gained. An extensive list of the perceived difficulties had been provided with relation to aspects of selection criteria for study area, air quality and health data. Technical difficulties faced when using AirQ+ included: difficulty in navigating the interface; understanding of technical terminology; compatibility with other software; exporting the results; lack of interactive online support; and the limited use of specific parameters, for example, the sum of means over 35 parts per billion (daily maximum eight-hour) for ozone. A major potential area of improvement was to include socioeconomic evaluation of the health findings. It was also recommended that tests not to be conducted during the summer period due to the limited availability of partners. The French-language version of AirQ+ would be officially launch in Paris, in November 2019.

29. A representative of the WHO European Centre for Environment and Health provided an update on the recent upgrade of the WHO AirQ+ software. AirQ+ was a user-friendly software programme for estimating the magnitude of the most important and most widely recognized effects of air pollution in a given population. It targeted mainly public health or environmental specialists with minimal knowledge of atmospheric modelling and epidemiology. AirQ+ could also be used for educational purposes, and to create a dialogue with local and national politicians and decision makers. It supported two types of calculations: impact calculations, assessing different scenarios of pollutant concentrations; and burden of disease calculations, which used the current population and air pollution levels to assess related effects on mortality. Default values were based on the European experience of the Health Risks of Air Pollution in Europe project; however, all default values could be overridden manually. The software was downloadable online, which allowed for statistical data to be gathered on its usage. A voluntary online survey had gathered 252 responses from 84 countries, with a majority from academia, followed by national authorities and public agencies. There were more participants from the environment sector compared to health, whereas there were none from agriculture, for example. Its usage was mainly research-based, followed by health impact assessment and consultancy. Pollutants with most interest were $PM_{2.5,}$ followed by PM_{10} and others, including polycyclic aromatic hydrocarbons. In response to feedback received, the next version of AirQ+ would include the possibility of conducting multiple-zone analysis and multiple data entry. There were ongoing efforts on update the methods for estimating the burden of disease attributable to air pollution, ensuring that any update to the software was tested for a few years prior to inclusion. Future work included the implementation of an economic impact module. Future dissemination activities included capacity-building training in Lithuania and Mexico and workshops. AirQ+ version 2.0 was expected to be launched by the end of 2019.

30. A representative of the WHO European Centre for Environment and Health presented a brief update on capacity-building activities. The first pilot training activity had been held in November 2018 in Sarajevo, in cooperation with the ECE secretariat, with 26 environmental and public health experts from the Western Balkans and Georgia participating. The subregional nature of the training had facilitated networking, sharing of experiences and the building of partnerships. The aim of the workshop had been the application of AirQ+, in addition to wider aims such as building knowledge of: health effects of air pollution; assessment and quantification of air quality impact; and intervention measures. Communication issues and climate change had also featured on the agenda. Feedback had been positive overall, and constructive feedback had been used to update the curriculum for future training activities. Following feedback, questions used in the questionnaire were also being updated to include aspects such as the AirQ+ manual. A representative of the Institute for Public Health of the Federation of Bosnia and Herzegovina – one of the workshop participants – shared further insights into experiences from the workshop. The training had provided exposure to epidemiological and toxicological studies, sharing examples from member States and highlighting European and global air quality trends. It had also covered

systematic reviews of evidence on causality, principles and tools of health risk assessments and the synergies between air quality and climate change policies from a public health perspective. Participants had worked with the relevant local health and air quality data and, after the training had finished, had prepared calculations for the three most polluted cities of the Federation of Bosnia and Herzegovina: Tuzla, Zenica and Sarajevo. The analysis results would be included in a report assessing air quality and health in the Western Balkans, to be presented jointly by WHO and the United Nations Environment Programme. It was emphasised that hands-on training on AirQ+ not only helped in assessing health risks related to air quality, but also in raising awareness of the adverse health effects of air pollution. However, it was stated that further help was needed in interpreting the data extracted from AirQ+, due to a lack of experience in using the software programme.

31. A representative of the WHO European Centre for Environment and Health provided an overview of the Carbon Reduction Benefit on Health calculation tool and its role in achieving health and economic benefits through carbon emissions reduction. The tool, developed by WHO and launched in December 2018, quantified the physical and economic consequences for human health of improvements in country-level air quality from domestic carbon reductions. Policy mitigation measures were as derived by the Nationally Determined Contributions submitted by the Conference of the Parties to the United Nations Framework Convention on Climate Change. The tool could be used by countries to determine more ambitious targets to be included in their Nationally Determined Contributions, to be submitted in 2020. Currently, the tool included parameters for Europe only but there were plans to extend it globally. Estimates of applying Nationally Determined Contributions suggested 74,000 avoided premature deaths annually in Europe by 2030. In addition to mortality, morbidity was also analysed where it was estimated to have 1.9 million fewer asthma attacks and 17 million prevented lost work days. From an economic perspective, WHO European Region countries could achieve a gain of 0.5–1.2 per cent of GDP by preventing mortality and morbidity.

