World Health Organization
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ASSESSMENT AND MITIGATION OF RISKS FOR CHILDREN'S HEALTH FROM CHEMICALS IN INDOOR AIR

Tallinn, Estonia

25-26 May 2017

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Assessment and mitigation of risks for children's health from chemicals in indoor air

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ABSTRACT

Scientific evidence of the negative impact on children's health from exposure to a mixture of chemicals in the indoor environment is growing. Further action to mitigate the risks is needed. A workshop was organized in Tallinn, Estonia on 25–26 May 2017 to update knowledge of indoor chemicals and children's health, share experience in assessing combined exposure risks and discuss the next steps towards healthier indoor environments in public settings for children. The workshop was attended by representatives of relevant national authorities and national experts from Estonia and Lithuania, as well as invited international experts. It is expected that the outcomes will guide planning aiming to minimize the negative health impact of indoor air pollutants in target countries as well as in the other Member States in the WHO European Region.

Keywords

Air pollutants – adverse effects
Air pollutants – analysis
Air pollution, indoor – adverse effects
Air pollution, indoor – prevention and control
Child health
Risk assessment
Hazardous substances
Environmental exposure

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Abbreviations

CO	carbon monoxide
CO_2	carbon dioxide
EU	European Union
HCB	hexachlorobenzene l
IAQ	indoor air quality
IPCHEM	Information Platform for Chemical Monitoring
NO_2	nitrogen dioxide
NOx	nitrogen oxides
PAH	polycyclic aromatic hydrocarbons
PBDE	polybrominated diphenyl ethers
PCB	polychlorinated biphenyls
$PM_{2.5}$	particulate matter of diameter of less than 2.5 micrometers
PM_{10}	particulate matter of diameter of less than 10 micrometers
SINPHONIE	Schools Indoor Pollution and Health Observatory Network in Europe
SEARCH	School Environment and Respiratory Health of Children project
SO_2	sulfur dioxide
VOC	volatile organic compounds

Introduction

A subregional workshop for Estonia and Lithuania on the assessment and mitigation of health risks from indoor chemical pollution was held in Tallinn, Estonia, on 25–26 May 2017, in the framework of the Biennial Collaborative Agreements for 2016–2017 between Estonia and Lithuania and WHO. Representatives of the Ministry of Health of Lithuania and Health Board of Estonia and experts from relevant national institutions took part, as well as WHO temporary advisers and WHO staff (see Annex 1 for the programme and Annex 2 for the list of participants).

Jelena Tomasova (Deputy Director, Health Board of Estonia) opened the meeting. In welcoming the participants, she stressed the importance of the topic for Estonia, especially in the context of protecting children's health from environmental hazards, and expressed a hope that it would result in the planning of further steps towards the prevention of health risks from indoor pollution by chemicals. On behalf of WHO, Marge Reinap (Head, WHO Country Office in Estonia) welcomed the participants and noted the good collaboration with and support from the Health Board of Estonia in organizing the meeting.

Jelena Tomasova and Rita Sketerskienė (Ministry of Health, Lithuania) were elected co-chairpersons.

Scope and purpose

Growing scientific evidence confirms that children are exposed to many hazardous factors, including chemicals, in the indoor environment. Many projects implemented in the WHO European Region have created a scientific basis for planning and implementing measures to improve the protection of children from the negative health impact of indoor chemicals. Nevertheless, the assessment of risks from indoor air pollution by chemicals was identified as a priority during a subregional workshop on assessment of the risks of combined exposure to multiple chemicals (Vilnius, Lithuania, 14–15 October 2015).

It was expected that the discussions would result in proposals for feasible and realistic measures in the short- and long-term perspectives and in identification of the support needed to make progress in this area. The objectives of the workshop were defined as follows:

- to update knowledge of indoor chemical pollution and children's health;
- to consider a list of the most frequent chemical pollutants in the indoor air, and their health endpoints, in schools and other public buildings for children;
- to share experience in assessing the risks of the combined exposure of children to multiple chemicals in the indoor environment;
- to discuss the main challenges in promoting relevant national policies and risk reduction measures and the action needed to address them;
- to agree on the next steps in planning measures at national level and formulating a request for WHO support to help reduce the risks posed to children's health by chemical pollution of the indoor air in schools and other public buildings for children.

Children's health and the pollution of indoor air by chemicals: an overview of international and national scientific evidence

People spend 80–90% of their time indoors breathing air that is often polluted by chemicals from outdoor air, the building fabric, furnishings, fitted carpets, equipment and human activities. Decreased rates of ventilation driven by energy-saving requirements can worsen the situation.

