

## CHILDPROOFs position on EU air quality policy: Worried parents demand clean air for their children

**CHILDPROOF<sup>1</sup> is an interdisciplinary and informal group of Dutch and Flemish organisations and scientists to protect children's health. Children are not small adults because their physical development is still in full swing and therefore they are particularly vulnerable to the harmful effects of the environment on health. Childproof is of the opinion that measures intervening in society must be adapted to the most vulnerable link in our society, namely children. This vision usually goes hand in hand with the 'design for all' principle: when the weakest link is the benchmark, all other segments of society are also served by this policy. Action to protect children in environmental policy should be prioritised because they have the right to make a healthy start in life. If any, because over 400.000 premature deaths from air pollution in Europe is unacceptable.**

The European Union has named 2013 'the year of air'. According to CHILDPROOF an important potential milestone to translate the worrying findings of research into policy<sup>2</sup>.

**It therefore asks the European Commission to:**

- 1. To define children, and other vulnerable groups, as a main target in the review of EU Air Quality Policy<sup>3</sup>,**
- 2. Set ambitious air quality standards ensuring that children inhale air which is so low in pollution that it is safe to breathe.**

As the European Commission stated at the WHO 5<sup>th</sup> Ministerial Conference on Environment and Health: "A significant proportion of Europeans suffer from health problems linked to environmental conditions. **Vulnerable groups, such as children, pregnant women and socially disadvantaged people are particularly affected. Policy-makers have the responsibility to address this problem.** The European Commission will play its part by continuing to focus attention across European Union policies on environmental impacts on health"<sup>4</sup>

### Air quality and environmental children's health: facts

1) According to the World Health Organisation (WHO), air pollution is a major environmental risk to health. By reducing air pollution levels, we can help reduce the global burden of disease to the respiratory-, cardiovascular-, nervous-, and reproductive system and of cancer<sup>5</sup>.

2) Children are, according to the WHO, at high risk of suffering adverse effects of air pollution owing to their potentially high susceptibility (factors related to their physiology, metabolism, lung growth and development, time-activity patterns, chronic and acute disease)<sup>6</sup>.

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<sup>1</sup> See end of document.

<sup>2</sup> Focus in this position is on outdoor air quality. However, CHILDPROOF is very well aware that indoor air quality requires special attention as well, knowing that children spend about 90% of their time indoors.

<sup>3</sup> WHO is currently coordinating a project, with financial support from the European Commission, to review evidence on the health aspects of air pollution in relation to the review of the EU air policy. The outcome of this work will inform the need to review the air quality policies and/or WHO air quality guidelines, which were last updated in 2005.

<sup>4</sup> European Commissioner for Health and Consumer Policy John Dalli, Parma, March 2010.

<sup>5</sup> Air quality in Europe - report 2011, European Environmental Agency

<sup>6</sup> Health effects of air pollution, results from the WHO project 'systematic review of health aspects of air pollution in Europe, WHO, June 2004 and <http://www.euro.who.int/en/what-we-do/data-and-evidence/health-evidence-network-hen/publications/hen-summaries-of-network-members-reports/what-are-the-effects-of-air-pollution-on-childrens-health-and-development>. See also UCLA Institute for Environment and Sustainability, Air pollution impacts on infants and children <http://www.environment.ucla.edu/reportcard/article.asp?parentid=1700>.

3) At present, particulate matter<sup>7</sup> and ozone are Europe's most problematic pollutants in terms of harm to health with effects ranging from minor respiratory irritation to cardiovascular diseases and premature death. Many EU Member States do not comply with the legally binding EU air quality limit and target concentration values, especially for particulate matter (PM), ground level ozone (O<sub>3</sub>) and also nitrogen dioxide (NO<sub>2</sub>). Current pollution levels clearly have impact on large parts of the urban population. This is particularly evident in the population exposure estimates based on the WHO air quality guidelines, which are more stringent than corresponding standards in the EU legislation<sup>8</sup> because the WHO air quality guidelines are based on health considerations only, and not also on technical and/or economic considerations. However, when assessing the cost/benefit analysis of stricter standards, the gain in health costs and prevented absence of work should weigh equally as increased operating costs of companies.