32. In the general discussion, a representative of the Finnish National Institute for Health and Welfare reported (remotely) on several activities carried out during the Finnish chairmanship of the Arctic Council (May 2017–May 2019) that had complemented the work of the Task Force on Health Ad Hoc Expert Group on Black Carbon.[8] The health aspects were presented as important co-benefits resulting from climate actions strongly demanded by the President of Finland via reducing black carbon emissions from a variety combustion sources in the Arctic and nearby regions. The main activities involving both the climate and health aspects of black carbon were:

(a) A policy brief document;[9]

(b) The first Arctic Resilience Forum, Rovaniemi, Finland, 10 and 11 September 2018;[10]

(c) The establishment of a health subgroup for the Short-lived Climate Forcers Expert Group of the Arctic Monitoring and Assessment Programme Working Group;

(d) The side event hosted by the Arctic Council and Finland at the twenty-fourth Conference of the Parties to the United Nations Framework Convention on Climate Change (Katowice, Poland, 10 December 2018).[11]

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8 Nicole AH Janssen and others, *Health Effects of Black Carbon* (Copenhagen, WHO Regional Office for Europe, 2012).

9 Mikael Hildén and others, “Curbing black carbon emissions slows warming in the Arctic”, Finnish Environment Institute Policy Brief (Helsinki, 2017).

10 Arctic Council, “Arctic Resilience Forum: Sharing best-practices for improving Arctic resilience”, 25 October 2018. Available at https://arctic-council.org/index.php/en/our-work2/8-news-and-events/495-arctic-resilience-forum.

11 Arctic Council, “Arctic Council at COP24: Curbing black carbon emissions for health and Arctic climate benefits”, 13 December 2018. Available at: https://arctic-council.org/index.php/en/our-work2/8-news-and-events/501-cop24.

VII. Current activities and work plan of the Task Force on Health for 2020–2021

33. A representative of the WHO European Centre for Environment and Health presented an overview of the development of the 2018–2019 workplan and its current implementation and provided suggestions for the next biennial workplan for 2020–2021. A summary of the activities undertaken for the 2018–2019 workplan was provided and the following items were highlighted:

(a) Consolidating existing evidence on the health outcomes of exposure to air pollution, achieved through: the updating of global WHO air quality guidelines with relation to PM, O_3, NO_2, SO_2, and CO; and a consultation meeting on health impact assessment of NO_2 in the European region in February 2019;

(b) Further development of methodologies for assessment and quantification of direct and indirect effects of long-range transboundary air pollution on human health through further development of AirQ+;

(c) Capacity building for the health impact assessment of air pollution at the regional and subregional levels, through the development of a capacity-building curriculum and its implementation at the first training workshop on air quality and health, held in Sarajevo, in 2018;

(d) A review of the methods used to estimate the burden of disease attributable to air pollution, through the updating of AirQ+;

(e) A review of communication strategies for health messages related to air pollution, including on short-term episodes and for susceptible groups;

(f) The evaluation of current knowledge on the health risks of polycyclic aromatic hydrocarbons and the identification of critical gaps, through the establishment of a dedicated Working Group on Polycyclic Aromatic Hydrocarbons.

34. The proposed Task Force on Health workplan for 2020–2021 included the following activities:

(a) Consolidation of existing evidence on the health outcomes of exposure to air pollution;

(b) Further development of methodologies for assessment and quantification of direct and indirect effects of long-range transboundary air pollution on human health;

(c) Evaluation of current knowledge on the health risk of polycyclic aromatic hydrocarbons and identification of critical gaps. Assessment of whether and to what extent the work on that issue could be continued by the Task Force on Health;

(d) Capacity building for the health impact assessment of air pollution at the regional and subregional levels;

(e) Review of the methods used for estimating burden of disease attributable to air pollution;

(f) Development of communication strategies for health messages related to air pollution, including on the short-term episodes for susceptible groups.

35. As a result of the discussions at the meeting, the following activities were suggested by participants:

(a) Development of communication strategies for health messages related to air pollution in Europe, including uncertainties, interpretation of burden of disease estimates, preparedness to counter sceptical views, communication with hard-to-reach groups;

(b) Investigation of the co-benefits on air quality and health of climate change mitigation measures in the context of black carbon and other short-lived pollutants;

(c) Development of advice on conducting health impact assessments, with the aim of including potential health benefits in areas outside the study area;

(d) Investigation of inequalities in air pollution and health.

36. After discussions with the Parties, the final version of the workplan for 2020–2021, including specific deliverables, would be proposed to the Convention’s secretariat.