Scientific evidence gathered through a number of recent projects, such as the School Survey led by the WHO Regional Office for Europe, the Schools Indoor Pollution and Health Observatory Network in Europe (SINPHONIE) project and the School Environment and Respiratory Health of Children (SEARCH) project, has formed a solid basis for the development of policy and the planning and implementation of action to reduce the health risks related to the poor quality of the indoor environment in schools and other buildings for children.

The main aim of SINPHONIE (2010–2013), which included 38 partners in 25 countries in all geographical regions of Europe, was to develop guidance/recommendations to manage children's health risks linked to the indoor environment. The evaluation of environmental pollution based on the measurements of 18 physico-chemical parameters and biological agents and the assessment of children's respiratory health outcomes and their attention/concentration during lessons resulted in practical recommendations for risk management indoors. A number of guidance documents and a training package were developed in the framework of the project.

The SEARCH project (2010–2015), which aimed to develop efficient instruments and tools for multistakeholder cooperation (AirPack, environment and health assessment), was conducted in 10 countries in Europe and central Asia. Several approaches were recommended to reduce the exposure of children to indoor pollutants, including the regulation of school building ventilation, the correct location to reduce infiltration of outdoor pollutants, the development of construction strategies, the use of safer building materials and consumer products and the improvement of insulation and ventilation systems. The projects raised awareness about the prevention of respiratory disorders in children and facilitated the promotion of policies to protect public health by improving the physical environment in schools.

Individual country studies have contributed to knowledge about the indoor environment and children's health. In Hungary, two countrywide cross-sectional national children's respiratory surveys were conducted in 2005 and 2010 with the participation of around 63 000 and 68 000 children, respectively. The surveys aimed to demonstrate the links between indoor risk factors and children's health. A standardized methodology was applied in all subregions participating in the surveys. A high prevalence of respiratory diseases in children in the third grade of an elementary school was revealed, including high rates of bronchitis symptoms, asthma, allergies and allergic symptoms. The surveys revealed that the living conditions determining higher prevalences of health disorders included: living in small towns and villages and in the neighbourhood of roads with a high density of traffic; the use of coal/wood for heating and cooking; contamination with indoor mould; and cigarette smoking in the home. The projects provided information about the main risk factors, the spatial differences between regions, temporal changes in indoor pollution and prevalence of ill health.

According to WHO assessments, odour in the indoor and outdoor environments is a factor, chemical in nature, that affects the quality of life. Residents of communities located near odour-

emitting facilities generally report a higher number of health symptoms than populations of other communities. Odour is also a problem in indoor environments when certain furnishing materials or cleaning products are used. Some building construction techniques can influence the reactions between materials used in the interior, leading to additional emissions of chemicals and odour. Symptoms reported by exposed groups included cough, nausea, congestion, eye irritation, headache, dizziness, sleep disturbance, diarrhoea, chest pain and respiratory symptoms. Studies have shown that odour-induced health disorders depend strongly on the characteristics of the odour (such as pleasantness, familiarity) as well as individual factors (for example, past experience, cognitive bias). In Lithuania, the Ministry of Health responded to public complaints by Resolution No. V-885 of 4 October 2010 on residential area odour control, setting hygiene norms and issuing guideline HN 121:2010 on threshold for concentrations of odours in residential areas. The enforcement of the Resolution is, however, affected by technical problems such as differences in the threshold limits in European Union (EU) countries, assessment techniques, approaches adopted in response to public complaints, assessment of odours from individual and multiple chemicals and the modelling of odour impact. There is, therefore, a need for assistance in harmonizing odour thresholds, developing guidance for examining public complaints, communicating risk and planning action to prevent a negative impact from odours on human health.

Specific characteristics of indoor air pollution by chemicals and monitoring of indoor air quality

In Lithuania, the strong influence of outdoor air quality on indoor air quality (IAQ) has been revealed in many studies (SINPHONIE and other projects), including from particulate matter of less than 2.5 micrometers diameter ($PM_{2.5}$) and polycyclic aromatic hydrocarbons (PAH). Primary and secondary emissions from buildings, consumer products and furnishings also contribute to indoor air pollution. Only 17% of dwellings are, however, equipped with mechanical ventilation, and opening windows remains the main way to ventilate the indoor environment.