4) In our region, NO<sub>2</sub> (nitrogen dioxide) and PM (particulate matter) cause the highest impact on our health. The University of Hasselt calculated that on average Belgian citizens lose about 1 year due to the poor air quality. The EEA air quality report 2011 mentions that epidemiological studies have shown that lung function growth is impaired, and symptoms of bronchitis in asthmatic children increase in association with long-term exposure to NO<sub>2</sub>. This report indicates that Belgium, the Netherlands and Luxemburg have the highest average nitrogen oxide emissions (NO<sub>x</sub>) per km<sup>2</sup> in Europe, nearly three times above the European average. This is mainly due to diesel engines.

Belgium and the Netherlands can be characterised as 'PM hotspots'. Due to the high population density, the concentration of PM is relatively high. The Aphekom study shows a decrease to 10 micrograms/cubic metre of long-term exposure to PM<sub>2.5</sub> fine particles (WHO's annual air-quality guideline) could add up to 22 months of life expectancy for persons 30 years of age and older, depending on the city and its average level of PM<sub>2.5</sub>.<sup>9</sup> Hence, exceeding the WHO air-quality guideline on PM<sub>2.5</sub> leads to a burden on mortality of nearly 19,000 deaths per annum, more than 15,000 of which are caused by cardiovascular diseases. Aphekom also determined that the monetary health benefits from complying with the WHO guideline would total some €31.5 billion annually in the cities which were included in the analysis, including savings on health expenditures, absenteeism and intangible costs such as well being, life expectancy and quality of life. Living near busy roads could be responsible for some 15-30% of all new cases of asthma in children; and of chronic obstructive pulmonary disease and coronary heart disease in adults 65 years of age and older. The associated economic burden could total €300 million every year according to the study.

#### Why are children more susceptible to air pollution than adults?

Although the evaluation indicates that numerous issues require further research, it also points to the sound evidence that already exists indicating a causal link between air pollution and children's health. Air pollution affects children as early as the prenatal period<sup>10</sup>, affecting lung

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<sup>7</sup> Id. 5; in 2009 the daily limit value for PM<sub>10</sub> from transport was exceeded at 30% of the traffic sites across EU-27. 80-90% of the EU urban population is exposed to levels of PM<sub>10</sub> which exceeded the more stringent WHO air quality guidelines.

PM consists of very small liquid and solid particles floating in the air and become carriers of chemical substances present in the air.

<sup>8</sup> Id. 5

<sup>9</sup> Aphekom summary report 2008-2011, Improving Knowledge and Communication for Decision Making on Air Pollution and Health in Europe.

<sup>10</sup> See also Maternal Exposure to Particulate Air Pollution and Term Birth Weight: A Multi-Country Evaluation of Effect and Heterogeneity, Centre for Research in Environmental Epidemiology (CREAL) and Municipal Institute of Medical

development and increasing the risk of infant death. Air pollutants at concentrations common in European cities can aggravate respiratory infections, which are a primary cause of morbidity and death in young children. Moreover, traffic-related air pollution affects lung growth rates. These conclusions provide strong arguments for policymakers, legislators, administrators and all citizens to reduce air pollution and prevent its harmful influence on children's health and development.<sup>11</sup> According to UCLA Institute for the Environment and Sustainability there are several biological reasons why young children may be more susceptible to air pollution's effects. Children's lungs, immune system, and brain are immature at birth and continue to rapidly develop until approximately age 6, and the cell layer lining the inside of the respiratory tract is particularly permeable during this age period. Compared to adults, children also have a larger lung surface area in relation to their body weight, and breathe 50% more air per kilogram of body weight. The process of early growth and development is important for the health of the child in general, and therefore may also be a critical time when air pollution exposures can have lasting effects on future health. Additionally, children tend to spend more time outdoors doing strenuous activities, such as playing sports, so they are breathing more outdoor air compared to adults, who spend on average about 90% of their time indoors. Many studies in Southern California and around the world have linked exposure to traffic with various childhood respiratory health outcomes (see Annex 2).<sup>12</sup>

This position paper focuses on children's environmental health but it should be noted that ecosystems also suffer from bad air quality.