To obtain data on outdoor pollution, the national environmental monitoring system has been operating in Lithuania since 2011, covering a wide range of pollutants, including: $PM_{2.5}$, particulate matter of less than 10 micrometers diameter (PM_{10}), nitrogen dioxide ($NO_{2)}$/ nitrogen oxide (NOx), sulfur dioxide (SO_2), carbon monoxide (CO), carbon dioxide (CO_2), lead, cadmium, arsenic, chromium, copper, nickel, selenium, zinc, dioxins, benzo(a)pyrene, benzo(b)fluorathene, benzo(k)fluorathene, indeno(1,2,3-cd)pyrene, polychlorinated biphenyls (PCB) and hexachlorobenzene l (HCB). These data are useful to predict pollution of the indoor environment in relevant locations. In 2004, the Scientific Committee on Health and Environmental Risks identified the substances with the highest potential to cause adverse health effects, including substances that are typical for indoor air pollution, such as formaldehyde, CO, NO_2, benzene and naphthalene. Other pollutants of concern in indoor air are tobacco smoke products, radon, lead, organophosphate pesticides, volatile organic compounds (VOC) and phthalates. National and international studies indicate an association between exposure to phthalates and the symptoms of allergy and neurotoxic effects in children as well as linkages between neurotoxic effects in children and exposure to PCBs. Consideration should be given to developing and implementing an indoor monitoring programme at the national level to enable assessments to be made of the chemical risks in the indoor environment for children's health. Data collected by such monitoring programmes would allow national and the EU legislation on the prevention/minimization of indoor air pollution to be strengthened and enforced.

Another important factor in achieving substantial progress in improving the indoor environment is to involve different governmental sectors in the coordination and joint assessment of the health consequences. For example, a number of measures that are implemented to achieve energy efficiency targets (insulation of exterior walls, replacement and tightening of windows, cosmetic repairs) can result in lower overall air exchange between outside and inside, a related decrease in ventilation and increased humidity. Complaints about mould, unpleasant odours and "heavy indoor air" due to a higher concentration of CO_2 and reduction of oxygen content are more often registered in such buildings. Where the potential health effects of energy efficiency are not taken into account in the planning phase and no relevant recommendations on ventilations systems are in place, this can lead to poor IAQ and associated health complaints.

In Estonia, several surveys in schools and preschools have been conducted to support the enforcement of national legislation, including an IAQ study in 2005–2015, IAQ in new schools and kindergartens in 2013–2015, SINPHONIE in 2011–2012 and the WHO School Survey in 2013–2014. These studies have enabled the identification of appropriate action to target the main problems (common to many European schools) such as unpleasant odours, formaldehyde, VOC, 2-ethylhexanol in new buildings and CO_2 in old buildings. The IAQ in new schools and kindergartens survey in 2013–2015 found that the indoor environment in schools and kindergartens was characterized by a variety of chemicals and high levels of pollution of indoor air in newly renovated and new buildings, including a number of sources of chemicals such as finishing materials, flooring and furniture. The Health Board has developed a guideline for indoor air quality assessment and indoor air regulation based on the surveys' results. In the framework of the WHO School Survey 2013–2014, measurements of NO_2, benzene, formaldehyde, CO_2 and CO were taken and information collected on schoolrooms, mould and moisture problems and the children's behaviour. High levels of CO_2 were observed in many classrooms. Despite the good results shown by the Parma indicator on adequate ventilation (96% of preschool children and 92% of schoolchildren were in buildings with adequate ventilation), additional action to maintain and improve the IAQ should be taken.

IAQ monitoring programmes are the main source of data to support policy decisions at national level. National IAQ monitoring practices vary widely as regards substances, sources and methods. The following questions should be answered when planning an IAQ monitoring programme: what is the monitoring objective; what is the study design; what are the suitable and available analytical methods; how will the results be collected, evaluated and reported? There are many examples of IAQ monitoring programmes, but all of them have some limitations and barriers, including difficulties associated with the short duration of emissions, lack of knowledge about emissions and exposures, missing toxicological data and uncertainties regarding the health effects, uncertainties in the risk assessment models and a lack of harmonization and standardization of the testing methods.

A good example of how to establish an IAQ monitoring programme is the Pilot European Exposure and Health Examination Survey study, in which short and detailed checklists were developed. This provided an opportunity to evaluate a building's location and construction, whether it was residential/commercial/industrial and the characteristics of the rooms. A number of parameters were considered: VOC (formaldehyde, naphthalene, trichloroethylene and tetrachloroethylene), CO, NO_2, PAHs, radon, CO_2, $PM_{2.5}$, PM_{10}, ultrafine particles and other semivolatile organic compounds such as phthalates and polybrominated diphenyl ethers (PBDEs). A holistic approach to action at the building level, starting from the design stage (bearing in mind the nearby environmental context) is, however, missing so that it is still hard to

promote and acquire a coherent and consistent framework of monitoring programmes. This urgently needs to be resolved so as to facilitate IAQ monitoring programmes.

Risks of combined exposure to multiple chemicals in schools and other public settings for children

The European Commission has developed the Information Platform for Chemical Monitoring (IPCHEM) to: (i) promote a more coherent approach to the generation, collection, storage and use of chemical monitoring data in relation to humans and the environment; (ii) improve the knowledge and evidence base for the EU environmental policy; and (iii) assess the effectiveness and efficiency of the EU regulatory framework. A number of strategic partners are involved in IPCHEM including the European Commission, European agencies, international organizations, EU member states and EU-funded projects. The Platform's main principles are open access to data with respect to intellectual property rights, confidentiality and protection of commercial rights; its specific objectives are comparability (spatial and temporal comparative analyses across chemicals and media), interoperability (with relevant information systems) and data quality. IAQ monitoring data are included in module 4 (Products and Indoor Air). Along with indoor air pollution data, the scope of module 4 is to help build up an evidence base on the relationships between energy-efficiency measures, IAQ, thermal comfort conditions, ventilation and health via coordinated and systematic large-scale longitudinal studies and data collection and reporting at EU level. IPCHEM is also the official platform for accessing and sharing existing and new human biomonitoring data to be collected in the European Human Biomonitoring Initiative (HBM4EU) project (2017–2022). All in all, IPCHEM will contribute to the European Commission's circular economy package by providing the basis for addressing chemicals in products and enhancing the traceability of their chemical composition (important for recycling).

Chemicals in the indoor environment can act together at the same time and their health effects can change due to their interactions. Consideration should, therefore, be given to assessing the combined exposure of chemicals and the risks of exposure to a mixture of indoor chemicals. The most typical indoor chemicals are CO, NO_2, PM_{10}, VOCs, carbonyls, PAHs, brominated flame retardants, PBDEs and PCBs. They have different toxicological characteristics and potentials from combined exposure. In 2011, WHO developed a framework for assessment of combined exposure to multiple chemicals, which could be used to assess the risks from mixtures of chemicals in various media such as food, drinking-water, indoor air and consumer products. In the framework of the project Indoor environment in schools and respiratory morbidity in children (2010–2013) (SEARCH II), a number of chemicals were measured including benzene, ethylbenzene, xylene, toluene, formaldehyde, NO_2, PM_{10}, PBDEs and PCBs using passive and diffuse sampling. The WHO framework (tiers 0, 1 and 2) was applied to assess the combined exposure to chemicals measured in pilot schools in Belarus. The observed concentrations of individual chemicals were low in comparison with national standards and those of the EU, WHO and the United States Environmental Protection Agency, and the risks of respiratory disorders assessed on the basis of concentrations of individual components were also minimal or negligible. The calculated cumulative risk of respiratory disorders was much higher and was classified as medium. This case study confirmed that assessments of the cumulative risks of chemical mixtures in indoor environments are critical for planning and implementing health protection measures and ensuring the safety of indoor environments.

Improving indoor environments and minimizing the adverse effects of chemicals are priority areas of action for WHO. The 2010 Parma Declaration on Environment and Health encouraged

Member States in the European Region to work towards improving IAQ, including in public settings for children. This was echoed in the preparatory discussions for the 6th Ministerial Conference on Environment and Health, scheduled for June 2017.[1] To facilitate action on the regional level, the Regional Office has prepared a review of literature on combined exposure in the indoor environment (2013), developed a tool for assessing air quality and health and initiated the revision of the air quality guidelines. WHO is now developing a tool to assess the risks of exposure to chemical mixtures in indoor air. It is envisaged that this tool will be accompanied by an overview of methods for sampling and analysis.

Challenges in promoting national policies aimed at minimizing risks from indoor air chemical pollution and how to address them

The complexity of indoor air pollution is a challenge when it comes to improving indoor air quality. The strategies to ensure healthy indoor air must cover the type of premises (residential vs public), potential sources of pollutants (active vs passive pollution), types of pollutant of concern (particles vs gaseous, physical vs biological particles), control measures (organizational vs technological measures: source of pollution control vs ventilation vs air cleaning: natural vs forced ventilation).