#### Children and traffic:

According to the EEA<sup>13</sup> road transport is, next to the energy sector, an important source of pollution particularly in cities and urban areas such as towns, airports and sea ports. Key air pollutants emitted from combustion engines in all modes of transport include NO<sub>x</sub>, PM, CO, and VOCs.<sup>14</sup> The levels of some air pollutants have reduced but some do harm human health. Further, children, sick people and the elderly are more susceptible<sup>15</sup>. Heavy-duty vehicles are an important emitter of NO<sub>x</sub> (nitrogen oxides), while passenger cars are among the top sources of carbon monoxide (CO), NO<sub>x</sub>, PM<sub>2.5</sub> and non-methane volatile organic compounds (NMVOCs).

In contrast to other sources of pollution, traffic emissions occur very close to the places where people live, work, walk and commute. It is for that reason that traffic-related pollutants required particular attention from researchers and policy-makers alike<sup>16</sup>.

Studies show that many environmental and health problems are concentrated in the most deprived areas. Here, a poor environment imposes additional burdens on people of low socio-economic status. This combination, often in addition to a concentration of more vulnerable individuals — children, the elderly and people with an already lower health status — in deprived

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Research (IMIM-Hospital del Mar), Barcelona, Spain; and CIBER Epidemiología y Salud Pública (CIBERESP), Spain, February 2012.

<sup>11</sup> Effects of air pollution on children's health and development, A review of evidence, WHO, Special programme on health and environment, European Centre for environment and Health, 2005.

<sup>12</sup> Id. 6.

<sup>13</sup> The European Environment State and Outlook 2010, Air pollution.

<sup>14</sup> The contribution of transport to air quality TERM 2012: transport indicators tracking progress towards environmental targets in Europe, EEA report 10/2012

<sup>15</sup> WHO, Air Quality Guideline, Global Update 2005.

<sup>16</sup> Air Quality and Health, European Respiratory Society, 2010

areas, leads to poor outcomes and lower life expectancy (RCEP, 2007; Pye et al., 2008). In Germany, children from families of low socio-economic status are more heavily exposed to traffic – 27 % live on busy streets compared to 10 % of children with a high socio-economic status (Seiwert et al., 2009)<sup>17</sup>.

It is therefore recommended that policymakers should focus on traffic related pollutants first to make sure that the health impact of air quality will be reduced. Children in urban areas, especially in disadvantaged areas, suffer most. Nearly 75% of European citizens live in urban areas, and this is expected to be 80% by 2020 with increased air pollution, noise and accidents. According to the European Commission 75% of the traffic is commuter traffic and another increase of 40% is expected by 2030.

#### Launch of concept 'Child standard'

To promote the living environment of children, and other vulnerable groups, the interests of children must be included in present and future policy. This is presently is not done enough! The establishment of child-friendly policy needs to be anchored in strategic objectives within the different policy domains, such as air policy. CHILDPROOF is of the opinion that measures intervening in society must be adapted to the most vulnerable link in our society, including children. This vision usually goes hand in hand with the 'design for all' principle: when the weakest link is the benchmark, all other segments of society are also served by this policy.

CHILDPROOF introduces the 'child standard' as a concept which goes a step further than the goal of implementing child-friendly policy. A certain hierarchy is implied in the child standard; policy that directly or indirectly affects the safety and health of children should be examined more from the perspective of children. Specific policy instruments can be linked to this, so that the impact for children can be examined both before (*ex-ante*) and after policy-making decisions (*ex-post*). This means that the Commission on the implementation of EU Air Quality Policy and the preparation for its comprehensive review<sup>18</sup> should define children, including therefore other vulnerable groups, as a main target. On the other hand, there is also a strong need for concrete standards which ensures that children breath air safe for their health. Future policy<sup>19</sup> should include the specific vulnerability of certain groups based on the latest scientific knowledge which shows that vulnerable groups suffer more from health effects of air pollution.