The algorithm developed in the framework of the HealthVent project[2] presents a pathway which can be followed to select the most effective measures for each specific premise. At the same time, multiple challenges for the successful implementation of such an algorithm still exist. For example, technological measures face a challenge from the availability of a reliable and cheap technology for pollutant measurements; air cleaning technologies are not adequate to remove pollutants from the air efficiently; from an administrative perspective, the threshold values for many pollutants have not yet been established, and the labelling of pollution sources (such as building products) is being implemented too slowly. However, air quality management systems could be developed by using advances in real time management algorithms in the industrial production of sensors, with increasing reliability and decreasing prices of sensors.

A further challenge comes from the lack of health care professionals' knowledge (such as paediatricians) about chemicals in the indoor environment. To fill this gap, WHO has prepared an educational tool on the indoor environment for health professionals (available on the WHO website).

Schools and other settings for children are also addressed in the sustainable development agenda to 2030: sustainable development goal 4a is to "build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all". An opportunity to promote healthy schools is provided by the mainstreaming of efforts aimed at the creation of safe learning environments with planning for the sustainable development agenda.

[1] The Ostrava Declaration on Environment and Health, covering these points, was adopted at that Meeting.
[2] An EU-funded project designed to help develop health-based ventilation guidelines for European countries to help protect people in both public buildings (such as schools and nurseries) and private property.

Measures at national and international level to minimize risks for children's health from chemicals in indoor air: next steps

Two working groups discussed further action that could be taken at national level in five priority areas: policy and legislation, monitoring and assessment, education, technical measures and financing mechanisms, and made the following suggestions for action in the short and long term and support necessary for their implementation.

Policies should be developed and *legislation* strengthened on all levels including EU, national and local, as follows:

- a requirement to manage indoor air at local (municipal) level should be included;
- indoor air regulation should be developed/improved at national level, national construction regulations updated, limit values and guidance values for use of material in constructions implemented under the EU Construction Products Regulation, requirements included for planning and building such as choice of location for schools and other settings for children, and procedures established for purchasing building refurbishment materials based on quality rather than price;[3]
- awareness should be raised and (when possible) the development/revision of indoor air regulation should be initiated, including on the EU level;
- an opportunity should be used to mainstream action aimed at creating a safe learning environment with the national sustainable development agenda (where possible).

Countrywide *monitoring* programmes are necessary to collect information for evaluating health risks from indoor pollution. The following types/elements of potential monitoring programmes, for example, could complement each other:

- technical surveillance of new buildings during construction;
- health impact assessments of energy efficiency measures;
- real-time countrywide monitoring of basic parameters of indoor quality (CO_2, humidity, temperature);
- measurements of chemicals with a questionnaire survey (if needed) in selected schools and in health-promoting schools before the start of the school year, with compulsory IAQ check-ups in refurbished schools.

Parents and groups of professionals such as health care and public health professionals, school staff and managers and urban planners and architects should be targeted for *education.*

An integrated children's health programme, involving health care professionals (paediatricians), education professionals (teachers) and curricula for architects and builders could serve as an entry point for the promotion of education and training. The inclusion of IAQ management in certification curricula and accreditation of building professionals could have a positive impact.

[3] In Estonia a draft regulation has been already prepared.

It is envisaged that WHO will propose a basic training/education tool for national public health institutions to use for the education of school staff and managers, local authorities and parents.

Technical measures include the control or prevention of emissions through, for example, the use of cleaning products with low emissions, appropriate labelling of other products and the obligatory installation of mechanical ventilation in synergy with other energy-saving measures.

National *financing* should be secured to support monitoring and awareness campaigns. Other potential sources are environmental taxes redistributed for school IAQ campaigns and the EU-funded projects in the area of IAQ in public settings for children.

Other measures could include:

- stronger collaboration between interest groups and stakeholders (planners, builders, school staff, decision-makers from ministries and administrations), with children in schools involved as part of the educational process;
- the promotion of research to support public health agencies in solving emerging problems (such as odours and high levels of pollution);
- the creation of a public database of publications on emissions levels from construction materials.

The workshops also listed the areas in which WHO could give support:

- recommendations on legislation regulating the indoor environment;
- a tool for assessment of risks of combined exposure to multiple chemicals in indoor air;
- an educational course for health care professionals;
- a workshop to discuss how to communicate the risk to the mass media, personnel in schools and parents when a high risk of indoor air pollution is determined, with relevant recommendations;
- recommendations on the development of IAQ monitoring programmes in schools (chemicals, parameters);
- recommendations on assessing the efficiency of ventilation in various school settings for risk management;
- a platform to share good practice regarding the regulation of IAQ;
- a scientific report on the evidence of health effects and the socioeconomic impact of energy efficiency measures.

Conclusions and recommendations

Chemical pollution of indoor air is a risk factor for children's health. Children are exposed to mixtures of chemicals in indoor air in places where they learn, live and play.

Substantial progress has been made in collecting evidence in the framework of scientific research at EU and national levels (such as SINPHONIE or Healthvent) and minimizing the health risks from indoor pollution through strengthening legislation, improving monitoring and surveillance programmes, and implementing technical measures such as mechanical ventilation. A challenge

remains in translating science into policy and practice and implementing the recommendations resulting from scientific studies; this should be considered a priority in the short-term perspective.

Knowledge about combined exposures and the tools available to assess the risks from such exposures should be applied in the planning of health protection measures at national level.

To ensure that progress is made in minimizing the risks for children's health, a comprehensive approach to planning and implementation measures should be considered in all areas of IAQ management, including:

- the strengthening and enforcement of legislation at local, national and EU levels;
- the development of countrywide monitoring and surveillance programmes;
- the promotion of education of all relevant professionals (medical personnel, builders, local authorities, teachers) and parents;
- the implementation of technical measures, such as mechanical ventilation, as well as voluntary measures (purchase of appropriately labelled products with lower emissions) to reduce emissions from sources;
- technical support such as the development of tools and recommendations for cumulative risk assessment, educational modules, the establishment of monitoring programmes and training in risk assessment and communication.

Annex 1

PROGRAMME

Thursday, 25 May 2017

13:30–14:00 *Session 1. Opening of the meeting*

Ms Jelena Tomasova, Deputy Director, Health Board of Estonia
Ms Marge Reinap, Head of WHO Country Office in Estonia
Ms Irina Zastenskaya, WHO European Centre for Environment and Health

14:00–15:00 *Session 2. Pollution of indoor air by chemicals and children's health: an overview of scientific evidence at international and national level*

Children health and indoor pollution: main outcomes of multi-country projects (Ms Eva Csobod, Regional Environmental Centre for Central and Eastern Europe, Hungary)
National Children's Respiratory Survey (Mr Tamas Pandics, Hungary)
Odour in outdoor and indoor environments (Ms Irena Taraskeviciene, Lithuania)

15:20–16:20 *Session 3. Specific characteristics of indoor air pollution by chemicals and monitoring of indoor air quality*

Review of existing national and international data on indoor environment pollution and EU legislation aimed at minimizing it (Ms Loreta Strumylaite, Lithuania)
Indoor air quality in preschool/schools (Ms Kristina Aidla, Estonia)
Overview of monitoring programmes of indoor air pollution (Mr Eduardo de Oliveira Fernandes, Portugal)

16:20–17:30 *Session 4. Risks of combined exposure to multiple chemicals in the built environment in schools and other public settings for children*

The IPCHEM module on Products and Indoor Air Monitoring Data (Mr Stylianos Kephalopoulos, European Commission)
Assessment of risks of single chemicals and their combinations in indoor air: case study (Ms Irina Zastenskaya)
WHO activities aiming at reduction of risks of indoor environment (Ms Irina Zastenskaya)

Friday, 26 May 2017

09:00–10:00 *Session 5. Challenges of promoting national policies aimed at minimizing risks from indoor air chemical pollution and how to address them*

WHO Training course for paediatricians and public health professionals (Ms Irina Zastenskaya)
Management of indoor air quality (Mr Dainius Martuzevicius, Lithuania)
Plenary discussion facilitated by the co-chairpersons

10:00–12:30 *Session 6. Measures at national and international level to minimize risks for children's health from chemicals in indoor air: next steps*

Discussion in working groups; reporting to plenary; summary of action and request for support

12:30–13:00 Closure of the meeting

Annex 2

PARTICIPANTS

ESTONIA

Jelena Tomasova, Health Board *(Co-Chairperson)*
Leena Albreht, Health Board
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Kristina Aidla, Health Board
Hedi Harzia, Health Board
Jelena Laarin, Health Board
Marje Muusikus, Health Board
Katrin Tamm, Health Board
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Jarek Kurnitski, Tallinn University of Technology

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