#### Air quality standards

Exposure to air pollutants is largely beyond the control of individuals and requires action by public authorities at the national, regional and even international levels<sup>20</sup>. The current EU air legislation does not follow the guidelines developed by the WHO in 2005. These WHO guidelines are neither standards nor legally binding criteria, but were designed to offer guidance to policy-makers in reducing the *health* impacts of air pollution based on expert evaluation and current scientific evidence<sup>21</sup>. The Commission's proposal for the 7<sup>th</sup> Environmental Action Programme

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<sup>17</sup> The European environment State and Outlook 2010, Urban Environment

<sup>18</sup> European staff working paper On the implementation of EU Air Quality Policy and preparing for its comprehensive review, Brussels, 14.03.2011 SEC(2011) 342 final.

<sup>19</sup> Air quality in Europe, EEA report 4/2012. Due to the complex links between emissions and air quality, (explained later in this report) emission reductions do not always produce a corresponding drop in atmospheric concentrations, especially for PM and O<sub>3</sub>. For example, while reductions of O<sub>3</sub> forming substances (O<sub>3</sub> precursor gases) have been substantial in Europe, O<sub>3</sub> concentrations in Europe have remained stable. As a result, improving understanding of air pollution and developing and implementing effective policy to reduce it, remains a challenge and a priority.

<sup>20</sup> <http://www.who.int/mediacentre/factsheets/fs313/en/index.html>

<sup>21</sup> Id. 9, p 55.

states that 'a substantial portion of the EU's population remains exposed to levels of air pollution exceeding WHO recommended standards. Action is especially needed in areas where people, particularly sensitive or vulnerable groups of society, and ecosystems are exposed to high levels of pollutants, such as in cities or in buildings'. When looking at health aspects, the economic aspect should also be taken into consideration: the external costs should be internalised to have a balanced picture of the effects air pollution has on the society as a whole in the long run.

The WHO Air Quality Guidelines are more stringent compared to the current air quality standards of the European Union<sup>22</sup> when it comes to PM and ozone, which are indicated as two mayor pollutants. The WHO Guidelines states that as 'no threshold for PM has been identified below which no damage to health is observed, the recommended value should represent an acceptable and achievable objective to minimize health effects in the context of local constraints, capabilities and public health priorities'. The WHO report says that 'since a wide variety of vulnerable population groups exists, it is up to decision-makers to evaluate the evidence and decide who should be protected by air quality standards. *Special consideration should be given to determining appropriate levels in order to protect these vulnerable groups.* This may be done by evaluating studies that have specifically looked at the response of such populations to pollutant exposures, or through a conservative review and interpretation of the evidence to ensure adequate protection of vulnerable populations.' The '05 report recommends that 'areas of future research are likely to include pregnancy and pregnancy outcomes such as birth weight and prematurity.' This latest scientific evidence exists now and should be reflected in the updated EU air policy.

The European Commission is preparing the revision of the air quality legislation in 2013. According to the 7<sup>th</sup> EAP air pollution remains one of the public's top environmental concerns. EU citizens recently confirmed this.<sup>23</sup>

The WHO is also revising its guidelines to provide the Commission advice on its review. On 31/1/2013 the first results of the research<sup>24</sup> were published and WHO calls on the EU for stronger air policies. The report recommends, following newly found health effects, a modification of the EU PM 2,5 standard as the current EU limit is twice as high as the WHO one. A revision of several air quality guidelines (AQG) is also recommended, such as one for PM by 2015, one for long term average ozone concentration and the development of a new AQG for NO<sub>2</sub>.

## **CONCLUSION**

Air pollution affects children as early as the prenatal period, affecting lung development and increasing the risk of infant death. Air pollutants at concentrations common in European cities can aggravate respiratory infections, which are a primary cause of morbidity and death in young children. The European Commission estimates over 400.000 premature deaths per year in Europe. Moreover, traffic-related air pollution affects lung growth rates. These conclusions provide strong arguments for policymakers, legislators, administrators and all citizens to reduce air pollution and prevent its harmful influence on children's health and development. The child standard needs to be anchored in strategic objectives of air policy. Measures intervening in society must be adapted to the most vulnerable link in our society, including children. This vision

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<sup>22</sup> EU Air Quality Standards: <http://ec.europa.eu/environment/air/quality/standards.htm>; WHO Air Quality Guidelines [http://www.who.int/phe/health\\_topics/outdoorair\\_aqg/en/](http://www.who.int/phe/health_topics/outdoorair_aqg/en/)

<sup>23</sup> Eurobarometer 360, Attitudes of Europeans towards air quality

<sup>24</sup> Review of evidence on health aspects of air pollution - REVIHAAP; first results, WHO - regional office for Europe, 2013

usually goes hand in hand with the 'design for all' principle: when the weakest link is the benchmark, all other segments of society are also served by this policy.

**CHILDPROOF calls on the European institutions with the revision of the air quality policy to act according the following guiding principles:**

- **To define children, and other vulnerable groups, as a main target in the review of EU Air Quality Policy,**
- **Set ambitious air quality standards ensuring that children inhale air which is so low in pollution that it is safe to breathe.**

**Specific measures:**

- Develop an indicator for children suffering from respiratory diseases<sup>25</sup>. To achieve this, data need to be available. For Belgium, so far no official data of patients with respiratory diseases exist.
- The external costs should be internalised to have a balanced picture of the effects air pollution has on the society as a whole in the longer term. The gain in health costs and prevented absence of work and damage to ecosystems, should weigh equally as increased operating costs of companies.
- Air Quality Plans: the air quality directives in force require that air quality plans are developed as an additional policy instrument and implemented in air quality management zones and agglomerations where ambient concentrations of pollutants exceed the relevant air quality limit or target values. The air quality plans may additionally include specific measures aiming to protect sensitive population groups, including children.
- Socio-economic: have special attention for children living in deprived urban areas.
- Planning: Structure plans should ensure that playgrounds, kindergartens, schools, sport facilities and other places where children may stay for an extended period of time are not planned next to zones exceeding air quality standards, i.e. heavy traffic areas.
- Transport: develop a transport transition plan prioritising:
  - ✓ clean electric or hybrid public transport, especially for commuters;
  - ✓ promote and facilitate walking/cycling for shorter distances, with special attention for road safety;
  - ✓ low emission zones and green zones in cities;
  - ✓ reduction of speed limits.

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<sup>25</sup> Making a difference: indicators to improve children's environmental health, WHO, 2003. Here, attention is given to both outdoor and indoor air quality.

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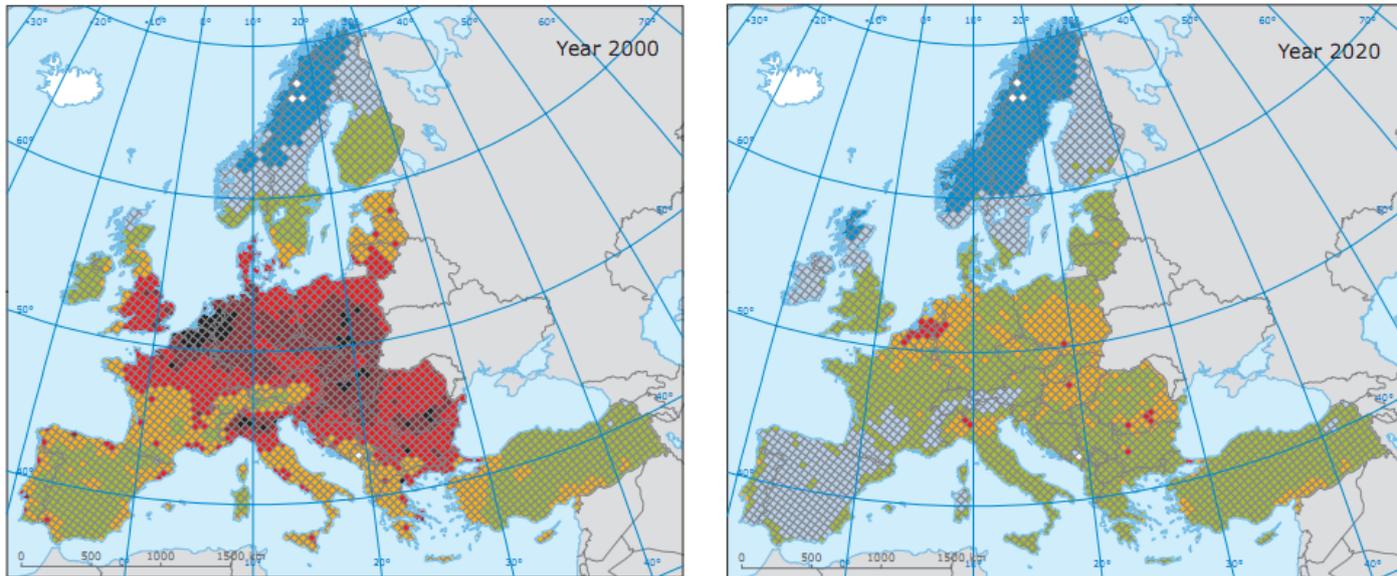
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**Annex 1:**

**Map 3.1**      **Loss of average statistical life expectancy (months) attributable to the exposure to fine particulate matter (PM<sub>2.5</sub>) in 2000 (left) and for the optimised \* scenario in 2020 (right)**



**Estimated loss of statistical life expectancy attributable to the exposure of fine particulate matter (PM<sub>2.5</sub>) in the year 2000 (left) and for the optimised scenario in 2020 (right)**

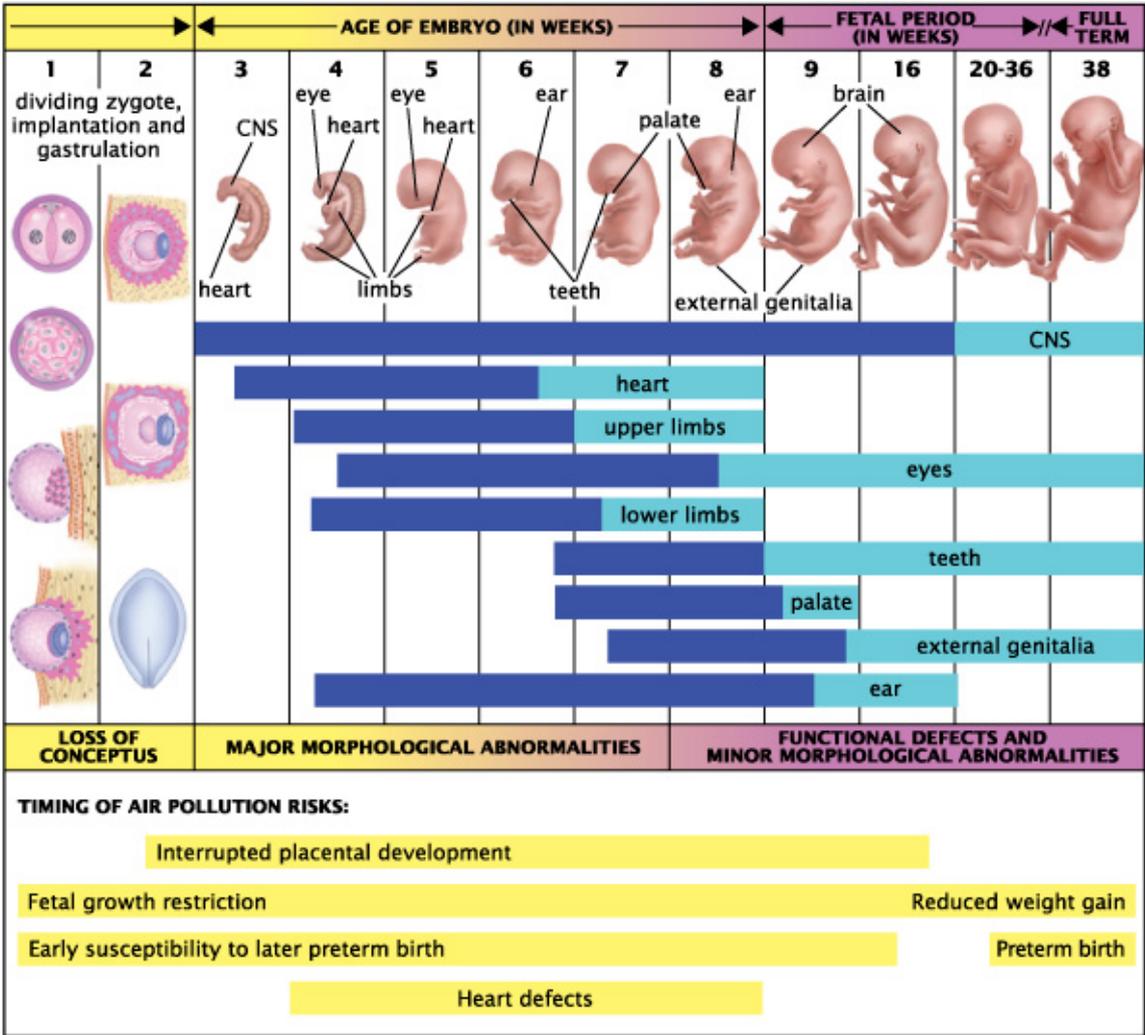
Months



**Note:** \* 'Optimised' refers to the scenario run carried out to assess cost-effective emission reductions that achieve the environmental objectives set in the TSAP. Only PM<sub>2.5</sub> pollution from anthropogenic sources is considered. The highest values were estimated for single grid cells in Hungary (up to 18 months), northern Italy (up to 17 months), Belgium, the Netherlands and in the German Ruhr area (up to 16 months) in 2000. For the 2020 scenario the four highest country averages (EU-27) were calculated for Belgium (6.6 months), Hungary and Poland (5.2 months) and Romania (4.9 months) (IIASA, 2010a).

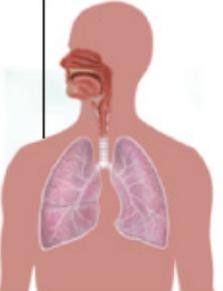
**Source:** IIASA, 2010b (based on IIASA, 2010a).

Annex 2: UCLA Institute for the environment and sustainability, Air pollution impacts on infants and children, Report card fall 2008, <http://www.environment.ucla.edu/reportcard/article.asp?parentid=1700>



Note: Blue bars indicate time periods when major morphological abnormalities can occur, while light blue bars correspond to periods at risk for minor abnormalities and functional defects.

Figure 1. Fetal development and timing of air pollution risks.

Stage: Age:	Newborn 0-2 mos	Infant/Toddler 2 mos-2 yrs	Young Child 2-6 yrs	School-Age Child 6-12 yrs	Adolescent 12-18 yrs
Lung development:					
	Alveolar development				
	High respiratory rate				
Air pollution risks:			Increasing lung volume		
	Respiratory death				
			Chronic cough and bronchitis		
			Reduced lung function		
			Wheezing and asthma attacks		
		Respiratory symptoms and illnesses*		Respiratory-related school absences	

\*Air pollution exposure has also been more recently linked to respiratory symptoms and illnesses in early life including cough, bronchitis, wheeze and ear infections

Figure 2. Air pollution effects on the developing respiratory system.